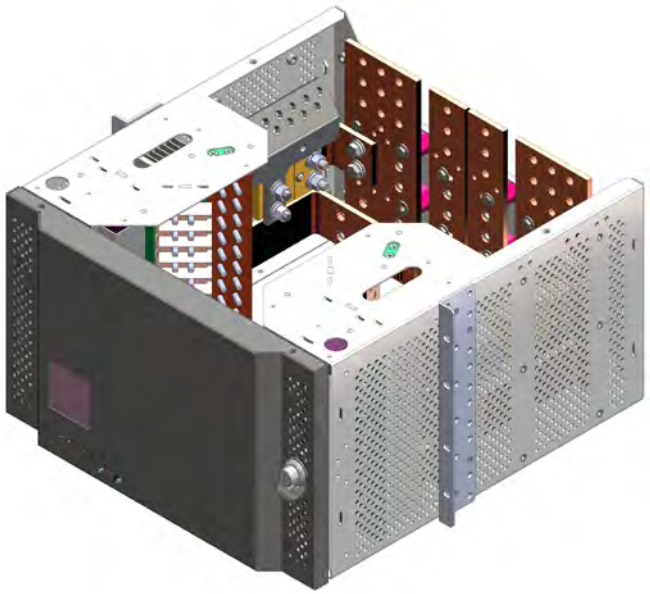
Cordex Modular Distribution System

Models: CXDS-M 1200
CXDS-M 600/600
CXDS-M 1200-19"
CXDS-M 600/600-19"

Installation & Operation Manual

Part # 9400002-J0
Effective: 06/2012



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Models: CXDS-M 1200
CXDS-M 600/600
CXDS-M 1200-19"
CXDS-M 600/600-19"

NOTE:

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

NOTE:

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

NOTE:

Alpha 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.

For technical support, contact Alpha Technologies:

Canada and USA: **1-888-462-7487**
International: **+1-604-436-5547**
Email: **support@alpha.ca**

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1. Safety

SAVE THESE INSTRUCTIONS: This manual 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 manual before proceeding. If there are any questions regarding the safe installation or operation of this product, contact Alpha Technologies or the nearest Alpha representative. Save this document for future reference.

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 manual. Where these symbols appear, use extra care and attention.

The use of ATTENTION indicates specific regulatory/code requirements that may affect the placement of equipment and /or installation procedures.

NOTE:

A NOTE provides additional information to help complete a specific task or procedure. Notes are designated with a checkmark, the word NOTE, and a rule beneath which the information appears

CAUTION!

CAUTION indicates safety information intended to PREVENT DAMAGE to material or equipment. Cautions are designated with a yellow warning triangle, the word CAUTION, and a rule beneath which the information appears.

WARNING!

WARNING presents safety information to PREVENT INJURY OR DEATH to personnel. Warnings are indicated by a shock hazard icon, the word WARNING, and a rule beneath which the information appears.

HOT!

The use of HOT presents safety information to PREVENT BURNS to the technician or user.

1.2 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.

1.3 Electrical Safety

WARNING!

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

- Before working with any live battery or power system, follow these precautions:
  a. Remove all metallic jewelry, such as watches, rings, metal rimmed glasses, or necklaces.
  b. Wear safety glasses with side shields at all times during the installation.
  c. Use OSHA approved insulated hand tools.

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 the utility power is disconnected and locked out before performing any installation or removal procedure.
- 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.

1.4 Battery Safety

- Servicing and connection of batteries must be performed by, or under the direct supervision of, personnel knowledgeable of batteries and the required safety precautions.
- Always wear eye protection, rubber gloves, and a protective vest when working near batteries. Remove all metallic objects from your hands and neck.
- Use OSHA approved insulated hand tools. Do not rest tools on top of batteries.
- Batteries contain or emit chemicals known to cause cancer and birth defects or other reproductive harm. Battery post terminals and related accessories contain lead and lead compounds. Wash your hands after handling batteries.

WARNING!

Follow battery manufacturer's safety recommendations when working around battery systems. Do not smoke or introduce an open flame when batteries (especially vented batteries) are charging. When charging, batteries vent hydrogen gas, which can explode.

- Batteries are hazardous to the environment and should be disposed at a recycling facility. Consult the battery manufacturer for recommended local authorized recyclers.

2. Introduction

2.1 Scope of the Manual

This instruction manual explains the features, installation, interconnection and startup of the Alpha CXDS-M modular Cordex distribution system. Images contained in this document are for illustrative purposes only and may not exactly match your installation.

In addition to this manual, the following documentation is part of the documentation package that ships with the Alpha CXPS.

- Cordex Controller (CXC) Software manual

Product Overview

Alpha modular distribution solution provides a remote power distribution for large communications applications that utilize large centralized power systems such as Alpha's CXPS-D series—central offices, mobile switching centers, data center and cable headend facilities. These systems have many benefits:

- Single and dual feed options with a maximum rating of 1200A for single feed and 600A for dual feed
- Compact front access design that reduces floor and rack space footprint
- Flexible input feed, circuit breaker, and TPS fuse options
- Cordex Controller to configure, monitor and control the distribution system from its local graphics display or remotely via a web browser. Other controller features include: event data storage, alarm generation and e-mail alarm notification.
- Rack mount up to four BDFBs in a 23" rack configuration and two BDFBs in a 19" configuration. Increases capacity, breakers and termination.

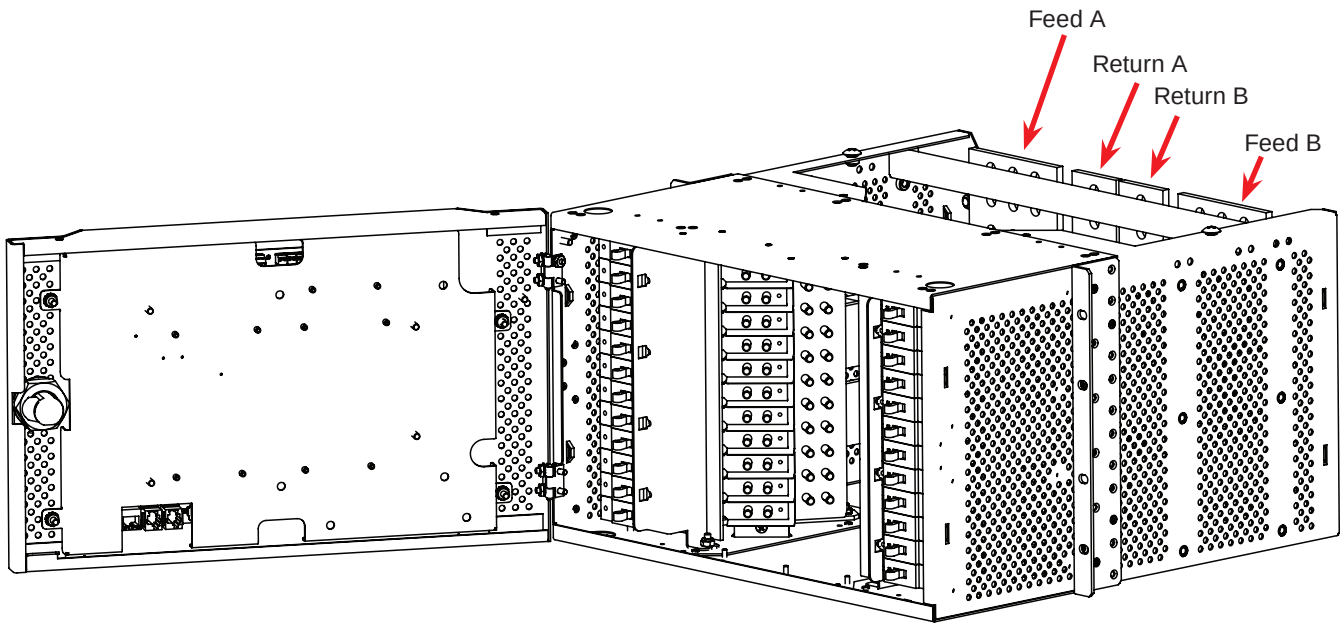


Figure 1 — Cordex BDFB, dual feed with isolated returns

Supervisory BDFBs

In a multiple BDFB system, a Cordex system controller is mounted in one of the BDFBs.

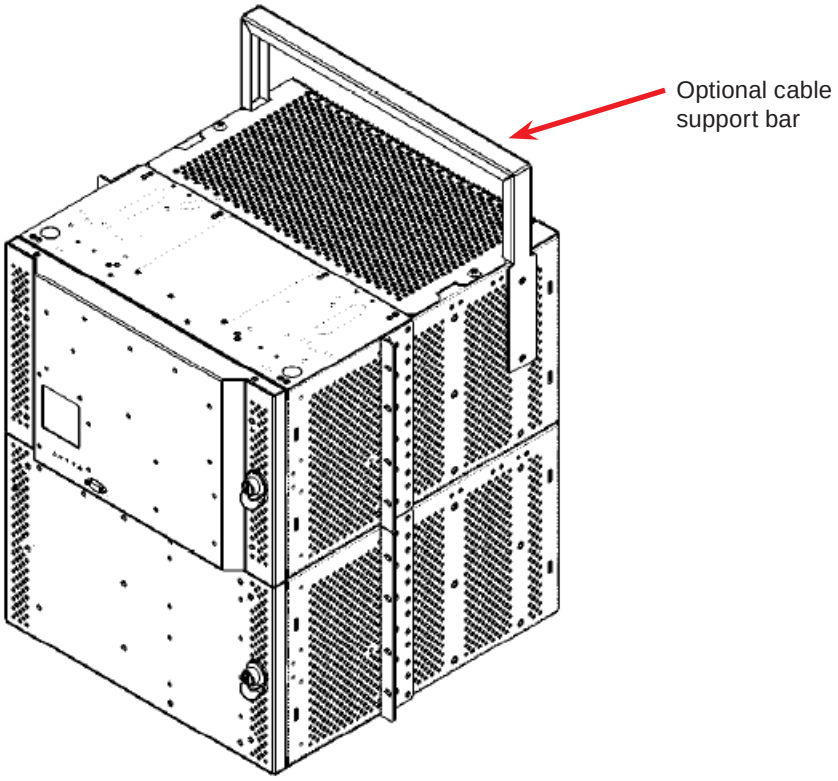
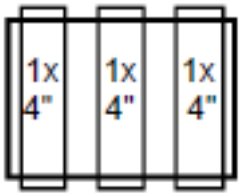
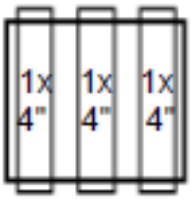
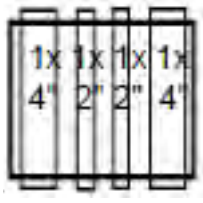


Figure 2 — Example of a distribution system with two BDFBs

Table A — Configurations

	23" Rack Mount		19" Rack Mount	
Model	CXDS-M 1200	CXDS-M 600/600	CXDS-M 1200-19	CXDS-M 600/600-19
Part Number	0906xxx-xxx	0908xxx-xxx	0907xxx-xxx	0909xxx-xxx
	600/600A Single Voltage Common Ground	600/600A Single Voltage Split Ground	600/600A Single Voltage Common Ground	600/600A Single Voltage Split Ground
Description				
System Voltage:	-24V, +24V and -48V			

- Single feed, 600A max
- Dual feed 1200A max

2.2 Distribution and Termination

The Fuse/Circuit Breaker BDFBs feature high capacity, modularity, and simplified installation. These features provide effective secondary load distribution and protection for multiple -48V DC feeds up to 600 amps.

Configuration: up to four BDFBs in a 23" rack and two BDFBs in a 19" rack. Each BDFB can contain one of the following:

- 2 banks of 12 plug-in bullet positions
- 2 banks of TLS/TPS fuses

Refer to Table B for the full complement of fuses/breakers when four BDFBs are installed (available with a 23" rack).

Table B — Modular Distribution and Termination

	Type	Description
Fuses	GMT	10 positions, up to 10A (max)
	TLS/TPS plug-in bullet	96 positions (max)
Breakers	AM plug-in bullet	96 positions (max)
Output termination	GMT Fuse	0.34 to 2.5 mm^2 (14 to 22AWG)
	TLS/TPS/AM breaker	1 pole and 2 pole are 1/4" diameter on 5/8" centers 3 pole are 3/8" diameter on 1" centers

2.2.1 Distribution Shunts

Each bank of breakers can be connected to the distribution bus via an optional 800 A / 25 mV shunt and the individual distribution shunt current can be viewed on the CXC. Refer to the electrical schematic that ships with your system.

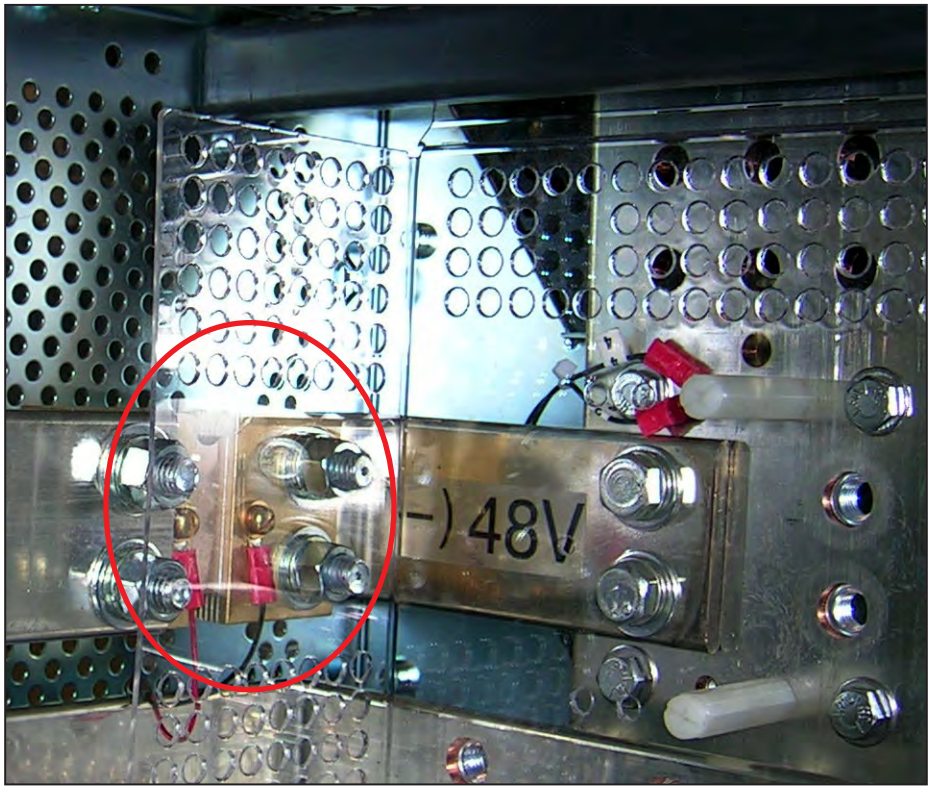


Figure 3 — Breaker bank shunt (left shunt shown in a dual feed BDFB)

2.2.2 Shunt Multiplexer Panel

The Cordex controller can monitor up to four current input channels, such as load currents and battery charge currents. When the number of current inputs is more than four, an optional shunt multiplexer panel monitors the individual branch load currents within the BDFBs and sends the current measurements to the CXC for data logging and display.

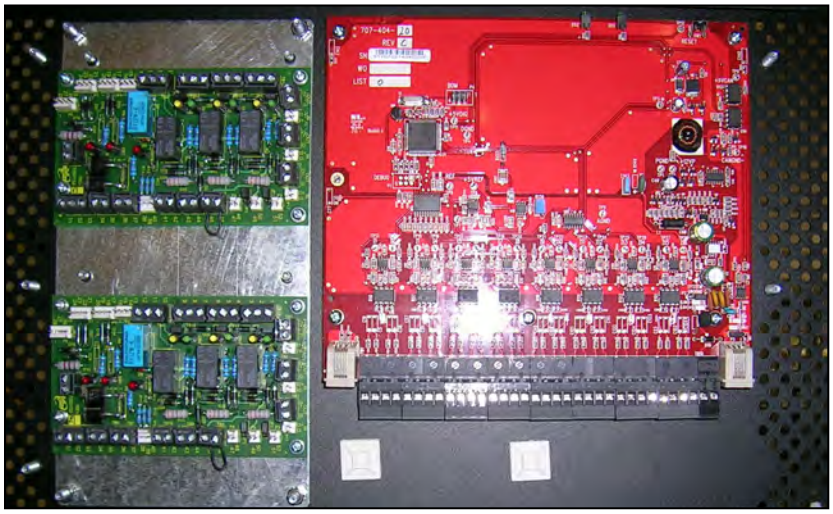


Figure 4 — Shunt mux panel mounted on the inside door of the top BDFB

2.2.3 Fuse/Breaker Alarms

Fuse/Breaker alarms occur when one or more fuse or breaker has opened. Each BDFB is equipped with one alarm which is wired to the system controller and also illuminates an LED on the panel inside the front door.

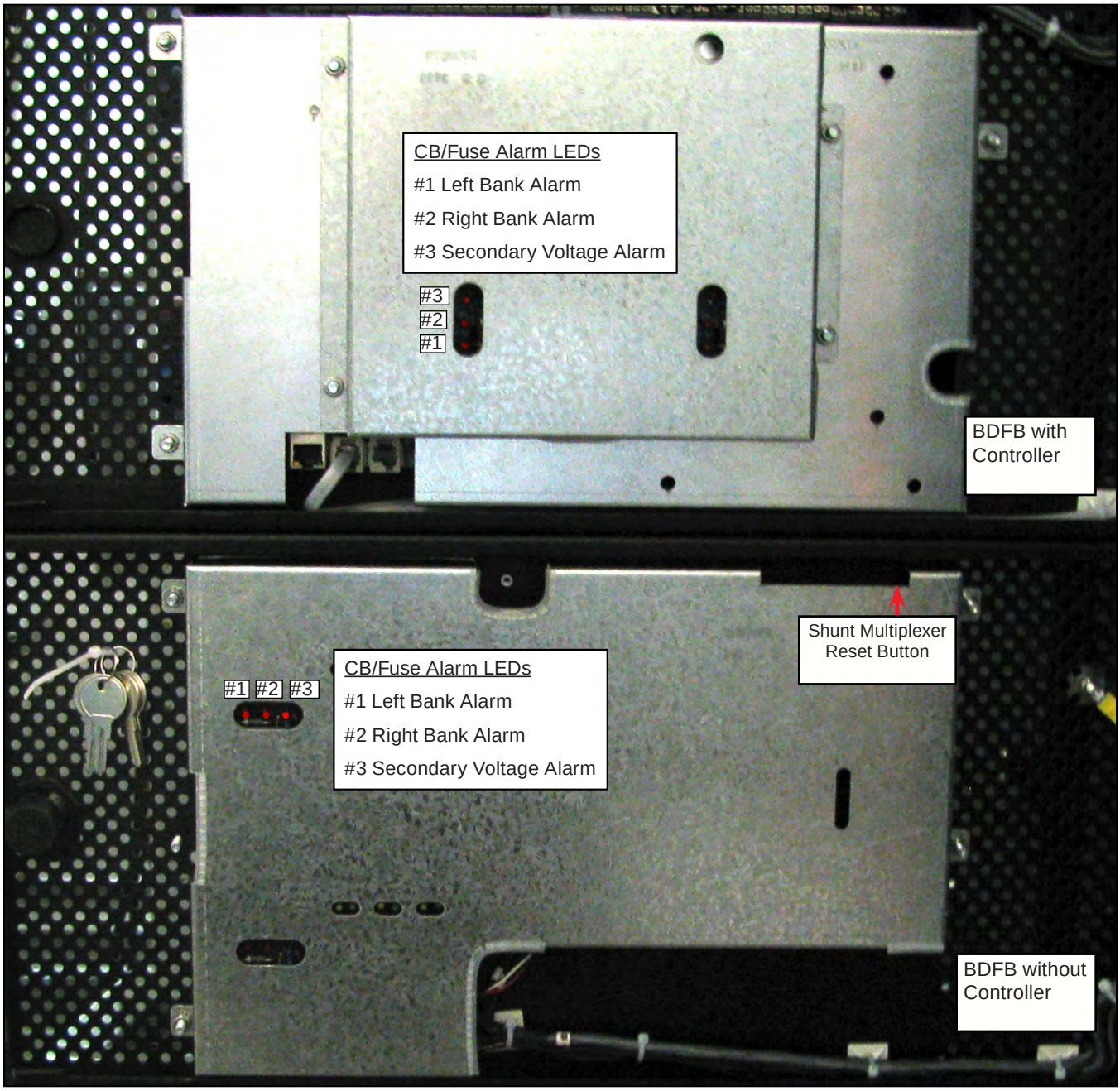


Figure 5 — Fuse/breaker alarm LEDs and shunt multiplexer reset button

2.3 Cordex System Controller

A Cordex system controller (CXCP), mounted in one of the BDFBs, provides easy access to controls and display status. The CXCP provides comprehensive setup, control, monitoring and communication for Alpha DC power systems.

The CXCP features include the following:

- Local and remote communications
- User definable alarms
- Daily logging of events and system statistics

See the CXC Software Manual shipped with your order for detailed information.

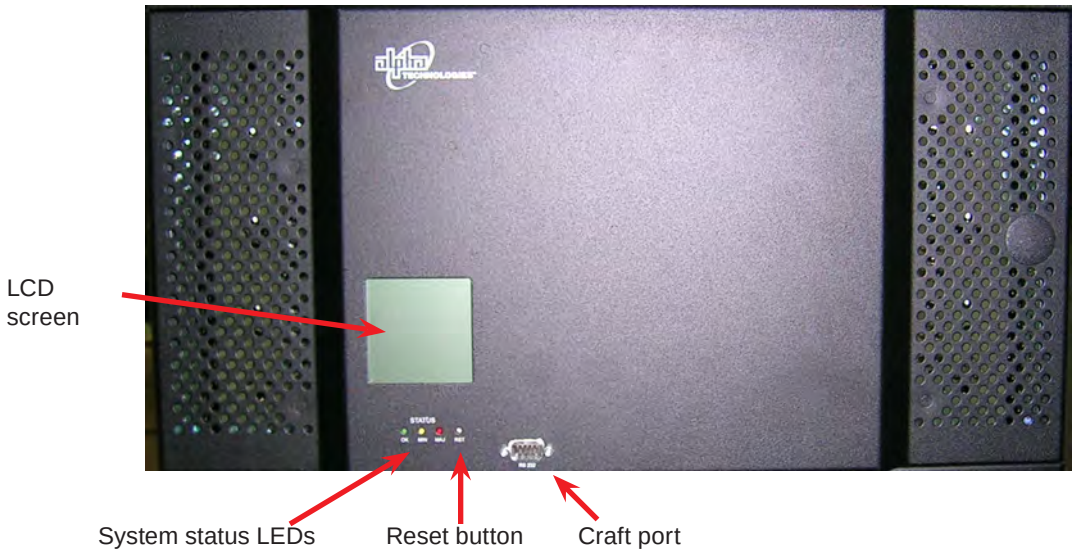


Figure 6 — CXCP controller mounted in a distribution BDFB

2.3.2 Front Panel LEDs

Three LEDs are located on the front panel: one green, one yellow, and one red. These LEDs display the alarm status of the system, controller progress and status during startup, as well as file transfers.

Alarm conditions

Only one LED light is illuminated at a time during alarm conditions. Each LED light corresponds to a specific alarm. A built-in audio speaker sounds an intermittent tone during active alarms.

Illuminated LED	Alarm
Green	OK, no alarms
Yellow	Minor alarm, no major alarms
Red	Major alarm

Progress and status indication

The LED lights are also used in the following situations:

- Base unit validation—all three LEDs illuminate
- File transfer—red LED illuminates

2.3.1 Front Panel Reset Button

If it is necessary to reset the controller (before a power-down for example), use the LCD to select the reset menu item. Resetting from the LCD initiates a soft reset with no loss of data.

The reset button (Figure 6) on the front panel initiates a hard reset of the CXC microprocessor. No data is saved and should be used only If the controller is hung up. It takes approximately 15 seconds before the display reappears after pressing the reset button.

2.3.3 Network connection and remote communications

The Cordex system can be set up, monitored, and tested over an Ethernet 10/100 Base-T serial data connection. The controller includes a web server that provides easy set up and monitoring over an Internet connection to a web browser.

Craft port

A DB9 COM port on the front panel provides computer to CXC communication over an RS-232 serial data connection (PPP) using a null modem cable connected to the Craft port (front panel RS-232).

Ethernet port

An Ethernet port is located inside the front panel. This port is designed to connect the controller to a user supplied TCP/IP network. Use a standard RJ-45 jack with a standard network cable.

The Ethernet port can be used for local access, for example to a laptop computer. Use a standard network crossover cable for the connection.

Internal CAN Bus

A CAN bus is used to transmit all alarm and control functions between the controller and BDFBs and also to provide communication between the shunt mux and the controller.

A single CAN Serial port, for communications with other BDFBs is located inside the front panel next to the Ethernet port.

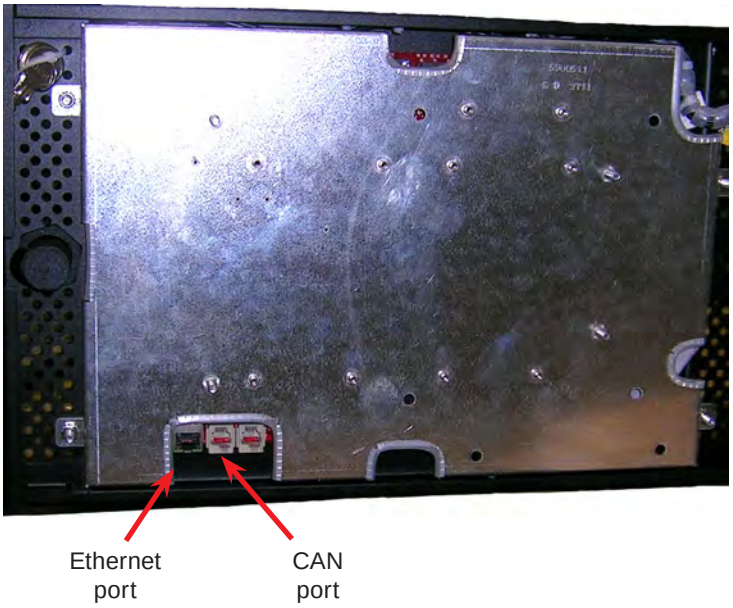


Figure 7 — Controller communication ports

2.3.4 Analog Inputs

Temperature inputs

Two temperature input channels, T1 and T2, provide monitoring of battery or room/ambient temperature. Voltage is supplied to these terminals to power the temperature sensors.

Voltage inputs

Two voltage input channels, V1 and V2, are used to monitor the system voltage. The controller software is pre-configured to monitor V1 for load voltage A and V2 for load voltage B.

Current inputs

The controller software is pre-configured to monitor I1 for load current A and I2 for load current B. It is wired internally to the system current shunt.

2.3.5 Digital Input Channels

The CXCP can accommodate up to eight digital input channels. Each channel responds to a zero or system voltage potential at the input to activate or deactivate the appropriate condition.

Some of these channels are pre-assigned to monitor specific signals. See the software manual for more information. Refer also to the electrical schematic that ships with your system.

2.3.6 Alarm and Control Output Relays

Each CXCP contains eight standard and eight optional Form C alarm output relays to extend alarms and control to external apparatus. Each internally generated alarm or control signal can be mapped to any one of the 16 relays, or, several signals may be mapped to just one relay or none at all.

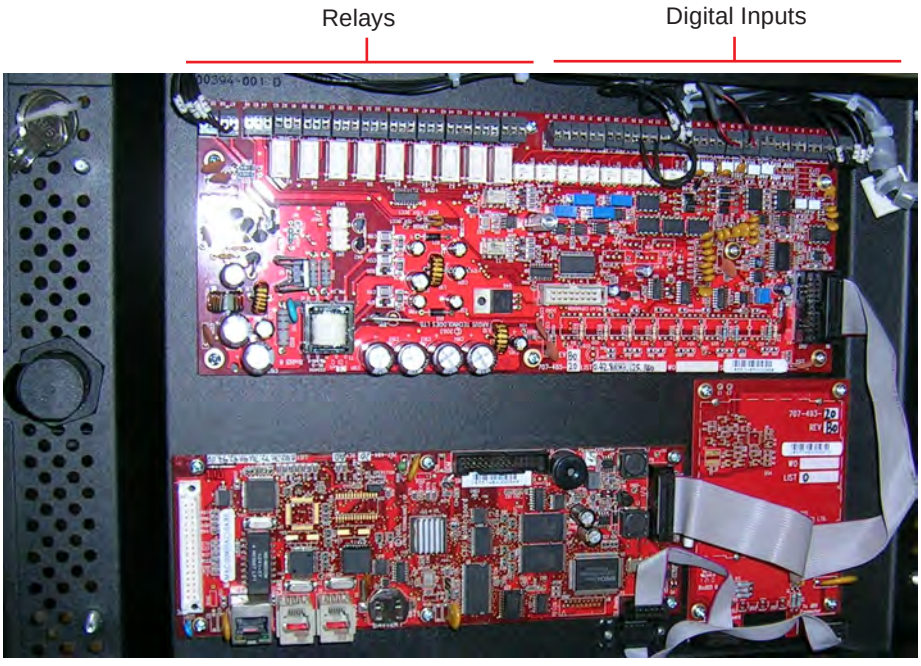


Figure 8 — Controller I/O and alarm interface

2.3.7 Safety Features

Insulating shield

Each BDFB has an insulating shield in front of the bus bars. This shield prevents casual touching of the bus bars with cable lugs and tools while working inside the BDFB. It also maintains separation between the cables and the bus bars.

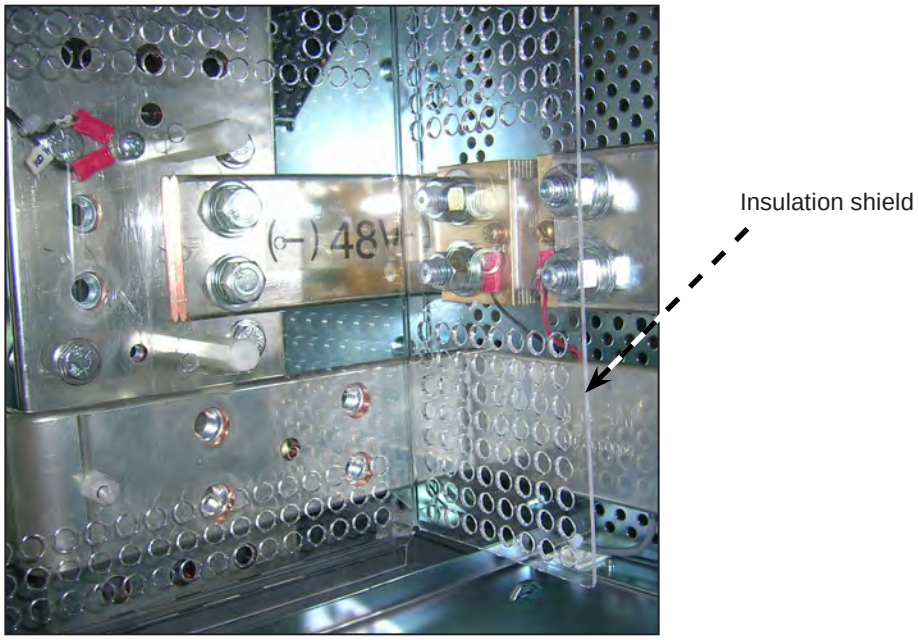
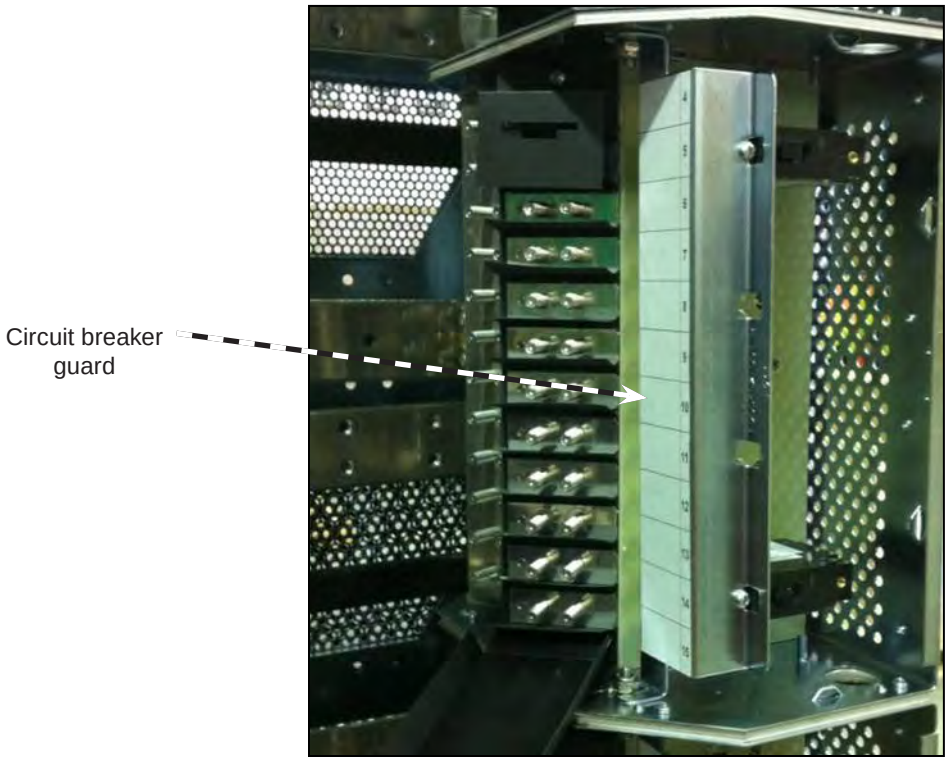


Figure 9 — BDFB installation shield

Circuit Breaker Guard

The pivoting circuit breaker guard, with a circuit designation strip, prevents accidental tripping of a breaker.



3. Pre-Installation Preparation

3.1 Site Selection

NOTE:

This BDFB is suitable for installation in Network Telecommunication facilities and locations where the NEC applies.

- The BDFB must be mounted in a clean and dry environment:
  - » Temperature:.....0 to 50°C (32 to 122°F)
  - » Humidity:.....0 to 95% RH non-condensing
  - » Elevation:.....-500 to 2800m (-1640 to 9186ft)
- The unit can be mounted flush or center mount in a standard 19" or 23" rack
- Dimensions for one BDFB:
  - » mm:.....263H x 660W x 482D
  - » Inches:.....10.5H x 26W x 19D
- Avoid areas that may be subjected to hot air exhaust from nearby equipment.
- Provide adequate space for safe and proper circulation of installation and maintenance personnel. (Post installation, only front access is required for maintenance.)
  - » Rear: 3ft (1m)
  - » Front: 3ft (1m)
  - » Sides: clearance required (approximately 4-6") if extensions are added to the vertical charge buses
  - » Top and bottom: clearance required for load cable entry

3.1.1 Floor Plan Layout

Sufficient free space must be provided at the front and rear of the power system to allow easy access to the power system components.

Consider the following before selecting a location for the CXDS-M 1200 BDFB.

- Structure of building able to support the additional weight
- Enough space to meet requirements for access
- Adequate space to do the install
- Route that equipment will take through the building to reach the site
- Check and record distances to load
- Check and record distances to batteries/DC power source
- Understand the full load on the DC system
- Window for working hours and other similar restrictions
- How much and what kind of prep work can be done in advance
  - » Reinforce floors
  - » Install cable racks
  - » Run wiring
  - » Minimize cable lengths (cost)
  - » Minimize cable flow and congestion

3.1.2 Installation Component Requirements

Supplied

- Internal DC cables

Not Supplied

- Rack mounting hardware
- External DC conduit, cable and fittings

3.2 Tools and Test Equipment

Insulated tools are essential for a DC power system installation. Use the following list as a guide:

- Slot head screwdrivers (blade sizes: 1/4”, 1/8”, 1/16”)
- Phillips head screwdriver, #2 (tip size 3/16”)
- Digital voltmeter equipped with test leads
- Adjustable 24/48Vdc load (optional)
- Anti-static wrist strap
- Computer (laptop) with Microsoft® Internet Explorer 7 or greater
- Crossover cable RJ-45 (to connect a laptop to the Ethernet port)
- Null modem cable (for access using the RS-232 port)
- Cutters and wire strippers (#14 to #22 AWG) [2.5 – 34 mm^2]

3.3 Unpacking the Equipment

Packaging assemblies and methods are tested to International Safe Transit Association standards.

Check For Damage

Prior to unpacking the BDFB, perform a visual inspection and note any damage. Unpack the equipment 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, please inform the carrier and contact Alpha Technologies for advice on the consequence of any damage.

General Receipt of Shipment

Consult the packing slip and power plant bill of materials to verify that you have the correct number of BDFBs per your order.

The inventory included with your shipment is dependant upon the options you have ordered. The options are clearly marked on the labels on the shipping containers.

Miscellaneous Small Parts

Review the packing slip and bill of material to determine the part numbers of the “configuration kits” included with your BDFB. Review the bill of materials for each configuration kits to verify all the small parts are included.

Verify that you have all the necessary parts per your order for proper assembly.

Call Alpha Technologies if you have any questions before you proceed: 1-888-462-7487

4. Installation

The power system must be mounted in a clean and dry environment. Provide sufficient free space at the front and rear of the distribution system to allow easy access to the system components.

4.1 Rack Mounting

The CXDS-M is designed for a standard flush or center mount in a 19" or 23" rack.

1. Mechanically secure the rack to the floor or other suitable structure.
2. Mount the BDFB(s) to the rack using four #12 – 24 x 1/2" screws in each bracket.
3. Use Phillips-type screws and screwdriver to prevent slippage and scratching of the unit's exterior.
4. Washers (such as internal tooth) or special screws that are designed to cut through the painted surface should be used to ensure a good chassis ground.

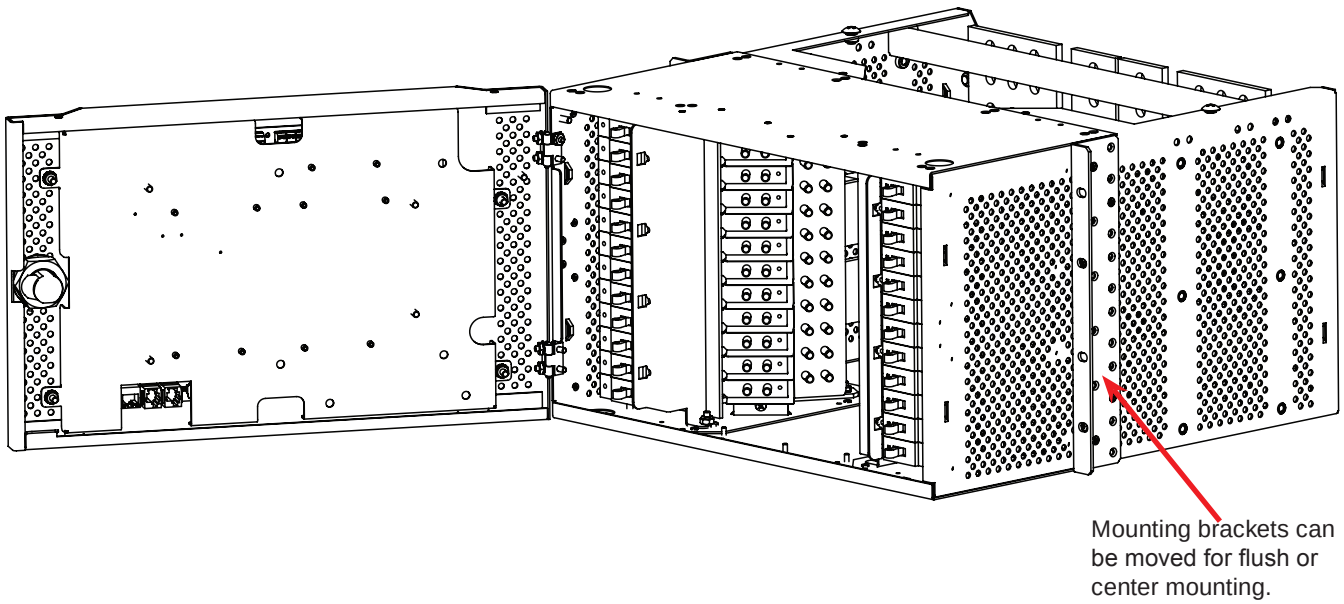


Figure 10 — BDFB with center mount brackets

5. Installation - DC and Grounding Cables

This section provides cabling details and notes on cable sizing for DC applications with respect to the Alpha CXDS-M -48/24 V modular distribution.

- Only qualified personnel should install and connect the power components within the Alpha power system.
- All wiring must be in accordance with applicable electrical codes.
- Electrical codes require that conductors carrying AC current be installed separately from conductors carrying DC current and signals.

5.1 Installation Notes

5.1.1 Installer Responsibility

The system arrives pre-wired, and the installer is responsible for connecting the following:

- DC input to the system
- System to the load
- Chassis and battery return to the reference ground
- Alarms

5.1.2 Calculating Output Wire Size Requirements

Although DC power wiring and cabling in telecommunication applications tend to exceed electrical code requirements, mostly due to the voltage drop requirements, all applicable electrical code(s) take precedence over the guidelines and procedures in the present chapter, wherever applicable.

Wire size is calculated by first determining the appropriate maximum voltage drop requirement. Use the formula below to calculate the circular mil area (CMA) wire size requirement. Determine the size and number of conductors required to satisfy the CMA requirement.

$$CMA = (A \times LF \times K) / AVD$$

A = Ultimate drain in amps.

LF = Conductor loop feet.

K = 11.1 constant factor for commercial (TW type) copper wire.

AVD = Allowable voltage drop.

Check again that the ampacity rating of the cable meets the requirement for the installation application. Consult local electrical codes (NEC, CEC, etc.) for guidelines. If required, increase the size of the cable to meet the code.

Refer to Table C for cable size equivalents.

Table C — Cable size equivalents (AWG to Metric)

Cable size (see notes 1 and 2)	Circular mils	Square millimeters	Equivalent metric cable
20 AWG	1020	0.519	1
18 AWG	1624	0.8232	1
16 AWG	2583	1.309	1.5
14 AWG	4107	2.081	2.5
12 AWG	6530	3.309	4
10 AWG	10380	5.261	6
8 AWG	16510	8.368	10

Table C — Cable size equivalents (AWG to Metric)			
Cable size (see notes 1 and 2)	**Circular mils**	**Square millimeters**	**Equivalent metric cable**
6 AWG	26250	13.30	16
4 AWG	41740	21.15	25
2 AWG	66370	33.63	35
0 AWG (or 1/0)	105600	53.48	50 or 70
00 AWG (or 2/0)	133100	67.42	70
0000 AWG (or 4/0)	211600	107.2	120
313 MCM (or kcmil)	313600	159	150 or 185
350 MCM (or kcmil)	350000	177.36	185
373 MCM (or kcmil)	373700	189	185 or 240
500 MCM (or kcmil)	500000	253.36	300
535 MCM (or kcmil)	535300	271	300
750 MCM (or kcmil)	750000	380.00	400
777 MCM (or kcmil)	777700	394	400

5.1.3 Recommended Torque Values

Recommended torque values for connection to the power system:

- Clear hole connections (nut and bolt)
- PEM studs
- PEM threaded inserts
- Thread formed connections (in copper bus bar)

Table D — Recommended torque values	
1/4"	8.8 ft-lbs (105 in-lb)
3/8"	32.5 ft-lbs (390 in-lb)
1/2"	73 ft-lbs (880 in-lb)

SAE Grade 5 hardware is required for these torque values.

5.1.4 Cabling Layout

The cabling at the time of installation is very straightforward.

- The DC input cables connect to the top BDFB at the rear.
- The load cables from the BDFB fuse/breaker exit the unit through the top. Open the front door of the BDFB to access fuse/breaker connections.
- All signaling wires (for example, alarms from the CXC Controller) interfacing with the outside world exit the BDFB through the top or bottom.

5.1.5 Alarms

All applicable alarms should be connected to the local alarm-sending unit from the power system. The CXC system controller provides form “C” relay contacts for interconnection.

5.2 Connecting the Frame and Reference Grounds

CAUTION!

The grounding methods described in this section are generic. Follow local requirements and electrical code.

NOTE:

This power system is suitable for installation as part of a Common Bonding Network (CBN) and is intended to be used in a DC-C configuration (common DC return)

A true single point ground system means that everything is referenced to a single point that is tied to the external earth ground system. In reality each component and external source is effectively bonded to a single point, which is then effectively bonded to the facility or site external ground system.

5.2.1 Frame Grounding

Securely ground the rack, containing the BDFB(s), to the building grounding system.

5.2.2 Battery Return Reference

The return reference is obtained from the DC source.

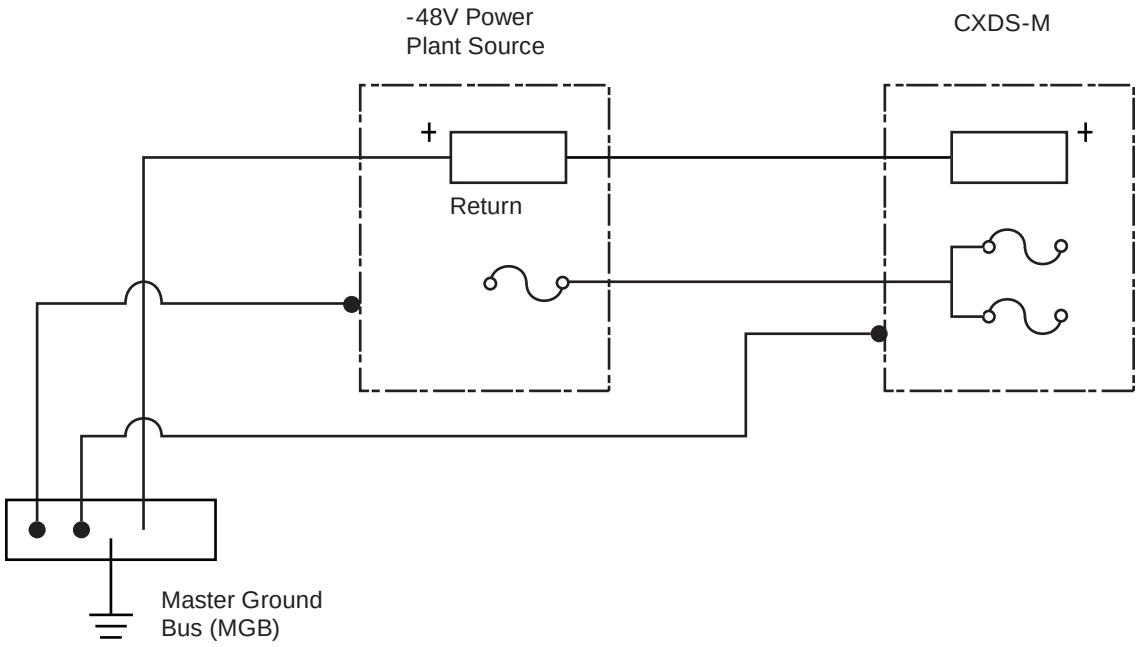


Figure 11 — Battery return reference

5.3 DC Input

- Single feed, 600A max
- Dual feed 1200A max

5.3.1 DC Cables from the DC Plant Source

Input cables should be sized for a 0.25 V drop from power system to the CXDS-M at full load including anticipated growth. The cables should also meet ampacity requirements of the protective device.

DC Plant Cables

Connect the DC plant return cables to the return bus bars (shown in Figure 12). The return bus bars are designed for a connection of 3/8" holes on 1" centers.

Live DC Plant Cables

Connect directly to the live bus bar. Protect input feeds with a high capacity fuse or circuit breaker.

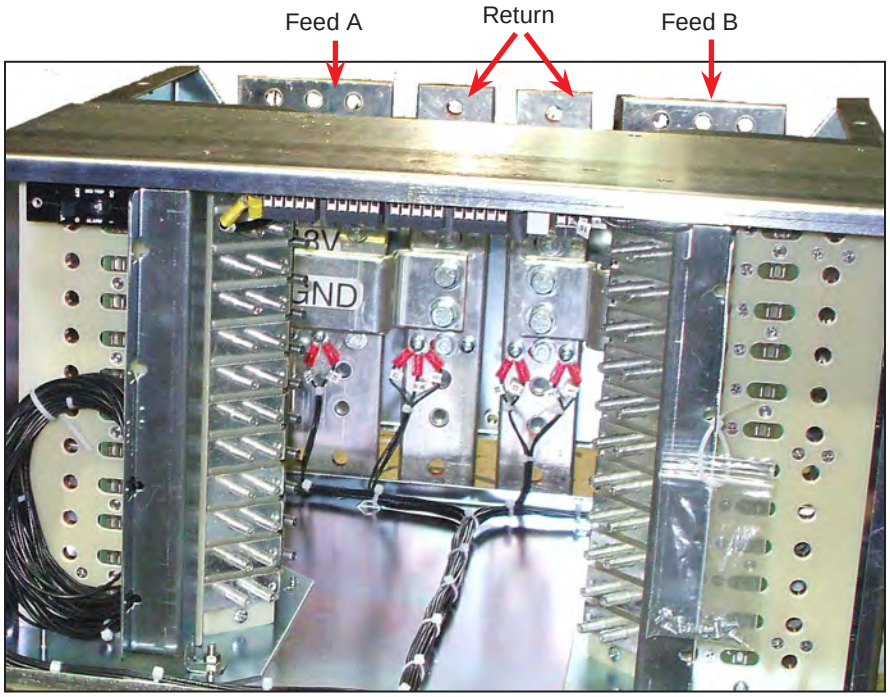


Figure 12 — DC input bus bars

5.4 Connecting DC Load Cables to Breaker/Fuse Circuitry

Refer to guidelines supplied with the load equipment. Distribution cables are typically sized to provide a 0.5 V loop drop at full load as well as meeting ampacity requirements of the protection fuse or circuit breaker.

5.4.1 Before You Begin:

1. Cut cables to length and terminate with a two-hole lug:
   - » 3-pole AM breaker—3/8" diameter on 1" center
   - » 1-pole, 2-pole AM breaker or TLS/TPS fuse holder— 1/4" diameter on 5/8" center
2. Identify each cable with a label that indicates its location within the BDFB.
3. Remove the top Kydex cover.

5.4.2 Load Cables to Breakers

1. Route the load cables through the top or bottom of the BDFB.
2. Remove the protective live terminal cover.
3. If using 2-pole or 3-pole breakers (Figure 13), remove the Insulating materials between adjacent breaker connections.
4. Connect the cables to the BDFB as shown in Figure 14 on page 24.
   Use the internal cable tie bars for strain relief.
5. Neatly group cables with tie wraps as shown in Figure 15 on page 25.

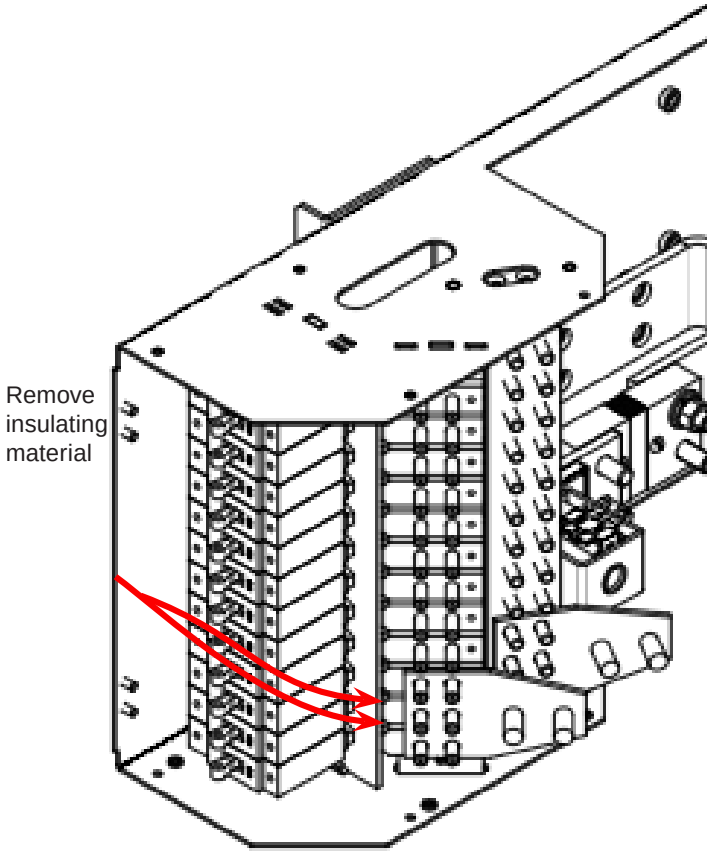


Figure 13 — Preparation for 2-pole and 3-pole breakers

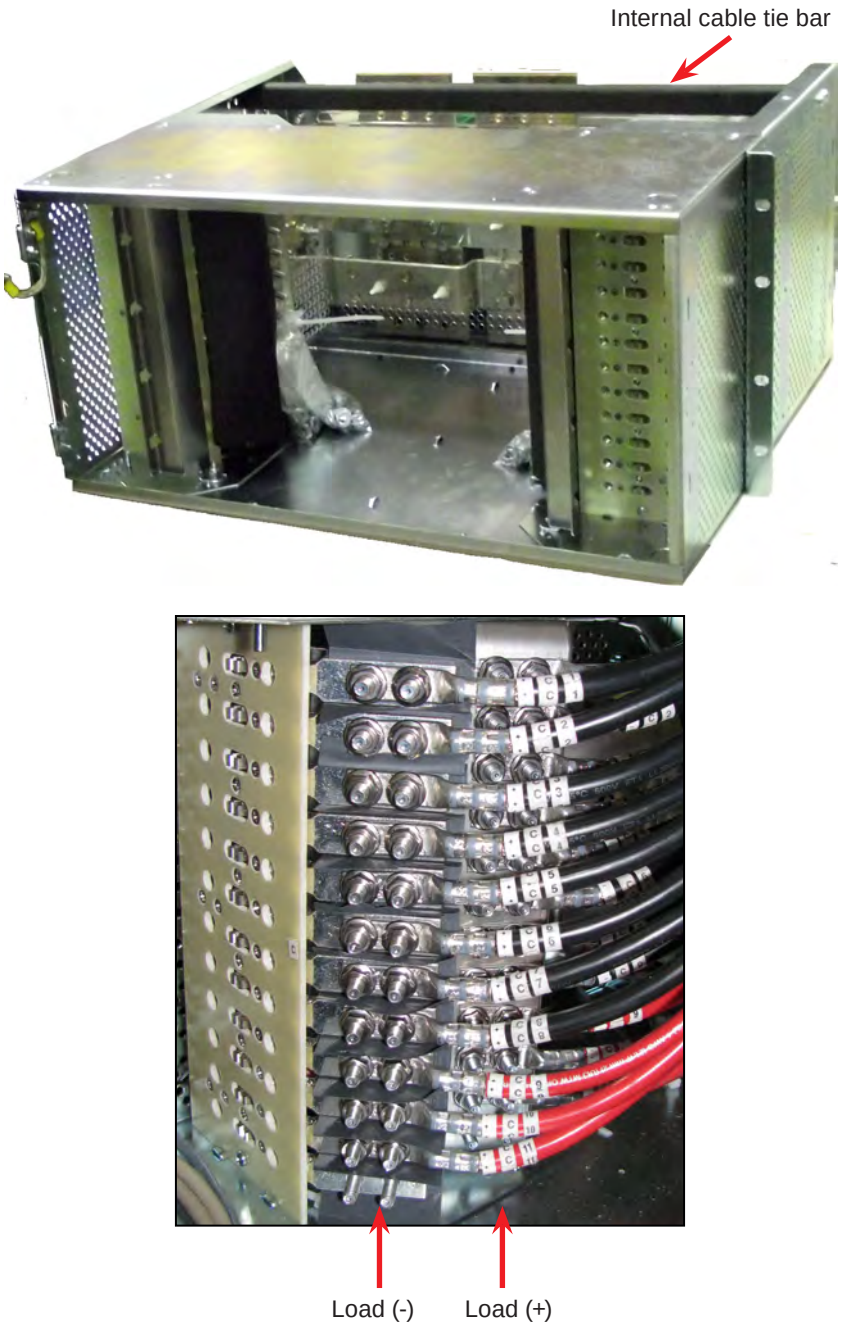


Figure 14 — Load cable connection to BDFB

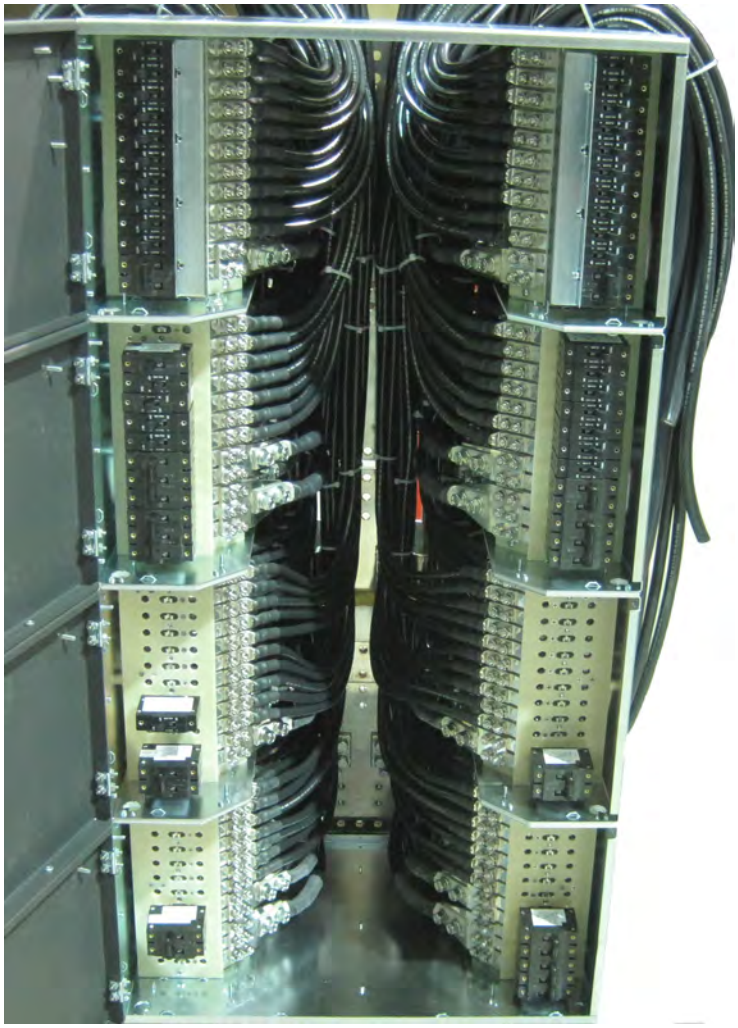


Figure 15 — Final load cable arrrangement (4 distribution BDFBs shown)

5.5 External Alarm Wiring

If using the alarm outputs from the CXCP relays, route the signal cable as shown in Figure 16 ,exiting through the knockout in the top BDFB. Refer to the controller software manual to set up the alarms.

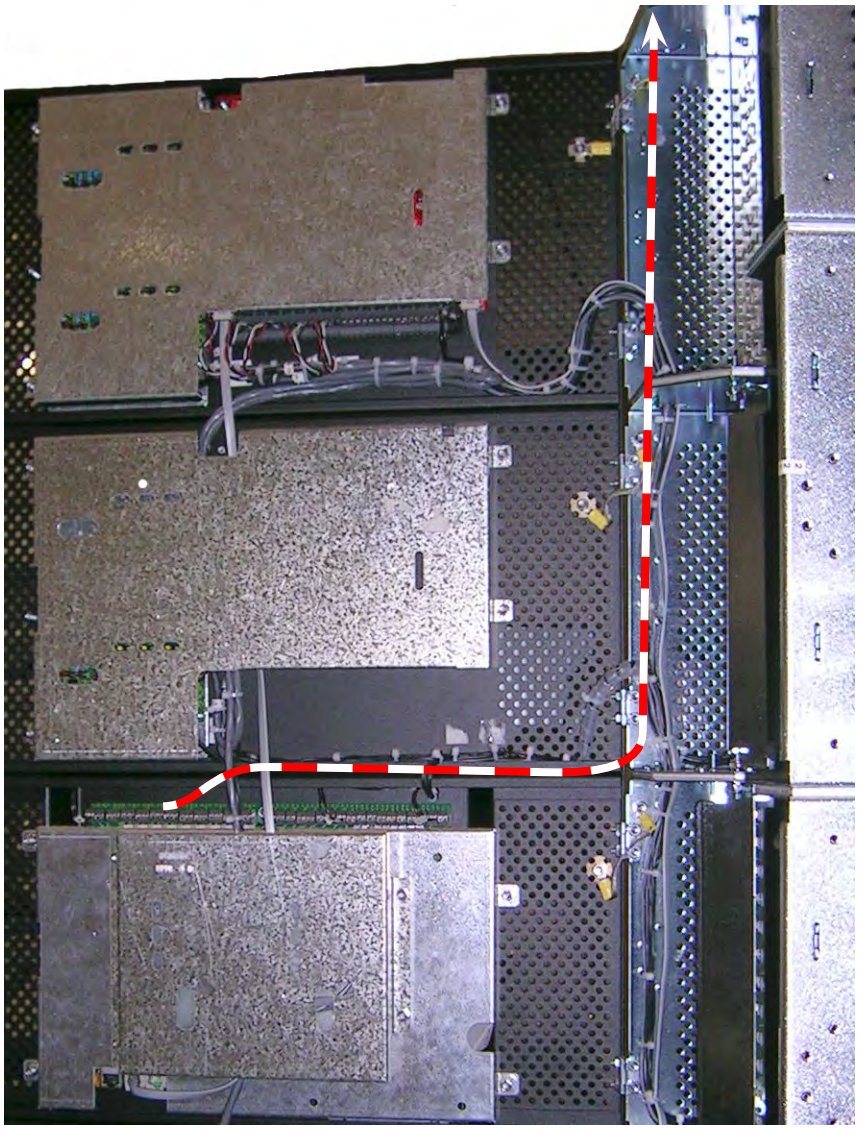


Figure 16 — Route of external signal wiring

WARNING!

To prevent electrical hazards such as short circuits, ensure that the system is free of debris such as metal filings, screws, etc., after the installation is complete.

5.5.1 Top Cover(s)

Cut between the holes with side cutters to make a large enough entryway for the required cables. Figure 17 shows a small hole cut in the cover.

Make a straight cut to the back edge of the cover, so the cover can be fitted around the cables when replacing it at the end of the installation.

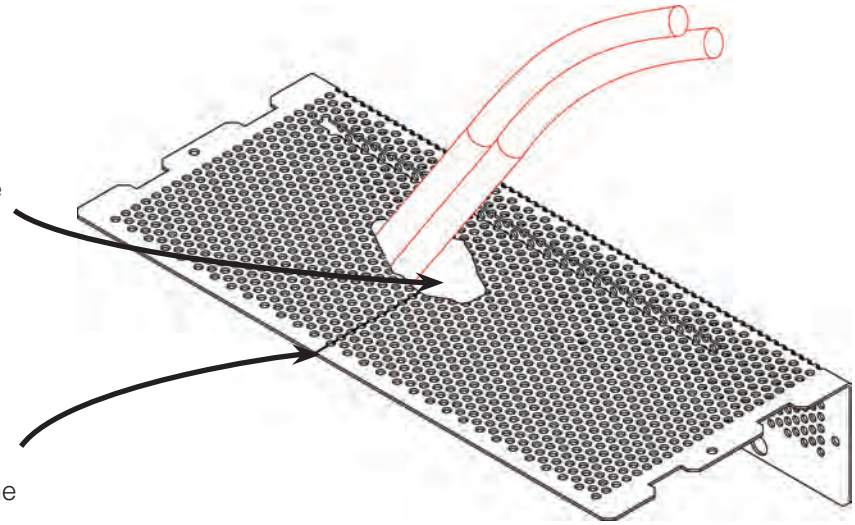


Figure 17 — Top Kydex cover with cuts for cable entry

Reinstall the top cover.

6. System Startup

Visually inspect the installation thoroughly. After completing the system installation and power system wiring, perform the following startup and test procedure to ensure proper operation:

CAUTION!

Make sure that the input source is disconnected or fuses are removed.

1. Use a voltmeter to verify that the input polarity is correct.
2. Connect the input (or insert the input fuses/breakers) to the output of the system.
3. Verify startup of the Cordex controller.
4. Configure other system parameters as required—changing the high current alarms, for example.
5. At this point there should be no alarms present. Investigate and correct any alarm issues.
6. Test the functionality of various alarms and controls as follows:

Alarm	Test
Minor alarm Major alarm	Refer to the Alarms>Configure Alarms menu and replicate a condition that causes each of these alarms.
Supervisory Fail	At the controller, tap the Home icon at the lower left of the “home” page and select **Reset** from the pop-up menu.

NOTE:

A Load Current High alarm will be triggered if the BDFB amperage capacity is exceeded.

7. Test and Commissioning Overview

7.1 System

All Alpha power system components undergo thorough factory testing. All levels/alarms are set to predetermined values as detailed in their individual component manuals except where custom levels are specified. Good installation practice is to check the operation of all features and alarms and to set the power system levels in accordance with the specific requirements of your system.

The individual system component manuals detail the methodology for testing and calibration of all components.

7.2 Documentation

Complete all necessary documentation; i.e., battery reports, DC wiring lists, AC distribution tables, floor plans, etc. Tag wires, fill out identification strips, and identify circuit breakers.

8. Adding an Expansion BDFB

This section describes the installation of an additional BDFB to an existing rack-mounted BDFB system.

The installation kit (#0380034) that ships with the expansion BDFB includes the following parts:

- » Copper bus bars connectors
- » Filler plates
- » Miscellaneous hardware

Preparation

STEP 1

- Remove the cable tie bar and insulation shield in the add-on BDFB.
- Set aside for later re-installation in Step 5.

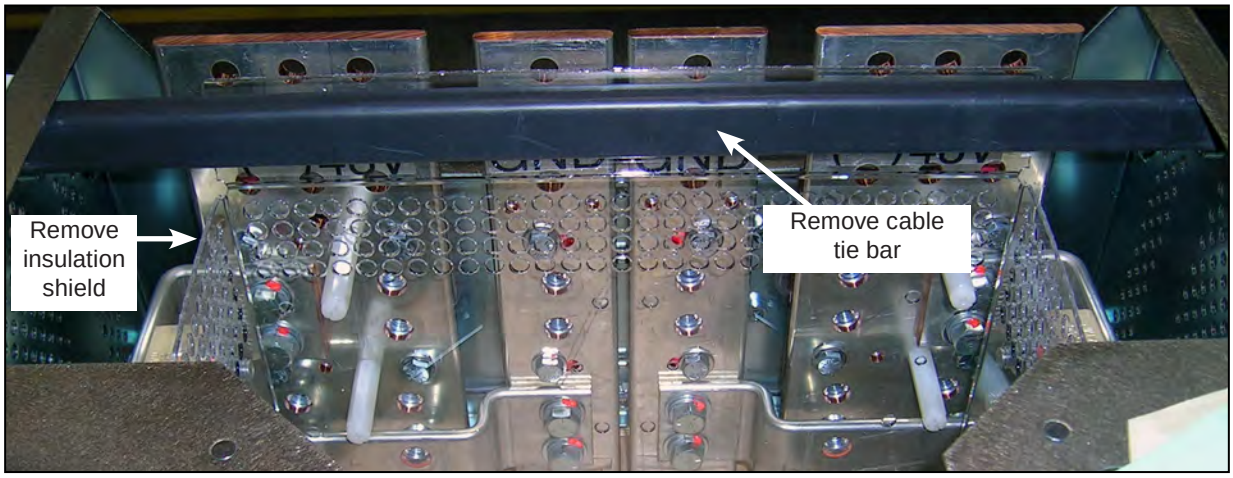


Figure 18 — Cable tie bar and insulation shield

STEP 2

- Remove the bottom covers from the existing BDFB.
- Reinstall them on the bottom of the add-on BDFB.

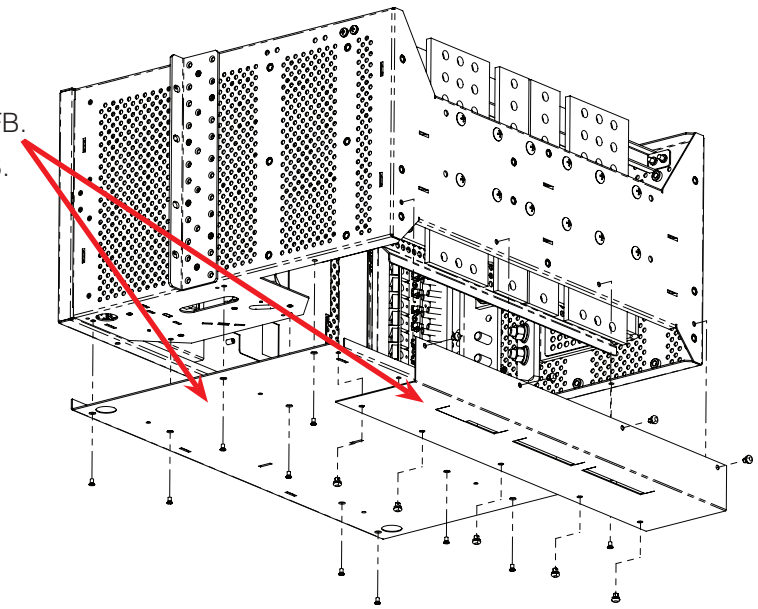


Figure 19 — BDFB bottom covers

Installing the Bus Bar Connectors, Filler Plates and Covers

STEP 3

- Use bolts in the BOTTOM row of the bus bar connectors (Figure 20) to attach them to the BDFB.
- Fasten the bolts FINGER TIGHT to allow for later alignment of the bus bars.

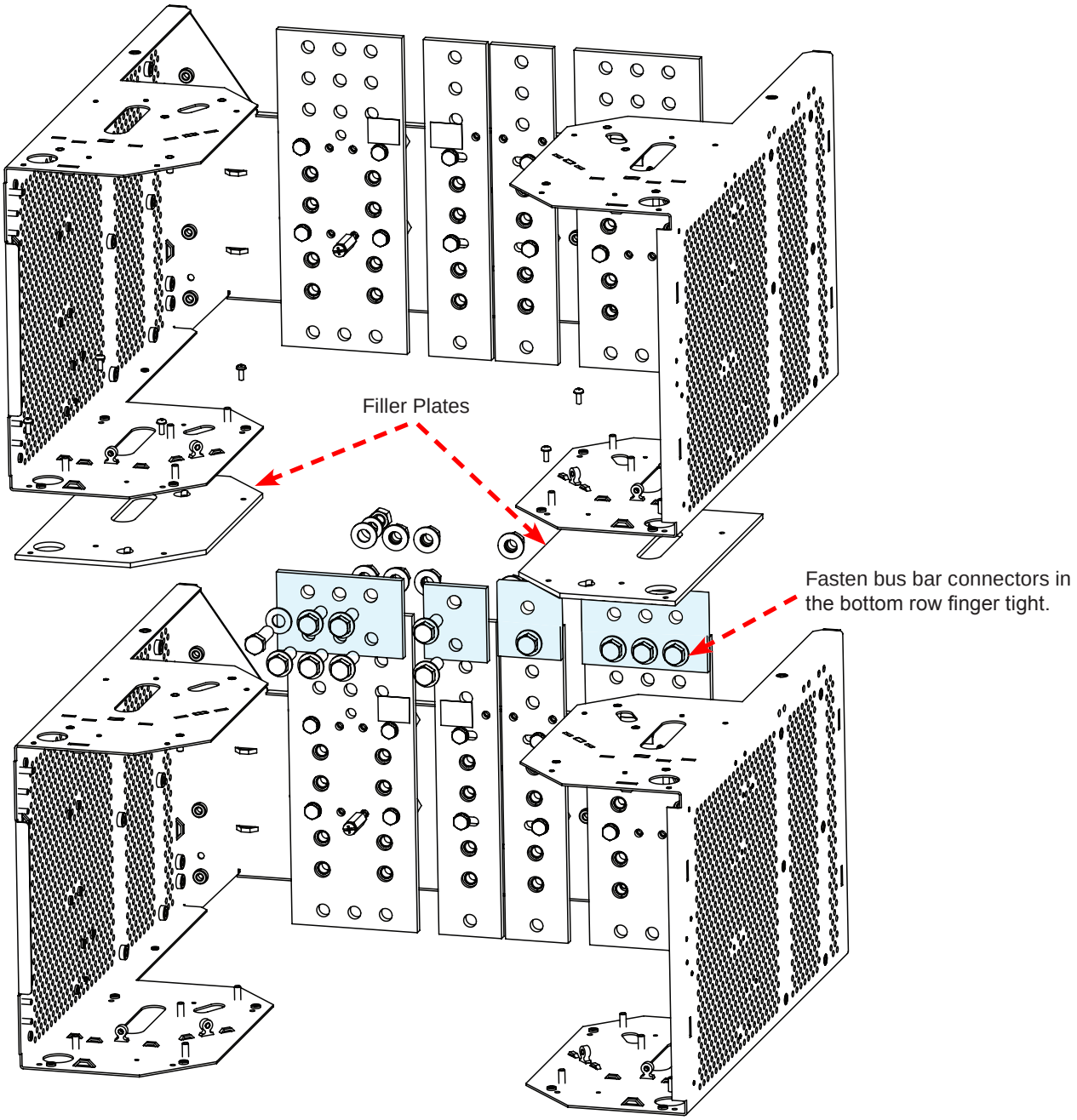


Figure 20 — Alignment of filler plates and bus bar connectors

STEP 4

- Install the BDFB in the rack below the existing BDFB.
- Place the filler plates as shown in Figure 20.
- Adjust the position of the bottom BDFB until the filler plates align with the bottom and top BDFB and the bus bars also align.
- Join BDFBs through the filler plates with the supplied hardware.

Required torque values	
1/4"	8.8 ft-lbs
3/8"	32.5 ft-lbs
1/2"	73 ft-lbs

STEP 5

- Re-install the cable tie bar and insulation shield in the add-on BDFB (see Figure 18).
- Install the back cover (Figure 21) on the lower BDFB (cover ships loose with the BDFB).

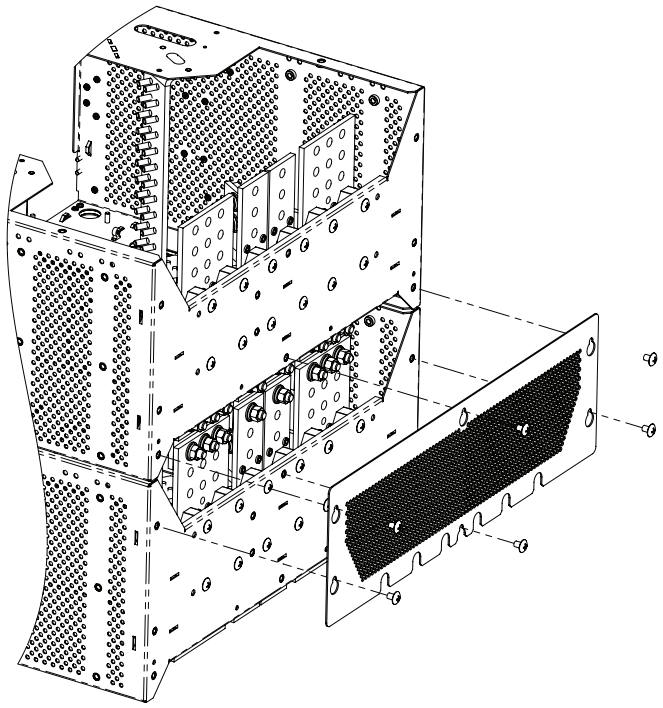


Figure 21 — BDFB back cover installation

Signal Wiring

STEP 6

- Open the front door of the expansion BDFB and locate the inter-BDFB signal cable.
- Open the front door of the BDFB with the controller and remove the inner cover.
- Connect the inter-BDFB cable to the terminal block of the I/O and Alarm Interface board (Figure 22).
- Replace the inner cover.

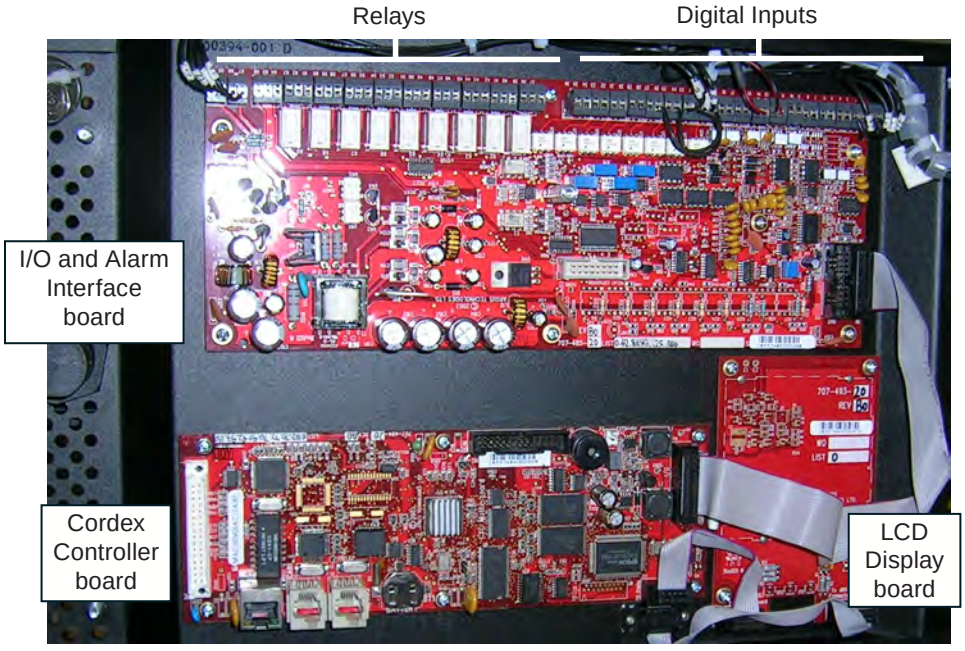


Figure 22 — I/O and Alarm Interface board

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.

Circuit cards, including RAM chips, can be damaged by static electricity. Always wear a grounded wrist strap when handling or installing circuit cards.

Ensure redundant BDFBs are used to eliminate the threat of service interruptions while performing maintenance on the system alarms and control settings.

Table E — Sample maintenance log

Procedure	Date Completed
Clean ventilation openings.	
Inspect all system connections. Re-torque if necessary.	
Verify alarm/control settings.	
Verify alarm relay operation.	

9.1 Controller Lithium Battery Replacement

NOTE:

Replace the battery within 30 seconds to prevent loss of date and time.

A removable lithium battery is located near the back and to the right of the motherboard. The battery life is rated up to three years, but replace earlier if the panel does not maintain date and time during power interruption.

WARNING!

Exercise extreme caution and do not touch any connected equipment.

To replace the lithium battery, shut down the CXC, remove the rear cover, and pull battery out carefully. Ensure that the new battery is the same as the one being replaced.

9.2 Spare Parts

Description	Part #
Interface board	7050132-001
Slam latch	6470008

10. Acronyms and Definitions

AC	Alternating current
ANSI	American National Standards Institute
AWG	American Wire Gauge
BRB	Battery return bus
BTU	British thermal unit
CAN	Controller area network
CEC	Canadian Electrical Code
CSA	Canadian Standards Association
CX	Cordex™ series; e.g., CXC for Cordex System Controller
DC	Direct current
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 USA)
HVSD	High voltage shutdown
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
LED	Light emitting diode
LVLD	Low voltage load 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 USA)
NO	Normally open
OSHA	Occupational Safety & Health Administration
OVP	Over voltage protection
RAM	Random access memory
RU	Rack unit (1.75”)
TCP/IP	Transmission Control Protocol / Internet Protocol
THD	Total harmonic distortion
UL	Underwriters Laboratories
VRLA	Valve regulated lead acid

11. Warranty

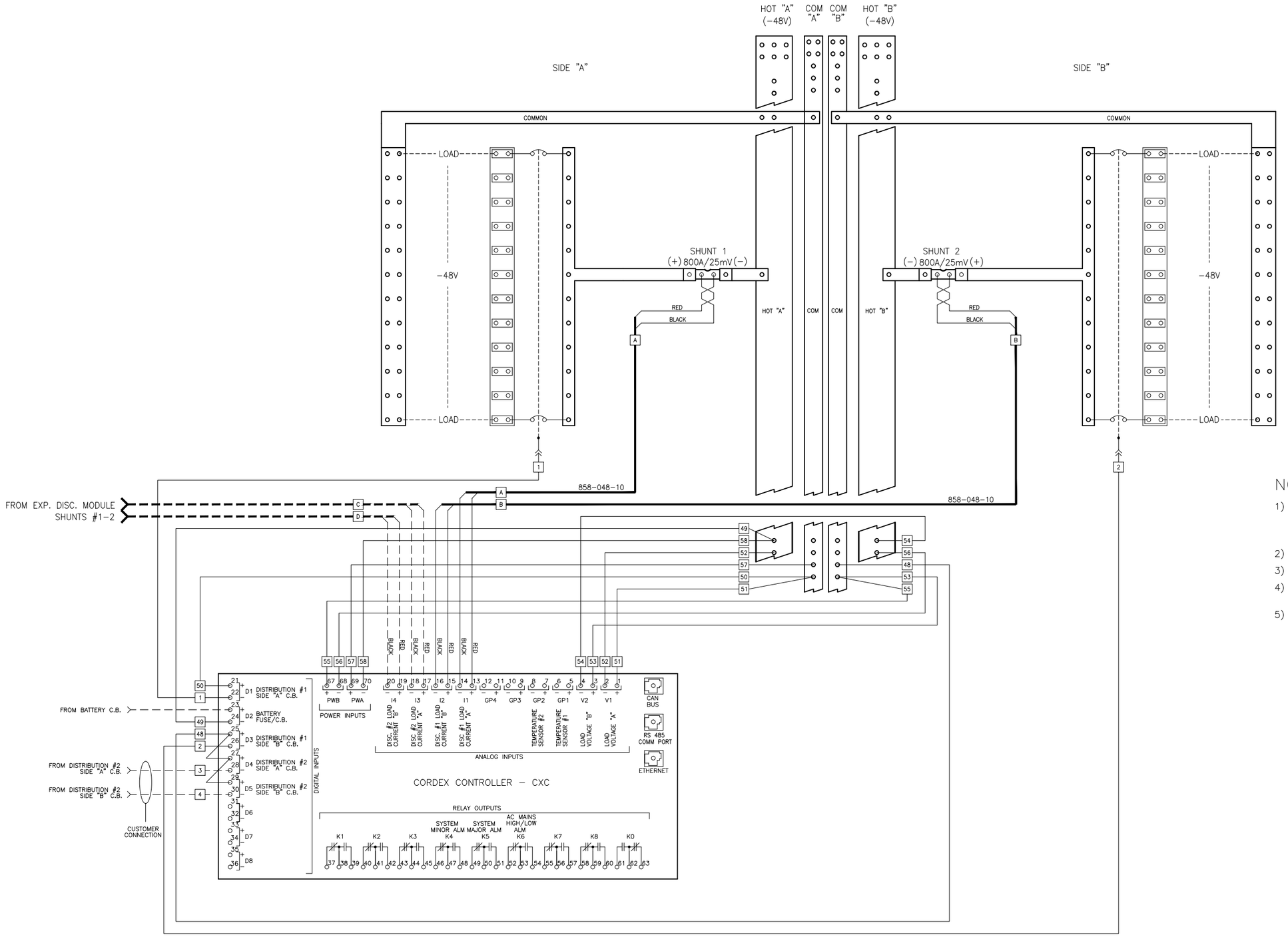
Alpha Technologies Ltd. warrants all equipment manufactured by it to be free from defects in parts and labor, for a period of two years from the date of shipment from the factory. The warranty provides for repairing, replacing or issuing credit (at Alpha's discretion) for any equipment manufactured by it and returned by the customer to the factory or other authorized location during the warranty period. There are limitations to this warranty coverage. The warranty does not provide to the customer or other parties any remedies other than the above. It does not provide coverage for any loss of profits, loss of use, costs for removal or installation of defective equipment, damages or consequential damages based upon equipment failure during or after the warranty period. No other obligations are expressed or implied. Warranty also does not cover damage or equipment failure due to cause(s) external to the unit including, but not limited to, environmental conditions, water damage, power surges or any other external influence.

The customer is responsible for all shipping and handling charges. Where products are covered under warranty Alpha will pay the cost of shipping the repaired or replacement unit back to the customer.

11.1 Battery Warranty

Note that battery warranty terms and conditions vary by battery and by intended use. The most common battery warranty provided by Alpha is a two year full replacement warranty with a pro-rated warranty for the following three years. Pro rated warranty provides a credit applicable toward the purchase of new batteries from Alpha. The credit is calculated as the purchase price multiplied by the percentage of the battery life that was not available (in months). Battery warranty coverage is lost where the battery charge is not maintained for 6 months. Contact your Alpha sales representative or the Technical Support team at the above number to understand your entitlements under Battery Warranty.

REVISIONS			
LTR	DESCRIPTION	DATE	APPD
B	REMOVED I/F PCB	11/09	JK
C	ADDED EXP. MODULE WIRING INFO.	12/06	RW



NOTES:

1) FOR CONTINUOUS OPERATION, IT IS RECOMMENDED THAT SHUNTS ARE NOT RUN AT MORE THAN 80% THE RATED CURRENT UNDER NORMAL CONDITIONS.
2) DASHED LINES DENOTE CUSTOMER WIRING.
3) ALL WIRES ARE #22AWG EXCEPT AS NOTED.
4) NUMBERS IN BUBBLES REFER TO ITEM NUMBERS ON BILL OF MATERIALS.
5) " □ " REFERS TO WIRE TAG NUMBERS ON WIRES.

LTR	DESCRIPTION	QTY
	FINISHED HOLE LEGEND	

ALPHA TECHNOLOGIES™

DESIGN	RW	11/09/14	MATERIAL
DRAWN	RW	11/09/14	
CHECKED	JK	11/09/21	
APPROVED	JK	11/09/21	FINISH
TOLERANCES (UNLESS OTHERWISE NOTED)			SCALE N/A

TITLE
CONFIG KIT, DISTRIBUTION
48V A/B, 600A, BDFB

ISSUE DATE | SHEET 1 OF 1

SIZE	TYPE	DWG NO.	REV
B	A2	0380033-05	C

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