Charles Universal Broadband Enclosure CUBE-SC2NN12HN1, CUBE-SC2NN12HN3, CUBE-SC2NN12HN4, CUBE-SC2NN12HN6, and CUBE-SC2NN12HN7 General Description and Installation

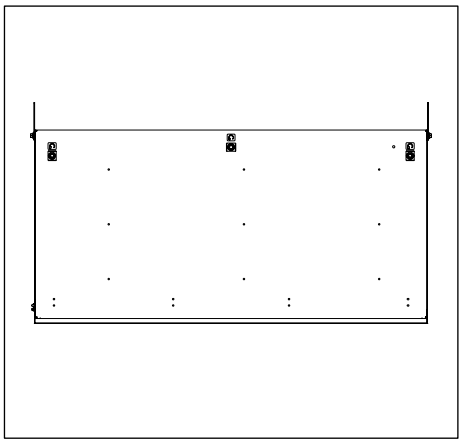

Figure 1 Front View of the CUBE

1. GENERAL INTRODUCTION

1.1. Document Purpose

This document provides general information for the CUBE-SC2NN12HNx 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-SC2NN12HN1, CUBE-SC2NN12HN3, CUBE-SC2NN12HN4, CUBE-SC2NN12HN6, and CUBE-SC2NN12HN7 will be referred to as "SC2NN12HN1," "SC2NN12HN3," "SC2NN12HN4,""SC2NN12HN6," "SC2NN12HN7,"or the "CUBE."

1.2. Product Purpose

This 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 low-profile, high power, small-cell (LP HPSC) radio shroud 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. 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 that supports radios and power supplies. The SC2NN12HN1, SC2NN12HN3, and SC2NN12HN4 support two radios and two power supplies, the SC2NN12HN6 supports three radios and three power supplies, and the SC2NN12HN7 supports four radios and one power supply. All radios and power supplies are customer supplied. The SC2NN12HN1 also has a mounting bracket for a Nokia ITP4. All models include a direct air cooling system (DAC) with venting and multiple speed-controlled fans.

See Table 1 for specific supported radio types for each model. Figures 2, 3, and 4 show the CUBE dimensions and Figures 5 through 9 show the main components of the CUBE.

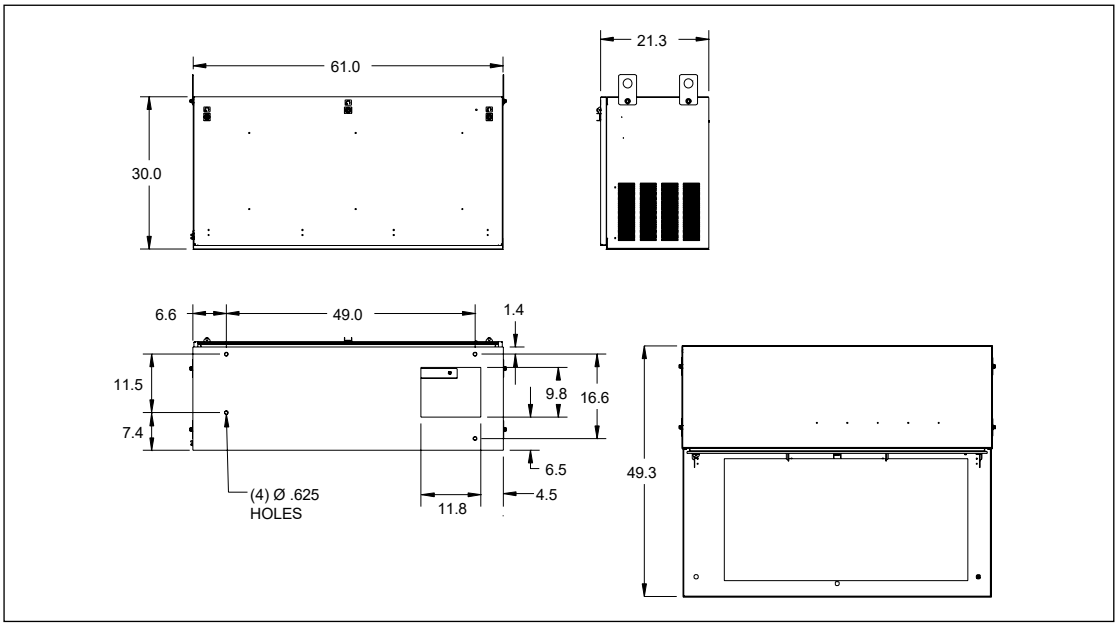

Figure 2 SC2NN12HN1 Dimensions (in inches)

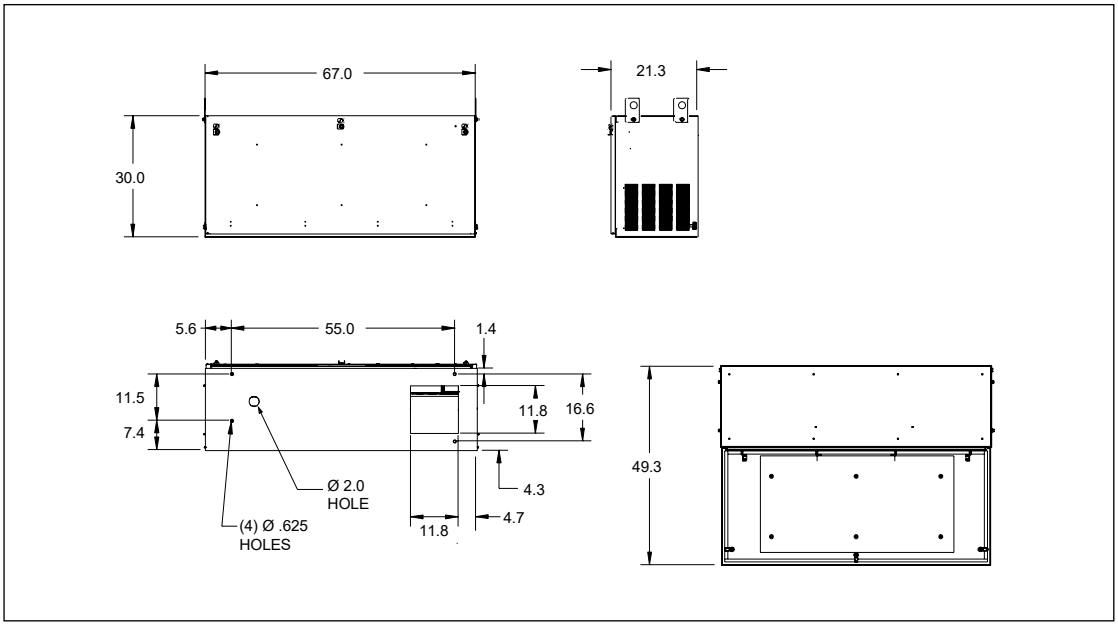

Figure 3 SC2NN12HN3/HN4/HN7 Dimensions (in inches)

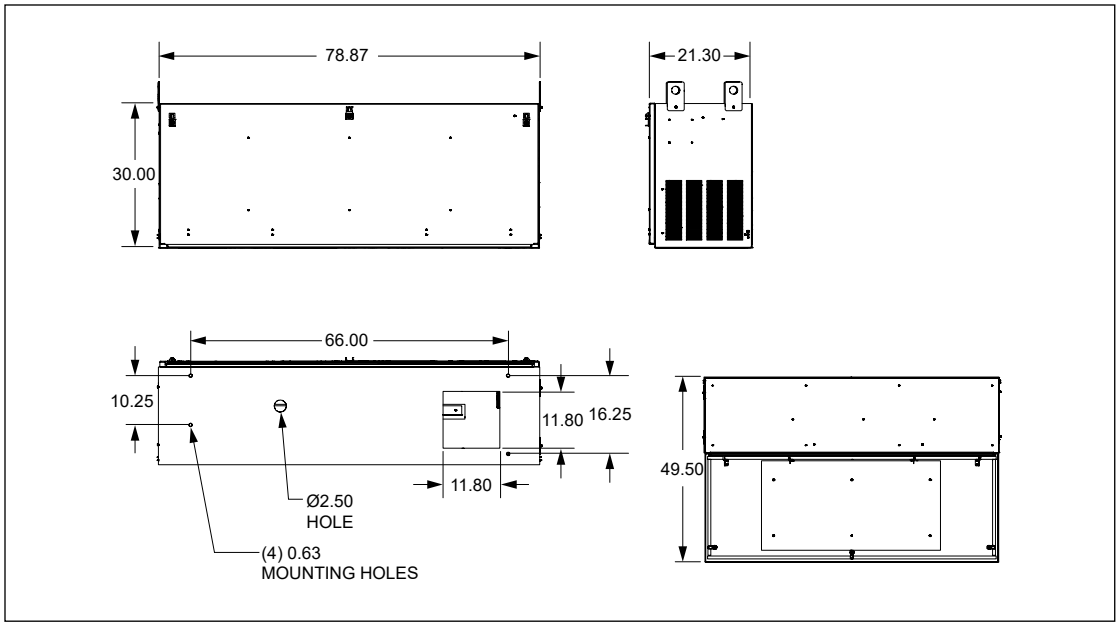

Figure 4 SC2NN12HN6 Dimensions (in inches)

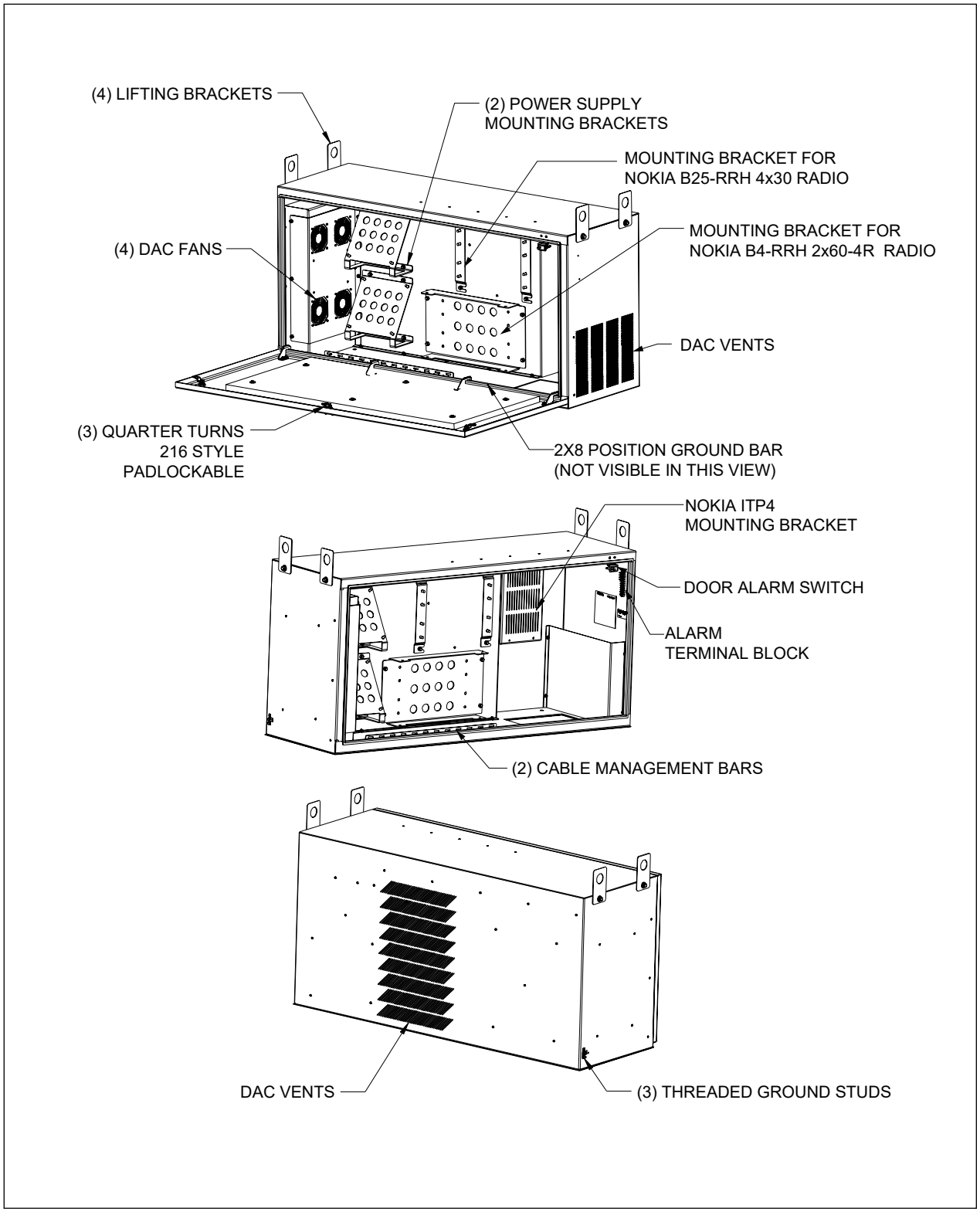

Figure 5 SC2NN12HN1 Components

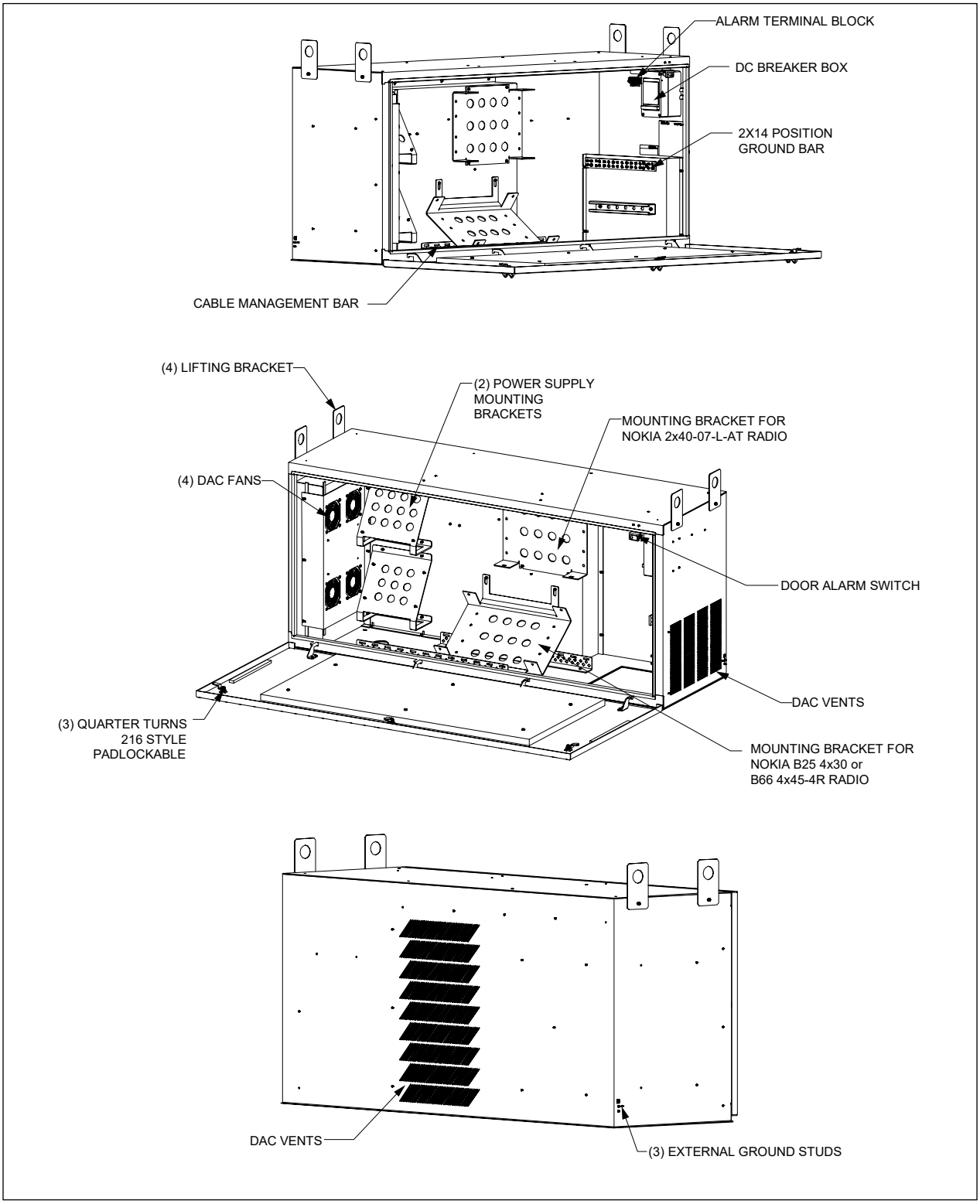

Figure 6 SC2NN12HN3 Components

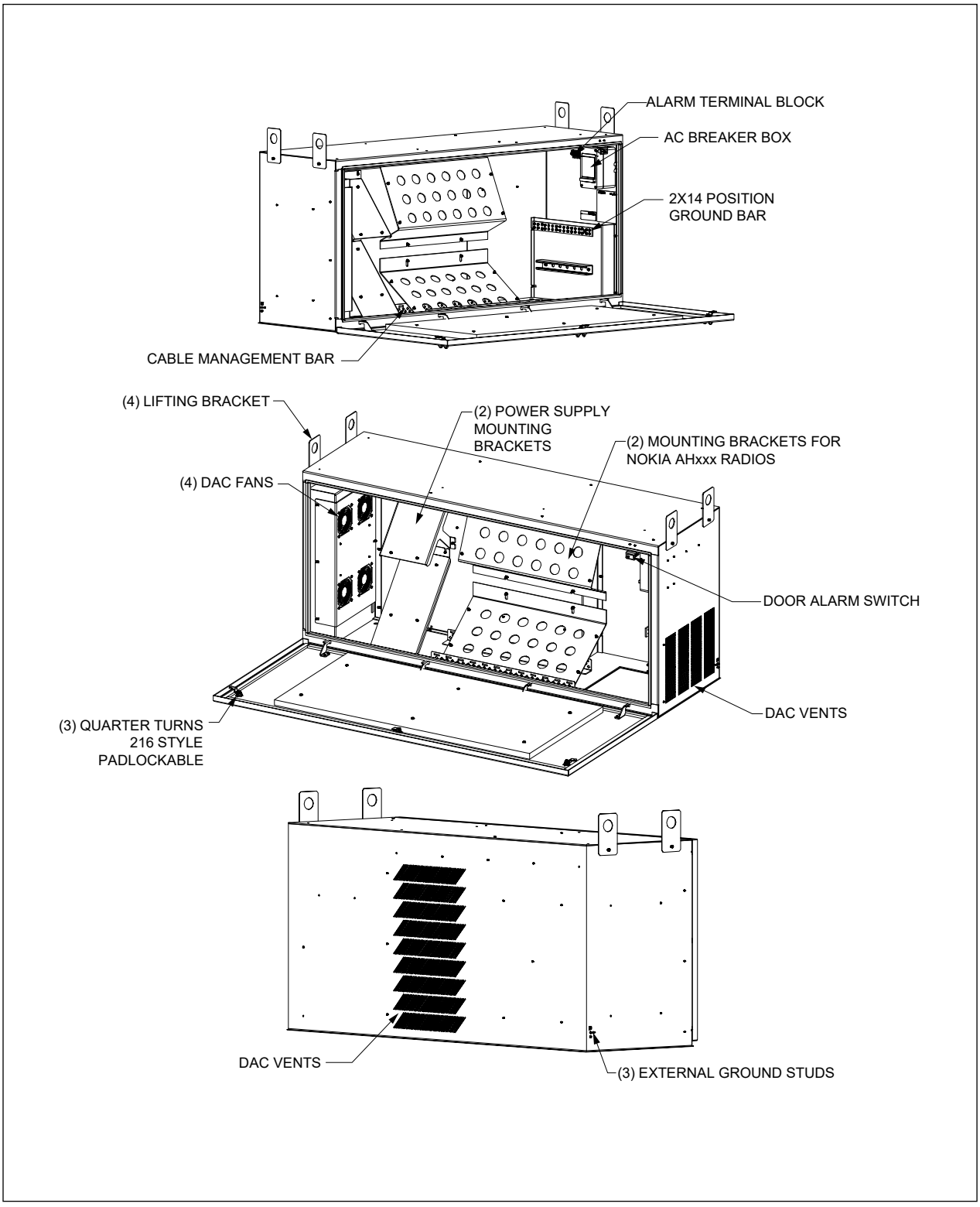

Figure 7 SC2NN12HN4 Components

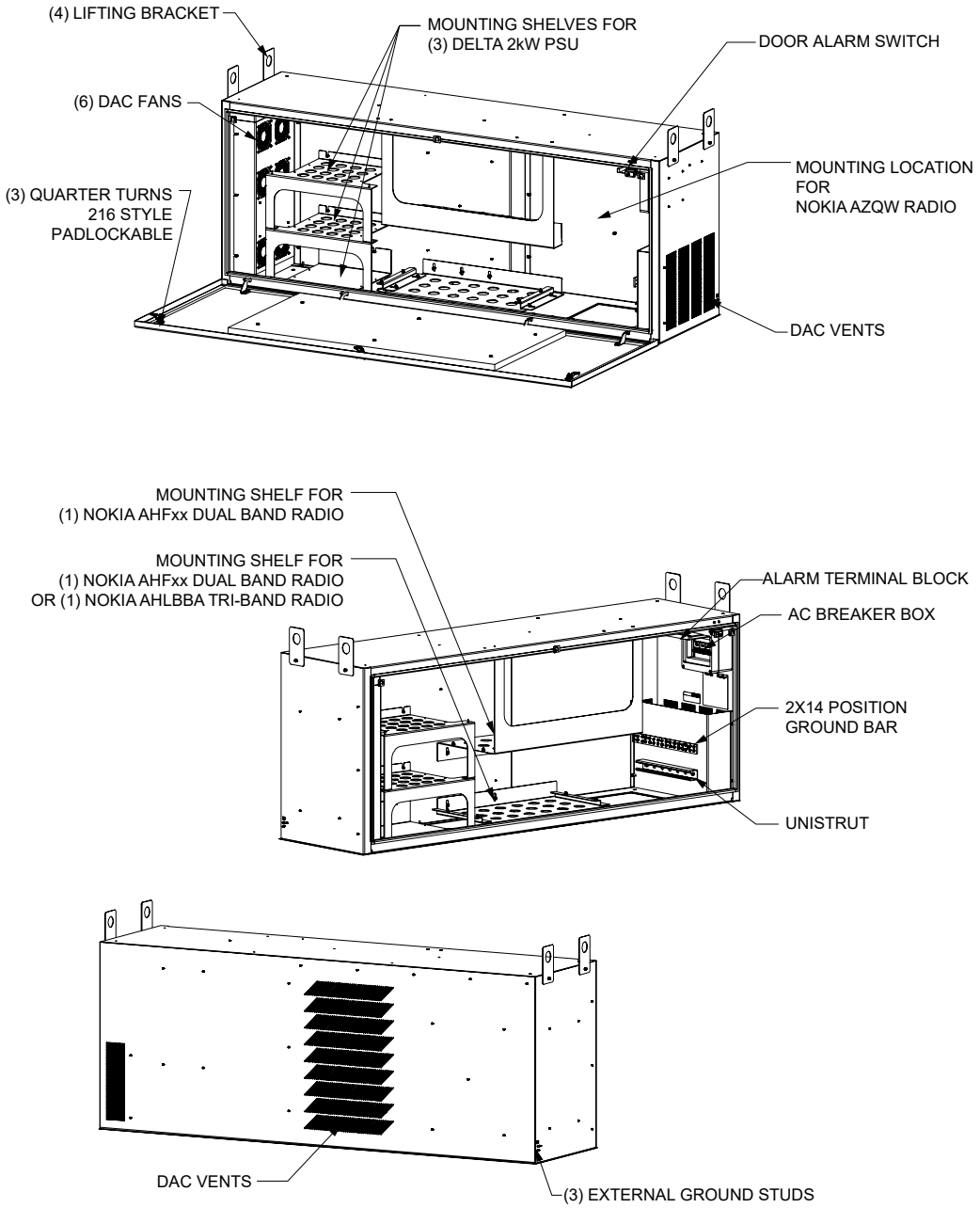

Figure 8 SC2NN12HN6 Components

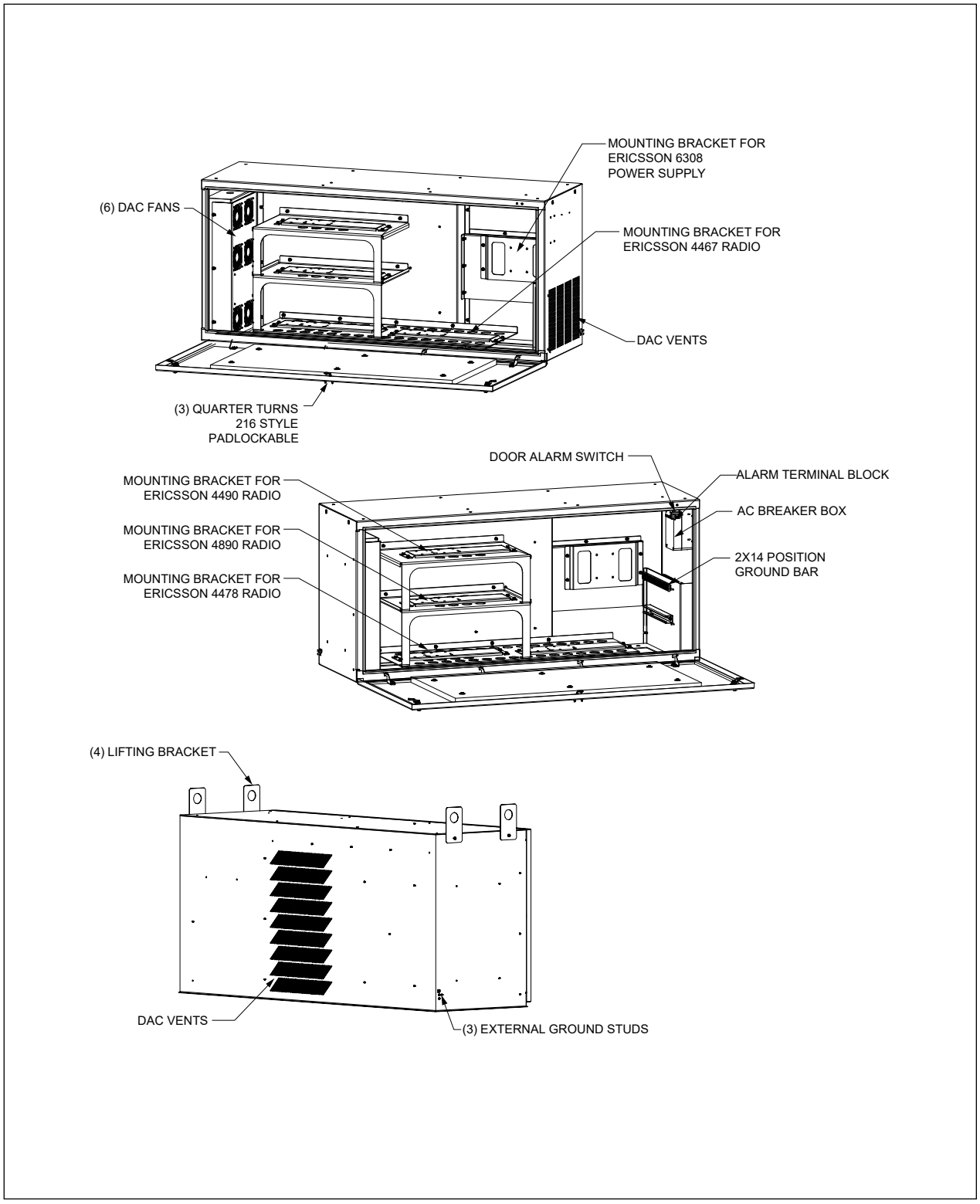

Figure 9 SC2NN12HN7 Components

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.

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 and Phillips screwdrivers
- 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 10.

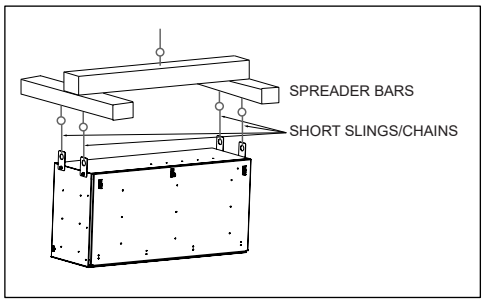

Figure 10 Lifting the CUBE

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 stabilizer 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. A loose gasket is provided inside the CUBE. Should the gasket become damaged during installation, a replacement can be ordered under part number 39-001142-0 (SC2NN12HN1), 39-001164-0 (SC2NN12HN3/HN4/HN7), or 39-001334-0 (SC2NN12HN6).

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 11 shows the required conduit openings and mounting hole dimensions for entering/mounting the bottom of the CUBE. Use these dimensions when designing the pad.

⚠	**WARNING**	**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.** **The slump of the concrete shall be 2” to 4” as determined by ASTM C143 test method.**

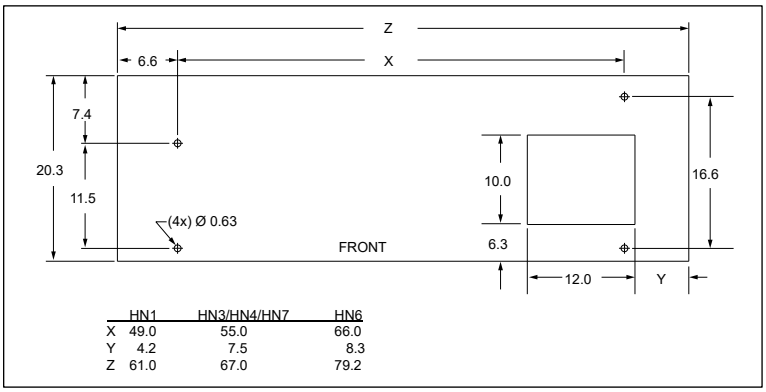

Figure 11 Mounting Hole Dimensions (in inches)

3.6.3. Mounting the CUBE on a Pad

Four customer supplied 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.

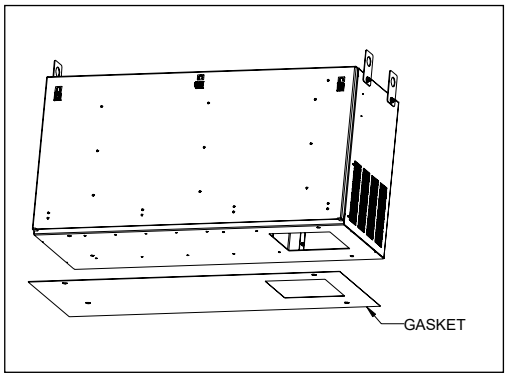

Figure 12 Gasket Installation

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. Remove the anchor bolts for later reuse.
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 over the anchor bolts as shown in Figure 12
4. Open the CUBE 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 1/2” hardware. Tighten all bolts securely.
8. Once the CUBE is secured, remove the slings and tagline. Close the CUBE door.

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.**

Basic electrical diagrams are shown in Figures 13 through 17.

3.7.1. Ground Connection

Use the ground bar provided for all grounding of internal equipment (8-position or 14-position, depending on the model). The external ground studs on the sides of the cabinet offer connection for an earth ground.

3.7.2. Power System

-48VDC power supplies are customer supplied.

3.7.3. DAC Operation

The CUBE includes a fan speed controller, which turns the fan on/off. The fan controller automatically adjusts the fan speed depending on the ambient temperature. The installer connects the controller to a -48VDC customer supplied power source.

3.7.4. 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.

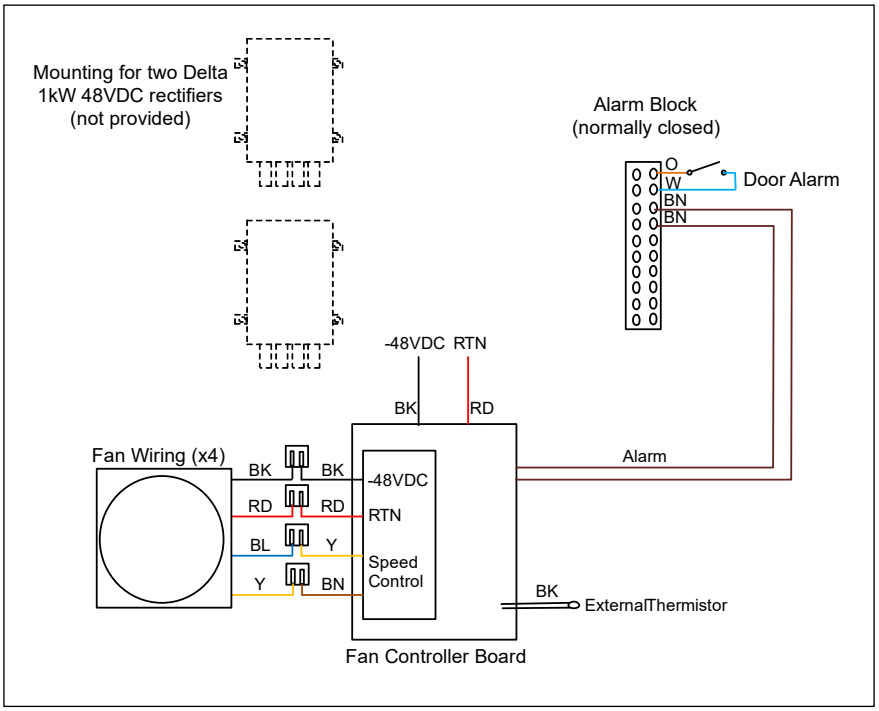

Figure 13 SC2NN12HN1 Electrical Diagram

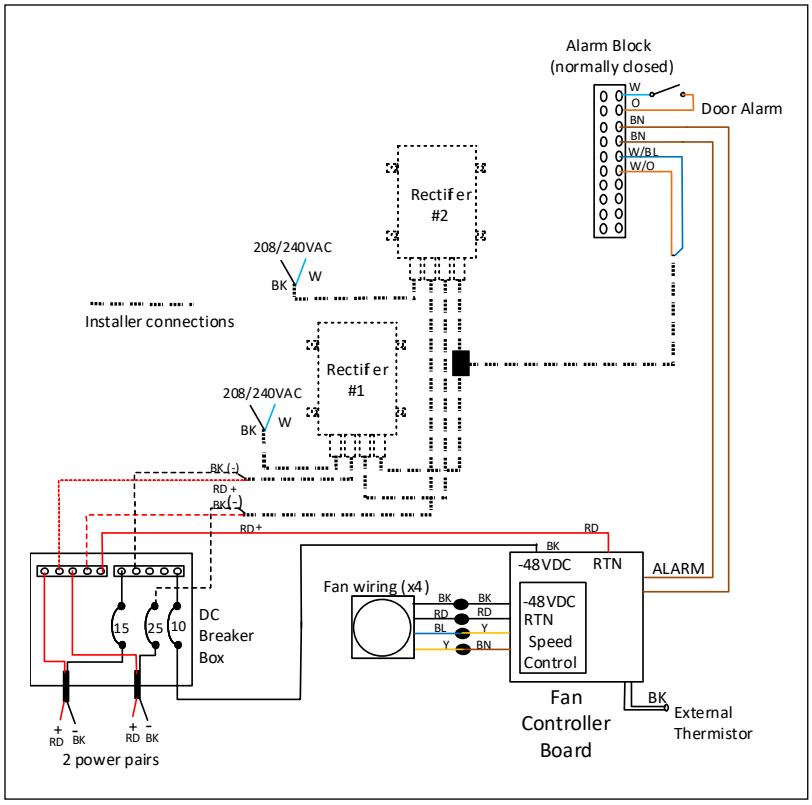

Figure 13 SC2NN12HN3 Electrical Diagram

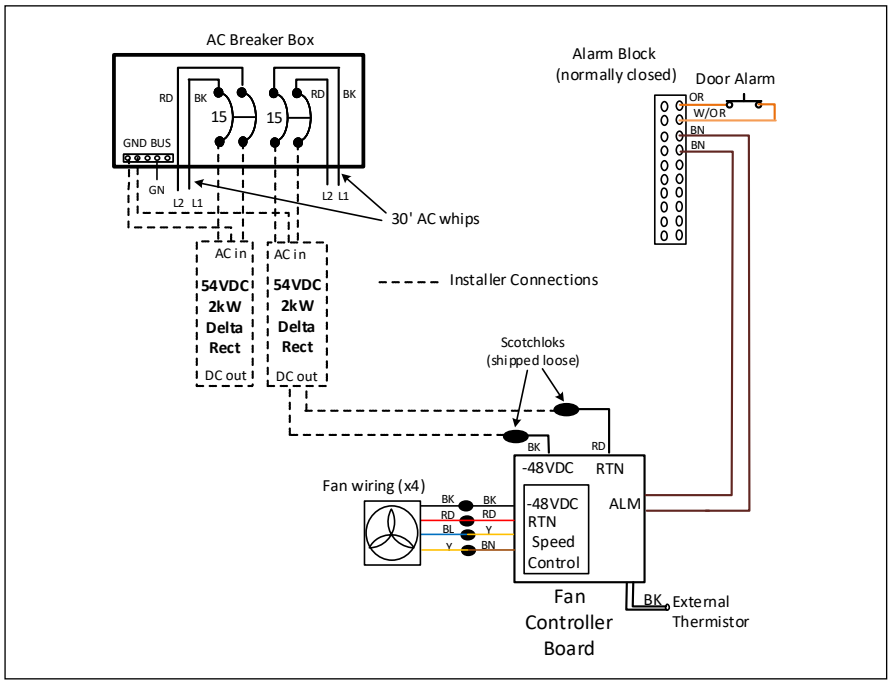

Figure 14 SC2NN12HN4 Electrical Diagram

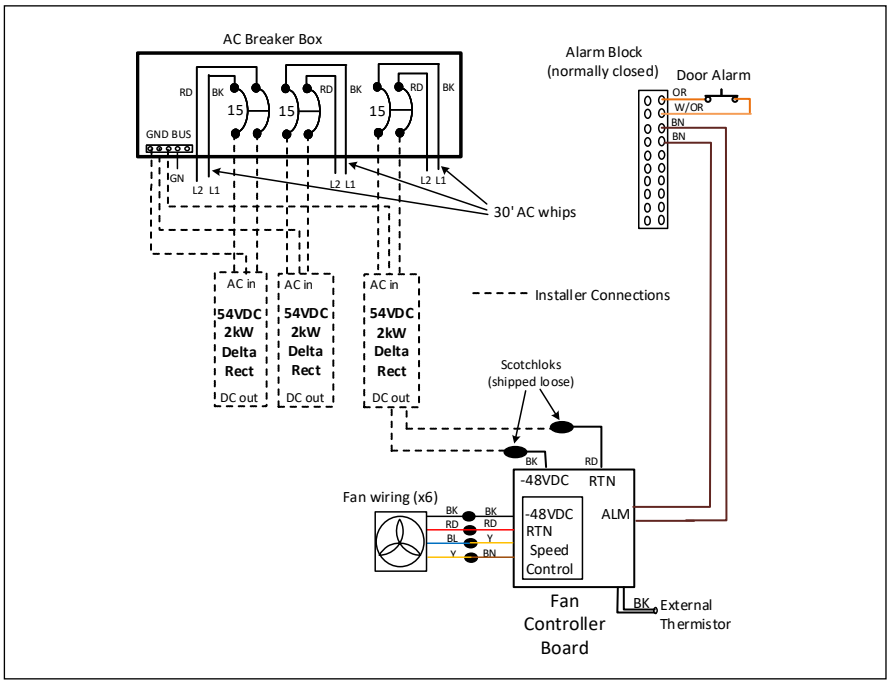

Figure 15 SC2NN12HN6 Electrical Diagram

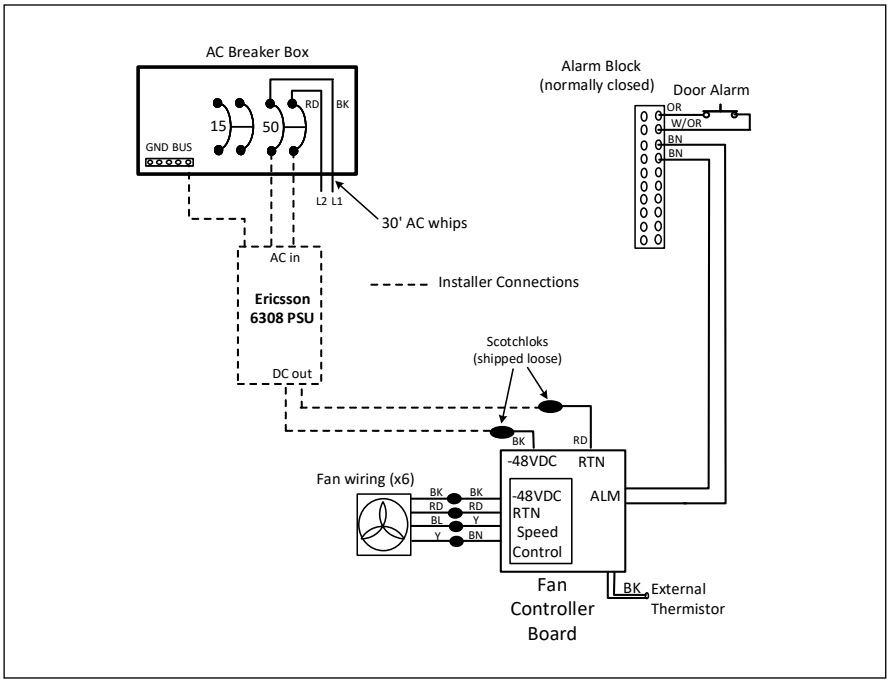

Figure 16 SC2NN12HN7 Electrical Diagram

3.8. 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 as needed.

Periodic cleaning of the vents is important to maintain proper ventilation. Use a soft brush to remove any debris.

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-60950 Recognized

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 and Weights	SC2NN12HN1: 30”Hx61”Wx21”D, approx. 175 lbs. as shipped SC2NN12HN3: 30”Hx67”Wx21”D, approx. 190 lbs. as shipped SC2NN12HN4: 30”Hx67”Wx21”D, approx. 200 lbs. as shipped SC2NN12HN6: 30”Hx79”Wx22”D, approx. 255 lbs. as shipped SC2NN12HN7: 30”Hx67”Wx21”D, approx. 259 lbs. as shipped
Color	Off-white
Material	0.125” Aluminum
Electrical	
Bonding and Grounding	SC2NN12HN1: One 2x8 position ground bar SC2NN12HN3/HN4/HN6/HN7: One 2x14 position ground bar
Supported Radios (customer supplied)	SC2NN12HN1: (1) Nokia B4-RRH 2x60-4R and (1) Nokia B25-RRH 4x30 SC2NN12HN3: (1) Nokia 2x40-07-L-AT and (1) Nokia B25 4x30 or B66 4x45-4R SC2NN12HN4: (2) Nokia AHxxx dual band SC2NN12HN6: (1) Nokia AZQW with (2) Nokia AHxxx OR (1) Nokia AHxxx and (1) Nokia AHLBBA SC2NN12HN7: (1) Ericsson 4490, (1) Ericsson 4890, (1) Ericsson 4478, (1) Ericsson 4467
Supported Power Supply	SC2NN12HN1/HN3: (2) Delta Advantage 1kW ESR-48/20C S SC1NN12HN4: (2) Delta 2kW SC2NN12HN6: (3) Delta 2kW SC2NN12HN7: (1) Ericsson 6308
Thermal	
DAC	4 or 6 fans, 48VDC, 243CFM
Environmental	
Operating Temp. Range, Outside Enclosure	-40° to +115°F, -40° to 46°C
Operating Temp. Range, Inside Enclosure	-40° to +131°F, -40° to 55°C
Humidity	0 to 95% (non-condensing)
Altitude	Up to 2,000 meters (6560’)
Replacement Parts	
Touch-up Paint	02-000290-0
Replacement Gasket	SC2NN12HN1: 39-001142-0 SC2NN12HN3/HN4/HN7: 39-001164-0 SC2NN12HN6: 39-001334-0
Replacement Fans	18-950454-0
Replacement Fan Controller	HN1/HN3/HN4/HN7: 80-004182-A HN6: 80-006079-P01-A
216 Type Security Tool	07-002070-0
1/4 Turn Latch with Padlock Hasp	39-000449-0
2-Wire Door Alarm Switch (White)	17-400314-0

Table 1 CUBE Specifications