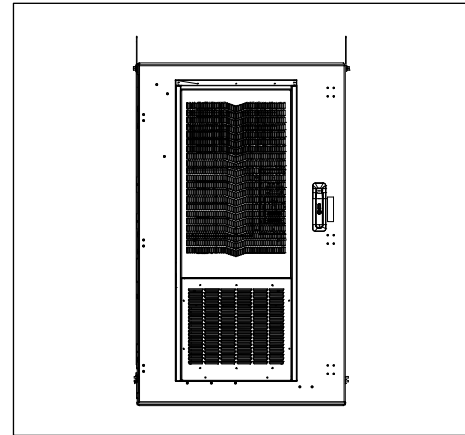


# Charles Universal Broadband Enclosure

## CUBE-PM60012LN3

### General Description and Installation

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**Figure 1 Front View of the CUBE**

## 1. GENERAL INTRODUCTION

### 1.1. Document Purpose

This document provides general information for the CUBE-PM60012LN3 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-PM60012LN3 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 concrete pad. The installer connects the power, fiber, and copper connections. Detailed mounting and installation information is covered in Section 3.

## 2. PRODUCT DESCRIPTION

The CUBE is a single compartment with front and rear doors and a 12000BTU AC powered HVAC system. The CUBE is designed to fully house an existing customer supplied equipment bay without any disassembly. The plinth inside the CUBE helps to mount the equipment bay.

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

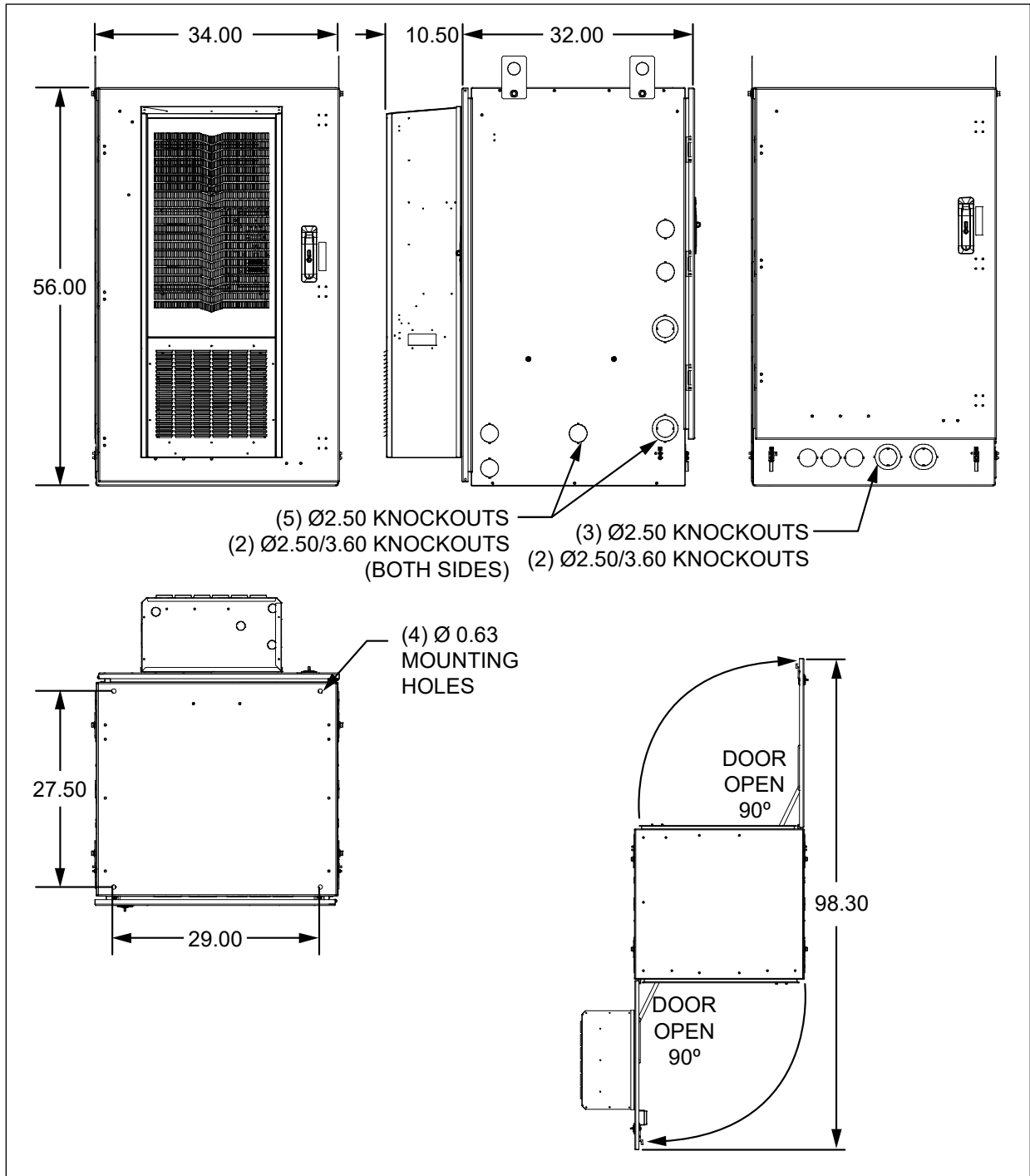
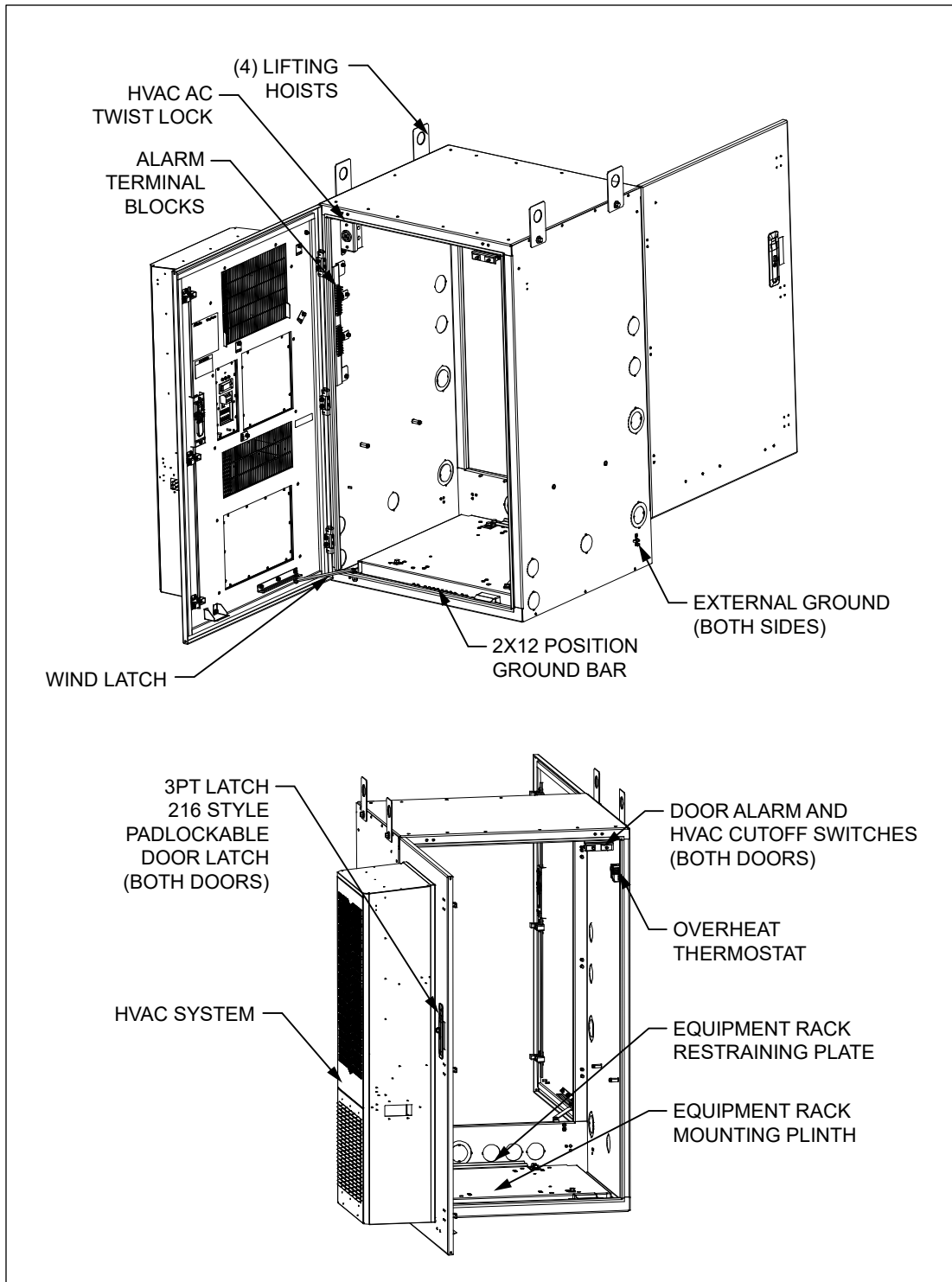


Figure 2 CUBE Dimensions (in inches)



**Figure 3 CUBE Components**

### 3. INSTALLATION

#### 3.1. Inspecting the Product

The CUBE is shipped mounted upright 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 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 bars
- Four 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.

#### 3.5.2. Warnings and Specific Safety Precautions

	<b>WARNING</b>	<b>Improper hoisting equipment and unsafe lifting procedures can result in serious injury or death</b>
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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.

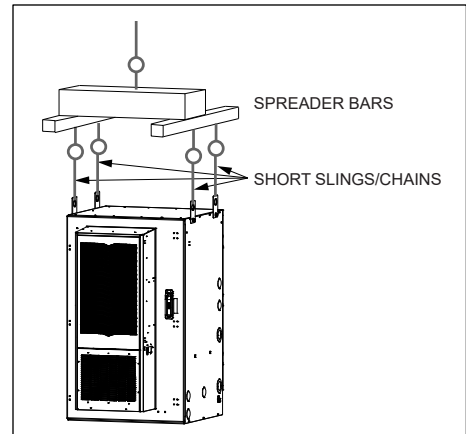


Figure 4 Lifting the CUBE

### 3.6. Mounting the CUBE

The CUBE can be mounted on a new or existing concrete pad. A loose gasket is provided for placing the CUBE on a concrete pad. If the gasket becomes damaged during installation, order a replacement under part number 39-000495-0. Ensure that the unit is level.

#### 3.6.1. Torque Requirements

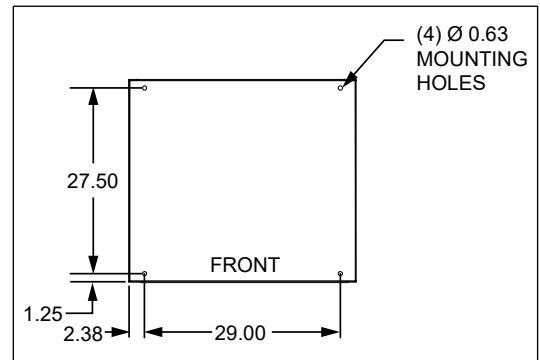
Torque all hardware as shown below (unless otherwise noted). These values apply to SAE Grade 1 & 2 Low Carbon Steel, ASTM A307 Low Carbon Steel, and Stainless Steel Grade 18-8.

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. Constructing a New Pad**

- Use only concrete for new pad construction. Do not use substitute materials since they lack the rigidity for CUBE placement.
- Observe local building practices for pad construction. Charles recommends that the pad should extend a minimum of 8” beyond the CUBE base on all sides.
- Use a minimum of 6” of sand or gravel as a base for the pad for leveling purposes.
- Figure 5 shows the required conduit openings and mounting hole dimensions for entering/mounting the bottom of the CUBE. Use these dimensions when designing the pad.

	<b>WARNING</b>	<p><b>When pad mounting, the compression strength of the pad must be at least 4000 psi as determined by ASTM C39 test of compression strength of concrete cylinders.</b></p> <p><b>The slump of the concrete shall be 2” to 4” as determined by ASTM C143 test method.</b></p>
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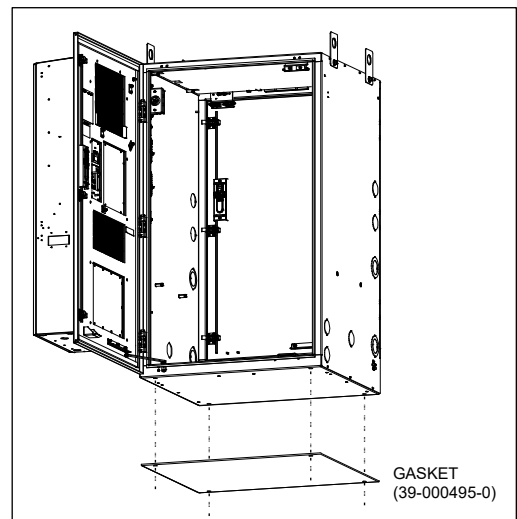


**Figure 5**  
Mounting Hole Dimensions (in inches), Top View

**3.6.3. Mounting the CUBE on a Pad**

Four customer supplied, corrosion resistant, 1/2”-13 hex head bolts with anchors are required for mounting the CUBE to the concrete pad. Use the following steps to mount the CUBE to a pad.

1. Layout, drill, and set the 1/2” anchors per manufacturer’s recommendations. The embedment depth is not to exceed 3.5”. Use the gasket as a mounting hole location template.
2. Clean any debris from the concrete pad.
3. Install the gasket by positioning it on the pad so that it is underneath the bottom of the CUBE when the cabinet is installed. Line up the gasket so that the cutouts are in proper position around the conduit opening and the bolt holes as shown in Figure 6.
4. Open the cabinet door to allow access to mounting holes.
5. Ensure that the CUBE is parallel to the pad surface as it is placed onto the pad and that it aligns with the holes in the pad and the gasket. Dress the cable/conduit so that it aligns with the CUBE openings as it is lowered onto the pad.
6. Place the CUBE on the pad. Loosen the slings so that all the weight is on the pad. Check that the CUBE is properly aligned.
7. Secure the CUBE to the pad using the 1/2”-13 hex head bolts. Tighten all bolts securely.
8. Once the CUBE is secured, remove the slings and tagline. Close the door.



**Figure 6**      **Gasket Installation**

### 3.8. 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.

	<b>WARNING</b>	<b>Perform all bonding and grounding connections prior to any electrical and communications connections.</b>
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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 7.

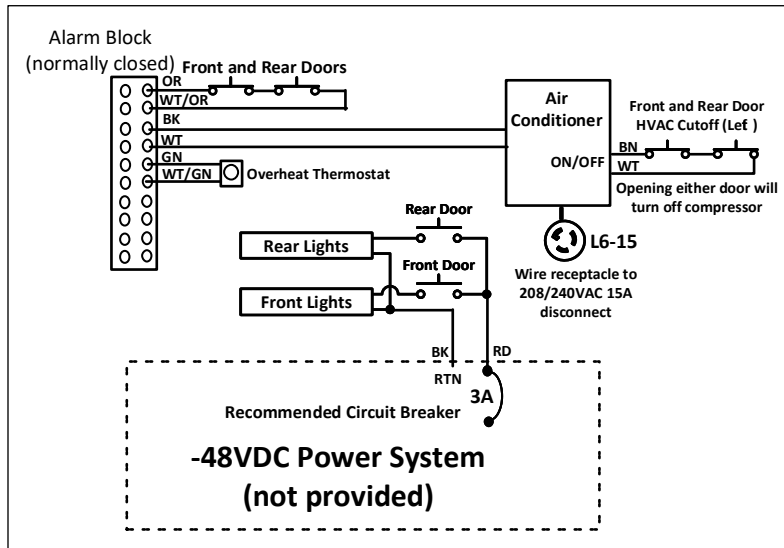


Figure 7 Electrical Diagram

#### 3.8.1. Ground Connection

Use the 2x8 position ground bar provided in the equipment compartment for all grounding of internal equipment. Stack hardware as shown in Figure 8. External ground lugs are available on the sides compartment for connecting a site ground wire.

#### 3.8.2. HVAC Operation

The 12000BTU AC powered HVAC compressor and fans are PID (proportional integral derivative) controlled. The compressor turns on at 33°C at low speed and will increase speed as needed to maintain that temperature. The compressor turns off at 28°C. The internal fan is always on at low speed to continually circulate heat within the cabinet. The heating cycle turns on at 8°C and off at 13°C. The CUBE is equipped with a cutoff switch that shuts off the HVAC compressor when a door is opened to minimize condensation buildup on the coils. For further information, refer to the HVAC documentation that ships with the CUBE.

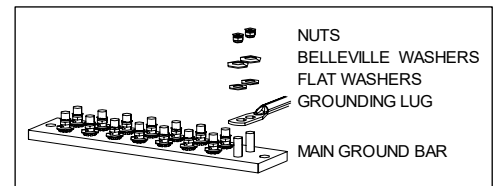


Figure 8 Ground Bar Hardware Stack

-NOTE-

*Changing the cooling or heating cycles' default factory set points can lead to system performance issues, such as equipment failures, increased power use, unnecessary alarms, noise, condensation build up, compressor or fan failure caused by excessive runtimes and vibration.*

*Avoid placing items in front of the HVAC's return and supply vents. Maintain a minimum of 6" clearance to enable proper air flow.*

#### 3.8.3. 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 50°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.*

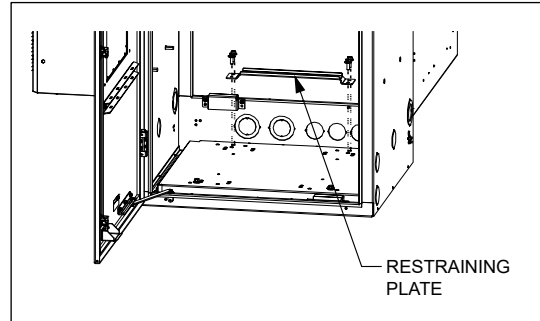
**3.8.4. Alarm Block Connections**

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

**3.8.5. Equipment Bay Restraining Plate**

The CUBE can accommodate two sizes of customer supplied equipment bays. The CUBE includes a restraining plate attached to the mounting plinth in the bottom. This plate allows the smaller equipment bay to fit properly inside. If placing the larger bay inside the CUBE, this restraining plate must be removed (Figure 9). See Charles MOP-18007 for more information.

Note: The smaller equipment bay must be bolted to the plinth at the two front mounting hole positions only. The larger equipment bay must be bolted to the plinth at four mounting hole positions (2 front, 2 rear).



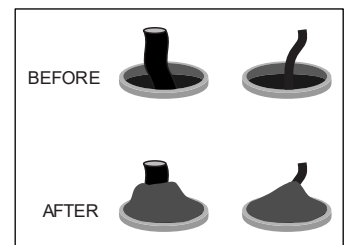
**Figure 9 Remove Restraining Plate**

**3.8.6. Fiber and Copper Entry**

The CUBE has multiple knockouts on the sides and rear for cable entry. The Ø2.50” knockouts accommodate Ø2.00” conduit fittings, and the Ø2.50/3.60” knockouts accommodate Ø2.00/3.00” conduit fittings. See Figure 2 for knockout locations.

**3.9. 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 10. 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 10 Applying Putty Seal**

**3.10. 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.

Refer to the HVAC manual supplied with the HVAC for periodic maintenance requirements.

**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](mailto: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 which 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](mailto:mktserv@charlesindustries.com) (email)  
[http://www.charlesindustries.com/main/telecom\\_sales\\_support.htm](http://www.charlesindustries.com/main/telecom_sales_support.htm)



## 7. SPECIFICATIONS

### 7.1. Regulatory Specifications

- Designed to meet GR-487
- 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

<b>Physical</b>	
Dimensions	56"Hx34"Wx32"D
Weight	Approx. 190 lbs. as shipped
Materials	0.125" aluminum
Color	Off-white
<b>Electrical</b>	
Bonding and Grounding	2x12 position ground bar inside, 2 external grounds
Cable Entry	Multiple knockouts on sides and rear, see Figure 2 or Section 3.8.6
<b>Thermal</b>	
HVAC System	230VAC, Vikinor VAK-3000-AC
Cooling Capacity	12000 BTU
<b>Environmental</b>	
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)
<b>Kits and Replacement Parts</b>	
Touch-up Paint	02-000290-0
216 Type Security Tool	07-002070-0
Replacement Gasket	39-000495-0
Shim Kit for Leveling	97-000010-0
Lift-Up Handle	39-000335-0
Door Rod Latch	39-000336-0
4-Wire Door Alarm Switch	17-400329-0
HVAC Cutoff Switch	17-400322-0
AC Twist Lock	15A/250V, 04-100247-0
Overheat Thermostat	99-004548-0

**Table 1 CUBE Specifications**