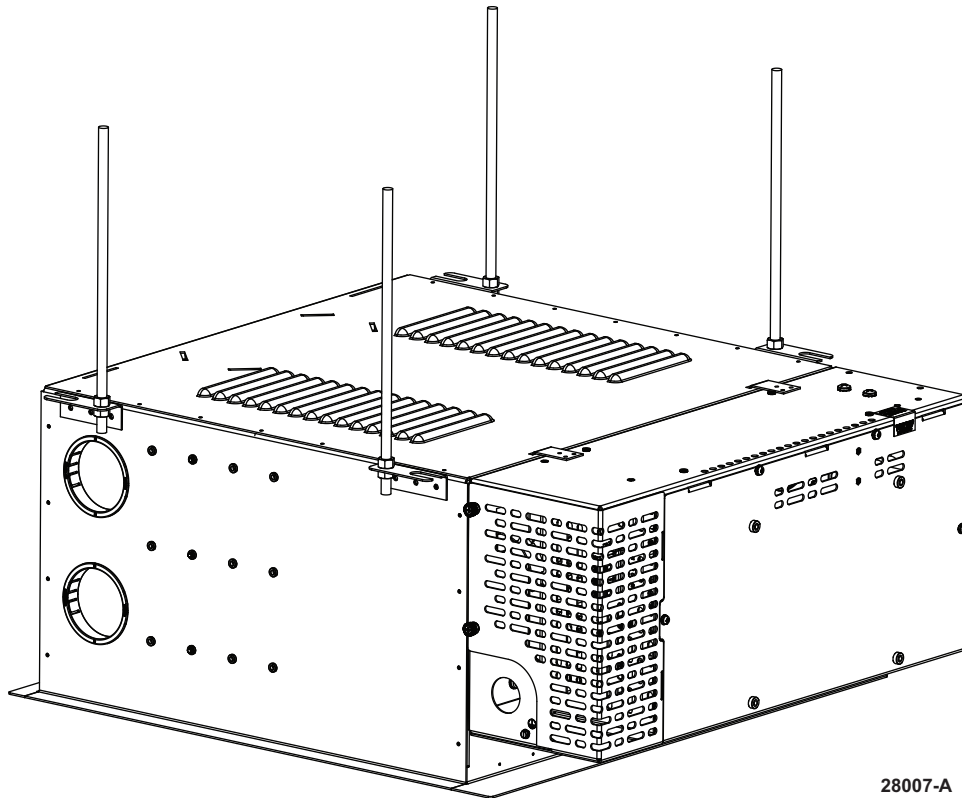


Constellation™ Edge Enclosure (CPCE-1) and Powered Backplane (CPCB-1)



Constellation Edge Enclosure and Powered Backplane

CONTENT	PAGE
1 INTRODUCTION	2
1.1 Trademarks	2
1.2 Important Safety Cautions	3
1.3 Standards Certification	3
1.4 Constellation Products	3
1.5 Constellation Publications	4
1.6 Important Symbols	4
2 PRODUCT DESCRIPTION	5
2.1 General Description	5
2.2 Constellation System	6

CONTENT	PAGE
2.3 Edge Enclosure (CPCE-1)	6
2.3.1 Main Features	6
2.3.2 Specifications and Dimensions	8
2.4 Powered Backplane (CPCB-1)	9
2.4.1 Main Features	9
2.4.2 Specifications and Dimensions	10
3 UNPACKING AND INSPECTION	11
4 INSTALLATION AND SET UP	12
4.1 Overview of Installation	12
4.2 Installing the Enclosure	13
4.3 Securing the Backplane to the Enclosure	14
4.4 Connecting the Powered Fiber Cable to the Backplane	14
4.5 Setting Up Power Usage	18
4.6 Installing Cassettes in the Enclosure	20
5 OPERATION	22
5.1 General	22
5.2 Power Health Status Windows	22
5.3 Temperature LEDs	23
5.4 Circuit Breakers	24
5.5 Inrush Current	25
5.6 Recommended Ground Bar	26
6 CONTACT INFORMATION	26

1 INTRODUCTION

Constellation™ delivers power and data over extended distances using a powered fiber cable. The power and data are delivered to the Constellation Powered Backplane (CPCB-1), which is mounted on the Constellation Edge Enclosure (CPCE-1).

This user manual describes these two products, which are intended to be used in conjunction with one another. Contents of this manual include a description of these two products and procedures for unpacking and installing them at the customer site.

1.1 Trademarks

CommScope (logo), CommScope, Constellation, and Propel are trademarks of CommScope, Inc.

1.2 Important Safety Cautions

When installing or operating the panel, observe these safety cautions:

- To reduce the risk of fire, electric shock, and injury to persons, read, understand, and adhere to the following instructions as well as any warnings marked on the product.
- This product has a remote risk of electric shock. Never install the product in wet conditions or during lightning storms. Never touch uninsulated power wires or terminals.
- This product is intended for indoor use only.
- Wearing safety glasses during installation of this panel is recommended.
- All wiring that connects to this equipment must meet applicable local and national building codes and network wiring standards.

1.3 Standards Certification

The CommScope Constellation power source is a Limited Power Source per IEC/UL/CSA 62368-1 suitable for supplying a Class 2 circuit under NEC Art. 725 and CEC Rule 16-200.

Note: Always follow local codes.

1.4 Constellation Products

Table 1 lists currently available Constellation products with catalog numbers and Material IDs (MIDs).

Table 1. Constellation Products

PRODUCT	CATALOG #	MID
Power Transmitter	CPCX-12	760254285
Management Module	CTX-MGT	760254286
Power Supply	CPM-3K	760254287
Transmitter Card	CTX-6	760254288
Power Transition Panel	CPT-PP-48C	760254293
Power Patch Cable	CTX-CBL-10	760254294
Powered Backplane	CPCB-1	760252855
Edge Enclosure	CPCE-1	760252854
Powered Fiber Cable	Configured to order	CTO
Power Supply Bay Cover	PM500-COVER	760254642




1.5 Constellation Publications

Table 2 lists technical publications available for the Constellation system. These manuals can be accessed online using the QR code on the product, its packaging, or by contacting the CommScope Support Center at <https://www.commscope.com/SupportCenter>.

Table 2. Constellation Technical Publications

PUBLICATION TITLE	PUBLICATION #
Constellation Power Transition Panel (CPT-PP-48C) User Manual	TC-96354-IP
Constellation Transmitter Card (CTX-6) Data Sheet	TC-96344-IP
Constellation Power Supply (CPM-3K) Data Sheet	TC-96345-IP
Constellation Multi-Chassis Synch Card (CMX-6) Quick Start Guide	TC-96346-IP
Constellation Power Supply Bay Cover (PM500-COVER) Data Sheet	TC-96347-IP
Constellation Management Software for Transmitters User Manual	TC-96348-IP
Constellation Edge Enclosure (CPCE-1) and Powered Backplane (CPCB-1) User Manual	TC-96350-IP
Constellation Best Practices Guide	TC-96352-IP
Constellation Power Transmitter (CPCX-12) Quick Start Guide	TC-96354-IP

1.6 Important Symbols

	Hazardous voltages are present when energized. Do not open this unit while it is energized.
	This symbol indicates the protective earth terminal for the device.
	This symbol indicates the supplementary ground terminal for the device.

2 PRODUCT DESCRIPTION

2.1 General Description

The Edge Enclosure (CPCE-1) is a ceiling box accessible to the customer via a swing down door or a neighboring ceiling tile front entry panel. The Powered Backplane (CPCB-1), mounted to the enclosure, contains AC and DC power outlets and a fiber pass through providing the customer with a convenient method of accessing power and data delivered over a powered fiber cable. [Figure 1](#) shows the Edge Enclosure and Powered Backplane.

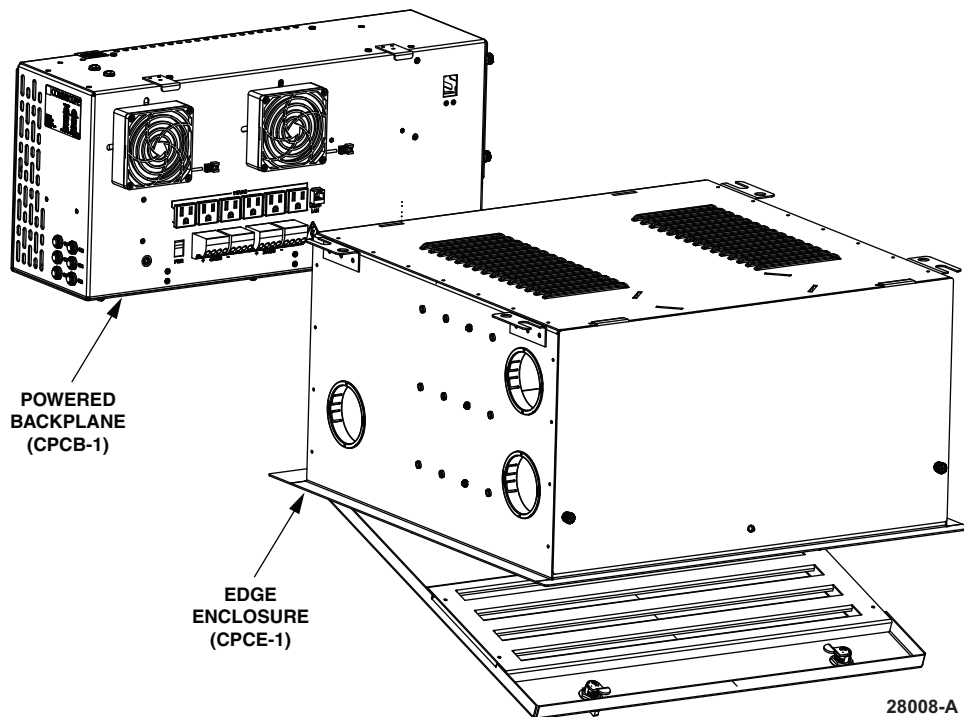


Figure 1. Constellation Powered Backplane and Edge Enclosure with Door Open

The enclosure provides a factory-installed, 19-inch 5U panel mount structure for mounting switches or other equipment. The 110 VAC and 24 or 48 VDC power outlets on the backplane can be used as desired to power elements in the enclosure, as well as to accommodate other local power needs. The enclosure also has a bracket that provides mounting locations for one 8- or 16-fiber Propel™ connection component and up to two G-2 series modules. Usually these are MPO-to-LC connection components.

Note: This user manual does not cover installation of non-CommScope equipment such as switches.

During installation, the enclosure is installed first by securing it to the existing building structure per the instructions in [Section 4.2 on Page 13](#). The backplane is then secured to the enclosure and the powered fiber cable is connected to the backplane, as directed in [Section 4.3 on Page 14](#) and [Section 4.4 on Page 14](#), respectively.

2.2 Constellation System

The CPCE-1 and CPCB-1 are intended to be used as part of a Constellation system such as shown in [Figure 2](#).

The Constellation system consists of CommScope hardware and software components that deliver power via power Interconnect cables (CTX-CBL-10). The cables transition to a larger powered fiber cable to provide long-haul transmission of power and data, terminating at the Powered Backplane.

[Figure 2](#) shows the typical components of the Constellation system.

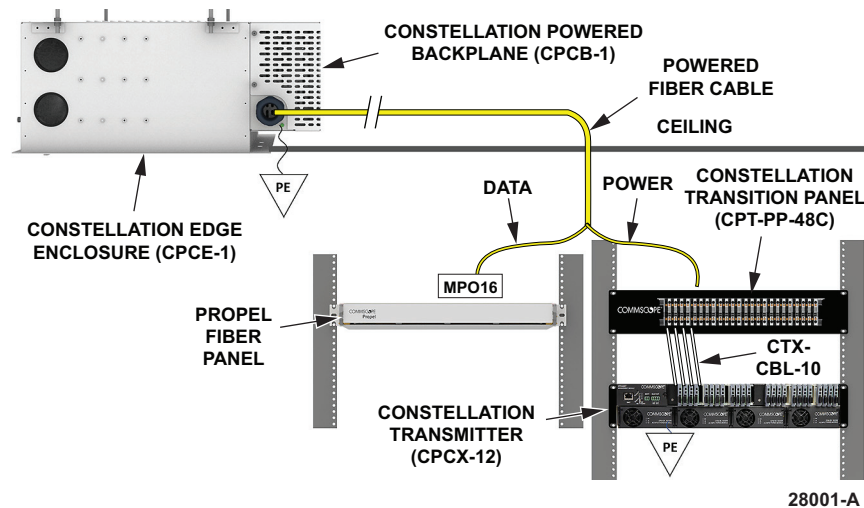


Figure 2. Constellation System

As shown, in addition to the enclosure and powered backplane, this system includes the Constellation Power Transmitter (CPCX-12) and the Constellation Power Transition Panel (CPT-PP-48C). The system also typically includes a fiber panel such as the CommScope Propel™ Panel. Some components of the Power Transmitter are offered separately including power supplies (CPM-3K) and transmitter cards (CTX-6).

2.3 Edge Enclosure (CPCE-1)

2.3.1 Main Features

[Figure 3](#) shows the enclosure as viewed from below when looking up toward the opening through which the powered backplane is accessed. (It is shown here installed.)

The main features are:

- **Basic Structure**—is a rectangular enclosure equipped with two points of access (below and front side) with openings on the back side that accept the powered backplane.

- **Patch Cord Portals**—are openings for patch cords routed from switch ports to end users.
- **Rack Structure**—is a 5U 19-inch rack integral to the enclosure.
- **Captive Screws**—are used to secure the powered backplane to the enclosure.
- **Cassette Bracket**—provides mounting locations for one 8- or 16-fiber Propel connection component and up to two G-2 series modules.
- **Bottom Access Door**—swings down providing access to equipment mounted in the enclosure and power outlets and other features on the backplane.

Note: The door is an integral part of the enclosure.

- **Power Outlets**—are available for powering local equipment. These outlets are described in more detail in [Section 2.4 on Page 9](#) and in other sections of this user manual.
- **Powered Backplane**—is the Constellation Powered Backplane (CPCB-1) described in [Section 2.4](#). It is secured to the back side of the enclosure.

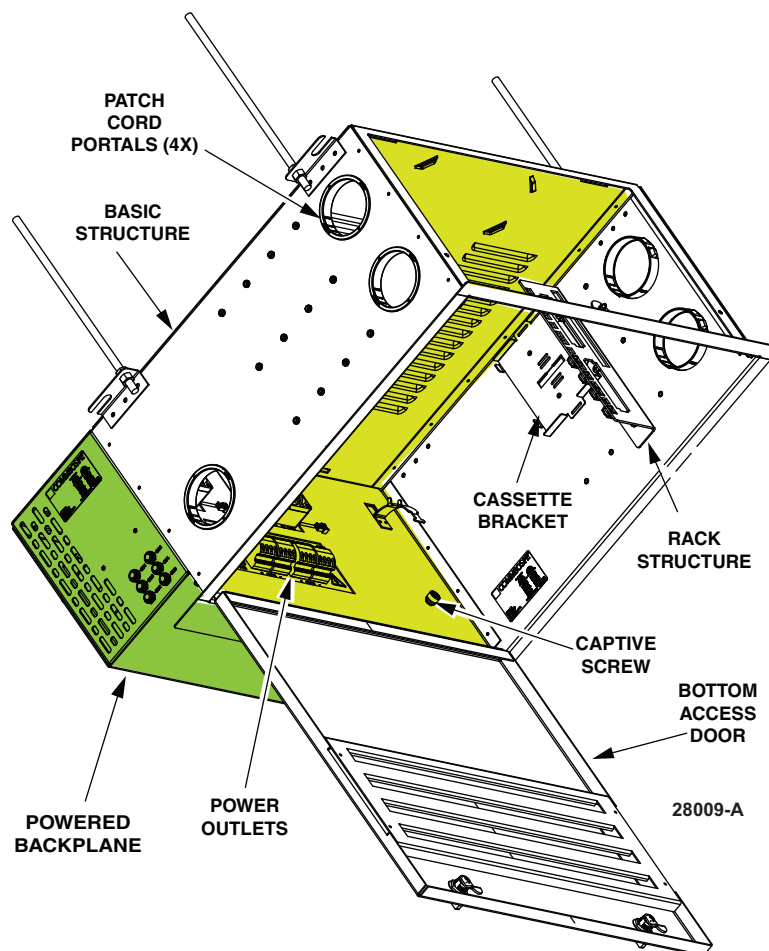
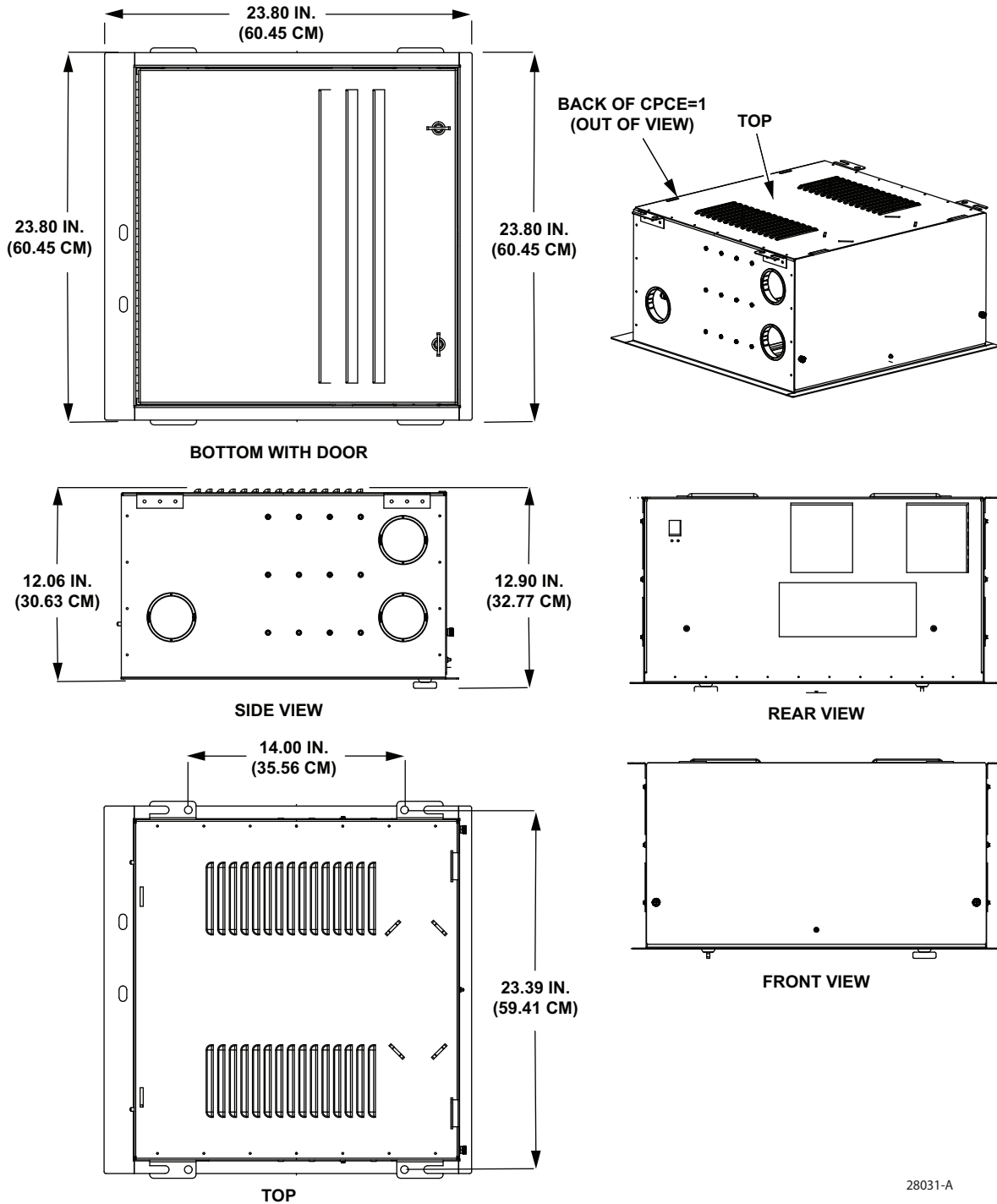


Figure 3. Main Features of Constellation Edge Enclosure and Powered Backplane

2.3.2 Specifications and Dimensions

Figure 4 shows dimensions for the Edge Enclosure (CPCE-1). Table 3 lists dimensions.



28031-A

Figure 4. Edge Enclosure Dimensions

Table 3. Edge Enclosure Specifications

PARAMETER	VALUE
Height (from ceiling into room)	12.06 in. (30.63 cm)
Width (within enclosure side to side facing power connectors)	21.87 in. (55.50 cm)
Depth (from power connectors to sheet metal behind)	20.87 in. (53.00 cm)

2.4 Powered Backplane (CPCB-1)

2.4.1 Main Features

Figure 5 is a front oblique view of the Powered Backplane, with the main features visible that are accessible from within the CPCE-1 enclosure. These features are:

- **Fans (2x)**—draw air in from the CPCE-1 and through the CPCB-1
- **Mounting Hooks**—are used to hang the backplane on the back of the enclosure.
- **Fiber Pass Through**—is the pass through between the CPCB-1 and CPCE-1 where the fiber portion of the powered fiber cable is directed.
- **Customer Connection Access Panel**—is removed to install the powered fiber cable.

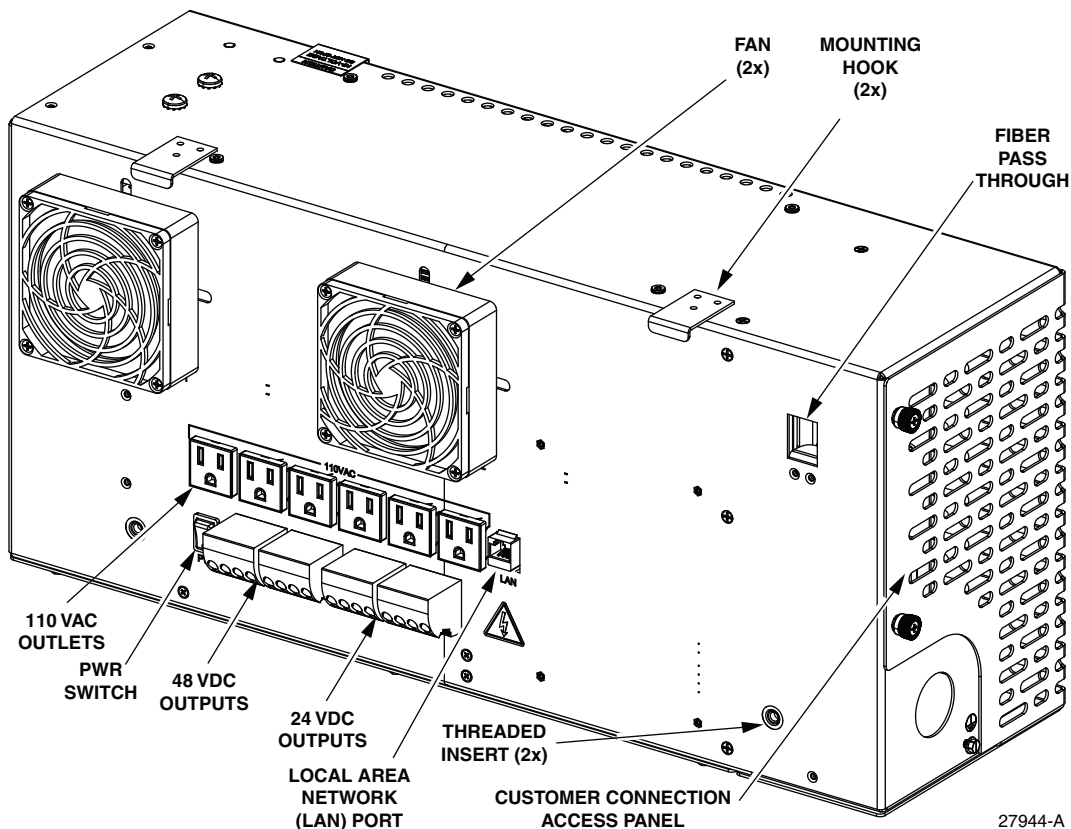


Figure 5. Constellation Powered Backplane

- **Threaded Inserts (2x)**—accept the captive screws within the CPCE-1 to secure the backplane to the enclosure.
- **110 VAC Outlets**—are used to direct power to elements mounted in the enclosure.
- **PWR Switch**—can be toggled to enable or disable power to the 119 VAC Outlets, 48 VDC Outputs, and 24 VDC Outputs (called out as such in [Figure 5](#)). Toggling the switch does not affect the 12 VDC fans, which run continuously.

Note: The Powered Backplane can supply a total of 1 kW of power divided between the six 110 VAC outlets, two 48 VDC outputs, and one 24 VDC output.

- **48 VDC Power Output**—Maximum power draw is 1 kW split over two circuits. Maximum draw per circuit is 980 W.
- **24 VDC Power Output**—Maximum power draw is 240 W.
- **LAN**—for future use.
- **Powered Fiber Cable Entry Point**—where both power and data are delivered to CPCB-1 over a single cable.

2.4.2 Specifications and Dimensions

[Table 4](#) lists specifications for the Powered Backplane. [Figure 5](#) shows dimension.

Table 4. Powered Backplane Specifications

PARAMETER	VALUE
Height	10.08 in. (25.60 cm)
Width	22.08 in. (56.08 cm)
Depth	6.57 in. (16.68 cm)

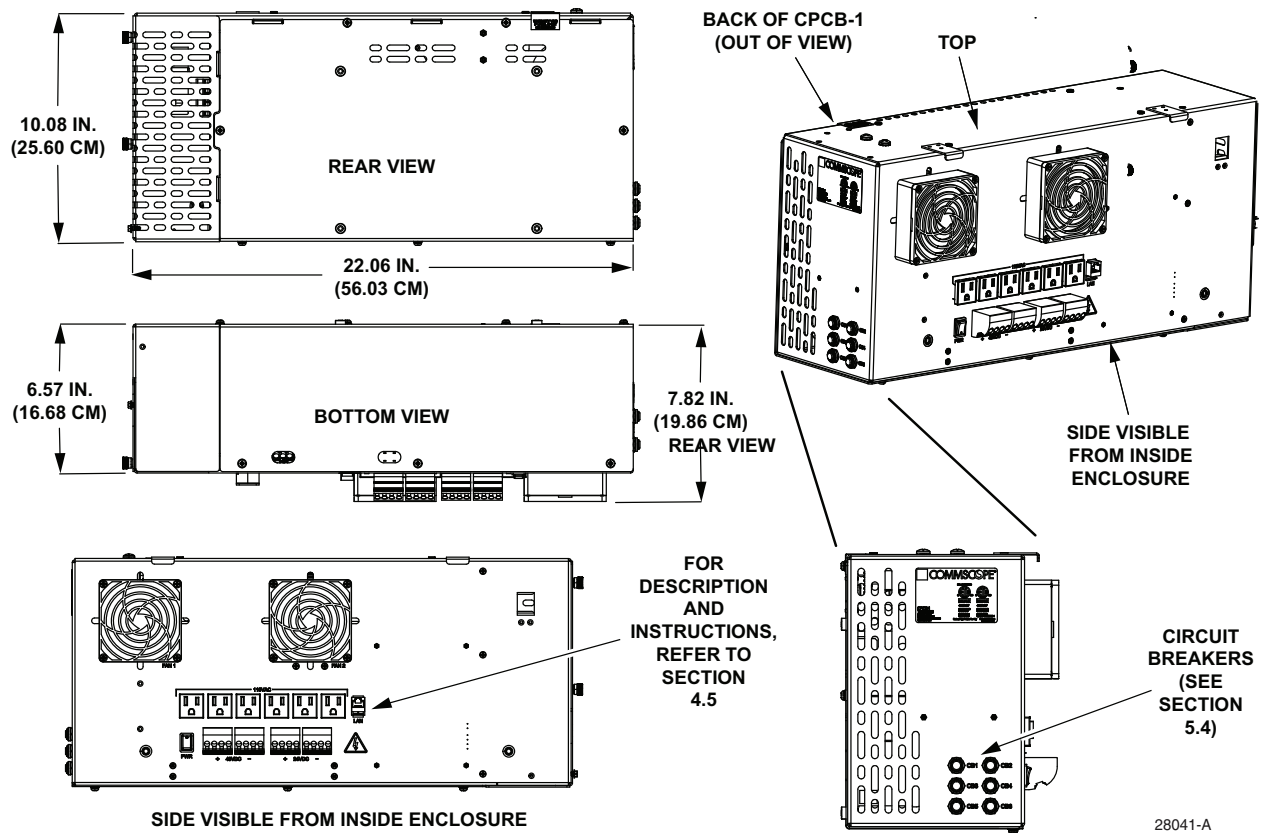


Figure 6. Powered Backplane Dimensions

3 UNPACKING AND INSPECTION

Use the following procedure to unpack and inspect the product. The enclosure and backplane come in separate boxes. Verify parts against [Table 5](#) below.

Table 5. Parts List for Edge Enclosure and Powered Backplane

DESCRIPTION	QTY
Powered backplane	1
Edge enclosure with the following items:	1
Hook and loop straps for cable routing	4
Hook and loop straps for securing fiber cable	3
Nylon fasteners for routing fiber jumpers	6
Hook and loop strap with buckle for securing Propel cassette if being installed (refer to Section on Page 19)	1

1. Inspect the exterior of the shipping boxes for evidence of rough handling that may have damaged the components in the container.
2. Open the boxes and remove the items listed in [Table 5](#) while carefully checking the contents for damage.
3. If damage is found or items are missing, contact the CommScope Support Center using the URL: <http://www.commscope.com/SupportCenter>
4. If damage is found, save the damaged components for inspection by the carrier.

4 INSTALLATION AND SET UP

4.1 Overview of Installation

In a typical installation process, the following procedures occur:

- The CPCE-1 enclosure is attached to the building structure, and positioned such that it takes the place of a standard 2 ft x 2 ft ceiling tile. This portion of the installation is suited for the rough-in phase of construction. For details of this procedure, refer to [Section 4.2 on Page 13](#)

Note: The enclosure should be supported by threaded downrods secured to adequate building structure and not by drop-ceiling grid structure.

Note: The enclosure is shipped with covers for the cord portals. These covers can be used in place of the bushings as needed.

- The CPCB-1 backplane is hung on the back side of the enclosure and then is secured using the captive screws in the enclosure. This portion of the installation is suited for the trim phase of construction. For details of this procedure, refer to [Section 4.3 on Page 14](#).

Note: The backplane is equipped with a grounding screw which should be tied to the same potential (building steel) as the transmitter (CPCX-12).

- Connectivity components are installed on the cassette bracket. (For location, refer to [Section 2.3.1 on Page 6](#).) The cassette bracket accommodates one Propel 8- or 16-fiber connection component and up to two G2-series modules. [Section 4.4 on Page 14](#) has guidelines for installing these components.
- Customer-selected Information Technology (IT) and Operational Technology (OT) equipment is mounted using the 19-inch frame structure in the enclosure. The IT or OT equipment is connected to the data and power outputs of the backplane, providing power to end users.

Note: This user manual does not cover installation of IT and OT equipment.

4.2 Installing the Enclosure

The Edge Enclosure (CPCE-1) is intended for use as a ceiling-installed component. It should be attached to the building structure using channel struts, beam clamps, or equivalent.

Note: All OSHA requirements should be followed when installing components in a ceiling or at elevation.

The enclosure is not intended to be supported by drop ceiling infrastructure. The enclosure is equipped with four mounting tabs. These tabs are designed to accommodate 3/8 inch threaded rod (Figure 7). The threaded rod assembly should include flat washers and at least one lock washer as illustrated in Figure 7.

Align the four mounting holes with the four holes in the selected rack location.

Note: All four mounting tabs should be used to attach the CPCE-1 to the building structure.



Figure 7. Down Rod Assembly Supporting Edge Enclosure

4.3 Securing the Backplane to the Enclosure

The Power Backplane (CPCB-1) is equipped with two hooks (shown in [Figure 8](#)) that mate up with the rear of the CPCE-1. These hooks are used to hang the CPCB-1 onto the back of the enclosure. Once hung, two captive screws inside the CPCE-1 can be used to secure the power backplane to the enclosure. It is helpful to tilt the CPCB-1 forward slightly so that the hooks can be aligned with and engage the CPCE-1. Once the hooks are engaged, the CPCB-1 can be rocked downward and into position at which point, the back side of the CPCE-1 and front side of the CPCB-1 will be flush with one another.

Note: The powered backplane is equipped with a grounding screw which should be tied to the same potential (building steel) as the transmitter (CPCX-12).

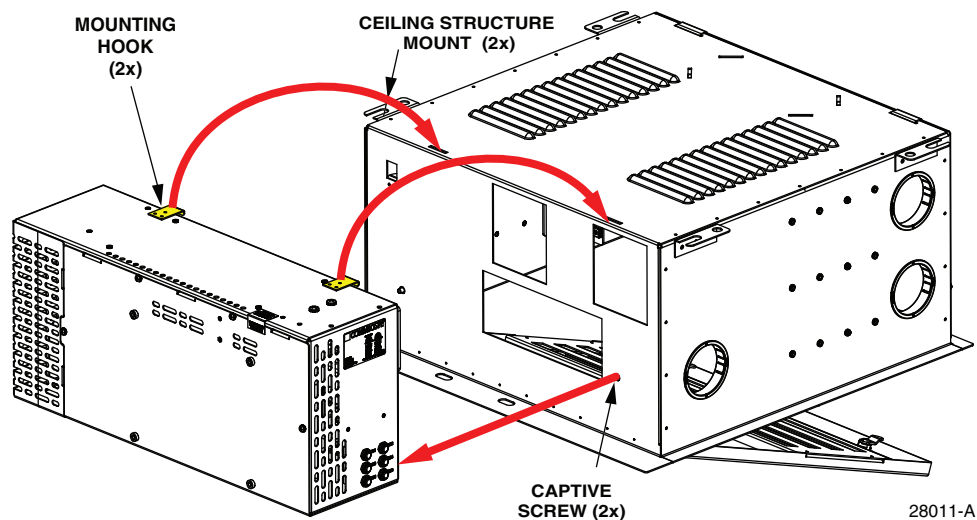


Figure 8. Securing the Power Backplane to the Enclosure

4.4 Connecting the Powered Fiber Cable to the Backplane

The CommScope powered fiber cable is connected to the back of the powered backplane (exterior of the enclosure). Use the following procedure, referring to [Figure 9](#), [Figure 10](#), and [Figure 11](#).

Note: CommScope powered fiber cables are available in two- or four-pair versions.

1. Remove the protective cage shown in [Figure 9](#).
2. Disassemble the cable gland on the end of the powered fiber cable.
3. Pass the powered fiber cable through powered fiber cable entry point identified in [Figure 9](#) and reassemble the cable gland.
4. Terminate 16 AWG conductors with wire ferrules.

Note: The jacket material can be removed from around the copper pairs and the pairs can be trimmed to length so that they effectively engage the connector.

5. Remove the input connectors (shown in green in [Figure 10](#)).
6. Direct the optical fiber through the fiber pass through and secure to fiber pass through tab using a hook-and-loop fastener.

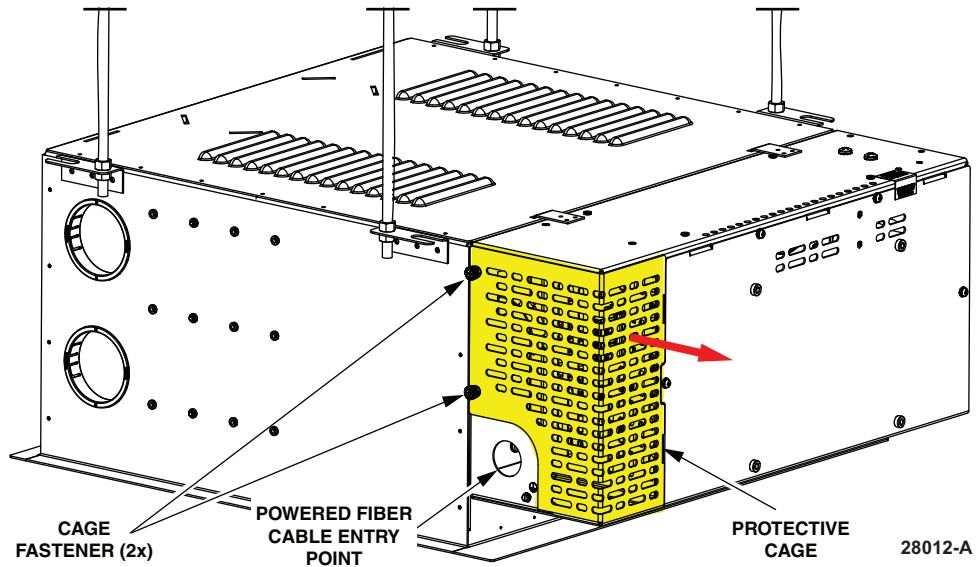


Figure 9. Cable Portal and Protective Cage

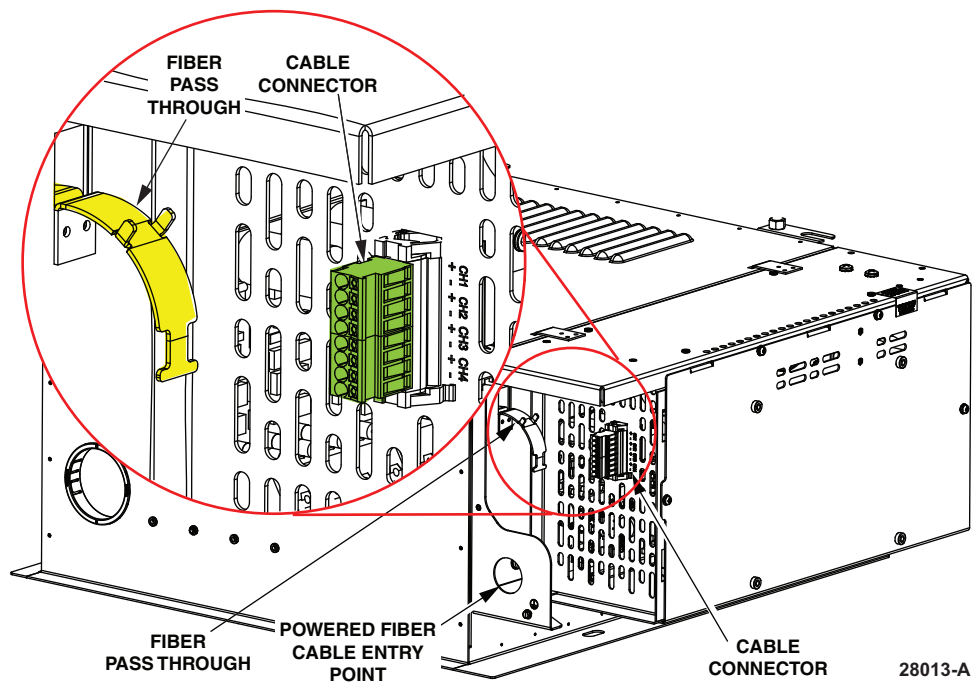


Figure 10. Connecting the Cable

7. Determine the number of pairs to be connected. Depending on distance from Constellation power transmitter to the Constellation powered backplane, two, three, or four pairs are required as indicated in [Table 6](#)

Table 6. Number of Pairs Required

DISTANCE FROM TRANSMITTER TO POWER PLANE	NUMBER OF PAIRS REQUIRED
Up to 150 m (492 feet)	At least two pairs must be used
Between 150 and 350 m (492 to 1148 feet)	Three pairs must be used
More than 350 m (more than 1148 feet)	Four pairs must be used

8. Referring to [Figure 11](#), remove the connector and insert ferrule-equipped conductors into the connector, for either two-pair, three-pair, or four-pair wiring, adhering to the following scheme:
 - a. Red - CH1+
 - b. White (red) - CH1-
 - c. Black - CH2+
 - d. White (black) - CH2-
 - e. Blue - CH3+
 - f. White (blue) - CH3-
 - g. Brown - CH4+
 - h. White (brown) - CH4-

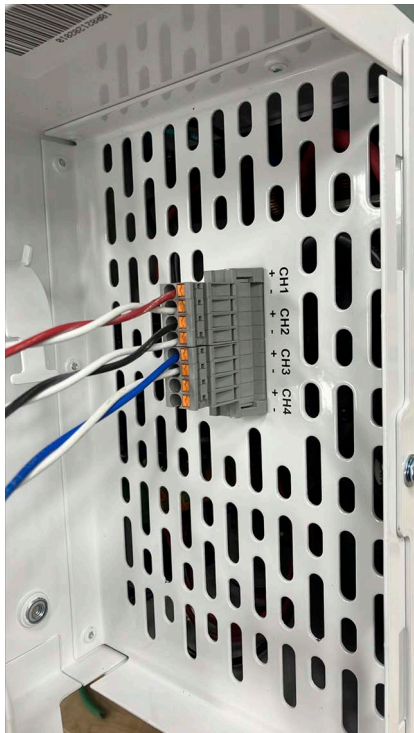
Note: If you have a two pair cable, terminate it as shown in the upper right photo. If you have a four pair cable and you are going to power it with 2, 3, or 4 cards on the transmit end, connect all four pairs to the enclosure (at the receive end). In that way, you can commit additional cards to the enclosure if necessary without having to manipulate the termination that is in the ceiling.



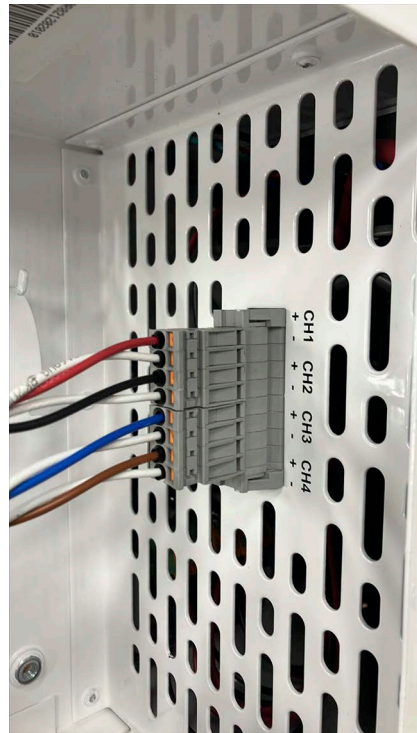
Empty Connector



Two-Pair Wiring



Three-Pair Wiring



Four-Pair Wiring

Figure 11. Two-, Three-, and Four-Pair Wiring

4.5 Setting Up Power Usage

The user interface of the powered backplane, shown in Figure 12, has six 110 VAC outlets, two 48 VDC terminal blocks, and two 24 VDC terminal blocks, intended for use in powering customer selected equipment such as mini switches, digital antenna systems, and information technology (IT) and operational technology (OT) equipment.

The backplane can supply 1 kW of power in total across all of its outlets. The user is responsible for budgeting the power over the available power outlet modes. For example, the customer would be able to draw 800 W from the 110 VAC outlets, 100 W from the 48 VDC outputs, and another 100 W from the 24 VDC output (summing to 1 kW).

The two 48 VDC terminal blocks are each rated to supply up to 980 W of power. For example, if no other power mode is in use, the customer can draw 500 W from each 48 VDC block, or 900 W from one and 100 W from the other.

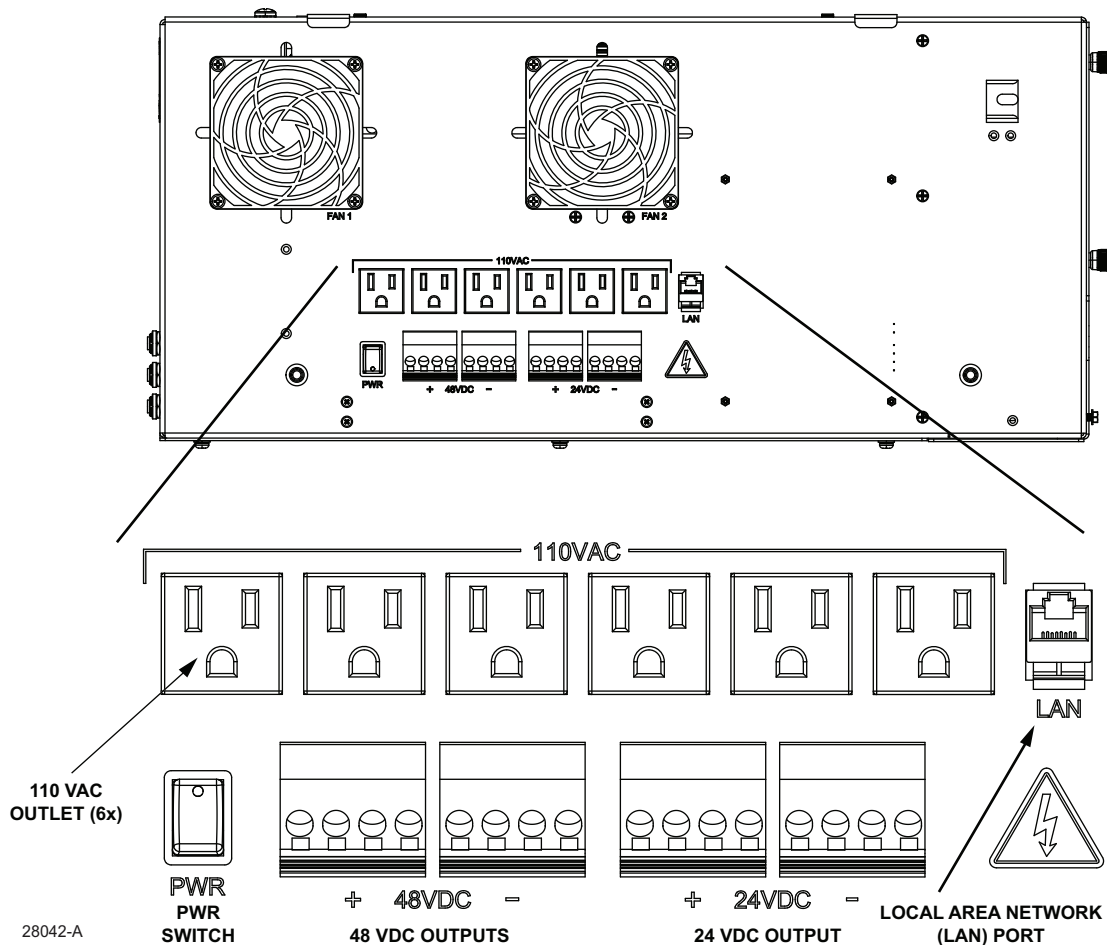


Figure 12. Powered Backplane Features

Figure 13 shows the 48 VDC and 24 VDC terminal blocks and how they divide into circuits each with positive and negative terminals. As indicated, there are two 48 volt circuits and one 24 volt circuit. Each 48 volt circuit uses four terminals. The single 24 volt circuit uses eight terminals.

Caution! The enclosure is equipped with a PWR switch. When the switch is engaged, the AC and DC outputs are live. To disable these outlets, toggle the PWR switch. Toggling the PWR switch does not affect the 12 VDC fans, which run continuously.

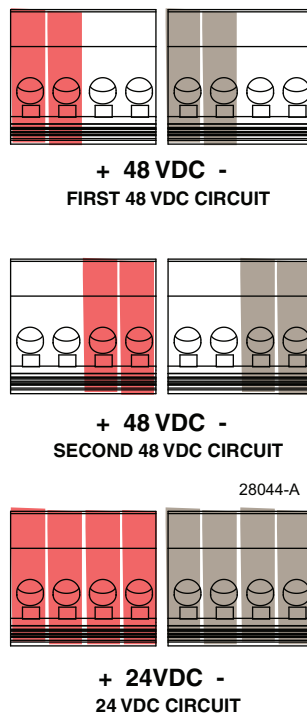


Figure 13. VDC Circuits

4.6 Installing Cassettes in the Enclosure

The enclosure has a bracket that holds one CommScope 8- or 16-fiber Propel connection component and up to two G2-series cassettes. [Figure 14](#) shows the cassette bracket fully loaded with two G2 modules (black objects on left) and one Propel connection component (blue object on right).



Figure 14. Cassette Bracket Loaded with Two G2 Modules and One Propel Connection Component

The usual purpose of these components is to convert from a high fiber count connector such as MPO to a lower fiber count connector such as LC. This is done because the fiber portion of the CommScope powered fiber input cable is usually terminated with MPOs, while the connector type required for the equipment mounted in the 19-inch frame structure within the enclosure is usually LC or SC.

Figure 15 shows a Propel module in hand and after being mounted.



Sample Propel Module



Mounting Propel Module

Figure 15. Propel Module

5 OPERATION

5.1 General

The CPCB-1 is designed to safely power information technology and operational technology equipment. The enclosure is equipped with sensors that monitor the temperature of the CPCE-1 and components in the CPCB-1. The CPCB-1 also has a local power-down switch so that equipment inside the enclosure can be powered down and removed or added without having to power down the whole enclosure (at the CPCX-12).

Note: Power up includes a short delay between when the incoming and outgoing power is established. This will be evident if the power to the enclosure is toggled off and on using the local power disable switch.

5.2 Power Health Status Windows

The CPCB-1 is equipped with two status windows, each with two LEDs, that can be used to visually assess the health of the enclosure.

One of the windows (closest to the corner of the CPCE-1) provides a visual assessment of the incoming power via two multicolor LEDs. On startup, the lights in the window will blink red while the CPCX-12 and CPCB-1 are assessing startup conditions. Once startup conditions are established, the lights blink green. After successful startup, the green blinking turns to a solid green color with a blue intermittent blink. Solid green and intermittent blue blink indicate a normal operating condition.

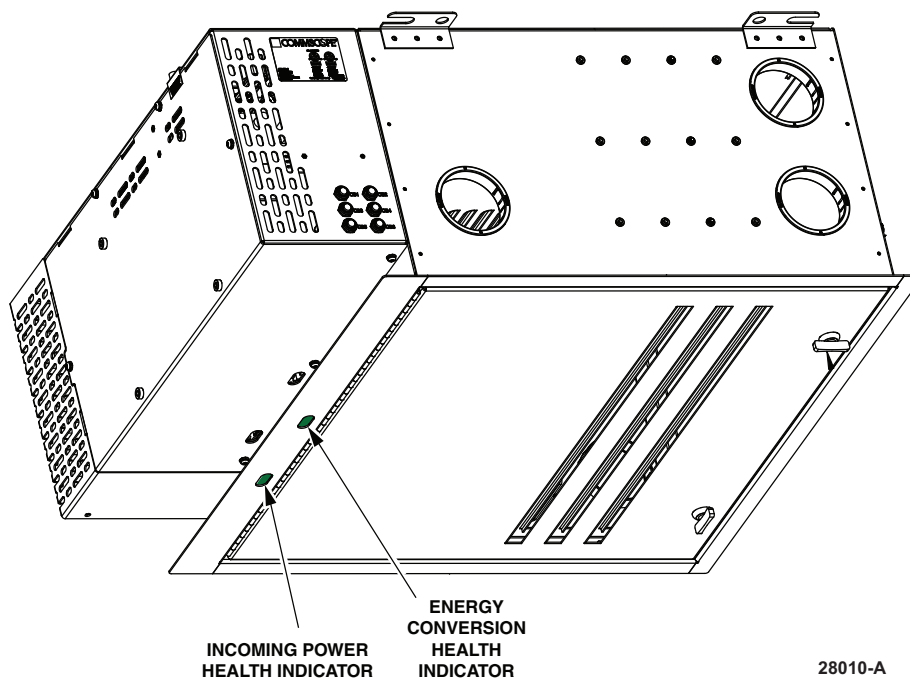


Figure 16. Location of Visual Indicators in CPCB-1

The second window, containing four LEDs, is located closer to the center of the enclosure bottom. It can be used to visually assess the health of the components responsible for converting the incoming power to a form for use in the CPCE-1. Figure 17 indicates the location of the two windows. During normal operating conditions, all four LEDs remain off.

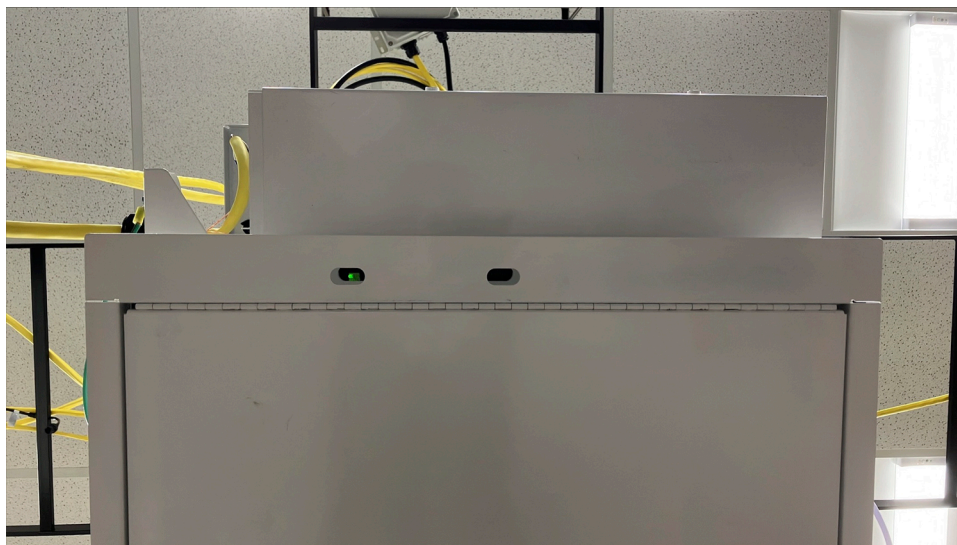


Figure 17. Power Health Status Windows

5.3 Temperature LEDs

The CPCE-1 is designed to operate in ambient conditions that do not exceed 33 °C. The cooling strategy of the enclosure is designed to limit temperature rise in the enclosure to 7 °C when there is up to 150 W of heat generated inside the enclosure.

The temperature sensors are setup to monitor the temperature of the air inside the enclosure and inside the powered backplane. If the air inside the enclosure exceeds 40 °C, an alarm will sound, a warning light will be turned on and power to the elements inside the enclosure disabled until the temperature in the enclosure drops below 37 °C.

Note: The fans that are used to vent the enclosure continue to operate when an elevated temperature event occurs.

There is also a temperature sensor in the powered backplane that will trigger an elevated temperature event when the temperature in the powered backplane exceeds 50 °C. The LEDs positioned above “INLET” and below “OUTLET” will glow when a temperature fault has occurred indicating that the temperature inside the CPCE-1 or in the CPCB-1 has exceeded its prescribed limit. Once this occurs, the internal power adaptations will be disabled and power into the CPCE-1 will be turned off. The fans responsible for cooling the CPCB/CPCE combination will continue to operate. Once the temperature has dropped beneath the established safe operating limit, the adaptations will be re-energized, power to the enclosure restored, and the corresponding LED will turn off.

There are LEDs positioned above “48V” and below “24V” as shown in [Figure 18](#). These provide a visual indication that the 48 VDC and 24 VDC adaptations are operating as intended. During normal operation, these LEDs are off.



Figure 18. 48 V and 24 V LEDs

5.4 Circuit Breakers

There are six circuit breakers included on the exterior of the CPCB-1. These are intended to limit over-current events. If the maximum recommended output current drawn from the 24 VDC or 48 VDC outlets is exceeded, the circuit breakers will trip effectively shutting down those power ports. The circuit breakers can be reset by pressing the button that has tripped back in. Customers should be aware that a tripped breaker represents an operating condition that exceeds recommended current draw and take steps to limit the current draw to less than the maximum. The maximum current draw from the 48 VDC output ports is 20 A. The maximum current draw from the 24 VDC output ports is 10 A.

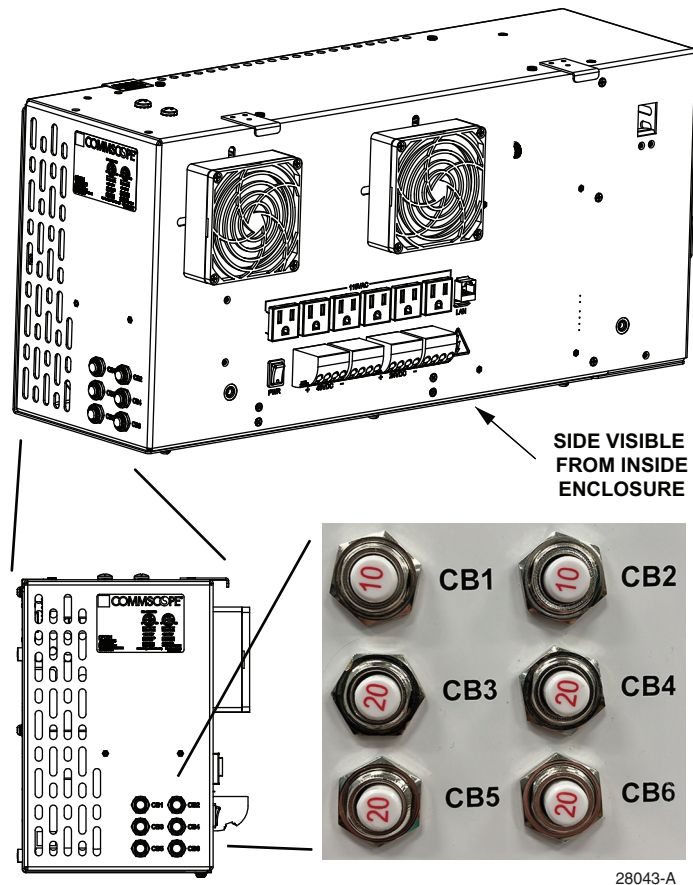


Figure 19. 48V and 24V LEDs

Table 7. Circuit Breakers

LABEL	AMPACITY	SIGNIFICANCE IF TRIPPED
CB1-2	10 AMP	Over-current condition in 24 VDC circuit
CB3-6	20 AMP	Over-current condition in 48 VDC circuit

5.5 Inrush Current

As with any circuit, there exists the possibility to activate the safety features of the CPCB-1 when connecting loads that draw a high startup or inrush current. Inrush currents greater than 10 Amps that are introduced when the system is already under load may activate the CPCB-1 over current protection circuit. During such an event, the 48V warning indicator will turn on. To restore the system to its normal operating state, de-energize the enclosure completely using the CPCX-12 management GUI, wait two minutes, and re-energize the enclosure using the same GUI.

5.6 Recommended Ground Bar

The Chatsworth Products Rack Bonding Busbar (PN: 10610-019) is recommended for customers who require a localized telecom ground.

6 CONTACT INFORMATION

- To find out more about CommScope® products, visit us on the web at www.commscope.com
- For technical assistance, customer service, or to report any missing/damaged parts, visit us at <http://www.commscope.com/SupportCenter>