



Installation Manual

Our energy working for you.™



**Power
Generation**

Transfer Switch

40–1000 Amps

OTECSE

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Safety Precautions

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.

Keep the transfer switch cabinet closed and locked. Make sure only authorized personnel have the cabinet keys.

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

If the cabinet must be opened for any reason:

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.

⚠ WARNING *AC power within the cabinet and the rear side of the cabinet door presents a shock hazard that can cause severe personal injury or death. With the circuit breaker in the Off position, the line side lugs are still energized.*

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 *Because the unit is top heavy, there is a risk of equipment damage and severe personal injury or death when it is moved. To prevent it from tipping, be sure to block and brace the transfer switch.*

⚠ 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.

1. Introduction

INSTALLATION MANUAL

This manual covers models produced under the Cummins®/Onan® and Cummins Power Generation (CPG) brand names.

This manual provides information necessary for the installation of an OTECSE transfer switch. This is an open and programmed transition service entrance transfer switch that includes an automatic transfer switch (ATS) control.

With an open transition switch, there is never a time when both sources are supplying power to the load.

Programmed transition switches pause in the neutral position of the transfer switch, between switched positions, so that transient currents from the load can diminish before the load is switched to the other source.

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.

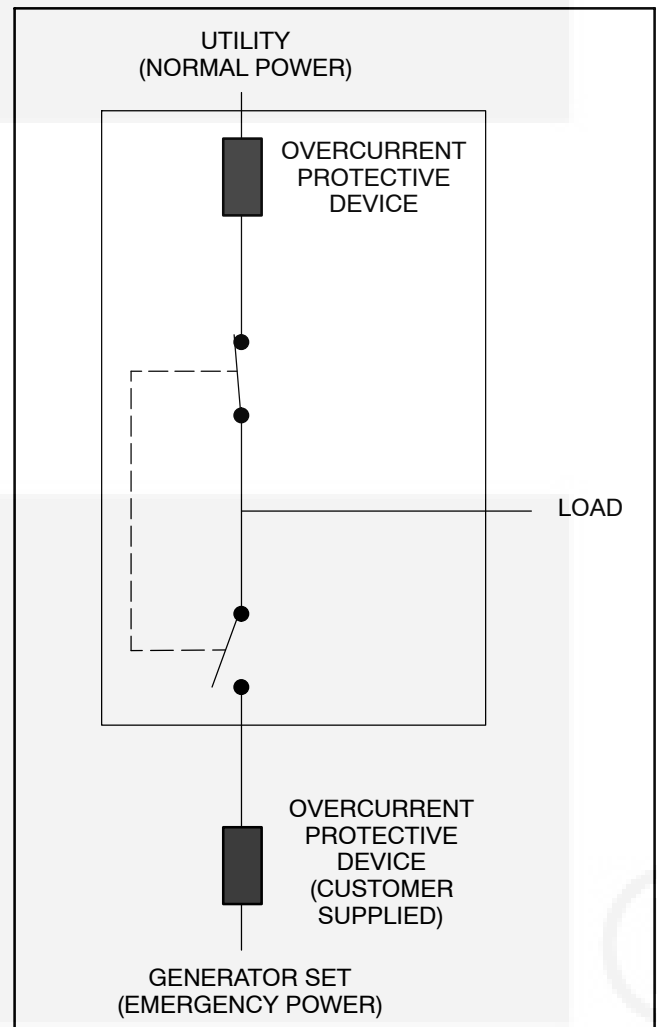
The load is connected to the common of the ATS (Figure 1-1). Under normal conditions, the load is supplied with power from the utility (as illustrated). If utility power is interrupted, the load is transferred to the generator set (genset). When utility power returns, the load is retransferred to the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

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 generator set.
3. Transfers the load to the generator set.
4. Senses the return of utility power.
5. Retransfers the load to the utility.
6. Sends a stop signal to the generator set.



**FIGURE 1-1. LOAD TRANSFER SWITCH
(TYPICAL FUNCTION)**

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 Power Generation distributor for assistance.

Application and Installation

Installations must be carefully planned and correctly installed for proper operation. This involves two essential elements: application and installation.

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, and 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. Specifying 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.

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.

MODEL IDENTIFICATION

Identify your model by referring to the Model and Specification number as shown on the nameplate. Electrical characteristics are shown on the lower portion of the nameplate (see Figure 1-2), which is located on the cabinet door.

If it is necessary to contact a distributor regarding the transfer switch, always give the complete Model, Specification, and Serial number. This information is necessary to properly identify your unit among the many types manufactured.

Model No. Modelo	①	②	③
Serial No. Serie	④		Spec. ⑤
IMPORTANT! Model & Serial No. Required When Ordering Parts. Modele & No. Serie Requis Pour Commander Des Pieces.			
CUMMINS POWER GENERATION 1400 73rd Avenue N.E. Minneapolis, MN 55432 MADE IN U.S.A.			
CURRENT RATING: AMPS CONTINUOUS LOAD CURRENT NOT TO EXCEED 80 PERCENT OF SWITCH RATING			
VOLTAGE- VAC FREQUENCY- Hertz POLES- APPL-			
FEATURES:			
WIRING DIAGRAM:			
BUILT IN COMPLIANCE WITH NFPA 70. AUTOMATIC TRANSFER SWITCH FOR EMERGENCY SYSTEMS.			

FIGURE 1-2. NAMEPLATE

The model number is made up of code segments that designate various features or options:

OTECSEA0000000

1 2 3

Serial Number

4

Spec.A

5

1. OTECSE - Service entrance transfer switch model
2. Ampere Rating:
A = 40, 70, 100, 125
B = 150, 200, 225, 250
C = 300, 400, 600
D = 800, 1000
3. Assigned spec number - issued for each specific combination of accessories, voltages, frequency, and standards codes. This number is only repeated for standard product.
4. Serial Number – A unique number assigned to the transfer switch.
5. Specification letter – advances with production modification.

HOW TO OBTAIN SERVICE

When the transfer switch requires servicing, contact your nearest Cummins Power Generation distributor. Factory-trained Parts and Service representatives are ready to handle all your service needs.

To contact your local Cummins Power Generation distributor in the United States or Canada, call 1-800-888-6626 (this automated service utilizes touch-tone phones only). By selecting Option 1 (press 1), you will be automatically connected to the distributor nearest you.

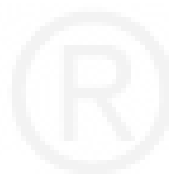
If you are unable to contact a distributor using the automated service, consult the Yellow Pages. Typically, our distributors are listed under:

Generators-Electric,
Engines-Gasoline or Engines-Diesel, or
Recreational Vehicles-Equipment,
Parts and Service.

For outside North America, call Cummins Power Generation, 1-763-574-5000, 7:30 AM to 4:00 PM, Central Standard Time, Monday through Friday. Or, send a fax to Cummins Power Generation using the fax number 1-763-528-7290.

When contacting your distributor, always supply the complete Model, Specification, and Serial Number as shown on the nameplate (see Figure 1-2).

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2. Mounting

LOCATION

The location of the transfer switch in the existing electrical circuit varies with the application and the type of entrance switch. The location and wiring must comply with the contract drawings.

A typical installation is shown in Figure 2-1. Cabinet dimensions and weights are listed in Table 2-1 and Table 2-2.

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.*

WALL MOUNTING

⚠WARNING *Because the unit is top heavy, there is a risk of equipment damage and severe personal injury or death when it is moved. To prevent it from tipping, be sure to block and brace the transfer switch.*

1. Make sure that the wall where the ATS switch is to be mounted is suitable to hold firmly the weight and size of the transfer switch, within a reasonable safety factor. Use factory recommended minimum Grade 2, 3/8" bolts.

2. Check the location to be sure no wires or plumbing, gas, or exhaust lines run behind the wall.
3. Make sure that all anchorage fasteners used to bolt the switch to wall are strong enough to withstand the switch weight and its vibration during operation, within a reasonable safety factor.
4. Install two mounting bolts in the wall for the top cabinet mounting keyholes.
5. With the shipping box standing so that the cabinet is upright, carefully remove the top and sides of the box.

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

6. Raise the cabinet and mount it on the two mounting bolts in the wall.
7. Install two bottom mounting bolts, but do not tighten them. **(Do not remove the cabinet support until all bolts are installed).**
8. Push the cabinet against the wall. If the cabinet does not align flush against the wall, shim the mounting bosses as required.
9. When the switch is installed on the wall, the switch cabinet should be squared up before final fastener tightening. Make sure the installed ATS is square, level, and plumb upon completion of the installation.
10. Tighten all mounting bolts.

TABLE 2-1. APPROXIMATE NEMA TYPE 1 CABINET DIMENSIONS

Switch Current Rating	Height	Width	Depth With Door		Weight
			Closed	Open	
40, 70, 100, 125 3-Pole	45.8 in 1164 mm	32.0 in 814 mm	16.3 in 413 mm	45.9 1165 mm	300 lb 136 kg
150, 200, 225, 250	73.6 in 1689 mm	32.3 in 820 mm	19.7 in 499 mm	49.6 in 1259 mm	500 lb 227 kg
300, 400, 600	74.5 in 1892 mm	34.4 in 873 mm	20.1 in 510.4 mm	50.9 in 1293 mm	520 lb 236 kg
800, 1000	90 in 2286 mm	39 in 991 mm	26.3 in 667 mm	63 in 1599 mm	920 lb 417 kg

TABLE 2-2. APPROXIMATE NEMA TYPE 3R AND 12 CABINET DIMENSIONS

Switch Current Rating	Height	Width	Depth with Door		Weight
			Closed	Open	
40, 70, 100, 125 3-Pole	45.8 in 1164 mm	32.0 in 814 mm	16.3 in 413 mm	45.9 in 1165 mm	340 lb 154 kg
150, 200, 225, 250	73.6 in 1689 mm	32.3 in 820 mm	19.7 in 499 mm	49.6 in 1259 mm	580 lb 263 kg
300, 400, 600	74.5 in 1892 mm	34.4 in 873 mm	20.1 in 510.4 mm	50.9 in 1293 mm	600 lb 272 kg
800, 1000	90 in 2286 mm	39 in 991 mm	26.3 in 667 mm	63 in 1599 mm	1050 lb 476 kg

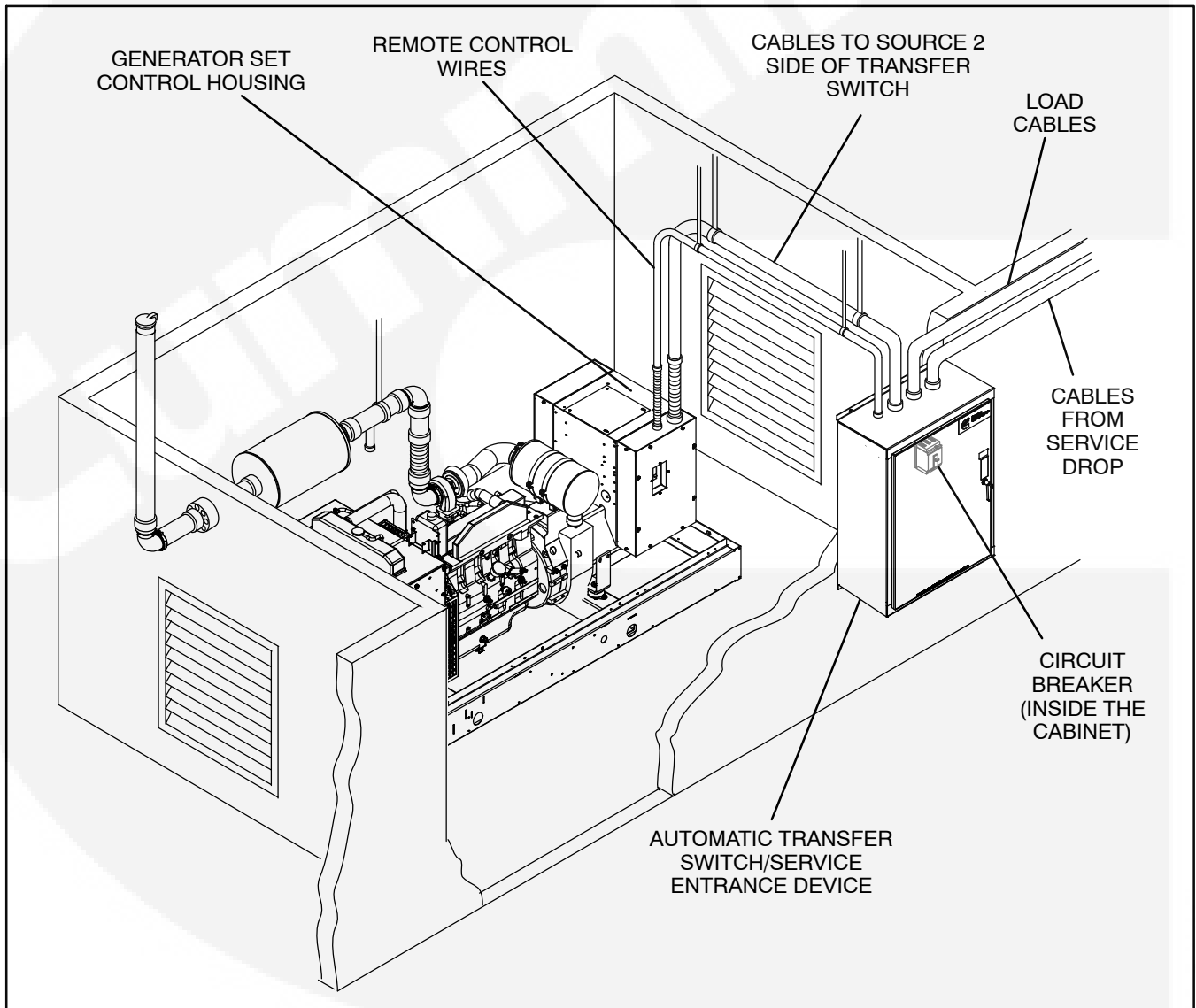


FIGURE 2-1. TYPICAL WALL-MOUNT INSTALLATION

3. Wiring

Refer to Figures 3-1 thru 3-4 for component locations.

⚠ 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. Cutouts can be made through the top, bottom, or sides of the cabinet. (Refer to the switch outline drawings included in Section 4.)

⚠ 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.*

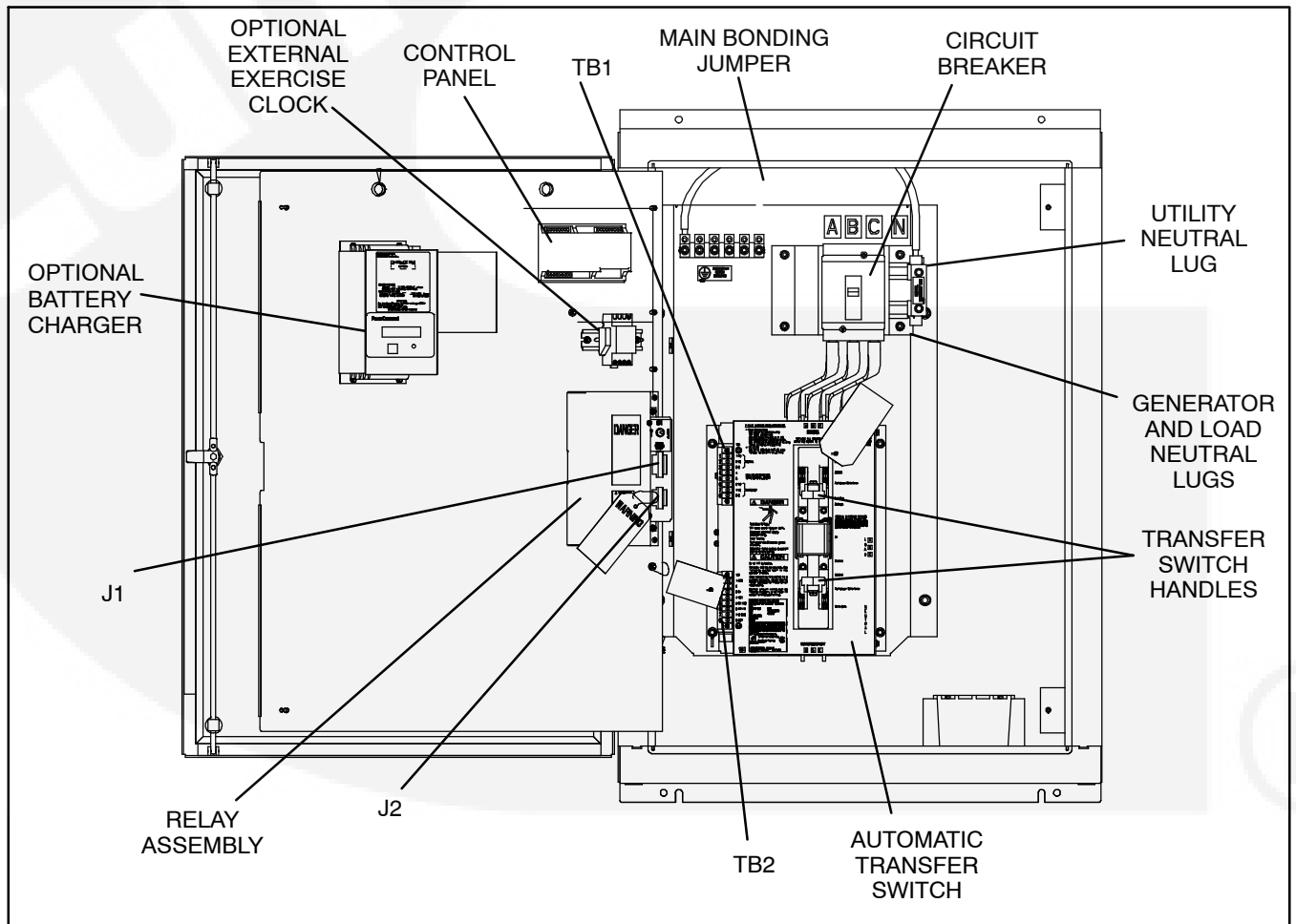


FIGURE 3-1. INTERIOR/COMPONENTS: 40-125 AMP, 3 POLE SWITCH, TYPE 3R AND 12 CABINET

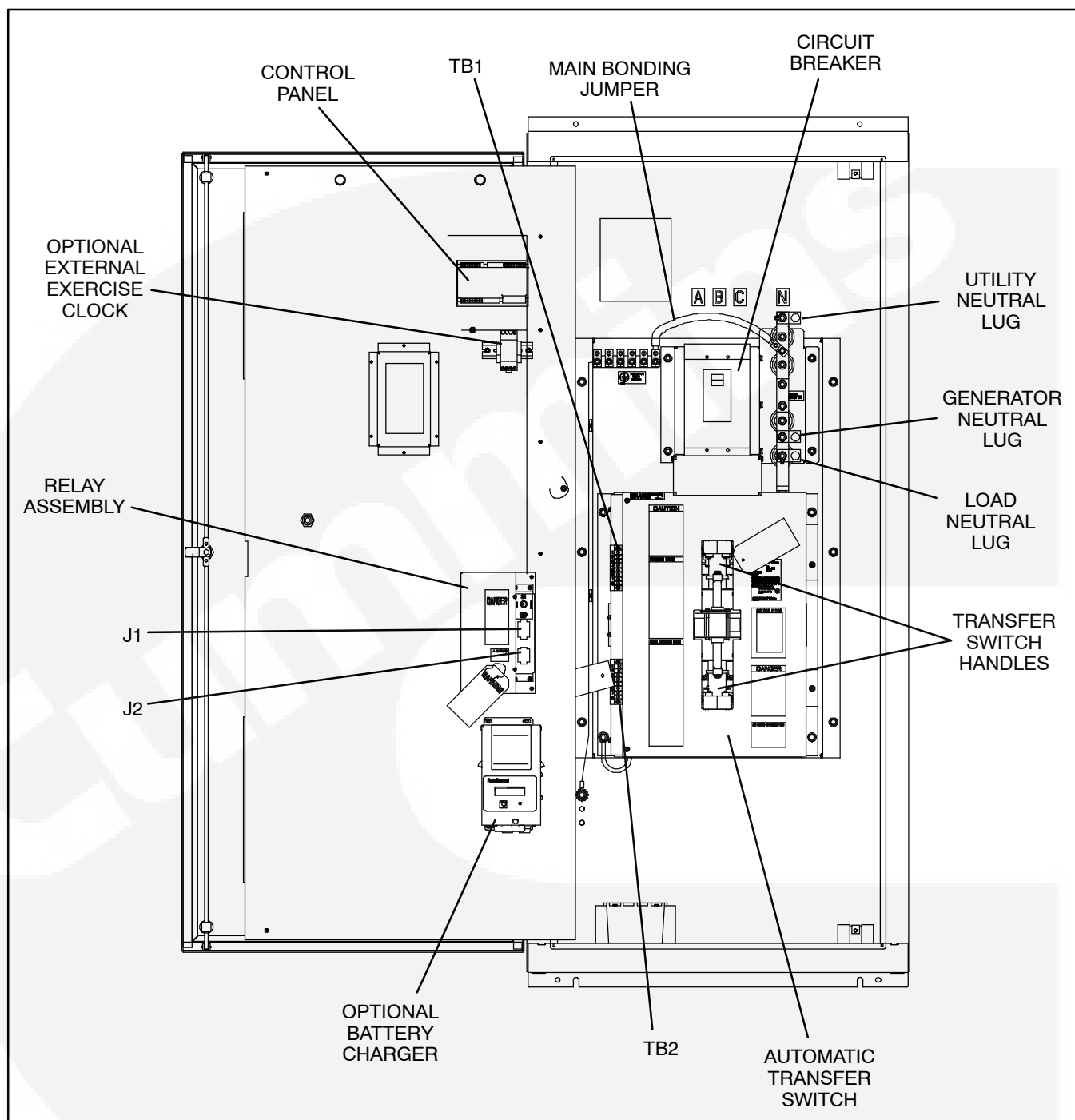


FIGURE 3-2. INTERIOR/COMPONENTS: 150-250 AMP, 3 POLE SWITCH, TYPE 3R AND 12 CABINET

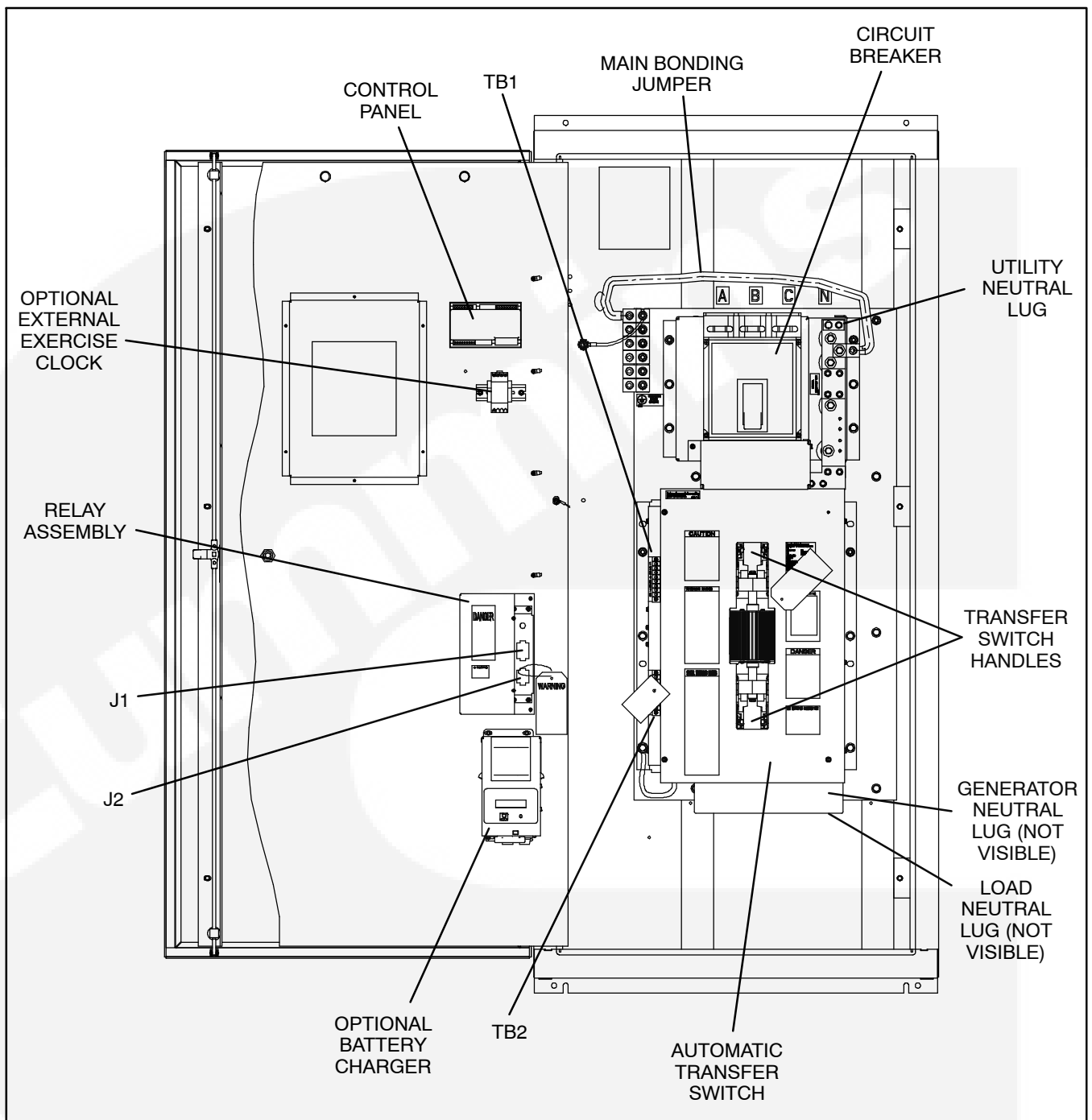


FIGURE 3-3. INTERIOR/COMPONENTS: 300-600 AMP, 4 POLE SWITCH, TYPE 3R AND 12 CABINET

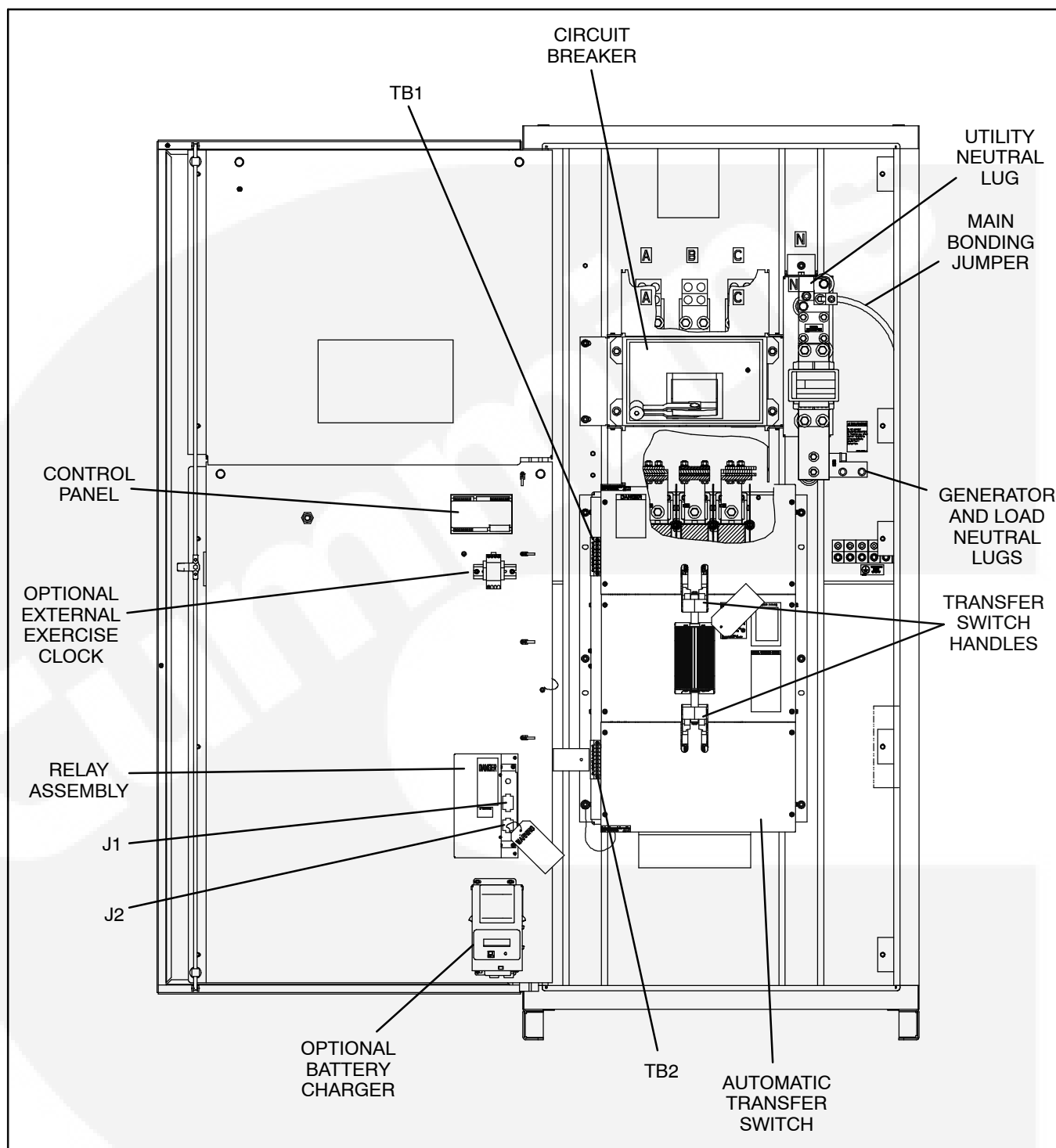


FIGURE 3-4. INTERIOR/COMPONENTS: 800-1000 AMP, 3 POLE SWITCH, TYPE 3R AND 12 CABINET

AC CONNECTIONS

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 generator set power sources.

Table 3-2 gives the type and maximum conductor size the transfer switch accepts. Figure

3-5 shows transfer switch source and load connections.

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 Table 3-1.

TABLE 3-1. 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)
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.

TABLE 3-2. TERMINAL LUG CAPACITY FOR COPPER (CU) OR ALUMINUM (AL) CONDUCTORS

Current Rating	Utility circuit Breaker		Emergency, Load, and Neutral		Ground	
	Cables Per Phase	Wire Size	Cables Per Phase	Wire Size	Cables	Wire Size
40/70/125	1	#14 AWG-3/0	1	#12 AWG-2/0	1	#14 AWG-1/0
150/225/250	1	#2 AWG-600 MCM (CU)	1	#6 AWG-400 MCM	1	#14 AWG-1/0
	1	#2 AWG-500 MCM (AL)				
300/400/600	3	#3 AWG-500 MCM	2	250–500 MCM	1	#6 AWG-350 MCM
800/1000	4	250–500 MCM	4	250–500 MCM	1	#6 AWG 250 MCM

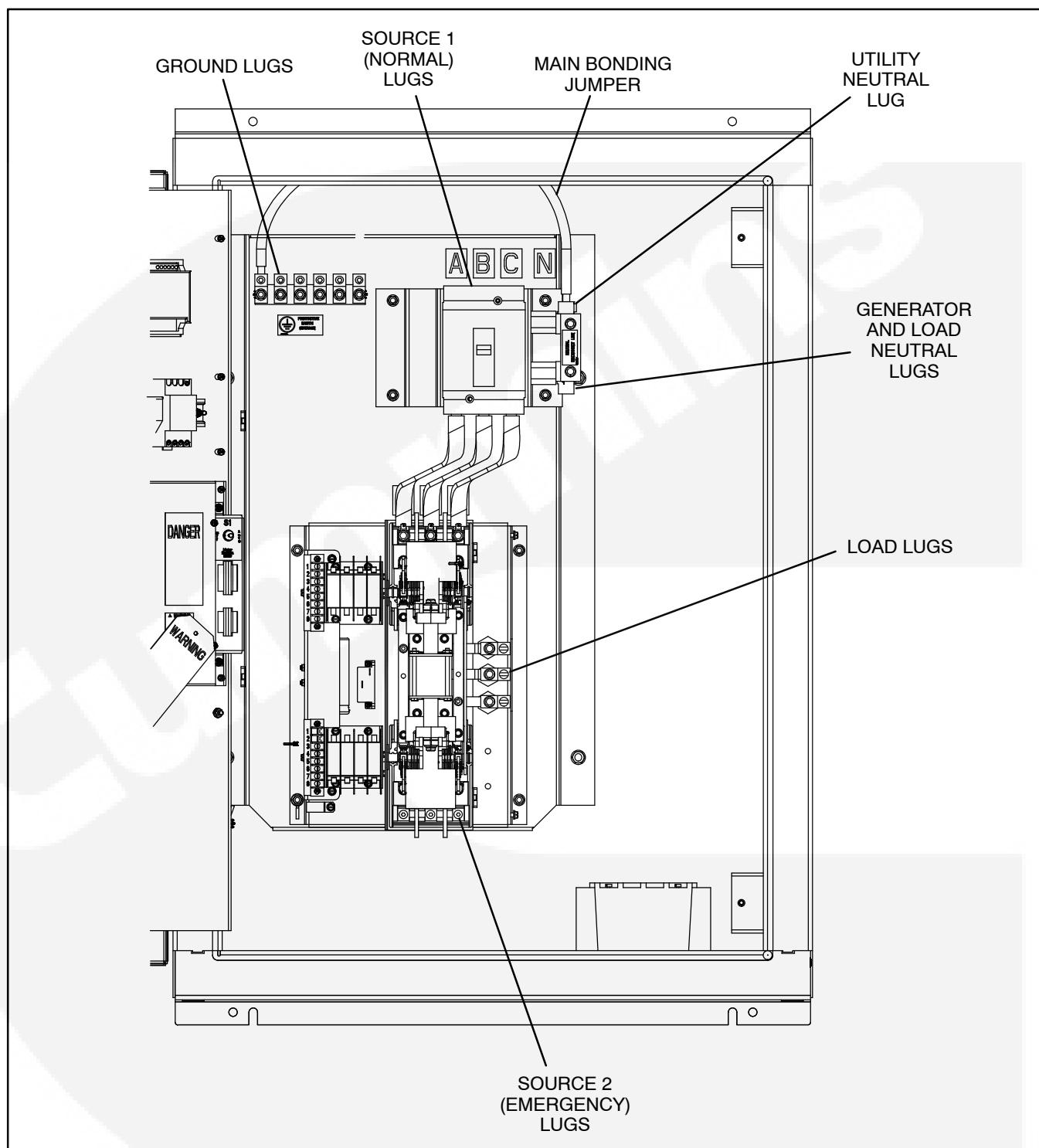


FIGURE 3-5. 40-125 AMPERE TRANSFER SWITCH TERMINAL ACCESS

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 mounted on the relay plate (see Figure 3-6).

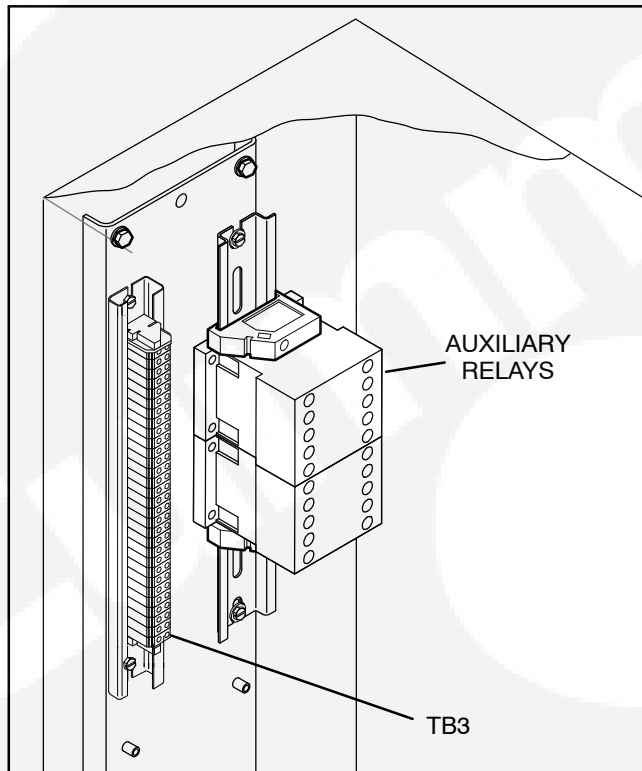


FIGURE 3-6. CONTROL WIRING CONNECTIONS

Connecting Transfer Switch to Generator Set

⚠ 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. Refer to Table 3-3 to determine the wire size required.

- All leads to TB2 use Column A.
- If the transfer switch is not equipped with a battery charger, use Column A for all wires.
- If the transfer switch is equipped with a 2-Amp charger with a maximum voltage drop of 1.5

volts, use Column B for B+ and GND (leads 1-1 and 1-3). Use Column A for all other wires.

- If the transfer switch is equipped with a 2-Amp charger with a maximum voltage drop of .75 volts, use Column D for B+ and GND (leads 1-1 and 1-3). Use Column A for all other wires.
- If the transfer switch is equipped with a 12/15-Amp charger with a maximum voltage drop of 1.5 volts, use Column C for B+ and GND. Use Column A for all other wires.
- If the transfer switch is equipped with a 12/15-Amp charger with a maximum voltage drop of .75 volts, use Column E for B+ and GND. Use Column A for all other wires. To meet the NFPA requirement to return a fully discharged battery to 100% of its ampere-hour rating within 24 hours, use Column E.
- If the generator set is equipped with an annunciator, use Column A for wires to the annunciator.

TABLE 3-3. WIRE SPECIFICATIONS

Wire Size (AWG)	Distance in Feet, One Way (Multiply by 0.3 for Meters)				
	A	B	C	D	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).

Remote starting (for Cummins Power Generation water-cooled generator sets only) uses terminals B+, GND (ground), and RMT of terminal block TB2 (Figure 3-8). 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 and PCC 2100 generator set controls, install a jumper between TB2-1 and TB2-2 for ground-to-start connection.

- For Detector 12 generator set controls, install a jumper between TB2-2 and TB21-3 for B+ start.
- For PCC 3200, PCC 1301, PCC 1302, PCC 2300, and PCC 3300 generator set controls requiring a dry contact start, do not install a jumper.

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

Auxiliary Contacts

Auxiliary contacts, for external alarm or control circuitry, are available for the Normal (utility power) and Emergency (generator set power) sides of the transfer switch. Connections for the auxiliary contacts can be made on terminal block TB1 (Figure 3-7). The contacts have ratings of 10 amperes at 250 VAC. Figure 3-7 shows the normally open and normally closed positions of the auxiliary contacts with the transfer switch in the neutral position. Moving the transfer switch to Normal or Emergency actuates the corresponding auxiliary contacts.

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

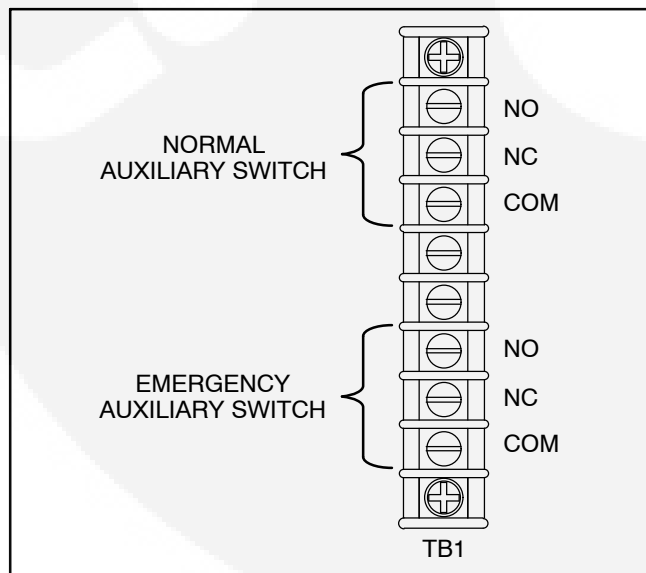


FIGURE 3-7. TERMINAL BLOCK TB1

Remote Start-Stop Connections

Use number 18 to number 12 AWG wire. Resistance must not exceed 0.5 ohm per line. Stranded wire is recommended. For connection to the screw terminal, strip the insulation back 3/8 inch (10 mm).

Remote starting (for CPG water-cooled generator sets only) uses terminals B+, GND (ground), and RMT of terminal block TB2 (Figure 3-8). Connect these terminals to like terminals on the generator set. Refer to your generator set wiring diagrams.

Connect the supplied jumper between terminals 1 and 2 for PowerCommand control systems. Connect the jumper between terminals 2 and 3 for Detector Control systems. Do not use the jumper for all other systems.

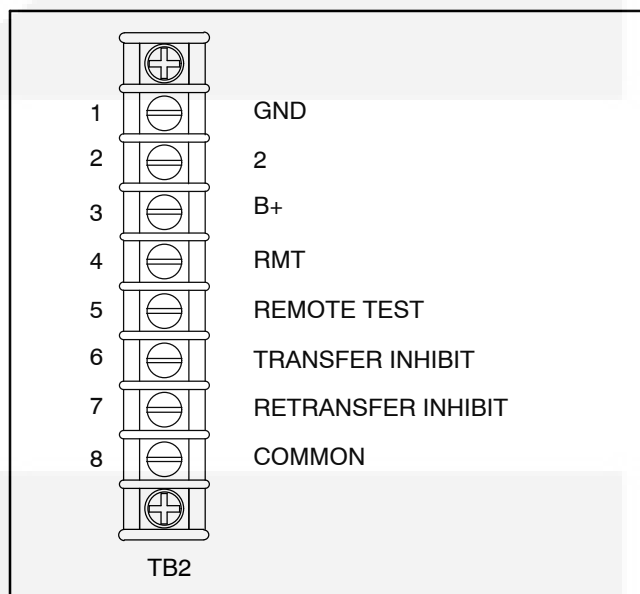


FIGURE 3-8. TB2: START CONNECTIONS, REMOTE TEST, AND TRANSFER/RETRANSFER INHIBIT

Remote Test Input

To add remote test, connect a normally open, dry contact between terminals 5 and 8 of TB2 (see Figure 3-9). Closing the contact activates the feature and opening the contact deactivates it.

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

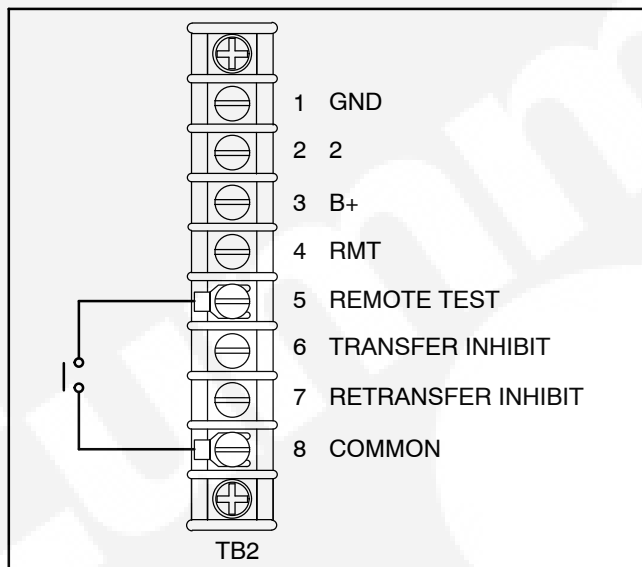


FIGURE 3-9. TB2 CONNECTIONS FOR REMOTE TEST TRANSFER

Transfer Inhibit Input

To add transfer inhibit, connect a normally open, dry contact between terminals 6 and 8 of TB2 (see Figure 3-10). Closing the contact enables the feature and opening the contact disables it.

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

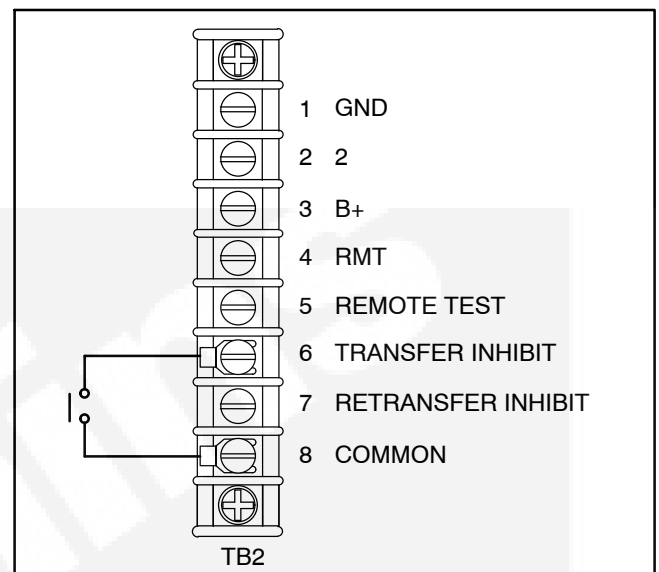


FIGURE 3-10. TB2 CONNECTIONS FOR TRANSFER INHIBIT

Retransfer Inhibit Inhibit

To add retransfer inhibit, connect a normally open, dry contact between terminals 7 and 8 of TB2 (see Figure 3-11). Closing the contact enables the feature and opening the contact disables it.

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

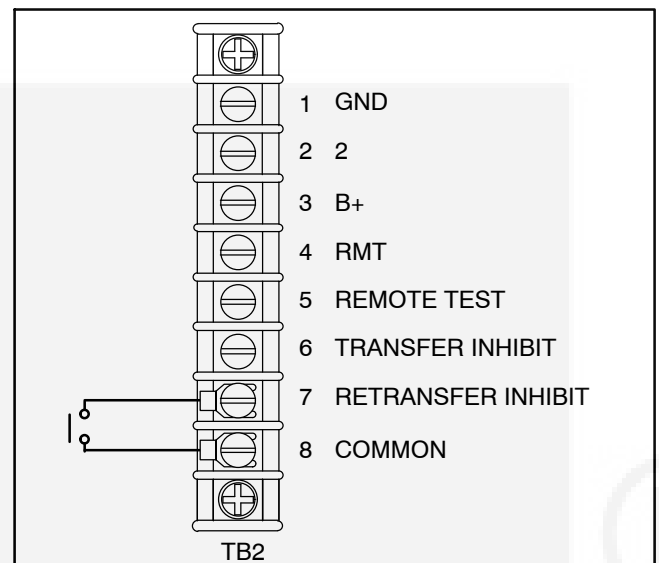


FIGURE 3-11. TB2 CONNECTIONS FOR RETRANSFER INHIBIT

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 (see Figure 3-12). Closing the

contact enables the feature and opening the contact disables it.

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

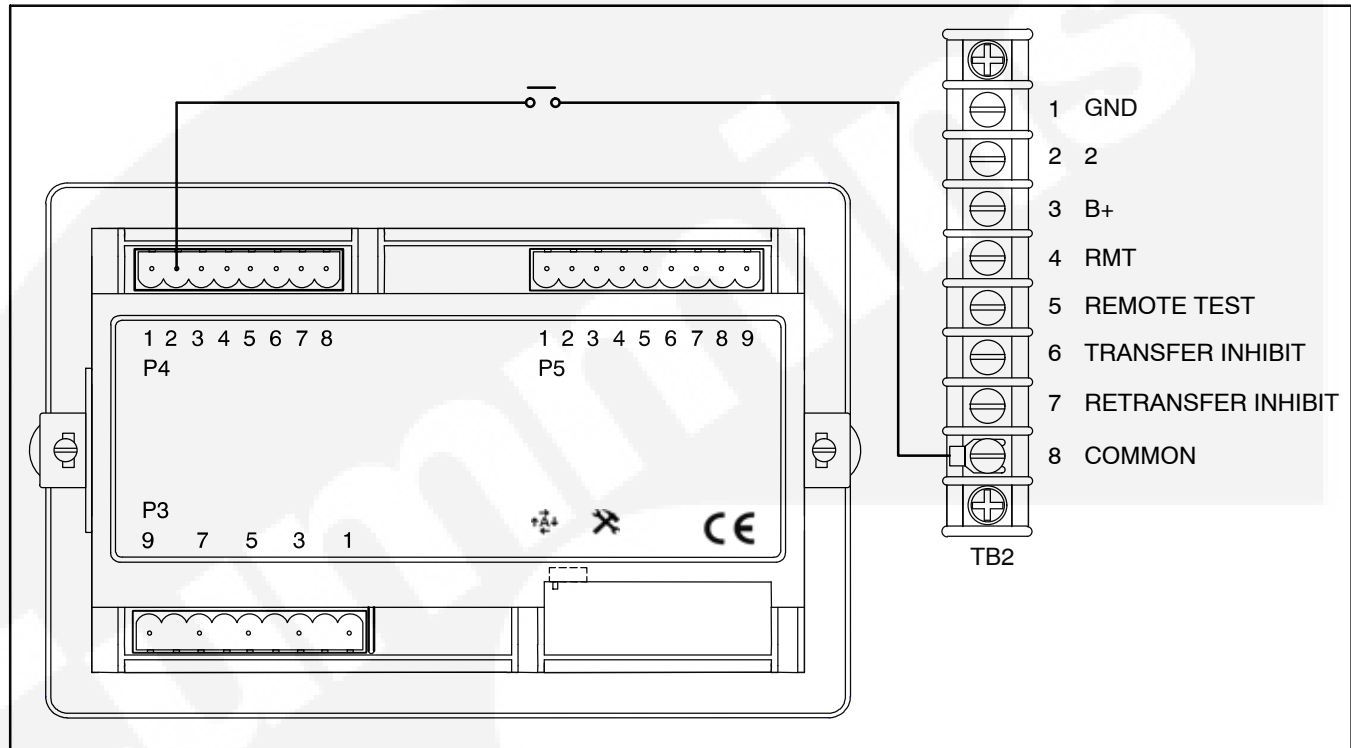


FIGURE 3-12. CONNECTIONS FOR REMOTE OVERRIDE INPUT

Auxiliary Relays and Elevator Relay Options

Connections to the auxiliary and elevator relays are made directly to the relay terminals. Auxiliary relays are mounted on the relay plate. The terminals accept wire sizes from one number 18 AWG wire to two number 12 AWG wires. For connection to the screw terminal, strip the insulation back 3/8 inch (10 mm).

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

TABLE 3-4. 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

Table 3-4 lists the available auxiliary relay and elevator signal relay options, along with their feature codes.

All relays have two normally open and two normally closed contacts that are rated for 6 amperes at 600 VAC (see Figure 3-13).

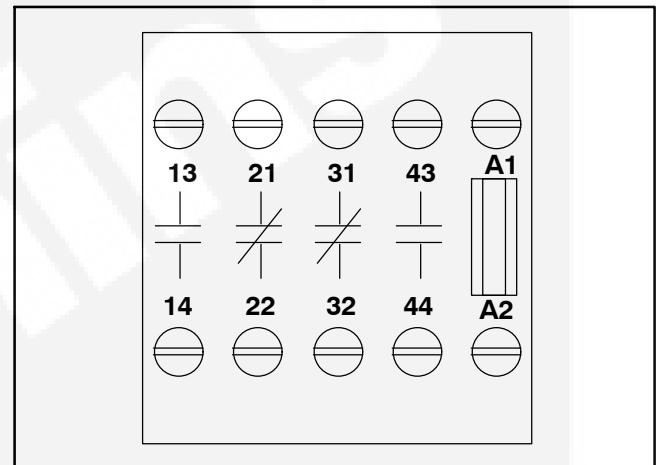


FIGURE 3-13. RELAY TERMINALS

Battery Charger Options

When so equipped, a battery charger can be used for charging generator set 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 3-14). 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.

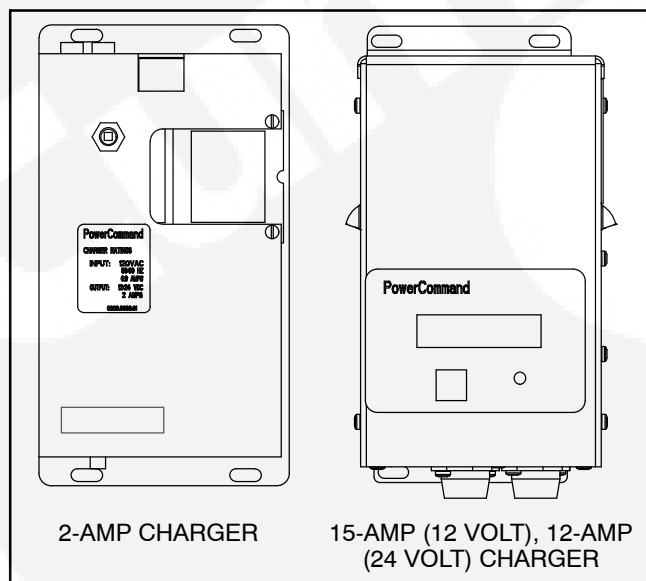


FIGURE 3-14. CURRENT BATTERY CHARGERS

2-Amp Battery Charger

The 2-ampere battery charger (see Figure 3-15) 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 ener-

gized 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 3-16).

- 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.

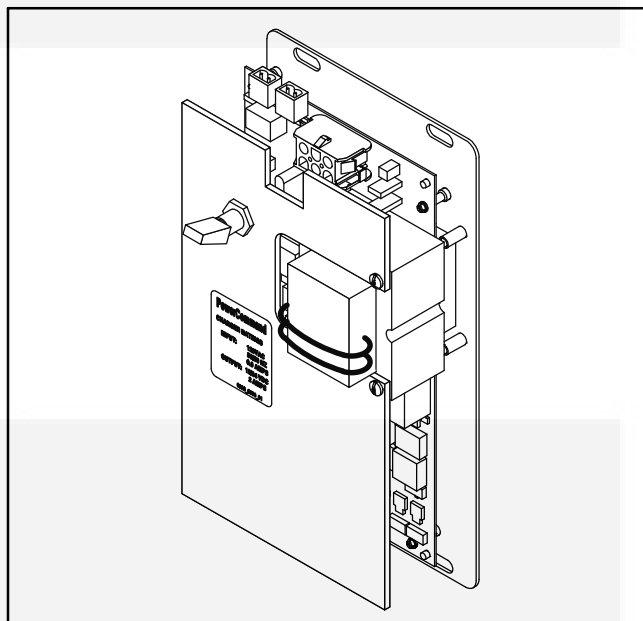


FIGURE 3-15. 2-AMP POWERCOMMAND BATTERY CHARGER

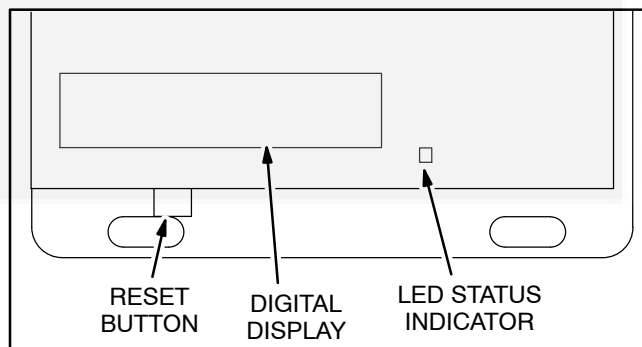


FIGURE 3-16. 2-AMP CHARGER CONTROL PANEL

Battery Charger Configuration – The **RESET** button on the control panel (see Figure 3-16) 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.)

15/12-Amp Battery Charger

There are two types of 15/12-amp PowerCommand battery chargers (see Figure 3-18). 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 3-17).

- 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 3-17) 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).

NOTE: 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 battery equalization is in process, the LED status indicator turns amber.

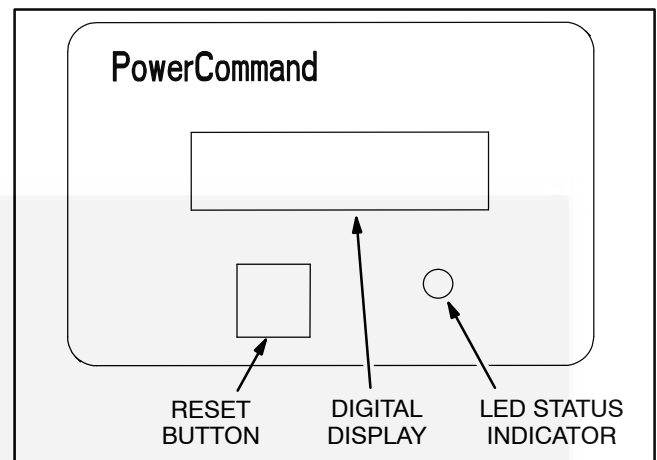


FIGURE 3-17. 15/12-AMP CHARGER CONTROL PANEL

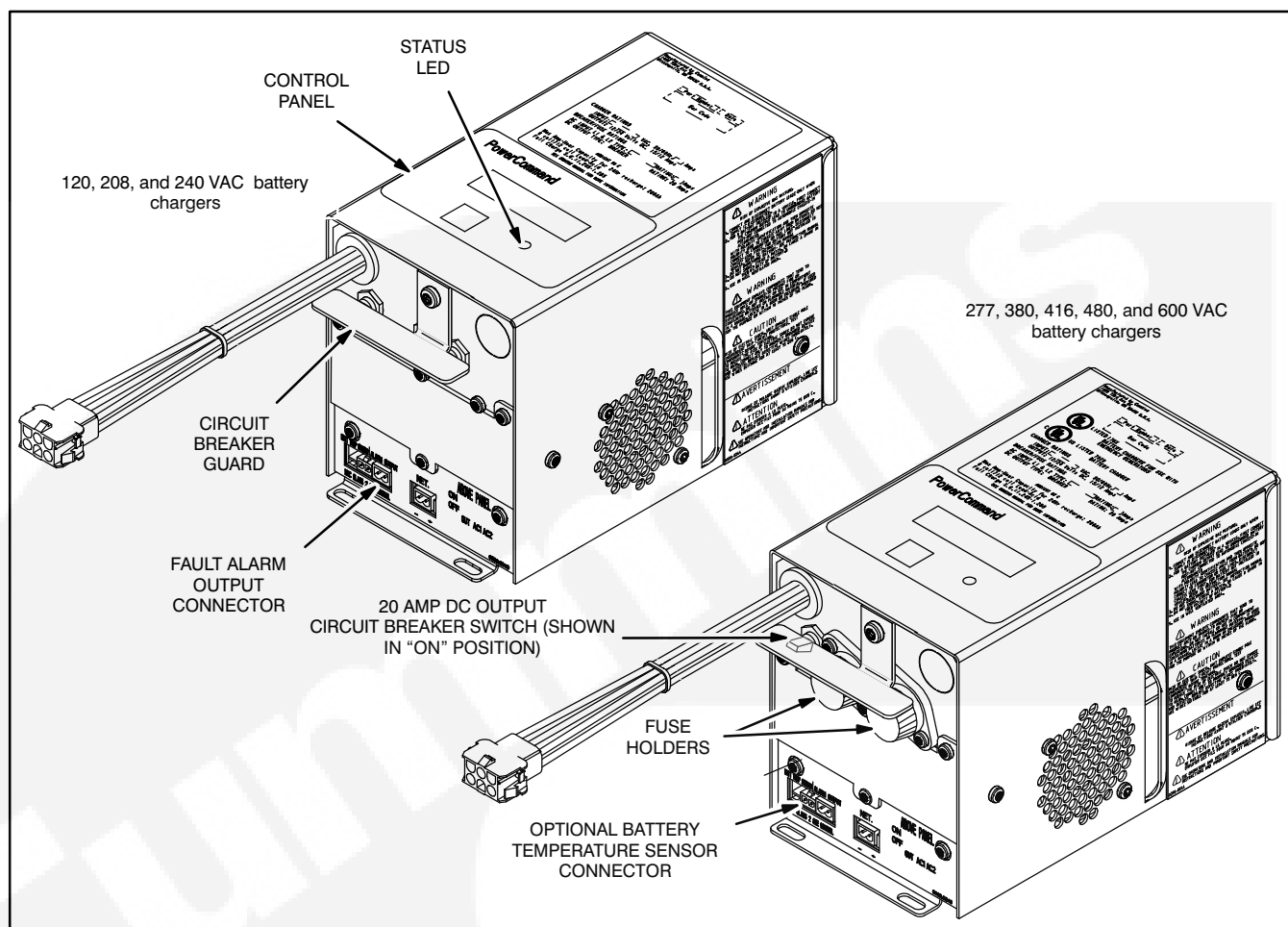


FIGURE 3-18. 15/12-AMP POWERCOMMAND BATTERY CHARGERS

CIRCUIT BREAKER TRIP UNITS

Each circuit breaker on an OTECSE transfer switch includes one of the following trip units. The following pages describe trip units used on 150–1000 amp service entrance transfer switches.

- STR23SP – Used with 150, 225, and 250 amp service entrance transfer switches
- Micrologic® 3.0 LI – Used with 300, 400, and 600 amp service entrance transfer switches
- Micrologic 6.0A LSI – Used with 800 and 1000 amp service entrance transfer switches

The circuit breaker trip units are preset at the factory. The default settings are listed in the following tables.

Circuit Breaker STR23SP Trip Unit Settings

Rated Switch Amperage	I _o	I _r	I _m
150A	1	1	6
200A	0.8	1	6
225A	0.9	1	6
250A	1	1	6

Circuit Breaker Micrologic 3.0 Trip Unit Settings

Rated Switch Amperage	I _r	t _r	I _i
300A	0.5	0.5	1.5
400A	0.67	0.5	1.5
600A	1	0.5	1.5

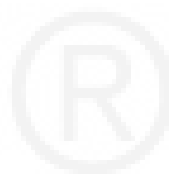
Circuit Breaker Micrologic 6.0 Trip Unit Settings

Rated Switch Amperage	I _r	t _r	I _{sd}	t _{sd}	I _i	I _g	t _g
800A	0.8	0.5	1.5	0 (Off)	2	A	0.1
1000A	1	0.5	1.5	0 (Off)	2	A	0.1

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 cabinet, clean the interior with a vacuum cleaner to remove any chips, filings, or dirt from the cabinet interior 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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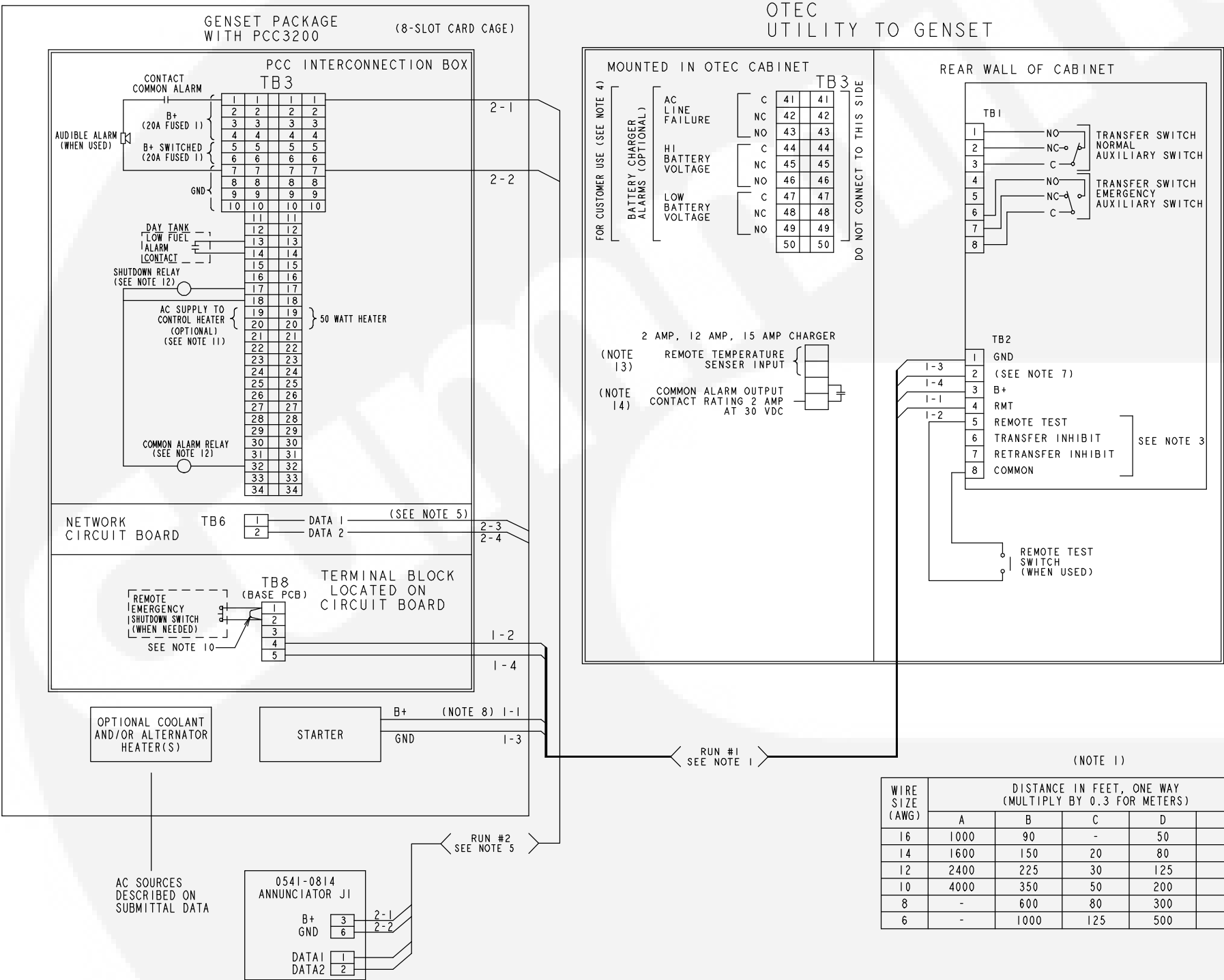
4. Schematics

SCHEMATIC	PAGE
40–1000 Amp Typical Interconnection Diagram 630–2810 (Sheet 1 of 9)	4-3
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40–1000 Amp Typical Interconnection Diagram 630–2810 (Sheet 3 of 9)	4-5
40–1000 Amp Typical Interconnection Diagram 630–2810 (Sheet 4 of 9)	4-6
40–1000 Amp Typical Interconnection Diagram 630–2810 (Sheet 5 of 9)	4-7
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40–1000 Amp Typical Interconnection Diagram 630–2810 (Sheet 9 of 9)	4-11
Circuit Breaker Wiring Diagram 630–3641	4-12
Outline Drawing 500–4721, 40–125 AMP (NEMA Control Box Type 3R Shown)	4-13
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Outline Drawing 500–4611, 300–600 AMP (NEMA Control Box Type 3R Shown)	4-15
Outline Drawing 500–4606, 800–1000 AMP (NEMA Control Box Type 1 Shown)	4-16

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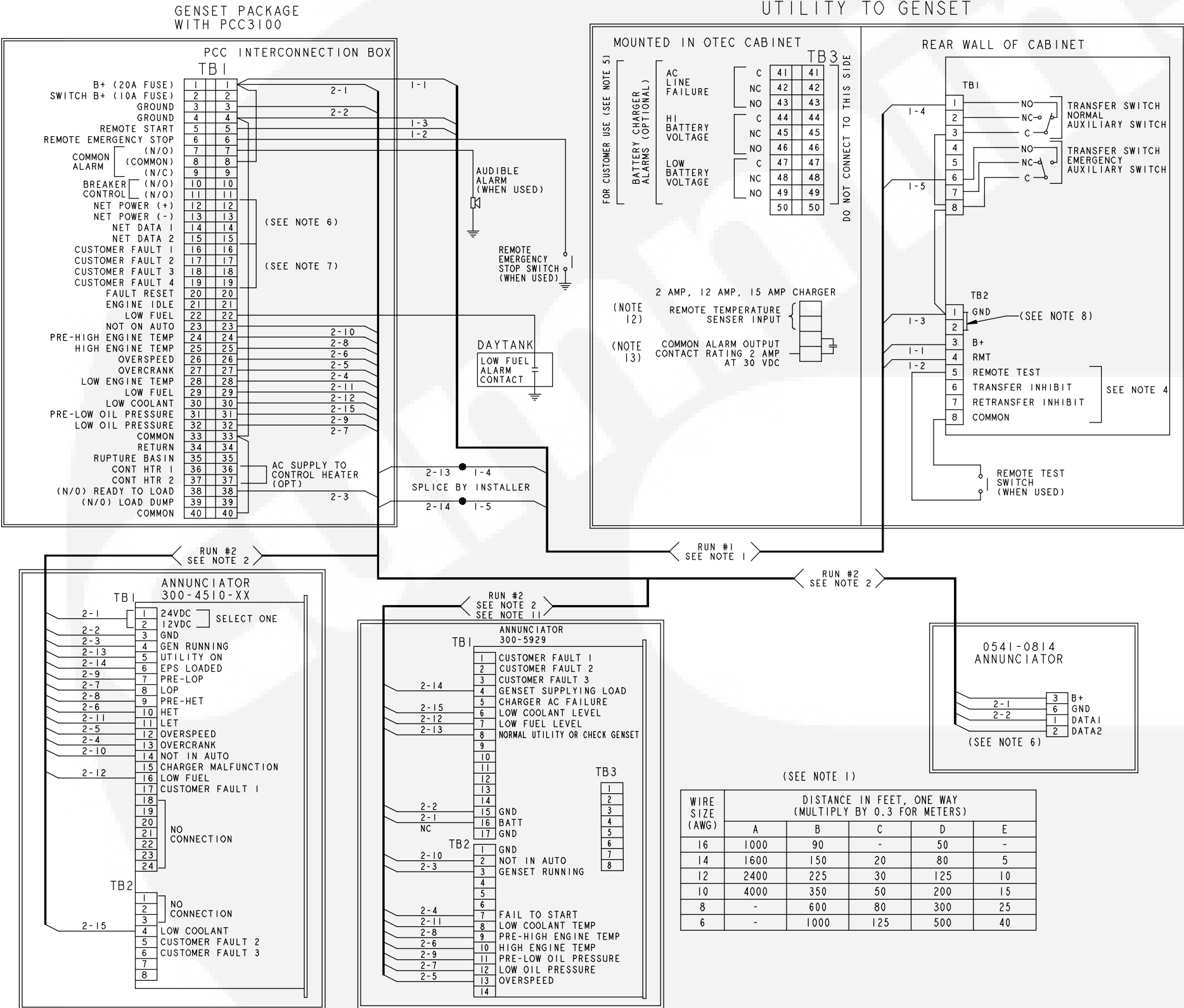
THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.



- 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 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.
 3. CONNECT AN OPEN DRY CONTACT BETWEEN THE APPLICABLE TERMINAL AND COMMON (TB2-8). FOR REMOTE TEST, TRANSFER INHIBIT AND RETRANSFER INHIBIT TO ACTIVATE.
 4. CONTACTS RATED: 4 AMPS AT 30 VDC OR 120V MAX.
 5. REFER TO ONAN 900-0529 POWERCOMMAND NETWORK INSTALLATION & OPERATION MANUAL FOR WIRING INSTRUCTIONS, WIRE SIZE, AND LENGTH. USE STRANDED TWISTED PAIR WIRES WHEN CONNECTING DATA1 AND DATA2 TO NETWORK. PART # 0334-1350 OR EQUAL.
 6. INPUTS FOR CUSTOMER FAULTS. GROUNDED SIGNAL REQUIRED TO ACTIVATE INPUT (MAX 50 MA.)
 7. ON PCC 3200 CONTROLS NO JUMPER IS REQ'D BETWEEN TB1-1 & TB1-2.
 8. CONFIGURATION SHOWN IS FOR ATS-MOUNTED BATTERY CHARGER. IF WALL-MOUNTED CHARGER IS USED, CONNECT B+ AND GND FROM CHARGER DIRECTLY TO BATTERY OR STARTER.
 9. TRANSFER SWITCH SHOWN CLOSED TO NORMAL.
 10. OPEN CONNECTION TO INITIATE EMERGENCY STOP THESE TERMINALS MUST BE SHORTED TOGETHER IF REMOTE EMERGENCY STOP OPTION NOT USED. JUMPER SHOWN BETWEEN TB8-1 AND TB8-2 NOT SUPPLIED WITH UNIT.
 11. 120VAC OR 240VAC AT 50W.
 12. CUSTOMER SUPPLIED EITHER 12 OR 240VDC RELAYS OUTPUT SIGNAL 20ma @ 24VDC MAX.
 13. USE THE INVENTER REMOTE TEMPERATURE PROBE (0193-0530).
 14. THE FOLLOWING FAILS WILL CAUSE A BATTTERY 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).

OTEC
UTILITY TO GENSET

THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.



- 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 GROUND 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. GROUND 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).

OTEC UTILITY TO GENSET

NOTES:

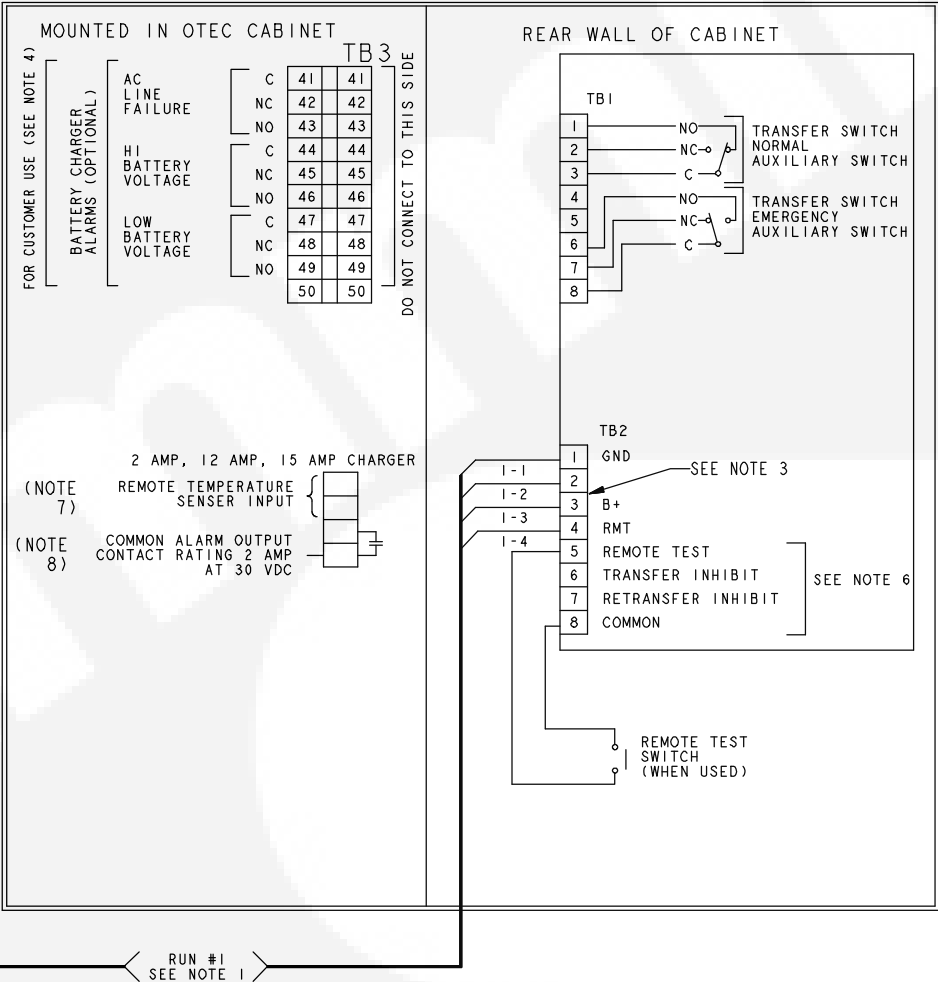
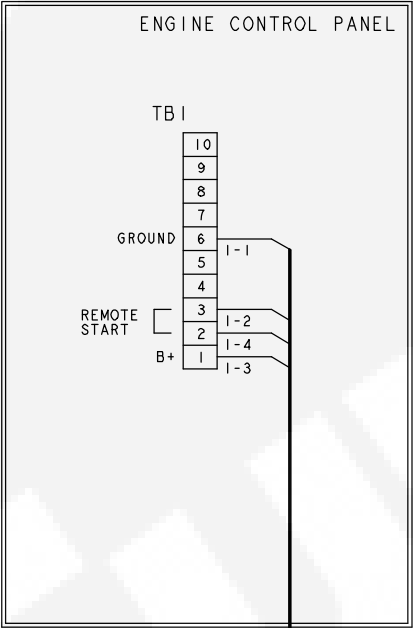
1. WIRE SIZES MUST BE AS FOLLOWS:
RUN #1-GENSET TO TRANSFER SWITCH-LEAD SIZE MUST BE INCREASED IF A BATTERY CHARGER IS INSTALLED IN THE SWITCH.
WITH NO BATT CHARGER-LEADS 1-1, -2, -3, -4, -5 USE COL. A.
WITH 2 AMP CHARGER, MAXIMUM VOLTAGE DROP OF 1.5 VOLTS, LEADS 1-1, 81-3 USE COL. B.
WITH 12/15 AMP 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, 81-3 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. 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 WIRE 1.
4. INSTALL JUMPER BETWEEN TB2-2 & TB2-3.
5. 300-4510-XX ANNUNCIATOR MAY BE USED ALSO.
WIRE TBI AS SHOWN.
6. CONTACTS RATED: 4 AMPS AT 30 VDC OR 120V MAX.
7. TRANSFER SWITCH SHOWN CLOSED TO NORMAL.
8. CONNECT AN OPEN DRY CONTACT BETWEEN THE APPLICABLE TERMINAL AND COMMON (TB2-8). FOR REMOTE TEST, TRANSFER INHIBIT AND RETRANSFER INHIBIT TO ACTIVATE.
9. CONTACTS RATED: 2 AMPS AT 30 VDC OR 0.60 AMPS AT 120 VAC.
10. REFER TO 0900-0301 FOR INSTALLATION OF 0300-5929.
11. USE THE INVENTOR REMOTE TEMPERATURE PROBE (0193-0530).
12. 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).
13. NETWORK CONNECTIONS: USE BELDEN 9729 24 GAUGE TWISTED, STRANDED, SHIELDED CABLE. SHIELD SHOULD BE GROUND 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.).

(SEE NOTE 1)					
WIRE SIZE (AWG)	DISTANCE IN FEET, ONE WAY (MULTIPLY BY 0.3 FOR METERS)				
	A	B	C	D	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

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Modified 6/2008

THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.

CUMMINS POWERGENERATOR SET
SERIES GGDB ALL SPECS, GN SPEC B,
DN SPEC B WITH TWO WIRE CONTROL

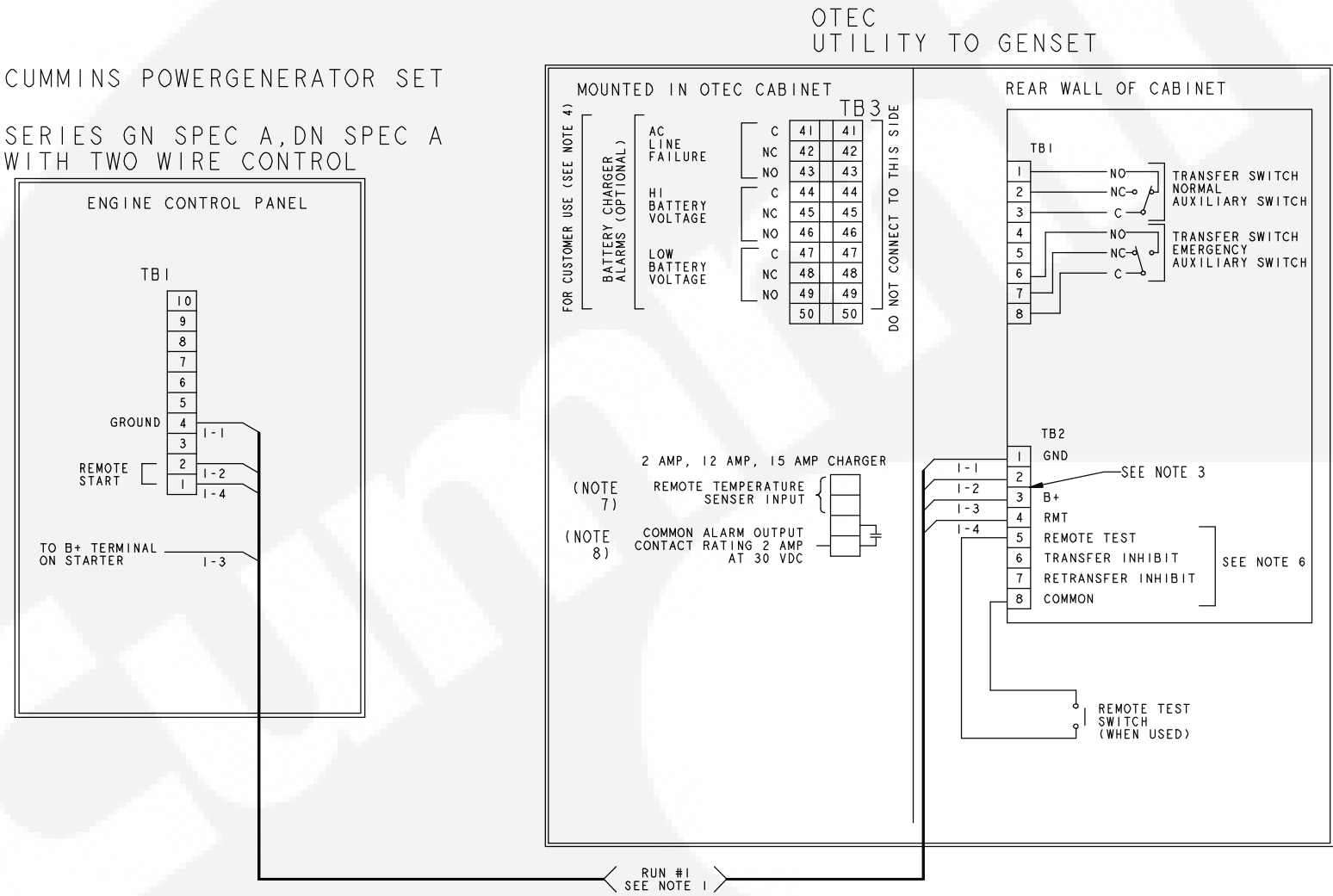


(SEE NOTE 1)

WIRE SIZE (AWG)	DISTANCE IN FEET, ONE WAY (MULTIPLY BY 0.3 FOR METERS)				
	A	B	C	D	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

- 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 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.
 3. DO NOT INSTALL JUMPER BETWEEN TB2-2 & TB2-3 OR BETWEEN TB2-2 & TB2-1.
 4. CONTACTS RATED: 4 AMPS AT 30 VDC OR 120V MAX.
 5. TRANSFER SWITCH SHOWN CLOSED TO NORMAL.
 6. CONNECT AN OPEN DRY CONTACT BETWEEN THE APPLICABLE TERMINAL AND COMMON (TB2-8). FOR REMOTE TEST, TRANSFER INHIBIT AND RETRANSFER INHIBIT TO ACTIVATE.
 7. USE THE INVENTER REMOTE TEMPERATURE PROBE (0193-0530).
 8. 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).

THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.



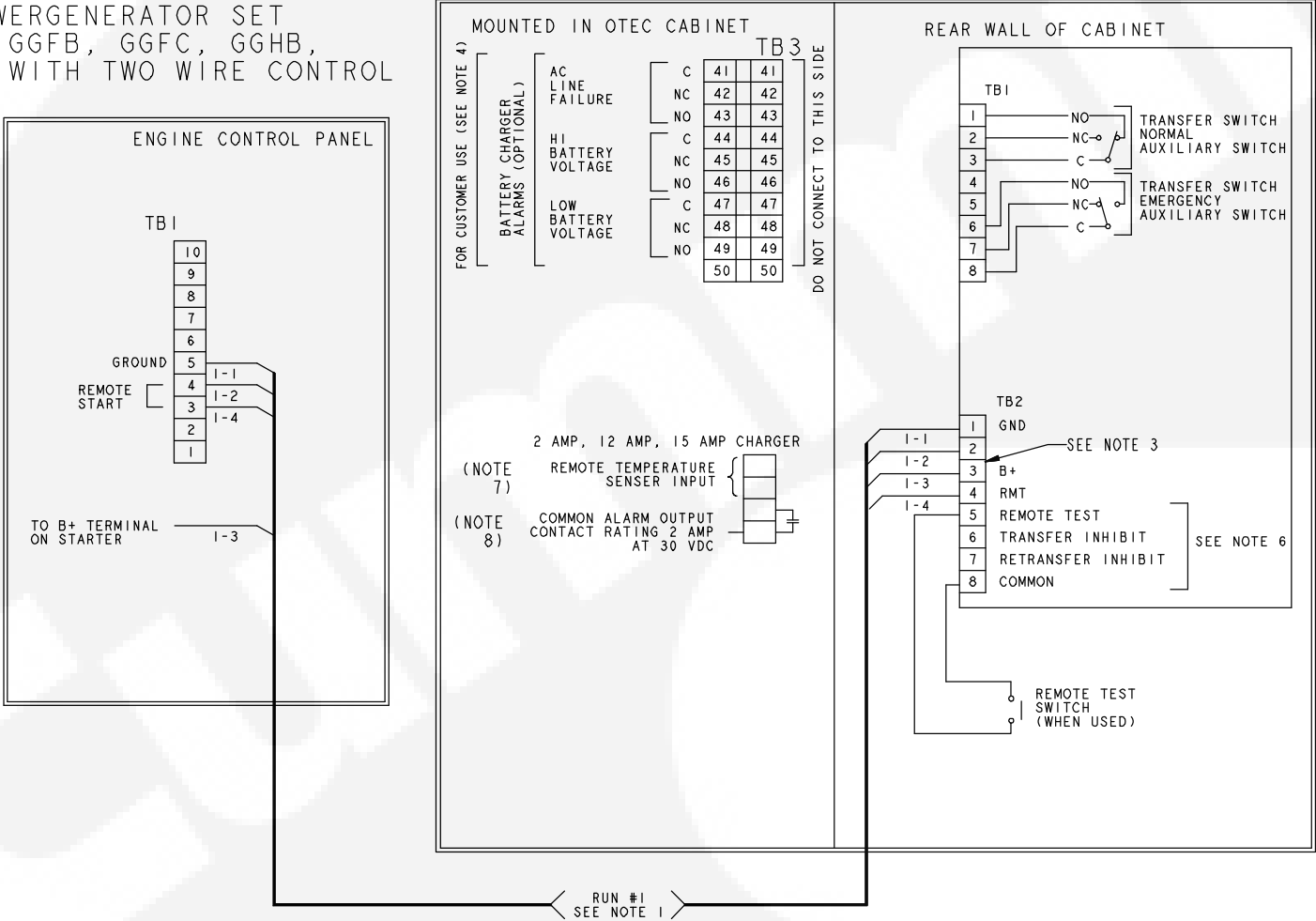
(SEE NOTE 1)

WIRE SIZE (AWG)	DISTANCE IN FEET, ONE WAY (MULTIPLY BY 0.3 FOR METERS)				
	A	B	C	D	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

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THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.

CUMMINS POWERGENERATOR SET
SERIES DG, GGFB, GGFC, GGHB,
GGHC, GGHD WITH TWO WIRE CONTROL



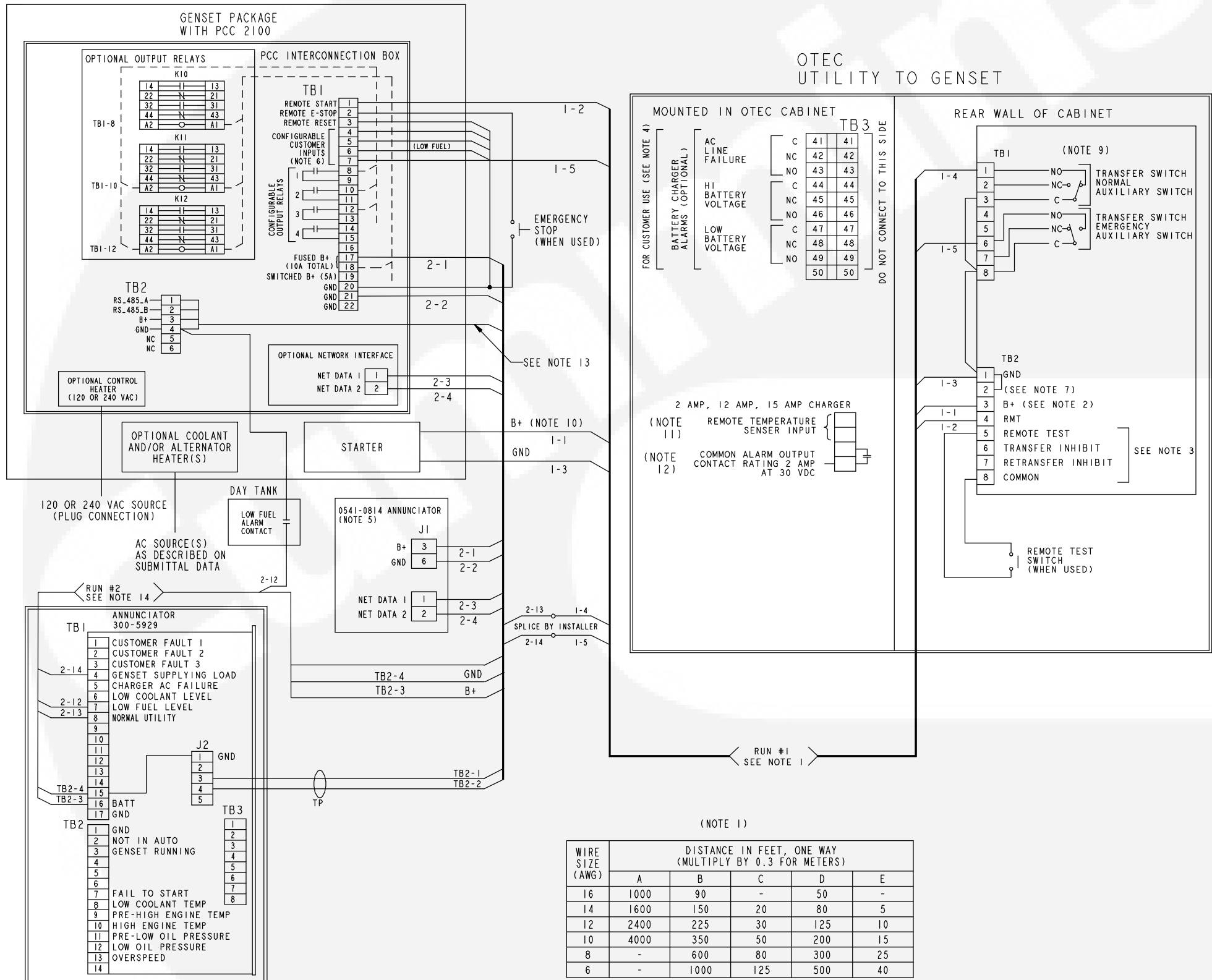
- NOTES:
1. WIRE SIZES MUST BE AS FOLLOWS:
RUN #1-GENSET TO TRANSFER SWITCH-LEAD SIZE MUST BE INCREASED IF A BATTERY CHARGER IS INSTALLED IN THE SWITCH.
WITH NO BATT CHARGER-LEADS 1-1, -2, -3, -4, -5 USE COL A.
WITH 2 AMP CHARGER, MAXIMUM VOLTAGE DROP OF 1.5 VOLTS, LEADS 1-1, & 1-3 USE COL B.
WITH 12/15 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 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.
 3. DO NOT INSTALL JUMPER BETWEEN TB2-2 & TB2-3 OR BETWEEN TB2-2 & TB2-1.
 4. CONTACTS RATED: 4 AMPS AT 30 VDC OR 120V MAX.
 5. TRANSFER SWITCH SHOWN CLOSED TO NORMAL.
 6. CONNECT AN OPEN DRY CONTACT BETWEEN THE APPLICABLE TERMINAL AND COMMON (TB2-8). FOR REMOTE TEST, TRANSFER INHIBIT AND RETRANSFER INHIBIT TO ACTIVATE.
 7. USE THE INVENTER REMOTE TEMPERATURE PROBE (0193-0530).
 8. 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).

(SEE NOTE 1)

WIRE SIZE (AWG)	DISTANCE IN FEET, ONE WAY (MULTIPLY BY 0.3 FOR METERS)				
	A	B	C	D	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

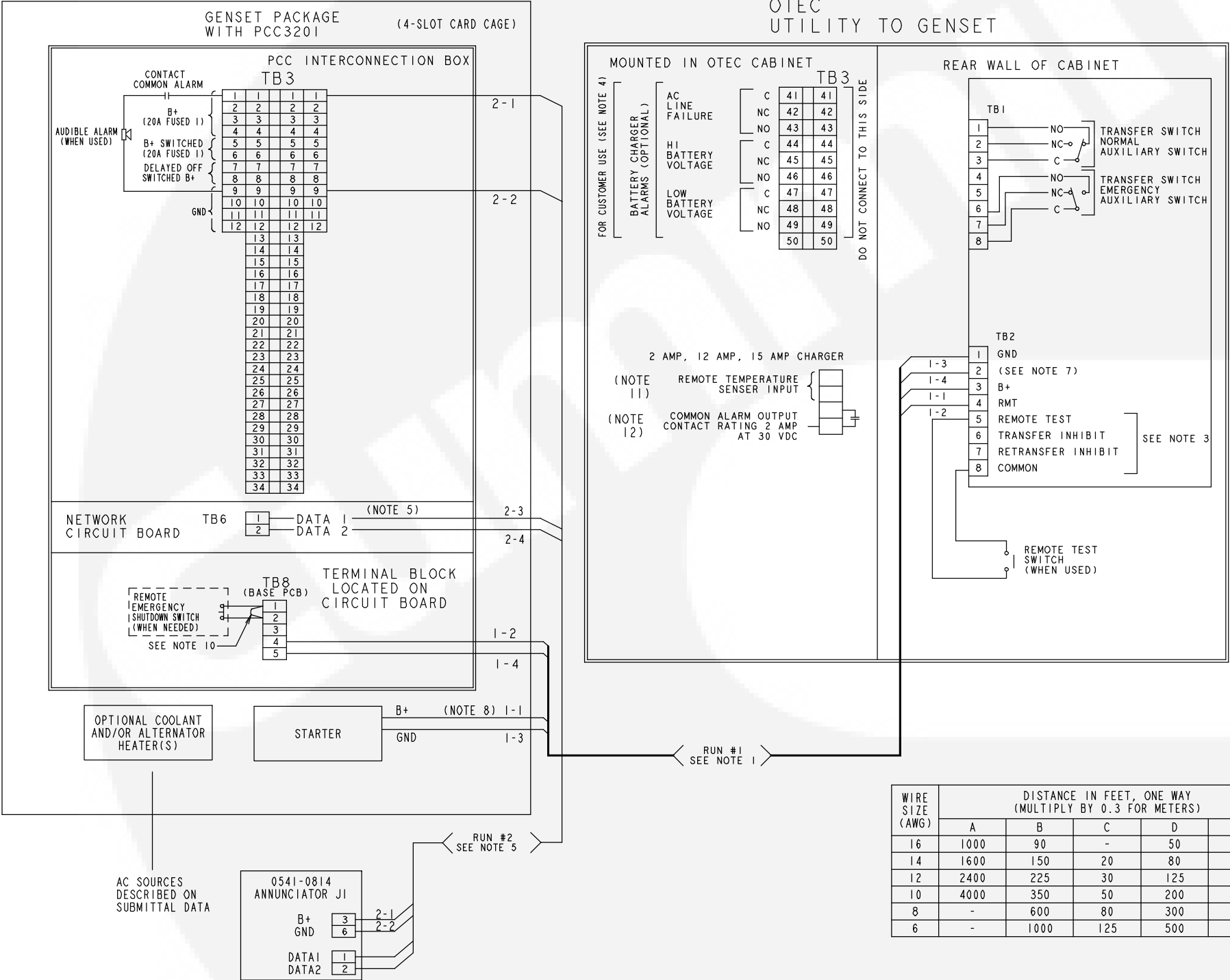
No. 630-2810 Sh 6 of 9
Rev. F
Modified 6/2008

THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.



No. 630-2810 Sh 7 of 9
Rev. F
Modified 6/2008

THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.



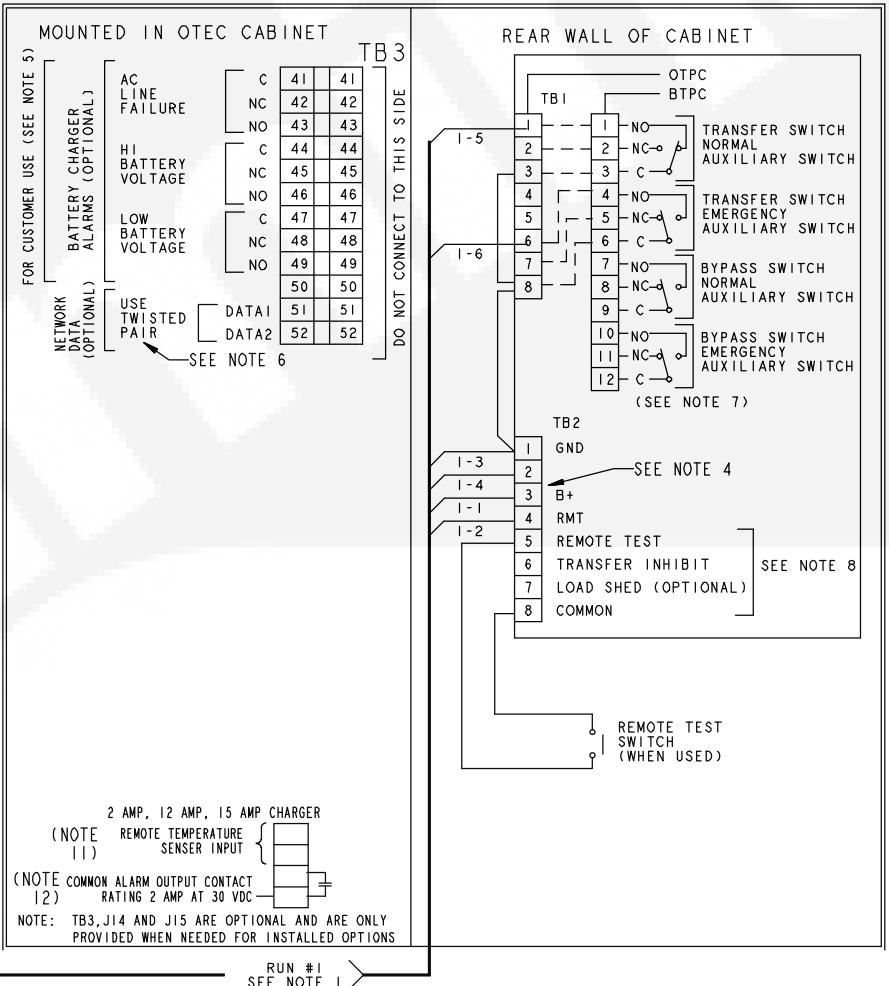
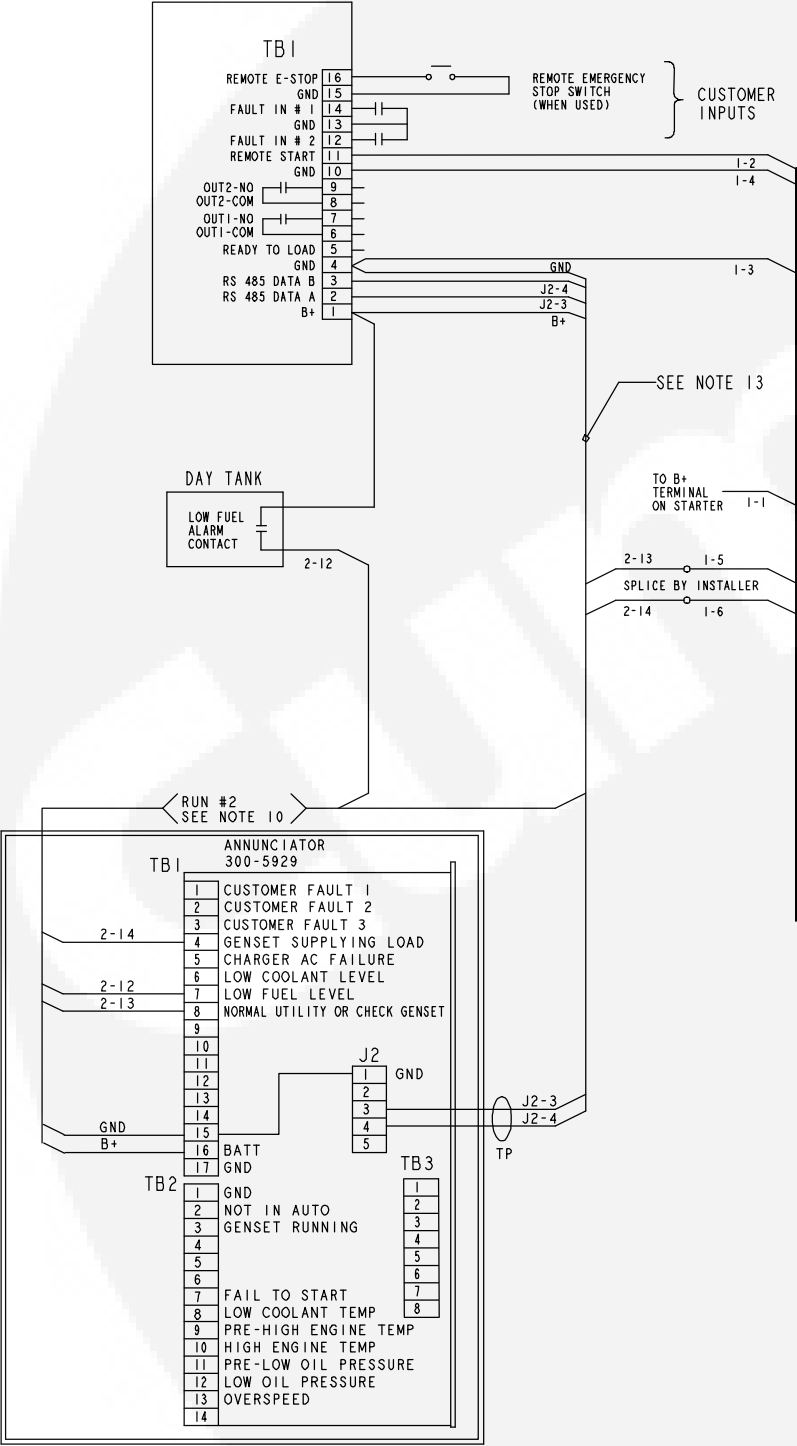
- NOTES:
1. WIRE SIZES MUST BE AS FOLLOWS:
RUN #1-GENSET TO TRANSFER SWITCH-LEAD SIZE MUST BE INCREASED IF A BATTERY CHARGER IS INSTALLED IN THE SWITCH.
WITH NO BATT CHARGER-LEADS 1-1, -2, -3, -4, -5 USE COL A.
WITH 2 AMP CHARGER, MAXIMUM VOLTAGE DROP OF 1.5 VOLTS, LEADS 1-1, & 1-3 USE COL B.
WITH 12/15 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 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.
 3. CONNECT AN OPEN DRY CONTACT BETWEEN THE APPLICABLE TERMINAL AND COMMON (TB2-8). FOR REMOTE TEST, TRANSFER INHIBIT AND RETRANSFER INHIBIT TO ACTIVATE.
 4. CONTACTS RATED: 4 AMPS AT 30 VDC OR 120V MAX.
 5. REFER TO ONAN 900-0529 POWERCOMMAND NETWORK INSTALLATION & OPERATION MANUAL FOR WIRING INSTRUCTIONS, WIRE SIZE, AND LENGTH. USE STRANDED TWISTED PAIR WIRES WHEN CONNECTING DATA1 AND DATA2 TO NETWORK. PART # 0334-1350 OR EQUAL.
 6. INPUTS FOR CUSTOMER FAULTS. GROUNDED SIGNAL REQUIRED TO ACTIVATE INPUT (MAX 50 MA.)
 7. ON PCC 3200 CONTROLS NO JUMPER IS REQ'D BETWEEN TB1-1 & TB1-2.
 8. CONFIGURATION SHOWN IS FOR ATS-MOUNTED BATTERY CHARGER. IF WALL-MOUNTED CHARGER IS USED, CONNECT B+ AND GND FROM CHARGER DIRECTLY TO BATTERY OR STARTER.
 9. TRANSFER SWITCH SHOWN CLOSED TO NORMAL.
 10. OPEN CONNECTION TO INITIATE EMERGENCY STOP THESE TERMINALS MUST BE SHORTED TOGETHER IF REMOTE EMERGENCY STOP OPTION NOT USED. JUMPER SHOWN BETWEEN TB8-1 AND TB8-2 NOT SUPPLIED WITH UNIT.
 11. USE THE INVENTER REMOTE TEMPERATURE PROBE (0193-0530).
 12. 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).

WIRE SIZE (AWG)	DISTANCE IN FEET, ONE WAY (MULTIPLY BY 0.3 FOR METERS)				
	A	B	C	D	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

ONAN/CUMMINS GENERATOR SET
WITH PCC1301, PCC1.1, PCC1.2, PCC2.1
PCC2.2, PCC3.1, PCC3.2 CONTROL

OTEC UTILITY TO GENSET

THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.

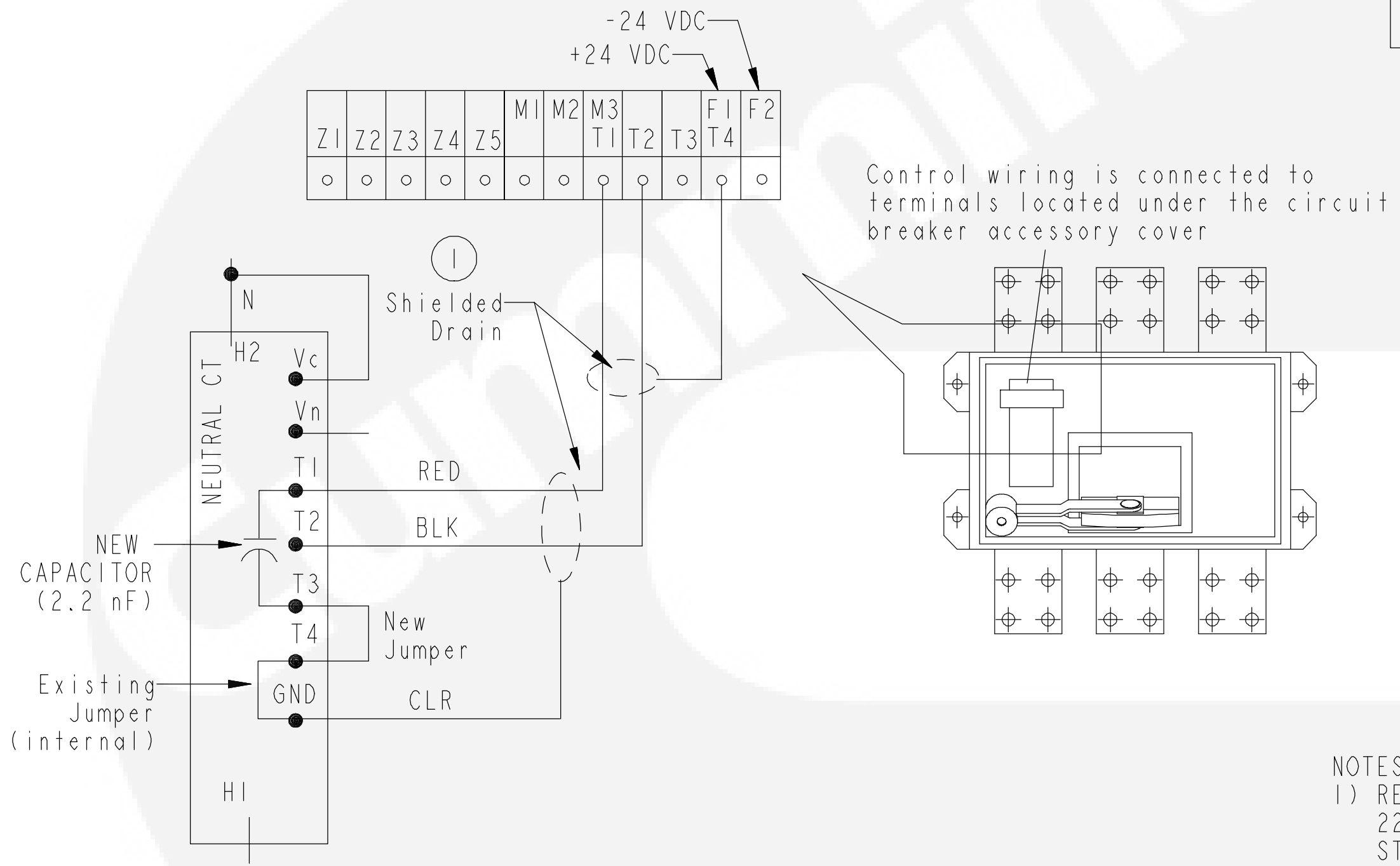


WIRE SIZE (AWG)	DISTANCE IN FEET, ONE WAY (MULTIPLY BY 0.3 FOR METERS)				
	A	B	C	D	E
16	1000	90	-	50	-
14	1600	150	20	80	5
12	2400	225	30	125	10
10	4000	350	50	200	15
8	-	600	80	300	25
6	-	1000	125	500	40

- 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. 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. DO NOT INSTALL JUMPER BETWEEN TB2-2 & TB2-3 AND TB2-1 & TB2-2.
 5. CONTACTS RATED: 4 AMPS AT 30 VDC OR 120V MAX.
 6. USE STRANDED TWISTED PAIR WIRES WHEN CONNECTING DATA1 AND DATA2 TO THE NETWORK.
 7. TRANSFER SWITCH SHOWN CLOSED TO NORMAL BYPASS SWITCH SHOWN IN NEUTRAL POSITION.
 8. CONNECT AN OPEN DRY CONTACT BETWEEN THE APPLICABLE TERMINAL AND COMMON (TB2-8). FOR REMOTE TEST, TRANSFER INHIBIT AND LOAD SHED. CLOSE TO ACTIVATE.
 9. CONTACTS RATED: 2 AMPS AT 30 VDC OR 0.60 AMPS AT 120 VAC.
 10. REFER TO 0900-0301 FOR INSTALLATION OF 0300-5929.
 11. USE THE INVENTOR REMOTE TEMPERATURE PROBE (0193-0530).
 12. 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).
 13. 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.).

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Modified 6/2008

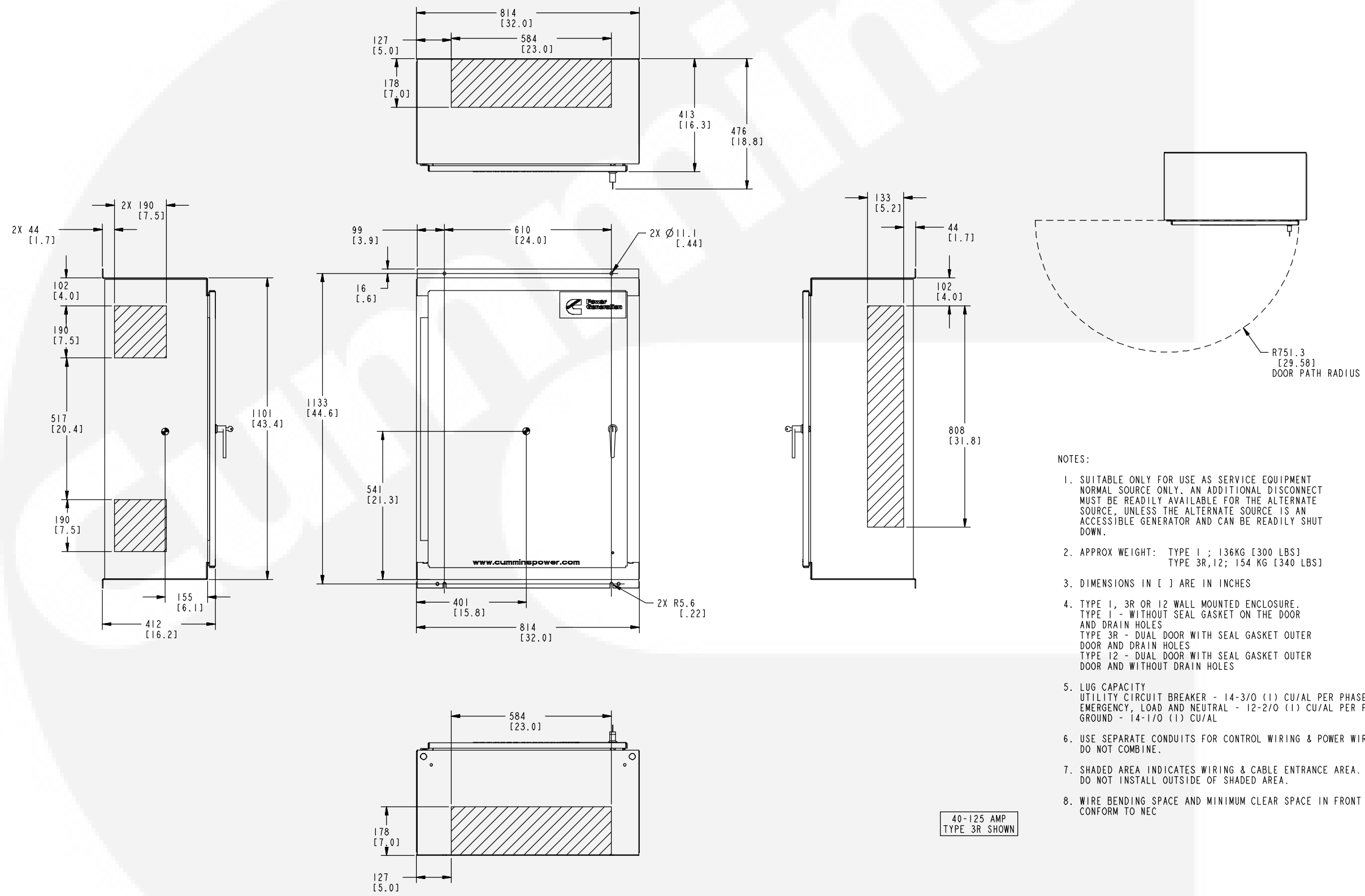
THIS IS A REPRESENTATIVE (GENERIC) SCHEMATIC/WIRING DIAGRAM. FOR TROUBLESHOOTING, REFER TO THE SCHEMATIC AND WIRING DIAGRAM PACKAGE THAT WAS SHIPPED WITH THE TRANSFER SWITCH.



NOTES:
1) RECOMMENDED WIRE SIZE:
22 AWG (0.3 SQUARE MM)
STRANDED SHIELDED CABLE

NEUTRAL CURRENT TRANSFORMER
0315-1722

No. 630-3641 Sh 1 of 1
Rev. B
Modified 6/2008



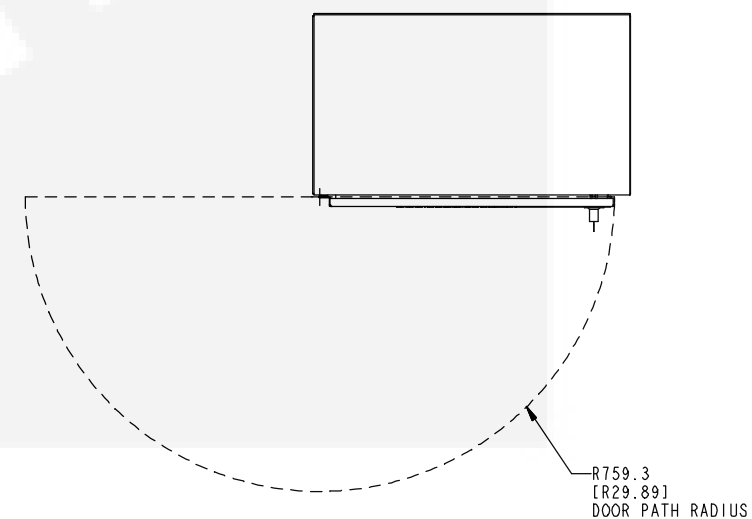
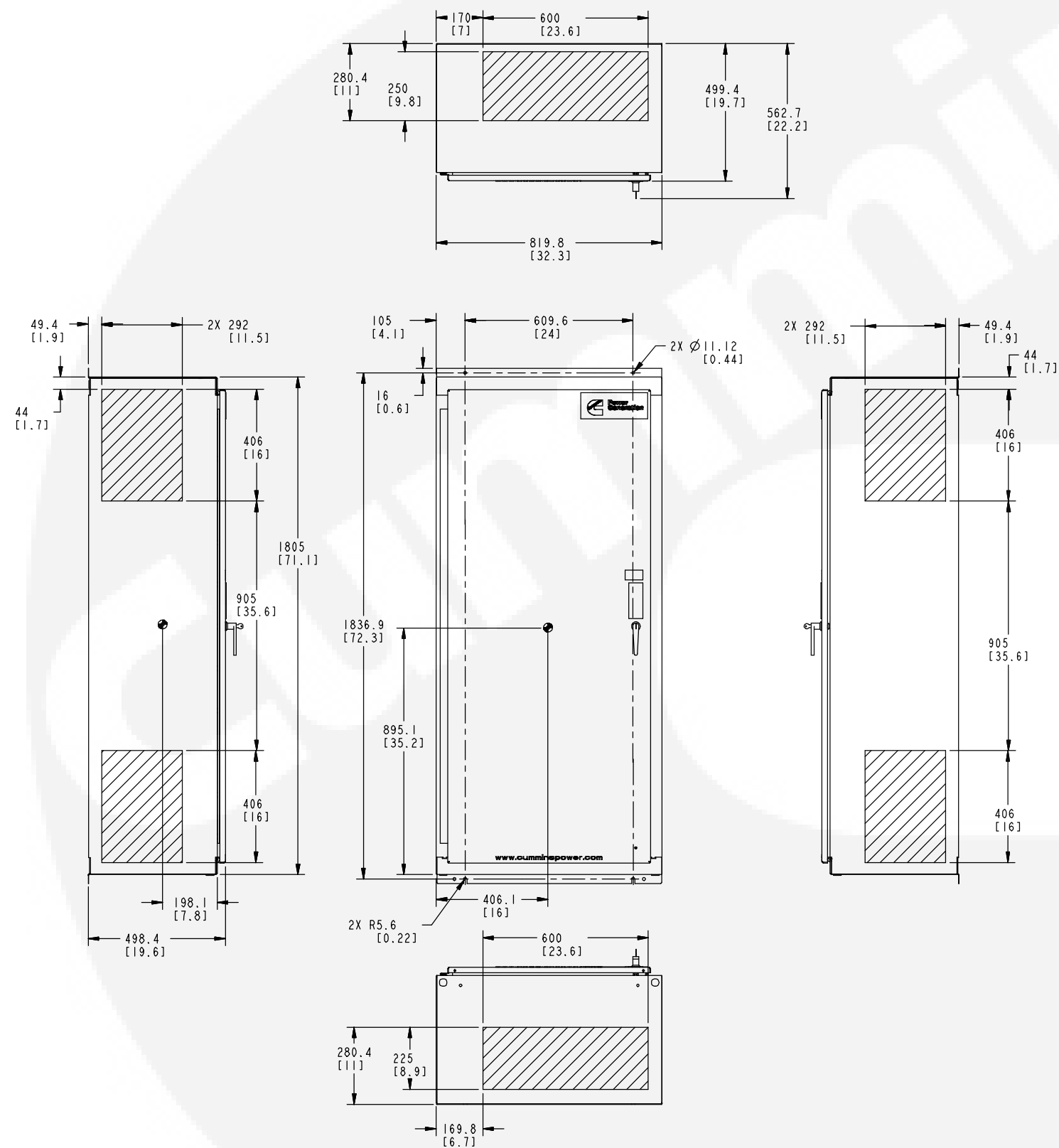
NOTES:

- SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT NORMAL SOURCE ONLY. AN ADDITIONAL DISCONNECT MUST BE READILY AVAILABLE FOR THE ALTERNATE SOURCE, UNLESS THE ALTERNATE SOURCE IS AN ACCESSIBLE GENERATOR AND CAN BE READILY SHUT DOWN.
- APPROX WEIGHT: TYPE 1 ; 136KG [300 LBS]
TYPE 3R,12; 154 KG [340 LBS]
- DIMENSIONS IN [] ARE IN INCHES
- TYPE 1, 3R OR 12 WALL MOUNTED ENCLOSURE.
TYPE 1 - WITHOUT SEAL GASKET ON THE DOOR AND DRAIN HOLES
TYPE 3R - DUAL DOOR WITH SEAL GASKET OUTER DOOR AND DRAIN HOLES
TYPE 12 - DUAL DOOR WITH SEAL GASKET OUTER DOOR AND WITHOUT DRAIN HOLES
- LUG CAPACITY
UTILITY CIRCUIT BREAKER - 14-3/0 (1) CU/AL PER PHASE
EMERGENCY, LOAD AND NEUTRAL - 12-2/0 (1) CU/AL PER PHASE
GROUND - 14-1/0 (1) CU/AL
- USE SEPARATE CONDUITS FOR CONTROL WIRING & POWER WIRING. DO NOT COMBINE.
- SHADED AREA INDICATES WIRING & CABLE ENTRANCE AREA. DO NOT INSTALL OUTSIDE OF SHADED AREA.
- WIRE BENDING SPACE AND MINIMUM CLEAR SPACE IN FRONT OF UNIT CONFORM TO NEC

40-125 AMP
TYPE 3R SHOWN

No. 500-4721 Sh 1 of 1
Rev. A
Modified 1/2008

OUTLINE DRAWING 500-4721, 40-125 AMP
(NEMA CONTROL BOX TYPE 3R SHOWN)

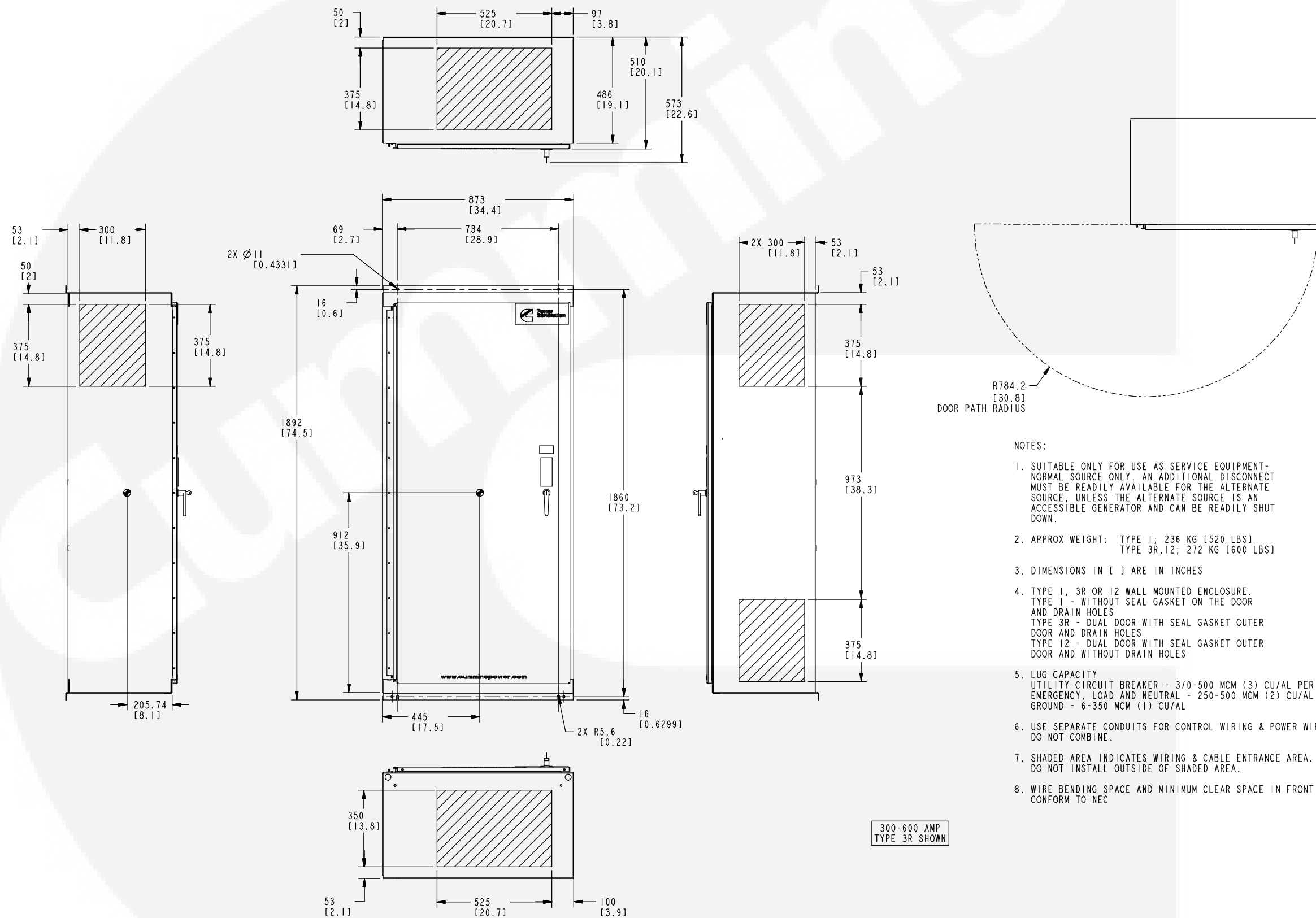


NOTES:

- SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT-NORMAL SOURCE ONLY. AN ADDITIONAL DISCONNECT MUST BE READILY AVAILABLE FOR THE ALTERNATE SOURCE, UNLESS THE ALTERNATE SOURCE IS AN ACCESSIBLE GENERATOR AND CAN BE READILY SHUT DOWN.
- APPROX WEIGHT: TYPE 1; 227 KG [500 LBS]
TYPE 3R, 12; 263 KG [580 LBS]
- DIMENSIONS IN [] ARE IN INCHES
- TYPE 1, 3R OR 12 WALL MOUNTED ENCLOSURE.
TYPE 1 - WITHOUT SEAL GASKET ON THE DOOR AND DRAIN HOLES
TYPE 3R - DUAL DOOR WITH SEAL GASKET OUTER DOOR AND DRAIN HOLES
TYPE 12 - DUAL DOOR WITH SEAL GASKET OUTER DOOR AND WITHOUT DRAIN HOLES
- LUG CAPACITY
UTILITY CIRCUIT BREAKER - 2-600 MCM (1) CU/2-500 MCM (1) AL PER PHASE
EMERGENCY, LOAD AND NEUTRAL - 6-400 MCM (1) CU/AL PER PHASE
GROUND - 14-1/0 (1) CU/AL
- USE SEPARATE CONDUITS FOR CONTROL WIRING & POWER WIRING. DO NOT COMBINE.
- SHADED AREA INDICATES WIRING & CABLE ENTRANCE AREA. DO NOT INSTALL OUTSIDE OF SHADED AREA.
- WIRE BENDING SPACE AND MINIMUM CLEAR SPACE IN FRONT OF UNIT CONFORM TO NEC

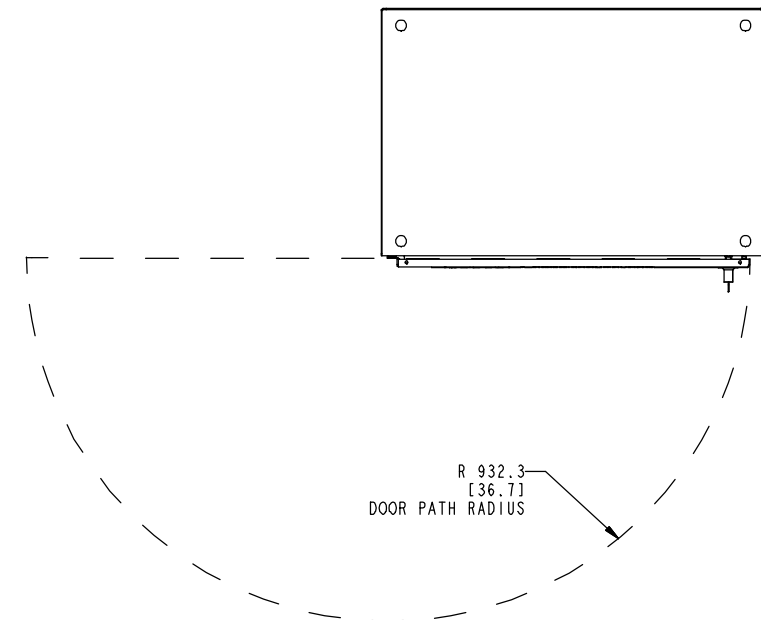
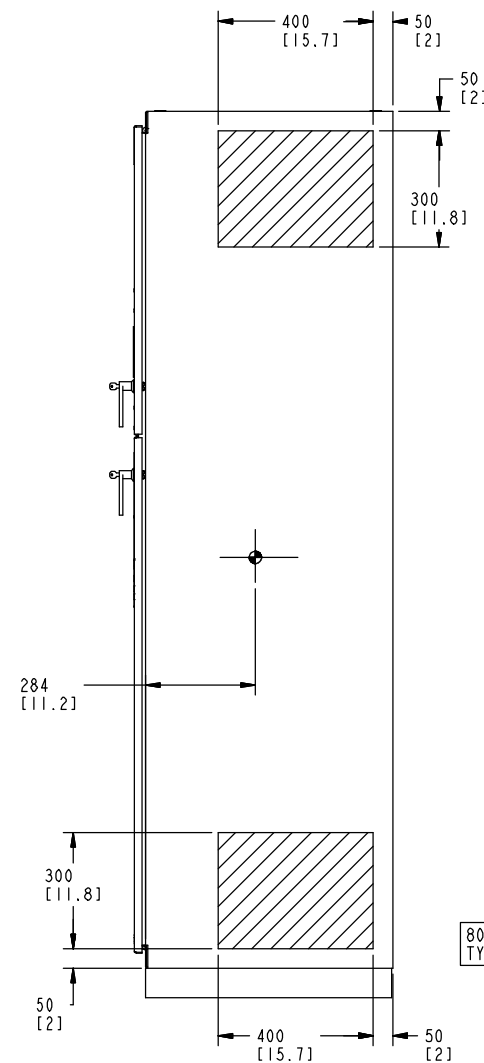
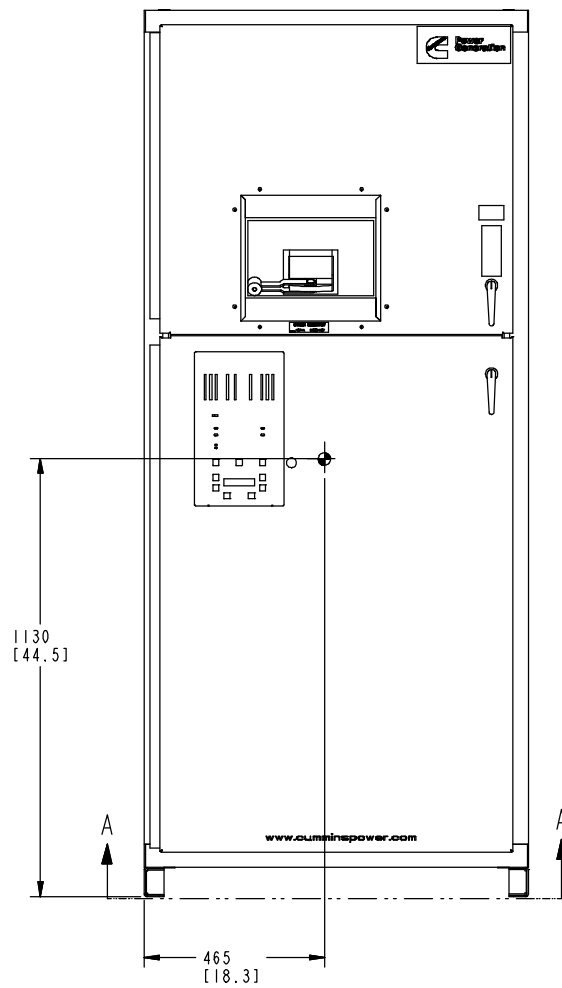
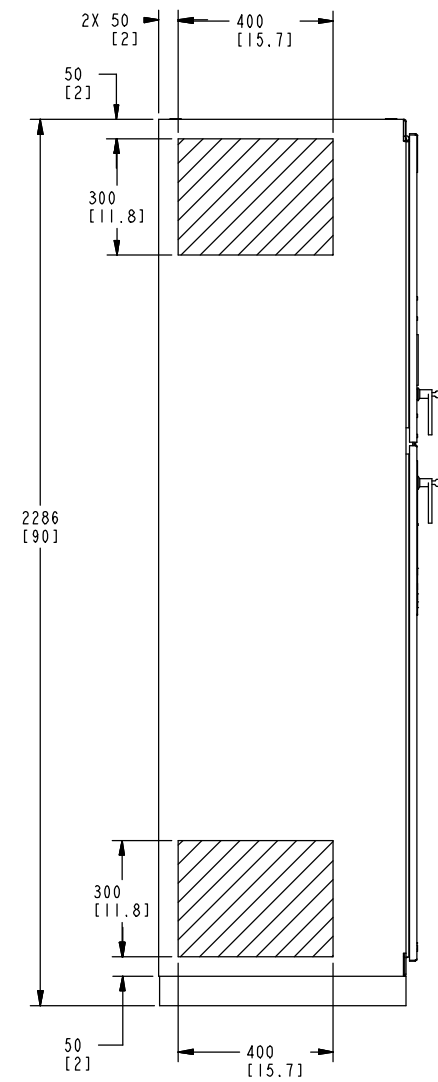
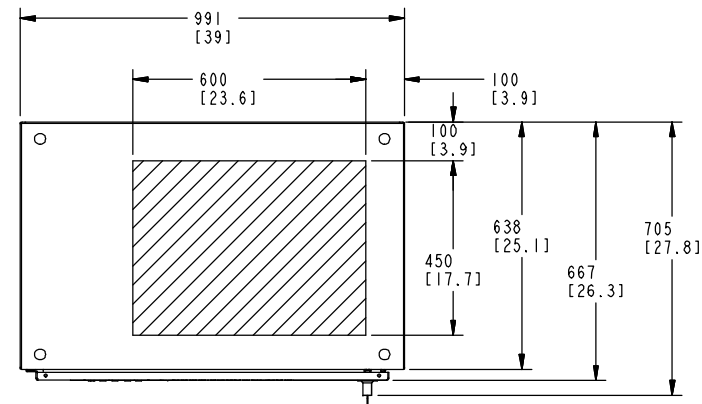
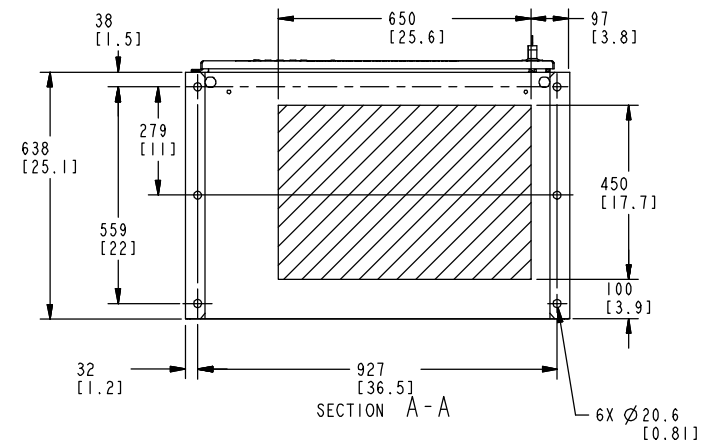
150-250 AMP
TYPE 3R SHOWN

No. 500-4606 Sh 1 of 1
Rev. A
Modified 1/2008



No. 500-4611 Sh 1 of 1
Rev. A
Modified 1/2008

OUTLINE DRAWING 500-4611, 300-600 AMP
(NEMA CONTROL BOX TYPE 3R SHOWN)



NOTES:

- SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT-NORMAL SOURCE ONLY. AN ADDITIONAL DISCONNECT MUST BE READILY AVAILABLE FOR THE ALTERNATE SOURCE, UNLESS THE ALTERNATE SOURCE IS AN ACCESSIBLE GENERATOR AND CAN BE READILY SHUT DOWN.
- APPROX WEIGHT: TYPE 1; 417 KG [920 LBS]
TYPE 3R, 12; 476 KG [1050 LBS]
- DIMENSIONS IN [] ARE IN INCHES
- TYPE 1, 3R OR 12 FLOOR MOUNTED ENCLOSURE.
TYPE 1 - WITHOUT SEAL GASKET ON THE DOOR AND DRAIN HOLES
TYPE 3R - DUAL DOOR WITH SEAL GASKET OUTER DOOR AND DRAIN HOLES
TYPE 12 - DUAL DOOR WITH SEAL GASKET OUTER DOOR AND WITHOUT DRAIN HOLES
- LUG CAPACITY
UTILITY CIRCUIT BREAKER - 250-500 MCM (4) CU/AL PER PHASE
EMERGENCY, LOAD AND NEUTRAL - 250-500 MCM (4) CU/AL PER PHASE
GROUND - #6-250 MCM (1) CU/AL
- USE SEPARATE CONDUITS FOR CONTROL WIRING & POWER WIRING. DO NOT COMBINE.
- SHADED AREA INDICATES WIRING & CABLE ENTRANCE AREA. DO NOT INSTALL OUTSIDE OF SHADED AREA.
- WIRE BENDING SPACE AND MINIMUM CLEAR SPACE IN FRONT OF UNIT CONFORM TO NEC

800-1000 AMP
TYPE 1 SHOWN

No. 500-4608 Sh 1 of 1
Rev. A
Modified 1/2008

OUTLINE DRAWING 500-4606, 800-1000 AMP (NEMA CONTROL BOX TYPE 1 SHOWN)

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