

Charles Universal Broadband Enclosure

SH60-702018 Series

General Description and Installation

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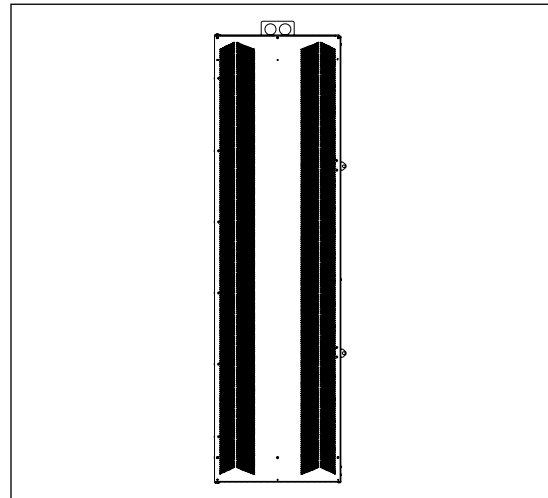


Figure 1 Front View of the SHRD60

1 GENERAL INTRODUCTION

1.1 Document Purpose

This document provides general information for the Charles Industries SH60-702018xxxx series vented concealment shroud. A closed front view of the SH60-702018xxx is shown in Figure 1.

-NOTE-
Hereafter, the SH60-702018xxxx series enclosure will be referred to as "SHRD60."

1.2 Product Purpose

The SHRD60 is a vented shroud that houses customer supplied remote radio heads (RRH) and ancillary equipment.

1.3 Product Mounting and Location

The SHRD60 is suitable for outside plant-type (OSP) locations and those that may require NEC compliance. The outdoor SHRD60 products are to be mounted on a pole. The installer connects the power, fiber and copper connections. Detailed mounting and installation information is covered in Section 3.

2 PRODUCT DESCRIPTION

See Tables 2 and 3 for a list of all models and configurations. All radios, power supplies, diplexers, and fiber boxes are customer supplied. The SH60-702018xNE1 family includes mounting brackets for five Ericsson 220x/440x radios.

The SH60-702018xNE3 family includes mounting brackets for two Ericsson RRUS12 or two RRUL11 2x40W radios, two Ericsson AC-02 power supplies, two Microlab BK-96 quadplexers, and one fiber box (Charles CFTT, Corning OptiSheath, or AFL OptiNID 500).

The SH60-702018xNE4 family includes mounting brackets for two Ericsson RRUS32 RRHs, two Ericsson PSU-AC-08 power supplies, two Commscope CBC1923T-DS-43 diplexers, and one fiber box (Charles CFTT, Corning OptiSheath, or AFL OptiNID 500).

The SH60-702018xNE7 family includes mounting brackets for one Ericsson 8843 radio, one Ericsson 4449 radio, two Ericsson 220x/440x radios, one Microlab BK-747E triplexer, two Ericsson 6302 or four Ericsson AC-08 power supplies, and one Charles CFTT fiber box. It also includes two cooling fans controlled by a thermostat.

The SH60-702018xNEC includes mounting brackets for one Ericsson 4455 or 4435 radio, one Ericsson 4449, 8843, 4490, or 4890 radio, one Ericsson 220x/440x radio, one Ericsson 6302 or 6308 or two Ericsson AC-08 power supplies, and one Charles CFTT. It also includes two cooling fans controlled by a thermostat.

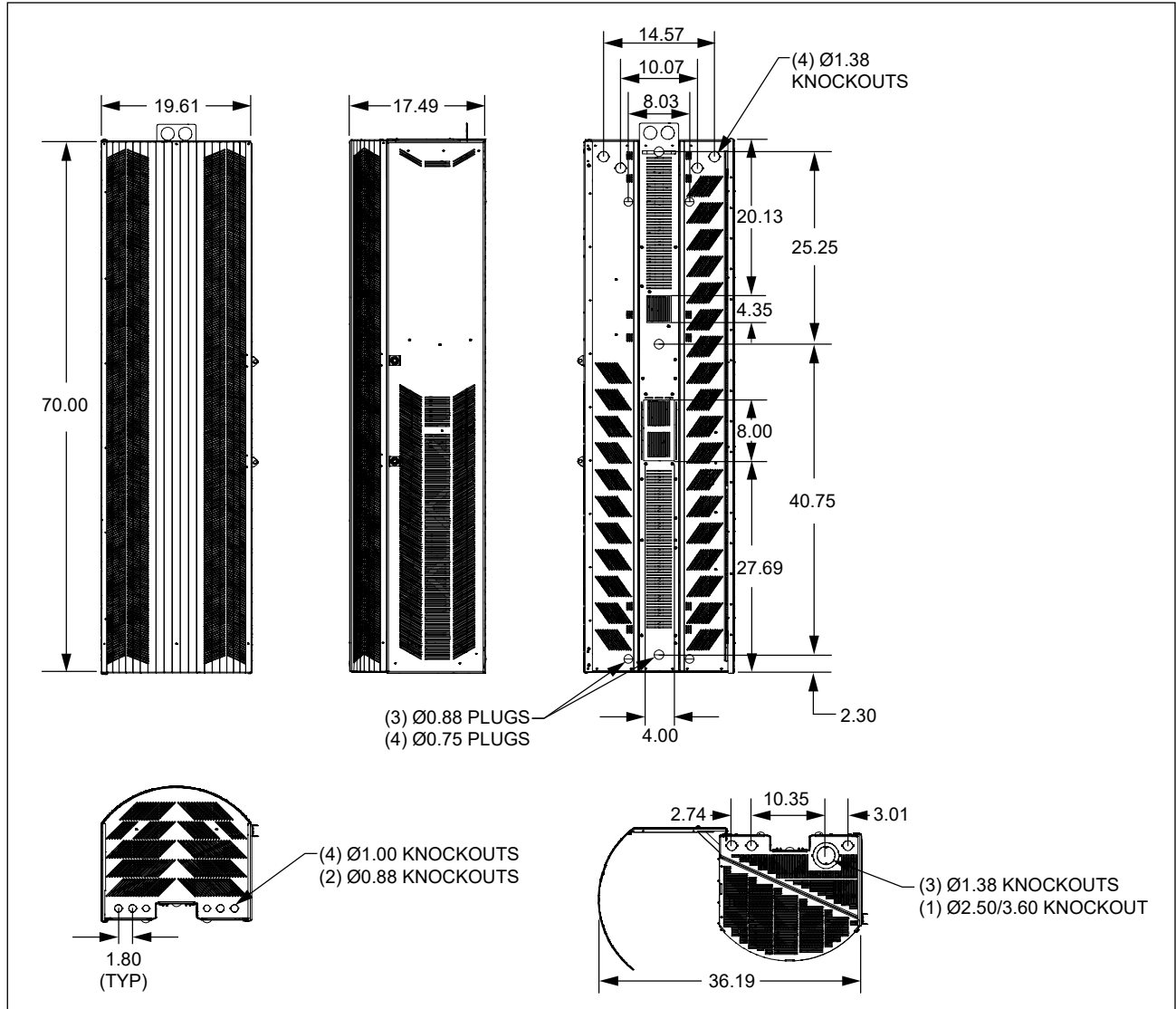
SH60-702018xNED includes mounting brackets for one Ericsson 4455 radio, one Ericsson 8863 radio, two Commscope diplexers, one Ericsson AC-08 power supply, one Ericsson 6304 power supply, one Ericsson 220x440x radio, and one Ericsson FrontHaul or Charles CFTT fiber box.

The SH60-702018xNEG includes mounting brackets for three Ericsson 4435 radios, eight Ericsson 220x/440x radios, six Microlab BK-747E triplexers, and four Microlab BK-75E diplexers.

The SH60-702018xNP2 family includes mounting brackets for three low power Commscope ION CAP M radios and either one Commscope E14F05P57 diplexer or two hybrid couplers.

The SH60-702018xNXX models are sold empty, and are configurable in multiple different ways by ordering different mounting bracket kits. See Table 3 for a full list of available configurations. All configurations can be ordered with a fiber box (Charles CFTT, Corning OptiSheath, or AFL OptiNID 500).

Figure 2 shows the SHRD60 dimensions. Figures 3 through 11 show the main components of the SHRD60.



**Figure 2 SHRD60 Dimensions (in inches)
(SH60-702018xNXX pictured)**

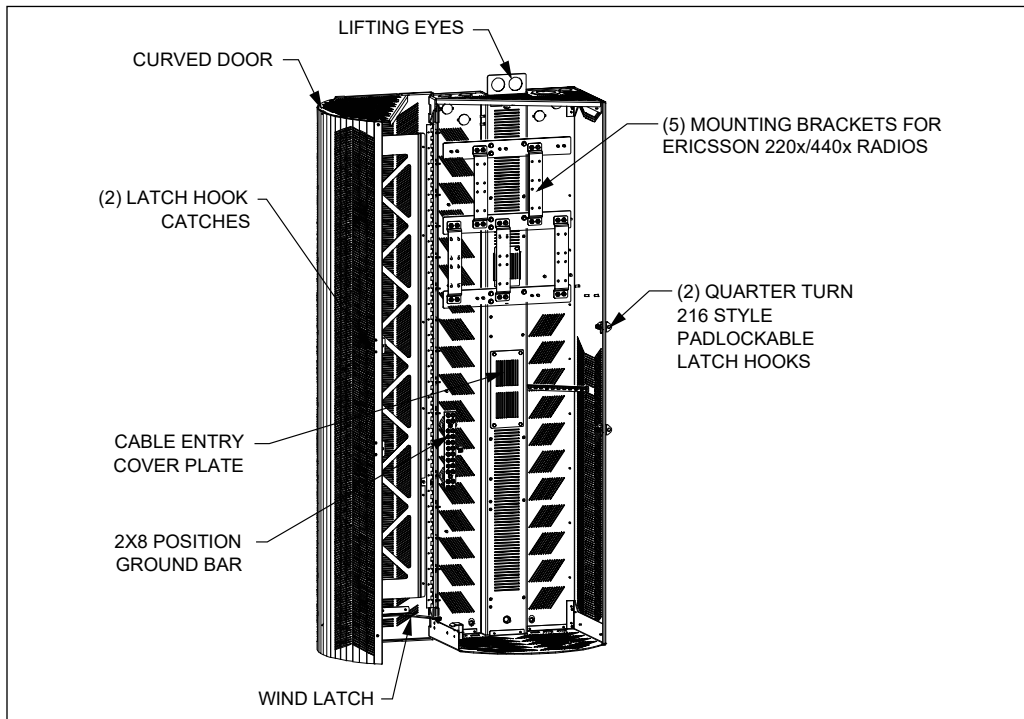


Figure 3 SH60-702018xNE1 Components

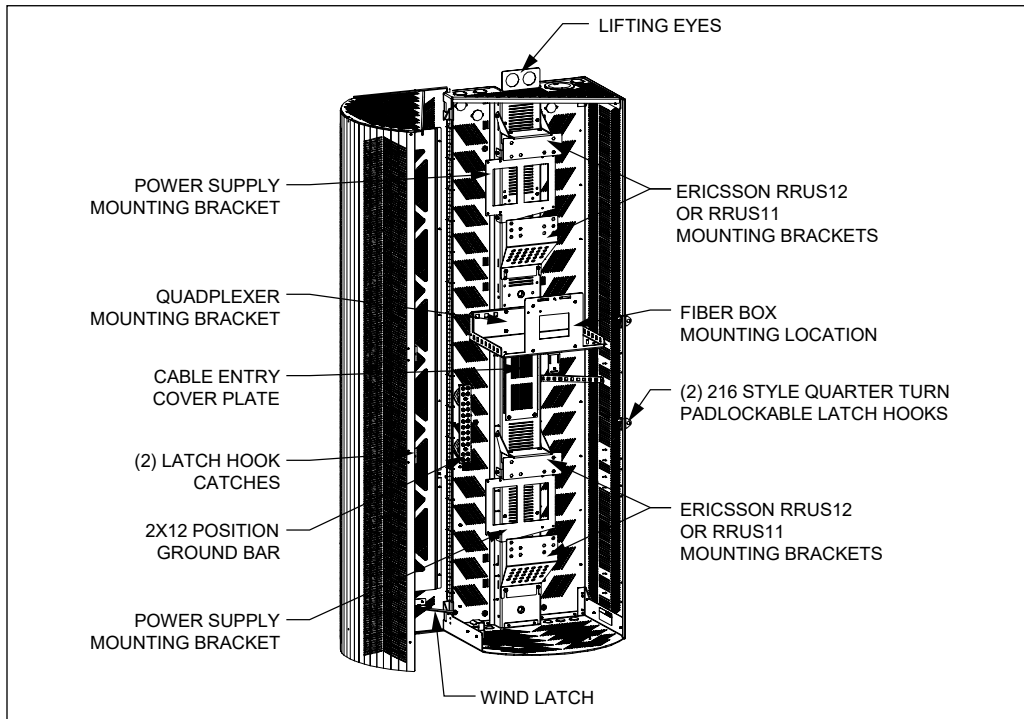


Figure 4 SH60-702018xNE3 Components

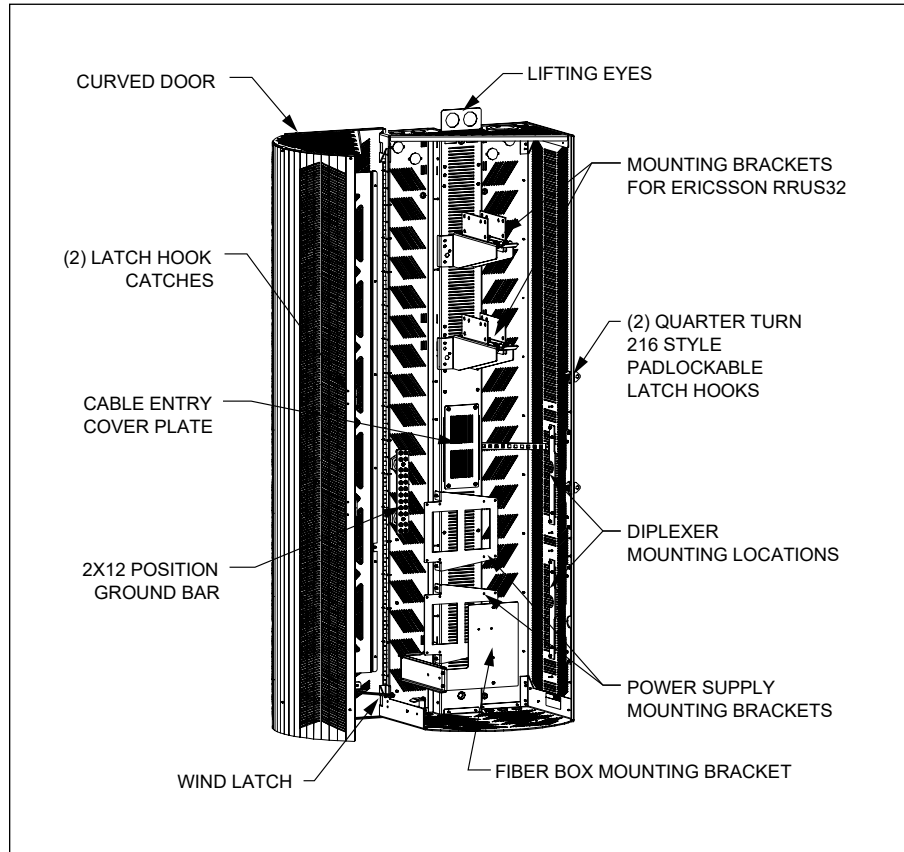


Figure 5 SH60-702018xNE4 Components

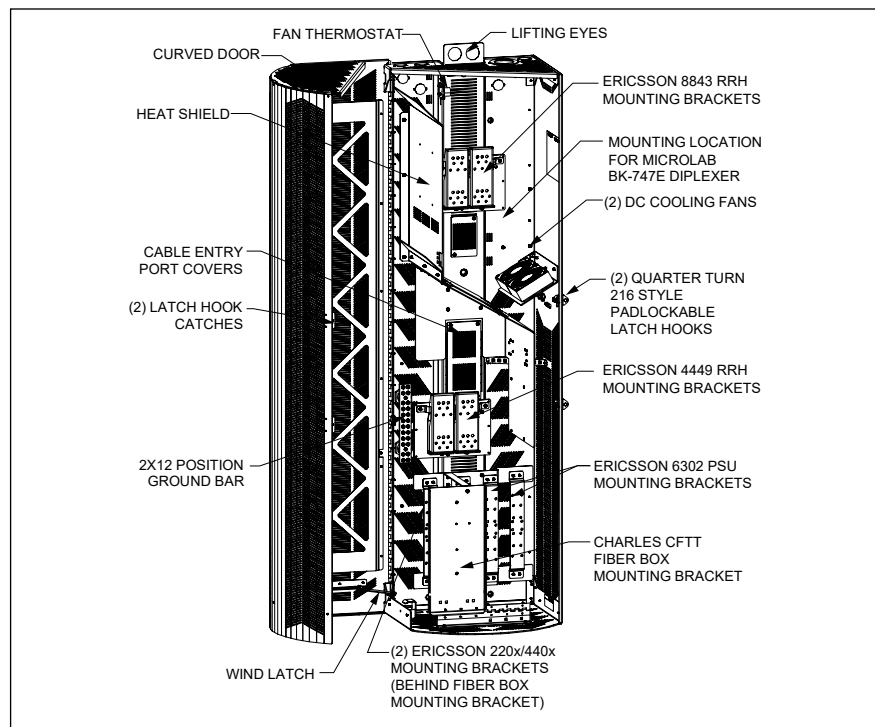


Figure 6 SH60-702018xNE7 Components
(Mounting brackets for Ericsson AC-08 power supplies ship loose in the SHRD60)

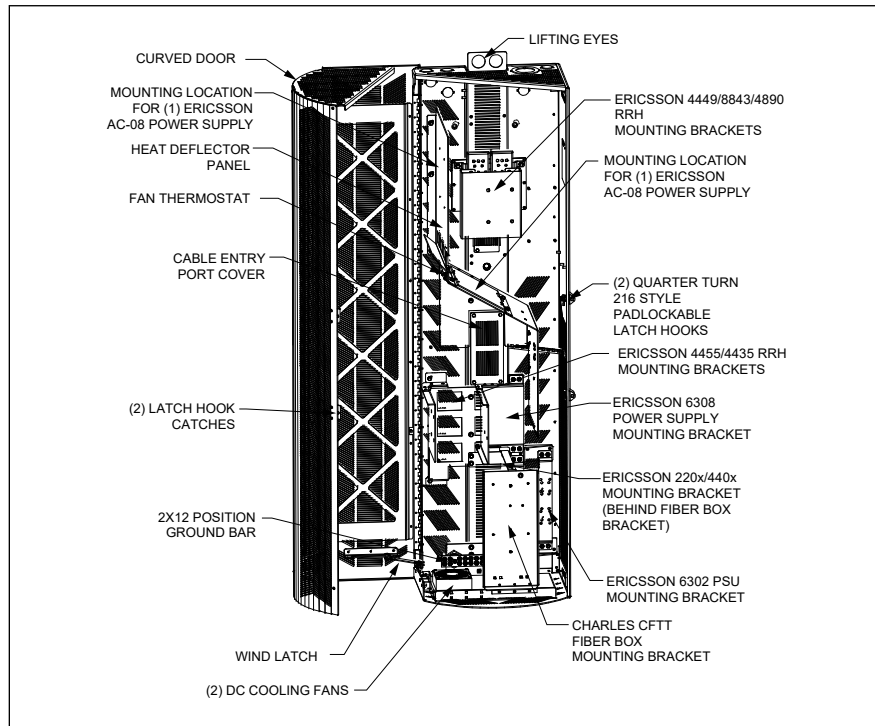


Figure 7 SH60-702018xNEC Components

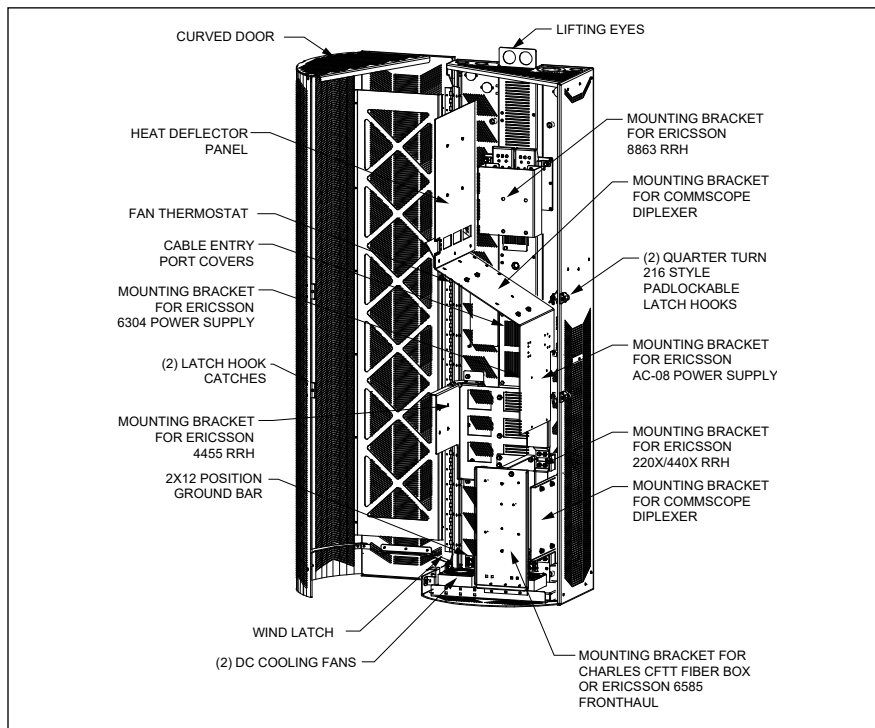


Figure 8 SH60-702018xNED Components

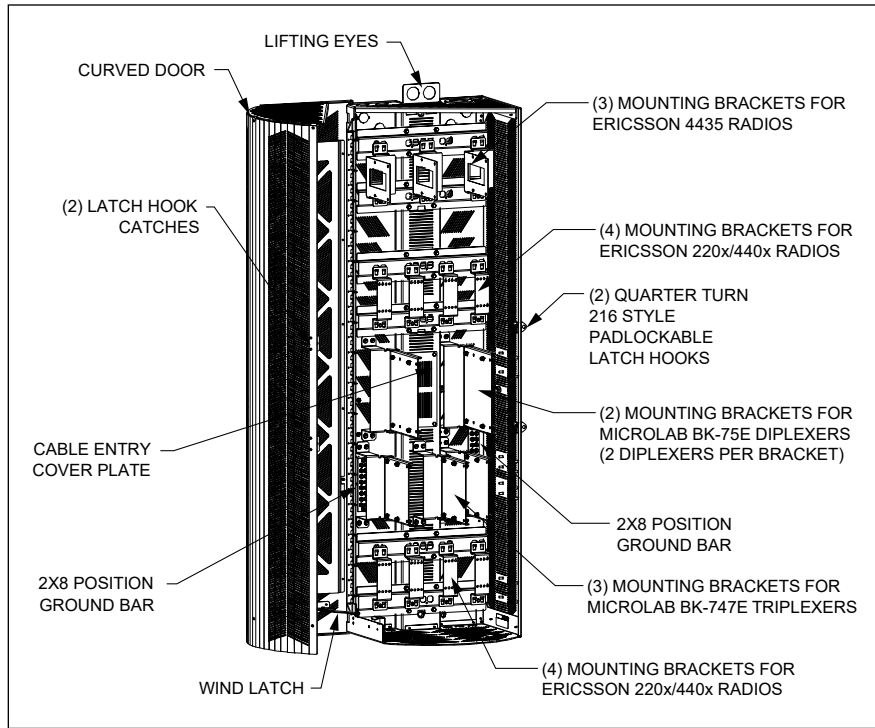


Figure 9 SH60-702018xNEG Components

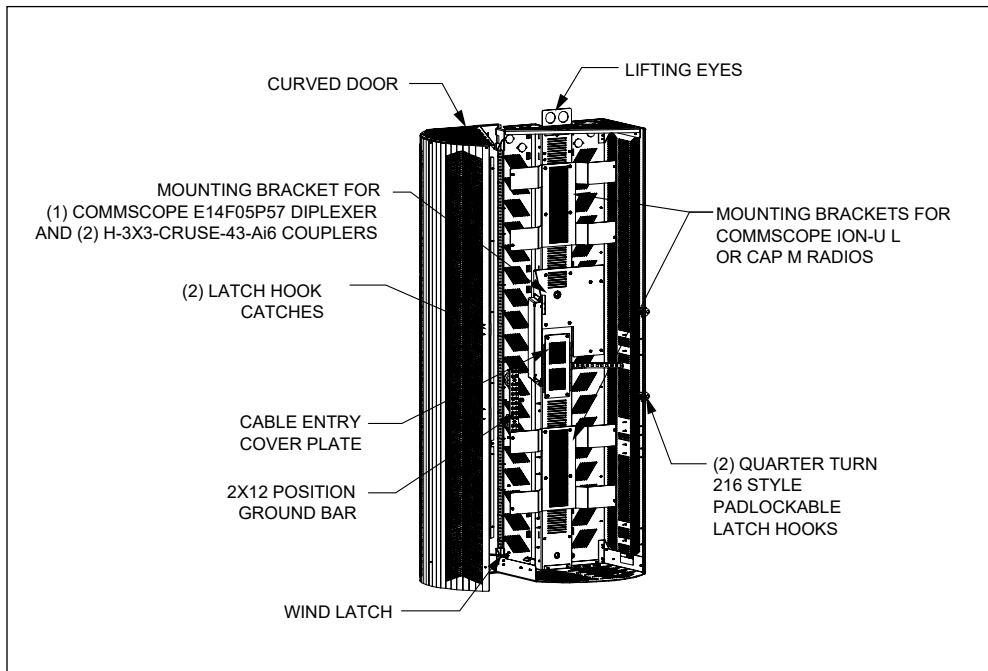


Figure 10 SH60-702018xNP2 Components

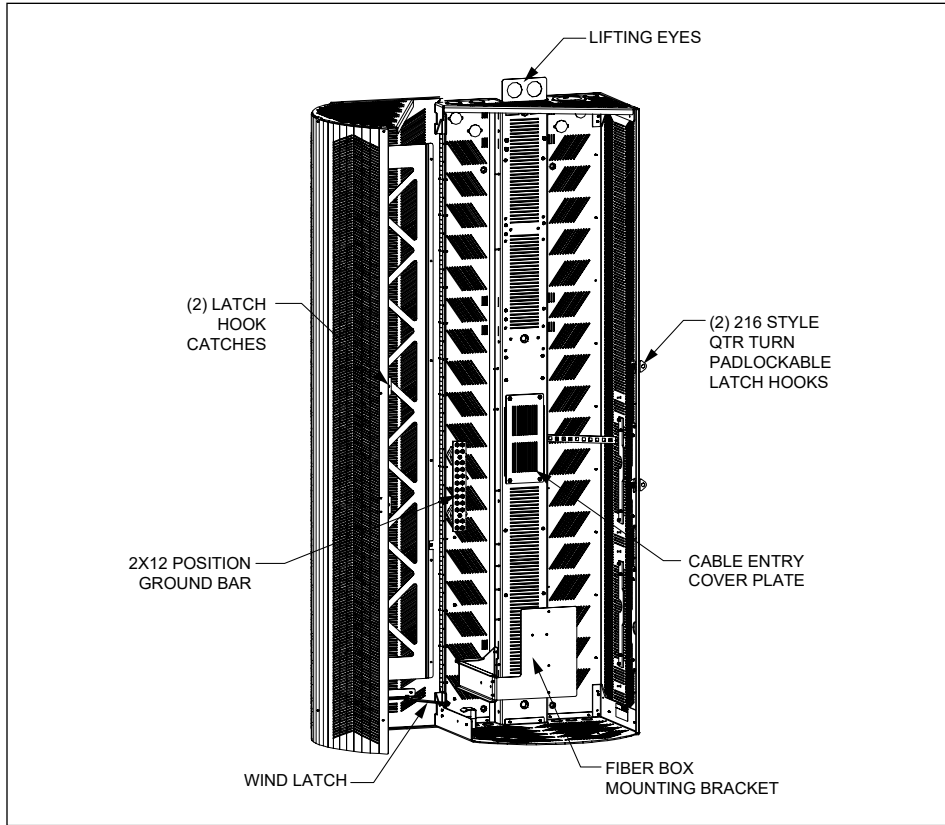


Figure 11 SH60-702018xNXX Components

3 INSTALLATION

3.1 Inspecting the Product

The SHRD60 is shipped in a box on a skid. 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 SHRD60.
- In windy conditions, be sure to engage the door latch to secure the door in a stationary position.

3.3 Obtaining Tools and Equipment

Obtain the following recommended or needed items for installing the SHRD60.

- 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
- Torque wrench
- Can wrench (216 tool)
- Assorted cable ties, clips, or fasteners (optional)
- 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 in front and to the sides of the SHRD60 to open the door.
- 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 pole must be able to support the weight of the SHRD60.
- Run all fiber and copper facilities to the site.

3.5 Lifting the SHRD60

See Table 1 for SHRD60 weight.

3.5.1 Required Equipment

- One derrick (crane) capable of lifting the SHRD60
- Two lifting slings or chains with a 2,500 lbs. capacity
- Connecting links to attach sling to the SHRD60's lifting bracket
- 75-ft. long tagline rope

Insert the lifting sling connecting links securely through the lifting bracket as shown in Figure 12.

3.5.2 Warnings and Specific Safety Precautions

	WARNING	Improper hoisting equipment and unsafe lifting procedures can result in serious injury or death.
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Observe the following local safety procedures when performing the tasks in this section:

- Keep the SHRD60 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 SHRD60.
- 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 crane until all stabilizers are extended and in firm contact with the ground or adequate support structure.

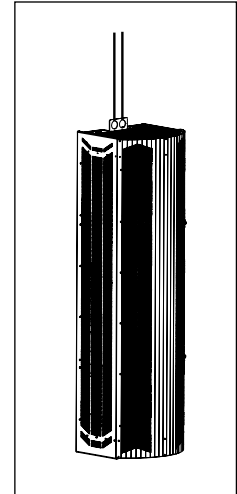


Figure 12
Lifting the SHRD60

3.6 Mounting the SHRD60

The SHRD60 can be mounted directly to the pole, however, Charles recommends using one of the two available mounting bracket kits. Kit 97-002342x-A is a mounting bracket kit that installs the SHRD60 flush against the pole. Kit 97-002309x-A, used in conjunction with kit 97-002342x-A, allows mounting with a 7” offset from the pole. Kit 97-002398x-A, used in conjunction with kit 97-002342x-A, allows mounting with a 5” offset from the pole. Kit 97-002391x-A, used in conjunction with kit 97-002342x-A, allows mounting with a 3” offset from the pole. See the documentation that ships with the kit for more information.

Clearance Note: Vented shrouds require a minimum of 12” of exterior clearance at all vents. Do not install the SHRD60 within 12” of any other equipment or objects.


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%

3.7 SHRD60 Wiring and Equipment

After the SHRD60 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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A basic electrical diagram for connecting the fans in the SH60-702018xNE7, SH60-702018xNEC, and SH60-702018xNED is shown in Figure 13.

3.7.1 Ground Connections

Use the ground bar inside the SHRD60 for grounding to earth and internal equipment. This requires a 1/4-20x5/8 two-hole lug for each connection.

3.7.2 Optional Squirrel Guard Kit

The SHRD60 can be ordered with the 96-SH60SQLGRDA kit. If ordered, the cable entry cover plate is replaced at the factory with a grommited plate that prevents squirrel intrusion into the enclosure. This kit is also available as the field kit 97-003005A-A, which is installed by the customer. To route cables into the SHRD60, cut slits in the center of the rubber grommets and pass cables through the slits. Only cut grommets that are needed for cable entry.

3.8 Customer Equipment Mounting: SH60-702018xNE1

See Figure 14 for a view of the SH60-702018xNE3 with all customer equipment installed.

1. Remove the radio mounting bracket from the rear panel. Save the hardware for reuse later.
2. Attach the radio mounting bracket to the radio using customer-provided hardware.
3. Mount the radio/mounting bracket assembly onto the rear panel using the hardware removed previously.

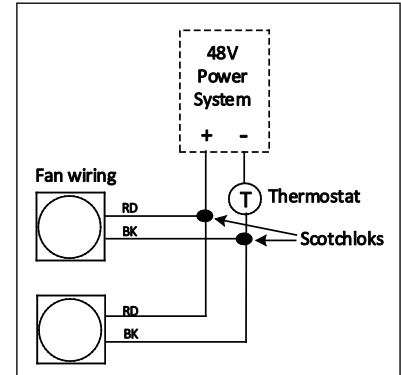


Figure 13
Fan Electrical Diagram

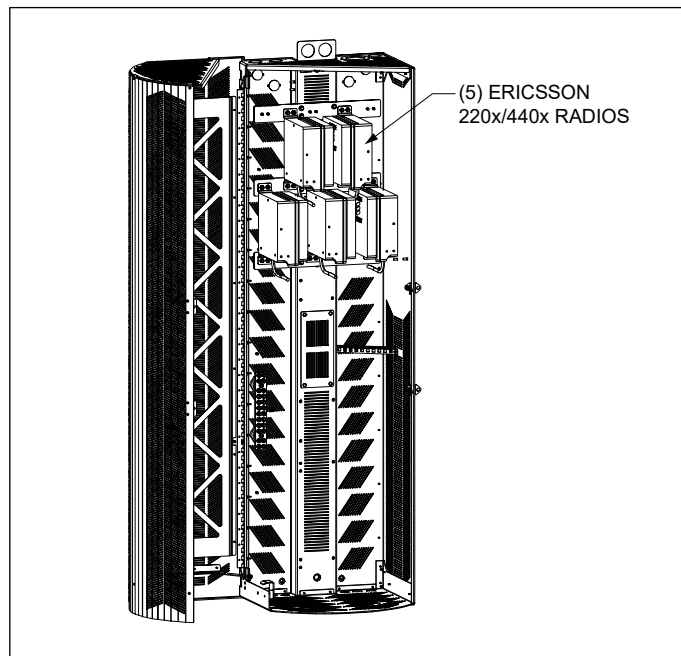


Figure 14 SH60-702018xNE1 with Equipment Installed

3.9 Customer Equipment Mounting: SH60-702018xNE3

Mount equipment in the order listed below. See Figure 15 for a view of the SH60-702018xNE3 with all customer equipment installed.

3.9.1 Power Supply Mounting

4. Remove the power supply mounting bracket from the rear spine of the SHRD60. Save the hardware.
5. Mount the power supply onto the mounting bracket using customer supplied hardware.
6. Mount the power supply/mounting bracket assembly onto the SHRD60 rear spine using hardware saved previously.

3.9.2 Quadplexer Mounting

1. Locate the quadplexer mounting bracket.
2. Mount the quadplexer on this bracket by aligning the holes on the quadplexer with the studs on the bracket.

3.9.3 Radio Mounting

1. Remove the top and bottom radio mounting brackets from the rear spine of the SHRD60. Save the hardware.
2. Mount the radio onto the mounting brackets using customer supplied hardware.
3. Mount the radio/mounting bracket assembly onto the SHRD60 rear spine using hardware saved previously.

3.9.4 AFL Fiber Box Mounting

1. Punch out the material from the center of the three mounting bosses on the back of the fiber box.
2. Remove the three Phillips head screws from the mounting bracket inside the shroud.
3. With the fiber box cover open, align the mounting bosses with the three threaded holes on the mounting bracket.
4. Install the mounting screws through the fiber box into the mounting bracket.

3.9.5 Charles Fiber Box Mounting

1. Locate the mounting tabs at the top and bottom of the fiber box.
2. Align the studs on the fiber box mounting bracket with the slots on these tabs.
3. Secure with the nuts provided with the fiber box.

3.9.6 Corning Fiber Box Mounting

1. Locate the mounting tabs on the fiber box.
2. Secure the box to the mounting bracket using two customer supplied screws.

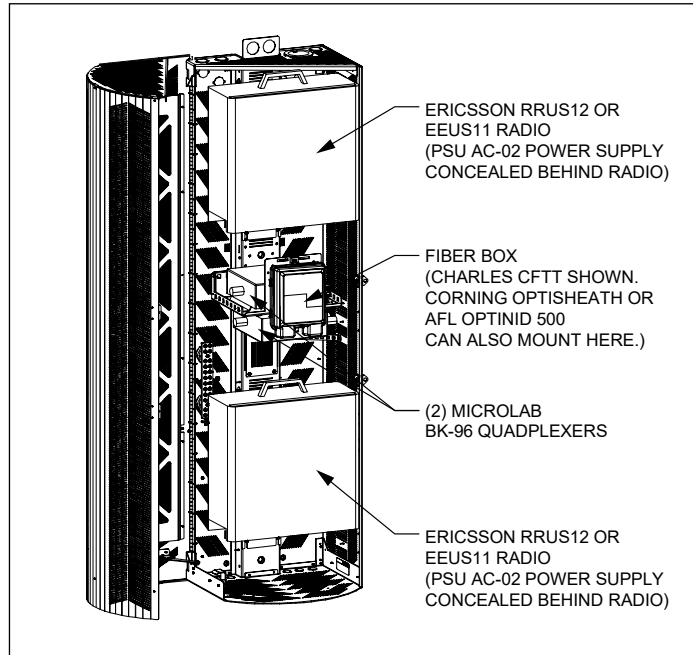


Figure 15 SH60-702018xNE3 with Equipment Installed

3.10 Customer Equipment Mounting: SH60-702018xNE4

Mount equipment in the order listed below. See Figure 16 for a view of the SH60-702018xNE4 with all customer equipment installed.

3.10.1 Diplexer Mounting

1. Remove the 1/4-20 hex nuts and washers from the diplexer mounting panel.
2. Use this hardware to mount the diplexers to this panel.

3.10.2 Radio Mounting

1. Remove the four U-channel brackets from the horizontal mounting brackets using a 7/16" wrench to remove the top two hex-head screws, lock washers, and flat washers.
2. Fasten two of the U-channel brackets to each radio using M10 x 16mm bolts
3. Lift and place the radio/U-channel bracket assembly onto the two horizontal mounting brackets and secure back down using the hardware removed previously.

3.10.3 Power Supply Mounting

1. Remove the power supply mounting bracket from the rear spine of the SHRD60. Save the hardware.
2. Mount the power supply onto the mounting bracket using customer supplied hardware.
3. Mount the power supply/mounting bracket assembly onto the SHRD60 rear spine using hardware saved previously.

3.10.4 AFL Fiber Box Mounting

1. Punch out the material from the center of the three mounting bosses on the back of the fiber box.
2. Remove the three Phillips head screws from the mounting bracket inside the shroud.
3. With the fiber box cover open, align the mounting bosses with the three threaded holes on the mounting bracket.
4. Install the mounting screws through the fiber box into the mounting bracket.

3.10.5 Charles Fiber Box Mounting

1. Locate the mounting tabs at the top and bottom of the fiber box.
2. Align the studs on the fiber box mounting bracket with the slots on these tabs.
3. Secure with the nuts provided with the fiber box.

3.10.6 Corning Fiber Box Mounting

1. Locate the mounting tabs on the fiber box.
2. Secure the box to the mounting bracket using two customer supplied screws.

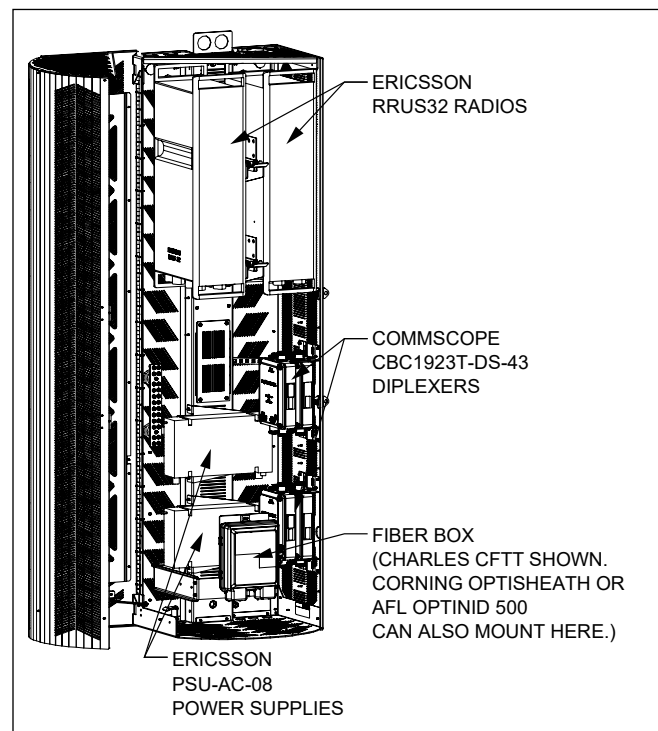


Figure 16 SH60-702018xNE4 with Equipment Installed

3.11 Customer Equipment Mounting: SH60-702018xNE7

Mount equipment in the order listed below. See Figures 18 and 19 for a view of the SH60-702018xNE7 with all customer equipment installed.

3.11.1 Ericsson 6302 Power Supply Mounting

These power supplies are used only if connecting to 240VAC. These brackets ship mounted in the correct location in the SHRD60.

1. Remove the power supply mounting brackets from the rear spine of the SHRD60 (two brackets per power supply). Save the hardware.
2. Mount one power supply onto two mounting brackets using customer supplied hardware.
3. Mount the power supply/mounting bracket assembly onto the SHRD60 rear spine using hardware saved previously (Figure 14).

3.11.2 Ericsson AC-08 Power Supply Mounting

These power supplies are used if connecting to either 120VAC or 240VAC. Two brackets ship loose in the SHRD60.

1. Remove the 6302 brackets in the lower right corner of the SHRD60.
2. Locate the two AC-08 brackets.
3. Attach an AC-08s to each of these brackets using hardware included with the power supply.
4. Mount the bracket/power supply assemblies to the SHRD60, in the locations formerly occupied by the 6302 brackets (Figure 15).
5. Mount the third AC-08 to the bottom-right section of the heat shield using customer supplied hardware (Figure 15).
6. Mount the final two AC-08s to the mounting locations on the heat shield (Figure 15)

3.11.3 Ericsson 220x/440x Radio Mounting

1. Remove the screw at the top of the fiber box mounting bracket and pivot this bracket downward to allow access to the radio brackets. Save this screw.
2. Remove the radio mounting bracket. Save the hardware for reuse later.
3. Attach the radio mounting bracket to the radio using customer-provided hardware.
4. Place the radio/mounting bracket assembly onto the mounting support using the hardware removed previously. Make sure the mounting holes are on the right
5. Move the fiber box mounting bracket back into its upright position and replace the screw that holds it in place.

3.11.4 Diplexer Mounting

1. Remove the 1/4-20 hex nuts and washers from the diplexer mounting panel.
2. Use this hardware to mount the diplexers to this panel.

3.11.5 Ericsson 4449 and 8843 Radio Mounting

These radios are mounted on hanging brackets (Figure 17).

1. Loosen the 1/4-20 screws on the bottom of each hanging bracket.
2. Lift the hanging bracket off of the bracket plate (plate stays on SHRD60 wall).
3. Attach the hanging bracket to the equipment with customer supplied hardware.
4. Return the hanging bracket to its position in the plate and tighten the screws.

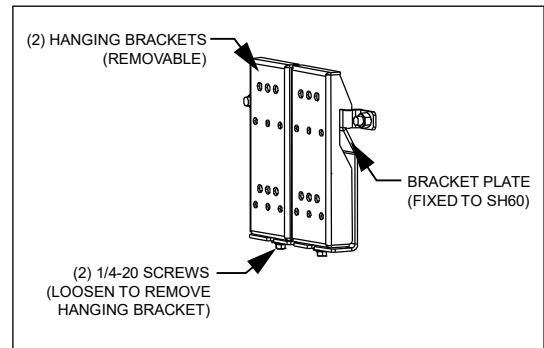


Figure 17 Hanging Brackets

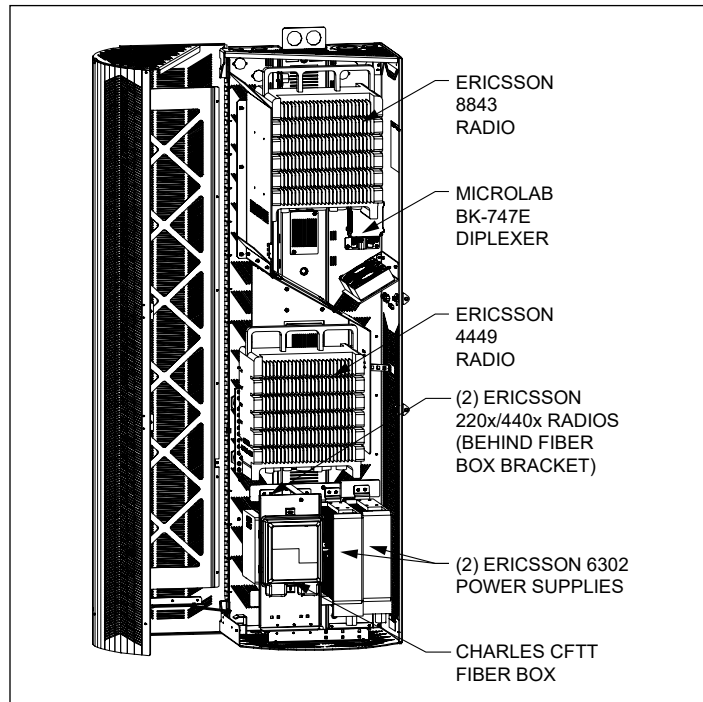
3.11.6 Charles Fiber Box Mounting

1. Ensure that the screw at the top of the bracket is securely fastened.
2. Remove the two mounting screws from the bracket.
3. Locate the mounting tabs at the top and bottom of the fiber box. Align these holes with the screw holes on the bracket and use the screws removed previously to secure the box to the bracket.
4. Use the square cutouts near the bottom of the bracket as tie-down points for fibers entering and exiting the box.

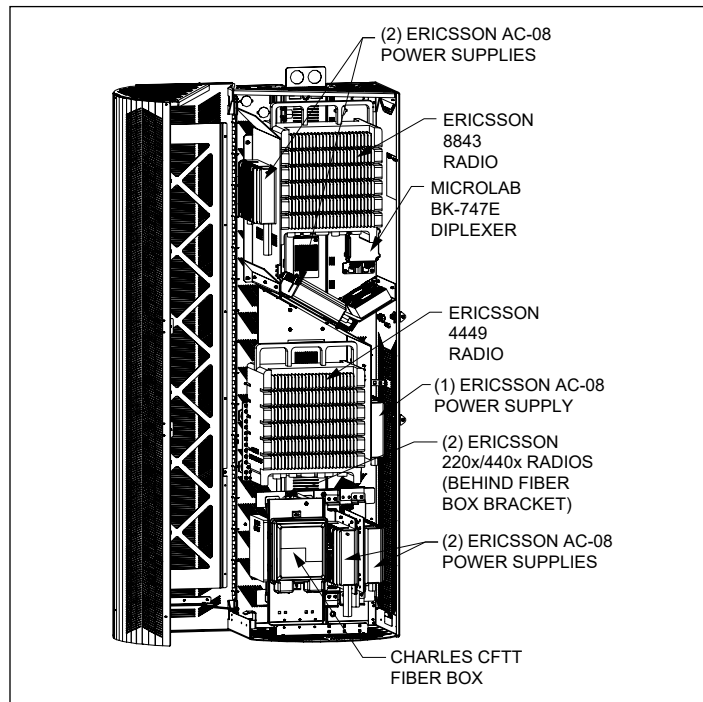
3.11.7 Fan Connection

If using the 6302 power supply, then connect the two fans to a spare output on the power supply. See Figure 13 for connection information.

If using the AC-08 power supplies, then there is no spare output for the fans. However, the 96-AC48PSUSH601 kit can be ordered, which contains a Meanwell power supply specifically used for the fans. This kit is ordered with the SHRD60 and is installed at the factory.



**Figure 18 SH60-702018xNE7 with Equipment Installed:
Ericsson 6302 Configuration**



**Figure 19 SH60-702018xNE7 with Equipment Installed:
Ericsson AC-08 Configuration**

3.11.8 SH60-702018xNE7, Single Radio Configuration

This configuration only houses a single Ericsson dual-band radio (either 8843 or 4449), along with the two Ericsson 220x/440x radios. This configuration only requires one Ericsson 6302 or two Ericsson AC-08 power supplies, leaving space for an additional diplexer mounted on the power supply bracket (either Commscope CBC1923Q-43, Commscope SDX1926Q-43 or Kaelus DBC0219F1V1-1). This configuration is shown in Figure 20.

3.11.9 SHRD60 with 96-000011-A Kit

Charles offers the optional 96-000011-A kit. This kit is factory installed and includes a CFIT fiber enclosure mounted in place of the Ericsson 4449 radio. This configuration is similar to the single radio configuration and is shown in Figure 21.

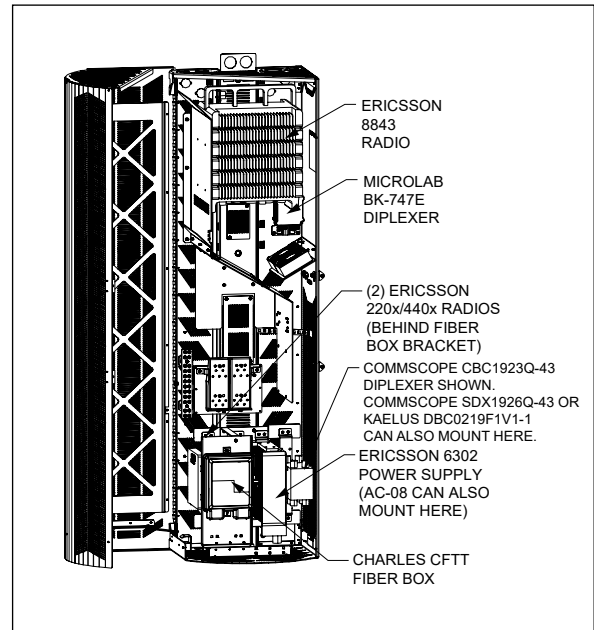


Figure 20
SH60-702018xNE7 with Single Dual-band Radio

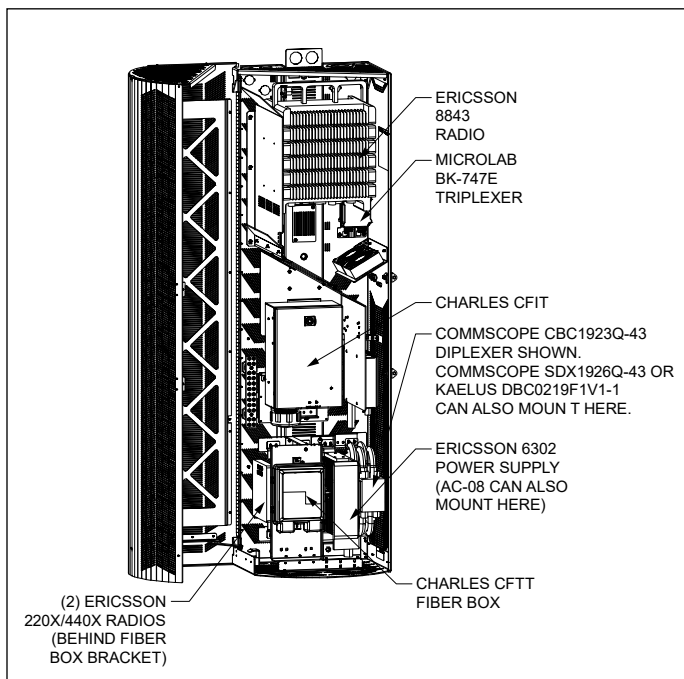


Figure 21
SH60-702018xNE7 with Single Dual-band Radio
And CFIT Enclosure

3.11.10 SH60-702018xNE7 with AC Disconnect Kit

The SH60-702018xNE7 can be ordered with the 96-RCP6533SH600 kit, which includes brackets for one Raycap RSCAC-6533-P-120D AC disconnect device. These brackets are installed at the factory. If this option is preferred, then the SHRD60 will no longer support the fiber box or the Ericsson 220x/440x radios.

If installing the Raycap device, it is necessary to first remove the fiber box bracket assembly (Figure 22). Then install the Raycap device on the angled sides of the Raycap brackets using customer supplied hardware (Figure 23).

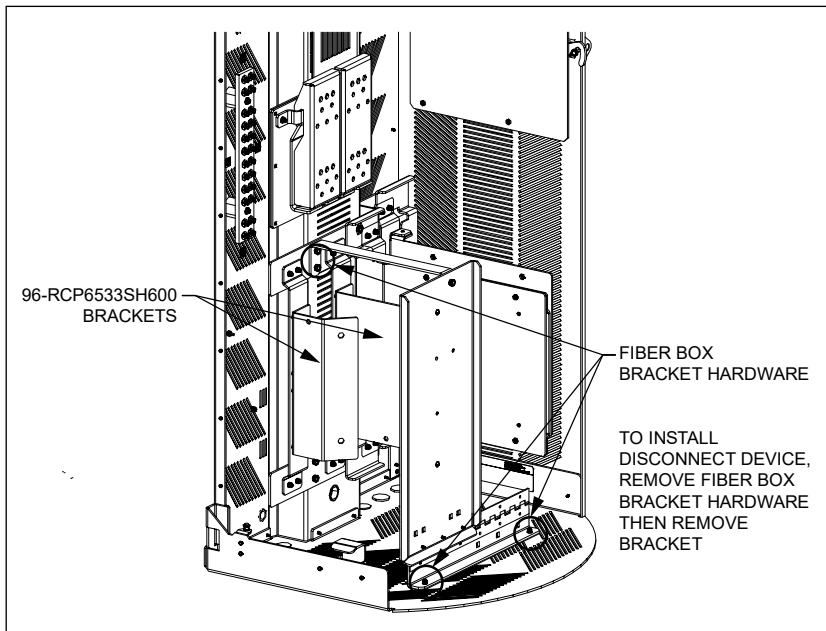


Figure 22
SH60-702018xNE7 with 96-RCP6533SH60

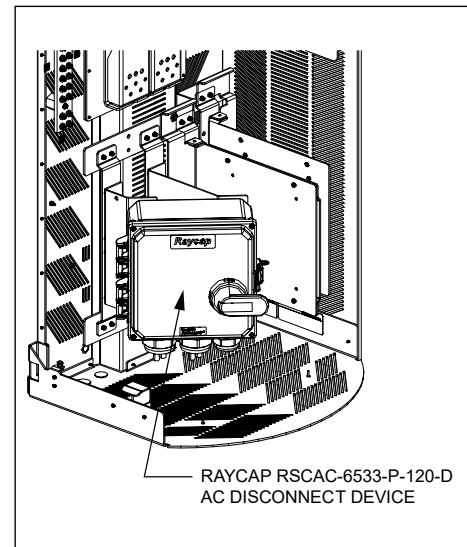


Figure 23
SH60-702018xNE7 with Raycap Device

3.12 Customer Equipment Mounting: SH60-702018xNEC

Mount equipment in the order listed below. See Figures 25-26 for views of the SH60-702018xNEC with all customer equipment installed.

3.12.1 Ericsson 6302 Power Supply Mounting

Use this power supply only if connecting to 240VAC.

1. Remove the power supply mounting bracket from the rear panel of the SHRD60. Save the hardware.
2. Attach the power supply to the bracket using customer supplied hardware.
3. Mount the power supply/mounting bracket assembly onto the SHRD60 rear panel using hardware saved previously.

3.12.2 Ericsson AC-08 Power Supply Mounting

Use these power supplies if connecting to either 120VAC or 240VAC.

1. Attach one AC-08 to the left side of the topmost section of the heat deflector panel using customer supplied hardware.
 2. The second AC-08 can be mounted in either of two locations:
 - Remove the mounting plate from the middle (angled) section of the heat deflector panel. Attach the plate to the second AC-08 using customer supplied hardware. Mount this assembly back onto the heat deflector panel using hardware removed previously.
- OR
- Attach the radio to the left side of the heat deflector panel, just below the first AC-08. Use this location if needed to increase clearance underneath the upper radio.

3.12.3 Ericsson 6308 Power Supply Mounting

Use this power supply if connecting to either 120VAC or 240VAC.

The L-shaped bracket for this power supply is located directly under the cable entry port on the SHRD60 central spine. Mount the power supply onto the right side of the forward-facing leg of this bracket using customer supplied hardware.

3.12.4 Ericsson 220x/440x Radio Mounting

1. Remove the screw at the top of the fiber box mounting bracket and pivot this bracket downward to allow access to the radio brackets. Save this screw.
2. Remove the radio mounting bracket. Save the hardware.
3. Attach the radio mounting bracket to the radio using customer supplied hardware.
4. Mount the radio/mounting bracket assembly onto the SHRD60 using the hardware removed previously.
5. Move the fiber box mounting bracket back into its upright position and replace the screw that holds it in place.

3.12.5 Ericsson 4449/8843/4490/4890 Radio Mounting

These radios are mounted on hanging brackets (Figure 24).

1. Loosen the 1/4-20 screws on the bottom of each hanging bracket.
2. Lift the hanging brackets off of the bracket plate (plate stays on SHRD60 wall).
3. Attach the hanging brackets to the equipment with customer supplied hardware.
4. Return the hanging bracket to its position on the plate and tighten the screws.

3.12.6 Ericsson 4455/4435 Radio Mounting

The L-shaped bracket for this power supply is located on the lower left section of the SHRD60 rear wall. Mount the radio onto the right side of the forward-facing leg of this bracket using customer supplied hardware.

3.12.7 Charles Fiber Box Mounting

1. Ensure that the screw at the top of the bracket is securely fastened.
2. Remove the two mounting screws from the bracket.
3. Locate the mounting tabs at the top and bottom of the fiber box. Align these holes with the screw holes on the bracket and use the screws removed previously to secure the box to the bracket.
4. Use the square cutouts near the bottom of the bracket as tie-down points for fibers entering and exiting the box.

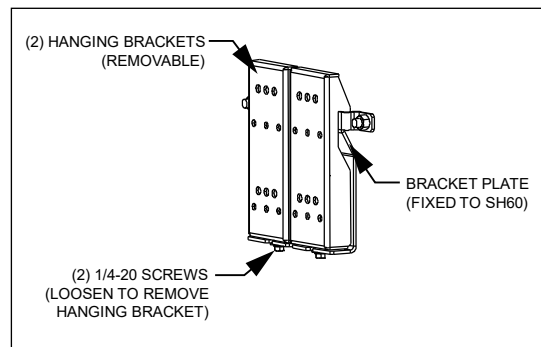


Figure 24 Hanging Brackets

3.12.8 Fan Connection

If using the 6302 or 6308 power supply, then connect the two fans to a spare output on the power supply. See Figure 13 for connection information.

If using the AC-08 power supplies, then there is no spare output for the fans. However, the 96-AC48PSUSH601 kit can be ordered, which contains a Meanwell power supply specifically used for the fans. This kit is ordered with the SHRD60 and is installed at the factory.

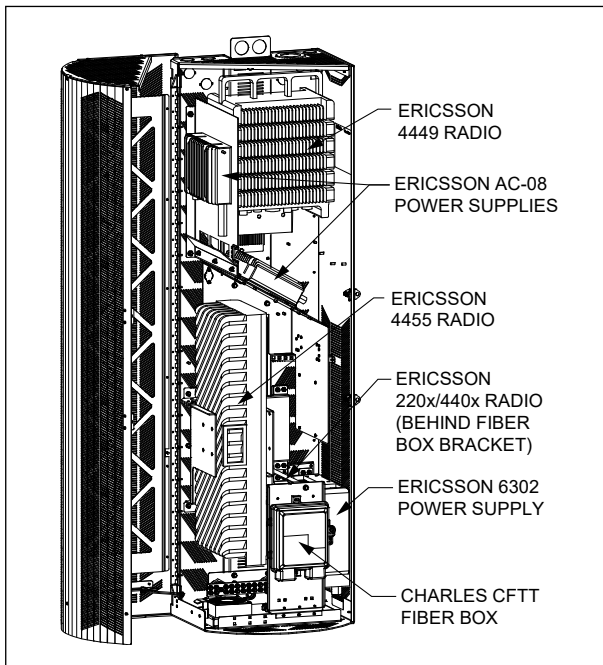


Figure 25
SH60-702018xNEC with 8843/4449 Radio

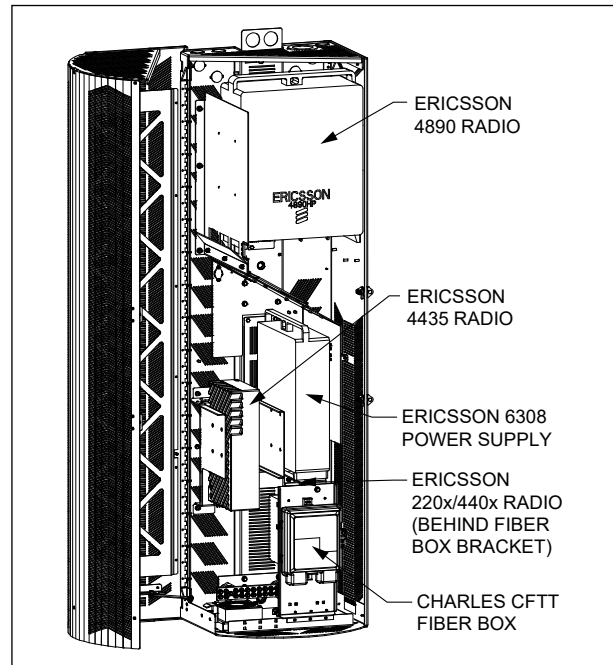


Figure 26
SH60-702018xNEC with 4890 Radio

3.13 Customer Equipment Mounting: SH60-702018xNED

Mount equipment in the order listed below. See Figure 29 for a view of the SH60-702018xNED with all customer equipment installed.

3.13.1 Ericsson 8863 Radio Mounting

This radio is mounted on hanging brackets (Figure 28).

1. Loosen the 1/4-20 screws on the bottom of each hanging bracket.
2. Lift the hanging bracket off of the bracket plate (plate stays on SHRD60 wall).
3. Attach the radio to the front of the radio bracket using customer supplied hardware.
4. Return the hanging bracket to its position on the plate and tighten the screws.

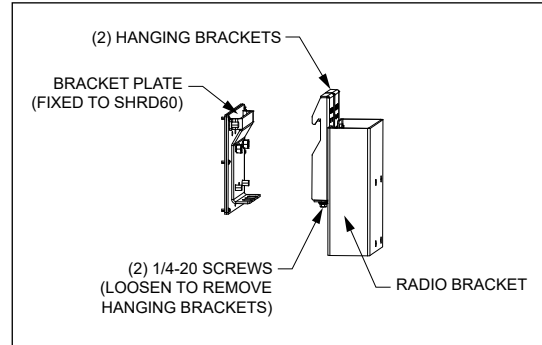


Figure 28 Hanging Brackets

3.13.2 Commscope CBC1726T-4310 Diplexer Mounting

Mount the first diplexer to the angled section on the heat deflector panel using customer supplied hardware.

For the second diplexer:

1. Remove the diplexer mounting bracket from the rear panel of the SHRD60. Save the hardware.
2. Attach the diplexer to the bracket using customer supplied hardware.
3. Mount the diplexer/mounting bracket assembly onto the SHRD60 rear panel using hardware saved previously.

3.13.3 Ericsson AC-08 Power Supply Mounting

Mount the AC-08 power supply to the right side of the heat deflector’s bottom section.

3.13.4 Ericsson 6304 Power Supply Mounting

1. Remove the power supply mounting bracket from the rear panel of the SHRD60, below the angled section of the heat deflector panel. Save the hardware.
2. Attach the power supply to the bracket using customer supplied hardware.
3. Mount the power supply/mounting bracket assembly onto the SHRD60 rear panel using hardware saved previously.

3.13.5 Ericsson 220x/440x Radio Mounting

1. Prior to mounting, remove the bolt at the top of the CFTT bracket. This bracket is hinged. Swing the bracket forward and down to access the 220x/440x radio bracket.
2. Remove the radio mounting bracket from the rear panel of the SHRD60. Save the hardware.
3. Attach the radio to the bracket using customer supplied hardware.
4. Mount the radio/mounting bracket assembly onto the SHRD60 rear panel using hardware saved previously.

3.13.6 CFTT Fiber Box or Ericsson 6585 FrontHaul Mounting

1. Swing the hinged bracket back into its upright position and secure using the bolt removed previously.
2. Mount the CFTT or FrontHaul device onto the front of the bracket. If mounting the CFTT, use the hardware included with the SHRD60. If using the 6585, hardware is customer supplied.
3. Use the square cutouts near the bottom of the bracket as tie-down points for fibers entering and exiting the box.

3.13.7 Ericsson 4455 Radio Mounting

Mount the 4455 radio to the right side of the forward-directed panel on the bracket using customer supplied hardware.

3.13.8 Fan Connection

If using the 6302 power supply, then connect the two fans to a spare output on the power supply. See Figure 13 for connection information.

If using the AC-08 power supplies, then there is no spare output for the fans. However, the 96-AC48PSUSH601 kit can be ordered, which contains a Meanwell power supply specifically used for the fans. This kit is ordered with the SHRD60 and is installed at the factory.

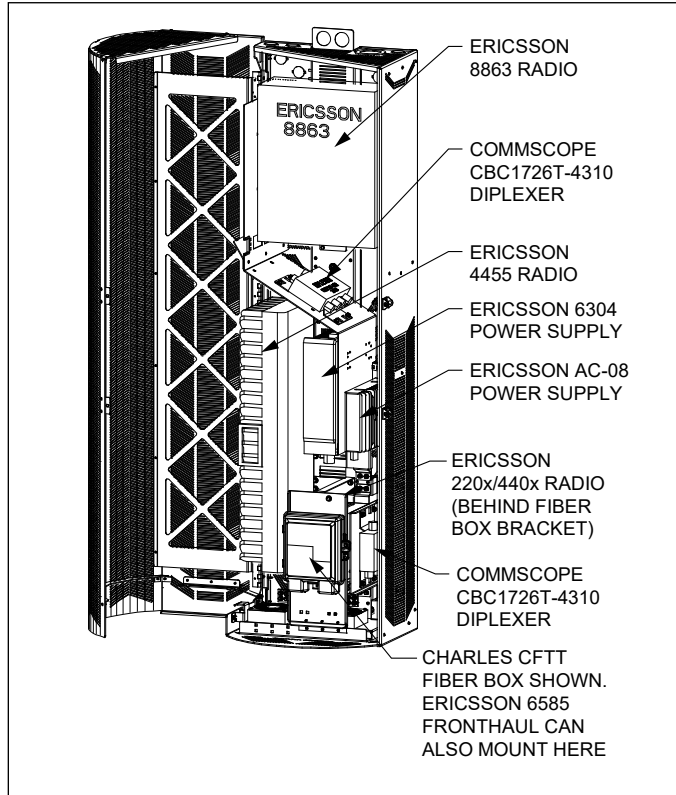


Figure 29
SH60-702018xNED with Equipment Installed

3.14 Customer Equipment Mounting: SH60-702018xNEG

Mount equipment in any order. See Figure 30 for a view of the SH60-702018xNEG with all customer equipment installed.

3.14.1 Ericsson 4435 Mounting

The 4435 radio brackets are L-shaped, with one leg extending forward. Mount the radios onto the right side of the forward-facing leg using customer supplied hardware. It is simplest to start by mounting the rightmost radio, then the center radio, then the leftmost radio.

3.14.2 Ericsson 220x/440x Mounting

1. Remove the radio bracket from the SHRD60 rear panel.
2. Secure the radio to the bracket using customer supplied hardware.
3. Attach the radio/bracket assembly to the SHRD60 using hardware removed previously.

3.14.3 Diplexer/Triplexer Mounting

1. Remove the diplexer/triplexer bracket from the SHRD60 rear panel.
2. Secure the diplexer or triplexer to the bracket using customer supplied hardware.
3. Attach the diplexer/bracket assembly to the SHRD60 using hardware removed previously.

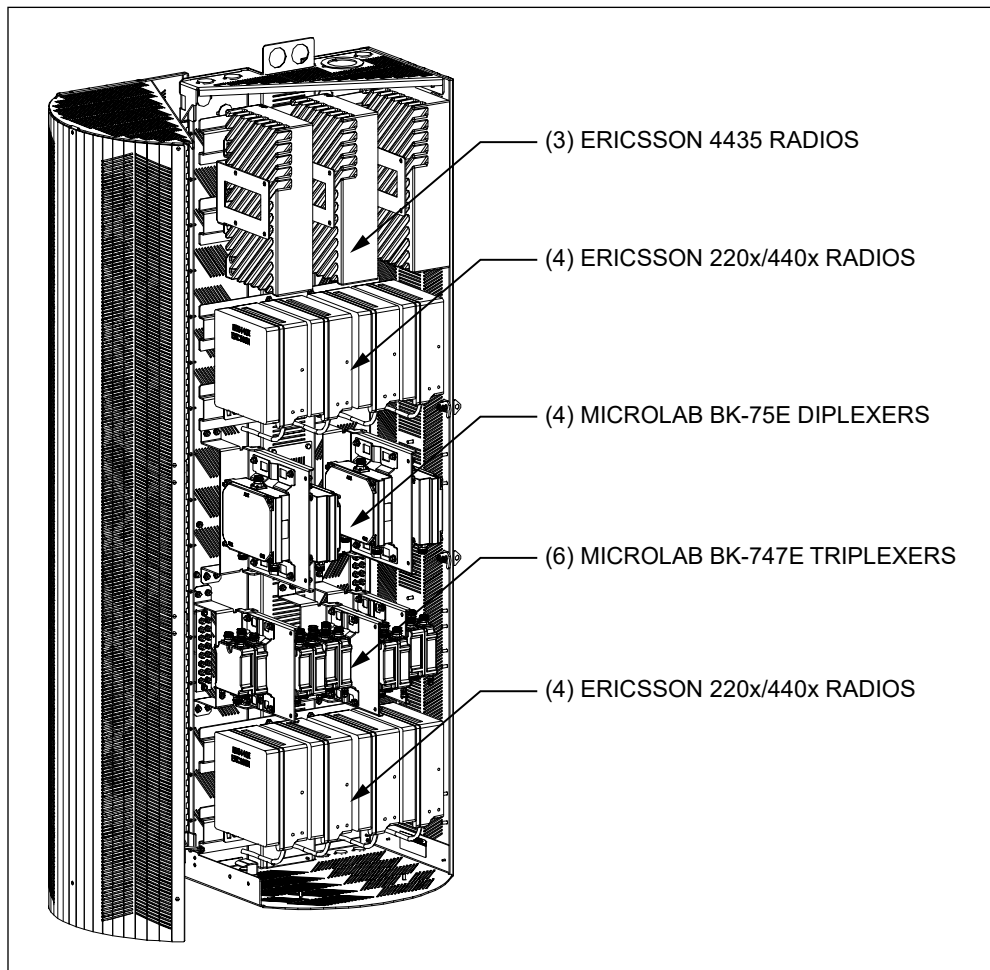


Figure 30
SH60-702018xNEG with Equipment Installed

3.15 Customer Equipment Mounting: SH60-702018xNP2

Mount equipment in the order listed below. See Figure 31 for a view of the SH60-702018xNP2 with all customer equipment installed.

3.15.1 Diplexer Mounting

1. Remove the 1/4-20 hex nuts and washers from the diplexer mounting panel.
2. Use this hardware to mount the diplexers to this panel.

3.15.2 Coupler Mounting

1. Set the coupler into position on the bracket, aligning the holes in the coupler with the holes in the bracket.
2. Secure the coupler into position using four customer supplied screws into the PEM nuts on the bracket.

3.15.3 Radio Mounting

1. Remove the four Keps nuts from the corners of the radio mounting bracket in the SHRD60. Save this hardware.
2. The Commscope radio comes with a wall mounting bracket. Mount this Commscope bracket onto the SHRD60 radio bracket using the four Keps nuts.
3. Hang the Commscope radio onto the Commscope bracket.

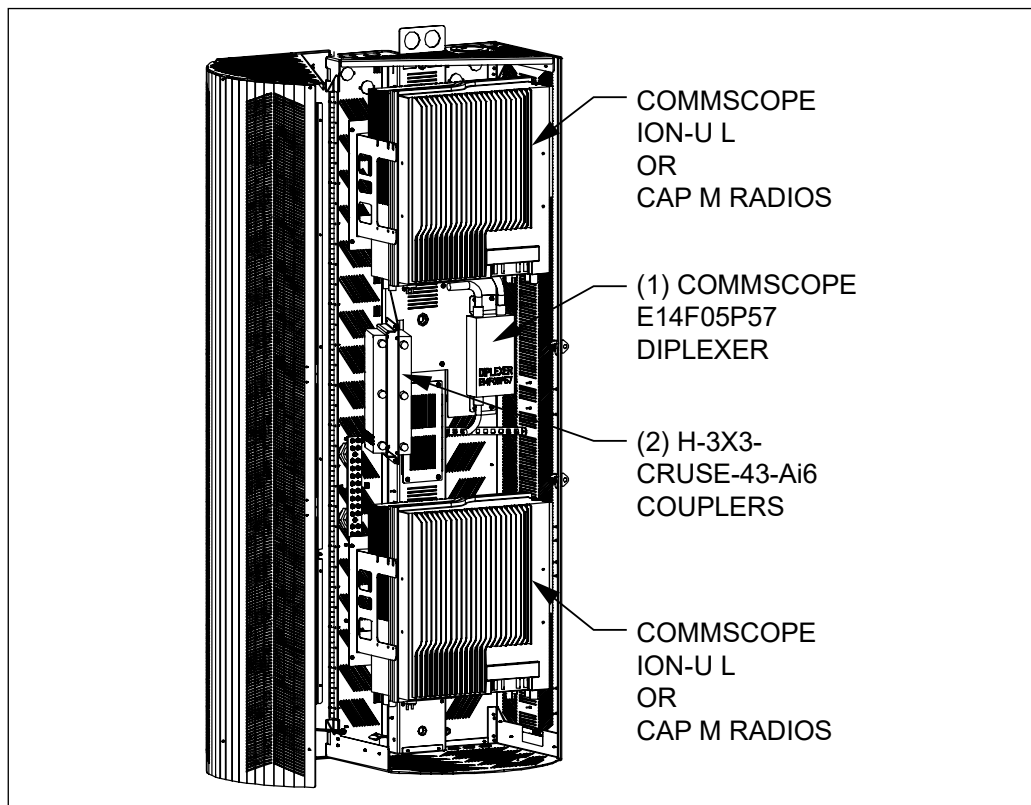


Figure 31 SH60-702018xNP2 with Equipment Installed

3.16 Customer Equipment Mounting: SH60-702018xNXX

SH60-702018xNXX configurations must be ordered with the correct mounting brackets for the preferred radio configuration (bracket kits are sold separately). All configurations can also support a fiber enclosure. See Table 3 for a full list of available configurations and the kits required for each. See Figures 32 through 39 for views of the SH60-702018xNXX with radios and other customer supplied equipment installed.

3.16.1 Diplexer Mounting

1. Remove the 1/4-20 hex nuts and washers from the shroud inner side panel.
2. Mount the diplexers to this panel with the hardware removed previously.

Note: in some configurations, diplexers are mounted on separate brackets.

3.16.2 Radio Mounting

1. Remove the radio mounting bracket from the rear spine. Save the hardware for reuse later.
2. Attach the radio mounting bracket to the radio using customer-provided hardware.
3. Place the radio mounting bracket with the radio onto the mounting support using the hardware removed previously.

3.16.3 Power Supply Mounting

To mount the power supply to the PSU mounting bracket, follow these steps:

1. Remove the power supply mounting bracket from the rear spine. Save the hardware for reuse later.
2. Attach the power supply to the mounting bracket using four customer-provided screws.
3. Replace the power supply and mounting bracket assembly onto the mounting support using the hardware removed previously.

3.16.4 AFL Fiber Box Mounting

1. Punch out the material from the center of the three mounting bosses on the back of the fiber box.
2. Remove the three Phillips head screws from the mounting bracket inside the shroud.
3. With the fiber box cover open, align the mounting bosses with the three threaded holes on the mounting bracket.
4. Install the mounting screws through the fiber box into the mounting bracket.

3.16.5 Charles Fiber Box Mounting

1. Locate the mounting tabs at the top and bottom of the fiber box.
2. Align the studs on the fiber box mounting bracket with the slots on these tabs.
3. Secure with the nuts provided with the fiber box.

3.16.6 Corning Fiber Box Mounting

1. Locate the mounting tabs on the fiber box.
2. Secure the box to the mounting bracket using two customer supplied screws.

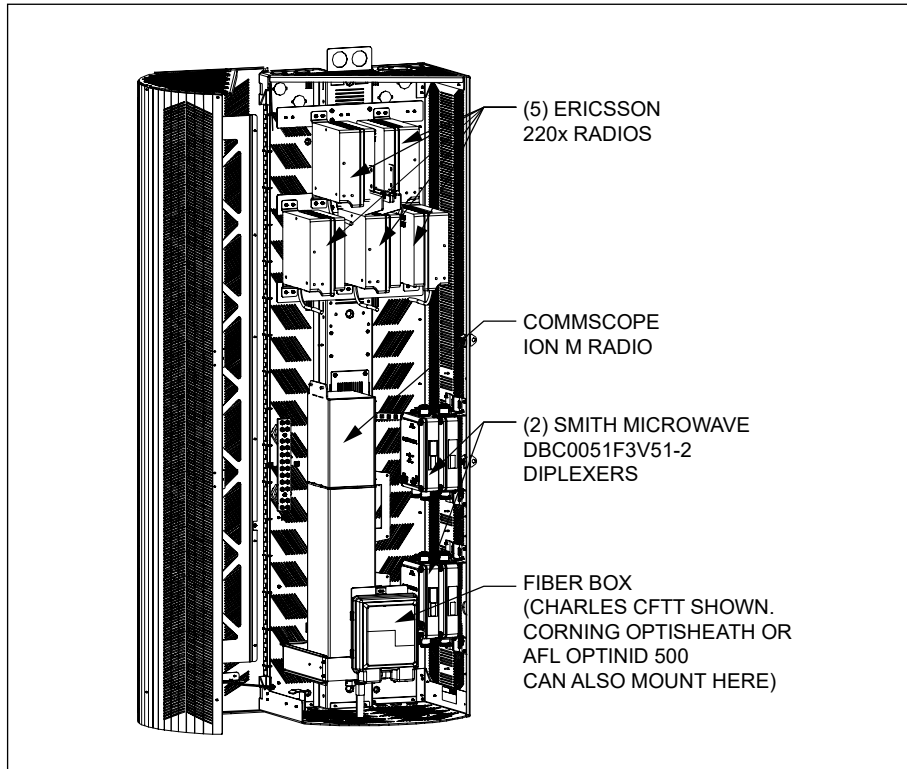


Figure 32 SH60-702018xNXX with Equipment Installed (96-E2203SHRD1-A and 96-CIONMSHRD1-A)

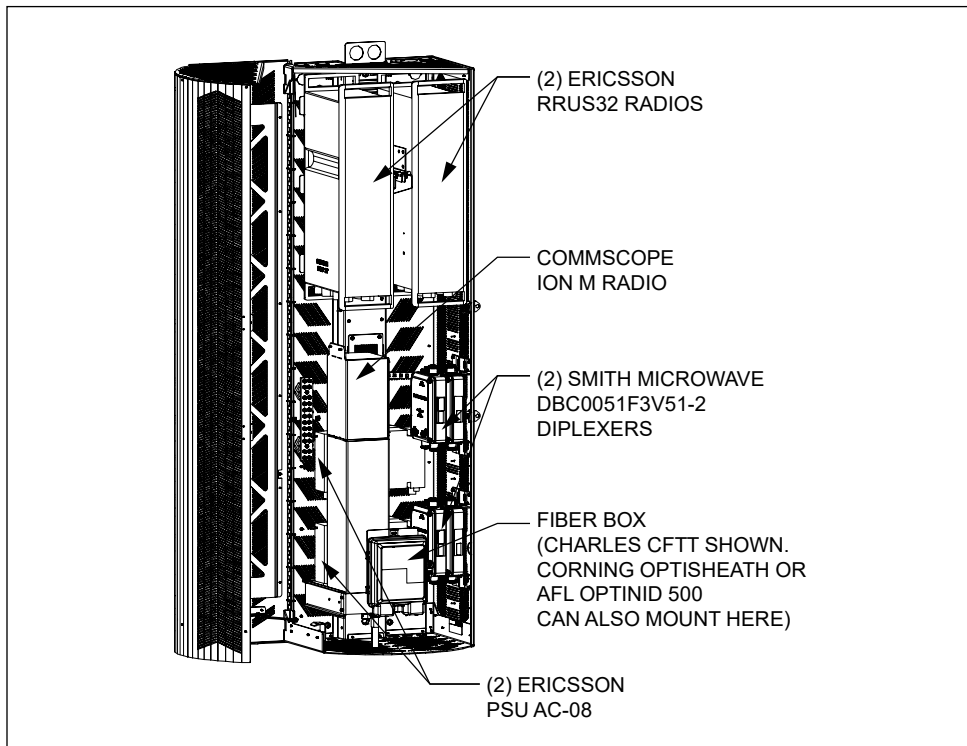


Figure 33 SH60-702018xNXX with Equipment Installed (96-RUS32SHRD1-A and 96-CIONMSHRD1-A)

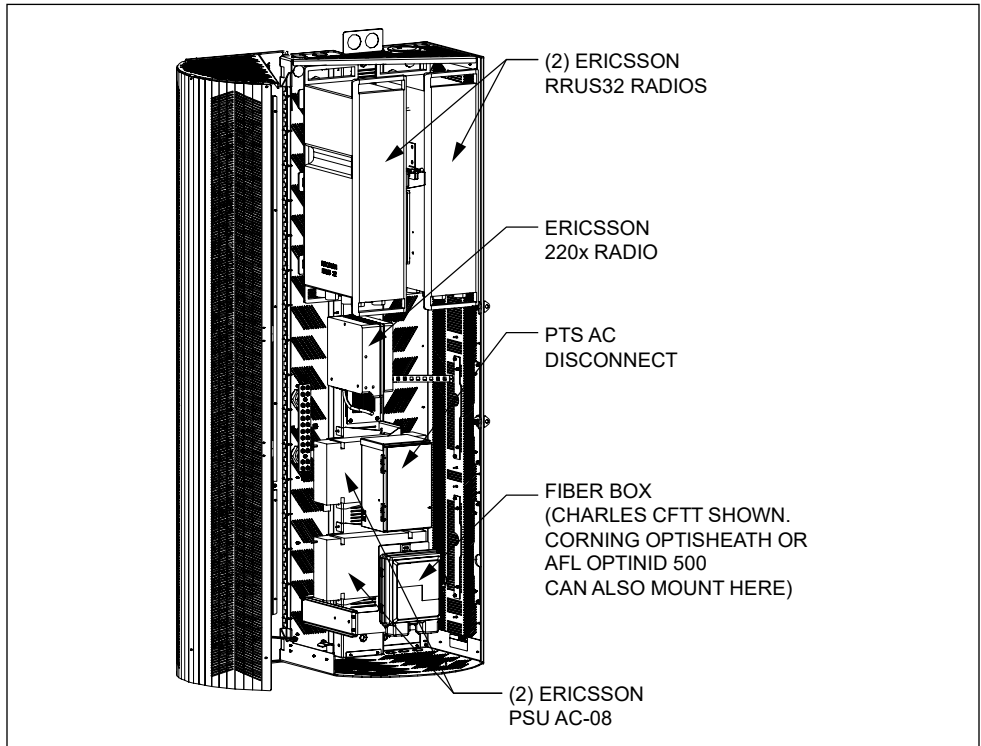


Figure 34 SH60-702018xNXX with Equipment Installed (96-RUS32SHRD1-A, 96-E2203SHRD2-A, and 96-PT901204FF7)

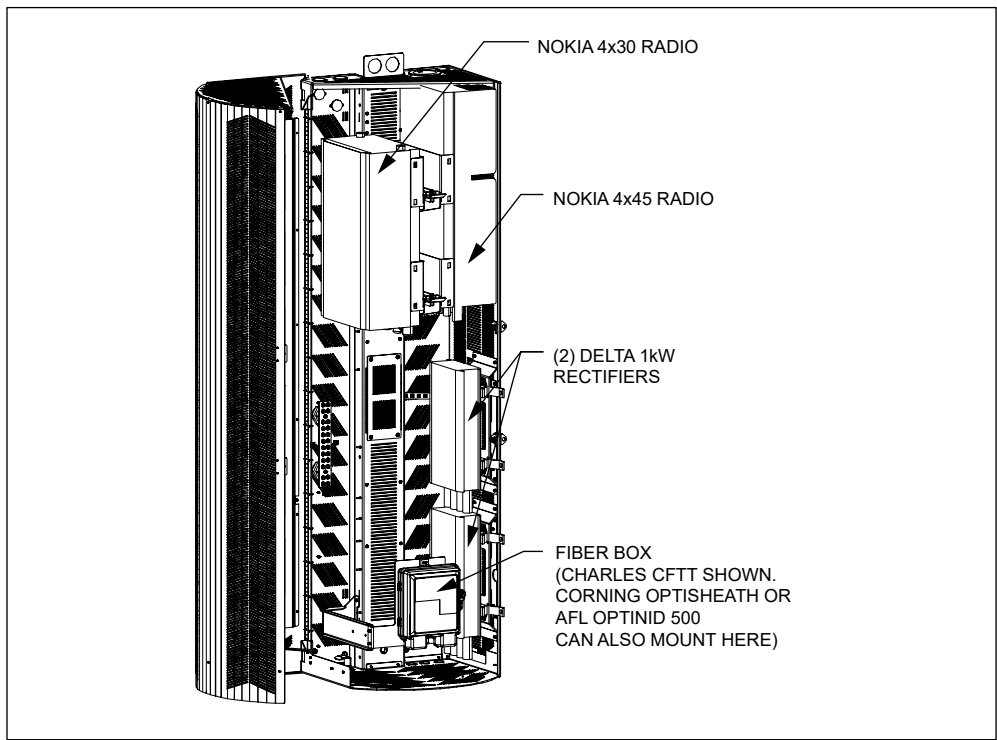


Figure 35 SH60-702018xNXX with Equipment Installed (96-N4X45SHRD1-A)

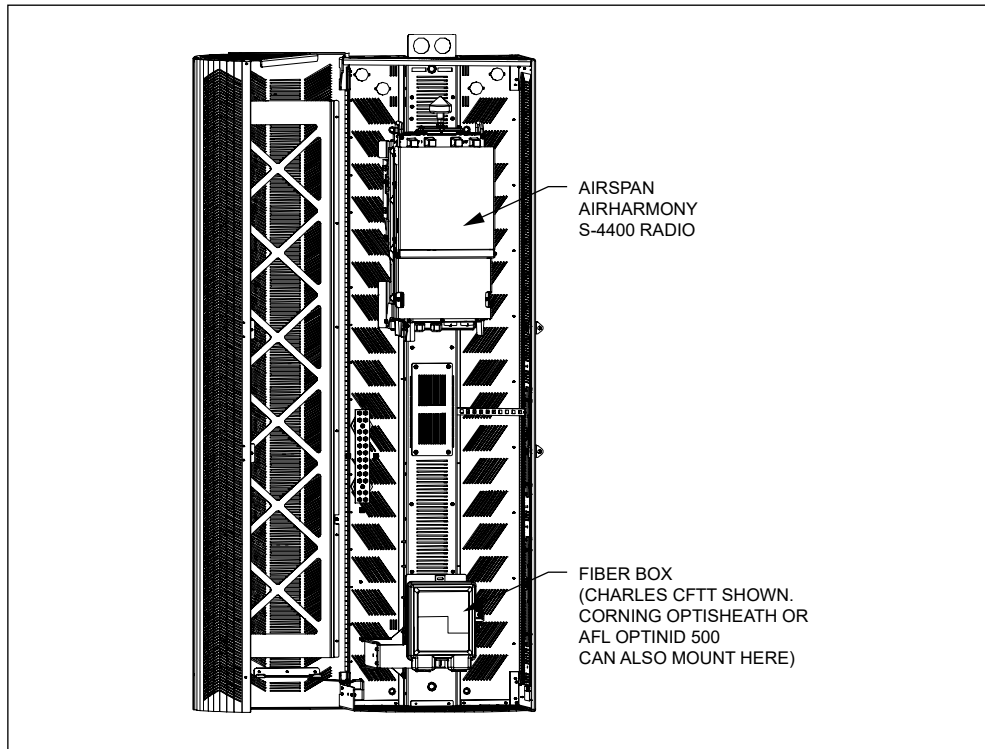


Figure 36 SH60-702018xNXX with Equipment Installed (96-CRNCIN70CFG1)

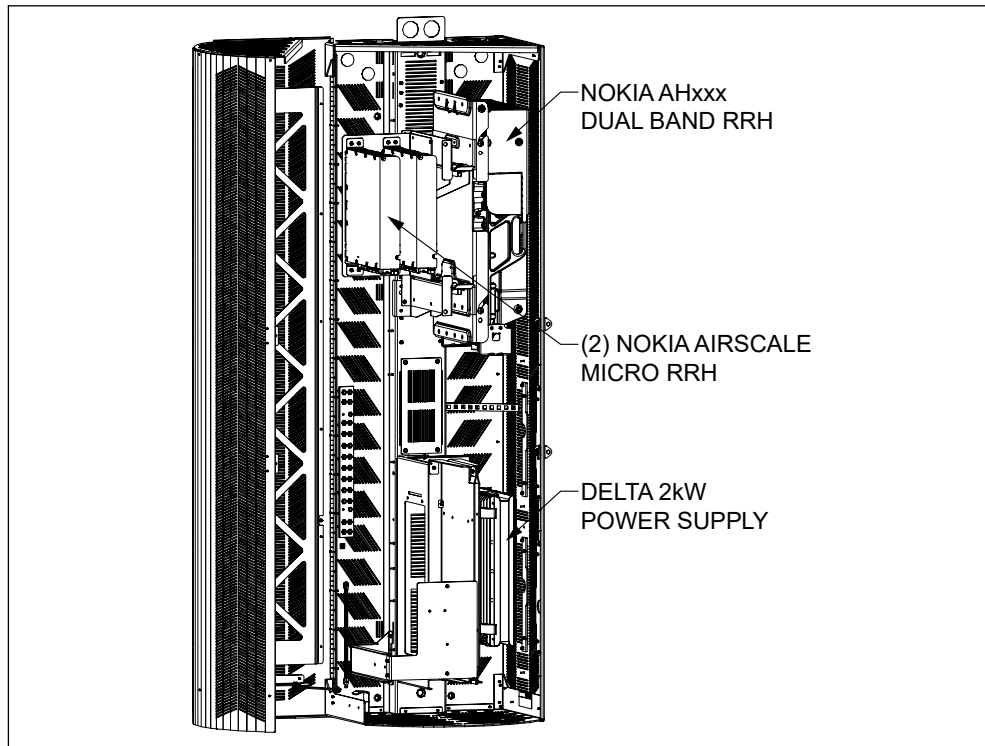


Figure 37 SH60-702018xNXX with Equipment Installed (96-NASDBSHRD1-A)

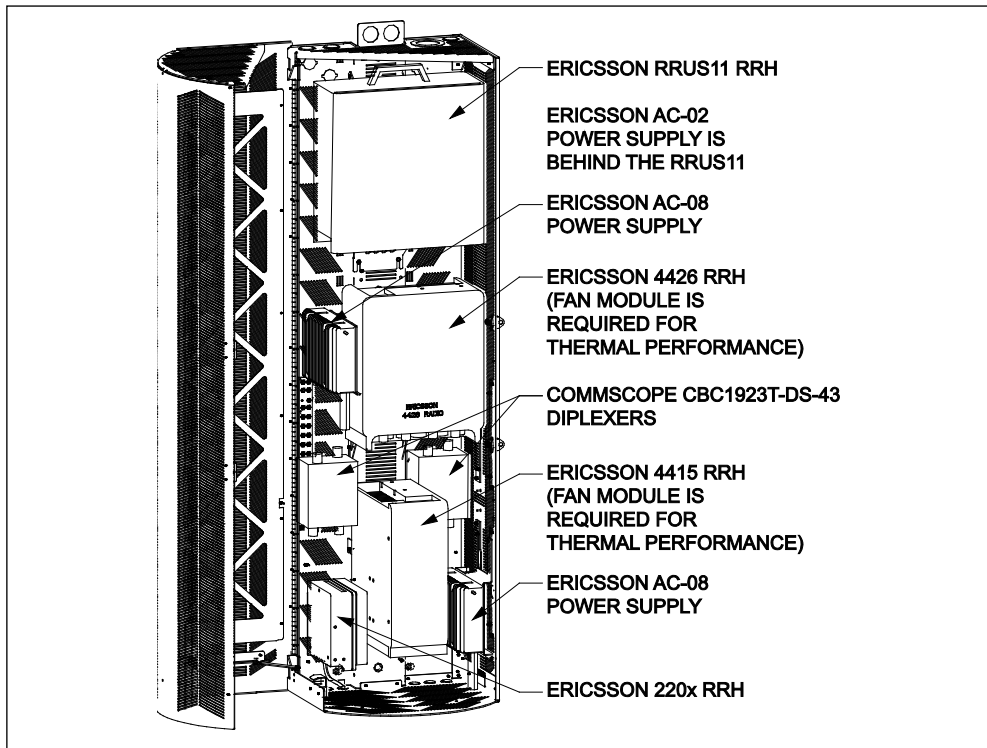


Figure 38 SH60-702018xNXX with Equipment Installed (96-SH6070NEB1-A)
 Note: this configuration operates up to a max. ambient temperature of 38°C

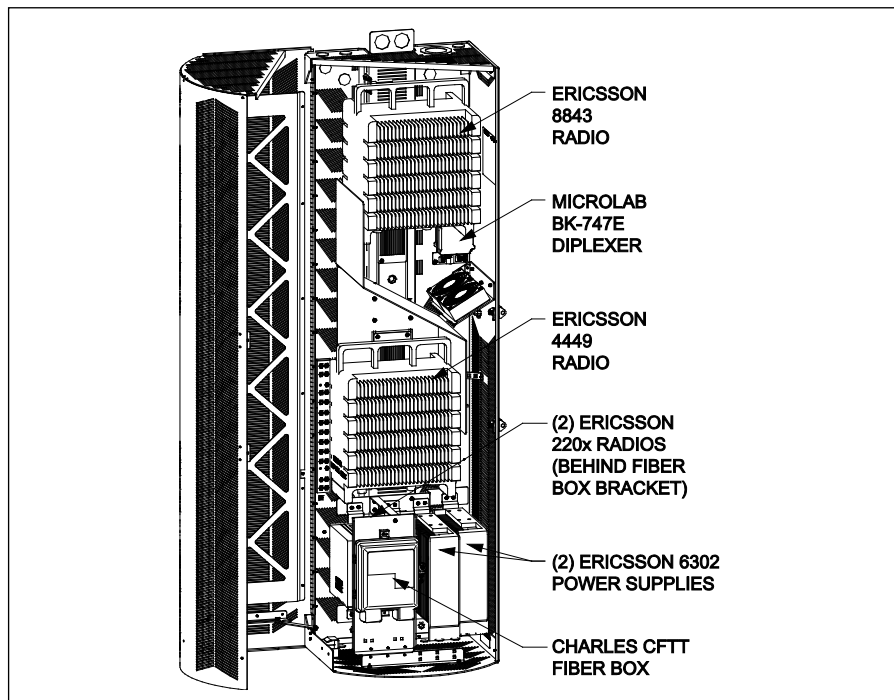


Figure 39 SH60-702018xNXX with Equipment Installed (96-EHP7020181-A)

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 buildup around the door and locking mechanism. A commercial aerosol de-icer spray can be used to free up locks and latches if needed.

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 SHRD60 product. The Charles warranty is limited to the operation of the SHRD60 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 the 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 Product Specifications

Physical	
Dimensions	70"Hx20"Wx18"D
Weight	SH60-702018xNE1: approx. 100 lbs. as shipped, 150 lbs. with equipment SH60-702018xNE3: approx. 150 lbs. as shipped, 320 lbs. with equipment SH60-702018xNE4: approx. 111 lbs. as shipped, 260 lbs. with equipment SH60-702018xNE7: approx. 181 lbs. as shipped, 428 lbs. with equipment SH60-702018xNEC, with 8863/4449: approx. 198 lbs. as shipped, 402 lbs. with equipment SH60-702018xNEC, with 4890: approx. 198 lbs. as shipped, 390 lbs. with equipment SH60-702018xNED: approx. 208 lbs. as shipped, 385 lbs. with equipment SH60-702018xNEG: approx. 182 lbs. as shipped, 433 lbs. with equipment SH60-702018xNP2: approx. 127 lbs. as shipped, 226 lbs. with equipment SH60702018xNXX: approx. 92 lbs. as shipped Weight with equipment: 96-E2203SHRD1-A and 96-CIONMSHRD1-A: Approx. 242 lbs. 96-RUS32SHRD1-A and 96-CIONMSHRD1-A: Approx. 336 lbs. 96-E2203SHRD2-A and 96-RUS32SHRD1-A: Approx. 350 lbs. 96-E2203SHRD2-A, 96-RUS32SHRD1-A, and 96-PT901204FF7: Approx. 255 lbs. 96-N4X45SHRD1-A: Approx. 235 lbs. 96-CRNCIN70CFG1: Approx. 156 lbs. 96-NASDBSHRD1-A: Approx. 274 lbs. 96-SH6070NEB1-A: Approx. 210 lbs. 96-EHP7020181-A: Approx. 428 lbs.
Material	Spine: 12 gauge steel Door and sides: 0.125" aluminum
Electrical	
Bonding and Grounding	One 2x14 position ground bar
Cable Entrance	Refer to Figure 2
Supported Customer Equipment	SH60-702018xNE1: (5) Ericsson 220x/440x radios SH60-702018xNE3: (2) Ericsson RRUS12 or (2) RRUL11 2x40W radios, (2) Ericsson AC-02 power supplies, (2) Microlab BK-96 quadplexers, and (1) fiber box (Charles CFTT, Corning OptiSheath, or AFL OptiNID 500) SH60-702018xNE4: (2) Ericsson RRUS32 2x40W, (2) Commscope CBC1923T-DS-43 diplexers, (2) Ericsson PSU-AC-08 power supplies, and (1) fiber box (Charles CFTT, Corning OptiSheath, or AFL OptiNID 500) SH60-702018xNE7: (1) Ericsson 8843 radio, (1) Ericsson 4449 radio, (2) Ericsson 220x/440x radios, (2) Ericsson 6302 or (4) AC-08 power supplies, (1) Microlab BK-747E diplexer, and (1) Charles fiber box

SH60-702018xNEC: (1) Ericsson 4449/8843/4490/4890 radio, (1) Ericsson 4455/4435 radio, (1) Ericsson 220x/440x radio, (2) Ericsson AC-08 OR (1) Ericsson 6302/6308 power supplies, (1) Charles fiber box SH60-702018xNED: (1) Ericsson 4455 radio, (1) Ericsson 8863 radio, (1) Ericsson 220x/440x radio, (1) Ericsson 6304 power supply, (1) Ericsson AC-08 power supply, (2) Commscope CBC1726T-4304 diplexers, (1) Ericsson FrontHaul or Charles CFTT fiber box. SH60-702018xNEG: (3) Ericsson 4435 radios, (8) Ericsson 220x/440x radios, (6) Microlab BK-747E triplexers, and (4) Microlab BK-75E diplexers SH60-702018xNP2: (2) Commscope ION-U L or CAP M radios, (1) Commscope E14F05P57 diplexer, and (2) Commscope H-3x3-CPUSE-43-Ai6 hybrid couplers SH60-702018xNXX: multiple configurations available; see Table 3	
Thermal	
Fans (SH60-702018xNE7, xNEC, and xNED Only)	48VDC, 155CFM
Environmental	
Operating Temp. Range, Inside Enclosure	-40° to +131°F, -40° to 55°C
Operating Temp. Range, Outside Enclosure	-40° to +115°F, -40° to 46°C 96-SH6070NEB1 Only: -40° to +100°F, -40° to 38°C
Humidity	0 to 95% (non-condensing)
Altitude	Up to 2,000 meters (6560')
Kits and Replacement Parts	
1/4 Turn Latch with Hook and Padlock Hasp	39-200801-0
Hook Latch Catch	22-105089-0
Fan Thermostat (SH60-702018xNE7 and SH60-702018xNED Only)	99-004865-0
Replacement Fan (SH60-702018xNE7, xNEC, and xNED Only)	18-950465-0
Power Supply Kit (for configurations with fans only)	96-AC48PSUSH601
Raycap Disconnect Kit (SH60-702018xNE7 and SH60-702018xNEC Only)	96-RCP6533SH600
Squirrel Guard Kit	Factory installed: 96-SH60SQLGRDA Field installed: 97-003005A-A

Table 1 SHRD60 Specifications

7.2 Color Options

Part Number	Color	Touch-up Paint	Flush Mounting	7" Offset Mounting	5" Offset Mounting	3" Offset Mounting
SH60-702018ANE1	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNE1	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNE1	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNE1	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018ANE3	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNE3	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNE3	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNE3	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018ANE4	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398A-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNE4	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNE4	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNE4	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018ANE7	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398A-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNE7	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNE7	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNE7	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A

Part Number	Color	Touch-up Paint	Flush Mounting	7" Offset Mounting	5" Offset Mounting	3" Offset Mounting
SH60-702018HNE7	Hunt Club Green	02-000599-0	97-002342H-A	97-002309H-A with 97-002342H-A	97-002398H-A with 97-002342H-A	97-002391H-A with 97-002342H-A
SH60-702018ANEC	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398A-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNEC	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNEC	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNEC	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018ANED	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398A-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNED	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNED	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNED	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018DNEG	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNEG	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNEG	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018DNP2	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNFP2	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNP2	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018ANS2	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398A-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNS2	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNS2	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNS2	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018HNS2	Hunt Club Green	02-000599-0	97-002342H-A	97-002309H-A with 97-002342H-A	97-002398H-A with 97-002342H-A	97-002391H-A with 97-002342H-A
SH60-702018ANXX	Off-White	02-000290-0	97-002342A-A	97-002309A-A with 97-002342A-A	97-002398A-A with 97-002342A-A	97-002391A-A with 97-002342A-A
SH60-702018DNXX	Classic Texture Gray	02-000629-0	97-002342D-A	97-002309D-A with 97-002342D-A	97-002398D-A with 97-002342D-A	97-002391D-A with 97-002342D-A
SH60-702018FNXX	Onyx Black	02-000611-0	97-002342F-A	97-002309F-A with 97-002342F-A	97-002398F-A with 97-002342F-A	97-002391F-A with 97-002342F-A
SH60-702018GNXX	National Park Brown	02-000626-0	97-002342G-A	97-002309G-A with 97-002342G-A	97-002398G-A with 97-002342G-A	97-002391G-A with 97-002342G-A
SH60-702018RNXX	Light Gray	02-000736-0	97-002342R-A	97-002309R-A with 97-002342R-A	97-002398R-A with 97-002342R-A	97-002391R-A with 97-002342R-A
SH60-702018WNXX	Dark Bronze	02-000739-0	97-002342G-A	97-002309R-A with 97-002342R-A	97-002398R-A with 97-002342R-A	97-002391R-A with 97-002342R-A

Table 2 SHRD60 and Mounting Kit Part Numbers

7.3 Bracket Mounting Kits

Customer Equipment Configuration (SH60-702018xNXX Only)	Mounting Kit(s) Needed
Up to five Ericsson 220x/440x	96-E2203SHRD1-A (one kit supports five radios)
Up to five Ericsson 220x/440x and One ION M	96-E2203SHRD1-A (one kit supports five radios) and 96-CIONMSHRD1-A
Two Ericsson RRUS32	96-RUS32SHRD1-A
Two Ericsson RRUS32 and One ION M	96-RUS32SHRD1-A and 96-CIONMSHRD1-A
Two Ericsson RRUS32 and One Ericsson 220x/440x	96-RUS32SHRD1-A and 96-E2203SHRD2-A
Two Ericsson RRUS32 and One Ericsson 220x/440x and One PTS AC disconnect device	96-RUS32SHRD1-A and 96-E2203SHRD2-A and 96-PT901204FF7 (kit includes disconnect device)
One Nokia 4x45 radio, One Nokia 4x30 radio, and Two Delta 1 kW rectifiers	96-N4X45SHRD1-A
One Airspan AirHarmony 4400 radio	96-CRNCIN70CFG1
One Nokia AHxxx dual band Two Nokia Airscale Micro RRH One Delta 2kW power supply	96-NASDBSHRD1-A This kit is also available as the 97-NASDBSHRD1-A (field installed version)
One Ericsson RRUS11 or RRUS12 RRH One Ericsson PSU AC-02 One Ericsson 4415 RRH (with fan module) One Ericsson 4426 RRH (with fan module) Two Ericsson PSU AC-08 One Ericsson 220x/440x RRH	96-SH6070NEB1-A
One Ericsson 8843 radio One Ericsson 4449 radio Two Ericsson 220x/440x radios Two Ericsson 6302 or four AC-08 power supplies One Microlab BK-747E diplexer	96-EHP7020181-A

Table 3 Available Bracket Kits for NXX Configurations