

# Installation Manual

## Transfer Switch

40-1000 Amps

OTECA (Spec A)

OTECB (Spec A)

OTECC (Spec A)

OTECD (Spec A)



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# Safety Precautions

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This manual includes the following symbols to indicate potentially dangerous conditions. Read the manual carefully and know when these conditions exist. Then take the necessary steps to protect personnel and the equipment.

## DANGER

*This symbol warns of immediate hazards that will result in severe personal injury or death.*

## WARNING

*This symbol refers to a hazard or unsafe practice that can result in severe personal injury or death.*

## CAUTION

*This symbol refers to a hazard or unsafe practice that can result in personal injury or product or property damage.*

### **ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH**

High voltage in transfer switch components presents serious shock hazards that can result in severe personal injury or death. Read and follow these suggestions.

Due to the serious shock hazard from high voltages within the cabinet, all service and adjustments to the transfer switch must be performed only by an electrician or authorized service representative.

### **UTILITY-TO-GENSET APPLICATIONS**

1. Move the operation selector switch on the generator set to Stop.
2. Disconnect the battery charger.
3. Disconnect the starting batteries of the generator set or sets (remove the ground [-] lead first).
4. Remove AC power to the automatic transfer switch. If the instructions require otherwise, use extreme caution due to the danger of shock hazard.

### **GENERAL PRECAUTIONS**

Place rubber insulative mats on dry wood platforms over metal or concrete floors when working on any electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surfaces to be damp when handling any electrical equipment.

Jewelry is a good conductor of electricity and should be removed when working on the electrical equipment.

Wear safety glasses whenever servicing the transfer switch and do not smoke near the batteries.

Do not work on this equipment when mentally or physically fatigued, or after consuming alcohol or any drug that makes the operation of equipment unsafe.

## WARNING

***INCORRECT SERVICE OR REPLACEMENT OF PARTS CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR EQUIPMENT DAMAGE. SERVICE PERSONNEL MUST BE QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE.***

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# 1 Introduction

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## 1.1 Installation Manual

This manual covers models produced under the Cummins®/Onan® and Cummins Inc. brand names.

This manual provides information necessary for the installation of all product models and specs provided on the cover of this manual.

## 1.2 Transfer Switch Application

Transfer switches are an essential part of a building's standby or emergency power system. The utility line (normal power), is backed up by a generator set (emergency power). The transfer switch automatically switches the electrical load from one source to the other.

The load is connected to the common of the ATS ([Figure 1](#)). Under normal conditions, the load is supplied with power from the utility (as illustrated). If utility power is interrupted, the load is transferred to the generator set (genset). When utility power returns, the load is retransferred to the utility. The transfer and retransfer of the load are the two most basic functions of a transfer switch.

## 1.3 Transfer Switch Function

Automatic transfer switches, capable of automatic operation without operator intervention, perform the basic function of transferring the load to the available power source. The controller monitors each source for allowable voltage and frequency range.

This automatic transfer switch, capable of automatic operation without operator intervention, is designed for utility-to-genset applications. In utility-to-genset applications, the transfer switch performs the following functions:

1. Senses the interruption of utility power.
2. Sends a start signal to the genset.
3. Transfers the load to the genset.
4. Senses the return of utility power.
5. Retransfers the load to the utility.
6. Sends a stop signal to the genset.

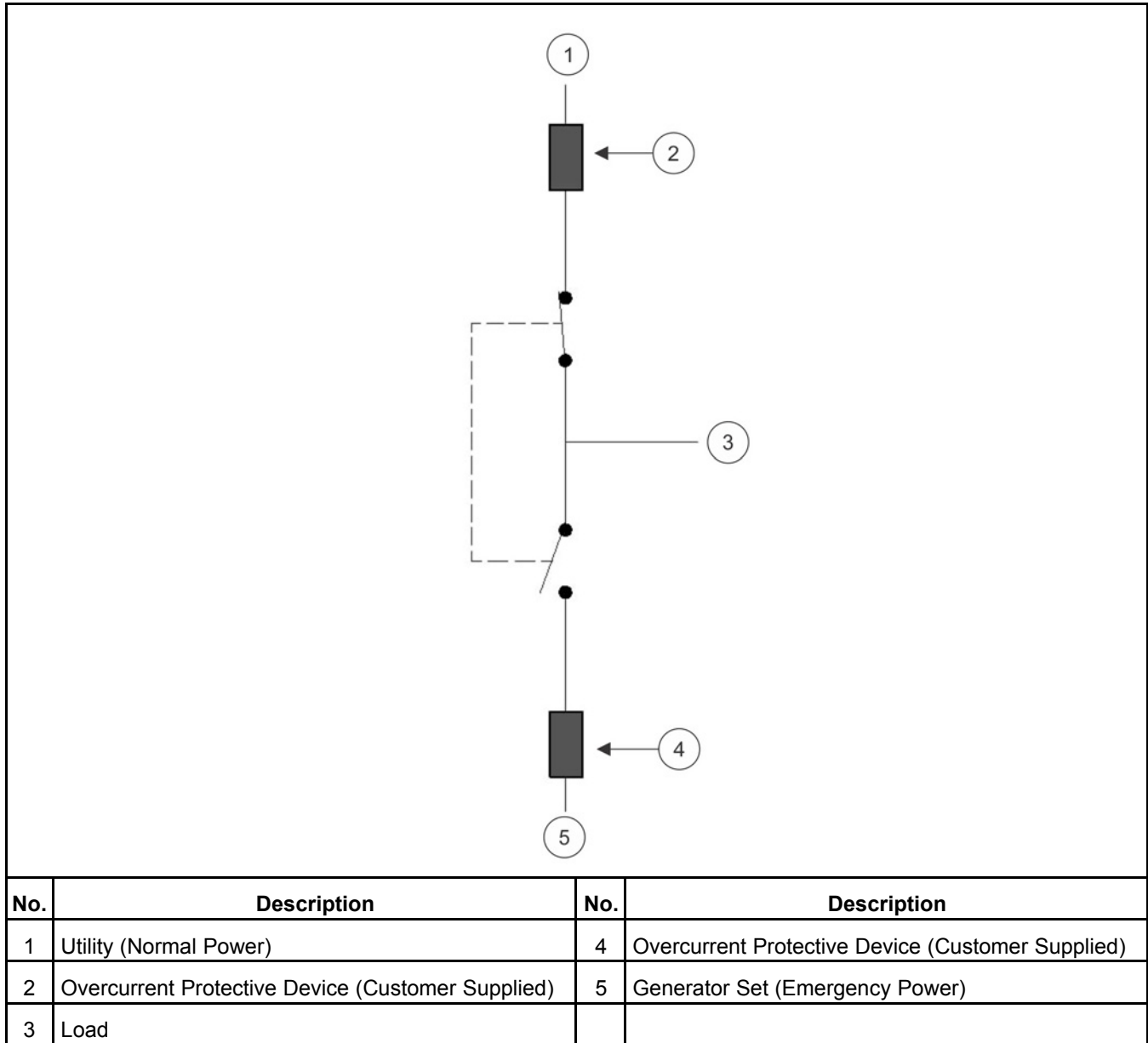


FIGURE 1. LOAD TRANSFER SWITCH (TYPICAL FUNCTION)

## 1.4 Installation Overview

These installation recommendations apply to typical installations. Whenever possible, these recommendations also cover factory designed options or modifications. However, because of the many variables in any installation, it is not possible to provide specific recommendations for every situation. If there are any questions not answered by this manual, contact your nearest Cummins distributor for assistance.

### 1.4.1 Application and Installation

Installations must be carefully planned and correctly installed for proper operation.

This involves two essential elements:

**Application** refers to the design of the complete standby power system that usually includes:

- power distribution equipment
- transfer switches
- ventilation equipment
- mounting pads
- cooling systems
- exhaust systems
- fuel systems

Each component must be correctly designed so the complete system functions as intended. Application and design is an engineering function generally done by specifying engineers or other trained specialists. Engineers are responsible for the design of the complete standby system and for selecting the materials and products required.

**Installation** refers to the actual set-up and assembly of the standby power system. The installers set up and connect the various components of the system as specified in the system design plan.

The complexity of the standby system normally requires the special skills of qualified electricians, plumbers, sheet metal workers, etc. to complete the various segments of the installation. This is necessary so all components are assembled using standard methods and practices.

## 1.4.2 Safety Considerations

The transfer switch has been carefully designed to provide safe and efficient service when properly installed, maintained, and operated. However, the overall safety and reliability of the complete system depends on many factors outside the control of the manufacturer. To avoid possible safety hazards, make all mechanical and electrical connections to the transfer switch exactly as specified in this manual. All systems external to the transfer switch must comply with all applicable codes. Make certain all required inspections and tests have been completed and all code requirements have been satisfied before certifying the installation is complete and ready for service.

Verify that both power source voltages match the nameplate rating prior to installation.

## 1.5 Model Identification

If the transfer switch ever needs to be serviced, the distributor will need this information in order to properly identify your unit from the many types manufactured:

- Model No. (Product Model)
- Serial No. (Product Serial Number)
- Spec. (Product Specification Letter)

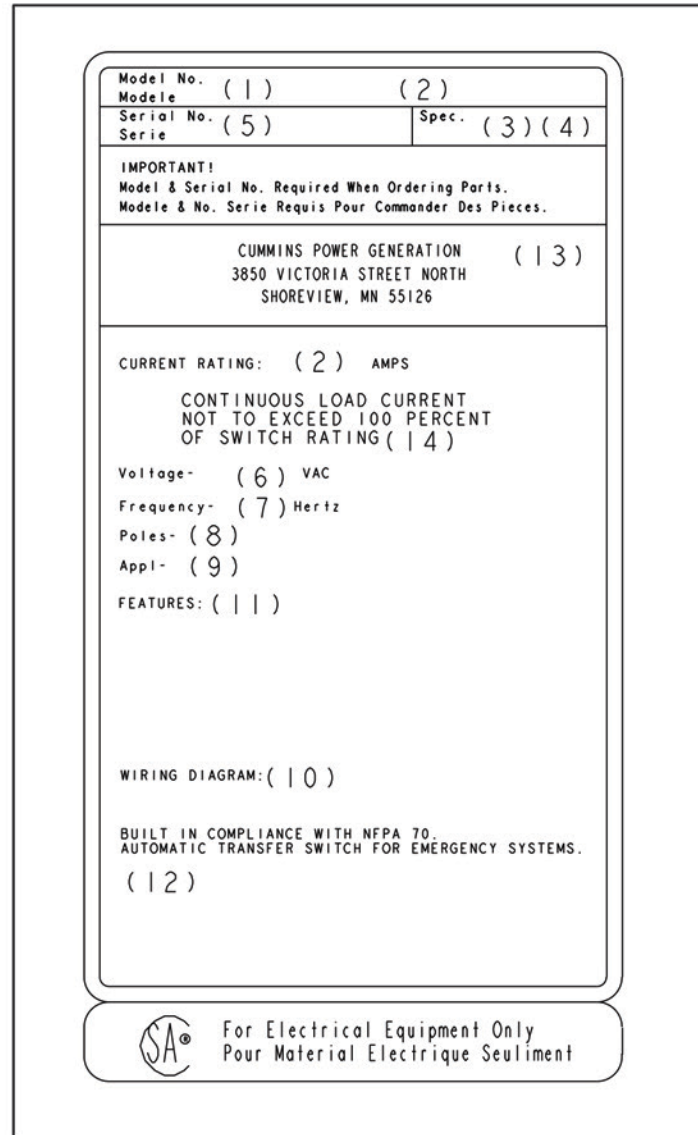


FIGURE 2. CONTROL NAMEPLATE

## 1.6 How to Obtain Service

When a product requires servicing, contact the nearest Cummins distributor. To locate the distributor, refer to [www.cummins.com/support](http://www.cummins.com/support) and select Distributor Locator. When contacting the distributor, always supply the complete model, specification, and serial number as shown on the nameplate.

### In the U.S. and Canada

To easily locate the nearest certified distributor/dealer for Cummins generator sets in your area, or for more information, contact us at 1-800-CUMMINS™ (1-800-286-6467) or visit [www.cummins.com/support](http://www.cummins.com/support).

If unable to contact a distributor using the automated service, consult the Internet.

If unable to arrange a service or resolve an issue, contact the Service Manager at the nearest Cummins distributor for assistance.

When contacting the distributor, always supply the complete Model, Specification, and Serial Number as shown on the product nameplate.

**Outside the U.S. and Canada**

Refer to [www.cummins.com/support](http://www.cummins.com/support) and select Distributor Locator, or send an email to [ask.powergen@cummins.com](mailto:ask.powergen@cummins.com).

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# 2 Mounting

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## 2.1 Location Requirements

- Location in the existing electrical circuit varies with the application and the type of switch.
- Location and wiring must comply with the contract drawings.
- There must be a service disconnect in the commercial power line ahead of the transfer switch.
- Choose a vibration-free mounting surface that supports the weight of the switch.
- Avoid locations that are near flammable liquids or gases, or are hot, moist, or dusty.

**⚠ WARNING**

***An electrical arc occurs during transfer that can ignite a flammable atmosphere, resulting in severe personal injury or death. The switch must not be located near batteries, fuel tanks, solvents, or other sources of flammable liquids or gases, or in areas sharing ventilation with such sources.***

## 2.2 Wall Mounting

1. Check the location to be sure that no wires or plumbing, gas, or exhaust lines run behind the wall.
2. Install two mounting bolts in the wall for the top cabinet mounting keyholes.
3. With the shipping box standing so the cabinet is upright, carefully remove the top and sides of the box.
4. Raise the cabinet and mount it on the two mounting bolts in the wall.

**⚠ WARNING**

***Improper lifting can cause severe personal injury. Have sufficient manpower for lifting and mounting the cabinet.***

5. Install two bottom mounting bolts, but do not tighten. (Do not remove the cabinet support until all bolts are installed.)
6. Push the cabinet against the wall. If the cabinet does not align flush against the wall, shim the mounting bosses as required.
7. Tighten all mounting bolts.

## 2.3 Seismically Certified Installations

Seismically certified transfer switch installations (feature code A080-7) have special requirements, as defined by IAA-VMC (Independent Approval Agency, the VMC Group).

1. The design of post-installed anchors in concrete used for the component anchorage; is prequalified for seismic applications in accordance with AC1 355.2 and documented in a report by a reputable testing agency (for example, the Evaluation Service Report issued by the international Code Council).

2. Anchors must be installed to an embedment depth, as recommended in the prequalification test report defined in Note 1. For IBC 2000 and IBC 2003 applications, the minimum embedment must be 8 times the anchor diameter.
3. Anchors must be installed in a minimum of 4000 PSI compressive strength normal weight concrete. Concrete aggregate must comply with ASTM C33. Installation in structural lightweight concrete is not permitted unless otherwise approved by the structural engineer of record.
4. Anchors must be installed to the maximum torque specification, as recommended by the anchor manufacturer.
5. Anchors must be installed in the locations specified on the Installation Outline Drawings or on Seismic Requirements Installation Drawing 0179-5288.
6. Wide washers must be installed at each anchor location between the anchor head and the equipment for tension load distribution. Wide steel washers must be Series W of American National Standard Type A plain washers (low carbon steel washers), ANSI B18.22.1- 1965, R1975, with the washer sizes specified on drawing 0179-5288 (Switch Installation; Seismic Requirements, sheet 2 of 3).
7. Concrete floor slab and concrete housekeeping pads must be designed and rebar-reinforced for seismic applications, in accordance with ACI 318.
8. All housekeeping pad thicknesses must be designed in accordance with the prequalification test report, as defined in Note 1 or a minimum of 1.5 times the anchor embedment depth, whichever is largest.
9. All housekeeping pads must be dowelled or cast into the building structural floor slab and designed for seismic application, as per ACI 318 and as approved by the structural engineer of record.
10. Wall mounting equipment must be installed to a rebar-reinforced structural concrete wall that is seismically designed and approved by the engineer of record to resist the added seismic loads from components being anchored to the wall.
11. Floor mounted equipment (with or without a housekeeping pad) must be installed to a rebar-reinforced structural concrete floor that is seismically designed and approved by the engineer of record to resist the added seismic loads from components being anchored to the floor.
12. When installing to a floor or wall, rebar interference must be considered.
13. Attaching seismic certified equipment to any floor or wall, other than those constructed of structural concrete and designed to accept the seismic loads from said equipment, is not permitted by this specification.
14. Attaching seismic certified equipment to any floor constructed of light weight concrete over steel decking is not permitted by this specification.
15. Attaching seismic certified equipment to any concrete block walls or cinder block walls is not permitted by this specification.

**For special switch installation requirements, see written and tabulated seismic requirements listed on drawing 0179-5288.**

The installation of the seismically certified switch should be overseen by the installation project structural engineer of record.

The Site Specific Requirements listed on page one of the "Seismic Certificate of Compliance" should be filled out by the installation project structural engineer of record.

Drawing 0179-5288 and the Seismic Certificate of Compliance for transfer switch and seismic installation requirements are included in the literature package of each seismically certified switch with feature code A080-7.

# 3 Wiring

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## WARNING

***AC voltages and currents present an electrical shock hazard that can cause severe personal injury or death. Only trained and experienced personnel are to perform the following procedures.***

When installing conduit, observe the following precautions:

1. **Before beginning conduit installation, cover the transfer switch to prevent accidental entry of metal chips.**
2. If using rigid conduit between the generator set and the transfer switch, install at least 2 feet (610 mm) of flexible conduit between the rigid conduit and generator set to absorb vibration.
3. Run control circuit wiring in separate conduit from the AC wiring; otherwise, induced currents could cause operational problems within the switch.

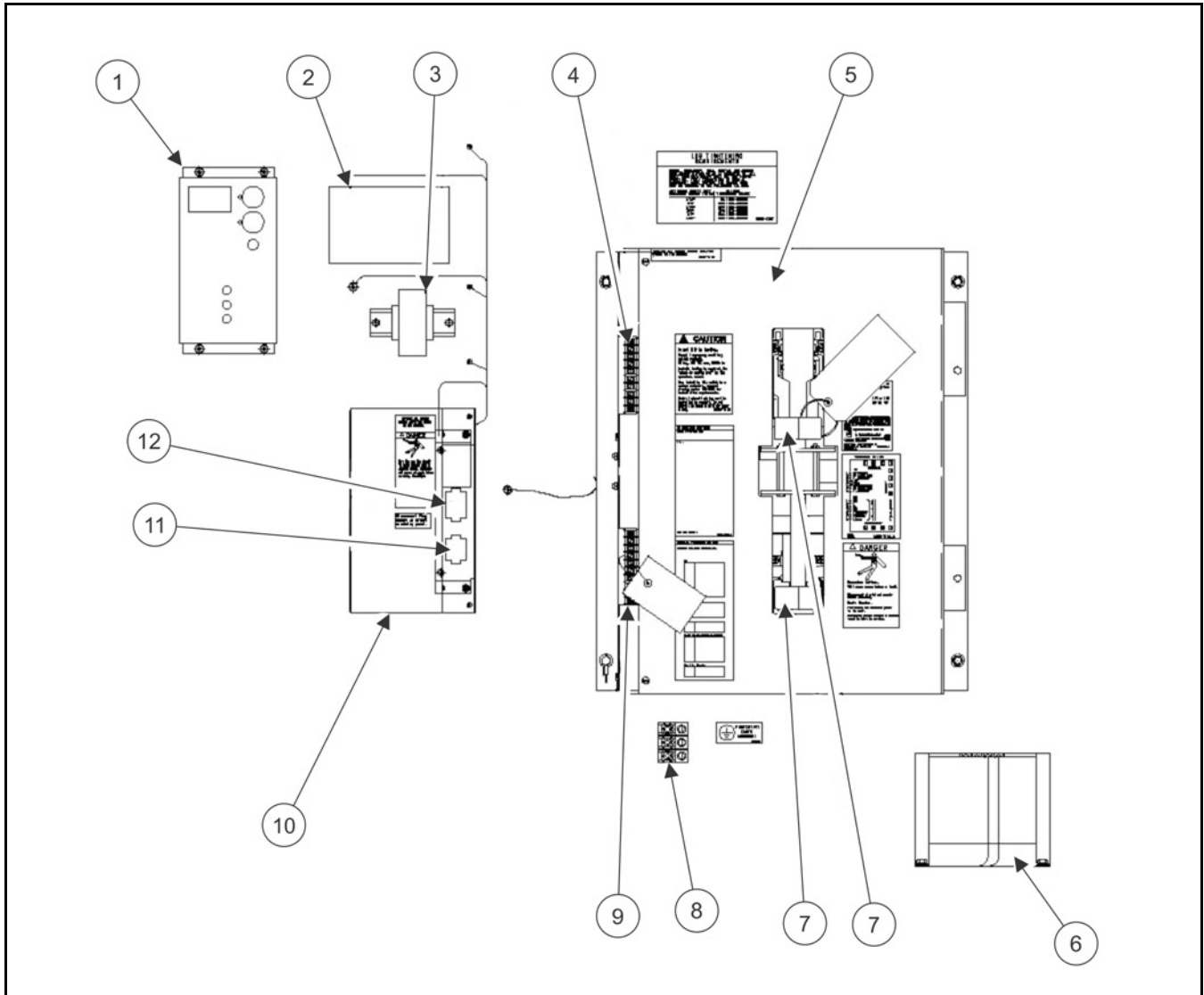
## NOTICE

**Regarding step 4 below, this is a recommendation only and does not overrule local codes and standards.**

4. In the case of underground cabling, where there are chances of moisture entering the ATS cabinet, follow the below procedure for sealing the conduit entrances into the ATS cabinet:
  - a. After cable installation is complete, use Duct Seal to seal the entrance of the conduit into the ATS cabinet.
  - b. Push the Duct Seal compound around the cables, and make sure there are no gaps.

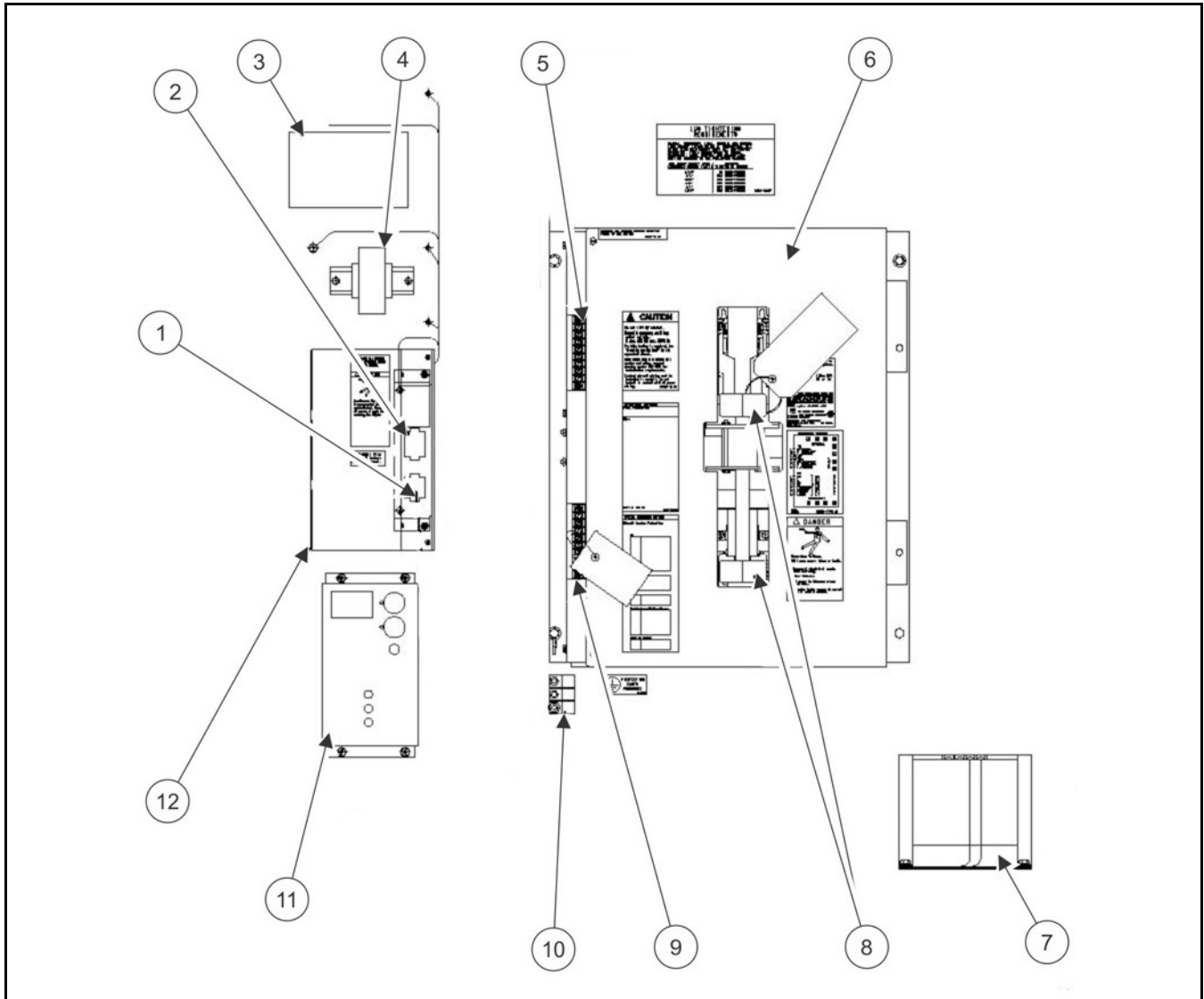
## CAUTION

***Installation debris can cause equipment failure and damage. Use extreme care to keep drill chips and filings out of the relays, contacts, and other parts of the automatic transfer switch when mounting or connecting conduit. Screwdrivers should be used carefully to prevent damage to components.***



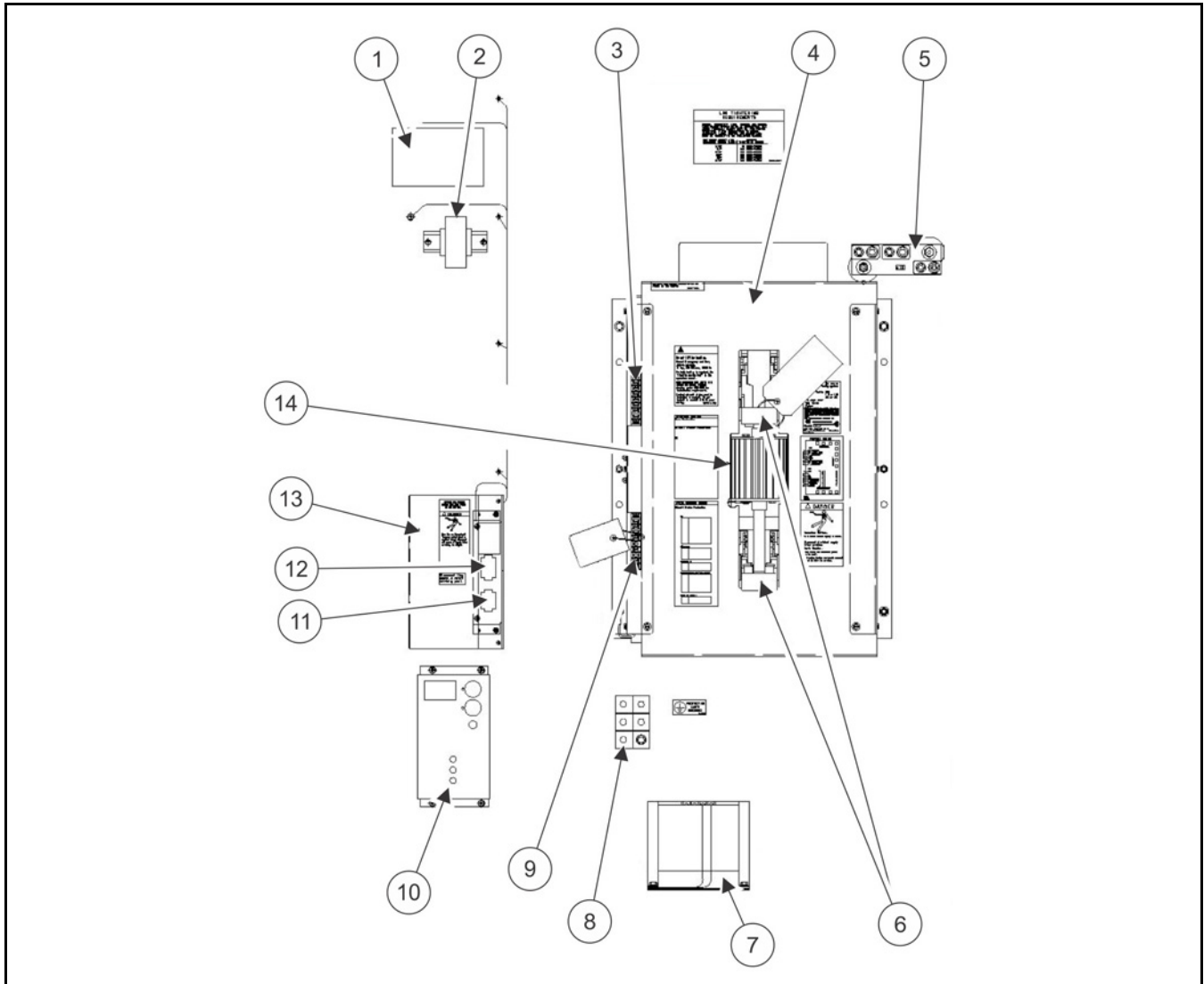
| No. | Description                             | No. | Description             |
|-----|---|-----|-------------------------|
| 1   | Optional Battery Charger                | 7   | Transfer Switch Handles |
| 2   | Control Panel                           | 8   | Ground Lugs             |
| 3   | Optional External Exercise Clock        | 9   | TB2                     |
| 4   | TB1                                     | 10  | Relay Assembly          |
| 5   | Automatic Transfer Switch               | 11  | J2                      |
| 6   | Power Transformer (600 Volt Units Only) | 12  | J1                      |

**FIGURE 3. COMPONENTS: 40, 70, 125 AMP (4-POLE) SWITCH**



| No. | Description                      | No. | Description                             |
|-----|----------------------------------|-----|---|
| 1   | J2                               | 7   | Power Transformer (600 Volt Units Only) |
| 2   | J1                               | 8   | Transfer Switch Handles                 |
| 3   | Control Panel                    | 9   | TB2                                     |
| 4   | Optional External Exercise Clock | 10  | Ground Lugs                             |
| 5   | TB1                              | 11  | Optional Battery Charger                |
| 6   | Automatic Transfer Switch        | 12  | Relay Assembly                          |

**FIGURE 4. COMPONENTS: 260 AMP SWITCH**



| No. | Description                             | No. | Description              |
|-----|---|-----|--------------------------|
| 1   | Control Panel                           | 8   | Ground Lugs              |
| 2   | Optional External Exercise Clock        | 9   | TB2                      |
| 3   | TB1                                     | 10  | Optional Battery Charger |
| 4   | Automatic Transfer Switch               | 11  | J2                       |
| 5   | Neutral Bus Bar                         | 12  | J1                       |
| 6   | Transfer Switch Handles                 | 13  | Relay Assembly           |
| 7   | Power Transformer (600 Volt Units Only) | 14  | Linear Actuator          |

**FIGURE 5. COMPONENTS: 300-600 AMP SWITCH (800-1000 AMP SIMILAR)**

## 3.1 AC Connections

TABLE 1. TERMINAL LUG CAPACITY FOR COPPER OR ALUMINUM CONDUCTORS

| Switch Current Rating             | Wires per Phase | Size Range of Wires                            |
|-----------------------------------|-----------------|--|
| 40/70/125 (3-Pole) Source         | 1               | 12 AWG-2/0 Cu-Al                               |
| 40/70/125 (3-Pole) Load & Neutral | 1               | 14 AWG-2/0 Cu-Al                               |
| 40 Amp (4-Pole)                   | 1               | 14 AWG-2/0 Cu-Al                               |
| 70, 125 Amp (4-Pole)              | 1               | 6 AWG-300 MCM Cu-Al                            |
| 150/225                           | 1               | 6 AWG-300 MCM Cu-Al                            |
| 260                               | 1               | 6 AWG-400 MCM Cu-Al                            |
| 300/400                           | 2<br>1          | 3/0 AWG-250 MCM Cu-Al<br>3/0 AWG-600 MCM Cu-Al |
| 600                               | 2               | 250-500 MCM Cu-Al                              |
| 800/1000                          | 4               | 250-500 MCM Cu-Al                              |

Perform wiring in the following sequence:

1. Test the operation of the generator set from its own controls.
2. Stop the generator set and remove the negative lead from the cranking battery to prevent starting.

**⚠ WARNING**

***Failure to prevent the generator set from starting before wiring procedures are performed presents a shock hazard that can cause severe personal injury or death. Disconnect generator set battery (negative (-) terminal first) before proceeding.***

3. Connect conductors of sufficient size (see contract drawings) to carry rated current from the line, load, and generator set directly to the transfer switch terminals, which are marked A, B, and C (A, B, C, and N on 4-pole switches). A neutral bar with lugs is standard on 3-pole switches. Phase rotation must be the same on the utility and genset power sources.
4. On 120-volt switches, connect the hot side to the (A) lug and the neutral side to the Neutral lug. On 240-volt single phase switches, connect the two hot lines to the A- and C-lugs and the Neutral line to the Neutral lug.
5. Connect power cables to the load terminals. Tighten the lugs as indicated in the following table:

TABLE 2. LUG TORQUES

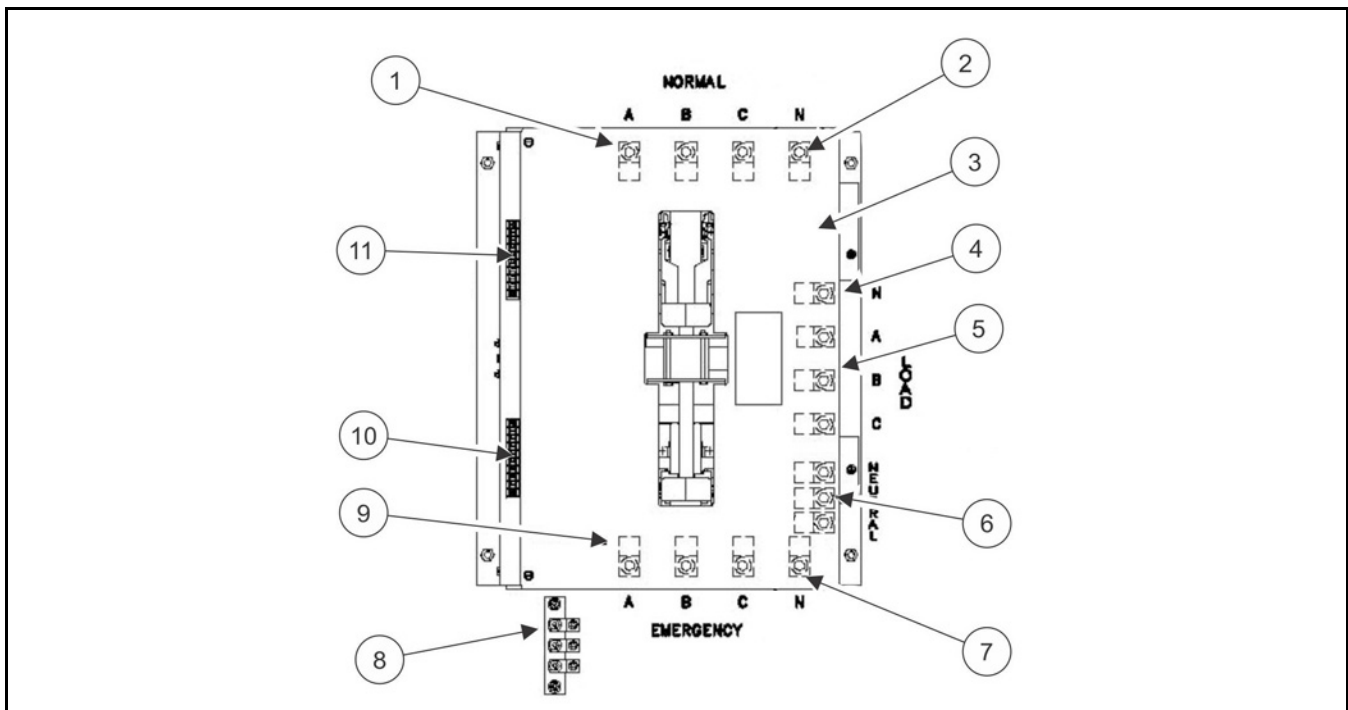
| Set Screw Socket Size (Across Flats) | Minimum Torque For Proper Operation |
|--------------------------------------|-------------------------------------|
| 3/16 In                              | 80 In-lbs (9 N•m)                   |
| 1/4 In                               | 200 In-lbs (23 N•m)                 |
| 5/16 In                              | 275 In-lbs (31 N•m)                 |
| 3/8 In                               | 375 In-lbs (43 N•m)                 |
| 1/2 In                               | 500 In-lbs (57 N•m)                 |

|   |  |
|---|--|
| <b>Set Screw Socket Size (Across Flats)</b> | <b>Minimum Torque For Proper Operation</b> |
| 9/16 In                                     | 600 In-lbs (68 N•m)                        |

**⚠ WARNING**

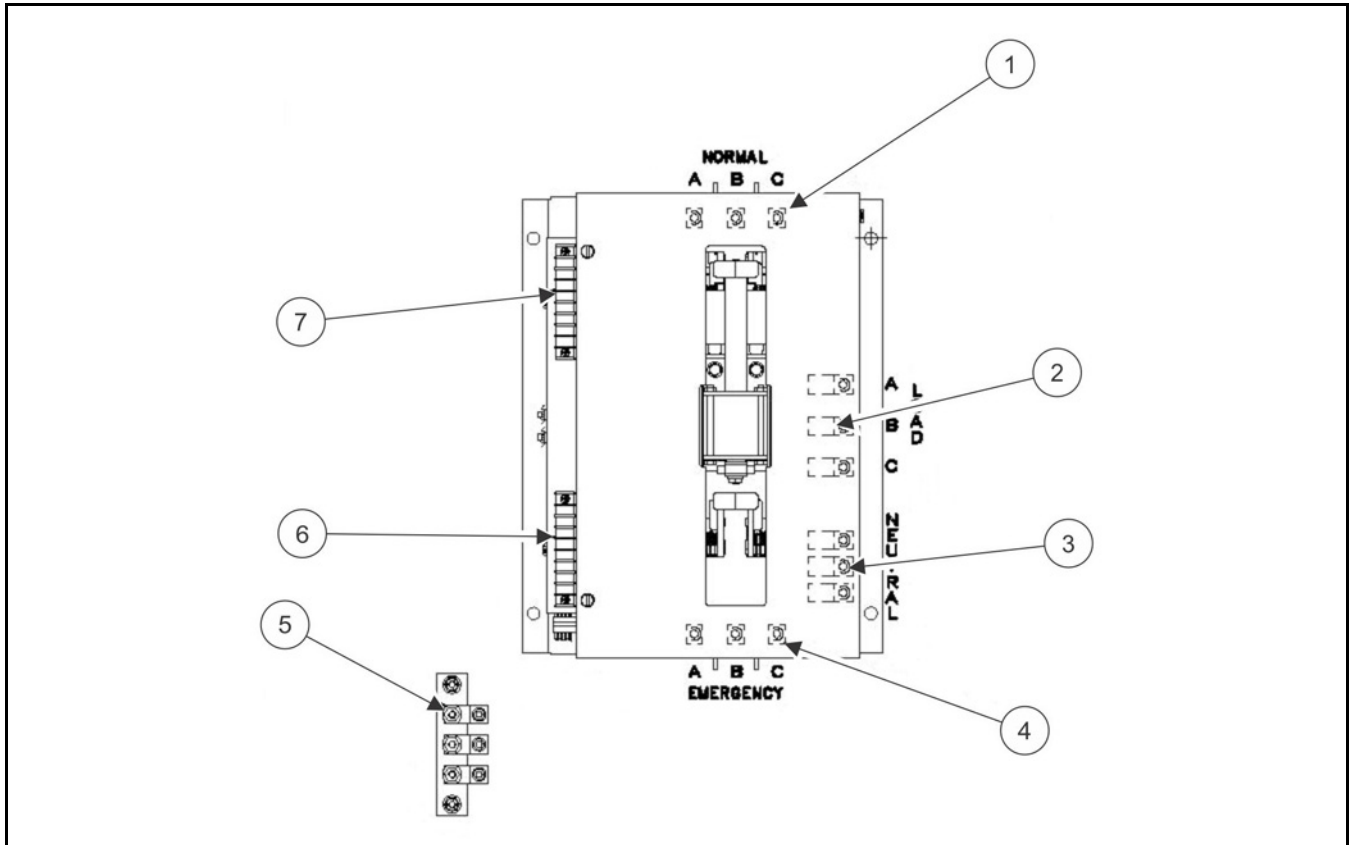
***AC voltages and currents present an electrical shock hazard that can cause severe personal injury or death. Make sure that both AC power sources are disconnected.***

6. Make sure that both AC power sources are disconnected.
7. For 800-1000 amp transfer switches used on a circuit capable of delivering 50,000 amps @ 600 volts, wrap the line cables together with nominal 1/2-inch nylon rope, or rope having a minimum tensile strength of 4200 pounds, at five inches from the line terminals with four wraps.



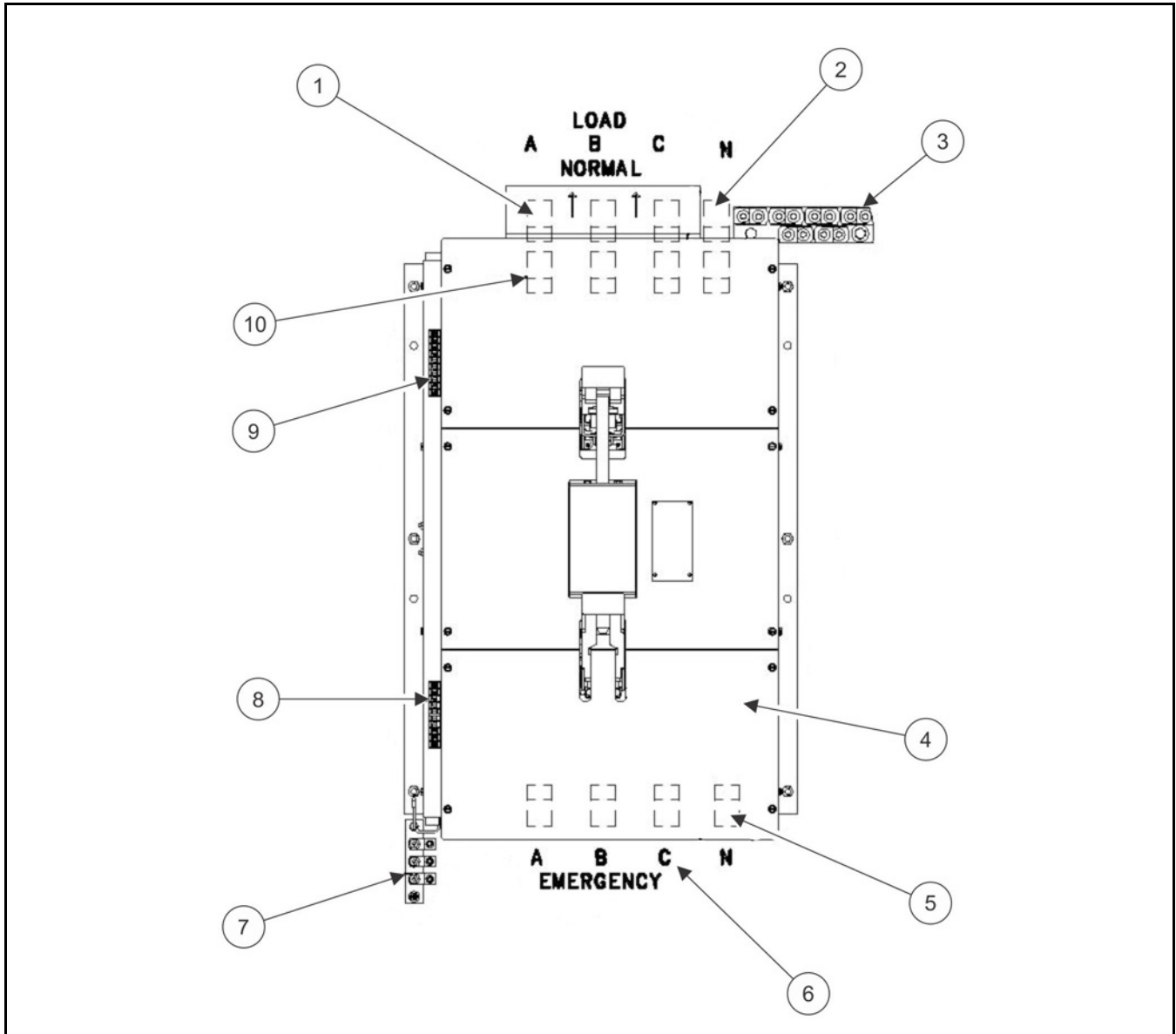
| No. | Description                        | No. | Description                 |
|-----|------------------------------------|-----|-----------------------------|
| 1   | Normal Lugs                        | 7   | Emergency Lug (4 Pole Only) |
| 2   | Normal Lug (4 Pole Only)           | 8   | Ground Lugs                 |
| 3   | Remove Switch Cover for Lug Access | 9   | Emergency Lugs              |
| 4   | Load Lug (4 Pole Only)             | 10  | TB2                         |
| 5   | Load Lugs                          | 11  | TB1                         |
| 6   | Neutral Lugs (3 Pole Only)         |     |                             |

**FIGURE 6. 150-260 AMPERE, 3 AND 4-POLE TRANSFER SWITCH TERMINAL LUG ACCESS**



| No. | Description    | No. | Description |
|-----|----------------|-----|-------------|
| 1   | Normal Lugs    | 5   | Ground Lugs |
| 2   | Load Lugs      | 6   | TB2         |
| 3   | Neutral Lugs   | 7   | TB1         |
| 4   | Emergency Lugs |     |             |

FIGURE 7. 40-125 AMPERE, 3 POLE TRANSFER SWITCH TERMINAL ACCESS



| No. | Description                        | No. | Description    |
|-----|------------------------------------|-----|----------------|
| 1   | Load Lugs                          | 6   | Emergency Lugs |
| 2   | Load Lug (4 Pole Only)             | 7   | Ground Lugs    |
| 3   | Neutral Lugs (3 Pole Only)         | 8   | TB2            |
| 4   | Remove Switch Cover for Lug Access | 9   | TB1            |
| 5   | Emergency Lug (4 Pole Only)        | 10  | Normal Lugs    |

**FIGURE 8. 300-1000 AMPERE, 3 AND 4 POLE TRANSFER SWITCH TERMINAL LUG ACCESS**

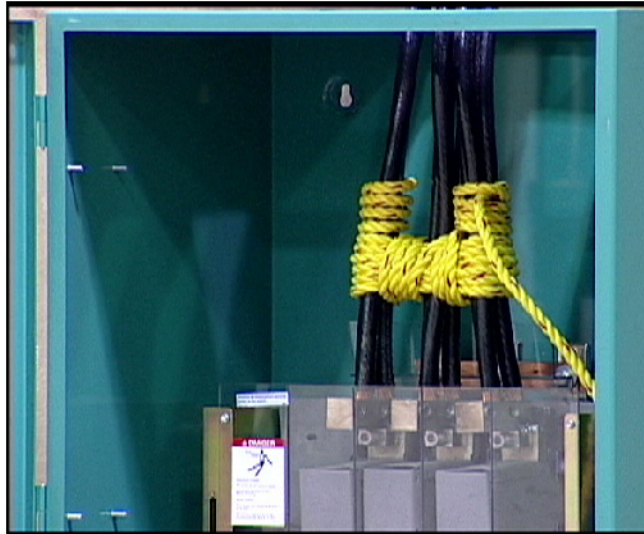


FIGURE 9. SECURE THE POWER CABLES

## 3.2 Control Connections

Connections of standard and optional control wiring are made at terminal blocks TB1, TB2, and TB3; and directly at the (optional) auxiliary relays.

TB1 is located near the top left side on the front of the transfer switch. TB2 is located below TB1, near the bottom left side of the transfer switch. TB3 and auxiliary relays are located on the DIN rail.

### 3.2.1 Connecting Transfer Switch to Genset

#### **⚠ WARNING**

***AC voltages and currents present an electrical shock hazard that can cause severe personal injury or death. Disconnect the AC power source.***

Wire size depends on the distance and the type of battery charger installed in the transfer switch. Lead size must be increased if a battery charger is installed in the switch.

- With no battery charger, all leads between the generator set and transfer switch: Use Column A.
- With 2-Amp charger, maximum voltage drop of 1.5 volts, leads B+ and GND: Use Column B.
- With 12/15-Amp charger, maximum voltage drop of 1.5 volts, leads B+ and GND: Use Column C.
- With 2-Amp charger, maximum voltage drop of 0.75 volts, leads B+ and GND: Use Column D.
- With 12/15-Amp charger, maximum voltage drop of 0.75 volts, leads B+ and GND: Use Column E.
- To return a fully discharged battery to 100% of its Ampere-hour rating within 24 hours: Use Column E.

**TABLE 3. WIRE SPECIFICATIONS**

| Wire Size (AWG) | Distance in Feet, One Way (Multiply by 0.3 for Meters) |          |          |          |          |
|-----------------|--|----------|----------|----------|----------|
|                 | Column A   | Column B | Column C | Column D | Column E |
| 16              | 1000   | 90       | -        | 50       | -        |
| 14              | 1600   | 150      | 20       | 80       | 5        |
| 12              | 2400   | 225      | 30       | 125      | 10       |
| 10              | 4000   | 350      | 50       | 200      | 15       |
| 8               | -  | 600      | 80       | 300      | 25       |
| 6               | -  | 1000     | 125      | 500      | 40       |

Wire resistance must not exceed 0.5 ohm per line. Use stranded wire only. For connection to the screw terminal, strip the insulation back 3/8 inch (10 mm).

Be sure to check the Interconnect Wiring diagram shipped with the transfer switch.

### 3.2.2 Remote Start-Stop Connections

Remote starting (for Cummins Inc. water-cooled generator sets only) uses terminals B+, GND (ground), and RMT of terminal block TB2. Connect these terminals to like terminals on the generator set. Refer to Interconnect Wiring diagram shipped with the switch. A jumper is shipped with the transfer switch and is in a small envelope attached to TB2.

- For PCC 3100, 1301, 1302, 2100, 1.X, 2.X, and 3.X genset controls:
  - install a jumper between TB2-1 and TB2-2 for ground-to-start connection.
- For Detector 12 genset controls:
  - install a jumper between TB2-2 and TB2-3 for B+ start.
- For PCC 3200 and 3201 genset controls requiring a dry contact start:
  - do not install a jumper.

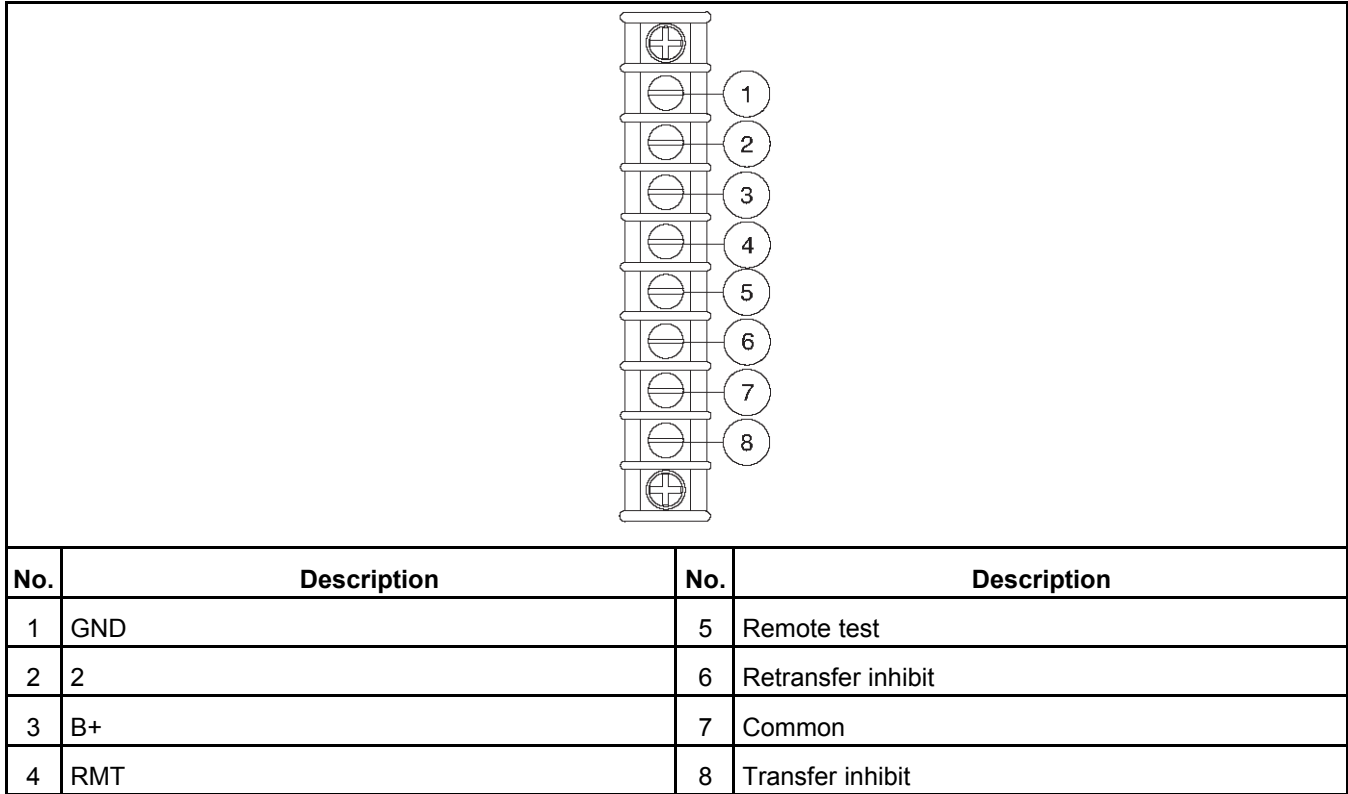


FIGURE 10. TB2 CONNECTIONS

### 3.2.3 Auxiliary Contacts

Auxiliary contacts, used for external alarm or control circuitry, are available for the Source 1 (Normal) and Source 2 (Emergency) sides of the transfer switch. Connections for the auxiliary contacts can be made on terminal block TB1. The contacts have ratings of 10 amperes at 250 VAC. The contacts are shown with the transfer switch in the neutral position. Moving the transfer switch to Normal or Emergency actuates the corresponding auxiliary contacts and they change state.

**NOTICE**

**TB1 and TB2 will accept 22 AWG - 12 AWG wire with 3/8 inch (10 mm) strip. Torque to 9 in-lbs.**

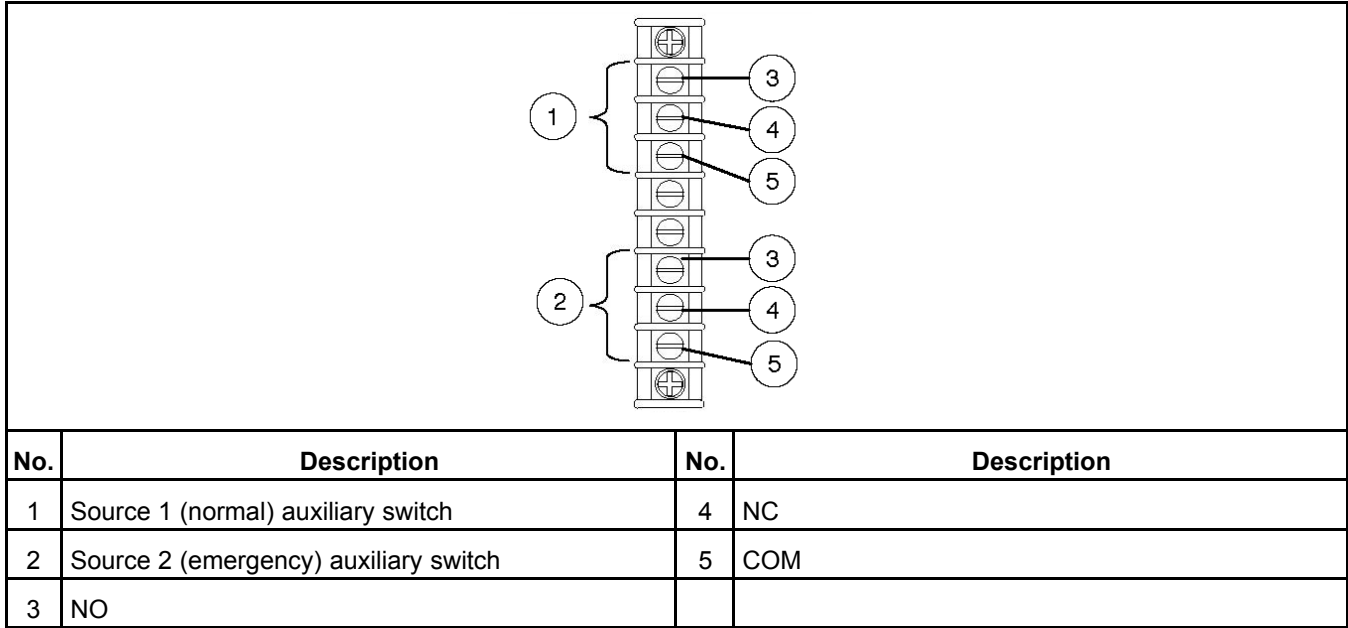


FIGURE 11. TB1 CONNECTIONS

### 3.2.4 Remote Test Input

The transfer switch may be wired for a remote test input. The switch is used to start and stop manually initiated system tests. As with the control panel Test pushbutton, the remote test input can be configured to test with or without load.

A remote test input is set up by connecting a dry (voltage free) contact between TB2-5 and TB2-8. Closing the contact starts a test and opening the contact cancels the test. The Test LED flashes to signify the start of a test and stays on during the test.

Closing the contact causes the transfer switch to sense a (simulated) utility power failure and sends a start/run signal to the genset. If the control is set up to test with load, the load is transferred to the genset when the genset becomes available. The Utility Power Available LED remains on to show that the utility did not fail.

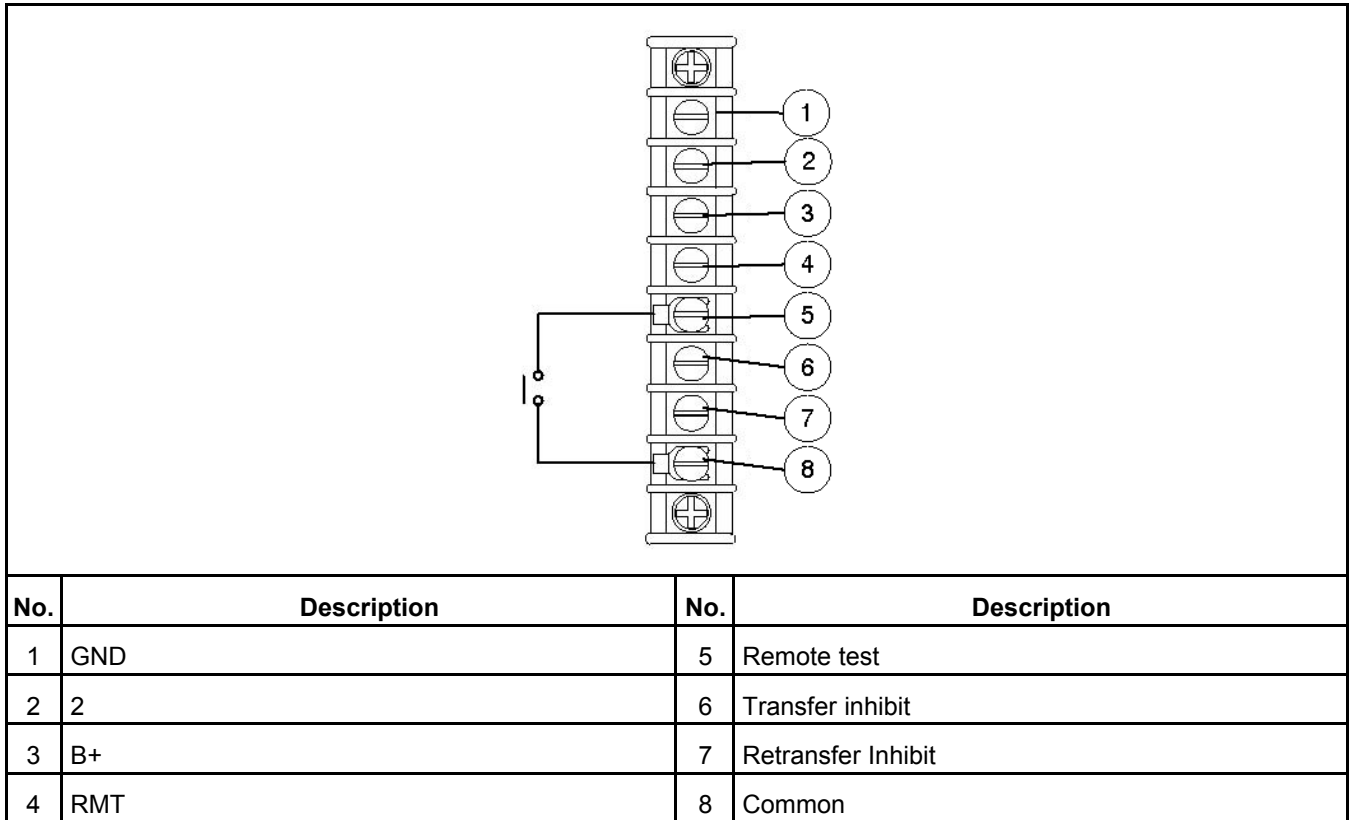


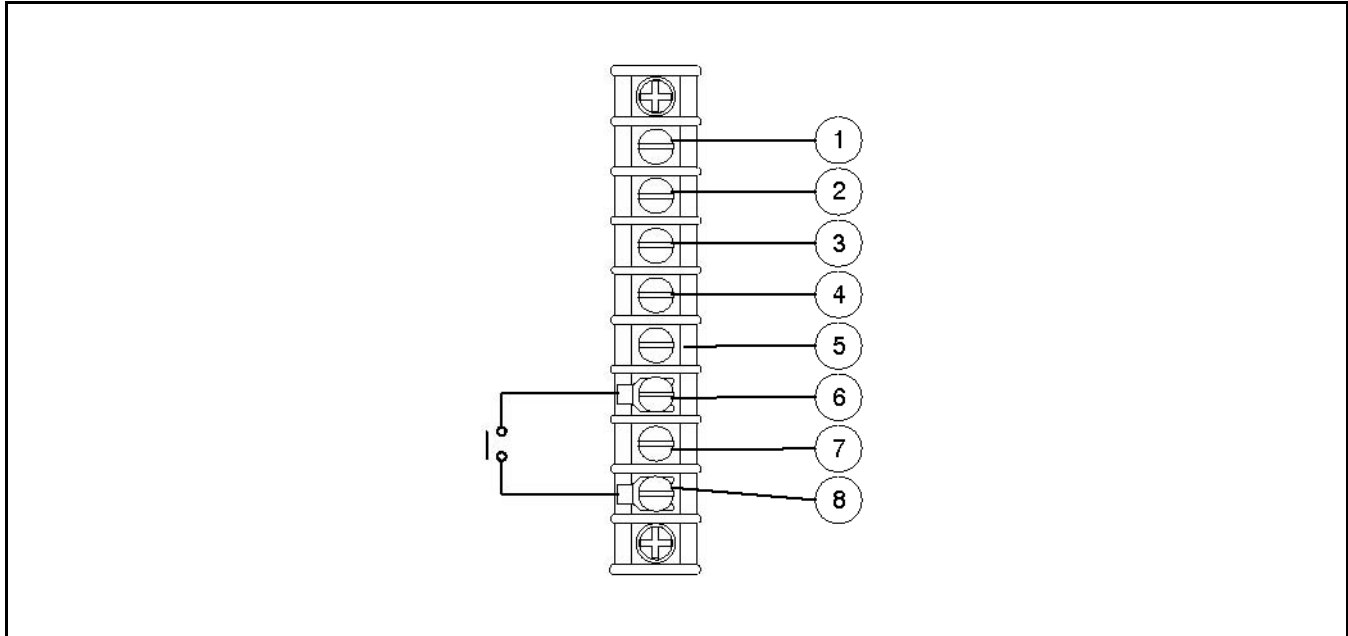
FIGURE 12. TB2 CONNECTIONS FOR REMOTE TEST TRANSFER

**NOTICE**

TB1 and TB2 will accept 22 AWG - 12 AWG wire with 3/8 inch (10 mm) strip. Torque to 9 in-lbs.

### 3.2.5 Transfer Inhibit Input

To add transfer inhibit, connect a normally open, dry contact between terminals 6 and 8 of TB2. Closing the contact enables the feature and opening the contact disables it.



| No. | Description | No. | Description          |
|-----|-------------|-----|----------------------|
| 1   | GND         | 5   | Remote Test          |
| 2   | 2           | 6   | Transfer Inhibit     |
| 3   | B+          | 7   | Load Shed (Optional) |
| 4   | RMT         | 8   | Common               |

FIGURE 13. TB2 CONNECTIONS FOR TRANSFER INHIBIT

**NOTICE**

TB1 and TB2 will accept 22 AWG - 12 AWG wire with 3/8 inch (10 mm) strip. Torque to 9 in-lbs.

### 3.2.6 Retransfer Inhibit Input

To add retransfer inhibit, connect a normally open, dry contact between terminals 7 and 8 of TB2. Closing the contact enables the feature and opening the contact disables it.

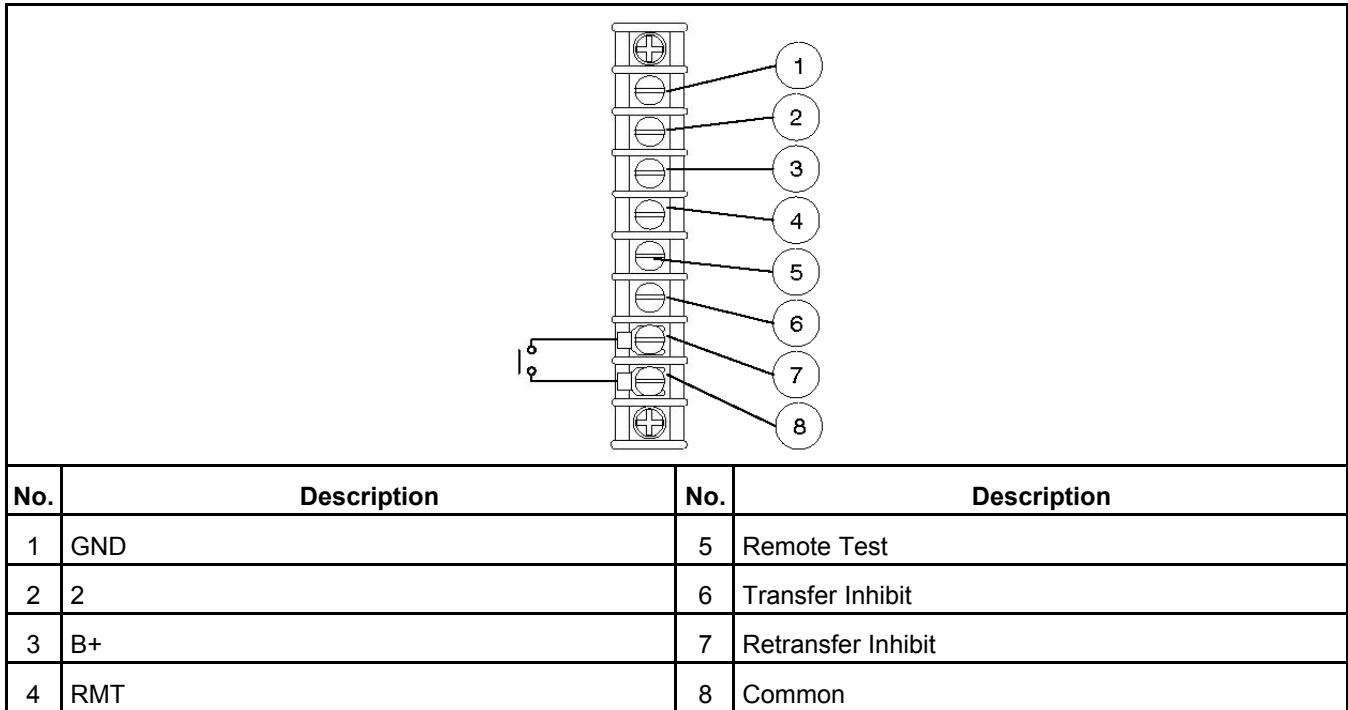


FIGURE 14. TB2 CONNECTIONS FOR RETRANSFER INHIBIT

**NOTICE**

TB1 and TB2 will accept 22 AWG - 12 AWG wire with 3/8 inch strip (10 mm). Torque to 9 in-lbs.

### 3.2.7 Remote Override Input

To add remote override, connect a normally open, dry contact between P4-2 on the back of the control panel and TB2-8. Closing the contact enables the feature and opening the contact disables it.

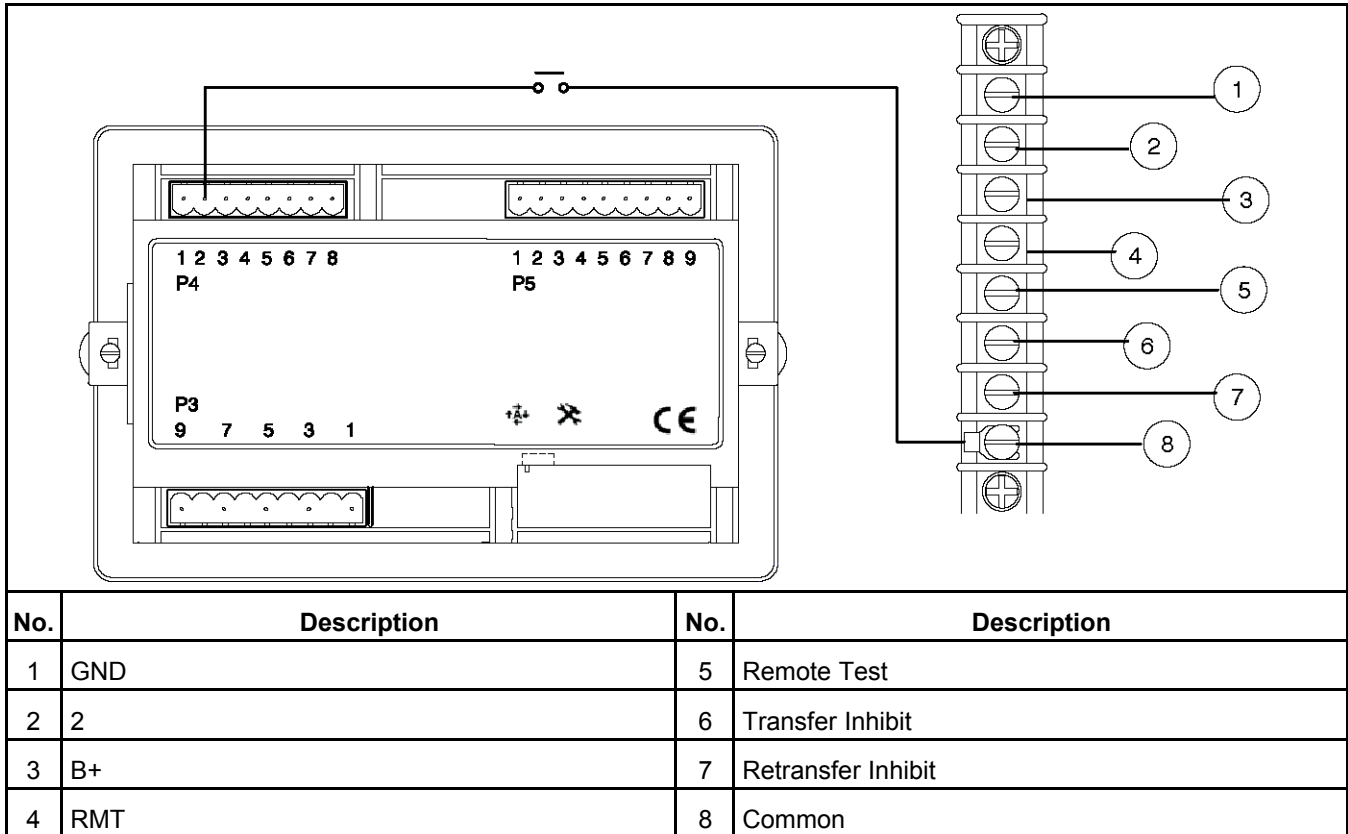


FIGURE 15. CONNECTIONS FOR REMOTE OVERRIDE INPUT

**NOTICE**

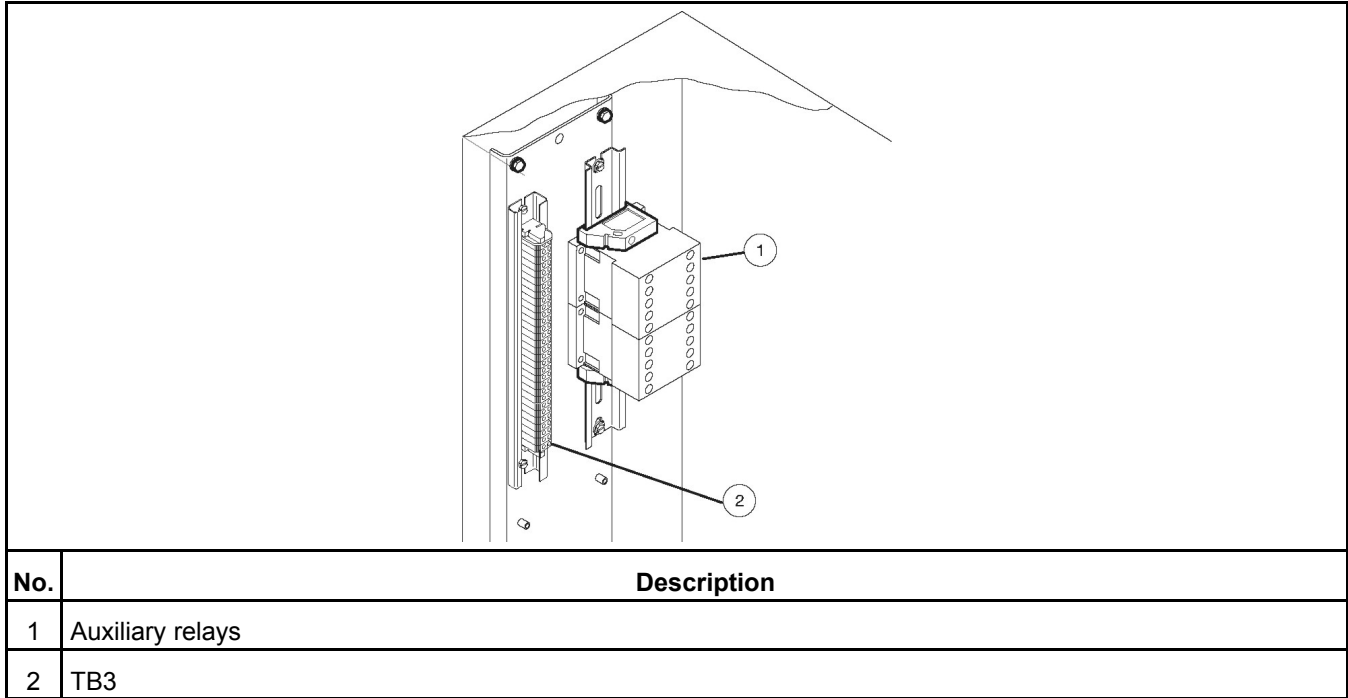
TB1 and TB2 will accept 22 AWG - 12 AWG wire with 3/8 inch strip (10 mm). Torque to 9 in-lbs.

### 3.2.8 Auxiliary Relays and Elevator Relay Options

Connections to the auxiliary and elevator relays are made directly to the relay terminals.

There are two types of auxiliary relay coils (12 VDC and 24 VDC).

All relays have two normally open and two normally closed contacts that are rated for 6 amperes at 600 VAC.



**FIGURE 16. AUXILIARY RELAYS AND TB3**

**NOTICE**

**TB1 and TB2 will accept 22 AWG - 12 AWG wire with 3/8 inch strip (10 mm). Torque to 9 in-lbs.**

**TABLE 4. AUXILIARY AND ELEVATOR RELAYS**

| Code | Coil type         | Description              |
|------|-------------------|--------------------------|
| L101 | 24 Vdc Coil       | Installed, Not Wired     |
| L102 | 24 Vdc Coil       | Emergency position Relay |
| L103 | 24 Vdc Coil       | Normal position Relay    |
| L201 | 12 Vdc Coil       | Installed, Not Wired     |
| L202 | 12 Vdc Coil       | Emergency position Relay |
| L203 | 12 Vdc Coil       | Normal position Relay    |
| M032 | 12 or 24 Vdc coil | Elevator Signal Relay    |

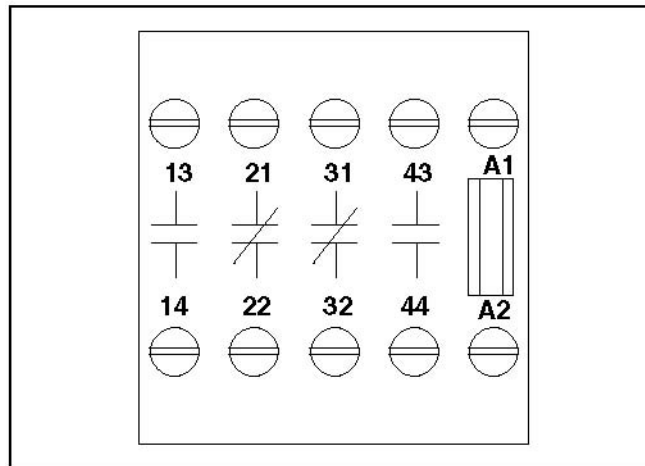


FIGURE 17. RELAY TERMINALS

### 3.2.9 Battery Charger Options

When so equipped, a battery charger can be used for charging genset starting and control batteries. These chargers are current limiting and supply automatic constant voltages.

When the battery approaches the full charge preset voltage, the charging current automatically tapers to zero amperes or to a steady-state load on the battery.

A float-charge battery charger regulates its charge voltage to continuously charge without damage to the battery. As the battery approaches full charge, the charging current automatically tapers to zero amperes or to steady-state load on the battery.

Two battery chargers are available (see [Figure 18](#)). One battery charger is rated for 2 amperes at 12 or 24 VDC. The other battery charger is rated for 15 amperes at 12 VDC or 12 amperes at 24 VDC.

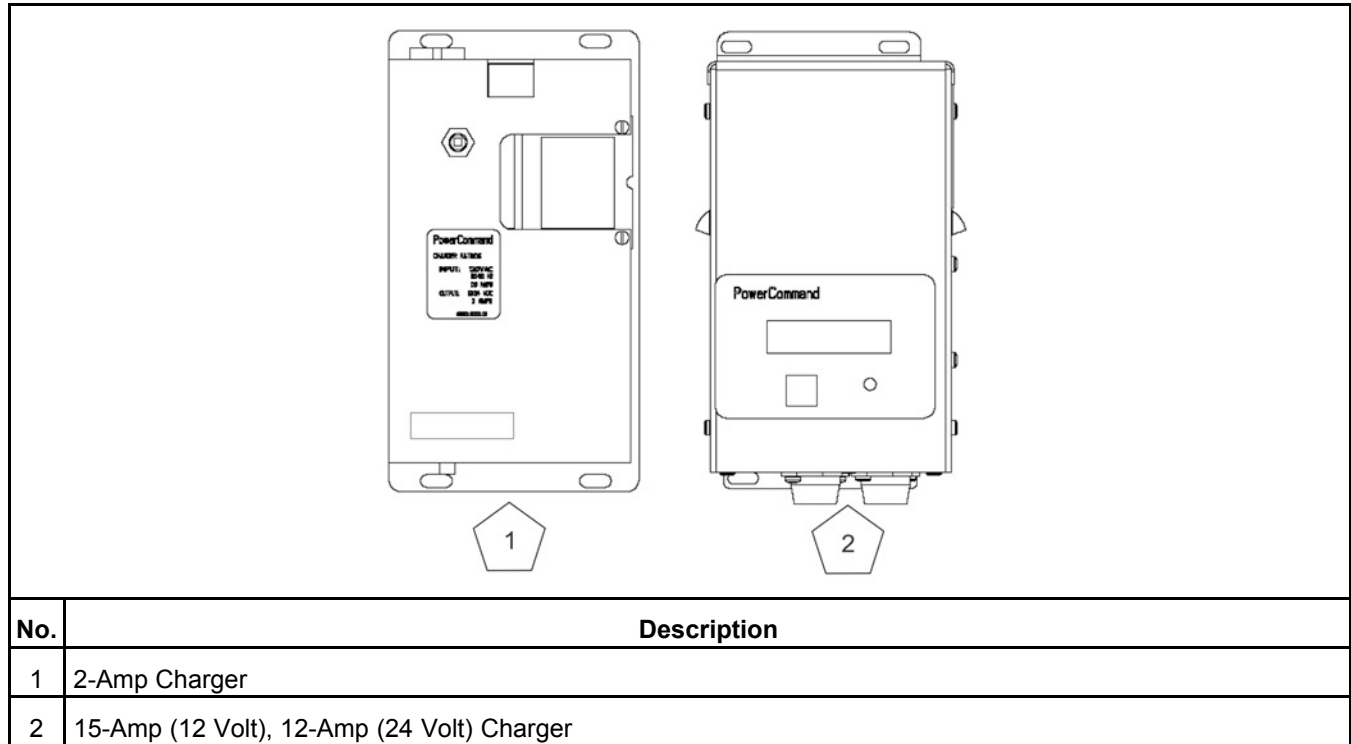


FIGURE 18. CURRENT BATTERY CHARGERS

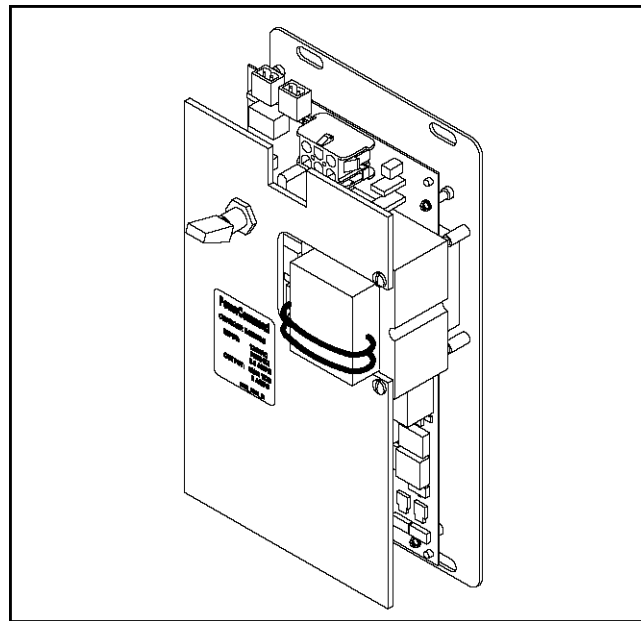
### 3.2.9.1 2-Amp Battery Charger

The 2-ampere battery charger (see [Figure 19](#)) has a 5 amp DC output circuit breaker switch on the front of the battery charger. The charger also includes a 5 amp AC fuse to protect the battery charger circuit.

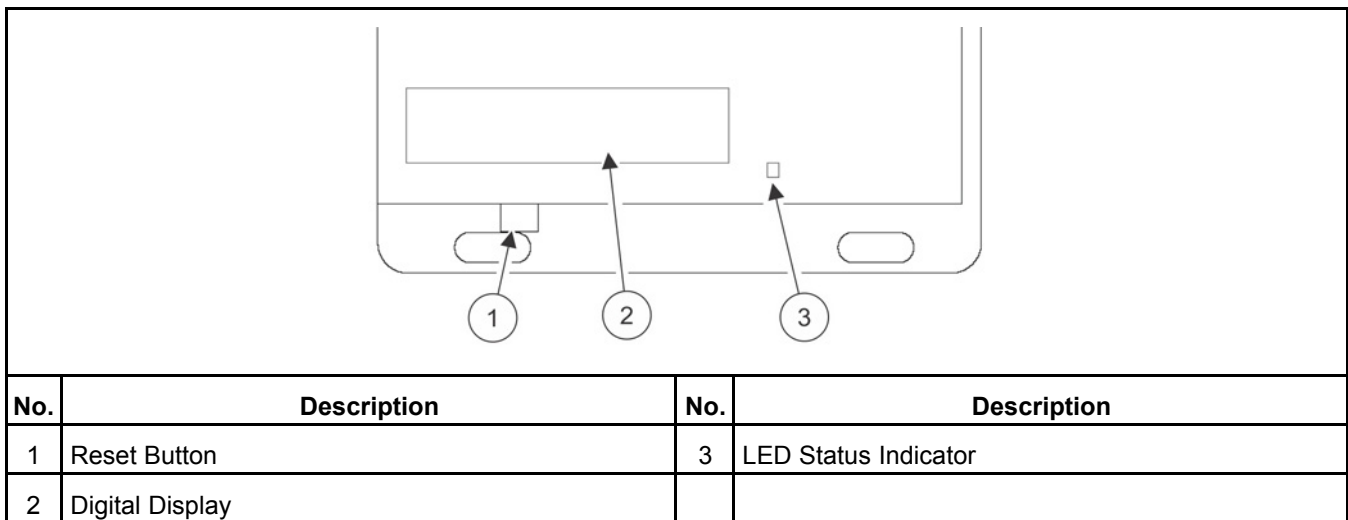
Under normal operating conditions, the Low Bat and AC Fail relays are energized and the High Bat relay is de-energized. In response to a Low Bat or AC Fail condition, the appropriate normally energized relay (Low Bat or AC Fail) drops out. In response to a High Bat condition, the normally de-energized High Bat relay is energized.

*Control Panel* - The 2-amp charger control panel includes a digital display, a RESET button, and an LED status indicator (see [Figure 20](#)).

- The 2-line X 16-character digital display displays menus and faults.
- The RESET button is used to select menu options and to clear fault messages.
- The status LED displays the appropriate color for the following conditions.
  - **Green** - On solid indicates unit is charging
  - **Red** - On solid indicates a fault condition. The fault number is shown on the digital display.



**FIGURE 19. 2-AMP POWERCOMMAND BATTERY CHARGER**



**FIGURE 20. 2-AMP CHARGER CONTROL PANEL**

*Battery Charger Configuration* - The RESET button on the control panel (see [Figure 20](#)) is used to configure the battery charger for the correct battery voltage. (More information on Setup menus is included in the Battery Charger Operator's Manual.)

### 3.2.9.2 15/12-Amp Battery Charger

There are two types of 15/12-amp PowerCommand battery chargers (see [Figure 22](#)). All 15/12-amp battery chargers have a 20 amp DC circuit breaker switch on the front of the battery charger. The 120, 208, and 240 VAC battery chargers include two 10 amp AC circuit breaker switches and a circuit breaker guard, while the 277, 380, 416, and 600 VAC battery chargers include two AC fuse holders.

*Control Panel* - The 15/12-amp charger control panel includes a digital display, a Reset button, and an LED status indicator (see [Figure 21](#)).

- The 2-line x 16-character digital display displays menus and faults.

- The Reset button is used to select menu options and to clear fault messages.
- The status LED is displays the appropriate color for the following conditions.
  - **Green** - On solid indicates unit is charging
  - **Amber** - On solid indicates Equalizing
  - **Red** - On solid indicates a fault condition. The fault number is shown on the digital display.

*Optional Battery Temperature Sensor* - A connector for an optional battery temperature sensor is located on the front of the battery charger. When used to monitor battery temperature, the optional battery temperature sensor is connected from the battery charger to the positive terminal of the battery. A fault message (fault code 2263) is displayed if the battery temperature is too high (reaches 131 degrees F (55 degrees C)).

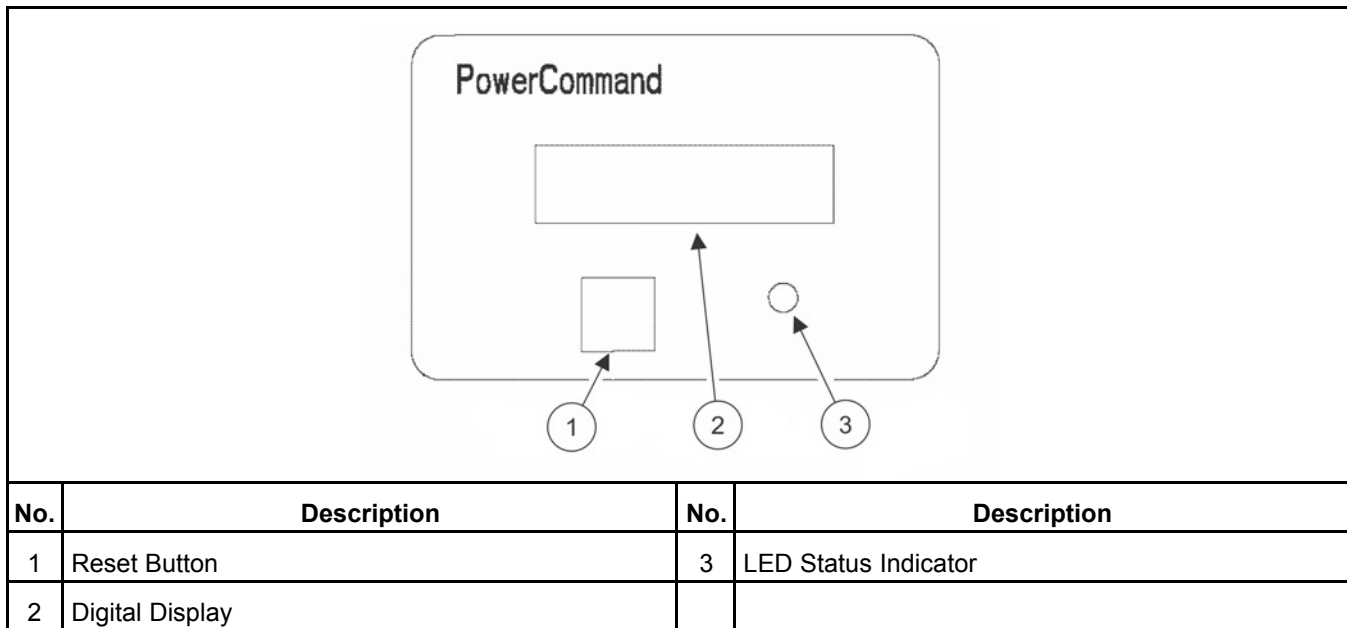
Battery Charger Configuration - The RESET button on the control panel (see [Figure 21](#)) is used to configure the battery charger, (More information on Setup menus is included in the Battery Charger Operator's Manual .)

- **Battery Voltage and Type** - The battery charger must be correctly configured, using the Setup menus, for the correct battery voltage and type before it is connected to the battery. The battery voltage can be set for 12 or 24 VDC (default = 12 VDC). The battery type can be set for Lead-Acid, Gel, or AGM batteries (default = Lead-Acid) .

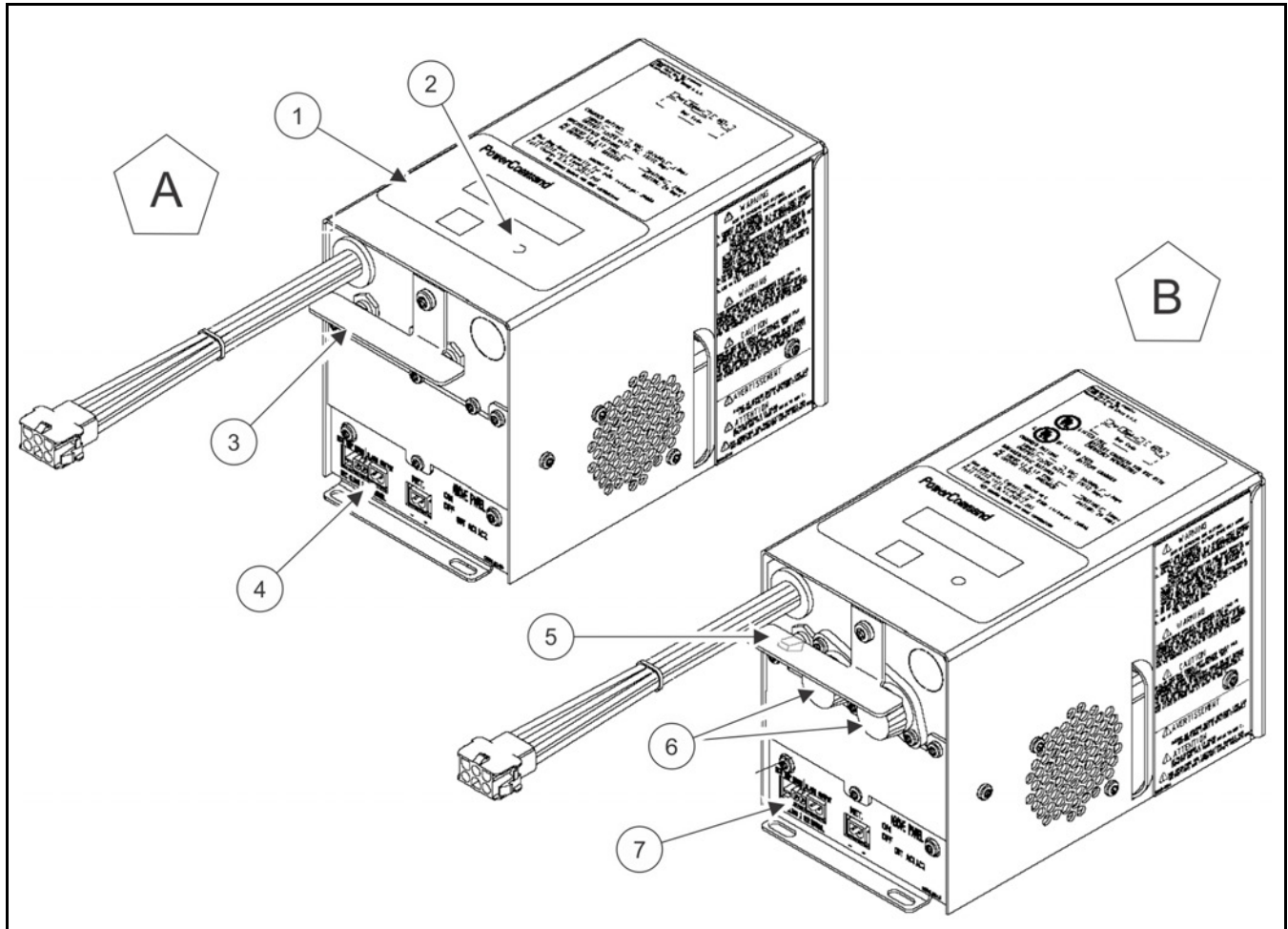
**NOTICE**

**A factory installed battery charger is set up for the proper DC battery voltage requested on the production order, with the Lead-Acid battery type selected as the default.**

- **Battery Equalization** - Battery equalization is available for lead-acid batteries that are completely charged, using the Equalize Battery screen in the Setup menus. When batteryequalization is in process, the LED status indicator turns amber.



**FIGURE 21. 15/12-AMP CHARGER CONTROL PANEL**



| No. | Description                                      | No. | Description  |
|-----|--|-----|--|
| A   | 120, 208, and 240 VAC Battery Chargers           | 4   | Fault Alarm Output Connector                                     |
| B   | 277, 380, 416, 480, and 600 VAC Battery Chargers | 5   | 20 Amp DC Output Circuit Breaker Switch (Shown in "ON" Position) |
| 1   | Control Panel                                    | 6   | Fuse Holders   |
| 2   | Status LED                                       | 7   | Optional Battery Temperature Sensor Connector                    |
| 3   | Circuit Breaker Guard                            |     |  |

FIGURE 22. 15/12-AMP POWERCOMMAND BATTERY CHARGERS

### 3.2.10 Battery Charger Alarm Contacts Option

The optional 10-ampere battery charger can include three sets of Form-C relay contacts, as an additional option.

Under normal operating conditions, the Low Bat and AC Fail relays are energized and the High Bat relay is de-energized. In response to a Low Bat or AC Fail condition, the appropriate normally energized relay (Low Bat or AC Fail) drops out. In response to a High Bat condition, the normally de-energized High Bat relay is energized.

The contacts are rated for 4 amperes at 120 VAC or 30 VDC. Connections to these contacts are made at terminals 41-42-43 (AC failure), 44-45-46 (high battery voltage), and 47-48-49 (low battery voltage) of TB3 (Figure 23). See Section 3.2 for the location of TB3 on the option panel.

Use number 22 to number 12 AWG wire. For connection to the screw terminal, strip the insulation back 3/8 inch (10 mm).

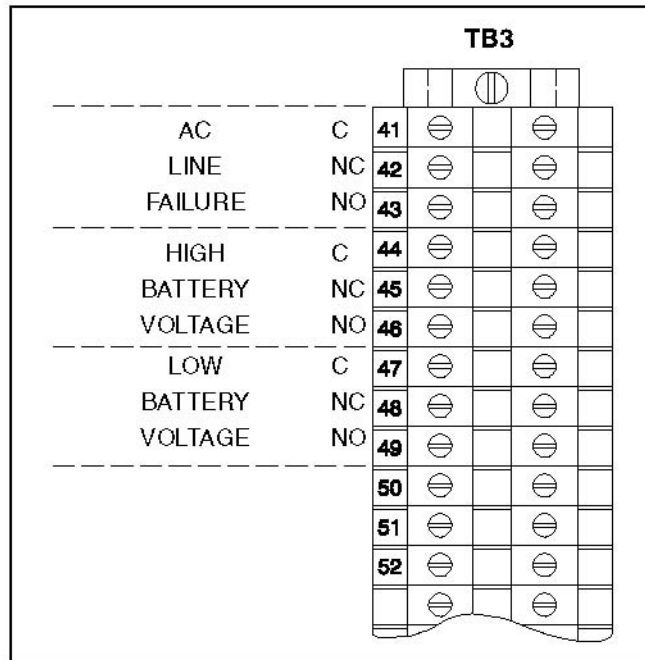


FIGURE 23. BATTERY CHARGER ALARM CONTACTS

### 3.3 Inspection and Cleanup

- Inspect all wiring to be certain that:
  - Wiring does not interfere with switch operation
  - Wiring is not damaged as the door opens and closes
  - Wiring does not contact sharp or abrasive surfaces
  - No wiring is left loose and unconnected.
- After mounting and wiring the switch, clean with a vacuum cleaner to remove any chips, filings, or dirt from around the switch and components.
- Double check the power supply voltages to make sure they match the voltages listed on the nameplate.
- Double check the phase rotation. The Normal side phase rotation must match the Emergency side phase rotation.
- Verify that the remote start connections are correct for your application. For more information on jumper replacement, determine the control type and refer to information provided earlier in this section.
- Manually operate the ATS with power off to make sure it operates smoothly, with no binding. If it does not operate smoothly, check for damage that may have occurred during shipping or installation. Also check for installation debris.

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# Appendix A. Interconnect Diagrams and Outline Drawings

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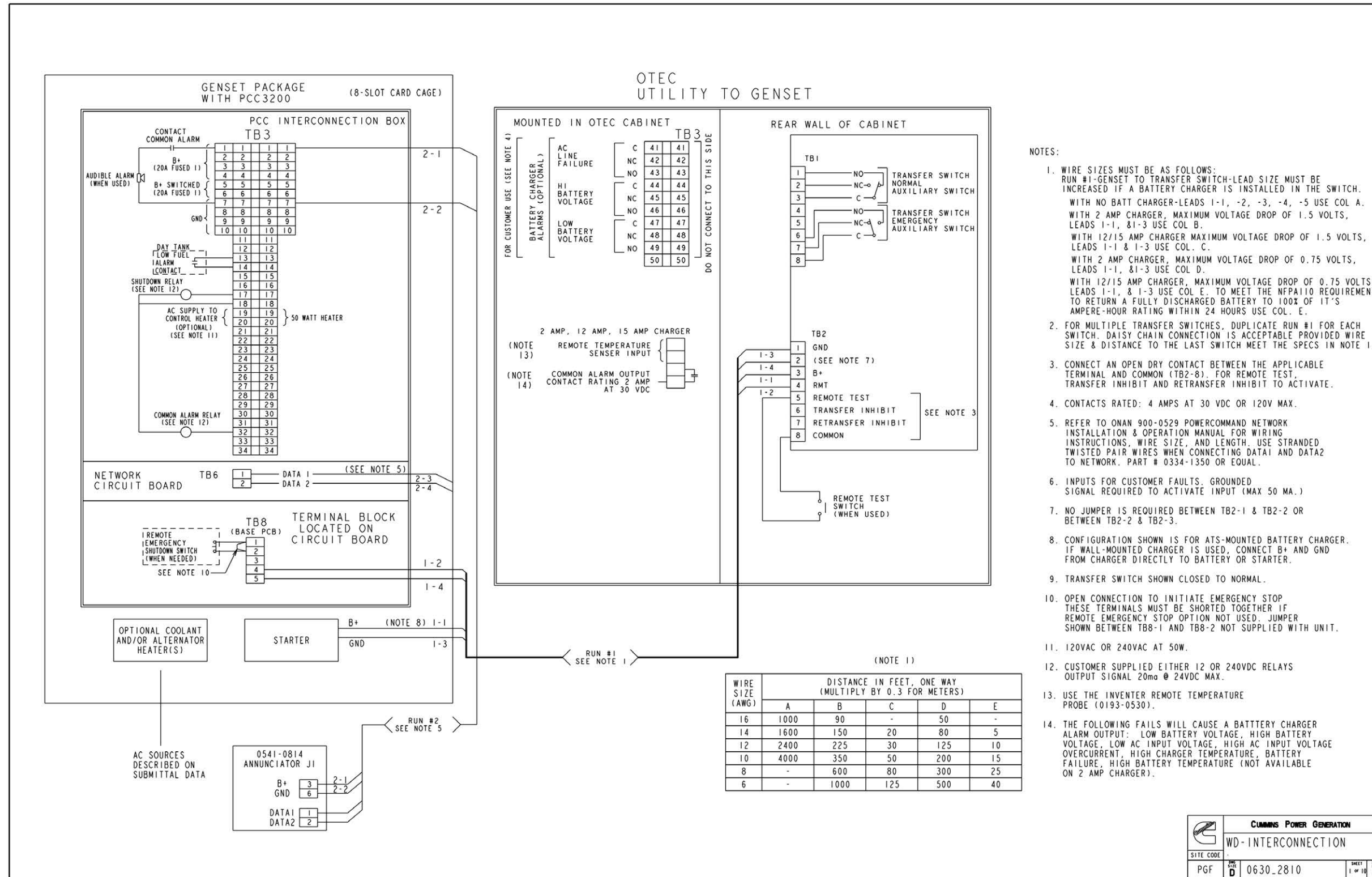
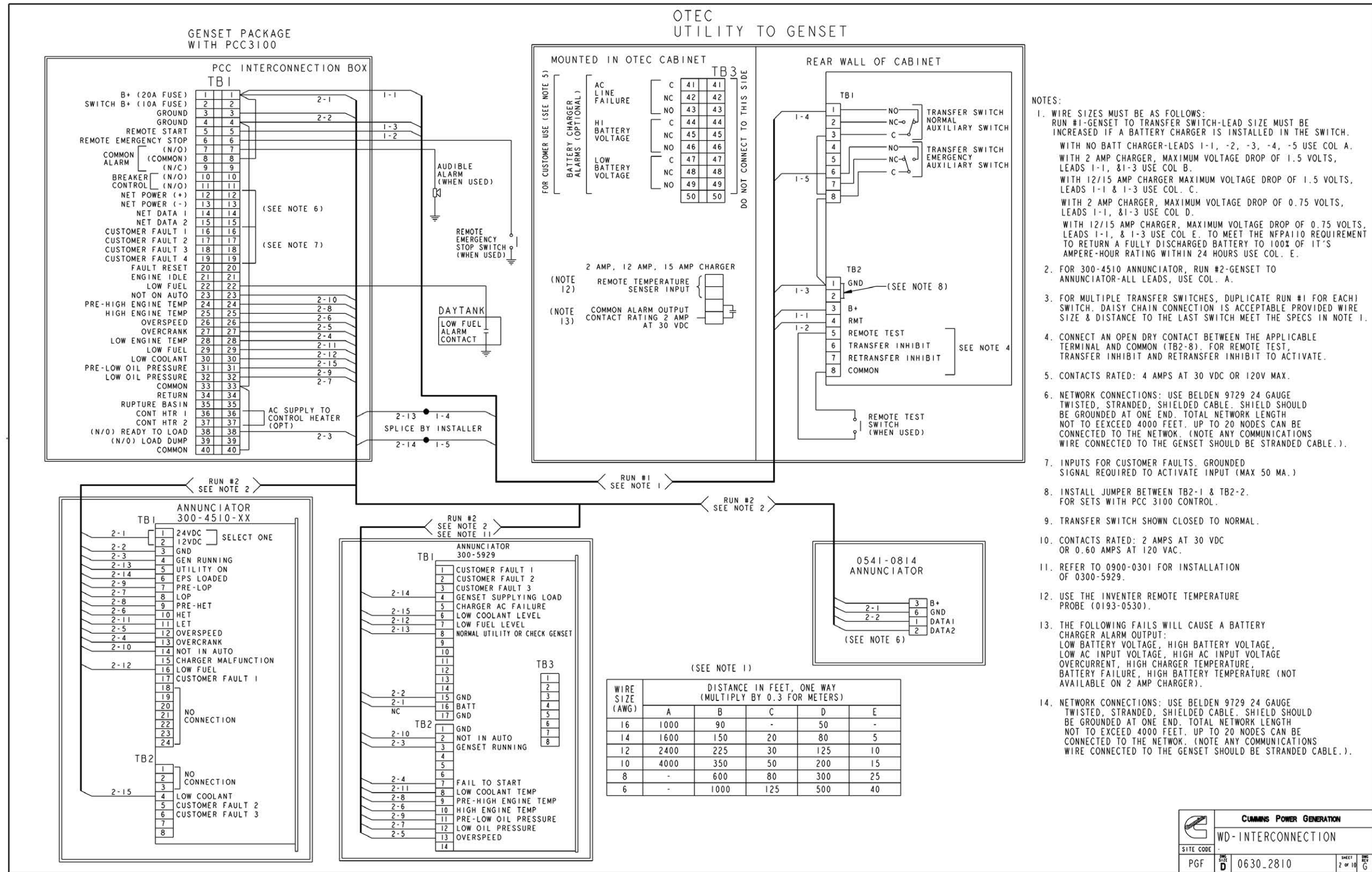


FIGURE 24. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 1 OF 10)



- NOTES:**
1. WIRE SIZES MUST BE AS FOLLOWS:  
 RUN #1-GENSET TO TRANSFER SWITCH-LEAD SIZE MUST BE INCREASED IF A BATTERY CHARGER IS INSTALLED IN THE SWITCH.  
 WITH NO BATT CHARGER-LEADS 1-1, -2, -3, -4, -5 USE COL A.  
 WITH 2 AMP CHARGER, MAXIMUM VOLTAGE DROP OF 1.5 VOLTS, LEADS 1-1, & 1-3 USE COL B.  
 WITH 12/15 AMP CHARGER MAXIMUM VOLTAGE DROP OF 1.5 VOLTS, LEADS 1-1 & 1-3 USE COL C.  
 WITH 2 AMP CHARGER, MAXIMUM VOLTAGE DROP OF 0.75 VOLTS, LEADS 1-1, & 1-3 USE COL D.  
 WITH 12/15 AMP CHARGER, MAXIMUM VOLTAGE DROP OF 0.75 VOLTS, LEADS 1-1, & 1-3 USE COL E. TO MEET THE NFPA110 REQUIREMENT TO RETURN A FULLY DISCHARGED BATTERY TO 100% OF IT'S AMPERE-HOUR RATING WITHIN 24 HOURS USE COL E.
  2. FOR 300-4510 ANNUNCIATOR, RUN #2-GENSET TO ANNUNCIATOR-ALL LEADS, USE COL. A.
  3. FOR MULTIPLE TRANSFER SWITCHES, DUPLICATE RUN #1 FOR EACH SWITCH. DAISY CHAIN CONNECTION IS ACCEPTABLE PROVIDED WIRE SIZE & DISTANCE TO THE LAST SWITCH MEET THE SPECS IN NOTE 1.
  4. CONNECT AN OPEN DRY CONTACT BETWEEN THE APPLICABLE TERMINAL AND COMMON (TB2-8). FOR REMOTE TEST, TRANSFER INHIBIT AND RETRANSFER INHIBIT TO ACTIVATE.
  5. CONTACTS RATED: 4 AMPS AT 30 VDC OR 120V MAX.
  6. NETWORK CONNECTIONS: USE BELDEN 9729 24 GAUGE TWISTED, STRANDED, SHIELDED CABLE. SHIELD SHOULD BE GROUNDED AT ONE END. TOTAL NETWORK LENGTH NOT TO EXCEED 4000 FEET. UP TO 20 NODES CAN BE CONNECTED TO THE NETWORK. (NOTE ANY COMMUNICATIONS WIRE CONNECTED TO THE GENSET SHOULD BE STRANDED CABLE.).
  7. INPUTS FOR CUSTOMER FAULTS. GROUNDED SIGNAL REQUIRED TO ACTIVATE INPUT (MAX 50 MA.)
  8. INSTALL JUMPER BETWEEN TB2-1 & TB2-2. FOR SETS WITH PCC 3100 CONTROL.
  9. TRANSFER SWITCH SHOWN CLOSED TO NORMAL.
  10. CONTACTS RATED: 2 AMPS AT 30 VDC OR 0.60 AMPS AT 120 VAC.
  11. REFER TO 0900-0301 FOR INSTALLATION OF 0300-5929.
  12. USE THE INVENTER REMOTE TEMPERATURE PROBE (0193-0530).
  13. THE FOLLOWING FAILS WILL CAUSE A BATTERY CHARGER ALARM OUTPUT:  
 LOW BATTERY VOLTAGE, HIGH BATTERY VOLTAGE, LOW AC INPUT VOLTAGE, HIGH AC INPUT VOLTAGE OVERCURRENT, HIGH CHARGER TEMPERATURE, BATTERY FAILURE, HIGH BATTERY TEMPERATURE (NOT AVAILABLE ON 2 AMP CHARGER).
  14. NETWORK CONNECTIONS: USE BELDEN 9729 24 GAUGE TWISTED, STRANDED, SHIELDED CABLE. SHIELD SHOULD BE GROUNDED AT ONE END. TOTAL NETWORK LENGTH NOT TO EXCEED 4000 FEET. UP TO 20 NODES CAN BE CONNECTED TO THE NETWORK. (NOTE ANY COMMUNICATIONS WIRE CONNECTED TO THE GENSET SHOULD BE STRANDED CABLE.).

FIGURE 25. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 2 OF 10)

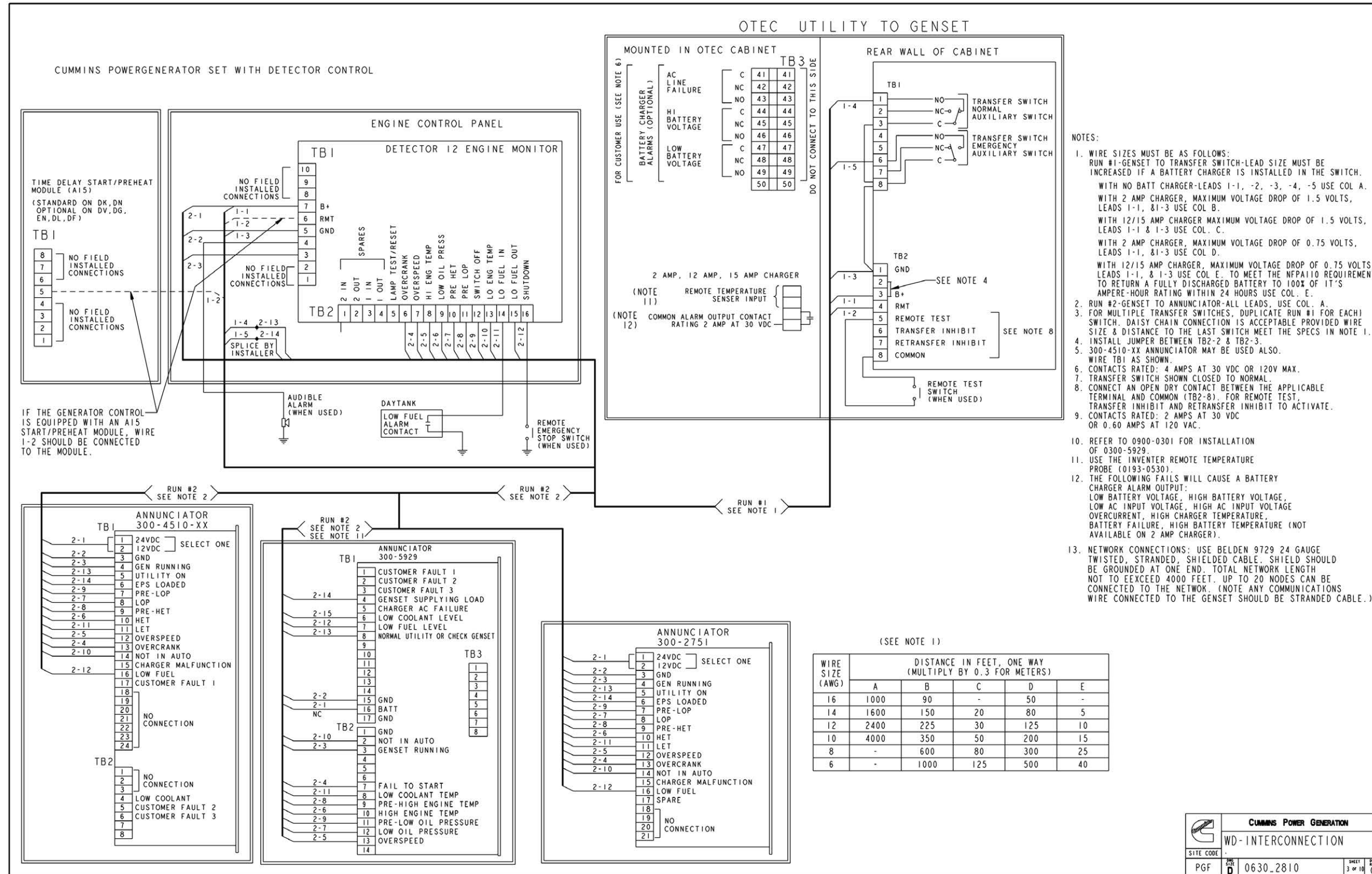


FIGURE 26. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 3 OF 10)

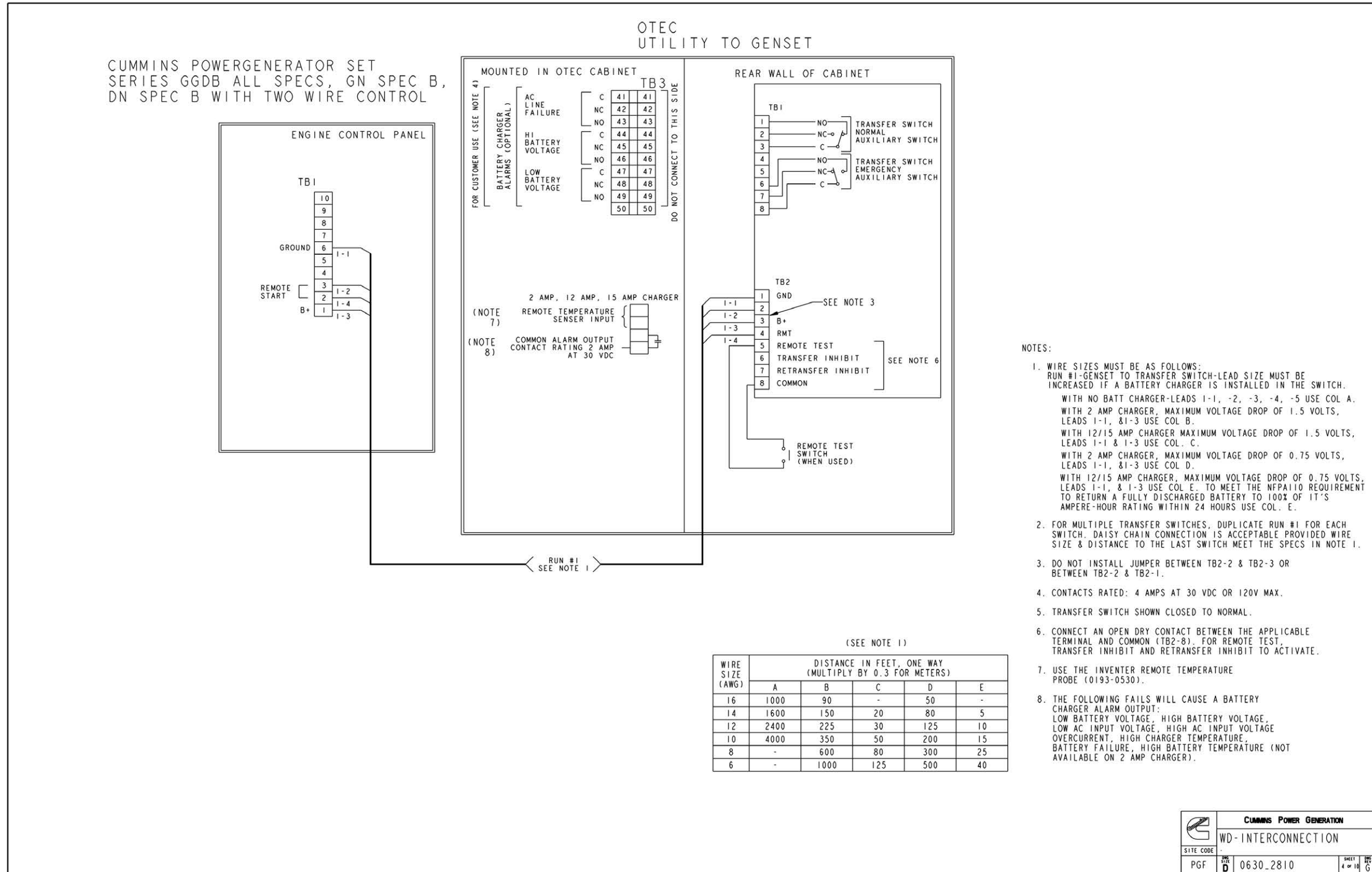


FIGURE 27. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 4 OF 10)

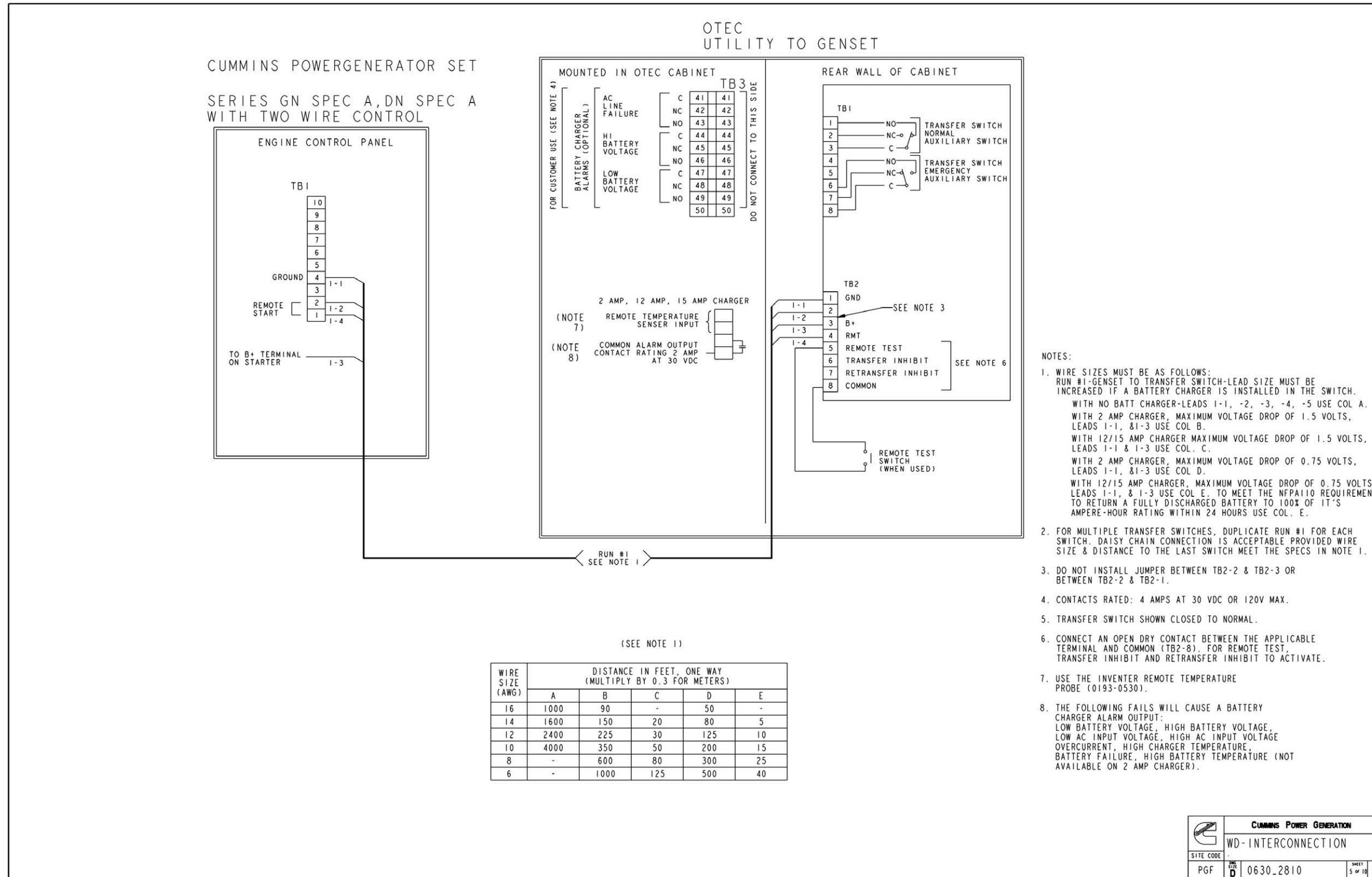


FIGURE 28. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 5 OF 10)

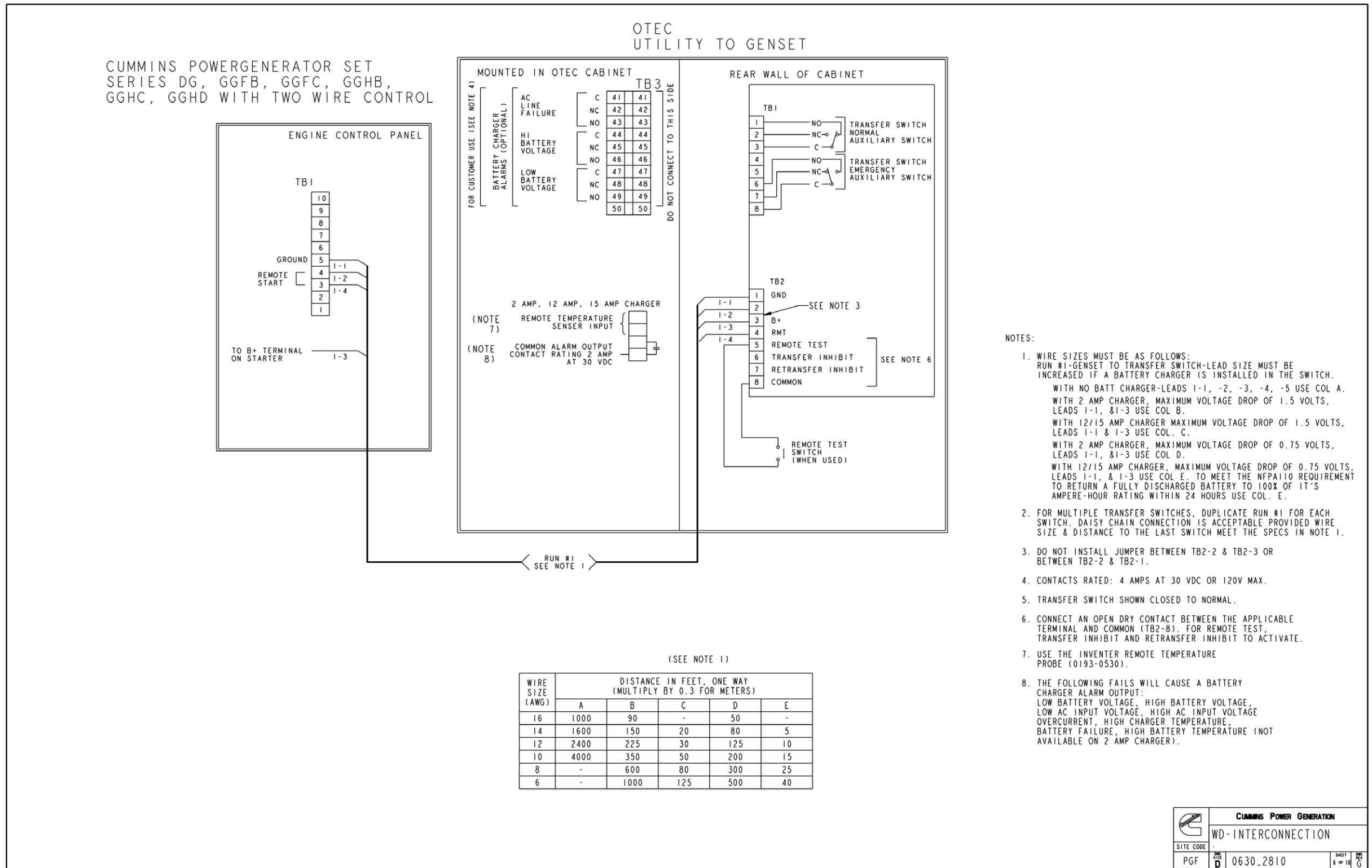


FIGURE 29. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 6 OF 10)

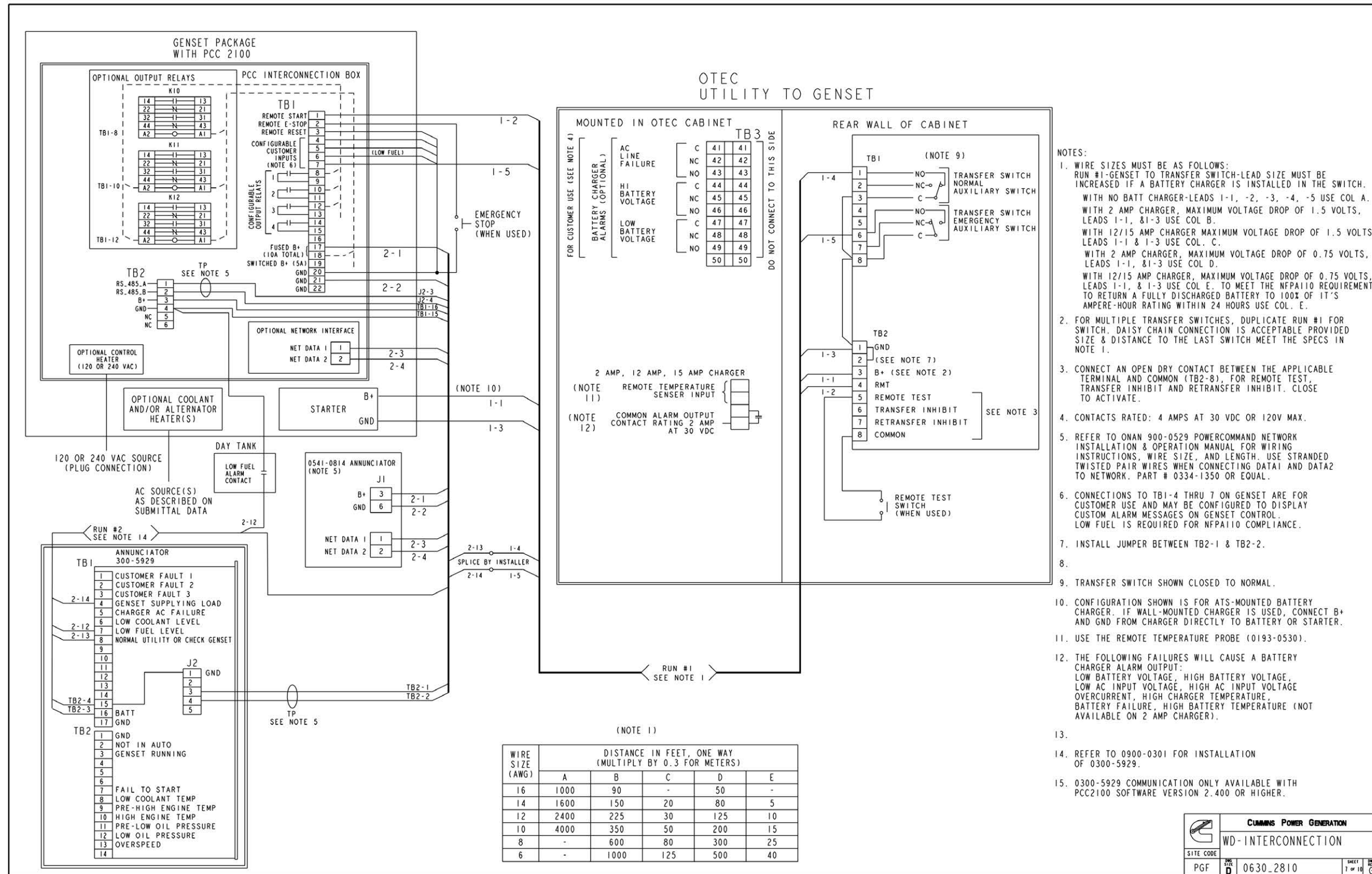


FIGURE 30. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 7 OF 10)

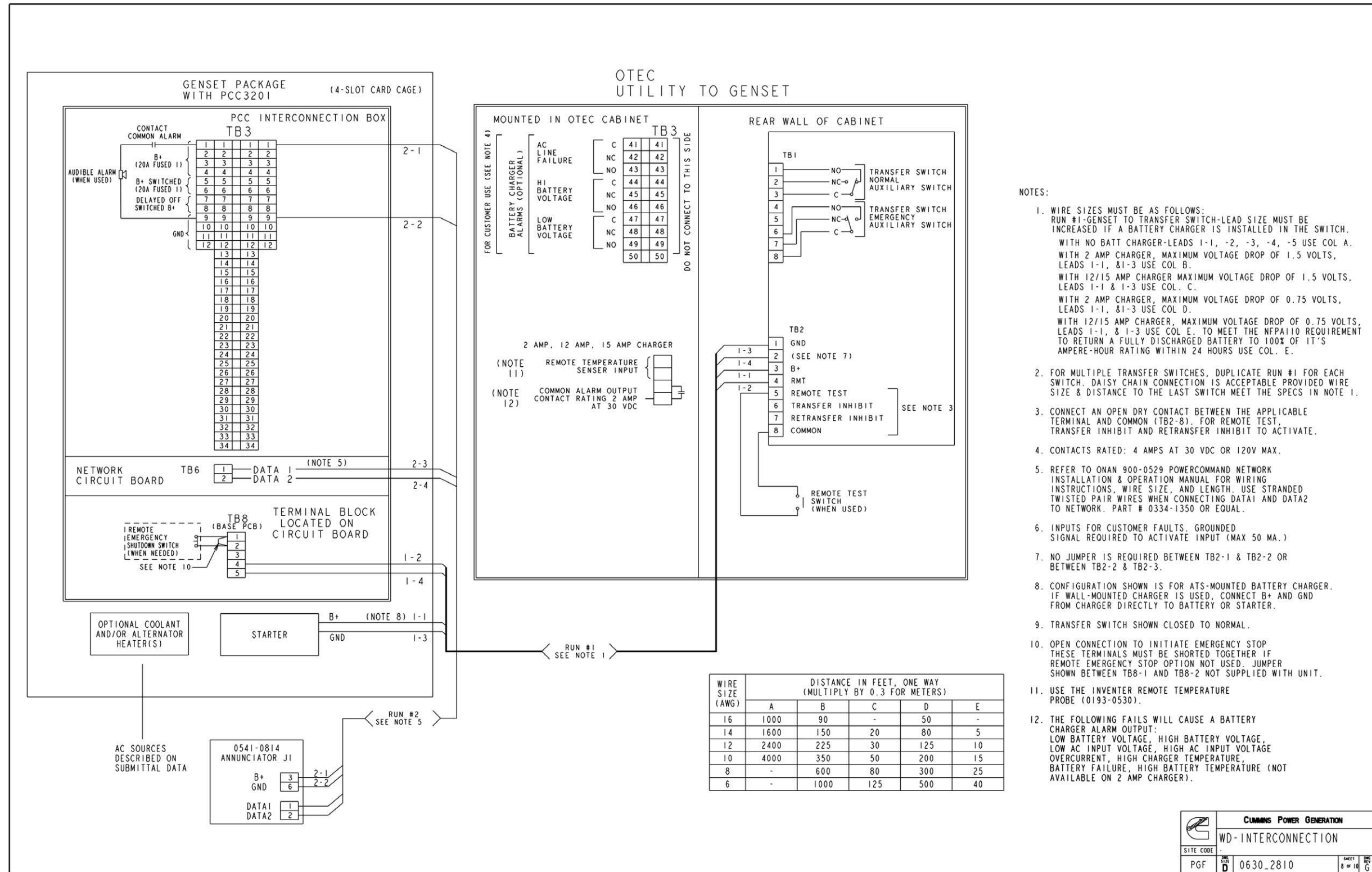


FIGURE 31. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 8 OF 10)

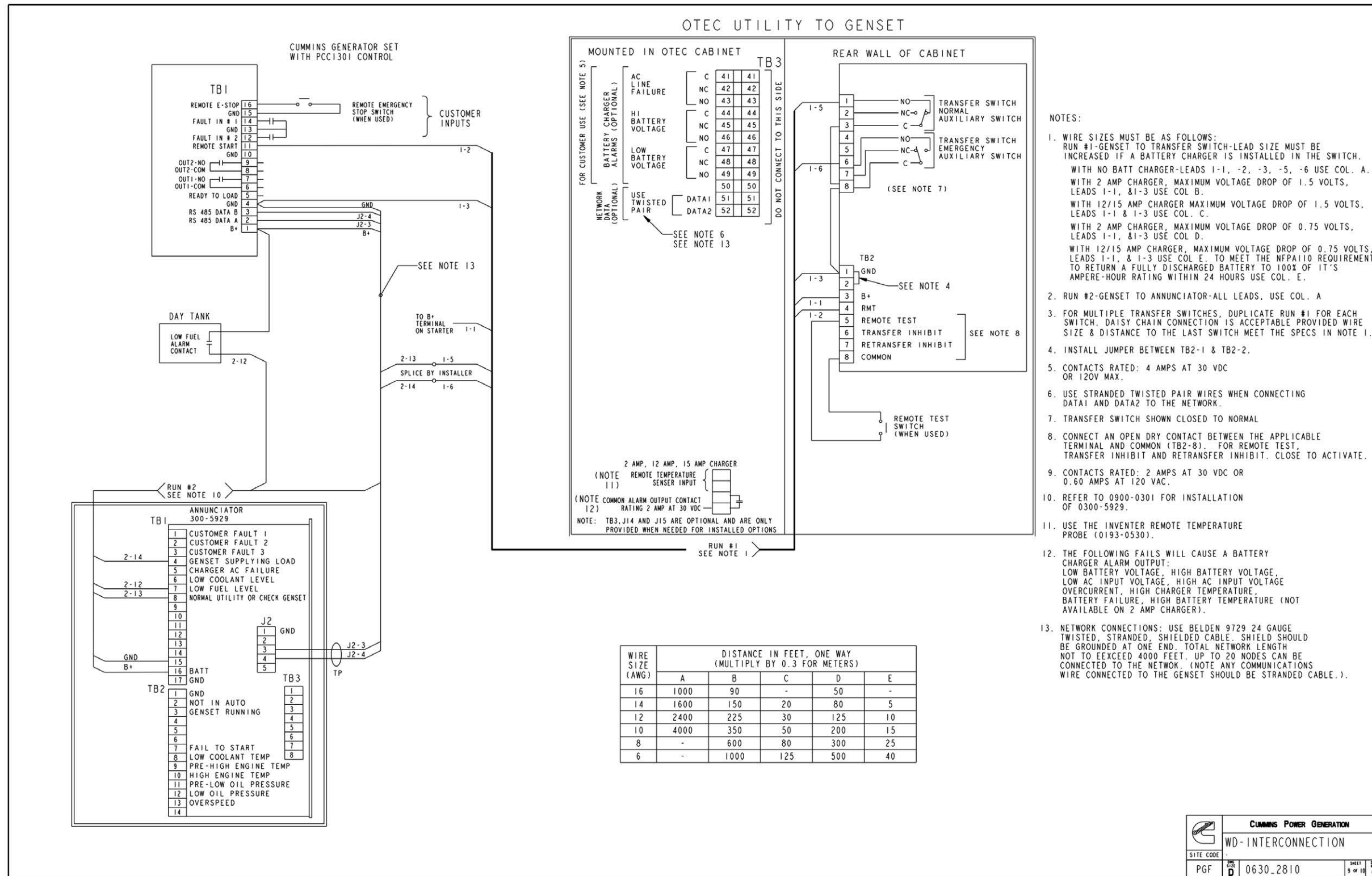


FIGURE 32. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 9 OF 10)

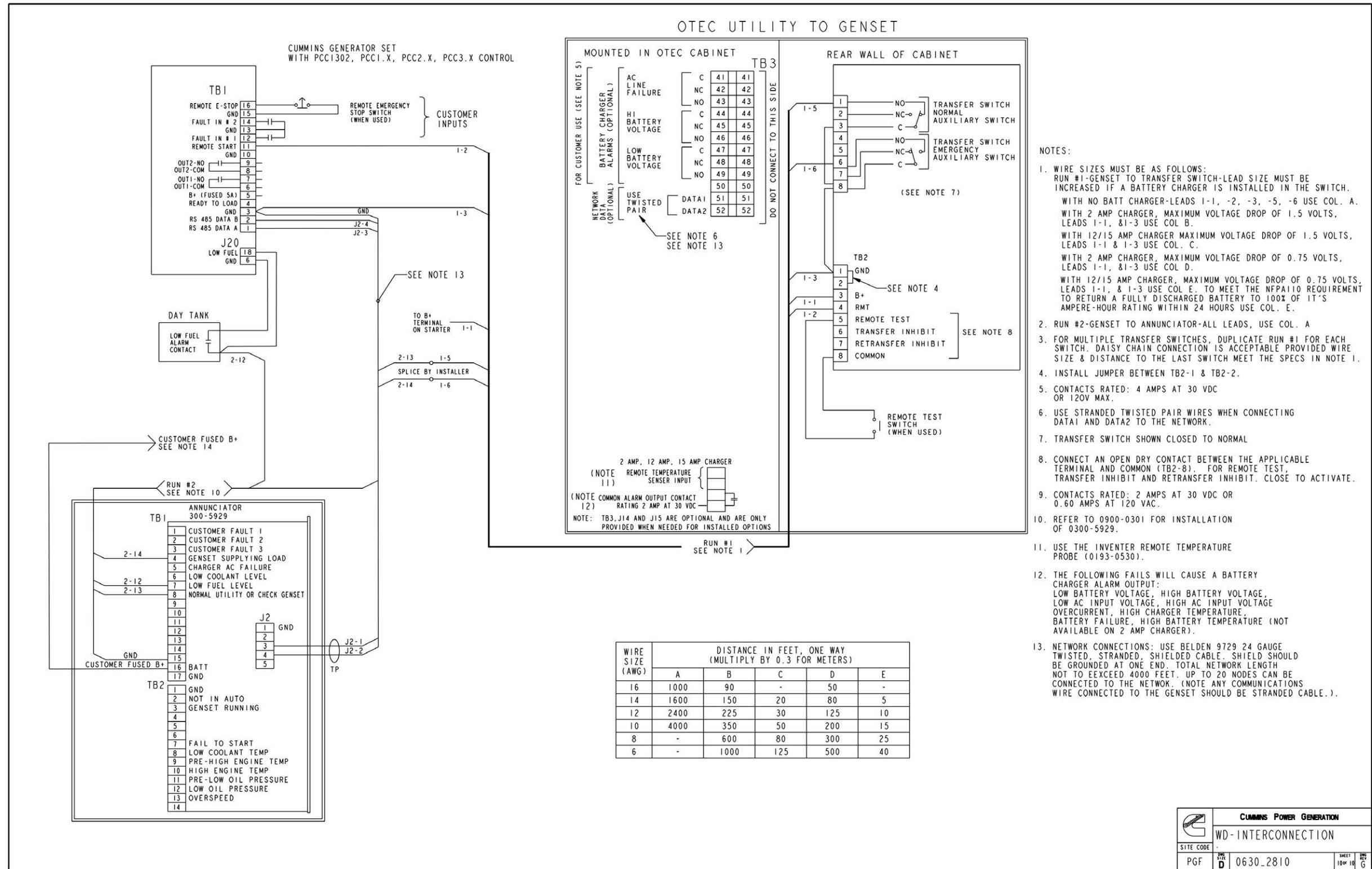
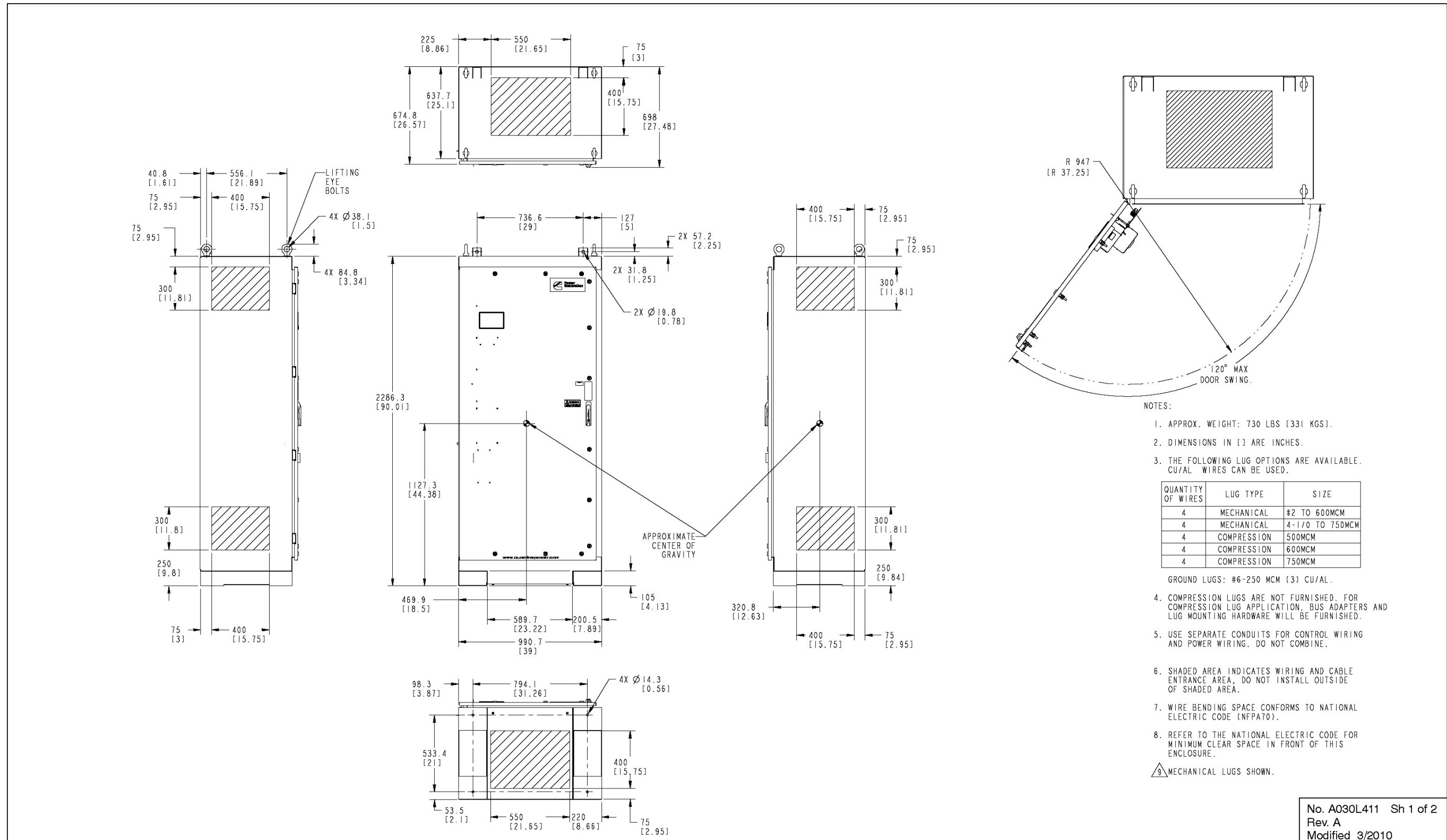


FIGURE 33. 40-1200 AMP TYPICAL INTERCONNECTION DIAGRAM 630-2810 (SHEET 10 OF 10)



No. A030L411 Sh 1 of 2  
 Rev. A  
 Modified 3/2010

FIGURE 34. OPEN CONSTRUCTION (SHEET 1 OF 8)

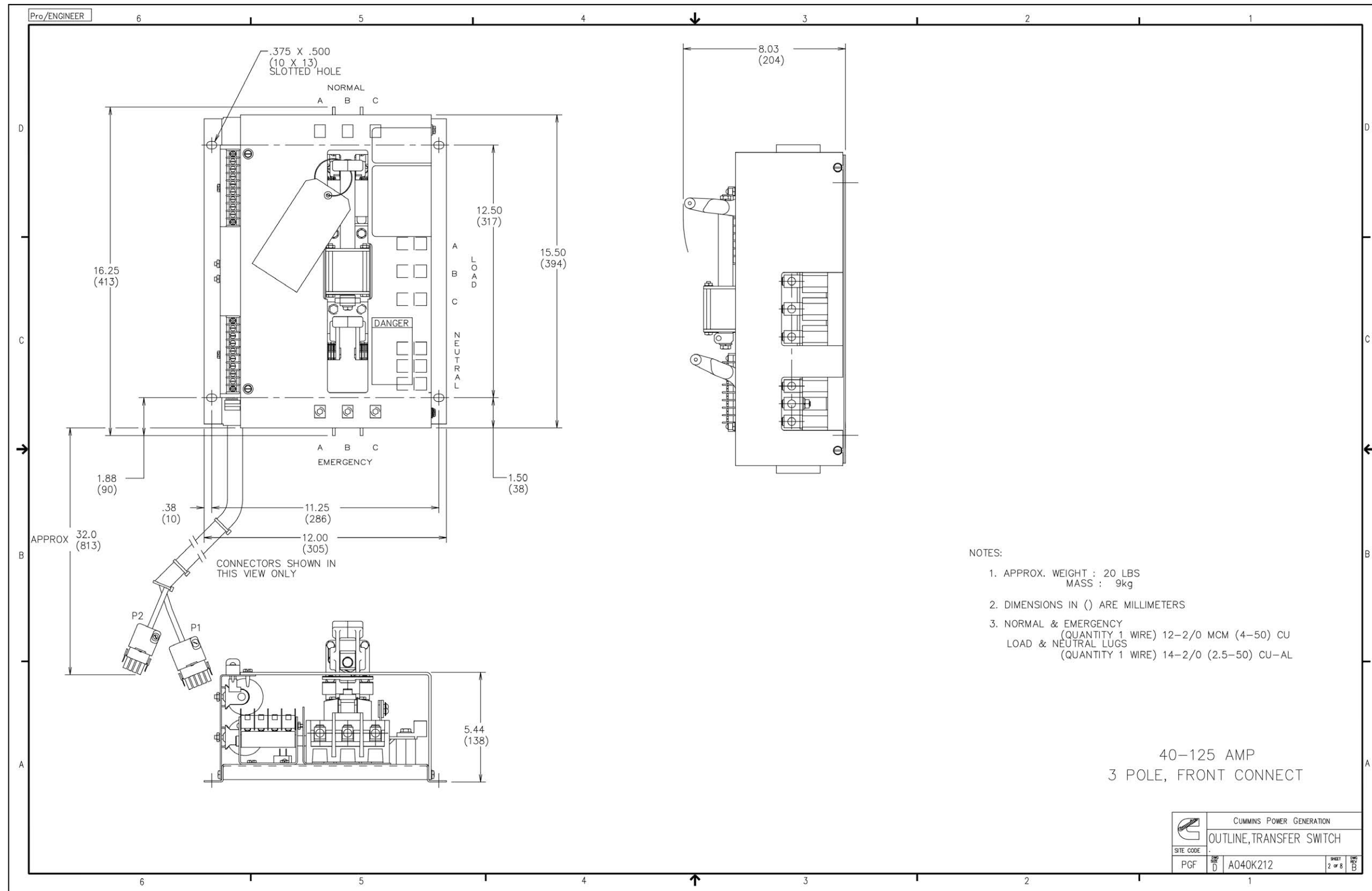


FIGURE 35. OPEN CONSTRUCTION (SHEET 2 OF 8)

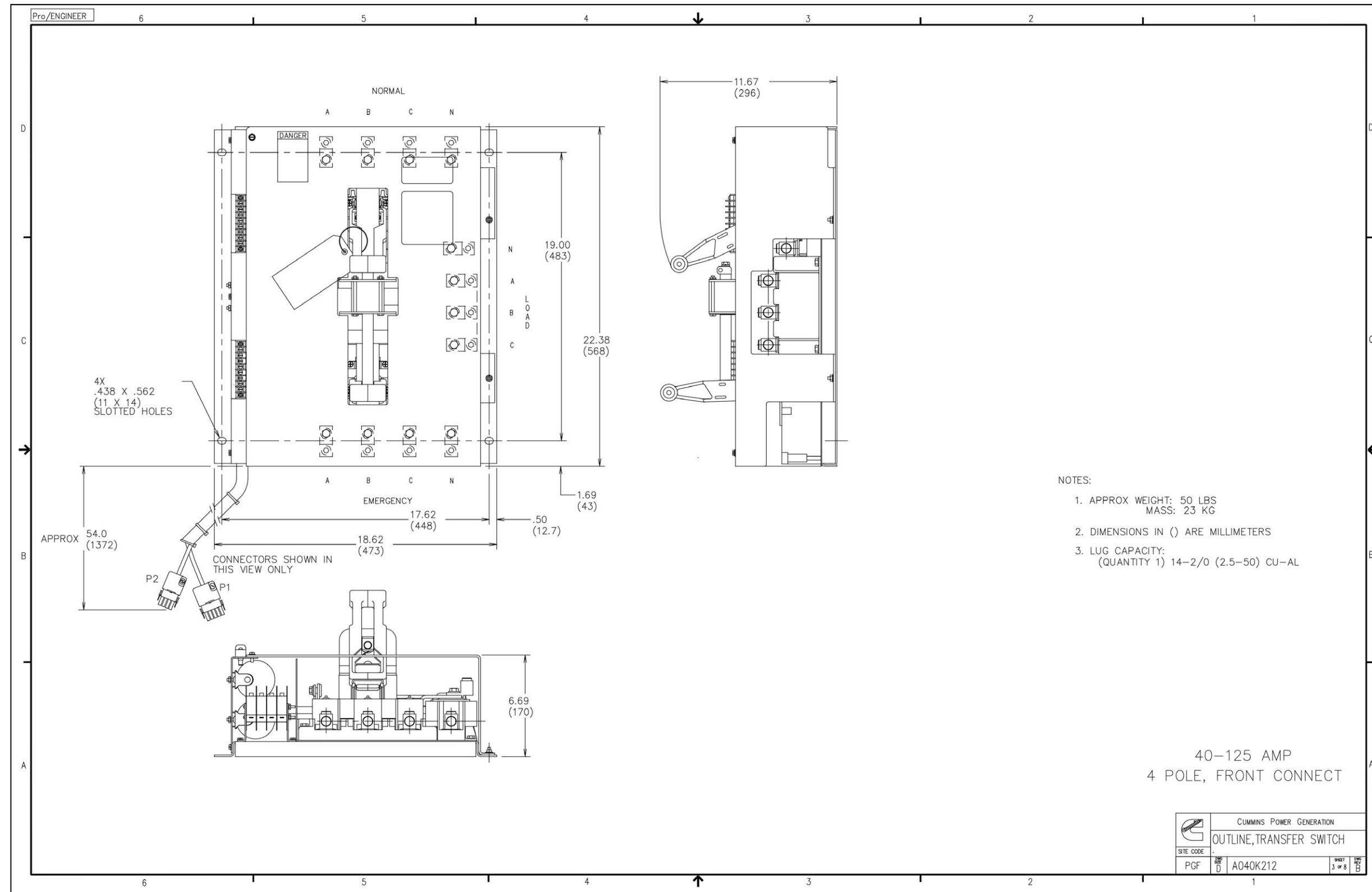


FIGURE 36. OPEN CONSTRUCTION (SHEET 3 OF 8)

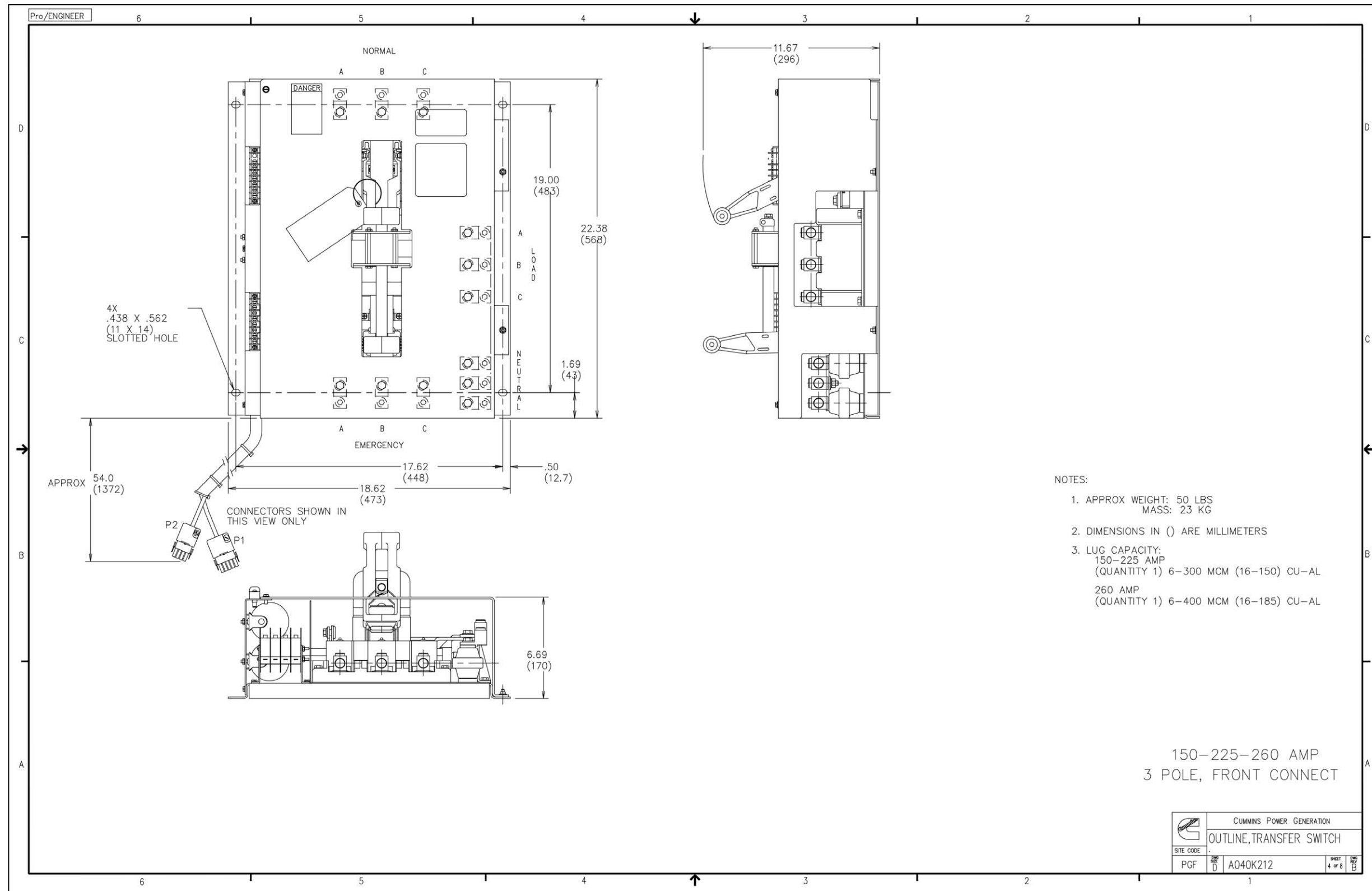


FIGURE 37. OPEN CONSTRUCTION (SHEET 4 OF 8)

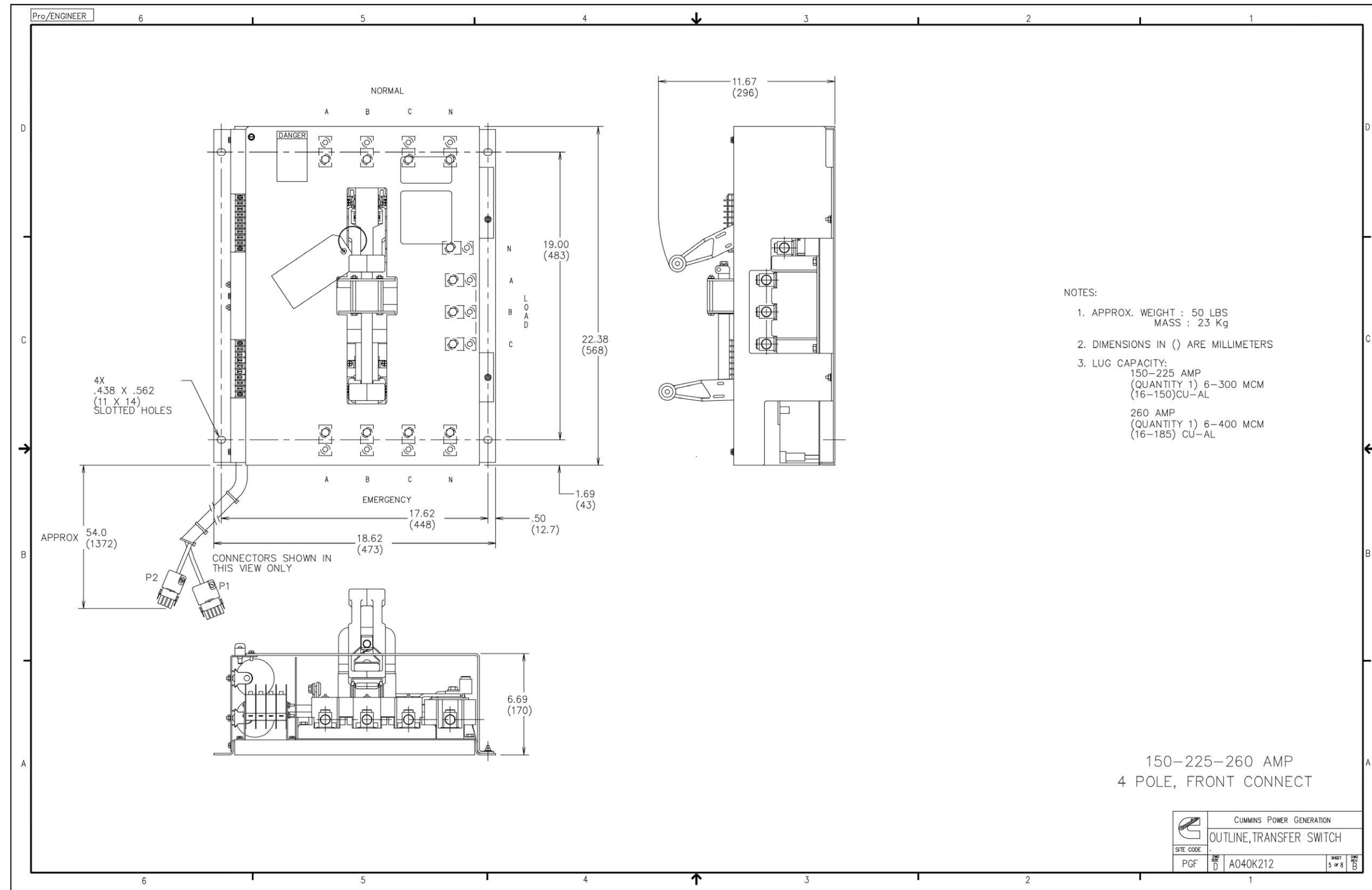


FIGURE 38. OPEN CONSTRUCTION (SHEET 5 OF 8)

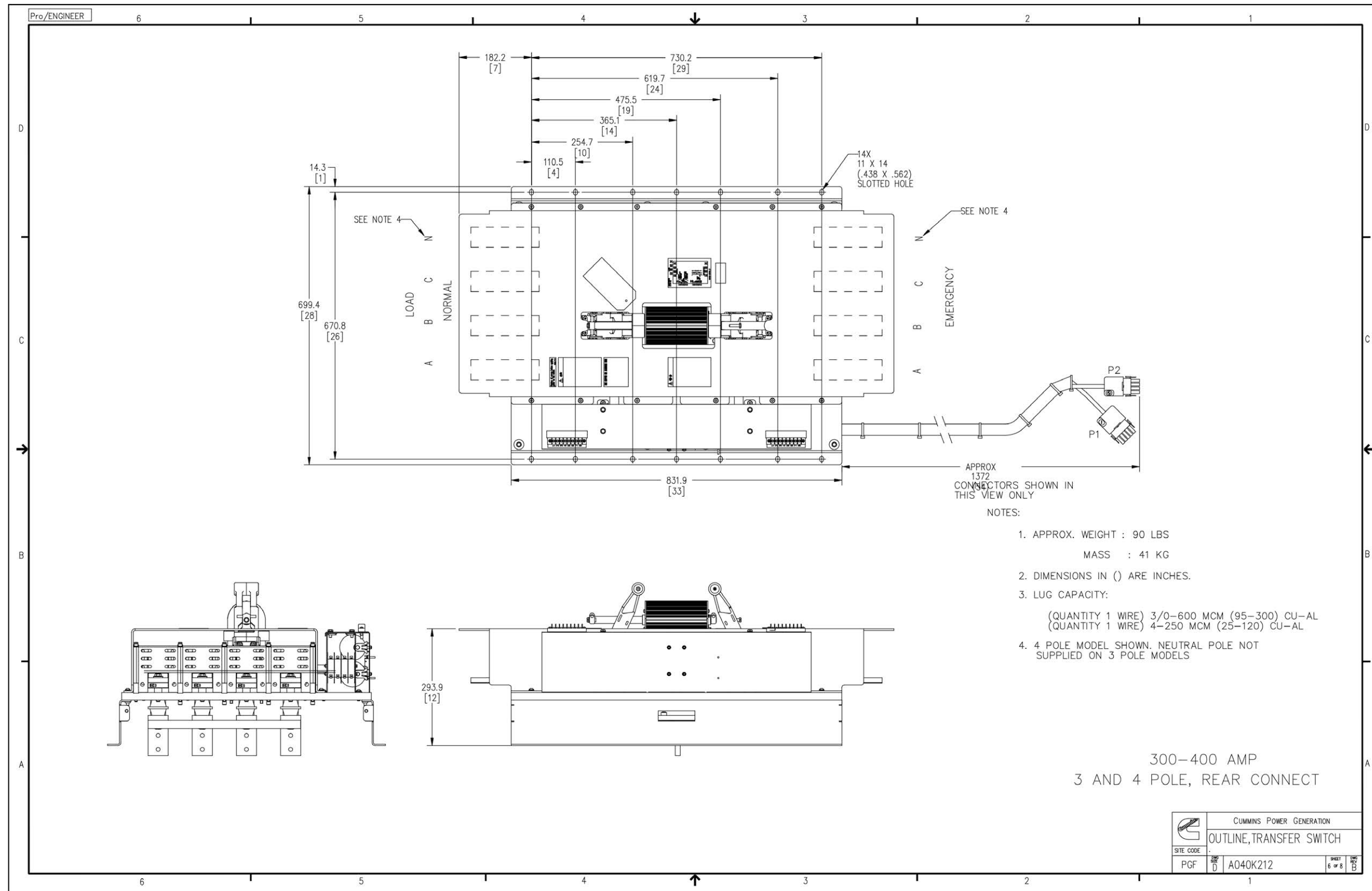


FIGURE 39. OPEN CONSTRUCTION (SHEET 6 OF 8)

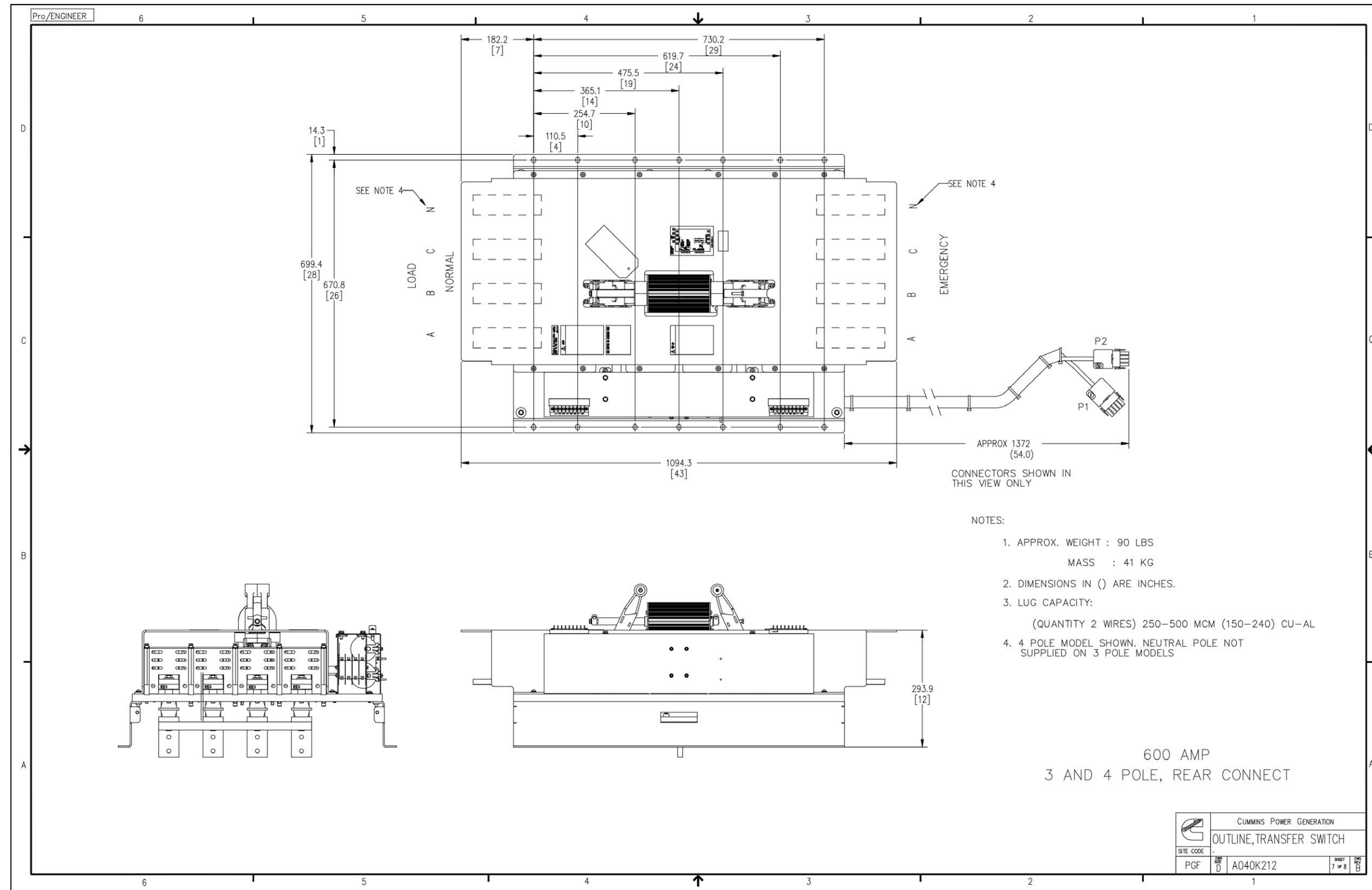


FIGURE 40. OPEN CONSTRUCTION (SHEET 7 OF 8)

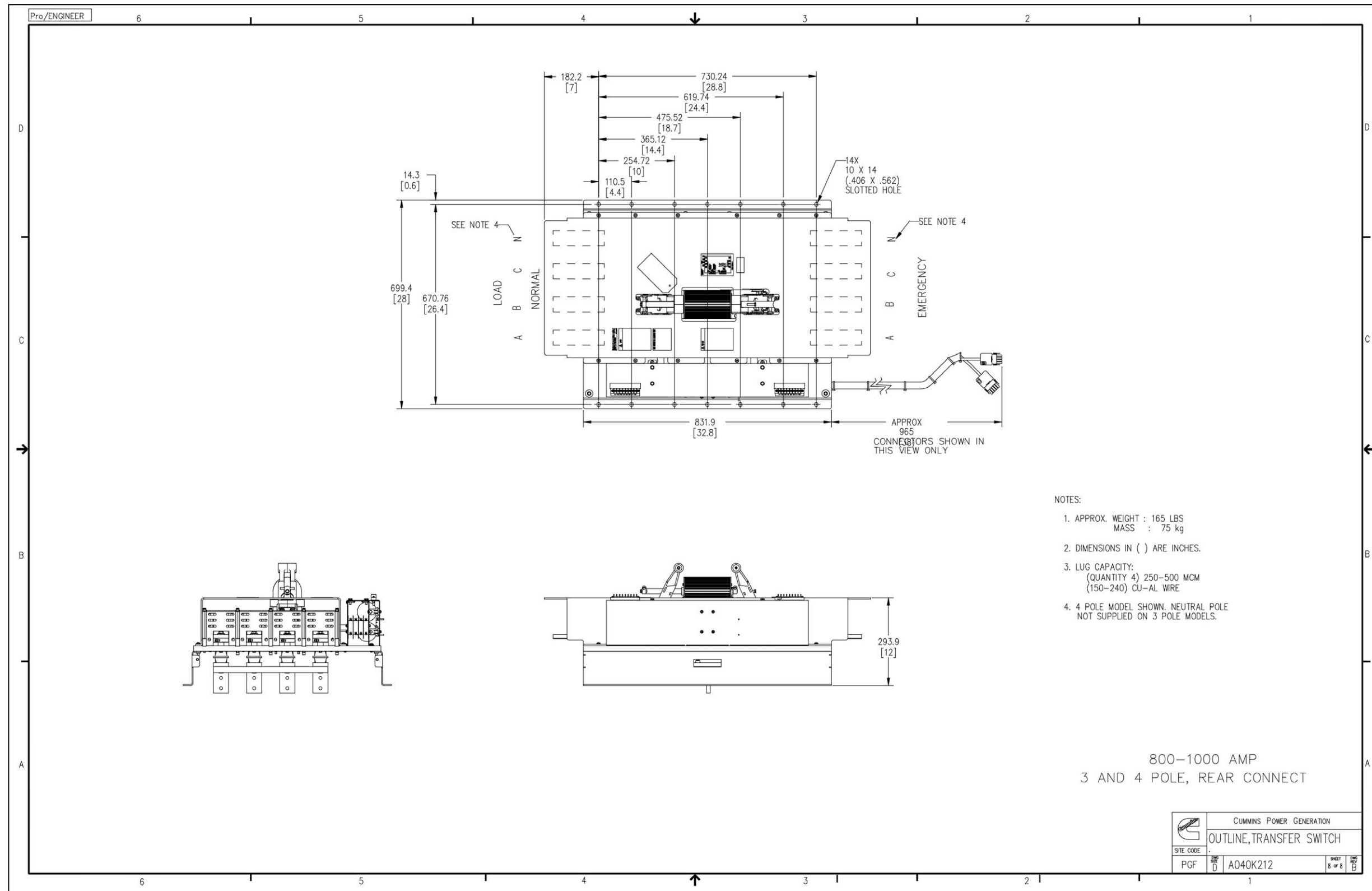


FIGURE 41. OPEN CONSTRUCTION (SHEET 8 OF 8)



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