Charles Universal Broadband Enclosure
CUBE-PM42712NN1
General Description and Installation

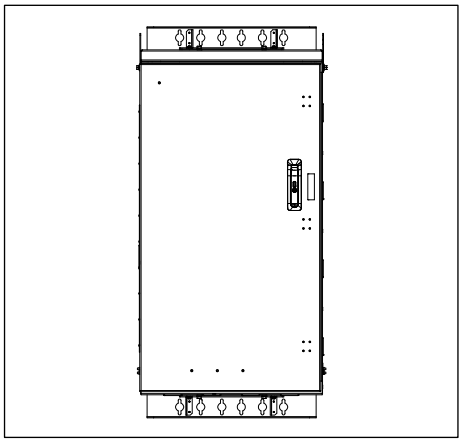

Figure 1 Front View of the CUBE

1. GENERAL INTRODUCTION

1.1. Document Purpose

This document provides general information for the CUBE-PM42712NN1 of the Charles Industries' Universal Broadband Enclosure (CUBE) product line. Figure 1 shows a closed front view of the enclosure.

-NOTE-
Hereafter, the Charles Universal Broadband Enclosure CUBE-PM42712NN1 will be referred to as the "CUBE."

1.2. Product Purpose

The CUBE consists of a protective enclosure for an integrated system of electronic components and equipment that can serve fiber and copper interfaces.

1.3. Product Mounting and Location

This enclosure is suitable for outside plant-type (OSP) locations and those that may require NEC compliance. The outdoor, weather-resistant CUBE is to be mounted on a wall or plinth (plinth kit sold separately). The installer connects the power, fiber, and copper connections. Detailed mounting and installation information is covered in Section 3.

2. PRODUCT DESCRIPTION

The CUBE consists of a single compartment with 27RU of 19” horizontal rack mount spacing.

Figure 2 shows the CUBE dimensions. Figure 3 shows the main components of the CUBE.

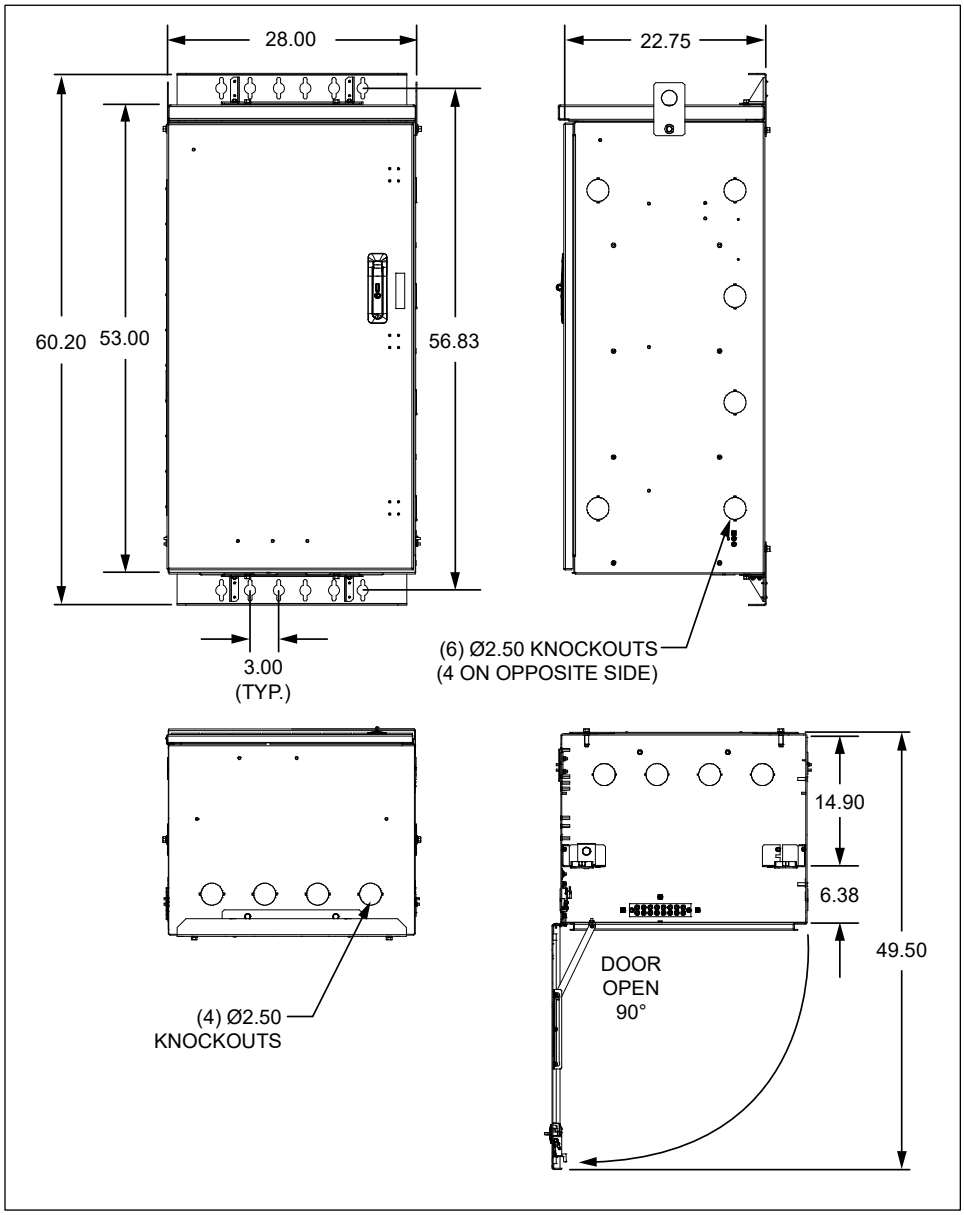

Figure 2 CUBE Dimensions (in inches)

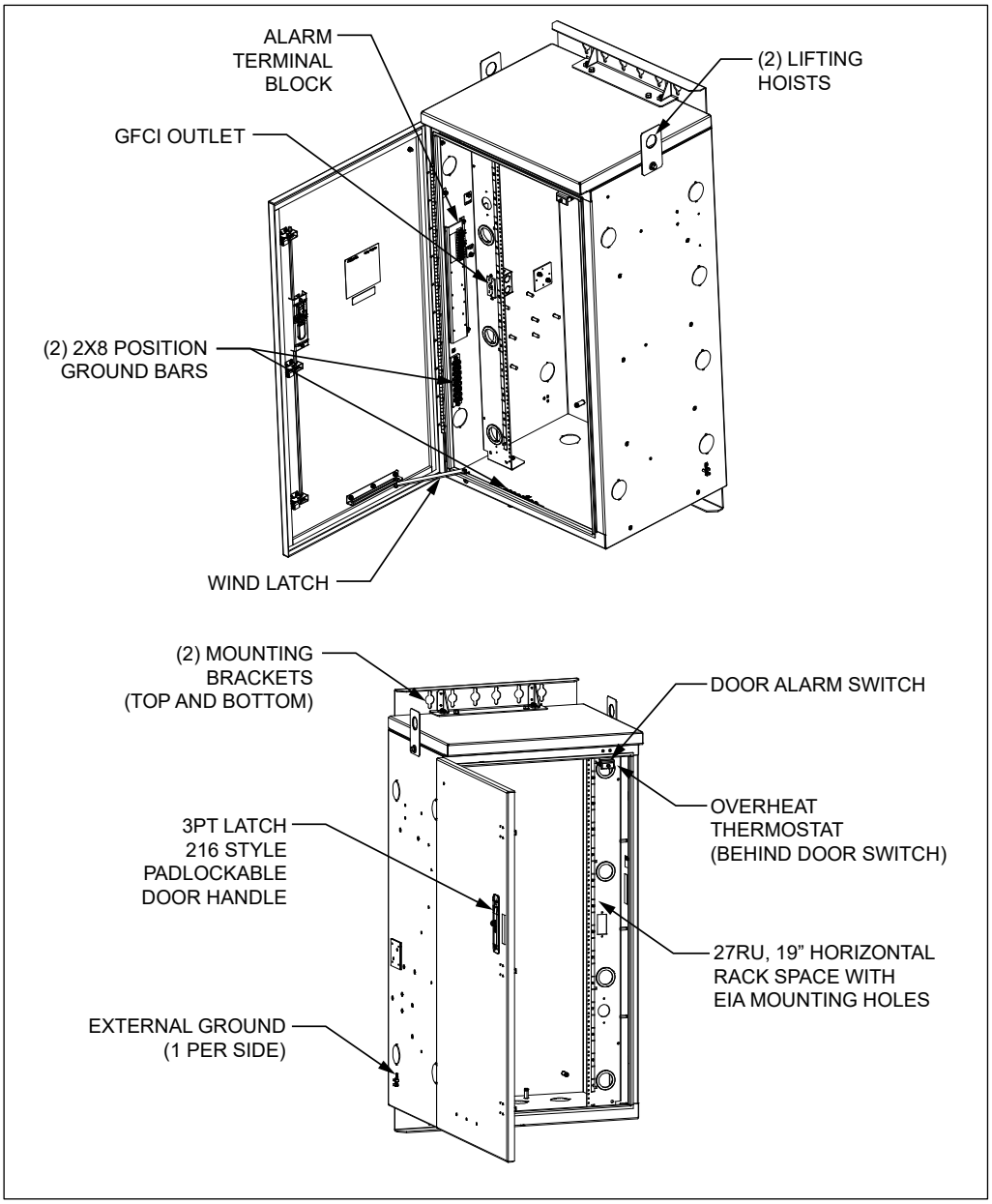

Figure 3 CUBE Components

3. INSTALLATION

3.1. Inspecting the Product

The CUBE is shipped on a skid. Remove the bolts, unpack the unit, and dispose of the packaging material.

-INSPECTION NOTE-

Visually inspect the unit for damages prior to installation. If the equipment was damaged in transit, immediately report the extent of the damage to the transportation company.

3.2. Following and Using Safety Precautions

Read the following site and safety tips, cautions, and warnings, then proceed with the paragraphs that follow.

- For installation, follow all National Electrical Codes (NEC) ANSI/NFPA 70, local, environmental, workplace, and company codes, safety procedures, and practices.
- Minimum spacing between the accessories and components and the housing for ITE equipment shall be maintained for safe operation of the equipment when installed in accordance with NEC ANSI/NFPA 70.
- Read all instructions, warnings and cautions on the equipment and in the documentation shipped with the product.
- Always connect ground connections first.
- Do not place this product on weak or unstable surfaces which may allow the product to fall, resulting in potentially serious damage(s) to persons or product.
- Only authorized trained personnel shall install the CUBE.
- In windy conditions, be sure to engage the door latches to secure the door in a stationary position.

3.3. Obtaining Tools and Equipment

Obtain the following recommended or needed items for installing the CUBE.

- Sufficient length and quantities of fiber cable (or pigtails)
- Cable scoring, opening, and cutting tools for cable sheathing, shields, wrappings, strength members and buffer tubes
- Wire strippers
- Crimpers
- Cable, tube, wire, and fiber cleaning materials
- Protective and/or insulated work gloves
- Safety glasses
- Tape measure
- Marking utensil
- #6 ground wire or rod and earth ground materials
- Bond strap (optional, from cable bond clamp to bond post)
- Any exterior cable strain relief, per company practice
- Slotted, hex, and Phillips screwdrivers
- Torque wrench
- Assorted cable ties, clips, or fasteners (optional)
- Can wrench (216 type tool)
- Derrick for lifting
- Level

3.4. Preparing the Installation Site

Observe the following site preparation recommendations.

- Leave adequate horizontal and vertical space between multiple installations to allow for proper cable access, as well as enough room around the enclosure to open the door(s).
- The site must meet minimal personnel and equipment safety requirements.
- The distance from the cable entry point should be consistent with local installation practices.
- The wall or pad must be able to support the weight of the CUBE.
- Run all fiber and copper facilities to the site.

3.5. Lifting the CUBE

See Table 1 for CUBE weight. Charles recommends the following procedure for lifting the CUBE.

3.5.1. Required Equipment

- One derrick (crane) capable of lifting the CUBE
- Spreader bar
- Two lifting slings or chains with each having a 2,500 lbs. capacity
- Connecting links to attach slings to the CUBE's lifting brackets
- 75-ft. long tagline rope

Insert the lifting sling connecting links securely through each of the lifting brackets as shown in Figure 4.

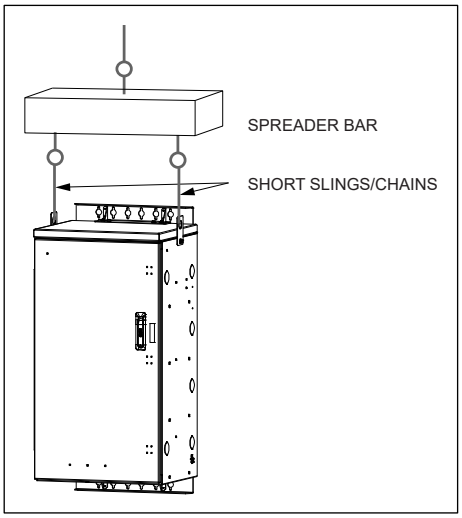

Figure 4 Lifting the CUBE

3.5.2. Warnings and Specific Safety Precautions

⚠	**WARNING**	**Improper hoisting equipment and unsafe lifting procedures can result in serious injury or death**

Observe the following local safety procedures when performing the tasks in this section.

- Keep the CUBE away from any power lines.
- Keep bystanders away from the work operations at all times.
- Only trained operators shall operate the crane for lifting and setting the CUBE.
- Do not suspend loads over people or equipment.
- All persons working with hoisting equipment shall wear standard safety gear according to local practices including safety helmets and steel-toed shoes.
- Do not operate the hoisting equipment until all stabilizers are extended and in firm contact with the ground or adequate support structure.
- Do not attempt to retract or extend the stabilizers while a load is suspended.

3.6. Mounting the CUBE

3.6.1. Torque Requirements

Torque all hardware as shown below (unless otherwise noted). These values apply to SAE Grade 1 & 2 Low Carbon Steel, ASTM A307 Low Carbon Steel, and Stainless Steel Grade 18-8.

Thread Size	In-lbs	Ft-lbs
4-40	4±10%	
6-32	8±10%	
8-32	16±10%	
10-32	26±10%	
12-24	50±10%	
1/4-20/M6	60±5%	5±5%
5/16-18	125±5%	10.4±5%
3/8-16	180±5%	15.0±5%
1/2-13	500±2%	41.7±2%
5/8-11	1000±1%	83.3±1%

3.6.2. Plinth Mounting

The CUBE can be mounted on a concrete pad using the 97-002244-A plinth mounting kit (sold separately). This kit includes a 24"H plinth, a gasket, and hardware for attaching the CUBE to the plinth. Hardware for mounting the plinth to a concrete pad is customer supplied. See the instructions that ship with the plinth for more information.

3.6.3. Wall Mounting

Charles recommends using a minimum SAE Grade 2, 3/8" diameter, corrosion-resistant, customer supplied bolts, washers, and nuts for wall mounting. Bolts need to be of sufficient length depending on the wall being used (minimum length 2"). If mounting on a wooden wall, Charles recommends that the wall is at least 3/4" thick plywood.

The CUBE ships with the mounting brackets facing toward the center. To re-orient the brackets for wall mounting, remove them and rotate them 180°, then re-attach them using the same hardware. Images in this document show the brackets in the correct position for wall mounting.

When mounting, allow 6" of space to the left of the CUBE so that the door can be fully opened, providing easy access to the equipment inside the CUBE.

1. Hold the CUBE in the desired mounting location and mark the top mounting hole locations on the wall. Set the CUBE aside.
2. Drill pilot holes at the marked locations to accommodate the mounting bolts or fasteners being used (hardware is customer supplied).
3. Partially install the bolts or wall fasteners, leaving approximately 5/8" of the bolt or fastener protruding from the wall.
4. Lift the CUBE, align the mounting holes in the top bracket with the protruding bolts/fasteners, and hang the CUBE.
5. Mark the bottom mounting hole locations and drill pilot holes.
6. Install bolts or wall fasteners, leaving approximately 5/8" of the bolt or fastener protruding from the wall.
7. When all hardware is correctly positioned, firmly tighten all bolts/fasteners in place.

3.7. CUBE Wiring and Equipment

After the CUBE is properly mounted in the desired location, apply No-Ox where bus bar and other 2-hole lug connections will be made. Install ground and power connections. Always ground the equipment first, before making any other connections.

⚠	**WARNING**	**Perform all bonding and grounding connections prior to any electrical and communications connections.**

In order to prevent condensation prior to being placed in service, do not remove the desiccant until the CUBE is sealed and power is applied. A basic electrical diagram is shown in Figure 5.

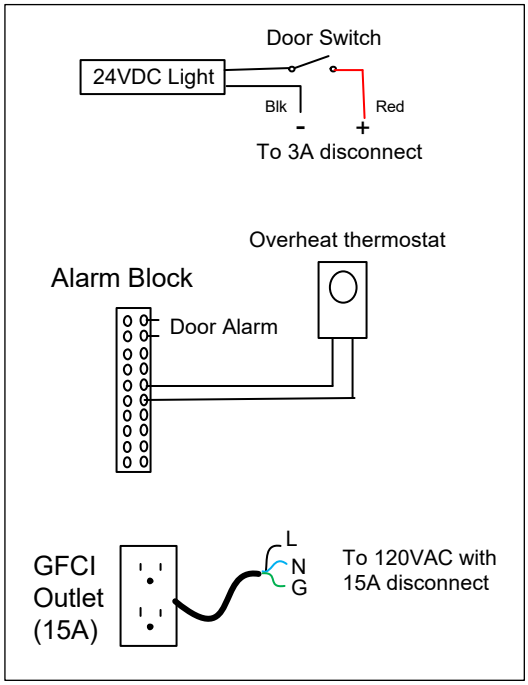

Figure 5 Electrical Diagram

3.7.1. Ground Connection

Use the two 2x8 position ground bars provided in the equipment compartment for all grounding of internal equipment. Stack hardware as shown in Figure 6. External ground lugs are available on the sides of the battery compartment for connecting a site ground wire.

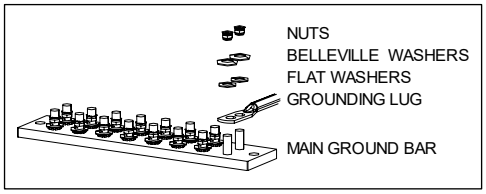

Figure 6
Ground Bar Hardware Stack

3.7.2. Overheat Thermostat

The CUBE is equipped with an overheat (high temperature) alarm thermostat in the equipment compartment that provides a normally closed connection. The overheat alarm is factory set at 60°C and opens the connection if this temperature is exceeded.

-NOTE-
Changing the overheat (high-temp) thermostat default factory set points can lead to unnecessary alarms or system performance issues, such as equipment failures as a result of unreported alarms.

3.7.3. Alarm Block Connections

A 10-position, labeled alarm block monitors components in the equipment compartment. See the electrical diagram for information about alarm connections. All alarm connections are normally closed and will open upon alarm.

3.7.4. Fiber and Copper Entry

The CUBE has multiple Ø2.50” knockouts on the sides and the bottom that accommodate Ø2.00” conduit fittings. See Figure 2 for knockout locations.

3.8. Conduit Seals

All internal and external conduit openings on the CUBE must be completely sealed with a duct seal compound to prevent moisture from entering the equipment compartment. Use a moldable, flame-retardant putty style duct seal material. Do not use an expanding foam seal. Mold the putty so that the open space around the wire or conduit is completely sealed, as shown in Figure 7. If the openings must be accessed at any time, remove the putty and set it aside. When work is complete, re-mold the putty to re-seal the opening.

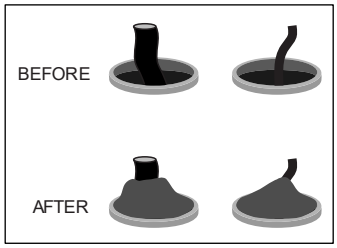

Figure 7 Applying Putty Seal

3.9. Verifying the Installation

Verify that earth ground and all grounding and bonding is complete and functional. After verifying that all installer connections are secure and complete, apply voltage.

4. PERIODIC MAINTENANCE

In the event that the enclosure needs to be opened in freezing conditions, a narrow, pointed metallic object such as a screwdriver or chisel, along with a non-metallic device like a rubber mallet, may be used to remove excessive ice buildup around the door and locking mechanism. A commercial aerosol de-icer spray can be used to free up locks and latches if needed.

Reset the GFCI duplex receptacle periodically to ensure it is working. The unit meets UL-943, which requires an auto-monitoring (self-testing) feature. A flashing or solid red LED indicates a fault. If the unit continues to show a fault after resetting, replace the unit.

5. TECHNICAL ASSISTANCE AND REPAIR SERVICE

For questions on product repair or if technical assistance is required, contact Charles Technical Support.

847-806-8500
techserv@charlesindustries.com (email)
http://www.charlesindustries.com/techserv.htm

6. WARRANTY & CUSTOMER SERVICE

Charles Industries LLC offers a one-year warranty on the CUBE product. The Charles warranty is limited to the operation of the CUBE hardware as described in this documentation and does not cover equipment that may be integrated by a third party. The terms and conditions applicable to any specific sale of product shall be defined in the resulting sales contract. For questions on warranty or other customer service assistance, contact your Charles Customer Service Representative.

847-806-6300
mktserv@charlesindustries.com (email)
http://www.charlesindustries.com/main/telecom_sales_support.htm

7. SPECIFICATIONS

7.1. Regulatory Specifications

- Designed to meet GR-487
- UL-2416 Listed
- GFCI: UL-943 Listed

If CUBEs are field-modified, a customer provided ETL field evaluation of the modified components may be required to re-establish ETL certification to UL standards. Consult local jurisdictions for guidance on a site-by-site basis.

7.2. Product Specifications

Physical	
Dimensions	53”Hx28”Wx23”D
Weight	Approx. 143 lbs. as shipped
19” Equipment Rack Space and Hole Spacing	47.25” (31RU) rack spacing with tapped EIA #12-24 mounting holes
Maximum Supported Weight	Rack Rails: 297 lbs.
Materials	0.125 aluminum
Color	Off-white
Electrical	
Bonding and Grounding	One 2x8 position ground bar inside CUBE
Cable Entry	See Figure 2 or section 3.7.4
Environmental	
Operating Temp. Range, Outside Enclosure	-40° to +115°F, -40° to 46°C
Operating Temp Range, Inside Enclosure	-40° to +149°F, -40° to 65°C
Humidity	0 to 95% (non-condensing)
Altitude	Up to 2,000 meters (6560 feet)
Kits and Replacement Parts	
Touch-up Paint	02-000290-0
216 Type Security Tool	07-002070-0
Plinth Mounting Kit	97-002244-A
Lift-Up Handle	39-000335-0
Door Rod Latch	39-000336-0
4-Wire Door Alarm Switch	17-400329-0
15A GFCI Outlet	04-100207-0
Overheat Thermostat	99-004548-0

Table 1 CUBE Specifications