

Charles Universal Broadband Enclosure Site Support Family CUBE-SSxx228xxx General Description and Installation

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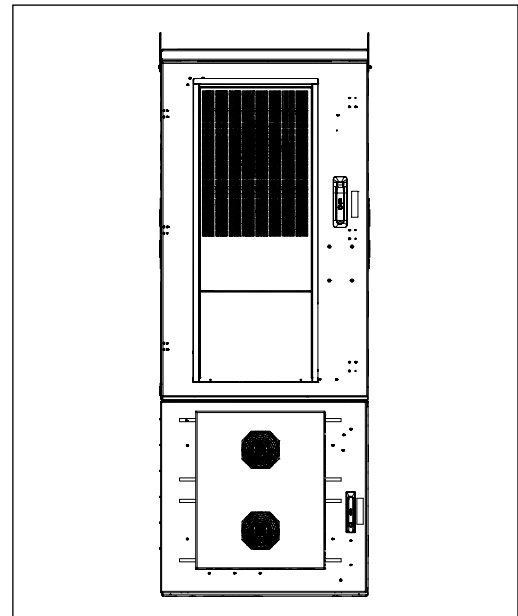


Figure 1 Front View of the CUBE-SS4B228LX1

1. GENERAL INTRODUCTION

1.1 Document Purpose

This document provides general information for the CUBE-SSxx228xxx family of the Charles Industries’ Universal Broadband Enclosure (CUBE) product line. Supplemental documentation that ships with the CUBE contains more detailed information about the models. Figure 1 shows a closed front view of the CUBE-SS4B228LX1 enclosure.

-NOTE-

Hereafter, the CUBE-SSxx228xxx Charles Universal Broadband Enclosure 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 pad or platform. The installer connects the power, fiber and copper connections. Detailed mounting and installation information is covered in Section 3. Charles recommends the CPAD composite pad for pad mounting applications.

2. PRODUCT DESCRIPTION

The series is available in two sizes. All models include a battery compartment and an equipment compartment with thermal devices on each. The differences in the models are summarized in Table 2.

CUBE-SS4B228xxx: The equipment compartment has 16RU of 19" horizontal rack mount spacing, 13RU of 23" horizontal rack mount spacing, and 6RU of 19" vertical rack mount spacing. The battery compartment supports two strings of -48VDC customer supplied VRLA or NiCd batteries.

CUBE-SS4C228xxx: The equipment compartment has 8RU of 23" horizontal rack mount spacing, 21RU of 19" horizontal rack mount spacing, and 7RU of 19" vertical rack mount spacing. The battery compartment supports three strings of 48VDC customer supplied VRLA batteries.

Figures 2 and 3 show dimensional views of each size. With the exception of the external thermal system, these dimensions are common to the other models of that size. Figure 4 shows the added dimensions of the thermal units. The supplemental documentation that ships with the CUBE includes a diagram of the CUBE components.

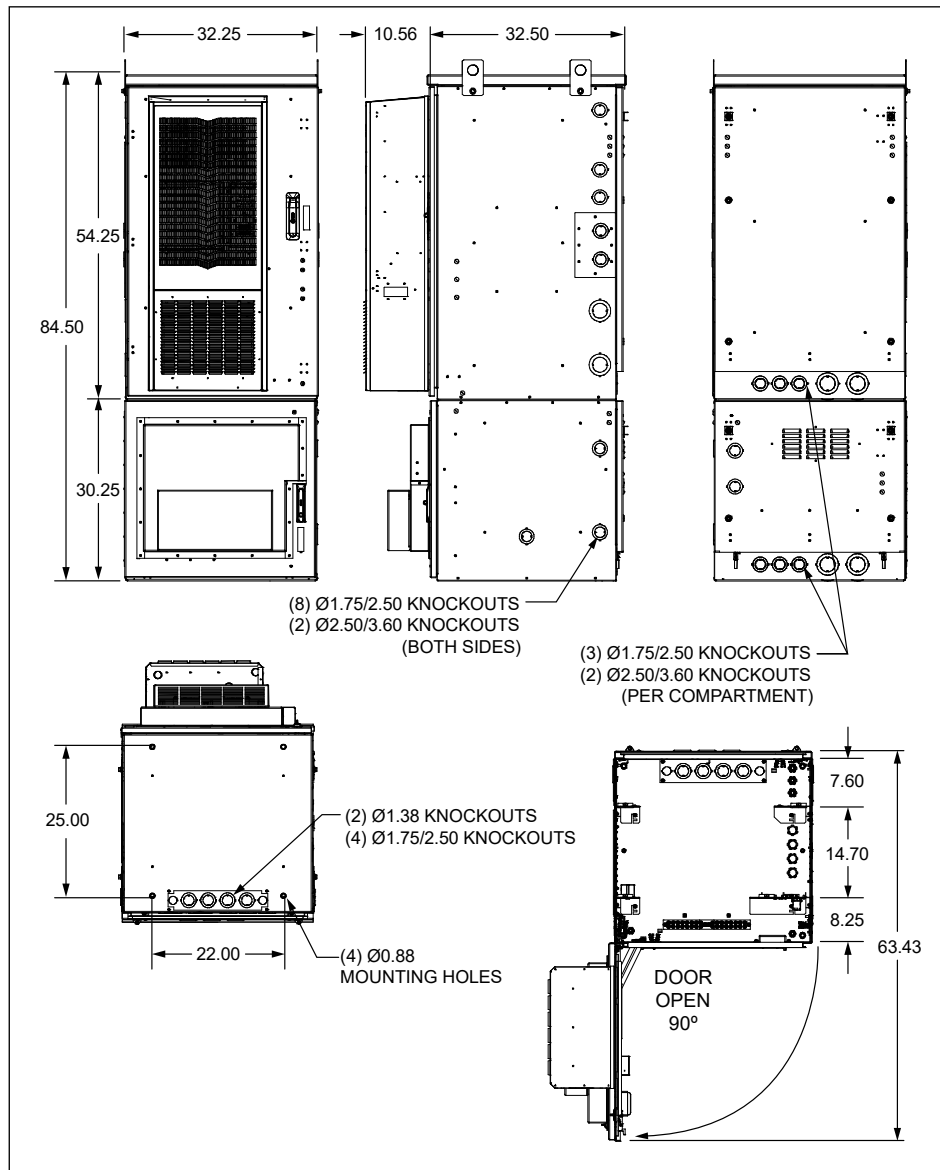


Figure 2 CUBE-SS4B228xxx Dimensions (in inches)

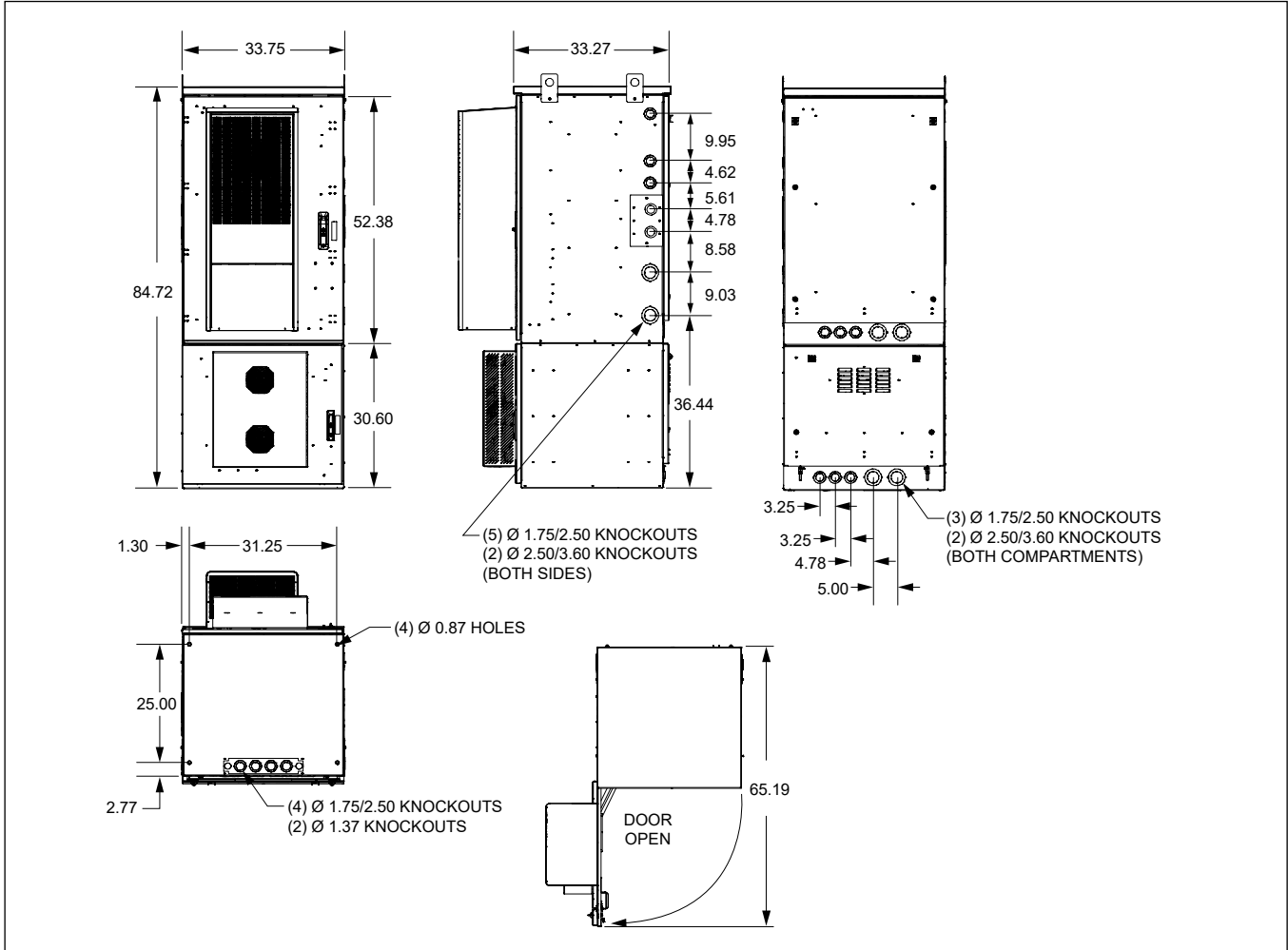


Figure 3 CUBE-SS4C228xxx Dimensions (in inches)
Note: In select models, the knockouts on the sides and bottom may be Ø2.50" only.

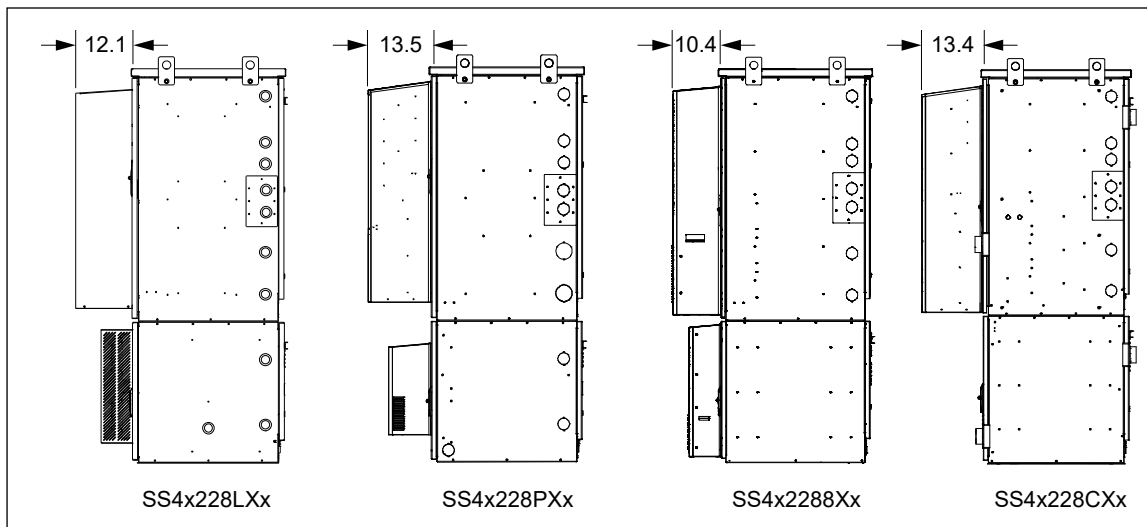


Figure 4 CUBE Dimensions (in inches) of Thermal Units

3. INSTALLATION

3.1 Inspecting the Product

The CUBE is shipped mounted to a skid. Remove the bolts, unpack the unit, remove 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, National Electrical Safety Codes (NEC), OSHA requirements, 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 latch(es) 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.

- Wire strippers
- Crimpers
- Cable, tube, wire, and fiber cleaning materials
- Protective and/or insulated work gloves
- Safety glasses
- Tape measure and 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)
- 7/16" wrench
- Derrick (crane) 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 to open the doors.
- 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 or platform must be able to support the weight of the CUBE.

3.5 Lifting the CUBE

See the supplemental documentation for CUBE weight.

	WARNING	Prior to lifting, remove the lifting brackets that hold the mounting gasket in place. Set aside the gasket, and then replace the brackets. Failure to do so can result in a failure of the lifting bracket assembly.
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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.

Insert the lifting cable sling connecting links securely through each of the lifting brackets as shown in Figure 5.

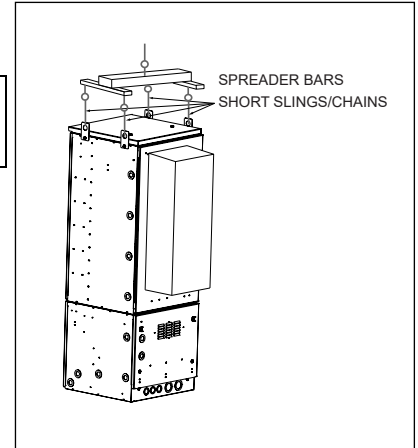


Figure 5 Lifting the CUBE

3.5.2 Warnings and Safety Precautions

	WARNING	Improper hoisting equipment and unsafe lifting procedures can result in serious injury or death. Because of the added risk of injury or damage, do not lift enclosures with batteries installed.
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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 crane equipment shall wear standard safety gear according to local practices including safety helmets and steel-toed shoes.
- Do not operate the crane 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

The CUBE can be mounted on a new or existing precast concrete pad or steel grate platform. The CUBE-SS4B228xxx models can be mounted on the optional plinth kit 97-002162-A or on the CPAD-MM1EXX single bay composite pad with the optional CPAD-MM1EXXEXT extension.

A gasket is provided for placing the CUBE on a concrete pad. If the gasket becomes damaged during installation, order a replacement under part number 39-000980-0 (for the SS4B228xxx models) or 39-000985-0 (for the SS4C228xxx models). The gasket is not needed if mounting on a CPAD. Note that in select models, the gasket is shipped fastened to the bottom of the CUBE.

3.6.1 Torque Requirements

Torque all hardware as shown below (unless otherwise noted). These values are appropriate for 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 the pad. Do not use substitute materials since they lack the rigidity for CUBE placement.
- Charles recommends using six 1/2" anchor bolts for mounting to the pad. The embedment depth of the anchor is not to exceed 3.5".
- 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.
- Figures 6 and 7 show the required conduit openings and mounting hole dimensions for entering/mounting the bottom of the CUBE. Use these dimensions when designing the pad.

	WARNING	<p>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.</p> <p>The slump of the concrete shall be 2" to 4" as determined by ASTM C143 test method.</p>
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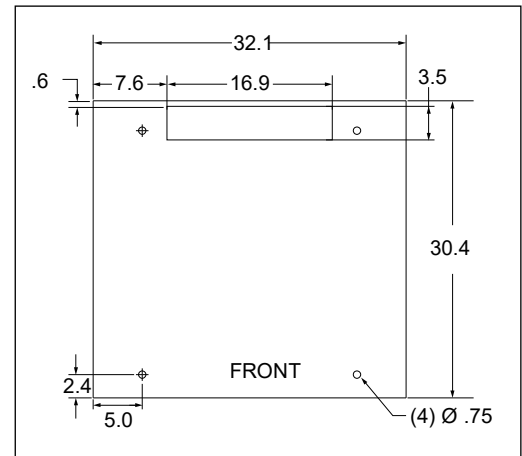


Figure 6 Mounting Dimensions (in inches) For SS4Bxxx Models

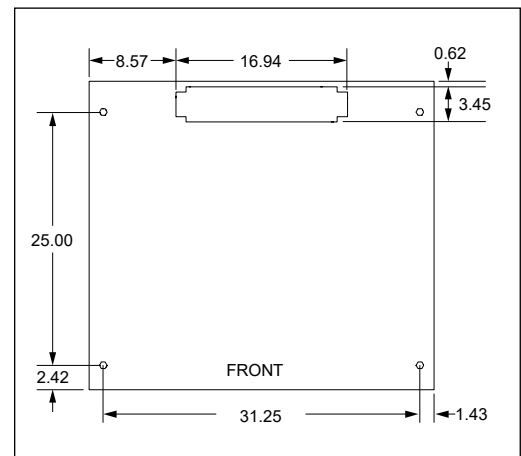


Figure 7 Mounting Dimensions (in inches) For SS4Cxxx Models

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. If the gasket is not fastened to the bottom of the CUBE, then 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 8.
4. For cabinets in which the cable conduit is entering from the bottom of the enclosure, dress the cable conduit so that it aligns with the opening in the base as it is lowered onto the pad or platform.
5. Open the battery compartment to allow access to mounting holes.
6. 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.
7. 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.
8. Secure the CUBE to the pad using the 1/2"-13 hex head bolts. Tighten all bolts securely.
9. To secure the CUBE to a steel grate platform, install 1/2" corrosion-resistant Grade 5 steel hardware through the cabinet and platform grate. Ensure that the bolts are long enough to extend past the nut on the bottom side of the platform grate. For all mounting applications, each bolted joint should have a minimum Ø1 inch fender washer on the inside of the cabinet (and underside of the platform grate for platform mounting) with a lock washer. The washer on the underside of the platform must be large enough to cover both adjacent bearing bars as shown in Figure 9.
10. Once the CUBE is secured, remove the slings and tagline. Close the doors.

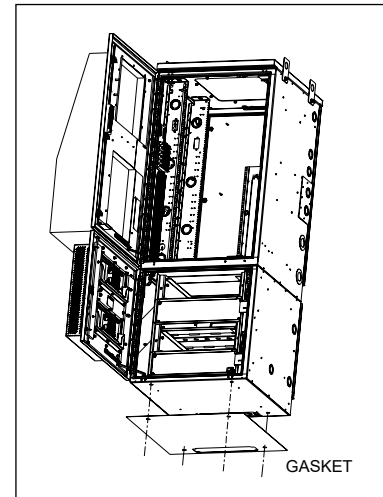


Figure 8 Gasket Installation

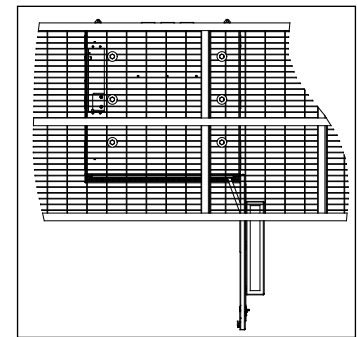


Figure 9 Installing on a Platform

3.6.4 Mounting the CUBE on a CPAD

CUBE-SS4B228xxx Only.

First, follow the instructions that ship with the CPAD to ensure that the CPAD is securely installed in the ground. Then proceed to mount the CUBE on the CPAD. Four customer supplied, corrosion resistant, 1/2"-13, 2" long fully threaded hex head bolts with flat and lock washers are required for mounting the CUBE to the CPAD. Use the following steps to mount the CUBE to a CPAD.

1. Clean any debris from the CPAD.
2. Open the battery compartment to allow access to mounting holes.
3. Ensure that the CUBE is parallel to the CPAD surface as it is placed onto the CPAD and that it aligns with the holes in the CPAD. Dress the cable/conduit so that it aligns with the CUBE openings as it is lowered onto the CPAD.
4. Place the CUBE on the CPAD. Loosen the slings so that all the weight is on the CPAD. Check that the CUBE is properly aligned.
5. Secure the CUBE to the CPAD using the 1/2"-13 hardware. Tighten all bolts securely.
6. Once the CUBE is secured, remove the slings and tagline. Close the doors.

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.
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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. Refer to supplemental documents for electrical diagrams for each CUBE.

3.7.1 Ground Connections

Use the two 2x8 position ground bars provided in the equipment compartment for grounding all internal equipment. Stack hardware as shown in Figure 10. Use the two threaded studs available on the rear toward the bottom of the cabinet for connecting double-lug site ground wires.

3.7.2 Battery Connections

	WARNING	Always turn off battery breakers prior to servicing batteries. If using VRLA batteries, ensure that the power system is set up for VRLA batteries with temperature compensation enabled.
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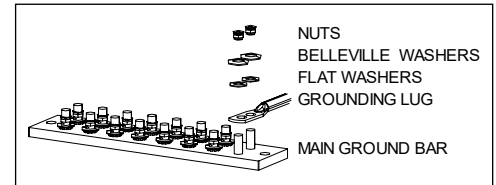


Figure 10
Ground Bar Hardware Stack

Verify the polarity of the cables prior to terminating them to the batteries. Ensure the battery terminations are properly insulated to avoid shorting prior to terminating to the batteries.

1. Switch off the battery breakers.
2. Remove the battery retainer bracket by removing the hardware.
3. If replacing batteries, disconnect battery cables from terminals and loosen the battery retaining strap(s).
4. VRLA Only: Remove the battery temperature probe.
5. Remove the interconnecting straps from the batteries. Remove batteries.
6. Carefully position the new batteries on the battery tray. Connect the interconnecting straps to each battery string.
7. VRLA Only: Replace battery temperature probe to the closest battery.
8. Connect the battery cables to the appropriate terminals.
9. Secure the battery retaining straps and reinstall the battery retainer brackets using hardware from step 2.
10. Secure the battery cables to the front of the retainer bracket.
 - Use lacing cord or cable ties suitable for 4/0 cable, 0.800 O.D.
 - Ensure that the bending radius is at least 5x the cable diameter (e.g. 4/0 battery cable = 4 inch bend radius).
 - Use as few bends as possible between the two termination points.
 - Do not bend the cable at the termination points.
 - Isolate the lug and insulation by at least 1/4" from all metal surfaces.
11. Reconnect the Anderson connector(s) or switch on the battery breaker.

Notes:

- Batteries are terminated at the power shelf.
- NiCD Only: NiCd batteries require nickel plated lugs. Charles cables are equipped with the correct nickel plating.
- VRLA Only: Ensure temperature compensation probes are installed per power system guidelines.
- Ensure back up battery amperage is inputted into the power system controller per power system guidelines.
- Ensure float voltage is set per power system and battery guidelines.
- Ensure all battery terminations and bus bars have No Ox applied.
- Refer to the battery manufacturer’s documentation for proper battery installation and maintenance information.

3.7.3 Battery Monitoring

CUBEs are equipped with eight jumpers or a PCB switch board to monitor the battery function. See the electrical diagram that ships with the CUBE to learn which is used in that model.

Battery Jumpers:

Each battery string has a set of DIN rail terminal blocks with jumpers that serve as a battery breaker monitor. The default jumper positions are on the outside and assume that all battery strings are present and breakers are turned on. This position provides a normally closed connection to the “Fuse Circuit Breaker.” If any of the battery breakers are turned off or have tripped, the normally closed connection opens. If a battery string is not present, then place the jumpers in the inside position, which bypasses the breaker. Refer to the electrical diagram in the supplemental document for more information.

-NOTE-

If a battery string is not present, place the jumper in the opposite position to bypass the breaker.

Battery Monitor Switch Board:

The CUBE has a switch board on the right inside panel that is connected to the battery breakers and serves as an alarm monitor. The default switch setting is to the bottom, indicating that a battery string is present and the battery breaker is turned on. If any battery breaker is turned off or tripped, it will cause a normally open alarm connection on the alarm block “BAT BRKR” position. If no battery string is present, then move the switch for that shelf into the top position to bypass the breaker.

3.7.4 LED Lights

The front and rear door switches in the equipment compartment have two sets of contacts. The primary side contacts are used for turning the equipment compartment’s front LED lights on and off. The LED lights are connected so that opening the front door turns on the front lights. The secondary set of contacts is used for intrusion alarms, which are covered in the Macro Terminal Alarm Block section of this document.

3.7.5 Door Switches

All door switches are wired in series with a normally closed connection. Opening any door opens the intrusion alarm connection on the macro alarm block.

3.7.6 Macro Alarm Terminal Panel

An integrated macro-site alarm panel is mounted on the left wall of the cabinet. This panel provides forty protected dry contact alarm inputs to screw down terminals or 66-block connections (Figure 11).

The cabinet comes with a standard alarm schedule label (See Table 4). The table can be replaced or augmented to match the specific alarms being used. All connections are normally closed and open on alarm.

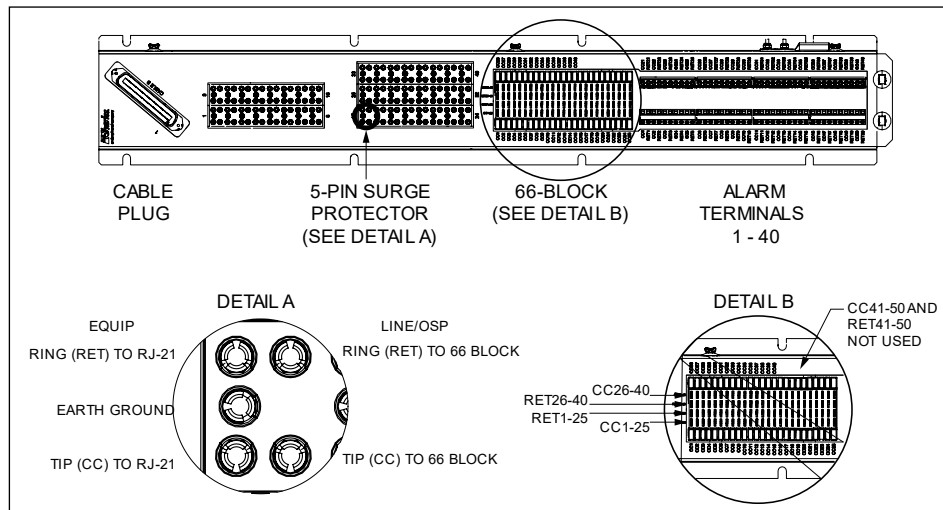


Figure 11 Alarm Terminal Panel

When connecting the CUBE in series with a battery backup unit (CUBE-BB family), take these additional wiring steps.

Step 1: Remove connections from the alarm panel in the SS cabinet.

- Remove RET1 (WHT/ORG)
- Remove RET12 (WHT)
- Remove RET13 (WHT/GRN)
- Remove RET23 (BLU/WHT)

Step 2: Lever lock connections.

- Use a lever lock to connect WHT/ORG removed from RET1 to ORG from the BB cabinet’s alarm cables. Strip both wires to 0.5”
- Use a lever lock to connect WHT removed from RET12 to BLK from the BB cabinet’s alarm cables. Strip both wires to 0.5”
- Use a lever lock to connect WHT/GRN removed from RET13 to GRN from the BB cabinet’s alarm cables. Strip both wires to 0.5”
- Use a lever lock to connect BLUE/WHT from the PM battery breaker to BLU from the BB cabinet’s alarm block. Strip both wires to 0.5”

Step 3: Connect the BB cabinet to the SS alarm panel.

- Connect WHT/ORG from the BB cabinet alarm cables to RET1 on the SS alarm panel. Strip to 0.33”
- Connect WHT from the BB cabinet alarm cables to RET12 on the SS alarm panel. Strip to 0.33”
- Connect WHT/GRN from the BB cabinet alarm cables to RET13 on the SS alarm panel. Strip to 0.33”
- Connect BLU/WHT from the BB cabinet alarm cables to RET23 on the SS alarm panel. Strip to 0.33”

Step 4: Groom wires.

- Secure cabling to wire grooming features and bundles located on the alarm panel.

See Figure 12 for a diagram of the in-series wiring.

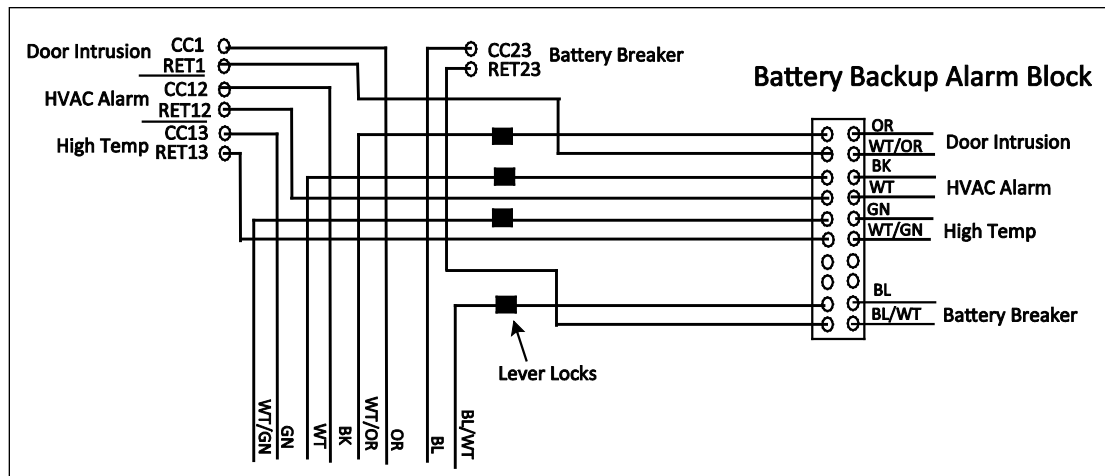


Figure 12 Alarm Connections In Series

3.7.7 Cable Entry

Use the multiple Ø1.75"/2.50" knockouts on the sides, bottom, and rear for cable entry. The bottom of the equipment compartment includes the same knockouts as shown on the bottom of the battery compartment in Figure 2, allowing easy cable passage from the ground into the upper chamber. The Ø1.75" knockouts accommodate Ø1.25" conduit and the Ø2.50" knockouts accommodate Ø2.0" conduit. The rear of the CUBE also has Ø2.50/3.60" knockouts that accommodate Ø2.0/3.0" fittings. Refer to Figure 2 to see all knockout locations.

3.7.8 Overheat Thermostat

The CUBE is equipped with overheat (high temperature) alarm thermostats in the equipment and battery compartments that provide a normally closed connection. The equipment compartment overheat alarm is factory set at 50°C in units with an HVAC system, or 60°C in units with a thermosiphon. The battery compartment overheat alarm is set at 35°C. Either alarm will open the connection if its temperature set point 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 Optional Puck Lock Kit

Some CUBE models can be ordered with the optional puck lock kit (see Table 2 for available part numbers). If the kit is ordered, then the CUBE ships with locking kits installed at the factory. The front hinged doors each have one lock, while the removable rear panels each have two locks. Figure 13 shows a CUBE with the puck locks installed.

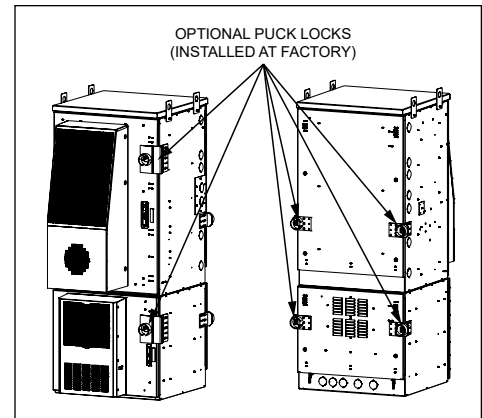


Figure 13 Puck Locks

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. The battery compartment (if present) must be internally sealed from the equipment compartment to prevent outgassing from the batteries into 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 14. 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.

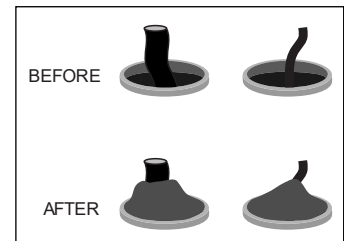


Figure 14 Applying Putty Seal

3.10 Verifying the Installation

Verify that the earth ground and all grounding and bonding are complete and functional. After verifying that all installer connections are secure and complete, connect power to the CUBE.

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 such as a rubber mallet may be used to remove excessive ice build-up around the door and locking mechanism. A commercial aerosol de-icer spray can be used to free up locks and latches if needed.

Periodic cleaning of the filter screens is important to maintain proper ventilation. To clean the filter screens, remove the four nuts on each screen and take out the screens. Use a soft brush or hose to remove any debris from the screen. Once clean, replace the screens using the four nuts removed previously.

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.

If equipped with an HVAC system, refer to the HVAC system manual for periodic maintenance requirements.

The thermosiphon (if equipped) requires no scheduled maintenance other than cleaning the fans if they become contaminated with dust or residue. Remove the cover by removing the screws on the outside. Examine periodically to determine the required cleaning periods based on the installed environmental conditions.

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, Type 3R
- 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	85"Hx32"Wx32"D
Battery Tray Size	SS4B228xN1: 10"Hx21"Wx26"D SS4B228xXx: 12"Hx20"Wx23"D SS4C228xV1: 12"Hx30"Wx23"D
Materials	Cabinet: 0.125" aluminum Battery Trays: 10GA steel
Maximum Supported Weight	Rack Rails: 308 lbs. Battery Tray: 912 lbs. per tray for VRLA, 555 lbs. per tray for NiCd
Color	Off-white
Electrical	
Bonding and Grounding	Two 2x8-position ground bars in equipment compartment
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	
Replacement Gasket	SS4B228xxx: 39-000980-0; SS4C228xxx: 39-000985-0
Touch-up Paint	02-000290-0
Shim Kit for Leveling	97-000010-0
Plinth Mounting Kit (SS4B228xxx Only)	97-002162-A
216 Type Security Tool	07-002070-0
Swing Handle	39-000148-0
Lift-Up Handle	39-000335-0
Lift-Up Rod Latch	39-000336-0
1/4 Turn Latch	39-000311-0
4-Wire Door Alarm Switch	17-400319-0
HVAC Cutoff Switch	17-400322-0
15A GFCI Outlet	04-100207-0
Overheat Thermostat	99-004548-0
Replacement DAC Fan	18-950484-0
48VDC TEC Assembly	99-004478-0

Table 1 CUBE Specifications (all models)

7.3 CUBE Models and Individual Specifications

Part Number	Equipment Thermal System	Battery Thermal System	Number of Battery Strings Supported	Puck Lock Kits Available?
CUBE-SS4B2288X1	12000BTU 48VDC HVAC system	(2) 200W 48VDC TECs	2, VRLA	N
CUBE-SS4B2288X2	12000BTU 48VDC HVAC system	2000BTU 48VDC HVAC	2, VRLA	N
CUBE-SS4B2288X3	12000BTU 48VDC HVAC system	2000BTU 48VDC HVAC	2, VRLA	N
CUBE-SS4B2288X6	12000BTU 48VDC HVAC system	2000BTU 48VDC HVAC	2, VRLA	N
CUBE-SS4B228LN1	10000BTU 48VDC HVAC system	-48VDC DAC, 2 Fans	2, NiCd	Y, 96-SESPKPKSSLH
CUBE-SS4B228LX1	10000BTU 48VDC HVAC system	(2) 200W 48VDC TECs	2, VRLA	N
CUBE-SS4B228LXR	10000BTU 48VDC HVAC system	(2) 200W 48VDC TECs	2, VRLA	N
CUBE-SS4B228PN1	2250W 48VDC thermosiphon	-48VDC DAC, 2 Fans	2, NiCd	Y, 96-SESPKPKSSLH
CUBE-SS4B228PX1	2250W 48VDC thermosiphon	(2) 200W 48VDC TECs	2, VRLA	N
CUBE-SS4B228PX2	2250W 48VDC thermosiphon	2000BTU 48VDC HVAC	2, VRLA	N
CUBE-SS4C2288N1	12000BTU 48VDC HVAC system	-48VDC DAC, 2 Fans	3, NiCd	Y, 96-SESPKPKSSLH
CUBE-SS4C228CV1	6000W 48VDC thermosiphon	n/a		Puck lock is standard
CUBE-SS4C228PX1	2250W 48VDC thermosiphon	(2) 200W 48VDC TECs	3, VRLA	N
CUBE-SS4C2285Q3	6000W 48VDC CTMS	-48VDC DAC, 2 Fans	3, NiCd	N

Table 2 CUBE Models and Individual Specifications

7.4 Supported Batteries

Manufacturer	Model Number	Amp Hours
Energys	SBS190F	190
East Penn Deka	Fahrenheit HT200ET	200
C&D	TEL 12-210F	210
Narada	12HTB200F	200
Saft	80-94865-02	180

Table 3 CUBE Supported Batteries

7.5 Macro Alarm Wiring Table

Alarm Number	Description
CC1	Door Intrusion
CC2	Commercial Power Failure
CC3	Surge Suppressor/Lightening Arrestor
CC4	Rectifier Failure
CC5	Multiple Rectifier Failure
CC6	Battery Discharge
CC7	Low Voltage
CC8	DC Power Failure
CC9	Generator Running
CC10	Generator Low Fuel
CC11	Generator Failure
CC12	HVAC Failure
CC13	High Temp
CC14	Low Temp
CC15	Tower Light
CC16	Tower Light Side
CC17	RRH Up-Convertor Failure
CC18	RRH Power Failure
CC19	RRH High Humidity
CC20	RRH Intrusion
CC21	Smoke/Fire
CC22	Bus Bar Theft
CC23	Battery Breaker Alarm
CC24	
CC25	Microwave Critical
CC26	Microwave Major
CC27	Dehydrator Alarm
CC28	Fire Suppression Discharge
CC29	Fire Suppression Trouble
CC30	Secondary HVAC Running
CC31	Explosive Gas
CC32	High Humidity

Table 4 Macro Alarm Wiring Table