CPH-144
Central Power Hub

User Guide ID: 0570257-J0
Effective: 03/2022

Read this manual carefully.
Learn how to protect your equipment from damage and fully understand its functions.

CPH-144
Central Power Hub

NOTICE

For the latest version of software, firmware, and product documentation, visit the Alpha® website, www.alpha.com or www.alpha.ca.

NOTICE

Photographs contained in this document are for illustrative purposes only. These photographs may not match your installation.

NOTICE

Operator is cautioned to review the drawings and illustrations contained in this document before proceeding. If there are questions regarding the safe operation of this powering system, contact Alpha Technologies Ltd. or your nearest Alpha® representative.

NOTICE

EnerSys shall not be held liable for any damage or injury involving its enclosures, power supplies, generators, batteries, or other hardware if used or operated in any manner or subject to any condition inconsistent with its intended purpose, or if installed or operated in an unapproved manner, or improperly maintained.

Copyright notice

Contents

Figures

1. Safety

Save these instructions

This document contains important safety instructions that must be followed during the installation, servicing, and maintenance of the product. Keep it in a safe place. Review the drawings and illustrations contained in this document before proceeding. If there are any questions regarding the safe installation or operation of this product, contact Alpha Technologies Ltd. or the nearest Alpha® representative.

1.1 Safety symbols

To reduce the risk of injury or death, and to ensure the continued safe operation of this product, the following symbols have been placed throughout this document. Where these symbols appear, use extra care and attention.

WARNING

Risk of serious injury or death

Equipment in operation poses a potential electrical hazard which could result in serious injury or death to personnel. This hazard may continue even when power is disconnected.

CAUTION

Cautions indicate the potential for injury to personnel.

CAUTION

Risk of burns

A device in operation can reach temperature levels which could cause burns.

ATTENTION

The use of attention indicates specific regulatory or code requirements that may affect the placement of equipment or installation procedures. Follow the prescribed procedures to avoid equipment damage or service interruption.

GROUNDING

This symbol indicates the location or terminal intended for the connection to protective earth. An enclosure that is not properly connected to protective earth presents an electrical hazard. Only a licensed electrician can connect AC power and protective earth to the enclosure.

NOTICE

A notice provides additional information to help complete a specific task or procedure or general information about the product.

1.2 General warning and cautions

WARNING

This system is designed to be installed in a restricted access location which is inaccessible to the general public.

- Read and follow all instructions included in this document.
- Only trained personnel are qualified to install or replace this equipment and its components.
- Use proper lifting techniques whenever handling equipment, parts, or batteries.

1.3 Mechanical safety

- Keep hands and tools clear of fans. Fans are thermostatically controlled and switch on automatically.
- Power supplies can reach extreme temperatures under load.
- Use caution around sheet metal components and sharp edges.

1.4 Electrical safety

WARNING

Hazardous voltages are present at the input of power systems. The DC output from rectifiers, though not dangerous in voltage, has a high short-circuit current capacity that can cause severe burns and electrical arcing.

The DC output from converters is a potentially hazardous voltage. Do not touch the output connections when under power. Ensure that power has been removed from the outputs before working on them.

Before working with any live battery or power system, follow these precautions:

- Remove all metallic jewelry, such as watches, rings, metal rimmed glasses, or necklaces.
- Wear safety glasses with side shields at all times during the installation.
- Use OSHA approved insulated hand tools. Do not rest tools on top of batteries.

WARNING

Lethal voltages are present within the power system. Always assume that an electrical connection or conductor is energized. Check the circuit with a voltmeter with respect to the grounded portion of the enclosure (both AC and DC) before performing any installation or removal procedure.

- Do not work alone under hazardous conditions.
- A licensed electrician is required to install permanently wired equipment. Input voltages can range up to 240 Vac.
- Ensure that no liquids or wet clothes come into contact with internal components.
- Hazardous electrically live parts inside this unit are energized from the batteries even when the AC input power is disconnected.
- The enclosure which contains the DC or AC power system along with customer installed radios must remain locked at all times, except when authorized service personnel are present.
- Always assume electrical connections or conductors are live. Turn off all circuit breakers and double-check with a voltmeter before performing installation or maintenance.
- Place a warning label on the utility panel to warn emergency personnel that a reserve battery source is present which will power the loads in a power outage condition or if the AC disconnect breaker is turned off.
- At high ambient temperature conditions, the internal temperature can be hot so use caution when touching the equipment.

2. Overview

The Central Power Hub (CPH) is based on an SE41-2722 enclosure with a Cordex® CXPS-E3 400A power system and a Cordex® HP LPS36 shelf to provide ±190 Vdc line powering channels from an AC utility source. To better communicate the function and application of the system, marketing material (user guide, data sheet, and website) will refer to the SE41-2722 enclosure as the CPH-144.

The CPH-144 is a Type 3R outdoor central power hub enclosure providing up to 144 ±190 Vdc line powering channels from an AC utility power source. The CPH-144 utilizes remote line powering equipment as a method of energizing remote devices using power delivered from a central source over copper cable.

The CPH-144 is configured as follows:

- SE41-2722 enclosure with heat exchanger AC loadcenter with main breaker and TVSS.
- Cordex® CXPS-E3 400A power system with Cordex® HP 2.4/3.0 kW rectifier shelves.
- Cordex® HP LPS36 up-converter shelves.
- Cordex® CXC HP system controller.
- High-voltage 50-pair protector panel.

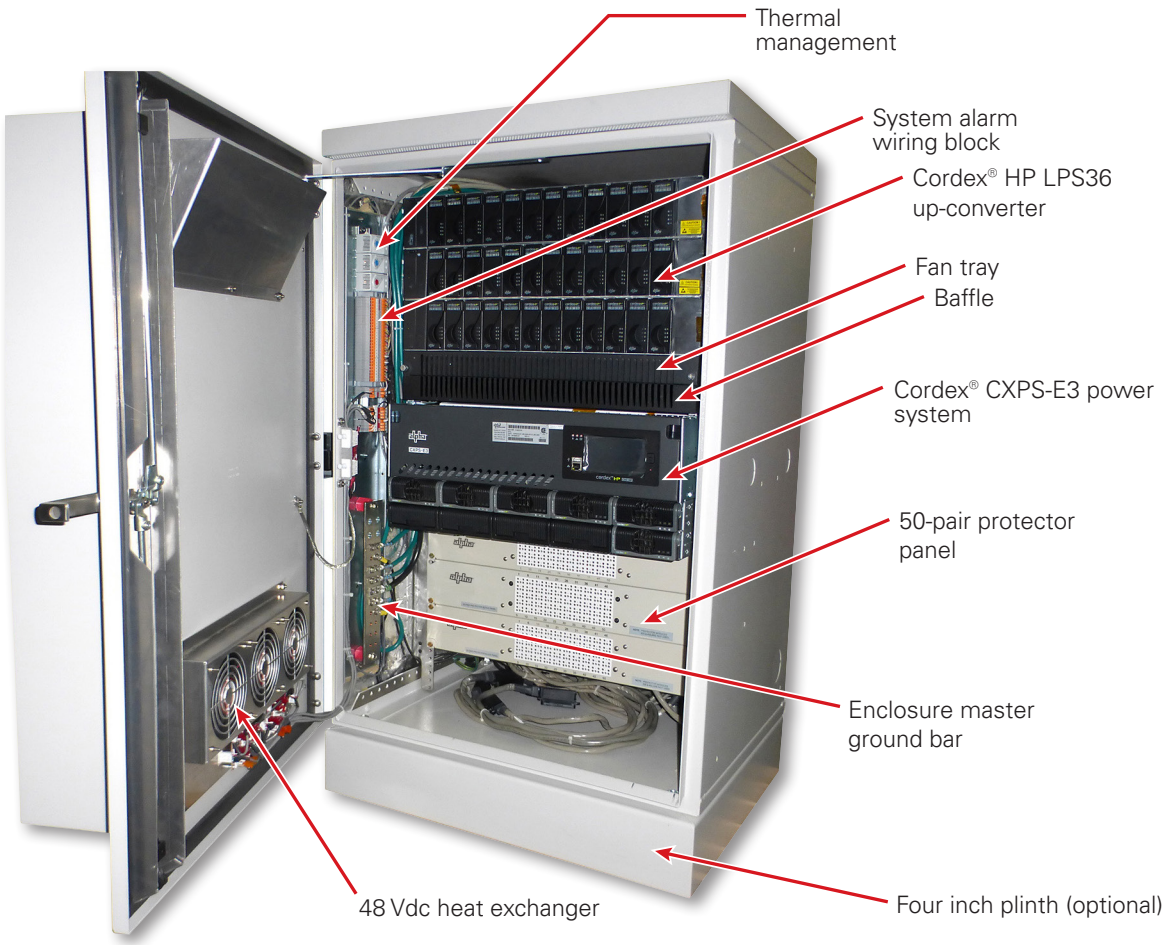


Figure 1: CPH-144 interior

3. Specifications

Electrical	
Input voltage	**Nominal:** 187 to 277 Vac
	Operating: 187 to 310 Vac
	Extended: 90 to 187 Vac (de-rated power)
	187 to 277 Vac (single phase)
Input frequency	45 to 66 Hz
Power factor	>98% (50 to 100% load)
THD	<8% (50 to 100% load)
Efficiency	90%
Output voltage	±190 Vdc
Output power	10.8 kW
Features	
Protection	• Pad-lockable door handle • 40 kA surge suppression • 50-pair protector panel for gas discharge tube modules
Mechanical	
Dimensions H × W × D	**Footprint:** 1041 mm × 686 mm × 559 mm (41 in. × 27 in. × 22 in.)
	Enclosure: 1041 mm × 803 mm × 767 mm (41 in. × 31.6 in. × 30.2 in.)
Weight	193 kg (425 lb)
Mounting	• Pole • Ground (optional plinth)
Cooling	50 W/°C heat exchanger
Enclosure	Aluminum, 5052-H32
Environmental	
Temperature	**Operating:** –40 to 46°C (–40 to 115°F)
	Storage: –40 to 85°C (–40 to 185°F)
Relative humidity	0 to 95% non-condensing
Elevation	–100 to 3000 m (–330 to 9840 ft)
Cabinet rating	Type 3R
Acoustic noise	< 65 dBA
Agency compliance	
Safety[1]	• CSA/UL 60950-1 • CSA/UL 60950-21 • CSA/UL 60950-22
[1] Only 0570228-101, 0570228-102, and 0570228-103 system part numbers are CSA/UL certified systems.	

ATTENTION

Only use accessories (such as grommets or fittings) with the proper Type 3R rating or better during field installation.

4. Features

4.1 Cordex® CXPS-E3 400A power system

For more information, refer to the CXPS-E3 400A power system documentation.

The Cordex® CXPS-E3 400A power system uses high-density rectifier shelves, a front access distribution panel, and the advanced Cordex® CXC HP system controller. The CXPS-E3 power system is the ideal solution for small to medium-sized 48 Vdc applications, providing up to 400 amps of output current. With universal 19-/23-inch mounting, high temperature operation, and high power density, it is the perfect solution for a wide variety of installation applications including those in harsh outdoor environments. The distribution panel provides up to 21 load breaker positions and five battery breaker positions, integrated shunt, and battery LVD. All distribution connections and controller I/O contacts are front accessible.

The Cordex® CXC HP system controller includes a touchscreen display for simple and convenient local setup. A built-in web server provides alternate setup via local or remote IP access, using a standard internet browser.

- Integrated 48 V, 400 A power system with front access distribution.
- Industry leading power system density.
- 26 distribution positions in 5RU form factor.
- Advanced Cordex® CXC HP system controller with touchscreen LCD for full local control.
- High temperature rated design for harsh outdoor applications.
- Wide range AC input for flexible worldwide deployment.

Figure 2: Cordex® CXPS-E3 400A power system

4.2 Cordex® HP LPS36 up-converter

For more information, refer to the Cordex® HP LPS36 documentation.

The Cordex® HP LPS36 is a modular DC to DC up-converter system designed for distributed power applications using ±190 Vdc over existing or new copper cabling.

Using switched mode technology, the LPS36 quad output converter module provides outstanding efficiency in a compact design. Applications include powering sealed DSLAMs, Distribution Point Units (DPU) as well as Optical Network Terminals (ONT) in Fiber to the Home Networks (FTTH). Each LPS36 converter module contains four isolated DC to DC converters, up to 100 watt maximum. Converter modules are ordered separately at time of ordering or later after the converter system has been installed. Blank plates can be ordered separately for empty slots.

- High efficiency >92% for reduced operating expenses (OPEX) and carbon footprint.
- High temperature tolerance for installation in Central Office (CO) or harsh outside plant (OSP) cabinet environments.
- Industry leading power density enabling up to 48 channels in a compact 2RU form factor.

Figure 3: Cordex® HP LPS36 up-converter

4.3 Cordex® CXC HP system controller

For more information, refer to the Cordex® CXC HP controller documentation.

The Cordex® CXC HP system controller provides a high performance control and monitoring option for all Cordex® products. The controller brings a refreshed look, increased horsepower, and advanced configurability to the proven Cordex® controller family.

The controller includes multiple communication ports including two Ethernet connections to permit simultaneous local craft access as well as permanent LAN/WAN connectivity. Dual USB ports provide advanced file management capabilities including firmware upgrades and system configuration management. Use a USB storage device to quickly backup and restore site configuration settings and data logs.

The web-based user interface provides detailed inventory management allowing integration of advanced energy systems incorporating multiple power elements. Systems with various energy generation and storage elements can be configured and monitored with ease. Users can create custom inventory such as shunts, battery LVDs, battery systems, and loads to effectively manage all aspects of their energy system. The controller ensures effortless operation and management to satisfy the most demanding and advanced energy system applications.

- Advanced next-generation control and monitoring platform for the Cordex® product family.
- High-resolution color touchscreen LCD with advanced local UI.
- Integrated USB host for local firmware upgrades, configuration updates, and system backup and restore.
- Comprehensive user interface for advanced system configuration.
- Seamless integration of multiple energy systems allowing comprehensive management, monitoring, and control.
- External ADIO smart peripherals for customizing unique I/O configurations.
- Compact flexible mounting options to reduce space requirements.

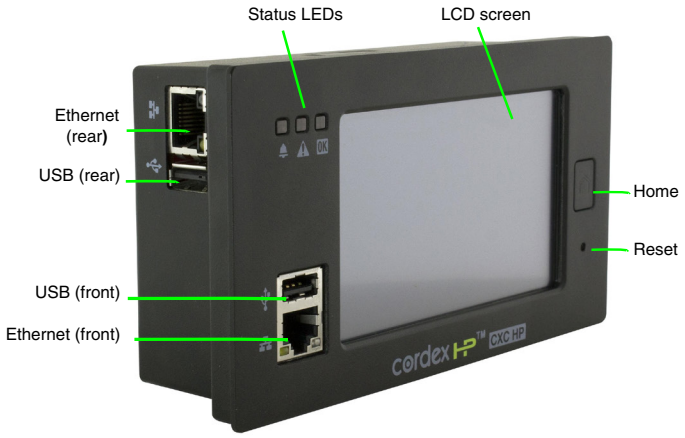


Figure 4: Cordex® CXC HP system controller

4.4 High voltage 50-pair protector panels

Each panel provides overvoltage protection for up to 50 copper circuit pairs. The panel accepts five-pin gas discharge tube (GDT) modules (part number: 1620018).

- Output uses 3M Company MS² 4005 Gel Bridge Module (GBM) connectors.
- Each loaded circuit requires one GDT module.

Figure 5: High voltage 50-pair protector panels

4.5 External AC loadcenter

The CPH-144 includes a 208/240 Vac loadcenter, with a 100 amp main breaker, that is pre-wired for the DC power system and other AC electrical connections.

Refer to the 0570257-05 drawing at the end of this document for the loadcenter wiring schematic.

Figure 6: External AC loadcenter

4.6 48 Vdc heat exchanger

The heat exchanger consists of a core, internal loop recirculation fans, and external loop fans for circulating outside ambient air across the core.

The heat exchanger features adjustable thermostat control and a heat exchanger fan fail alarm output that is wired to the enclosure alarm block. The heat exchanger fans shut off automatically when the enclosure door is opened.

Refer to the 0570257-05 drawing at the end of this document for the heat exchanger wiring schematic.

Figure 7: 48 Vdc heat exchanger

5. Inspection

5.1 Packing materials

EnerSys® is committed to providing products and services that meet our customers' needs and expectations in a sustainable manner, while complying with all relevant regulatory requirements. As such EnerSys strives to follow our quality and environmental objectives from product supply and development through to the packaging for our products.

Rectifiers and batteries are shipped on individual pallets and are packaged according to the manufacturer's guidelines.

Almost all EnerSys packaging material is from sustainable resources and is recyclable.

5.2 Returns for service

NOTICE

EnerSys is not responsible for damage caused by improper packaging of returned products.

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is unavailable, make sure that the product is packed with at least 7.6 cm (3 in.) of shock-absorbing material to prevent shipping damage.

5.3 Check for damage

Before unpacking the product, note any damage to the shipping container. Unpack the product and inspect the exterior for damage. If any damage is observed, contact the carrier immediately. Continue the inspection for any internal damage. In the unlikely event of internal damage, inform the carrier and contact Alpha Technologies Ltd. for advice on the impact of any damage.

5.4 General receipt of shipment

The inventory included with your shipment depends on the options you have ordered. The options are clearly marked on the shipping container labels and bill of materials.

5.5 Miscellaneous small parts

Review the packing slip and bill of materials to determine the part number of the "configuration kits" included with your system. Review the bill of materials to verify that all the small parts are included. Contact Alpha Technologies Ltd. if you have any questions before you proceed.

6. Installation

Only qualified personnel should install and connect the power components within the Alpha® power system. For the battery installation, refer primarily to the manufacturer's documentation.

6.1 Safety precautions

Refer to the "Safety" section near the beginning of this document.

6.2 Installation tools

Various insulated tools are essential for the installation. Use this list as a guide:

- Battery lifting apparatus (if required)
- Electric drill with hammer action, 1/2 inch capacity
- Various crimping tools and dies to match lugs used in installation
- Load bank of sufficient capacity to load largest rectifier to its current limit
- Digital voltmeter equipped with test leads
- Cable cutters
- MS² splicing tool
- Cutters and wire strippers 0.34 mm² to 2.5 mm² (22 AWG to 14 AWG)
- Torque wrench: 1/4 inch drive, 0 to 17 Nm (0 to 150 in-lb)
- Torque wrench: 3/8 inch drive, 0 to 135 Nm (0 to 100 ft-lb)
- Insulating canvases as required
- Various insulated hand tools including:
  - Combination wrenches.
  - Ratchet and socket set.
  - Various screwdrivers.
  - Electricians knife.
- Battery safety spill kit (required for wet cells only)

6.3 Site selection

Consider the following before selecting a mounting site:

- The CPH-144 is designed for pole or ground mounting.
- Avoid areas that could be subjected to hot air exhaust from nearby equipment or buildings.
- Avoid mounting in areas of extreme heat such as exposure to direct sunlight.
- Find out if your intended area is subjected to architectural controls or environmental restrictions.

CAUTION

Follow all local safety practices and guidelines while lifting the enclosure. All personnel involved with lifting and positioning the enclosure must wear head and eye protection, and gloves. Only properly trained and certified personnel should operate the crane. Only properly trained and certified personnel should operate the forklift.

6.4 Lifting

1. Before lifting the enclosure, make sure the lifting eyes have not come loose during shipping and are securely fastened.
2. Ensure that the clevises are correctly installed and that the enclosure is approximately level during the lift. This will simplify the enclosure positioning.

3. Close and latch the enclosure front door.
4. If included, place the enclosed rubber mat onto the slab or platform. Orient the mat so that the mounting holes line up. If the rubber mat is "ribbed" the ribs should be against the concrete slab.

6.5 Mounting the enclosure

The CPH-144 is designed for pole or ground mounting.

Concrete pad installation requiring seismic compliance requires approval by the appropriate engineering discipline, for example, civil or structural. Cast-in-place or pre-cast concrete slabs can be used.

Use the template in Figure 9 to place the anchor bolts. Follow the specific recommendations from the fastener manufacturer to ensure that the securing device achieves its full structural capacity. Refer to drawings at the end of this document for further details.

6.5.1 Pole mounting

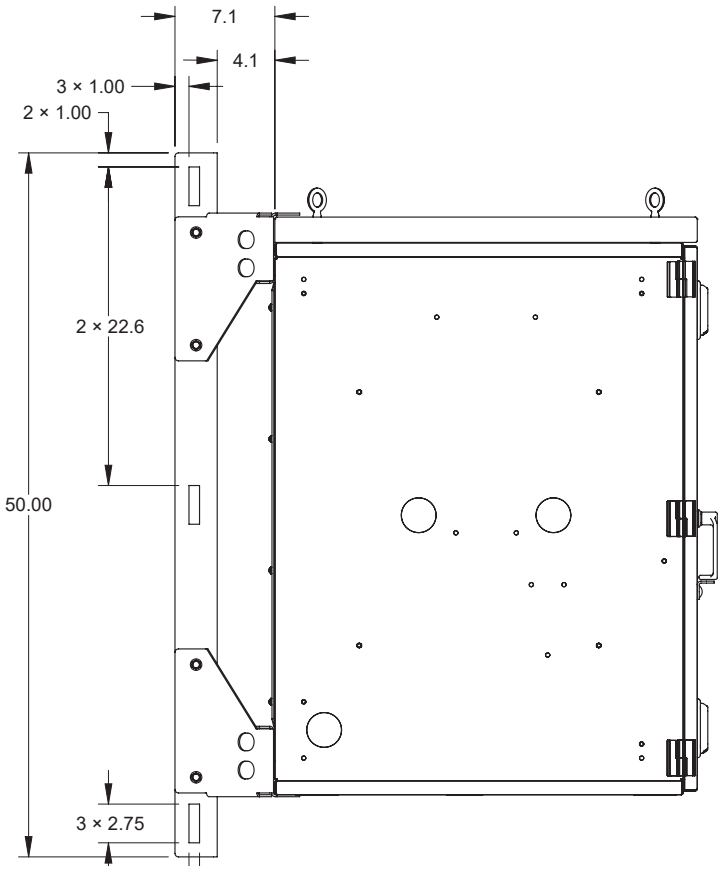


Figure 8: Pole mounting detail

6.5.2 Ground mounting

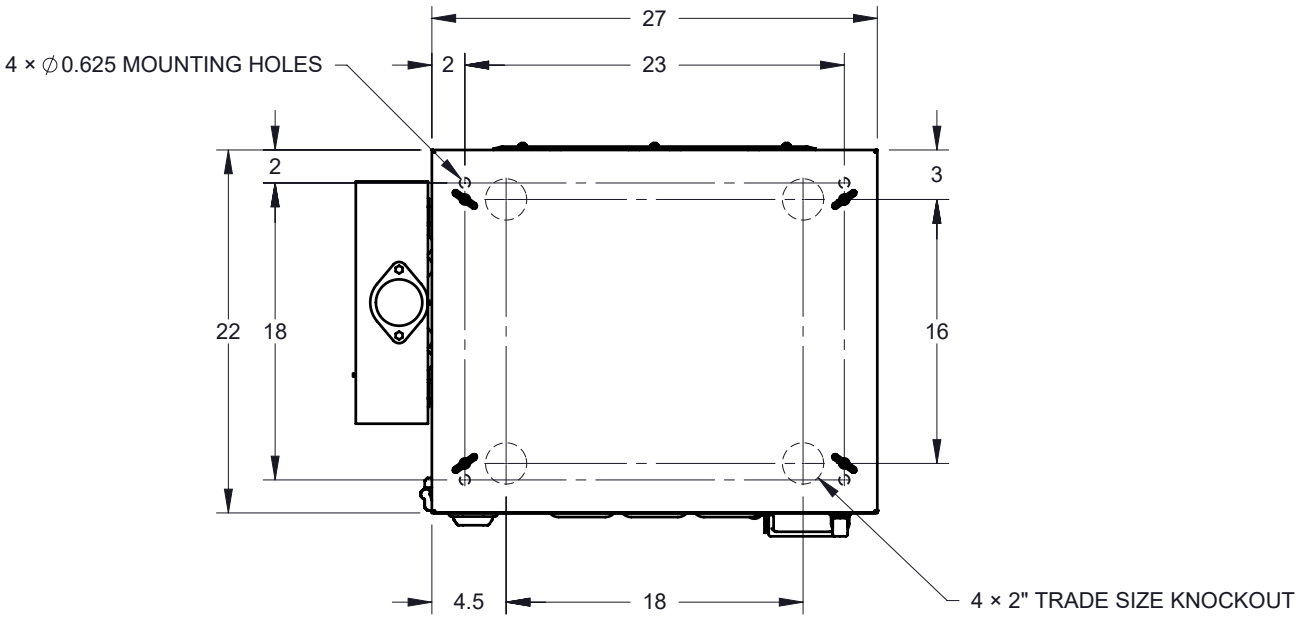


Figure 9: Ground mounting detail

7. Wiring

Only qualified personnel should install and connect the power components within the Alpha® power system.

WARNING

- **Only qualified personnel should install and connect the power components within the Alpha® system.**
- **An enclosure that is not properly grounded presents an electrical hazard and will likely result in premature equipment failure.**
- **A proper grounding system (ground electrode system) that meets or exceeds the specifications of the equipment must be designed and installed prior to or in conjunction with the installation. The ground system must be bonded to the enclosure to ensure a common or single-point ground.**

7.1 Grounding the enclosure

There are three different configurations of the CPH-144 enclosure, the following content describes grounding for these different scenarios. The grounding specifications and diagrams depicted in this document are based on recommended industry best practices. However, site grounding design and construction shall always adhere to local electrical codes and the internal standards of the company that is responsible for ownership and operation of equipment.

GROUNDING

It is recommended that all buried grounding connectors are 30.1 cm (12 in.) below finished grade line or below the frost line. For below grade connections, use crimp or mechanical connectors instead of an exothermic weld provided they are listed for direct burial applications.

7.1.1 Configuration 1: Grounding the CPH-144 with a combination meter and loadcenter

1. Install a 35 mm² (2 AWG) tinned solid copper site ground wire (grounding electrode conductor) originating at the closest driven ground electrode and connect it to the loadcenter AC Equipment Ground (ACEG) bus.
2. Route a length of 35 mm² (2 AWG) tinned solid copper conductor from a junction point on the grounding electrode conductor (GEC) and connect to the Enclosure Master Ground Bar (MGB) using an appropriate compression two-hole lug.

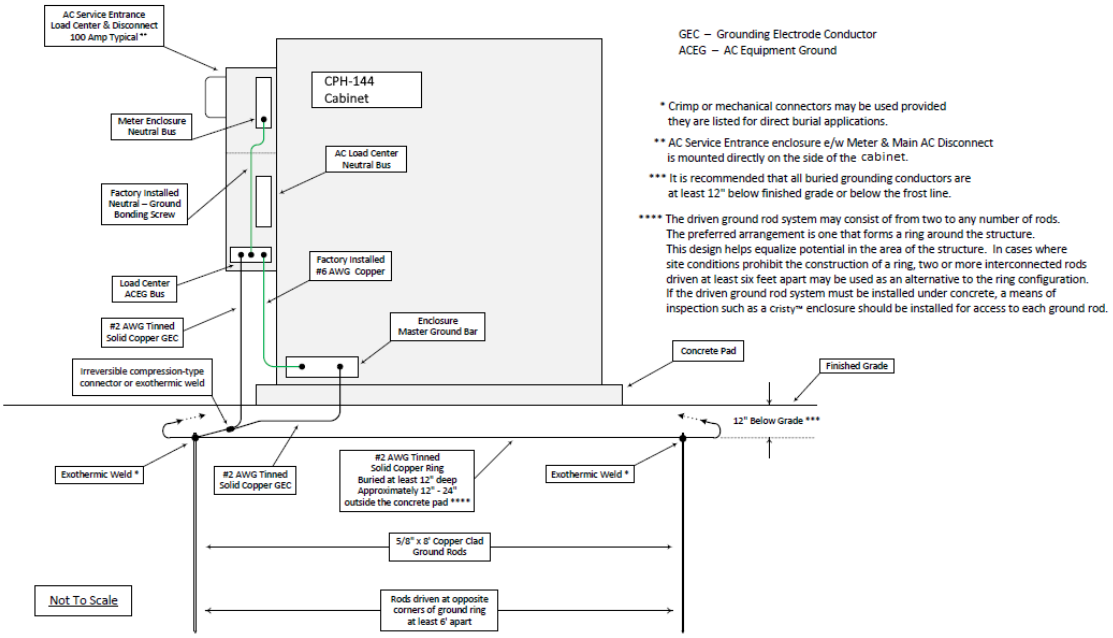


Figure 10: CPH-144 combination meter and loadcenter grounding diagram

Avoid tight radius bends and route the conductor such that it intersects with the GEC at a downward orientation as illustrated.

3. Connect the other end of the conductor to the GEC via an irreversible compression connector or exothermic weld.

7.1.2 Configuration 2: Grounding the CPH-144 with remote AC service disconnect located within four feet of the cabinet

1. Install a continuous length of 35 mm² (2 AWG) tinned solid copper conductor originating at the ACEG bus in the remote service disconnect enclosure and have it terminated at the MGB.
2. Connect the 35 mm² (2 AWG) tinned solid copper conductor to the ACEG bus in the remote service disconnect enclosure and then to the ground rod nearest to the enclosure MGB.
   Avoid tight radius bends.
3. Terminate this GEC to the enclosure MGB using an appropriate two-hole compression lug.

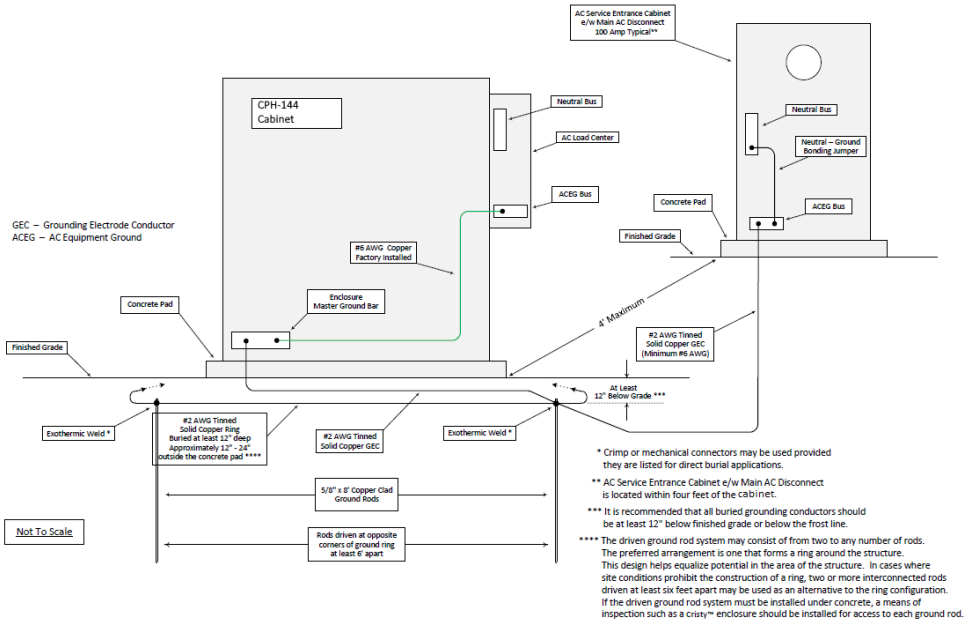


Figure 11: CPH-144 with remote disconnect (<4 feet) grounding diagram

7.1.3 Configuration 3: Grounding the CPH-144 with remote AC service disconnect located greater than four feet away from the cabinet

1. Install a continuous length of 35 mm² (2 AWG) tinned solid copper conductor originating at the ACEG bus in the remote service disconnect enclosure and have it terminated at the MGB.
2. Connect the 35 mm² (2 AWG) tinned solid copper conductor to the ACEG bus in the remote service disconnect enclosure and then to the ground rod nearest to the AC service disconnect enclosure and continue this GEC to the driven ground rod of the CPH-144 system.
   Avoid tight radius bends.
3. Connect the GEC to the CPH-144 driven ground rod nearest to the Enclosure MGB and have it terminated to the Enclosure MGB using an appropriate two-hole compression lug.

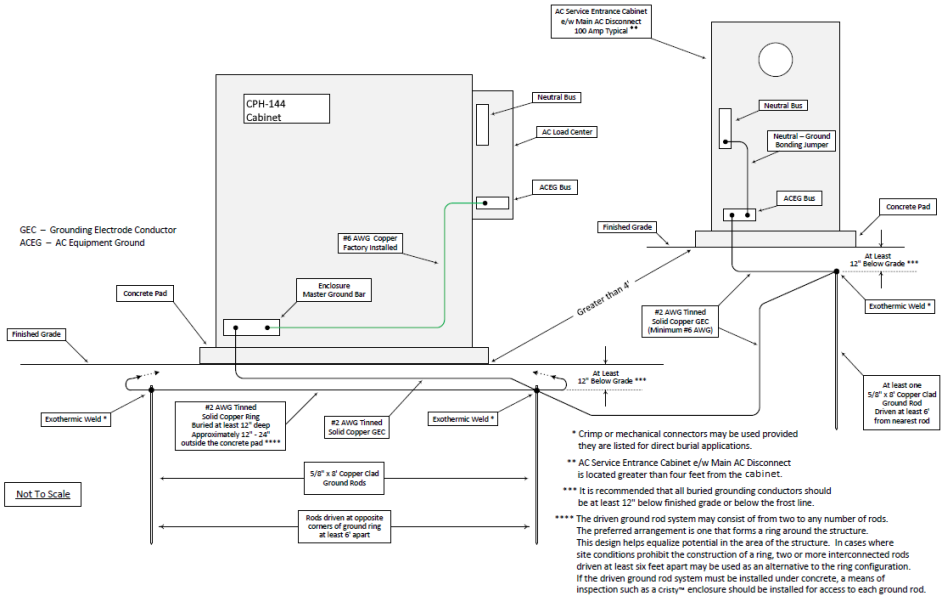
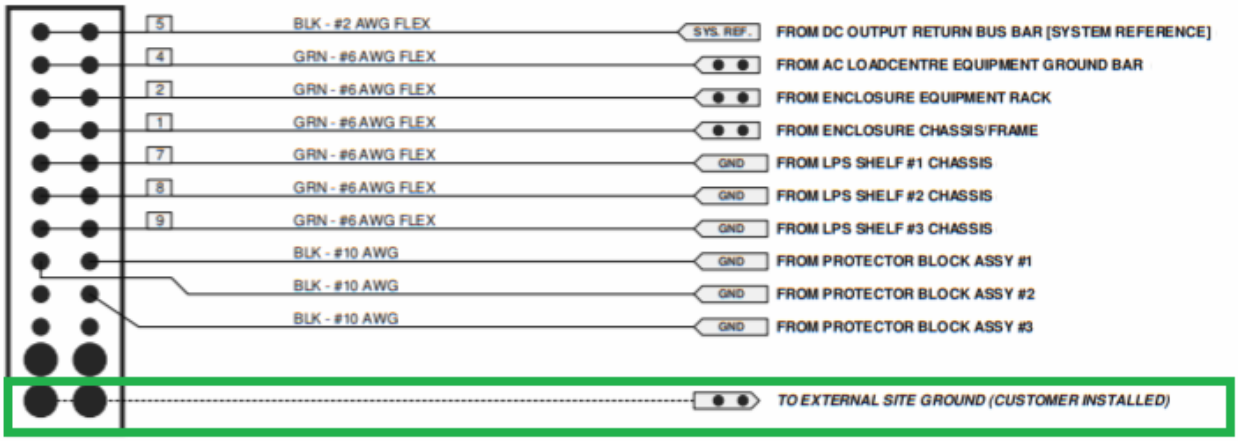


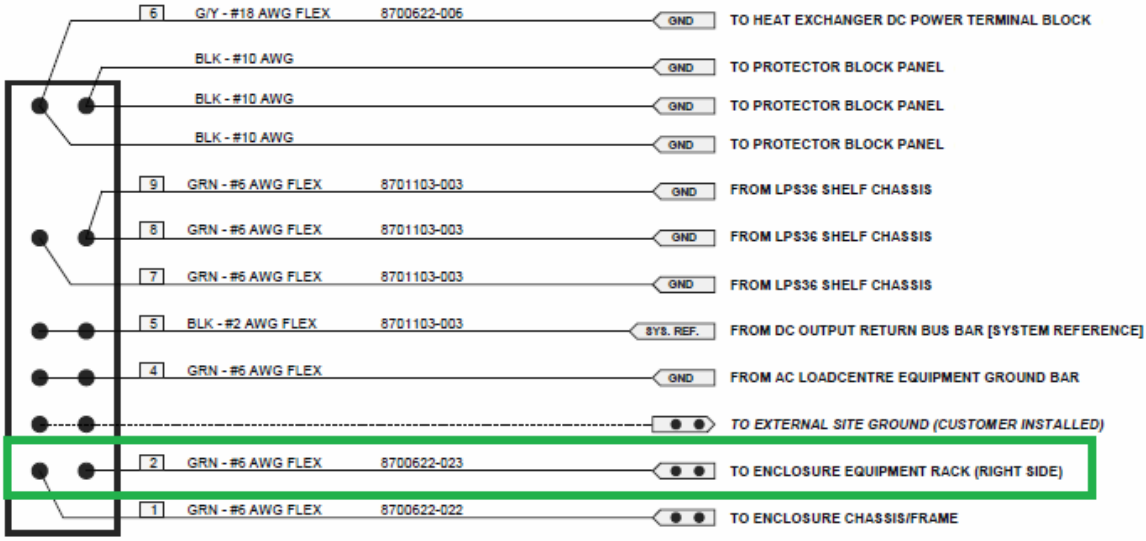
Figure 12: CPH-144 with remote disconnect (>4 feet) grounding diagram

7.2 Internal wiring configurations of enclosure master ground bar

7.2.1 Configuration 1: Typical internal wiring of the enclosure master ground bar for newer versions of the CPH-144



7.2.2 Configuration 2: Typical internal wiring of the enclosure master ground bar for older versions of the CPH-144



7.3 Grounding system location

A proper grounding system that meets or exceeds the specifications of the equipment must be designed and installed prior to or in conjunction with the installation. The ground system must be bonded to the enclosure to ensure a "common" or "single-point" ground.

1. Locate the CPH-144 enclosure master ground bar at the left front of the enclosure.
   Chassis ground is connected to the enclosure frame and is terminated at the master ground bar within the enclosure.
2. There are various size knockouts located on the exterior of the enclosure. Refer to the drawings at the back of the document. Use a suitable knockout for the external site ground connection. Route the cables into the enclosure using the appropriate conduit and fittings.
3. Connect the site ground wire to an open position of the enclosure MGB. The master ground bar accepts lugs with either 1/4 inch holes on 5/8 inch centers or 3/8 inch holes on 1 inch centers.

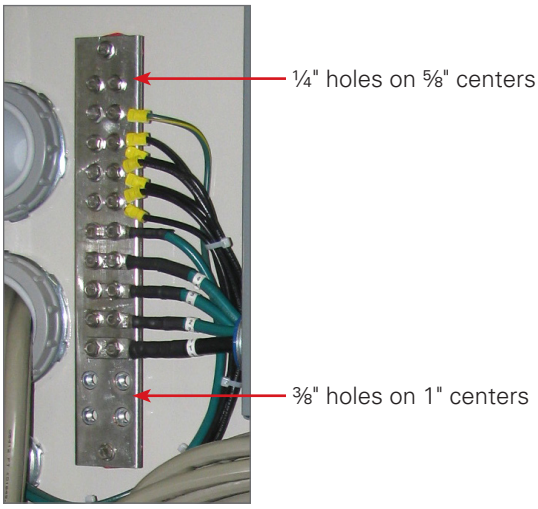


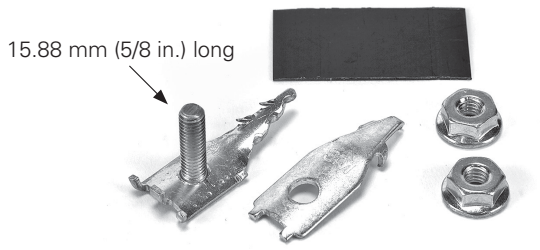
Figure 13: Enclosure MGB with site ground

7.4 Bonding OSP cable shield to the master ground bar

The OSP cable shield must be bonded to the Master Ground Bar (MGB). The OSP cable is the 50/100-pair twisted pair cable that carries the line power circuits out to the remote nodes. Shield bonding must take place at the cabinet and at all cable splice locations including the splice at the down converter location. High voltage surges such as lightning events could easily cause a flashover arc situation in the cabinet if the shield is not properly grounded.

Parts required

- Corning 80611384522 – 4460-DS-SS shield bond connector



- Corning 80610096150 25T grounding braid with eyelets; L × W: 25 ft. × 0.5 in. (optional)
- 16 mm² (6 AWG) grounding conductor

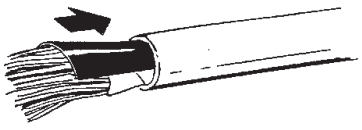
Tools required

- 3/8 inch terminal wrench
- Tabbing shears

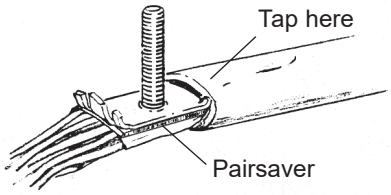
7.4.1 Bonding procedure

1. For both single and double sheath cables, cut the shield flush with the sheath.

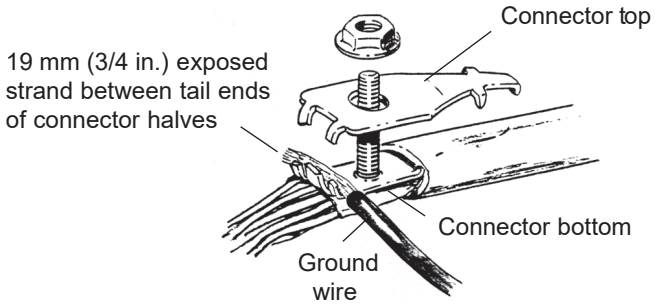
2. Take the OSP cable and insert the pair saving insulating shoe between the core wrap and the shield.



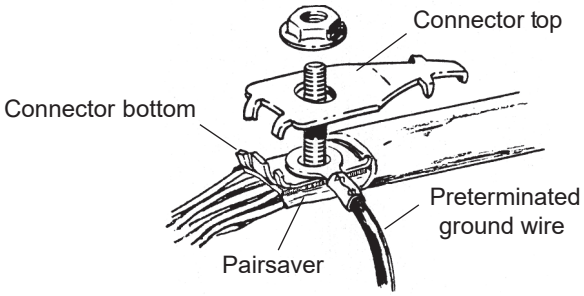
3. Insert the connector base between the shield and core wrap, or inner sheath for double sheath cables, until the connector stops to meet the outer sheath. Tap the sheath above the connector base.



4. If using an exposed strand ground wire, prepare the ground wire using 16 mm² (6 AWG) stranded conductor. Place the exposed strand onto the lip of the connector base. Ensure the wire is long enough to reach the MGB without straining the cable or making any sharp bends. Fasten in place using supplied hardware.



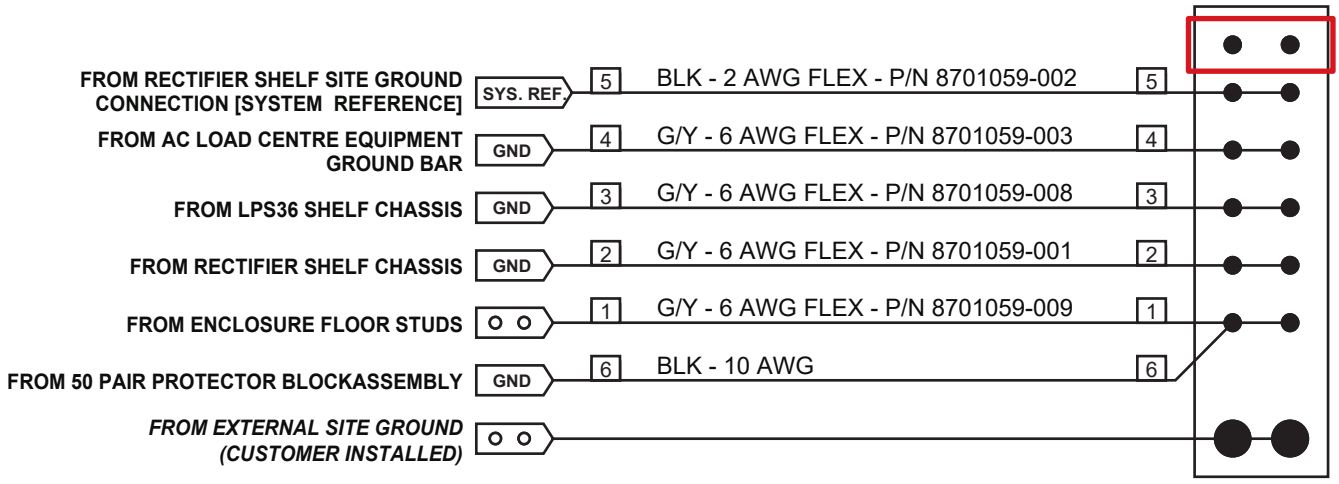
5. If using a pre-terminated ground wire, place the lug from the wire directly onto the PEM. Fasten in place using supplied hardware.



6. Connect the other end of the ground wire to the enclosure MGB using a two hole compression lug. The enclosure MGB uses 1/4 inch holes on 5/8 inch centers.

NOTICE

If there are already connections on the top position of the MGB, it will be necessary to remove the existing connections, land the OSP cable shield two-hole compression lug and re-connect the existing ground cables on top.



7.5 AC input wiring to the loadcenter

Use suitable knockout to route the AC cable into the AC loadcenter. Use appropriate conduit and fittings.

Make the connections in the following table to the AC loadcenter.

Wire color	Description	Connection terminal
Black	Line 1	L1
Red	Line 2	L2
White	Neutral	N
Green	Ground	Protective earth

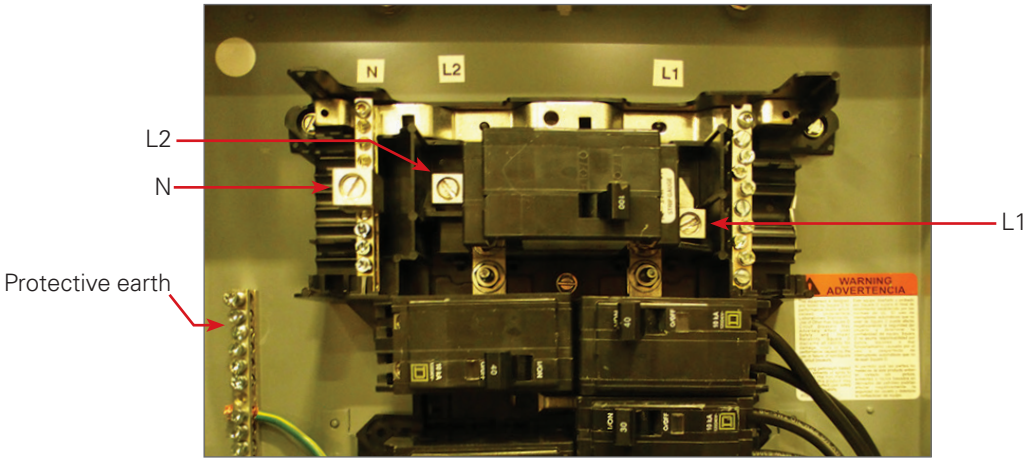


Figure 14: Internal AC loadcenter utility connection

7.6 Wiring the high voltage DC output

Each Cordex® HP LPS36 shelf can accommodate up to 12 four-channel LPS36 converter modules providing up to a total of 48 ±190 Vdc output circuits. These circuits are accessed through 25 pair cables terminated with 3M Company MS² 4005 GBM connectors. There are 24 output circuits available on each of these connectors. Refer to Table A for GBM pinout and Table B for GBM connector circuit assignments.

Use 25 pair load cables terminated with mating GBM connectors to interface to the system output GBM connectors. Route the load cables through a suitable knockout to the loads.

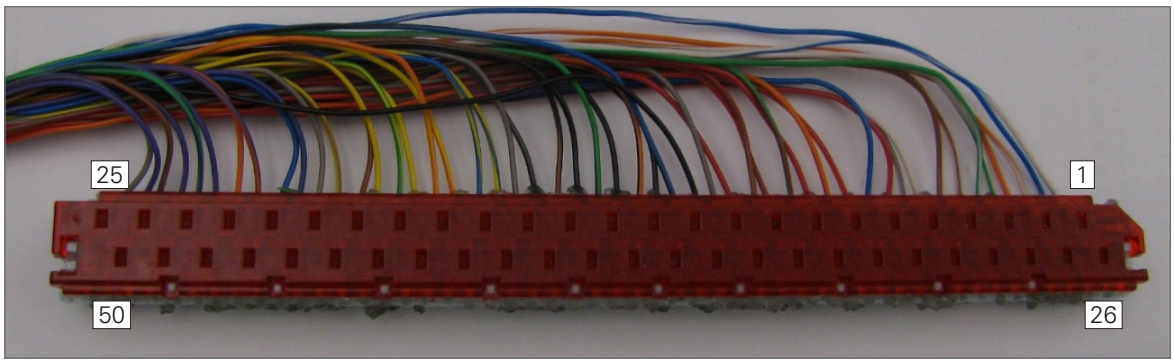


Figure 15: 3M Company MS² pair GBM connector pinout

Table A — 3M Company MS² GBM connector circuit designations

Circuit	Tip wire color / Ring wire color	3M MS² pin
1	White/Blue	26
	Blue/White	1
2	White/Orange	27
	Orange/White	2
3	White/Green	28
	Green/White	3
4	White/Brown	29
	Brown/White	4
5	White/Gray	30
	Gray/White	5
6	Red/Blue	31
	Blue/Red	6
7	Red/Orange	32
	Orange/Red	7
8	Red/Green	33
	Green/Red	8
9	Red/Brown	34
	Brown/Red	9
10	Red/Gray	35
	Gray/Red	10
11	Black/Blue	36
	Blue/Black	11
12	Black/Orange	37
	Orange/Black	12
13	Black/Green	38
	Green/Black	13
14	Black/Brown	39
	Brown/Black	14
15	Black/Gray	40
	Gray/Black	15
16	Yellow/Blue	41
	Blue/Yellow	16
17	Yellow/Orange	42
	Orange/Yellow	17
18	Yellow/Green	43
	Green/Yellow	18
19	Yellow/Brown	44
	Brown/Yellow	19
20	Yellow/Gray	45
	Gray/Yellow	20
21	Violet/Blue	46
	Blue/Violet	21
22	Violet/Orange	47
	Orange/Violet	22
23	Violet/Green	48
	Green/Violet	23
24	Violet/Brown	49
	Brown/Violet	24
25	Violet/Gray	50
	Gray/Violet	25

Populate the 50 pair protector panel with the quantity of five-pin gas tube modules corresponding to the number of loaded circuits. Install the gas tube modules in the protector panel numbered locations in accordance with shelf slots used (refer to the following table).

NOTICE

Shelf slots are numbered left to right.

Circuits 25, 50, 75, 100, 125, and 150 are not used.

Table B — Module circuit designation

LPS36 shelf slot	Protector panel circuit	Corresponding GBM connector
Module 1	1 to 4	A1
Module 2	5 to 8	A1
Module 3	9 to 12	A1
Module 4	13 to 16	A1
Module 5	17 to 20	A1
Module 6	21 to 24	A1
Module 7	26 to 29	A2
Module 8	30 to 33	A2
Module 9	34 to 37	A2
Module 10	38 to 41	A2
Module 11	42 to 45	A2
Module 12	46 to 49	A2
Module 13	51 to 54	B1
Module 14	55 to 58	B1
Module 15	59 to 62	B1
Module 16	63 to 66	B1
Module 17	67 to 70	B1
Module 18	71 to 74	B1
Module 19	76 to 79	B2
Module 20	80 to 83	B2
Module 21	84 to 87	B2
Module 22	88 to 91	B2
Module 23	92 to 95	B2
Module 24	96 to 99	B2
Module 25	101 to 104	C1
Module 26	105 to 108	C1
Module 27	109 to 112	C1
Module 28	113 to 116	C1
Module 29	117 to 120	C1
Module 30	121 to 124	C1
Module 31	126 to 129	C2
Module 32	130 to 133	C2
Module 33	134 to 137	C2
Module 34	138 to 141	C2
Module 35	142 to 145	C2
Module 36	146 to 149	C2

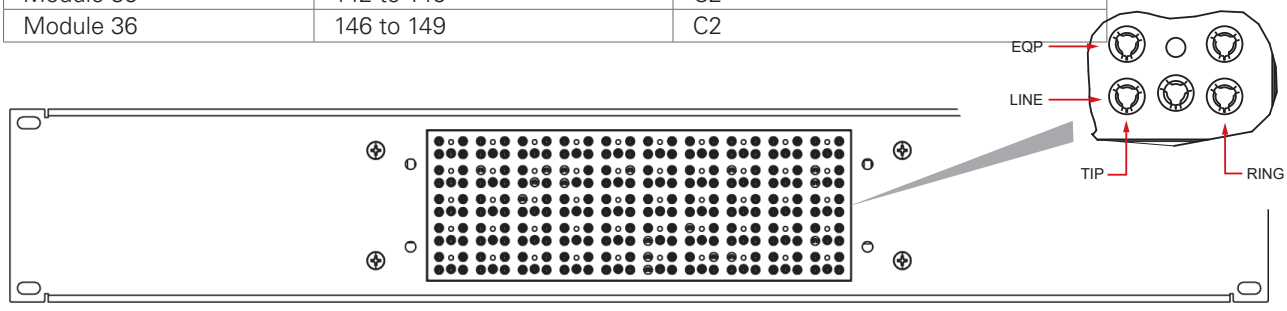


Figure 16: 50-pair protector panel

7.6.1 Power enclosure alarm wiring block

The alarm wiring block, located on the right side wall in the enclosure power compartment, uses Phoenix style blocks.

Refer to the schematic drawing, 0570257-05 at the end of this document for the alarm schedule.

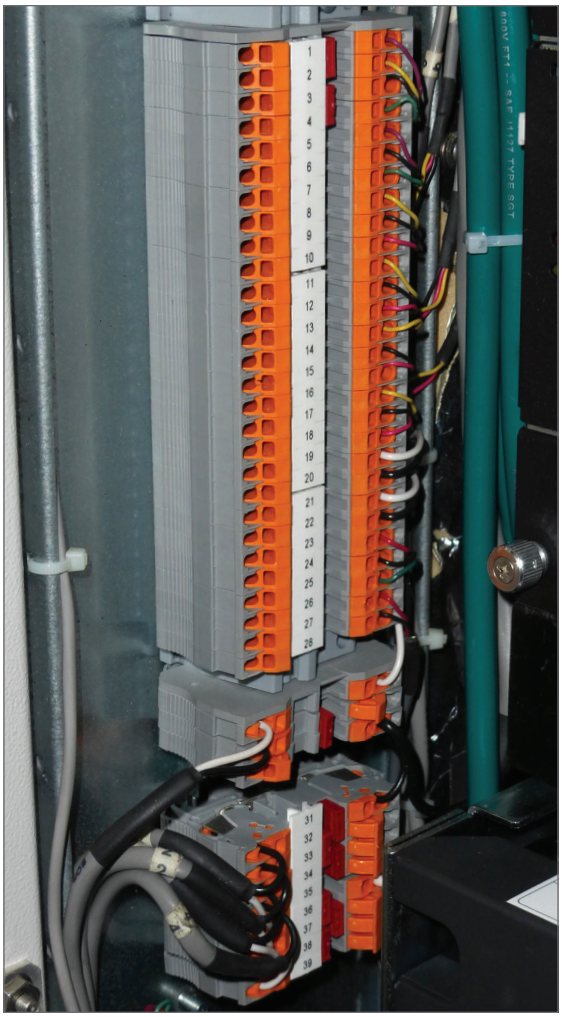


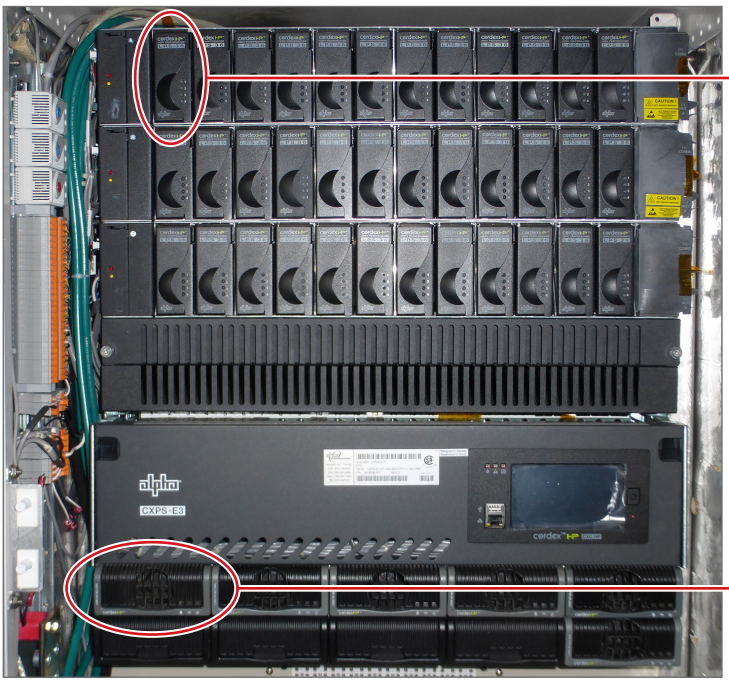
Figure 17: Enclosure alarm block wiring

NOTICE

Wires do not need to be stripped when connections are made.

8. System startup

1. Ensure all AC breakers in the AC loadcenter and all DC breakers in the Cordex® CXPS-E3 power system are switched OFF.
2. Install one rectifier module into the rectifier slot 1 and one Cordex® HP LPS36 converter module into LPS36 shelf slot 1. Slots are numbered left to right.



3. Verify AC input voltage is correct and switch the AC Main Utility circuit breaker in the AC loadcenter ON.
4. Switch the rectifier shelf AC feeder breaker corresponding to modules 1 and 2 ON.
5. The rectifier module OK LED should illuminate after a preset delay.
6. Switch DC breaker CB2 in the Cordex® CXPS-E3 power system ON.
7. The LPS36 module LEDs should illuminate and flash on and off for a short period before turning solid green.
8. Use a voltmeter to check there is approximately 380 Vdc across the Tip (T) and Ring (R) receptacles of circuits 1 to 4 on the protector panel. See Figure 16.
9. Verify loads are connected on circuits 1 to 4.
10. Install gas tube modules into protector panel positions for circuits 1 to 4.

NOTICE

Pairs will be energized once gas tubes are in place

11. Verify loads connected on circuits 1 to 4 are now receiving power.
12. Plug in remaining rectifier and LPS36 modules and switch remaining AC/DC breakers ON.
13. Install required number of gas tube modules in the protector panels. Verify they are installed in the correct locations in the panel.
14. Verify all connected loads are powered.
15. Install LPS36 module blanks in unused LPS shelf slots to ensure proper fan tray operation, and install 2.4/3.0kW module blanks in unused rectifier shelf slots.

NOTICE

Blanks will prevent air from escaping the space ensuring air is forced through the modules for effective cooling of the shelf.

8.1 Software

1. Refer to Cordex® CXC HP controller software manual to sign in to the controller.
2. Use the controller to test functionality of various module alarms and controls.

9. Maintenance

Although very little maintenance is required with Alpha® systems, routine checks and adjustments are recommended to ensure optimum system performance. Qualified service personnel should do the repairs.

The following table lists a few maintenance procedures for this system. These procedures should be performed at least once a year.

WARNING

Use extreme care when working inside the unit while the system is energized. Do not make contact with live components or parts.

ATTENTION

Circuit cards, including semi-conductor devices, can be damaged by static electricity. Always wear a grounded wrist strap when handling or installing circuit cards.

ATTENTION

Ensure redundant modules or batteries are used to eliminate the threat of service interruptions while performing maintenance on the system's alarms and control settings.

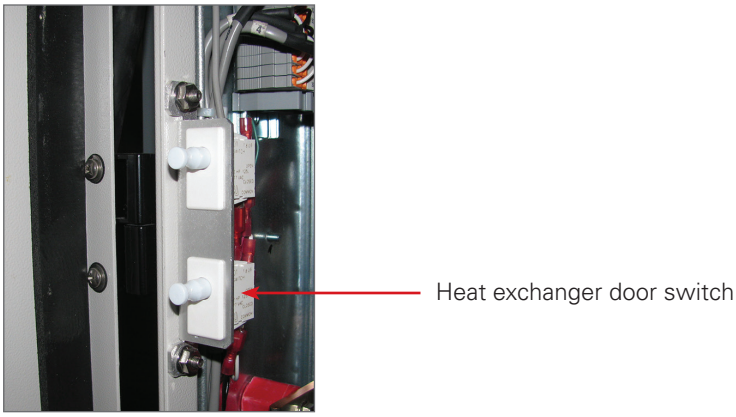
Table C — Sample maintenance log

Procedure	Date completed
Clean ventilation openings.	
Inspect all system connections.	
Verify heat exchanger for fan operation.	
Test enclosure environmental and power system alarms (refer to schematic drawing for alarm block schedule).	
Check for firmware or software updates for the controller and power modules.	

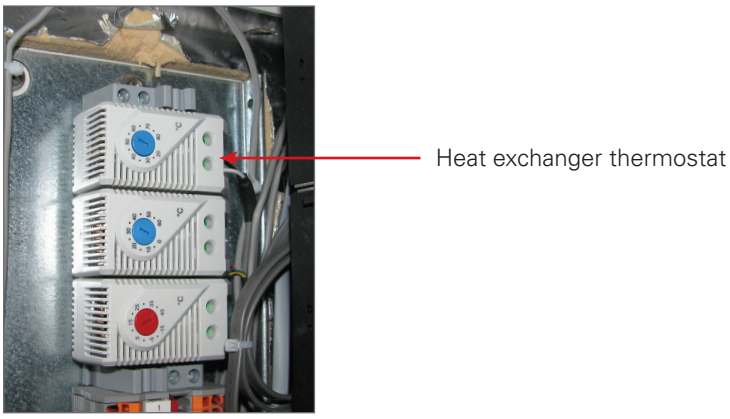
9.1 Heat exchanger fan test procedure

There are six heat exchanger fans. Three inner loop fans are located on the inside of the door and three outer loop fans on the outside of the door. Perform the following procedure to test the fans.

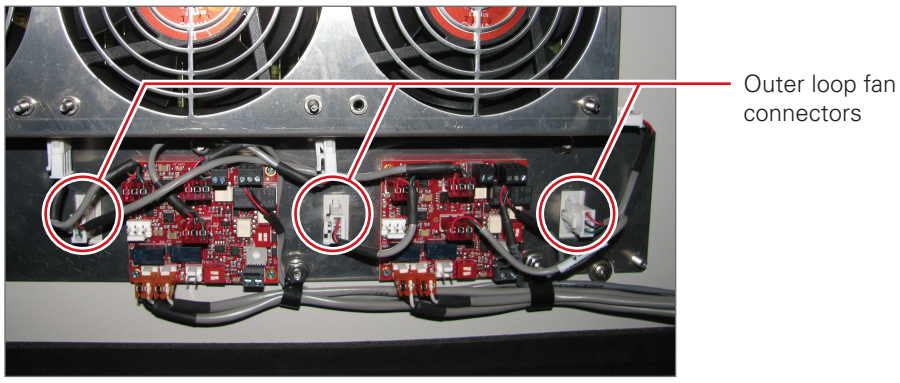
1. Pull out the plunger of the heat exchanger power door switch.



2. If the fans do not turn on, carefully apply heat to the heat exchanger thermostat using a heat gun. The fans turn on above 30°C (86°F).



3. Operation of the inner loop fans can be verified through visual inspection.
4. Unplug one of the outer loop fan connectors and listen for a noticeable drop in the sound level of the outside fans. Plug the fan connector back in.
5. Repeat **Step 4** for the two other outer loop fans.



9.2 Heat exchanger fan replacement procedure

NOTICE

This procedure can be performed on a live system.

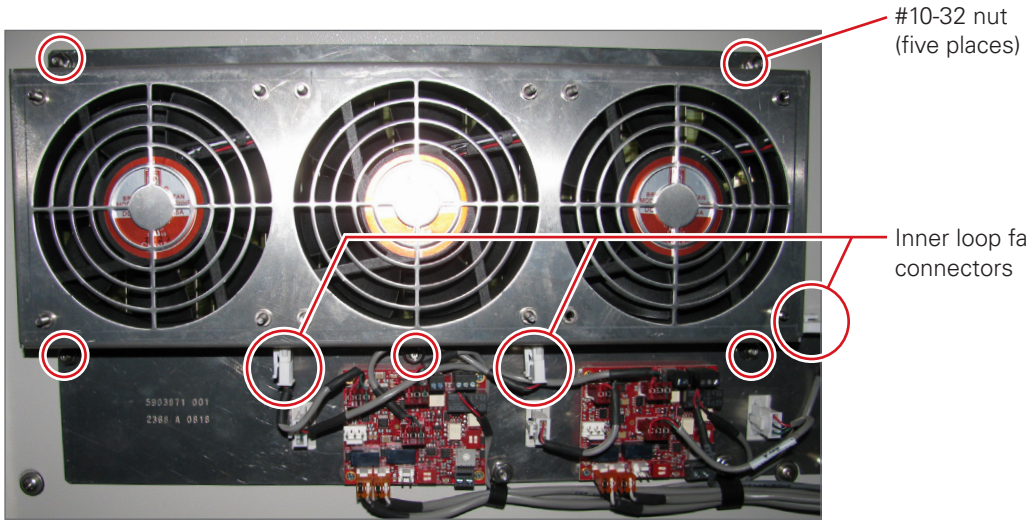
A **Fan Fail** alarm indicates failure of either an inner loop or outer loop fan. Perform the following procedures to replace a failed fan.

Tools required:

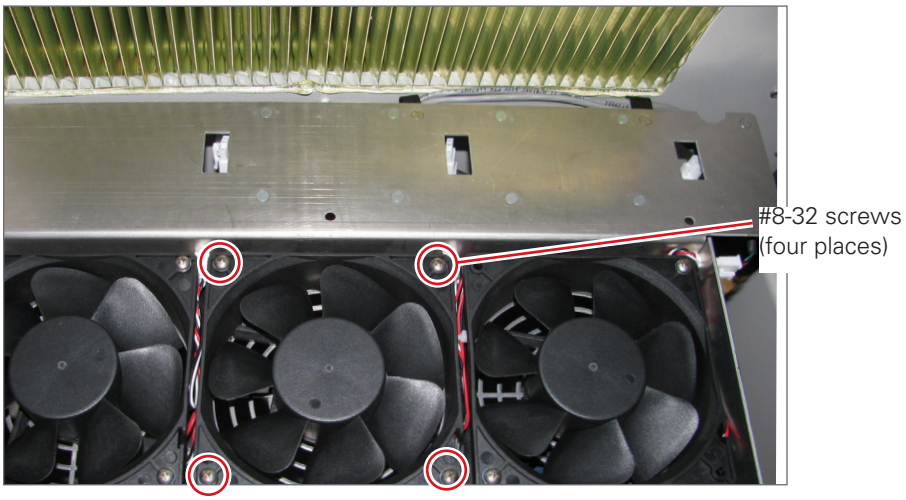
- #2 Phillips screwdriver
- 3/8 inch nut driver
- 11/32 inch nut driver

9.2.1 Removing inner loop fan

1. Perform the fan test procedure in section 9.1 to identify which interior fan has failed.
2. Push the plunger of the heat exchanger power door switch back to its normal resting position so all fans stop.
3. Unplug the three inner loop fan connectors.
4. Remove the five #10-32 nuts securing the inner loop fan mounting bracket to the door.



5. Carefully pull the mounting bracket off the door studs and flip the assembly down to expose the fans and fan mounting screws.
6. Remove the failed fan by removing the four #8-32 fan retaining screws securing the fan to the mounting bracket.



9.2.2 Removing outer loop fan

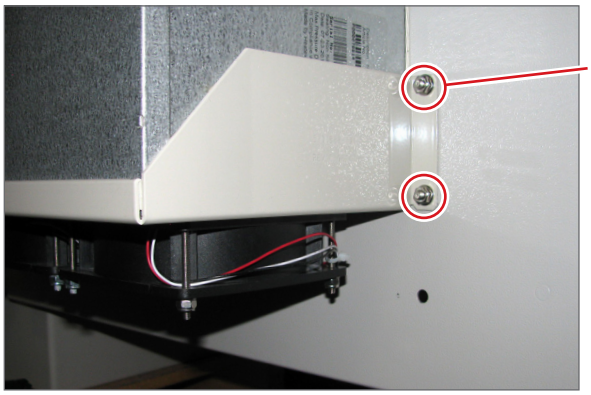
1. Remove the four #10-32 Phillips head screws and rubber washers securing the outer heat exchanger shroud to the door.

2. Remove the outer shroud to expose the heat exchanger core and outer loop fan mounting assembly below the core.

CAUTION

Use extreme care when inspecting the rotating fans as there are no fan guards.

3. Perform the fan test procedure in section 9.1 to identify which exterior fan has failed and set aside.
4. Remove the four #10-32 nuts securing the fan mounting assembly.



5. Pull the assembly off the door studs to expose the fans and fan mounting hardware.

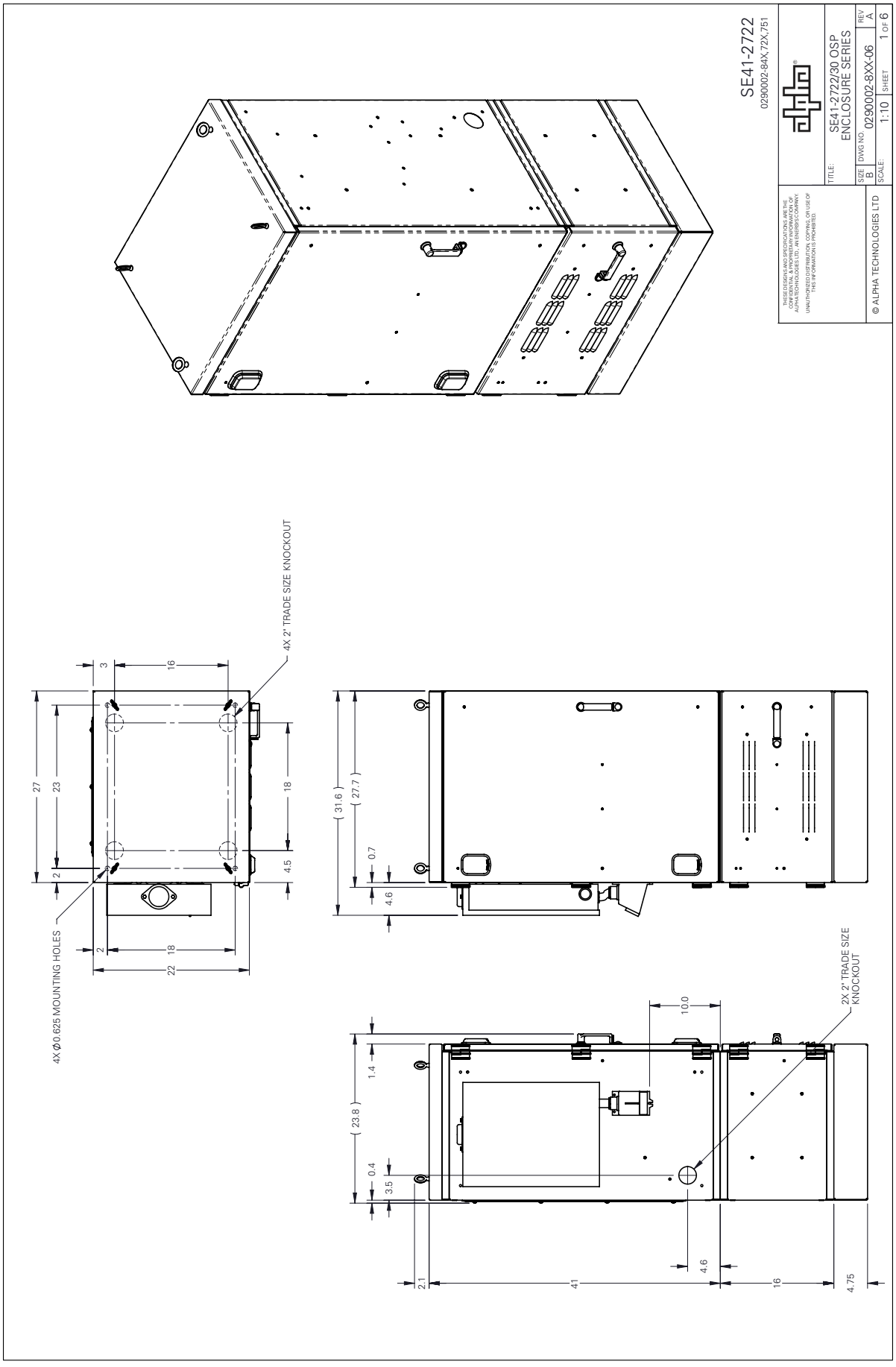
6. Unplug the failed fan connector on the inside of the door.
7. Remove the failed fan from the mounting bracket by removing the four #8-32 fan retaining screws and nuts.

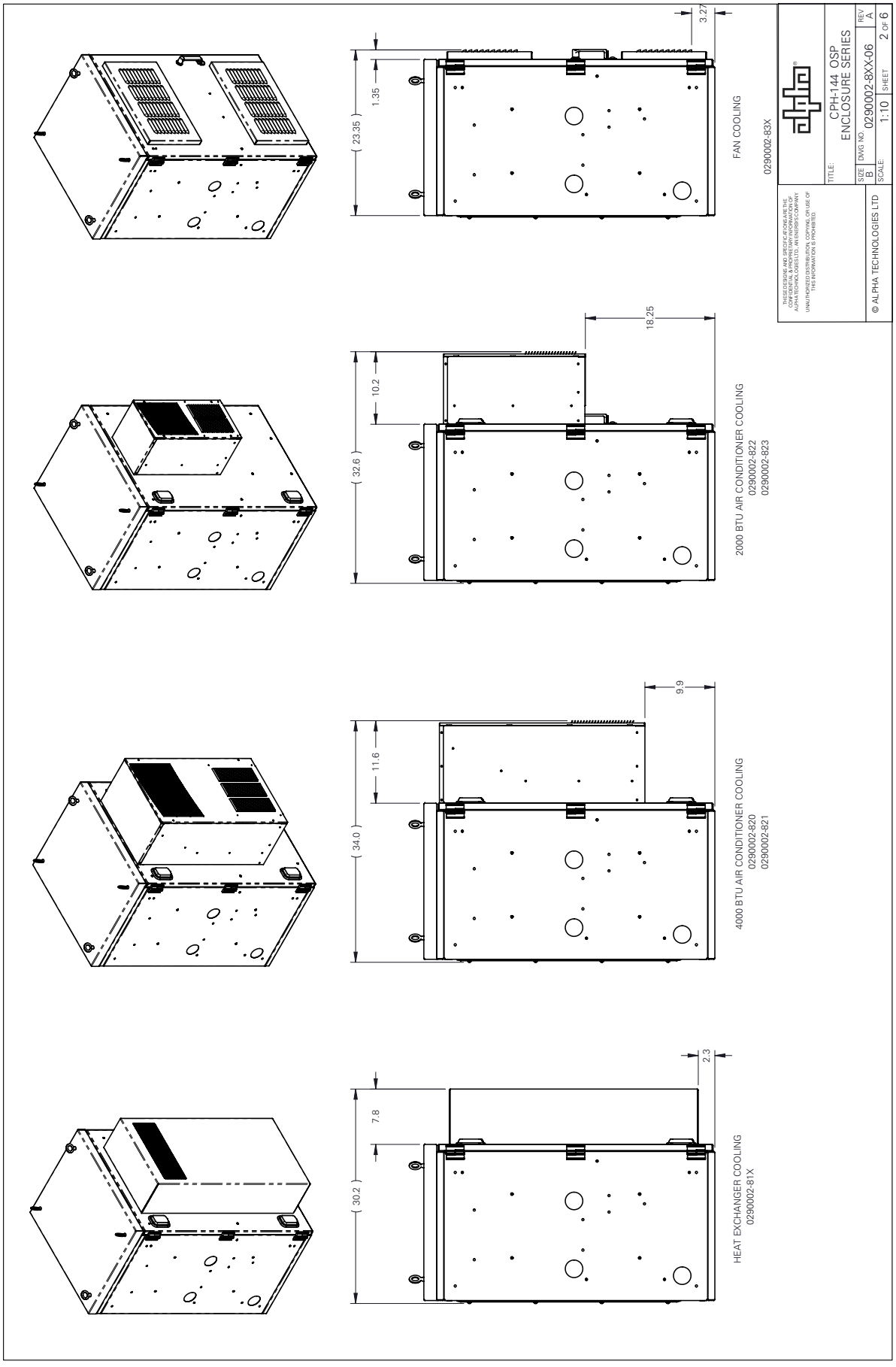
9.2.3 Replacing an inner or outer loop fan

1. Locate the airflow direction indicator on the side of the frame of the replacement fan.
2. Orient the arrow as follows:
   Interior fan: Arrow points out toward the inside of the enclosure.
   Exterior fan: Arrow points up towards the inside of the heat exchanger core.
3. Secure the replacement fan to the assembly using the existing hardware. Use one of the other installed fans as a guide for hardware installation.
4. Tighten hardware only to the point that it is snug and the fan bezel does not bend.
5. Perform the fan removal steps in reverse order to re-assemble the heat exchanger.
6. Reconnect the fan and perform the fan test procedure in section 9.1 to verify all fans are rotating and that the fan fail alarm is not active.

10. Acronyms and definitions

AC	Alternating current
ANSI®	American National Standards Institute
AWG	American Wire Gauge
BTU	British thermal unit
CAN	Controller area network
CEC	Canadian Electrical Code
CPH	Central power hub
CSA®	Canadian Standards Association
CX	Cordex® series; CXC for Cordex® System Controller
DC	Direct current
DHCP	Dynamic Host Configuration Protocol
EIA	Electronic Industries Alliance
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
ERM	Electromagnetic Compatibility and Radio Spectrum Matters
ESD	Electrostatic Discharge
FCC	Federal Communications Commission (for the US)
GFCI	Ground fault circuit interrupter
HVSD	High voltage shutdown
IEC	International Electrotechnical Commission
IEEE®	The Institute of Electrical and Electronics Engineers, Inc.
IP	Internet Protocol
LED	Light emitting diode
LVD	Low voltage disconnect
LVBD	Low voltage battery disconnect
MIL	One thousandth of an inch; used in expressing wire cross sectional area
MOV	Metal oxide varistor
MTBF	Mean time between failures
NC	Normally closed
NEC®	National Electrical Code® (for the US)
NO	Normally open
OSHA	Occupational Safety & Health Administration
OSP	Outside Plant
OVP	Over voltage protection
RU	Rack unit (44.45 mm; 1.75 in.)
TCP/IP	Transmission Control Protocol / Internet Protocol
THD	Total harmonic distortion
TVSS	Transient Voltage Surge Suppressor
UL®	Underwriters Laboratories
UATS	Universal Automatic Transfer Switch
VRLA	Valve regulated lead acid


SE41-2722
0290002-84X,72X,751
SE41-2722/30 OSP
ENCLOSURE SERIES
0290002-8XX-06
1:10
1 OF 6
© ALPHA TECHNOLOGIES LTD
4X 2" TRADE SIZE KNOCKOUT
4X Ø0.625 MOUNTING HOLES
2X 2" TRADE SIZE KNOCKOUT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1.35
23.35
FAN COOLING
0290002-83X
18.25
10.2
32.6
2000 BTU AIR CONDITIONER COOLING
0290002-822
0290002-823
9.9
11.6
34.0
4000 BTU AIR CONDITIONER COOLING
0290002-820
0290002-821
2.3
7.8
30.2
HEAT EXCHANGER COOLING
0290002-81X
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SIZE B
DWG NO. 0290002-8XX-06
REV A
SCALE: 1:10
SHEET 2 OF 6
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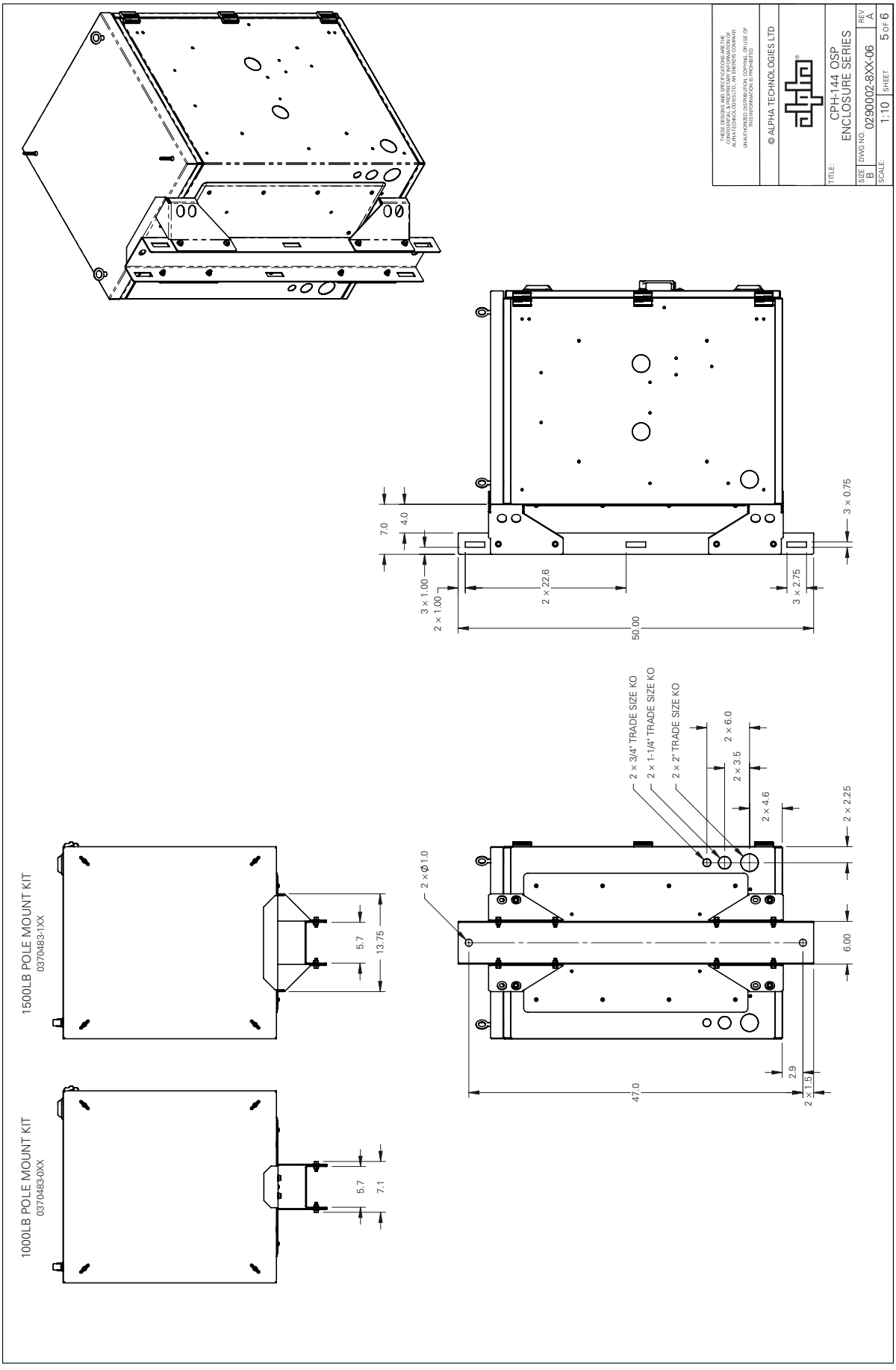
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TITLE: CPH-144 OSP ENCLOSURE SERIES
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DWG NO. 0290002-8XX-06
REV A
SCALE: 1:10
SHEET 5 OF 6
7.0
4.0
3 × 0.75
3 × 1.00
2 × 1.00
2 × 22.6
3 × 2.75
50.00
2 × 3/4" TRADE SIZE KO
2 × 1-1/4" TRADE SIZE KO
2 × 2" TRADE SIZE KO
2 × 6.0
2 × 3.5
2 × 4.6
2 × 2.25
2 × Ø1.0
6.00
2.9
2 × 1.5
47.0
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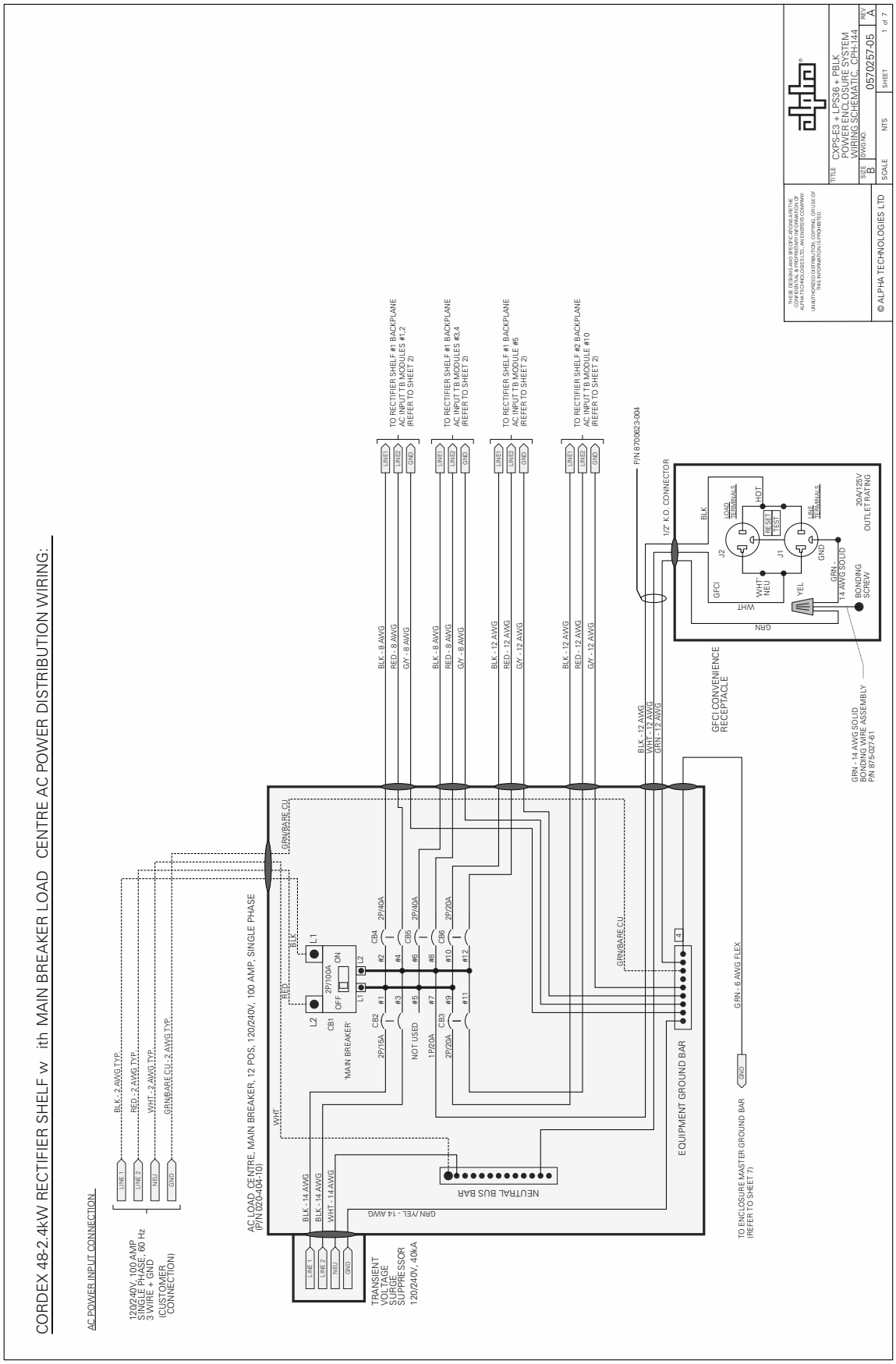
0370483-1XX
5.7
13.75
1000LB POLE MOUNT KIT
0370483-0XX
5.7
7.1


CORDEX 48-2.4kW RECTIFIER SHELF w ith MAIN BREAKER LOAD CENTRE AC POWER DISTRIBUTION WIRING:
AC POWER INPUT CONNECTION
120/240V, 100 AMP SINGLE PHASE, 60 Hz 3 WIRE + GND (CUSTOMER CONNECTION)
LINE 1
LINE 2
NEU
GND
BLK - 2 AWG TYP.
RED - 2 AWG TYP.
WHT - 2 AWG TYP.
GRN/BARE CU - 2 AWG TYP.
TRANSIENT VOLTAGE SURGE SUPPRESSOR 120/240V, 40kA
AC LOAD CENTRE, MAIN BREAKER, 12 POS, 120/240V, 100 AMP, SINGLE PHASE (P/N 020-404-10)
BLK - 14 AWG
WHT - 14 AWG
GRN /YEL - 14 AWG
WHT
RED
BLK
GRN/BARE CU
L1
L2
CB1
2P/100A
ON
OFF
MAIN BREAKER
CB2
2P/15A
CB3
1P/20A
2P/20A
CB4
2P/40A
CB5
2P/40A
CB6
2P/20A
#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
#12
NOT USED
NEUTRAL BUS BAR
EQUIPMENT GROUND BAR
4
GRN - 6 AWG FLEX
GND
TO ENCLOSURE MASTER GROUND BAR (REFER TO SHEET 7)
TO RECTIFIER SHELF #1 BACKPLANE AC INPUT TB MODULES #1,2 (REFER TO SHEET 2)
TO RECTIFIER SHELF #1 BACKPLANE AC INPUT TB MODULES #3,4 (REFER TO SHEET 2)
TO RECTIFIER SHELF #1 BACKPLANE AC INPUT TB MODULE #5 (REFER TO SHEET 2)
TO RECTIFIER SHELF #2 BACKPLANE AC INPUT TB MODULE #10 (REFER TO SHEET 2)
LINE1
LINE2
GND
BLK - 8 AWG
RED - 8 AWG
GY - 8 AWG
BLK - 12 AWG
RED - 12 AWG
GY - 12 AWG
P/N 8700823-004
1/2" K.O. CONNECTOR
BLK - 12 AWG
WHT - 12 AWG
GRN - 12 AWG
GFCI CONVENIENCE RECEPTACLE
BLK
WHT
GRN
GFCI
J2
J1
LOAD TERMINALS
LINE TERMINALS
HOT
RESET
TEST
WHT NEU
YEL
GND
GRN - 14 AWG SOLID
BONDING SCREW
20A/125V OUTLET RATING
GRN - 14 AWG SOLID BONDING WIRE ASSEMBLY P/N 875-027-61
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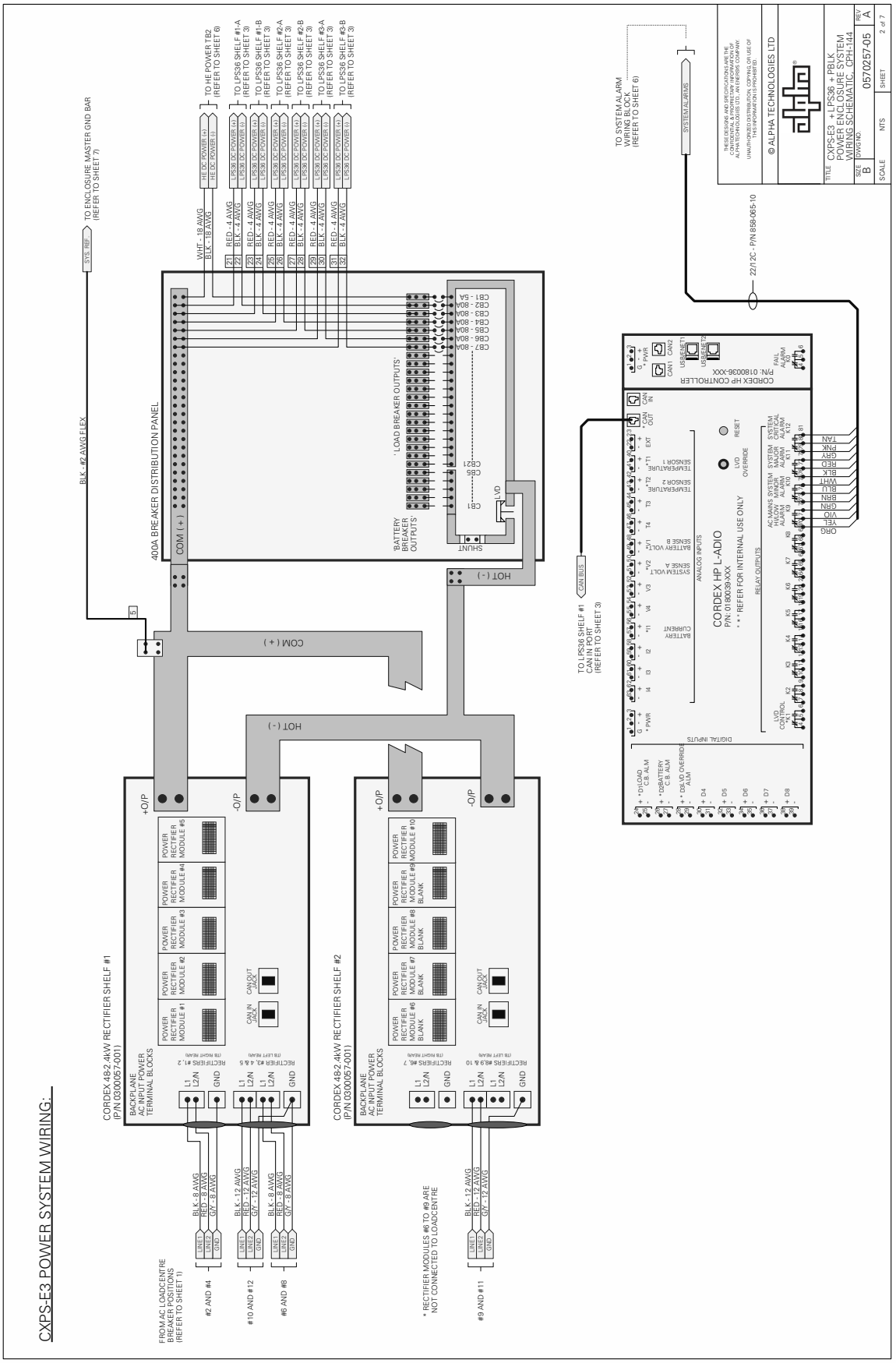
CXPS-E3 + LPS36 + PBLK POWER ENCLOSURE SYSTEM WIRING SCHEMATIC, CPH-144
SIZE B
DWG NO 0570257-05
REV A
SCALE NTS
SHEET 1 of 7


CXPS-E3 POWER SYSTEM WIRING:
CXPS-E3 + LPS36 + PBLK
POWER ENCLOSURE SYSTEM
WIRING SCHEMATIC, CPH-144
0570257-05
© ALPHA TECHNOLOGIES LTD
400A BREAKER DISTRIBUTION PANEL
CORDEX 48-2.4kW RECTIFIER SHELF #1
(P/N 0300057-001)
CORDEX 48-2.4kW RECTIFIER SHELF #2
(P/N 0300057-001)
CORDEX HP L-ADIO
P/N: 0180039-XXX
CORDEX HP CONTROLLER
P/N: 0180036-XXX
TO ENCLOSURE MASTER GND BAR
(REFER TO SHEET 7)
TO HE POWER TB2
(REFER TO SHEET 6)
TO LPS36 SHELF #1-A
(REFER TO SHEET 3)
TO LPS36 SHELF #1-B
(REFER TO SHEET 3)
TO LPS36 SHELF #2-A
(REFER TO SHEET 3)
TO LPS36 SHELF #2-B
(REFER TO SHEET 3)
TO LPS36 SHELF #3-A
(REFER TO SHEET 3)
TO LPS36 SHELF #3-B
(REFER TO SHEET 3)
TO SYSTEM ALARM
VIA MATING CONNECTOR
(REFER TO SHEET 6)
22/12C - P/N 858-065-10
BLK - #2 AWG FLEX
COM (+)
HOT (-)
SHUNT
'LOAD BREAKER OUTPUTS'
'BATTERY BREAKER OUTPUTS'
CB1 - 5A
CB2 - 80A
CB3 - 80A
CB4 - 80A
CB5 - 80A
CB6 - 80A
CB7 - 80A
CB8
CB21
CB5
LVD
+O/P
-O/P
BACKPLANE
AC INPUT POWER
TERMINAL BLOCKS
POWER RECTIFIER MODULE #1
POWER RECTIFIER MODULE #2
POWER RECTIFIER MODULE #3
POWER RECTIFIER MODULE #4
POWER RECTIFIER MODULE #5
POWER RECTIFIER MODULE #6 BLANK
POWER RECTIFIER MODULE #7 BLANK
POWER RECTIFIER MODULE #8 BLANK
POWER RECTIFIER MODULE #9 BLANK
POWER RECTIFIER MODULE #10
CAN IN ADDR
CAN OUT ADDR
L1
L2/N
GND
FROM AC LOADCENTRE
BREAKER POSITIONS
(REFER TO SHEET 1)
#2 AND #4
#10 AND #12
#6 AND #8
#9 AND #11
BLK - 8 AWG
RED - 8 AWG
GRY - 8 AWG
BLK - 12 AWG
RED - 12 AWG
GRY - 12 AWG
* RECTIFIER MODULES #6 TO #9 ARE
NOT CONNECTED TO LOADCENTRE
CAN BUS
TO LPS36 SHELF #1
CAN IN PORT
(REFER TO SHEET 3)
SYSTEM ALARMS
WHT - 18 AWG
BLK - 18 AWG
RED - 4 AWG
BLK - 4 AWG
ANALOG INPUTS
RELAY OUTPUTS
DIGITAL INPUTS
BATTERY CURRENT
SYSTEM VOLT. SENSE A
BATTERY VOLT. SENSE B
TEMPERATURE SENSOR 1
TEMPERATURE SENSOR 2
LVD OVERRIDE
RESET
LVD CONTROL
AC MAINS FAIL ALARM
SYSTEM MINOR ALARM
SYSTEM MAJOR ALARM
SYSTEM CRIT. ALARM
FAIL ALARM
ORG
YEL
VIO
GRN
BRN
BLU
WHT
BLK
RED
GRY
PNK
TAN
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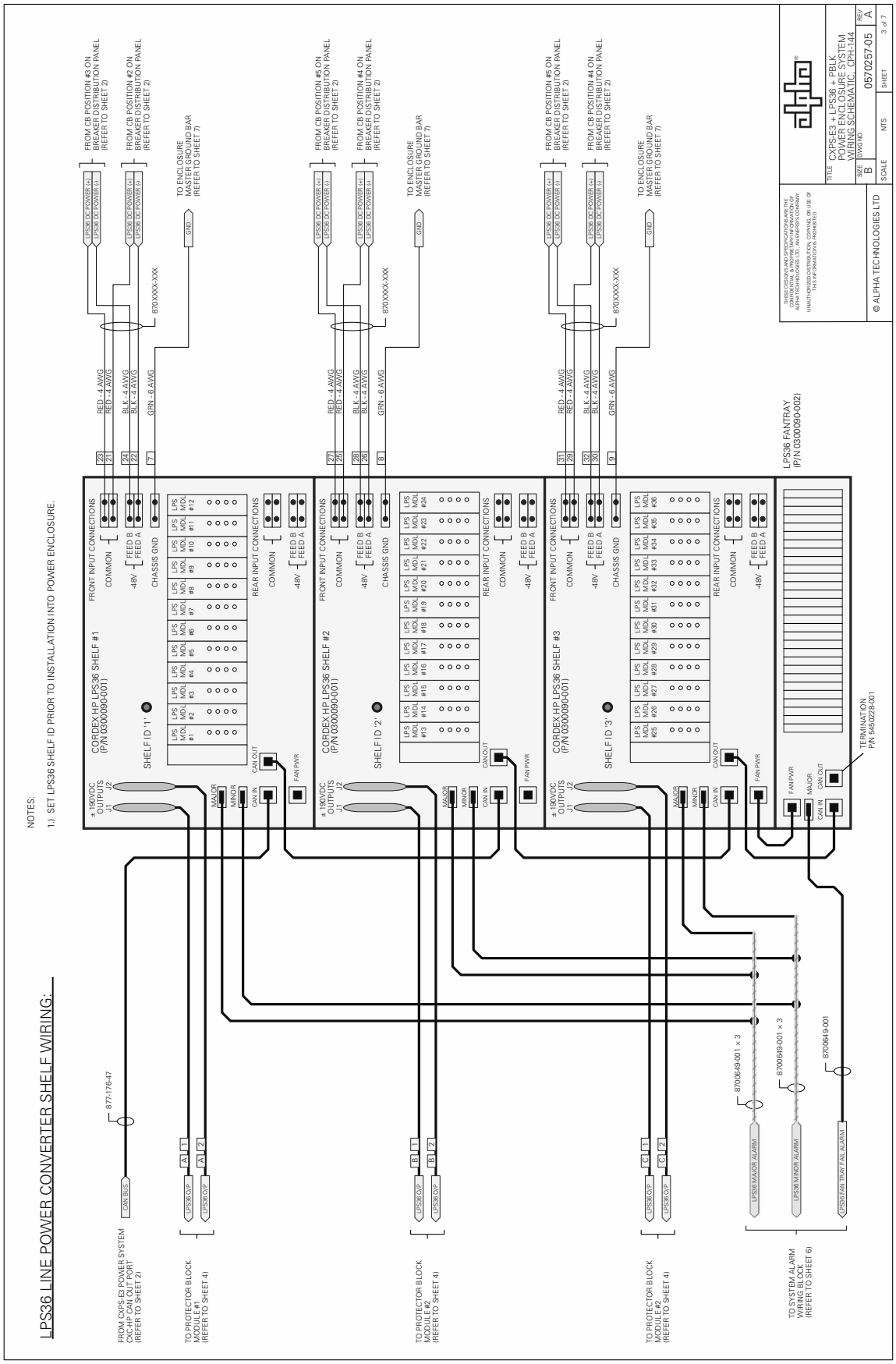
SHEET 2 of 7
REV A


LPS36 LINE POWER CONVERTER SHELF WIRING:
NOTES:
1.) SET LPS36 SHELF ID PRIOR TO INSTALLATION INTO POWER ENCLOSURE.
CORDEX HP LPS36 SHELF #1 (P/N 0300090-001)
CORDEX HP LPS36 SHELF #2 (P/N 0300090-001)
CORDEX HP LPS36 SHELF #3 (P/N 0300090-001)
SHELF ID '1'
SHELF ID '2'
SHELF ID '3'
± 190VDC OUTPUTS J1 J2
FRONT INPUT CONNECTIONS
REAR INPUT CONNECTIONS
COMMON
-48V
CHASSIS GND
FEED B
FEED A
CAN OUT
CAN IN
MAJOR
MINOR
FAN PWR
RED - 4 AWG
BLK - 4 AWG
GRN - 6 AWG
870XXXX-XXX
TO ENCLOSURE MASTER GROUND BAR (REFER TO SHEET 7)
GND
LPS36 DC POWER (+)
LPS36 DC POWER (-)
FROM CB POSITION #5 ON BREAKER DISTRIBUTION PANEL (REFER TO SHEET 2)
FROM CB POSITION #4 ON BREAKER DISTRIBUTION PANEL (REFER TO SHEET 2)
FROM CB POSITION #3 ON BREAKER DISTRIBUTION PANEL (REFER TO SHEET 2)
LPS36 FANTRAY (P/N 0300090-002)
TERMINATION P/N 5450226-001
877-176-47
CAN BUS
FROM CXPS-E3 POWER SYSTEM CXC-HP CAN OUT PORT (REFER TO SHEET 2)
LPS36 O/P
TO PROTECTOR BLOCK MODULE #1 (REFER TO SHEET 4)
TO PROTECTOR BLOCK MODULE #2 (REFER TO SHEET 4)
TO PROTECTOR BLOCK MODULE #2 (REFER TO SHEET 4)
8700649-001 x 3
8700649-001
LPS36 MAJOR ALARM
LPS36 MINOR ALARM
LPS36 FAN TRAY FAIL ALARM
TO SYSTEM ALARM WIRING BLOCK (REFER TO SHEET 6)
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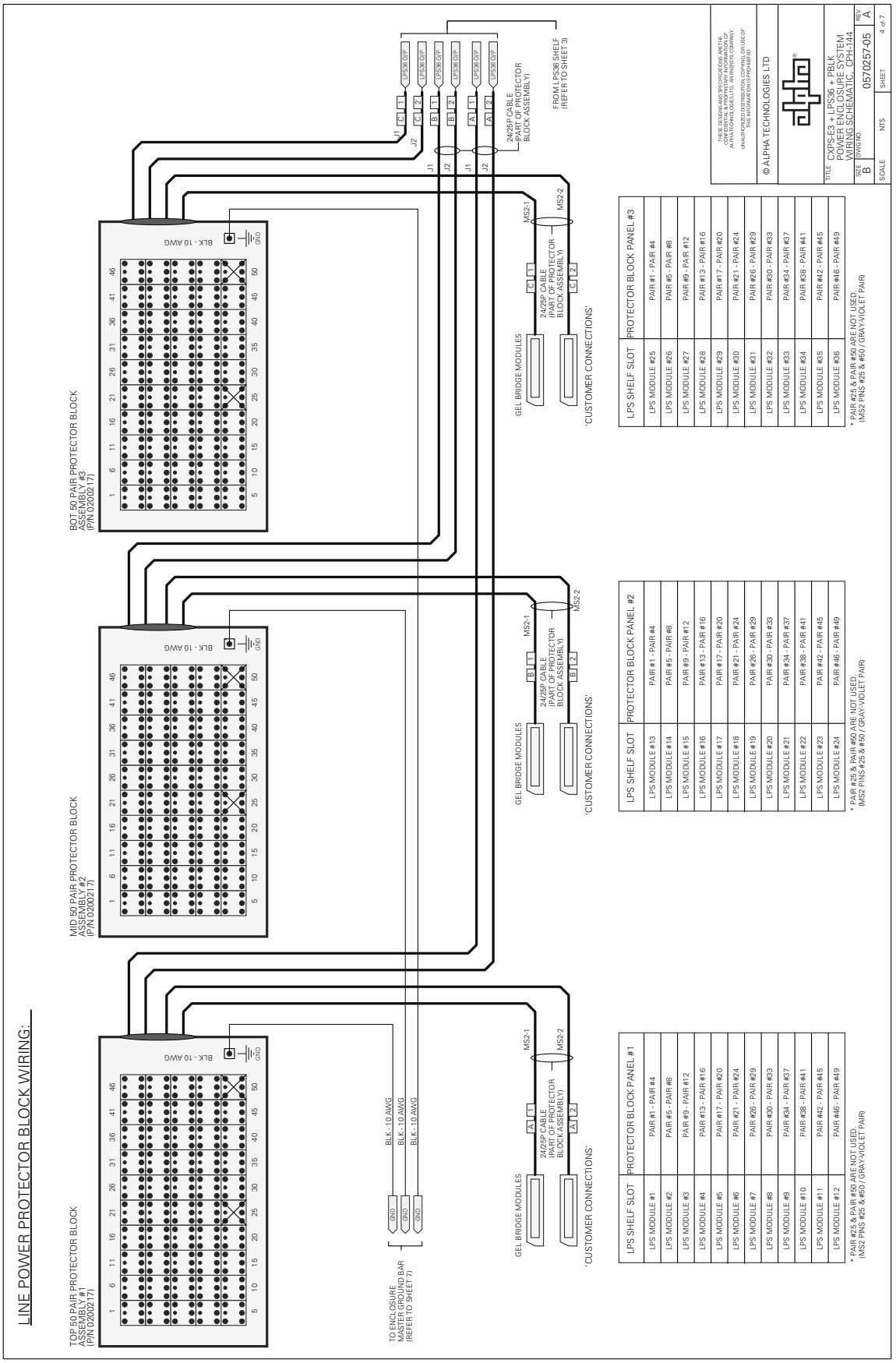
TITLE
CXPS-E3 + LPS36 + PBLK POWER ENCLOSURE SYSTEM WIRING SCHEMATIC, CPH-144
SIZE B
DWG NO. 0570257-05
REV A
SCALE NTS
SHEET 3 of 7


LINE POWER PROTECTOR BLOCK WIRING:
TOP 50 PAIR PROTECTOR BLOCK ASSEMBLY #1 (P/N 0230217)
MID 50 PAIR PROTECTOR BLOCK ASSEMBLY #2 (P/N 0230217)
BOT 50 PAIR PROTECTOR BLOCK ASSEMBLY #3 (P/N 0230217)
BLK - 10 AWG
GND
TO ENCLOSURE MASTER GROUND BAR (REFER TO SHEET 7)
BLK - 10 AWG
BLK - 10 AWG
BLK - 10 AWG
GEL BRIDGE MODULES
24/25P CABLE (PART OF PROTECTOR BLOCK ASSEMBLY)
MS2-1
MS2-2
'CUSTOMER CONNECTIONS'
LPS SHELF SLOT
PROTECTOR BLOCK PANEL #1
LPS MODULE #1 PAIR #1 - PAIR #4
LPS MODULE #2 PAIR #5 - PAIR #8
LPS MODULE #3 PAIR #9 - PAIR #12
LPS MODULE #4 PAIR #13 - PAIR #16
LPS MODULE #5 PAIR #17 - PAIR #20
LPS MODULE #6 PAIR #21 - PAIR #24
LPS MODULE #7 PAIR #26 - PAIR #29
LPS MODULE #8 PAIR #30 - PAIR #33
LPS MODULE #9 PAIR #34 - PAIR #37
LPS MODULE #10 PAIR #38 - PAIR #41
LPS MODULE #11 PAIR #42 - PAIR #45
LPS MODULE #12 PAIR #46 - PAIR #49
* PAIR #25 & PAIR #50 ARE NOT USED. (MS2 PINS #25 & #50 / GRAY-VIOLET PAIR)
LPS SHELF SLOT
PROTECTOR BLOCK PANEL #2
LPS MODULE #13 PAIR #1 - PAIR #4
LPS MODULE #14 PAIR #5 - PAIR #8
LPS MODULE #15 PAIR #9 - PAIR #12
LPS MODULE #16 PAIR #13 - PAIR #16
LPS MODULE #17 PAIR #17 - PAIR #20
LPS MODULE #18 PAIR #21 - PAIR #24
LPS MODULE #19 PAIR #26 - PAIR #29
LPS MODULE #20 PAIR #30 - PAIR #33
LPS MODULE #21 PAIR #34 - PAIR #37
LPS MODULE #22 PAIR #38 - PAIR #41
LPS MODULE #23 PAIR #42 - PAIR #45
LPS MODULE #24 PAIR #46 - PAIR #49
* PAIR #25 & PAIR #50 ARE NOT USED. (MS2 PINS #25 & #50 / GRAY-VIOLET PAIR)
LPS SHELF SLOT
PROTECTOR BLOCK PANEL #3
LPS MODULE #25 PAIR #1 - PAIR #4
LPS MODULE #26 PAIR #5 - PAIR #8
LPS MODULE #27 PAIR #9 - PAIR #12
LPS MODULE #28 PAIR #13 - PAIR #16
LPS MODULE #29 PAIR #17 - PAIR #20
LPS MODULE #30 PAIR #21 - PAIR #24
LPS MODULE #31 PAIR #26 - PAIR #29
LPS MODULE #32 PAIR #30 - PAIR #33
LPS MODULE #33 PAIR #34 - PAIR #37
LPS MODULE #34 PAIR #38 - PAIR #41
LPS MODULE #35 PAIR #42 - PAIR #45
LPS MODULE #36 PAIR #46 - PAIR #49
* PAIR #25 & PAIR #50 ARE NOT USED. (MS2 PINS #25 & #50 / GRAY-VIOLET PAIR)
J1 J2
LPS36 O/P
24/25P CABLE (PART OF PROTECTOR BLOCK ASSEMBLY)
FROM LPS36 SHELF (REFER TO SHEET 3)
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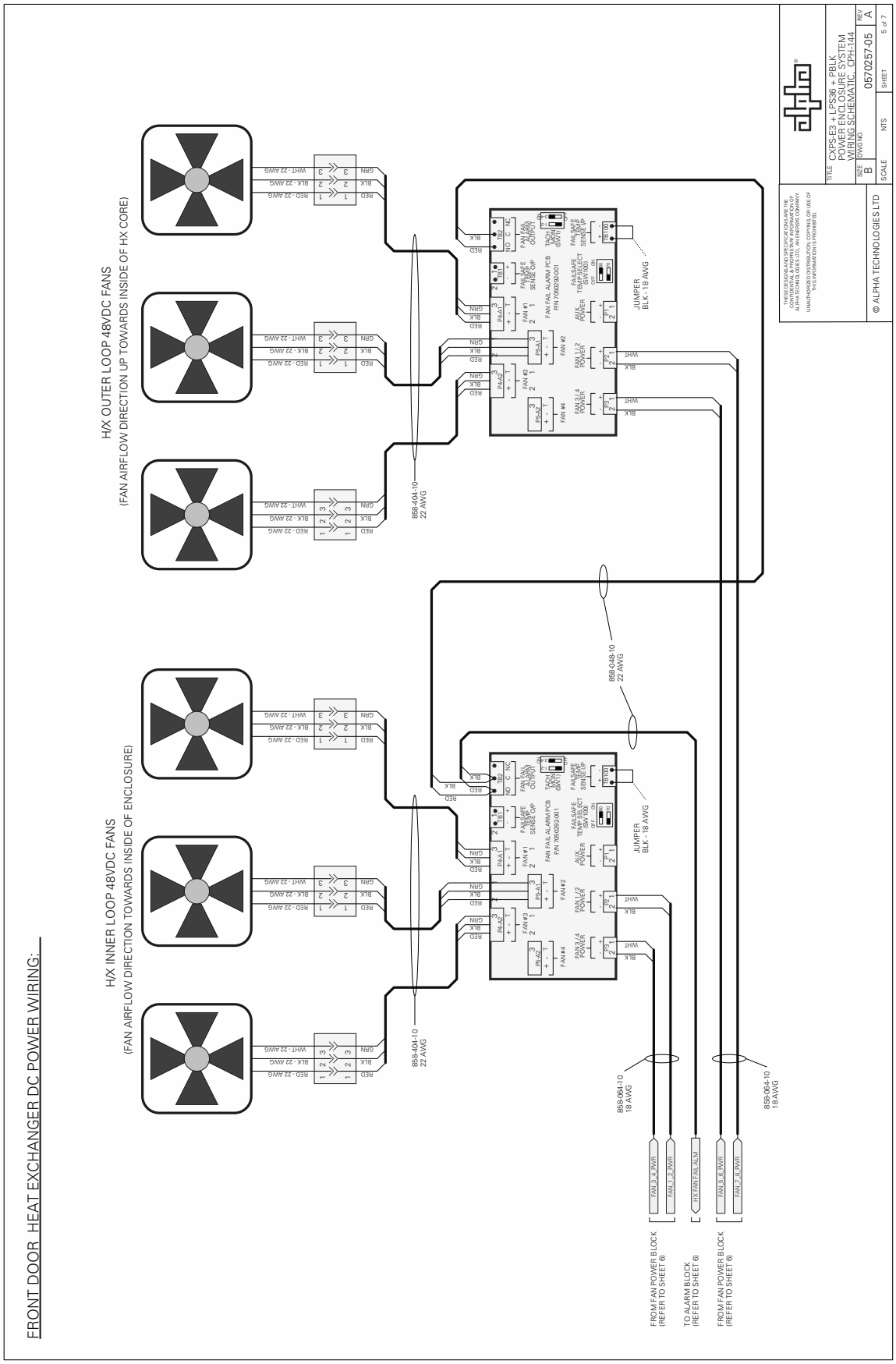
TITLE CXPS-E3 + LPS36 + PBLK POWER ENCLOSURE SYSTEM WIRING SCHEMATIC, CPH-144
SIZE B
DWG NO 0570257-05
REV A
SCALE NTS
SHEET 4 of 7


FRONT DOOR HEAT EXCHANGER DC POWER WIRING:
H/X INNER LOOP 48VDC FANS
(FAN AIRFLOW DIRECTION TOWARDS INSIDE OF ENCLOSURE)
H/X OUTER LOOP 48VDC FANS
(FAN AIRFLOW DIRECTION UP TOWARDS INSIDE OF H/X CORE)
858-404-10
22 AWG
858-048-10
22 AWG
859-064-10
18 AWG
858-064-10
18 AWG
JUMPER
BLK - 18 AWG
FAN FAIL ALARM PCB
P/N 700292-001
FAN #1
FAN #2
FAN #3
FAN #4
FAN 1/2 POWER
FAN 3/4 POWER
AUX. POWER
FAILSAFE SENSE OPP
FAILSAFE TEMP SELECT
FAILSAFE TEMP SENSE
FAN ALARM OUTPUT
TACH INPUT
FAN_3_4_PWR
FAN_1_2_PWR
H/X FAN FAIL ALM
FAN_5_6_PWR
FAN_7_8_PWR
FROM FAN POWER BLOCK
(REFER TO SHEET 6)
TO ALARM BLOCK
(REFER TO SHEET 6)
FROM FAN POWER BLOCK
(REFER TO SHEET 6)
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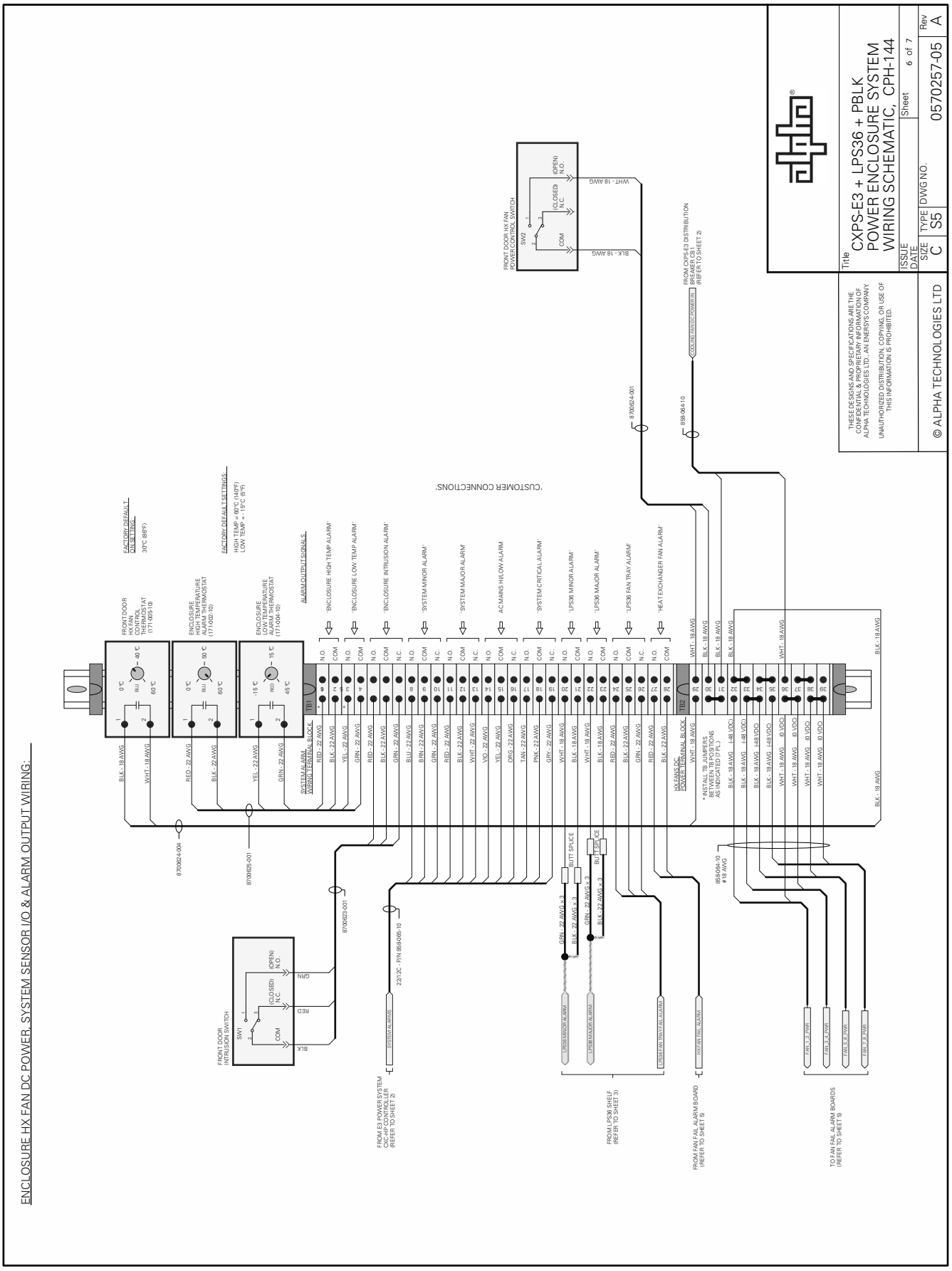
TITLE
CXPS-E3 + LPS36 + PBLK
POWER ENCLOSURE SYSTEM
WIRING SCHEMATIC, CPH-144
SIZE B
DWG NO. 0570257-05
REV A
SCALE NTS
SHEET 5 of 7


ENCLOSURE HX FAN DC POWER, SYSTEM SENSOR I/O & ALARM OUTPUT WIRING:
CXPS-E3 + LPS36 + PBLK
POWER ENCLOSURE SYSTEM
WIRING SCHEMATIC, CPH-144
0570257-05
Rev A
Sheet 6 of 7
SIZE C
TYPE S5
DWG NO.
ISSUE DATE
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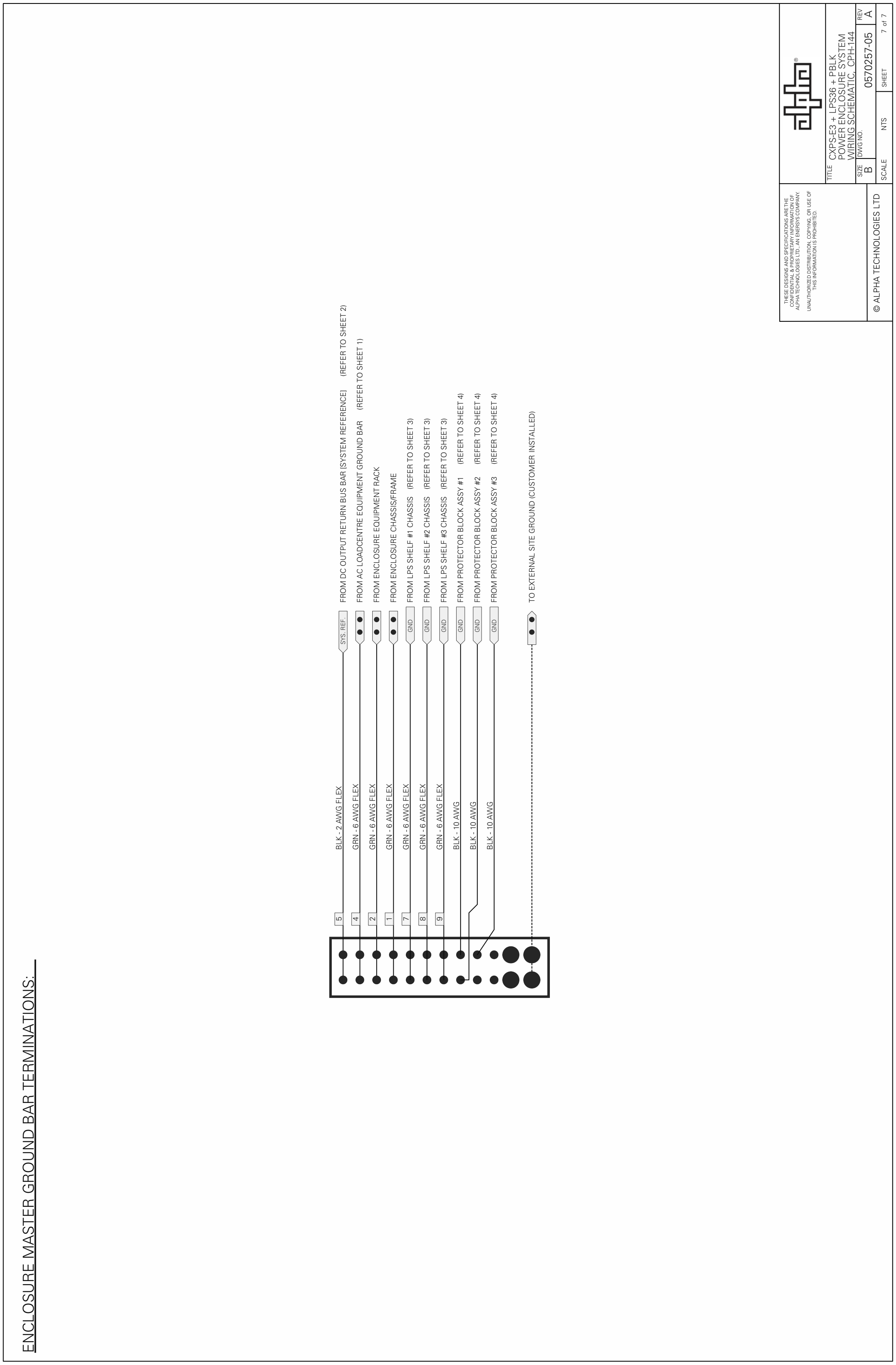
FRONT DOOR HX FAN CONTROL THERMOSTAT (171-005-10)
ENCLOSURE HIGH TEMPERATURE ALARM THERMOSTAT (171-002-10)
ENCLOSURE LOW TEMPERATURE ALARM THERMOSTAT (171-004-10)
FACTORY DEFAULT DIAL SETTING:
30°C (86°F)
FACTORY DEFAULT SETTINGS:
HIGH TEMP = 60°C (140°F)
LOW TEMP = 15°C (5°F)
ALARM OUTPUT SIGNALS:
'ENCLOSURE HIGH TEMP ALARM'
'ENCLOSURE LOW TEMP ALARM'
'ENCLOSURE INTRUSION ALARM'
'SYSTEM MINOR ALARM'
'SYSTEM MAJOR ALARM'
AC MAINS HI/LOW ALARM
'SYSTEM CRITICAL ALARM'
'LPS36 MINOR ALARM'
'LPS36 MAJOR ALARM'
'LPS36 FAN TRAY ALARM'
'HEAT EXCHANGER FAN ALARM'
'CUSTOMER CONNECTIONS'
SYSTEM ALARM WIRING TERMINAL BLOCK
TB1
TB2
HX FANS DC POWER TERMINAL BLOCK
FRONT DOOR INTRUSION SWITCH
SW1
FRONT DOOR HX FAN POWER CONTROL SWITCH
SW2
(OPEN) N.O.
(CLOSED) N.C.
COM
8700624-001
8700625-001
8700623-001
8700624-004
859-064-10
8839094-10 #18 AWG
* INSTALL TB JUMPERS BETWEEN TB1 POSITIONS AS INDICATED (7 PL.)
BUTT SPLICE
22/3C - P/N 8839095-10
FROM E3 POWER SYSTEM CXC-HP CONTROLLER (REFER TO SHEET 2)
FROM LPS36 SHELF (REFER TO SHEET 3)
FROM FAN FAIL ALARM BOARD (REFER TO SHEET 9)
TO FAN FAIL ALARM BOARDS (REFER TO SHEET 9)
FROM CXPS-E3 DISTRIBUTION PANEL (REFER TO SHEET 2)
COOLING FANS DC POWER IN


ENCLOSURE MASTER GROUND BAR TERMINATIONS:
5 BLK - 2 AWG FLEX SYS. REF. FROM DC OUTPUT RETURN BUS BAR (SYSTEM REFERENCE) (REFER TO SHEET 2)
4 GRN - 6 AWG FLEX FROM AC LOADCENTRE EQUIPMENT GROUND BAR (REFER TO SHEET 1)
2 GRN - 6 AWG FLEX FROM ENCLOSURE EQUIPMENT RACK
1 GRN - 6 AWG FLEX FROM ENCLOSURE CHASSIS/FRAME
7 GRN - 6 AWG FLEX GND FROM LPS SHELF #1 CHASSIS (REFER TO SHEET 3)
8 GRN - 6 AWG FLEX GND FROM LPS SHELF #2 CHASSIS (REFER TO SHEET 3)
9 GRN - 6 AWG FLEX GND FROM LPS SHELF #3 CHASSIS (REFER TO SHEET 3)
BLK - 10 AWG GND FROM PROTECTOR BLOCK ASSY #1 (REFER TO SHEET 4)
BLK - 10 AWG GND FROM PROTECTOR BLOCK ASSY #2 (REFER TO SHEET 4)
BLK - 10 AWG GND FROM PROTECTOR BLOCK ASSY #3 (REFER TO SHEET 4)
TO EXTERNAL SITE GROUND (CUSTOMER INSTALLED)
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SIZE B
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REV A
SCALE NTS
SHEET 7 of 7

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For more information visit our website at: www.alpha.com or www.alpha.ca

0570257-J0 REV D (03/2022)