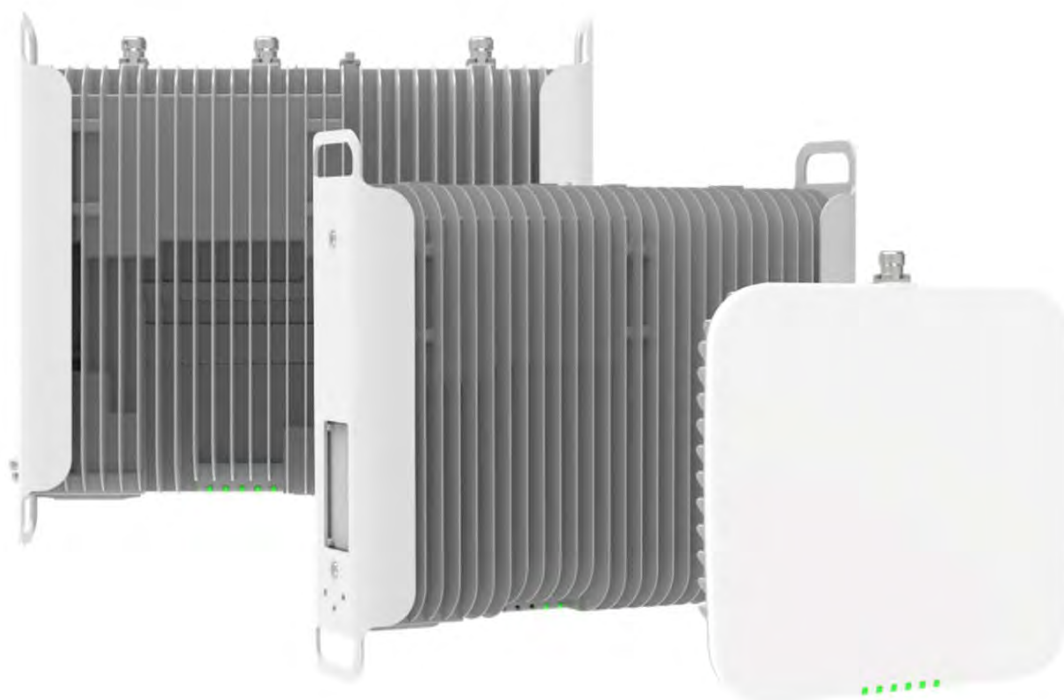


SOLiD BARS™

Installation and User Guide



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Getting Support and Providing Feedback

For technical support or product return inquiries, please have the SOLiD product identification and serial number available. These can be found on the back of the unit or by logging into its WebGUI. Also, include the site name and customer name in all communications. Faulty units must be returned in their original packaging or suitable protective packaging.



- Please visit our website at <https://solid.com> for more information.
 - For further inquiries, please contact our local customer support team at support@solid.com.
-

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1 Preface

1.1 About This Document

This document provides important procedures and information for installing the SOLiD BARST[™]

1.1.1. Audience

This document is intended for field hardware installers, administrators, network architects, and business planners responsible for planning and designing the SOLiD BARST[™] system deployment environment.

1.1.2. Conventions in this Document

This document uses the following conventions.

1.1.2.1. Symbols

Symbol	Description
	Indicates that additional or supplementary information is available to help you better understand a feature, function, or procedure.
	Provides information or instructions that you should follow to avoid service failure or damage to equipment.
	Provides information or instructions that you should follow to avoid personal injury or fatality.

Table 1-1 Document Cautions and Notes

1.1.2.2. Hyperlink or URL

Hyperlinks and URLs are highlighted in blue and may be underlined.

1.1.2.3. Courier New

Used for code samples.

1.1.2.4. Italic

Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.

1.1.2.5. Boldface

Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.

1.1.2.6. Century Gothic

Indicates interface elements that cannot be selected by clicking the mouse, such as window titles,

column headers, or labels

1.1.2.7. Greater-than Sign

Indicates a sequence of menu choices or command selections. For example, select **File > Download** to initiate a file download.

1.1.3. Document Revision History

The table below lists the changes in this document:

Revision	Issue Date	Description
v1.0.0	09.30.2025	Initial release

Table 1-2 Revision History

1.1.4. Document Overview

The table below provides an overview of the information covered in each chapter.

#	Chapter	Description
1	Preface	This chapter provides a brief overview of the document, including safety information and equipment markings.
2	Introduction to SOLiD BARS™	This chapter gives an overview of the products, key features, and topology examples.
3	Hardware Components	This chapter provides details about the components, including product specifications and exterior views.
4	Installation	This chapter outlines the procedures for installing the HE, HUB, and RU using various mounting kits.
5	Cables and Connections	This chapter outlines the procedures for connecting the cables to the HE, HUB, and RU.
6	Overview of SOLiD BARS™ Portal	This chapter provides detailed information about the SOLiD BARS™ Portal and its functionalities.
7	Overview of WebGUI	This chapter provides detailed information about the WebGUI and its functionalities.
8	Alarms & Troubleshooting	This chapter covers alarms and troubleshooting during system operation.
A	Used Abbreviations	This appendix lists the abbreviations and acronyms used in this document.
B	Cleaning the Optical Connector	This appendix describes the procedure for cleaning the optical connector and the cleaning tool.
C	Standard Torque	This appendix provides the standard torque when assembling the fasteners.

Table 1-3 Chapter & Document Overview

1.2 Product Safety

1.2.1. General Safety Guidelines

SOLiD BARS™ is an advanced cellular signal enhancement system designed for indoor environments to improve multi-carrier cellular coverage. To ensure safe operation and prevent injury or equipment damage, follow these general safety guidelines:

- Installation and maintenance must be performed by qualified personnel familiar with telecommunications equipment and local electrical codes.
- Before servicing or installing the system, disconnect all power sources to avoid an electric shock.
- Use only manufacturer-approved components, including antennas, cables, and accessories, to ensure compliance with FCC regulations and maintain system performance.
- The system is intended for fixed installation within buildings and should not be operated in mobile or outdoor environments unless explicitly specified.
- Maintain proper grounding and reliable earthing as specified in the installation instructions to prevent electrical hazards.
- Avoid exposure to moisture, dust, and extreme temperatures to preserve equipment integrity and longevity.
- Follow all local safety and regulatory requirements related to RF exposure and equipment placement.
- Unauthorized modifications or use of unapproved parts may void certifications and cause safety risks.
- In the event of any interference or malfunction, cease operation immediately and contact authorized service personnel.

1.2.2. Equipment Markings & Labeling



This device is certified for fixed, in-building use only. Before the operation, you must register it with your wireless provider and obtain consent. Use only approved antennas and cables. Maintain at least 50 cm (16 in) from donor antennas and 20 cm (8 in) from DAS antennas. Stop use immediately if requested by the FCC or your provider.



This product is UL certified, meeting recognized safety standards for electrical and fire hazards. The UL mark assures compliance with rigorous testing and ongoing factory inspections.



Hot Surface Warning

Allow the product to cool before servicing.
Do not touch the product until it has cooled.
Be cautious and avoid touching due to the high temperature.
Ensure that the system is installed in a restricted area and that the work is performed by personnel properly trained for the task.



Protective Earth

The equipment should be grounded.

1.2.3. Warning Notices

E911 location information may not be provided or may be inaccurate for calls made through this device.

This device's radiated output power complies with FCC and IC radio frequency exposure limits. Maintain a minimum separation distance of UL:50cm, DL:20cm between the device and a person's body during operation.

If this equipment causes harmful interference to radio or television reception (which can be confirmed by turning the equipment off and on), the user should try one or more of the following remedies:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a different circuit than the receiver.
- Consult the dealer or an experienced radio/TV technician for assistance.

1.3 Regulatory Compliance

1.3.1. FCC Compliance & Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This is a CONSUMER device intended for fixed-location, in-building use only.

Registration Requirement

Before use, you **MUST** register this device with your wireless provider and obtain their consent. Most providers permit the use of signal boosters; however, some may restrict them. If uncertain, contact your provider.

Operational Requirements

- Operate only with manufacturer-approved antennas and cables.
- Donor antennas must be installed at least 50 cm (16 inches) away from any person.
- DAS antennas must be installed at least 20 cm (8 inches) away from any person.
- Operation must cease immediately upon request by the FCC or a licensed wireless service provider.



E911 location information may not be provided or may be inaccurate for calls made through this device.



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The SOLiD BARST™ is FCC Part 20 certified for the following bands:

Band Configuration	Frequency	Full Bandwidth (MHz)	Max. Channel Bandwidth (MHz)	verizon [✓]				AT&T				T Mobile			
				1	2	3	4	1	2	3	4	1	2	3	4
Band 4 (AWS -1)	2110–2155	45	20		●	●	●		●	●	●		●	●	●
	1710–1755														
Band 5 (Cellular)	869–894	25	20	●	●		●	●	●		●	●	●		●
	824–849														
Band 12 (700 Lower)	729–746	17	10					●	●	●		●	●	●	
	699–716														
Band 13 (700 Upper)	746–756	10	10	●	●	●									
	777–787														
Band 25 (PCS)	1930–1995	65	20	●		●	●	●		●	●	●		●	●
	1850–1915														

1.3.2. UL Certification

This product has been evaluated and certified by UL (Underwriters Laboratories), an independent safety science organization. The UL mark indicates that the product has been tested and meets specific safety standards for electrical and fire hazards under normal usage conditions.

UL certification ensures that the device complies with recognized safety standards, such as UL 62368-1, which applies to information and communication technology equipment. This includes requirements related to electric shock protection, fire resistance, mechanical stability, and safe installation practices.

The presence of a UL mark also means that the manufacturing facility is subject to periodic inspections to ensure ongoing compliance with the applicable standards.

Please refer to the installation and safety sections of this manual for UL-specific requirements, including neutral fusing, reliable earthing, and restricted access installation.

1.4 Legal and Warranty

1.4.1. Limitation of Liability

Under no circumstances shall SOLiD, its affiliates, directors, officers, employees, agents, or suppliers be liable for any indirect, incidental, special, consequential, or punitive damages, including but not limited to loss of profits, loss of use, loss of data, or costs of procurement of substitute goods or services, arising out of or related to the use of this product or the terms of this agreement.

SOLiD's total liability for direct damages, regardless of the cause of action, shall not exceed the total amount paid by the end user to SOLiD for the specific product giving rise to the claim.

1.4.2. Warranty Terms

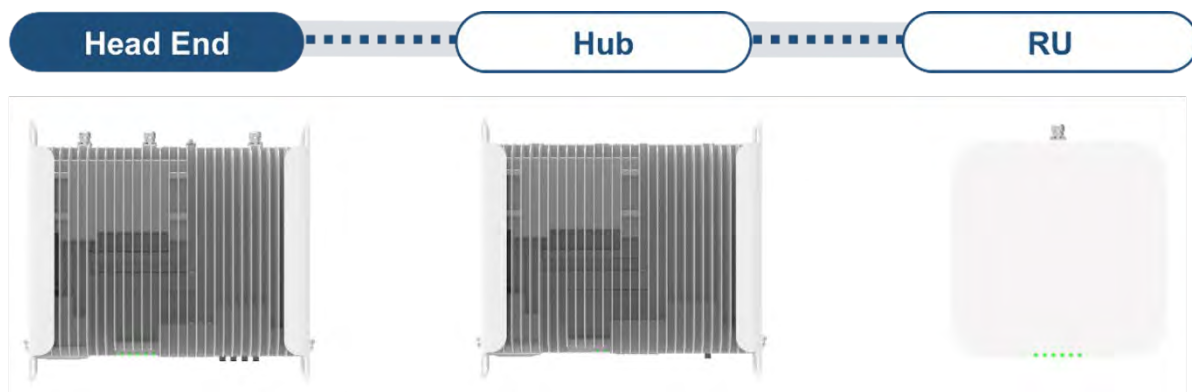
SOLiD, Inc. provides a limited warranty for its products, covering defects in materials and workmanship under normal use for a specified period from the date of purchase. This warranty is subject to the terms and conditions outlined on the SOLiD official website.

<https://www.solid.com/bars/>



2 Introduction to SOLiD BARS™

SOLiD BARS™ is an advanced solution for enhancing cellular signals within buildings. It provides reliable multi-carrier coverage from up to three carriers and is FCC Part 20 compliant, eliminating the need for retransmission agreements. The system supports up to forty (40) remote units (RU) through a single head-end (HE), utilizing up to four (4) hubs (HUB). With an adaptive Interference Cancellation System (ICS), SOLiD BARS™ ensures optimal coverage. The cloud-based Equipment Management System (EMS) and user-friendly web interface simplify network management.



2.1 Features & Benefits

2.1.1. Low Total Cost

- Off-air signal source enables immediate service without costly carrier fees.
- Ethernet cabling reduces installation complexity and commissioning time.
- Head-end and hubs each support up to eight remote units, minimizing the need for additional costly equipment.

2.1.2. Easy Setup (Installation & Commissioning)

- Single Ethernet cable per remote unit conserves conduit space.
- Power-over-Ethernet (PoE) support offers flexible remote placement.
- Auto commissioning reduces errors and site visits.

2.1.3. Multi-MNOs & Multi-Bands

- Supports up to three carriers and three bands per carrier, ideal for broadband selection in remote areas.
- Each carrier's donor antenna is amplified individually, reducing isolation requirements and enhancing power efficiency.

2.1.4. Web-based System

- User-friendly web interface simplifies commissioning.
- Robust Equipment Management System (EMS) enables continuous monitoring and optimization.

2.1.5. Advanced Signal Management Features

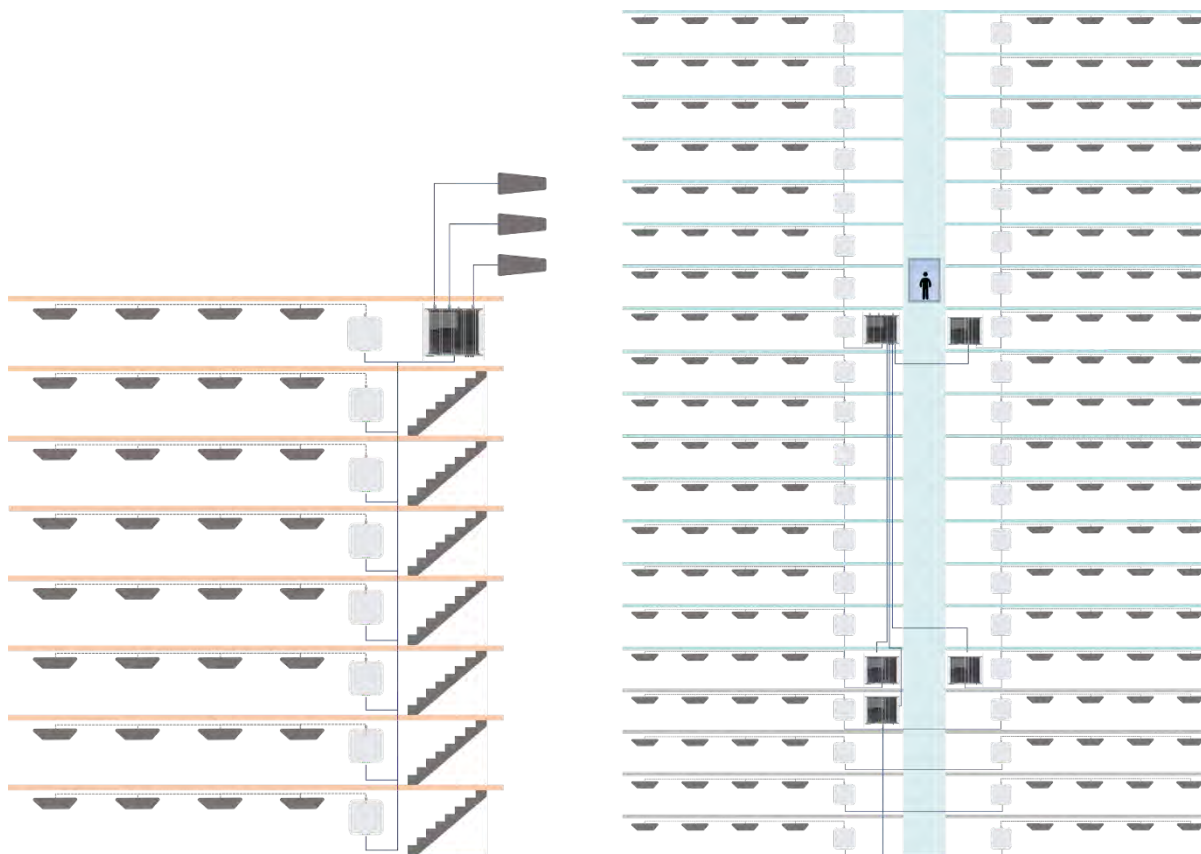
Feature	Function	Description
Anti-Oscillation	Cancels feedback loops	Prevents signal instability
Auto Gain Control	Adjusts gain dynamically	Maintains consistent output
Noise Power Limiting	Filters undesired signals	Enhances signal clarity
Auto Link Check & Recovery	Monitors head-end ↔ remote link	Reduces downtime

2.2 System Overview

The SOLiD BARS™ system enhances wireless signals and extends coverage over larger areas, making it ideal for improving network coverage in expansive buildings. It supports signal transmission from up to three mobile network operators (MNOs) and delivers high-quality service across three frequency bands for each MNO. Additionally, the BARS system features an Echo Cancellation System (ECS) that adjusts to changes in external conditions. For user convenience, it also offers a cloud-based SOLiD BARS portal.

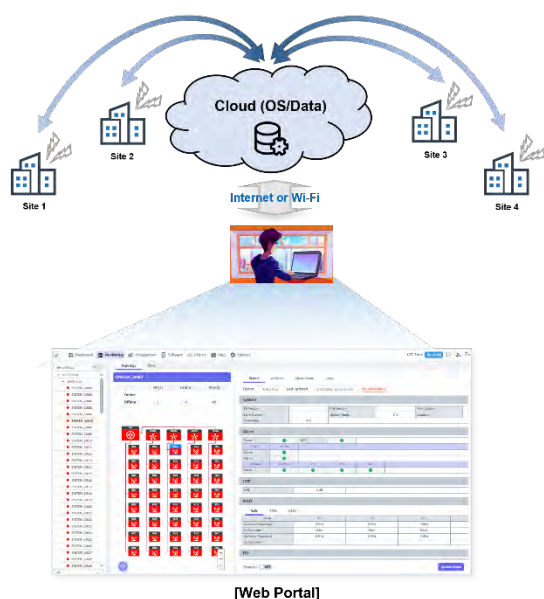


The SOLiD BARS™ can be configured with up to 40 remote units to improve indoor coverage. The head-end and hub can be installed up to 10 kilometers apart, and each RU can be placed within 100 meters of either the HE or the HUB.



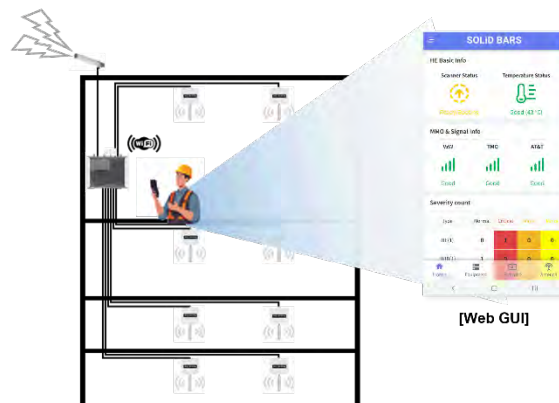
The SOLiD BARS™ provides a web-based user interface (SOLiD BARS™ Portal) for easy access to the system. After installing the hardware, use the portal to register and activate your product.

Accessing EMS on a PC



[Web Portal]

Accessing EMS on a Mobile Phone



[Web GUI]



For details about the system, refer to [Overview of SOLiD BARS™ Portal](#).

2.2.1. Off-Air Configurations

2.2.1.1. Example Diagram #1: 1 (HE) and 8 (RUs)

The diagram below shows a simple setup with one head-end (HE) and eight remote units (RUs) for receiving off-air signals.

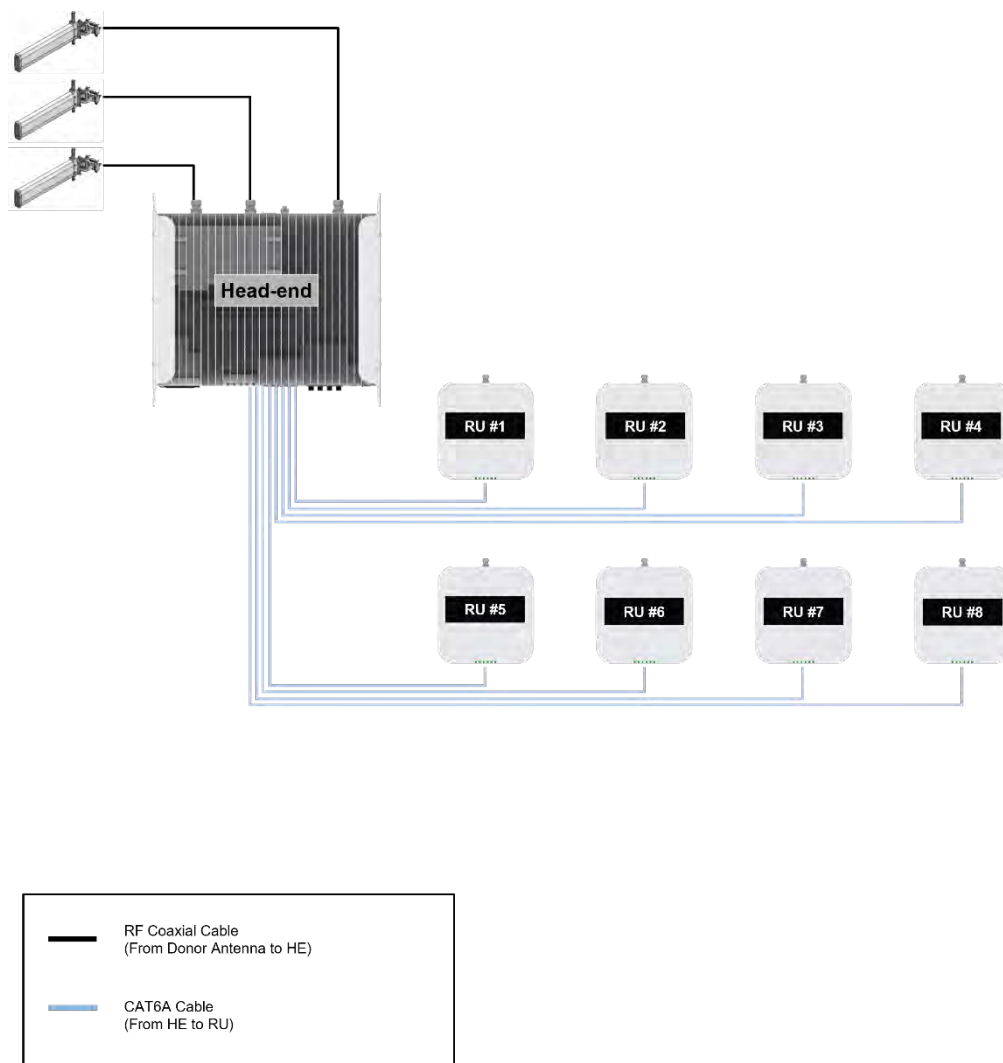


Figure 2-1 Off-Air Configurations_01

2.2.1.2. Example Diagram #2: 1 (HE), 4 (HUBs), and 40 (RUs)

The diagram below shows a full setup with one head-end (HE), four hubs, and forty remote units (RUs) for receiving off-air signals.

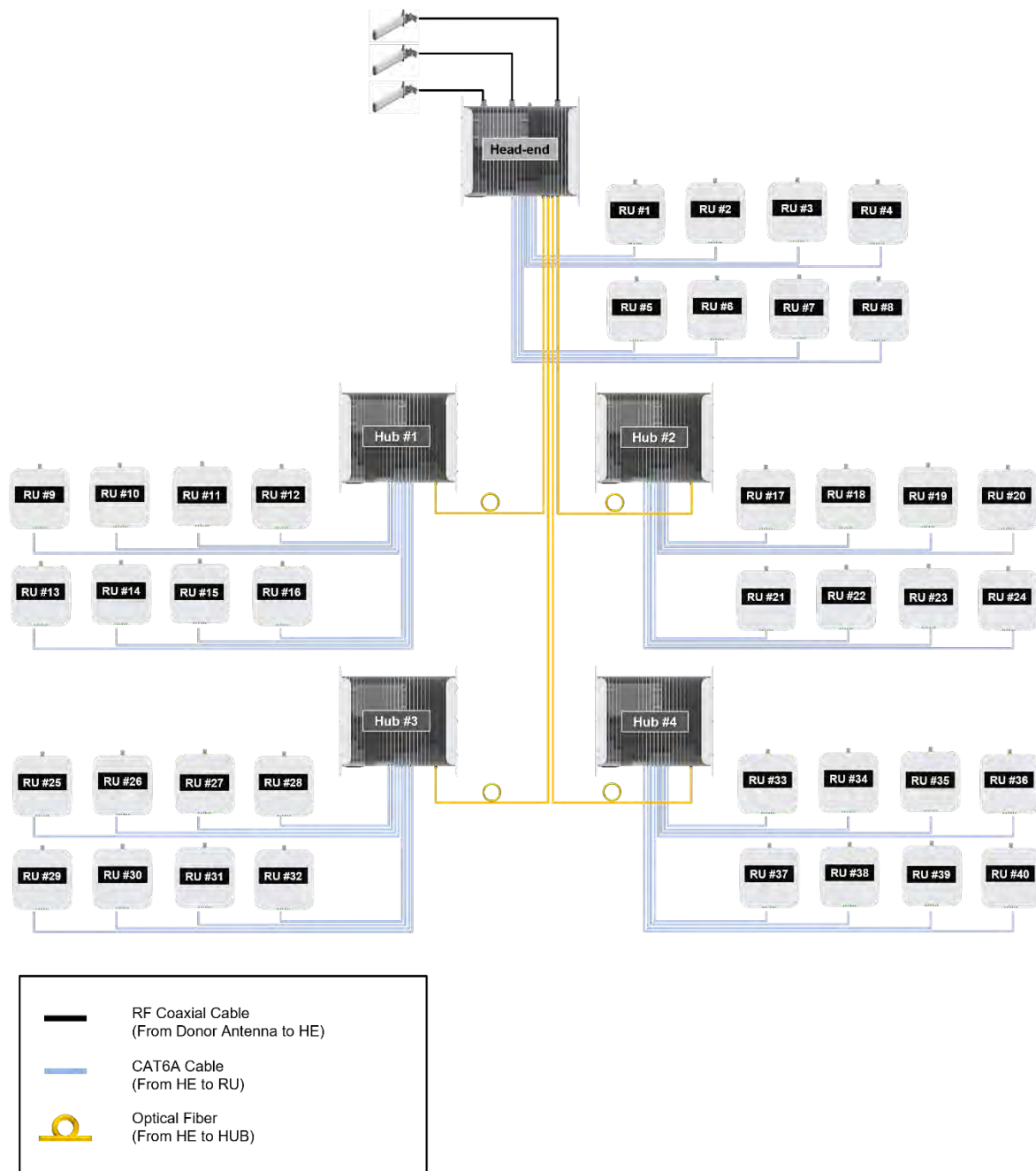


Figure 2-2 Off-Air Configurations_02

2.2.2. Alternative Signal Configurations

2.2.2.1. Example Diagram #3: 1 (HE) and 8 (RUs)

The diagram below shows a simple setup with one head-end (HE) and eight remote units (RUs) using signal sources.

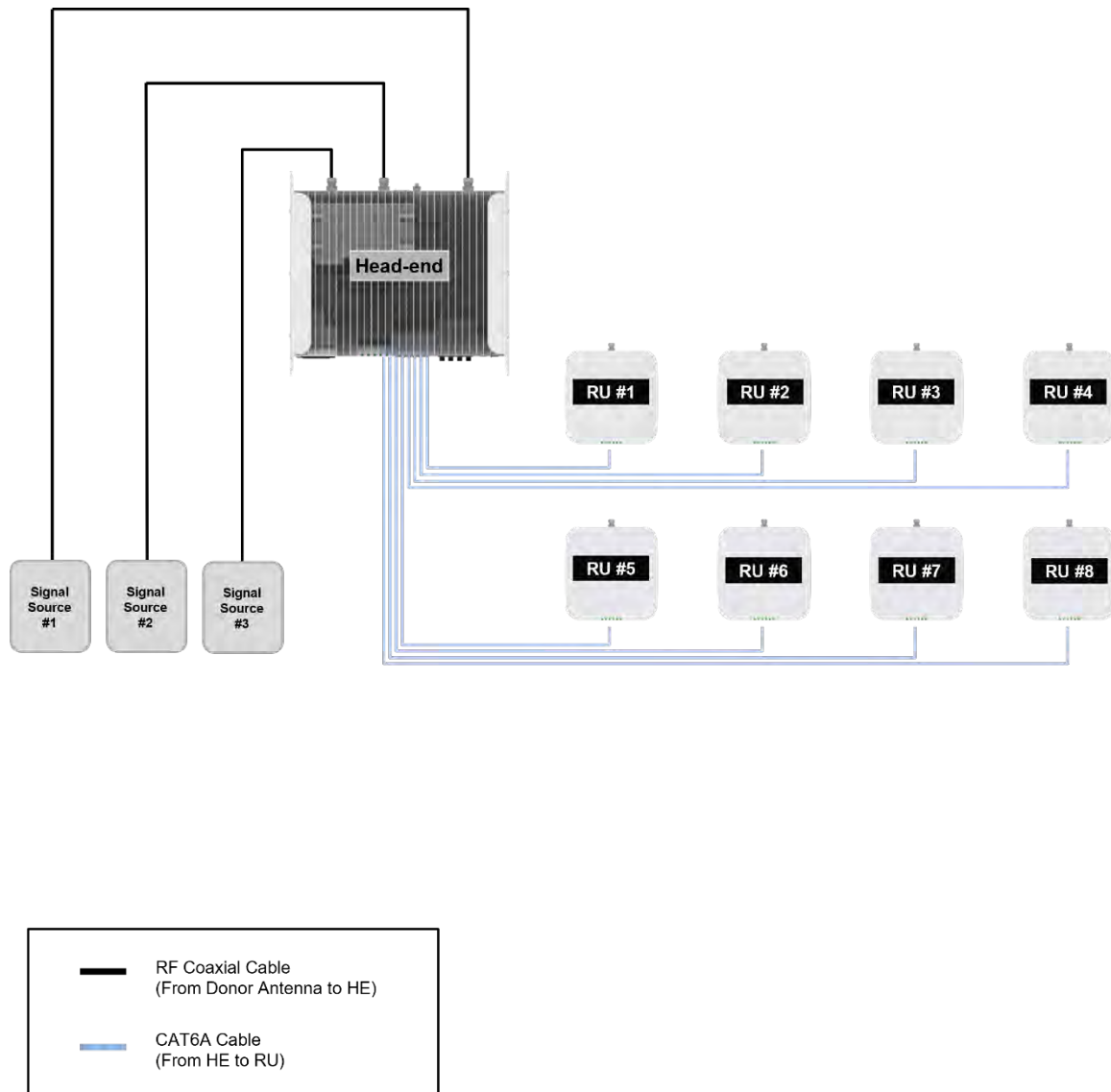


Figure 2-3 Alternative Signal Configurations

2.3 System Installation Procedure

The following image illustrates the general procedure for installing the SOLiD BARSTM.

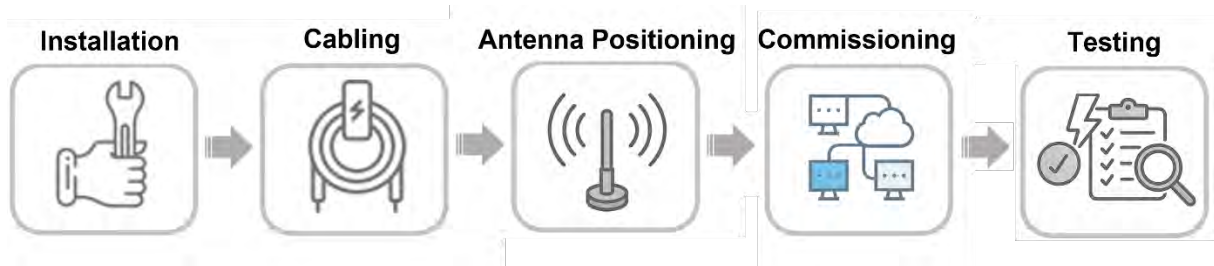


Figure 2-4 BARS Installation Procedure

When installing the system for the first time, follow the chapters in the order of the listed steps for best results.

#	Chapter	Description
1	Installation	This chapter outlines the procedures for installing the HE, HUB, and RU using various mounting kits.
2	Cables and Connections	This chapter outlines the procedures for connecting the cables to the HE, HUB, and RU.
3	Accessing WebGUI	This chapter explains how to position the antenna using the WebGUI.
4	Configuration and Commissioning	This chapter explains how to perform commissioning using the SOLiD BARS™ Portal.
5	Diagnostics and Testing	This chapter explains how to perform diagnostics and testing through the WebGUI.

3 Hardware Components

The SOLiD BARS™ consists of three main components: the head-end unit (HE), the hub unit (HUB), and the remote unit (RU). This chapter provides detailed information on the physical design, specifications, ports, and LED indicators of each component.

3.1 Head-End Unit (HE)

The head-end unit (HE) is the core of the system. It receives and digitizes signals from up to three mobile operators, then delivers data and power to remote units (RUs) via dedicated Ethernet cables. The HE extends its coverage by supporting up to 40 RUs simultaneously.

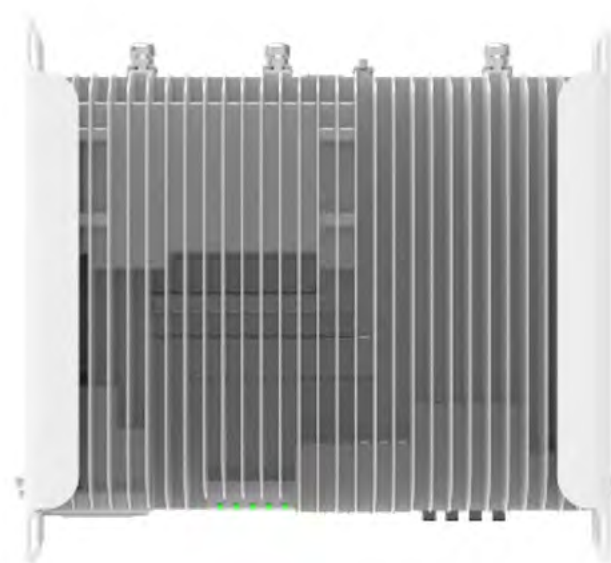


Figure 3-1 View of BARS HE

The HE package includes the following parts and accessories:

Part Number	Standard	Q'TY
ANCHOR BOLT SET_M6	PH (+)-M6-L30 Tapping Screw with 10×40 mm	4
B/K SCREW	FH (+)-M6-L8-ST5	4
WI-FI Antenna	YECT002AA	1
AC POWER CORD PLUG	SMDR-eBIU-P101	1
CABLE CLAMP	HD5D-08-80-V0 BK	1
BARS_HE_WALL_B/K_R	-	1
BARS_HE_WALL_B/K_L	-	1

Table 3-1 PKG Unboxing_HE

The figure below shows the dimensions of the HE.

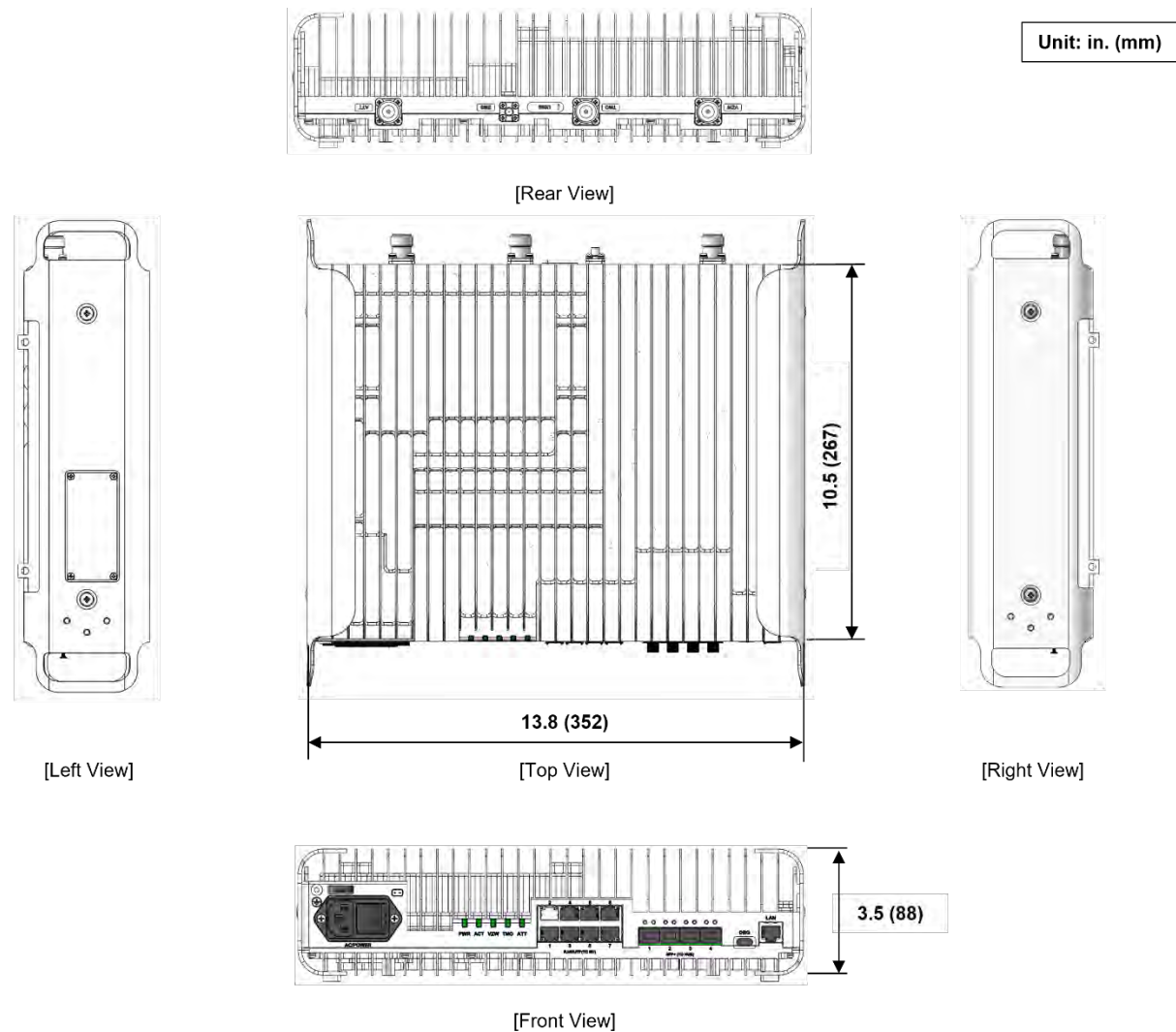


Figure 3-2 BARS HE Dimensions

3.1.1. Port Information

The figure below shows the port information for the HE:

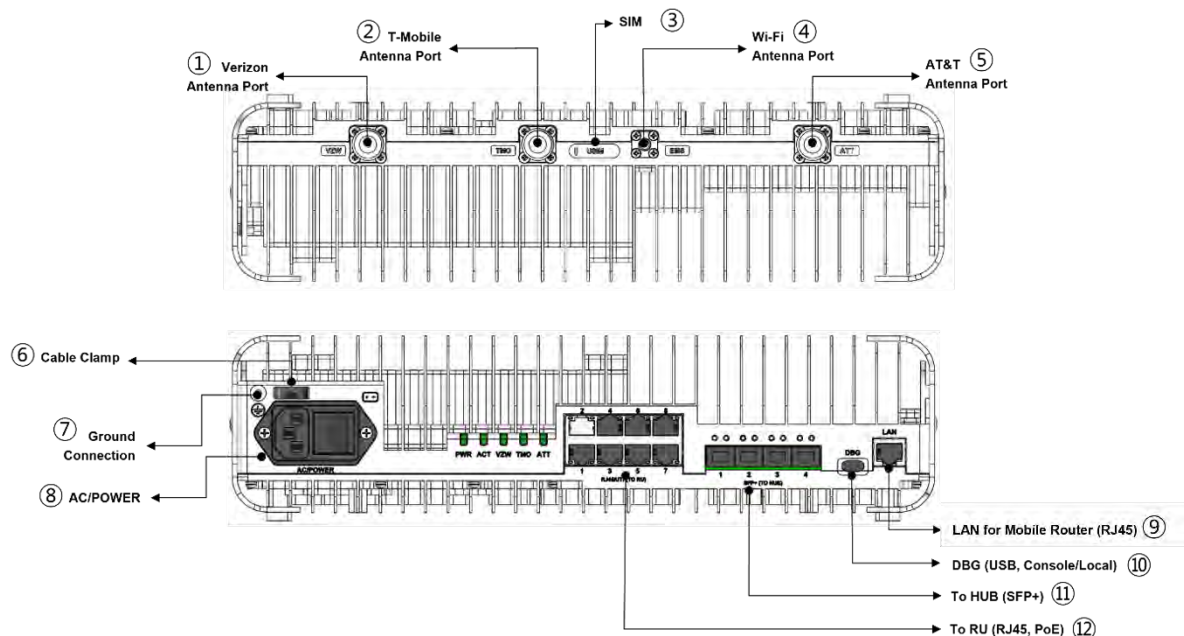


Figure 3-3 Port Details of BARS HE

The table below provides the port details for the HE:

#	Port Name	Description
1	Verizon Antenna Port	Operator port for Verizon
2	T-Mobile Antenna Port	Operator port for T-Mobile
3	SIM	SIM card slot
4	Wi-Fi Antenna Port	Wi-Fi and EMS connection port
5	AT&T Antenna Port	Operator port for AT&T
6	Cable Clamp	Power cable clamp
7	GND	Ground terminal
8	AC/Power	AC power input port
9	LAN	LAN port for a private network
10	DBG	Debug port
11	To HUB	Four SFP ports for HE to HUB connections
12	To RU	Eight RJ45 ports for HE to RU connections (Maximum 70 W per port)

Table 3-2 Port Information of BARS HE

3.1.2. LED Information

You can monitor alarms during system operation to identify and prevent issues. When an alarm is triggered, the main LED lights up or blinks in different colors to indicate a problem.

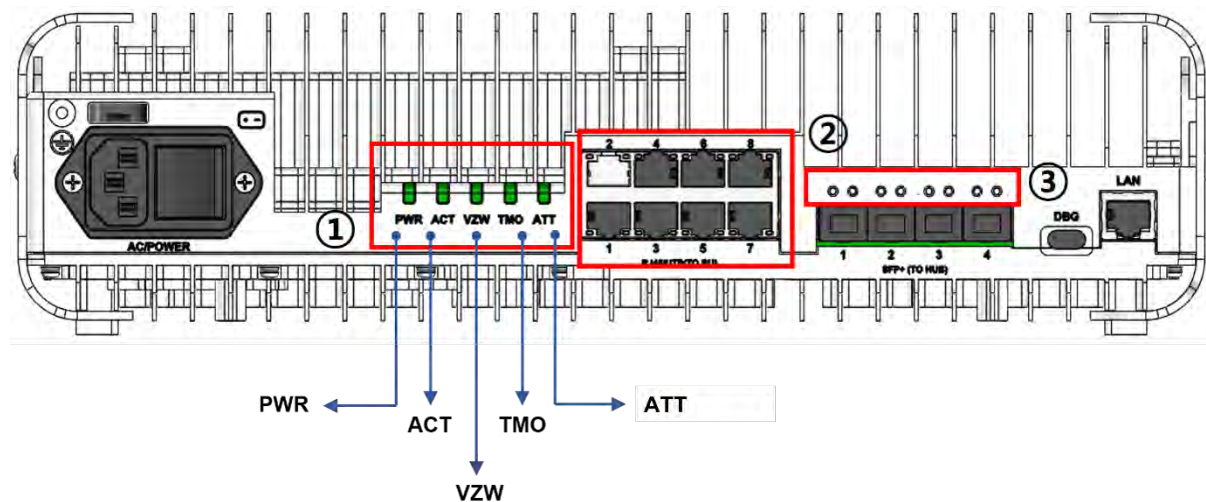


Figure 3-4 LED Details of BARS HE

#	Name	Description
1	PWR	HE power connection status
	ACT	General device status
	Verizon	Connection status between HE and Verizon
	T-Mobile	Connection status between HE and T-Mobile
	AT&T	Connection status between HE and AT&T
2	To RU	Connection status between HE and RUs
3	To HUB	Connection status between HE and HUBs

Table 3-3 BARS HE LED



Status	Description	
	Solid Red	- Critical/Major alarm: Indicates shutdown or disabled state (ACT, VZW, TMO, ATT) - Data link failure (SFP R, UTP R)
	Solid Green	- Booting complete - Normal operation - Band selection complete - Normal status (SFP L, UTP L)
	Blinking Green	- Post-boot, pre-service state (VZW, TMO, ATT): System has booted but is not yet providing service - Post-boot, Wi-Fi not yet activated (PWR) - Post-boot, scanning not yet complete (ACT) - Minor alarm during normal operation (ACT) - Minor alarm detected on operator path (VZW, TMO, ATT) - Normal status (UTP R) - Blinking pattern: 1s period, 50% duty cycle (500 ms ON/OFF)
	LED Off	- Power off: No power input - Normal status (SFP R)

Table 3-4 BARS HE LED Information

3.1.3. Key Specifications

The table below shows the specifications for the HE.

Parameters	Specifications		Remarks
Size (W x D x H)	352 x 267 x 88 (2U) (mm), without bracket		
Volume	8.3 L		
Weight	≤ 7.9 kg (excluding wall mount bracket, tolerance: ± 0.2 kg)		
Color	Jevisco PP#4636 X-Texture Semi-Gloss White Powder Coating		
Power	AC 90–264 V, 47–63 Hz		
Power Consumption	< 500 W		8 RUs with 100 m PoE cables
Cable Distance	Up to 10 km		Optical Fiber: HE-HUB
	Up to 100 m		CAT6A: HE-RU
	Up to 200 m		CAT6A: HE-Extender-RU
Port Information	Top	- N-type (f) for donor antenna, 3 ea - Reverse SMA-type (f) for Wi-Fi antenna, 1ea - SIM card slot for EMS modem, 1 ea	[SIM Card Information] Type: 4FF–Nano SIM Height: 12.3 mm Width: 8.8 mm

Parameters	Specifications		Remarks
	Bottom	- RJ45 for RU, 8 ea with PoE - RJ45 for LAN, 1 ea - USB-C for console/local, 1 ea - SFP+ for HUB, 4 ea - AC/power port, 1 ea - GND, 1 ea	Thickness: 0.67 mm
LED	LED (2 Color Green/RED): 5 ea		
Mounting Type	- Wall mount (vertical only) - Rack mount (horizontal only)		
Ingress Protection	IP40		
Cooling	Natural Convection		
Operating Temperature	-5 to +40 °C (For rack mount) -5 to +40 °C (For wall mount)		
Storage Temperature	-40 to +70 °C		

Table 3-5 BARS HE Specifications

3.2 HUB Unit (HUB)

The HUB unit serves as a distribution component within the BARS system. It transmits data from the HE up to 10 km using an SFP module and connects to up to eight remote units (RUs).



Figure 3-5 View of BARS HUB

The HUB package includes the following parts and accessories:

Part Number	Standard	Q'TY
ANCHOR BOLT SET_M6	PH (+)-M6-L30 Tapping Screw with 10×40 mm	4
B/K SCREW	FH (+)-M6-L8-ST5	4



Part Number	Standard	Q'TY
AC POWER CORD PLUG	SMDR-eBIU-P101	1
CABLE CLAMP	HDCCD-08-80-V0 BK	1
BARS_HE_WALL_B/K_R	-	1
BARS_HE_WALL_B/K_L	-	1

Table 3-6 PKG Unboxing_HUB

The figure below shows the dimensions of the HUB.

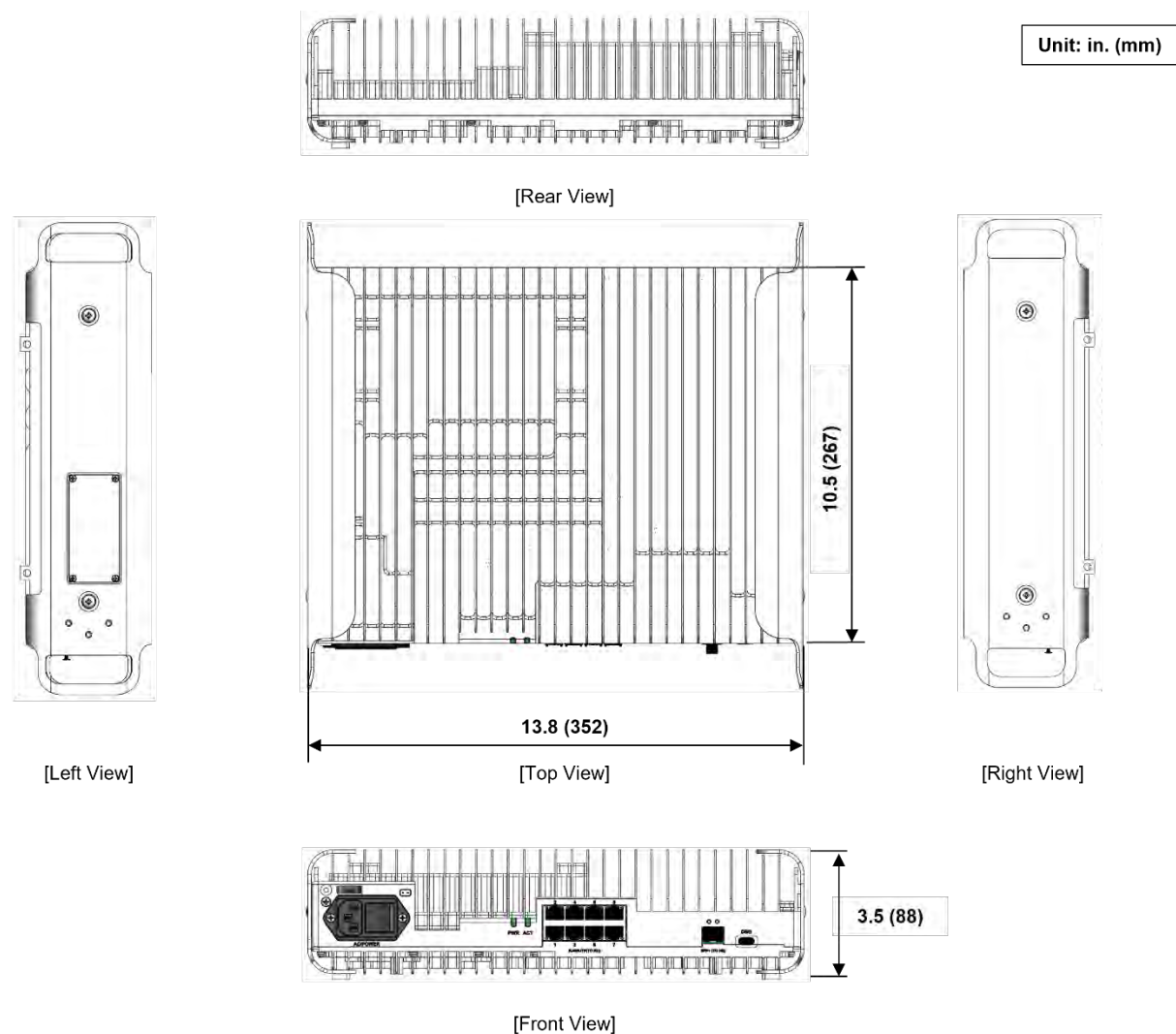


Figure 3-6 BARS HUB Dimensions

3.2.1. Port Information

The figure below displays the port information for the HUB:

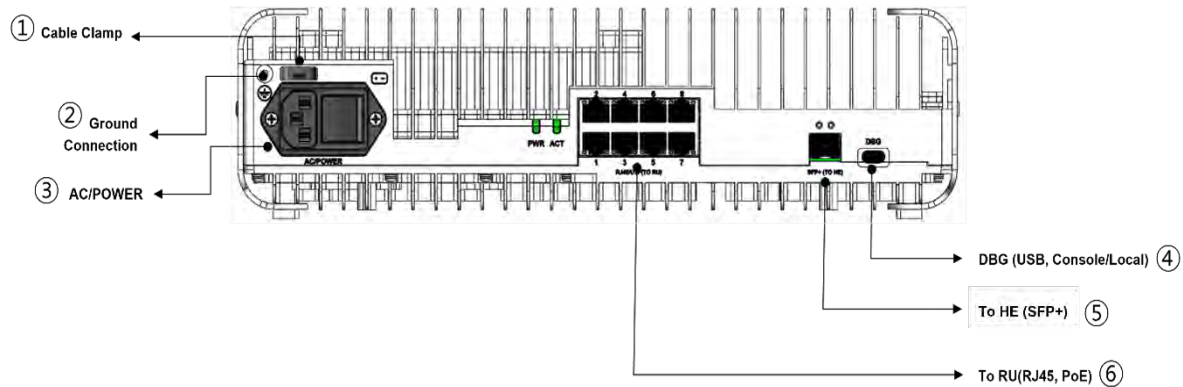


Figure 3-7 Port Details of BARS HUB

The table below provides the port details for the HUB:

#	Port Name	Description
1	Cable Clamp	Power cable clamp
2	GND	Ground terminal
3	AC/Power	AC power input port
4	DBG	Debug port for monitoring HUB status.
5	To HE	One SFP port for HE to HUB connection
6	To RU	Eight RJ45 ports for HUB to RU connections (Maximum 70 W per port)

Table 3-7 Port Information of BARS HUB

3.2.2. LED Information

You can monitor alarms during system operation to identify and prevent issues. When an alarm is triggered, the main LED lights up or blinks in different colors to indicate a problem.

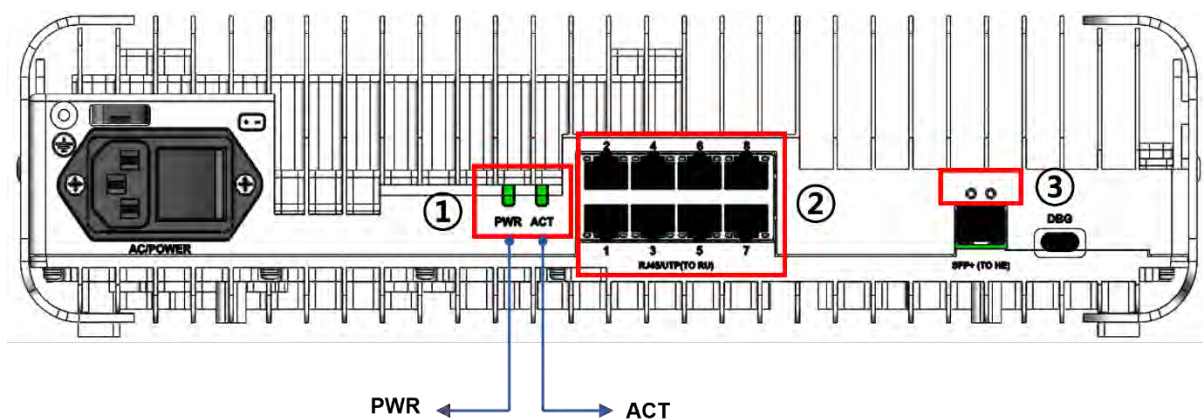


Figure 3-8 LED Details of BARS HUB

#	Name	Description
1	PWR	HUB power connection status
	ACT	General device status

#	Name	Description
2	To RU	Connection status between HUB and RUs
3	To HE	Connection status between HE and HUBs

Table 3-8 BARS HUB LED

Status	Description
	Solid Red - Critical/Major alarm (ACT): Indicates shutdown or disabled state - Data link failure (SFP R, UTP R)
	Solid Green - Booting complete - Normal operation - Band selection complete - Normal status (SFP L, UTP L)
	Blinking Green - Minor alarm during normal operation (ACT) - Normal status (UTP R) - Blinking pattern: 1s period, 50% duty cycle (500 ms ON/OFF)
	LED Off - Power off: No power input - Normal status (SFP R)

Table 3-9 BARS HUB LED Information

3.2.3. Key Specifications

The table below shows the specifications for the BARS HUB.

Parameters	Specifications	Remarks
Size (W x D x H)	352 x 267 x 88 (2U) (mm), without bracket	
Volume	8.3 L	
Weight	≤ 7.2 kg (excluding wall mount bracket, tolerance: ± 0.2 kg)	
Color	Jevisco PP#4636 X-Texture Semi-Gloss White Powder Coating	
Power	AC 90–264 V, 47–63 Hz	
Power Consumption	< 500 W	8 RUs with 100 m PoE cables
Cable Distance	Up to 10 km	Optical Fiber: HE–HUB
	Up to 100 m	CAT6A: HUB–RU
	Up to 200 m	CAT6A: HUB–Extender–RU
Port Information	Bottom - RJ45 for RU, 8 ea with PoE - USB-C for console/local, 1 ea - SFP+ for HUB, 1 ea - AC/power port, 1 ea - GND, 1 ea	
LED	LED (2 Color Green/RED): 2 ea	
Mounting Type	- Wall mount (vertical only) - Rack mount (horizontal only)	
Ingress Protection	IP40	
Cooling	Natural Convection	



Parameters	Specifications	Remarks
Operating Temperature	-5 to +40 °C (for rack mount) -5 to +40 °C (for wall mount)	
Storage Temperature	-40 to +70 °C	

Table 3-10 BARS HUB Specifications

3.3 Remote Unit (RU)

The BARS Remote Unit (RU) enables cellular coverage for the head-end unit (HE). It receives cellular signals directly from the HE or through a HUB, converts them into RF (radio frequency) signals, amplifies them, and transmits them through its RF port.



Figure 3-9 View of BARS RU

The RU package includes the following parts and accessories:

Part Number	Standard	Q'TY
ANCHOR BOLT SET_M6	PH (+) M6 × 30 mm tapping screw, plastic anchor 10 × 40 mm	4
B/K SCREW	PH (+) SF-M4-L10-STS	4
DAS Antenna	YECT002AA	1
ADAPTOR_N(P)-SMA(J)	AD00192-7/2	1
BARS_RU_MOUNT_B/K	-	1

Table 3-11 PKG Unboxing_RU

The figure below shows the dimensions of the RU.

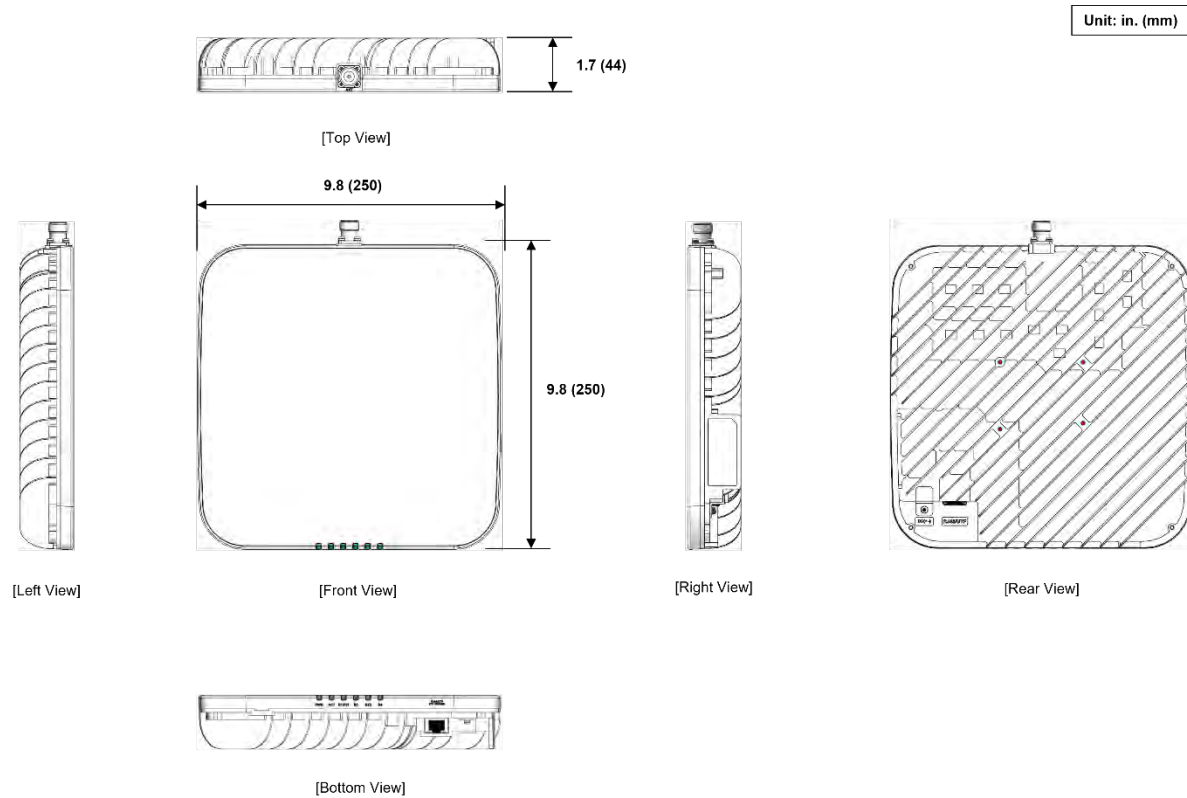


Figure 3-10 BARS RU Dimensions

3.3.1. Port Information

The figure below displays the port information for the RU:

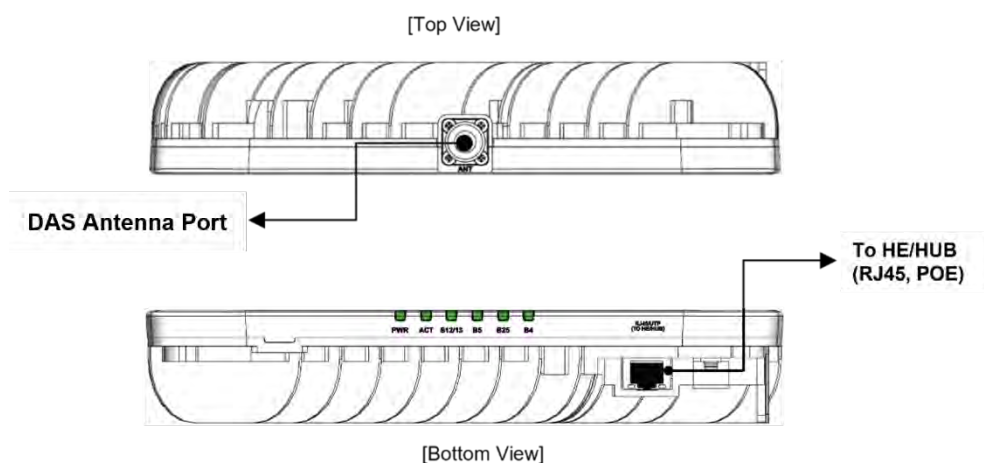


Figure 3-11 Port Details of BARS RU

The table below provides the port details for the RU:

Port Name	Description
To HE/HUB	One RJ45 port for HE/HUB to RU connection
DAS Antenna Port	DAS Antenna connection port

Table 3-12 Port Information of BARS RU

3.3.2. LED Information

You can monitor alarms during system operation to identify and prevent issues. When an alarm is triggered, the main LED lights up or blinks in different colors to indicate a problem.

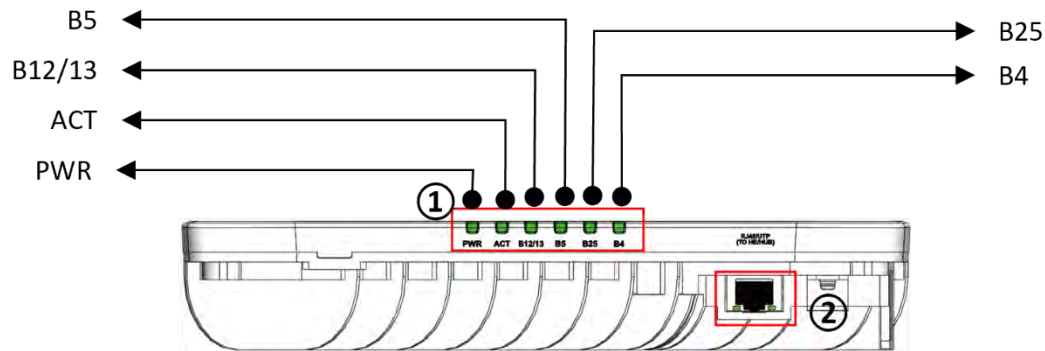


Figure 3-12 LED Details of BARS RU

#	Name	Description
1	PWR	RU power connection status
	ACT	General device status
	B12/13	Connection status of B12/13 bands
	B4	Connection status of the B4 band
	B25	Connection status of the B25 band
	B5	Connection status of the B5 band
2	To HE/HUB	Connection status between RU and HE/HUB

Table 3-13 BARS RU LED

Status	Description	
	Solid Red	Critical/Major alarm: Indicates shutdown or disabled state (ACT, VZW, TMO, ATT)
	Solid Green	- Booting complete - Normal operation - Normal status (UTP L) - TX On
	Blinking Green	- Minor alarm during normal operation (ACT) - Minor alarm detected on operator path (B12/13, B5, B25, B4) - Partial-path failure - Normal status (UTP R) - Blinking pattern: 1s period, 50% duty cycle (500 ms ON/OFF)
	LED Off	Power off: No power input

Table 3-14 BARS RU LED Information

3.3.3. Key Specifications

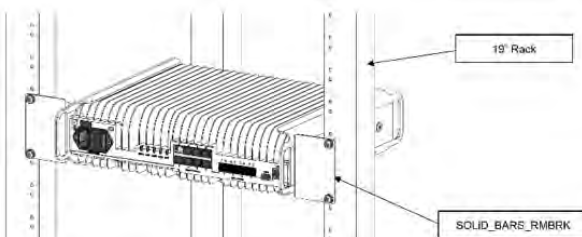
The table below shows the specifications for the RU.

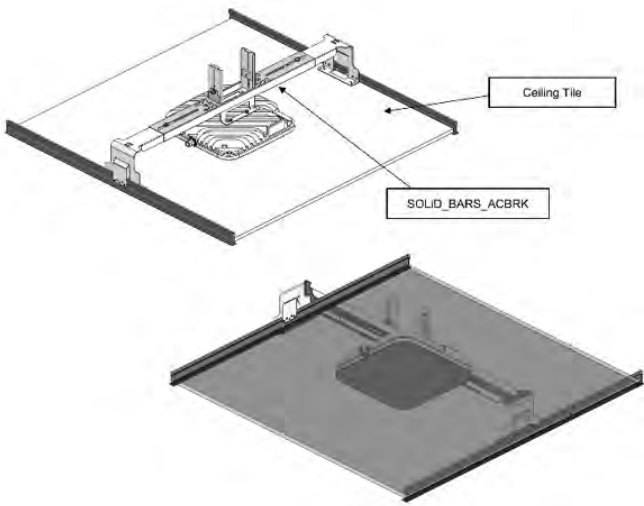
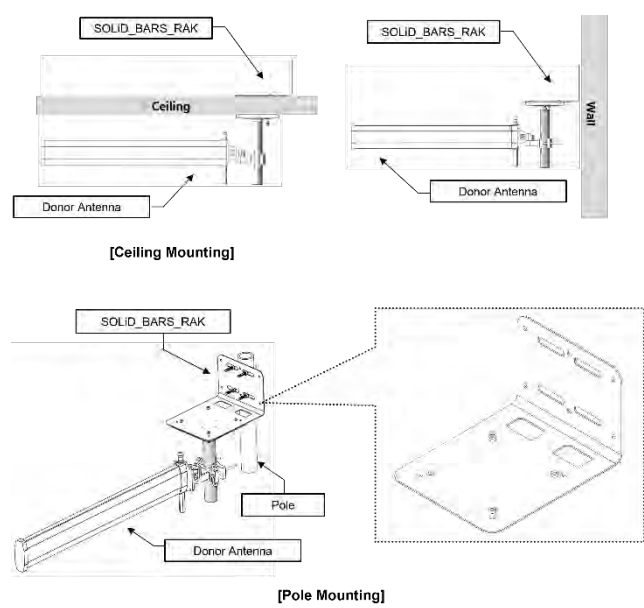
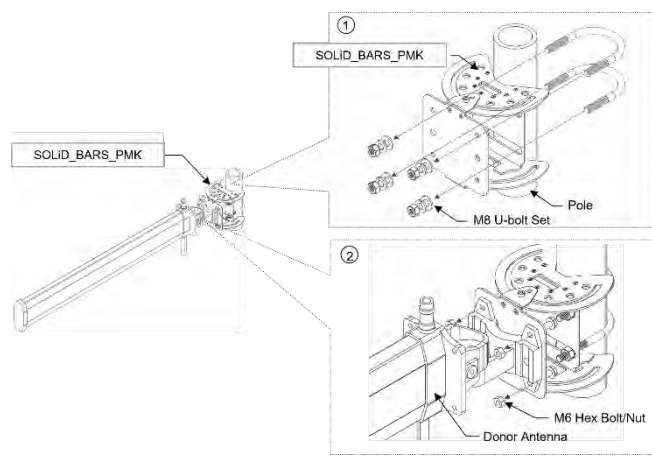
Parameters	Specifications	Remarks
Size (W x D x H)	250 x 250 x 44 (mm), without bracket	
Volume	2.75 L	
Weight	≤ 2.4 kg (excluding wall mount bracket, tolerance: ± 0.2 kg)	
Color	Jevisco PP#4636 X-Texture Semi-Gloss White Powder Coating	
Power	-57 VDC to -41.1 VDC at PoE from the HE and HUB	
Power Consumption	< 40 W	
Distance	Up to 100 m	CAT6A: - HE–RU - HUB–RU
	Up to 200 m	CAT6A: - HE–Extender–RU - HUB–Extender–RU
Port Information	- N-type (f) for DAS antenna, 1 ea - RJ45 with PoE, 1 ea	
LED	LED (2 Color Green/RED): 6 ea	
Mounting Type	- Wall mount - Ceiling mount	
Ingress Protection	IP40	
Cooling	Natural Convection	
Operating Temperature	-5 to +45 °C (for wall mount) -5 to +40 °C (for ceiling mount)	
Storage Temperature	-40 to +70 °C	

Table 3-15 BARS RU Specifications

3.4 Spare & Replacement Parts

The following spare and replacement parts for SOLiD BARST™ are optional and must be purchased separately if needed.

Part Number	Description	Images
SOLiD_BARS_RMBRK	Supports 19-inch rack installation of BARS HE/HUB.	

Part Number	Description	Images
SOLiD_BARS_ACBRK	Supports ceiling tile installation of BARS RU.	
SOLiD_BARS_RAK	Supports wall, pole, and ceiling installations with adjustable donor antenna rotation.	 [Ceiling Mounting] [Pole Mounting]
SOLiD_BARS_PMK	Supports pole installation with adjustable donor antenna rotation.	 ① ②



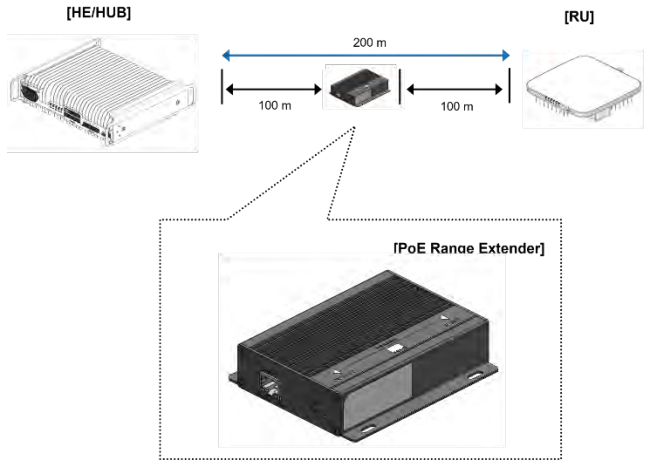
Part Number	Description	Images
SOLiD_BARS_PoERE	Extends the link between HE/HUB and RU up to 200 meters using a Cat6A cable.	 The diagram illustrates the installation of the SOLiD_BARS_PoERE. It shows a HE/HUB (Host Equipment/Hub) connected to a PoE Range Extender via a 100 m cable. The PoE Range Extender is then connected to the RU (Remote Unit) via another 100 m cable, extending the total link distance to 200 m. The PoE Range Extender is shown in a separate inset image.

Table 3-16 BARS Spare & Replacement Parts

4 Installation

This chapter provides a detailed explanation of the installation procedure for the SOLiD BARS™ system.



CAUTION: Double-pole neutral fusing. Disconnect the mains supply before servicing



- A qualified professional must carry out the installation instructions for connecting the conductor to the building's earth.
- This equipment is intended for installation in a restricted access area.



- Ensure that the power switch is OFF while installing the system. Installing the system with the power switch ON can cause system damage or fatal human injury when connecting or disconnecting the cables.
- Do not wear accessories such as watches and rings to prevent the risk of electric shock.

4.1 Installation Preparations

This chapter outlines the preparation steps, including important cautions and essential tools, to be used before the system installation at your site.

4.1.1. Cautions for Installation

This section outlines the safety instructions that must be followed during the installation of the system.

4.1.1.1. Before Installing

Before installation, follow these guidelines:

- Turn off the system power.
- Post warning signs in areas where high-voltage cables are installed.
- Post "Off Limits" signs in areas where accidents are most likely to occur.
- With guardrails or fences, block open areas such as connecting parts, roofs, and scaffolds.



- Keep a safe distance between the base station antenna and people.
- For wall installations to comply with FCC RF Exposure guidelines, install the base station at a proper distance (UL: 50cm, DL: 20cm) between the bottom of the base station and people.
- For the protection of the public from exposure to radio frequency electromagnetic fields, do not co-locate or operate in conjunction with any other antenna or transmitter.
- The BARS system uses natural cooling, so there's no need for extra fans.

4.1.1.2. While Installing

During installation, follow these guidelines:

- Make sure the system is powered off.
- Be careful not to damage or scratch the boards mounted on the system and the cables among the boards when the system is transported or installed.

- The conductor must be installed within the building's grounding system according to the provided instructions, and a qualified professional should complete this work.



- Turn off the power supply switch before installation. Installing the system with the power on can lead to system damage or serious injury if cables are not properly connected.
- Wear protective gloves and goggles to prevent injury from debris when drilling holes in walls or ceilings.
- Avoid wearing accessories, such as watches or rings, to reduce the risk of electric shock.



To prevent contaminants, outdoor air, and moisture from entering the cable inlet (including the cable gland and conduit):

- Use finishing materials, such as caps and rubber packing.
- After installing the cable, seal any remaining space in the inlet with tape, compressed sponge, rubber packing, or silicone.

4.1.1.3. After Installing

After installation, follow these guidelines:

- Remove any debris produced during the work and clean up the installation site.
- Always cover unused ports with caps to prevent foreign substances from entering.



Handle optical cables carefully, as the system uses laser beams within these cables. Direct exposure to the laser beam can cause severe eye injury.



- Avoid damaging installed cables while cleaning the rack.
- When cleaning the power supply device, take safety precautions to prevent any contact with foreign objects that could cause a power failure.



If a board is damaged during transportation or installation, replace it according to the guidelines provided by a qualified professional.

4.1.2. Cautions for Rack Mount

Please observe the following cautions when installing the equipment into a rack:

- **Elevated Operating Ambient:**
When installed in a closed or multi-unit rack, the ambient temperature inside the rack may be higher than the room temperature. Ensure the equipment is installed in an environment compatible with the manufacturer's specified maximum ambient temperature.
- **Reduced Air Flow:**
The installation should not obstruct the airflow required for the safe operation of the equipment. Proper ventilation must be maintained.
- **Mechanical Loading:**
The equipment must be mounted in a way that prevents hazardous conditions caused by uneven mechanical loading of the rack.
- **Circuit Overloading:**
Consider the impact of connecting the equipment to the supply circuit, especially the risk of circuit overloading that can affect overcurrent protection and wiring. Use the equipment's nameplate ratings to guide proper load management.
- **Reliable Earthing:**

Maintain reliable earthing for all rack-mounted equipment. Pay special attention to supply connections that are not directly connected to the branch circuit, such as power strips, to ensure effective grounding.

4.1.3. Transporting and Unpacking

This section details the process of unpacking cabinets/racks and other components, as well as transporting them to the installation site.

4.1.3.1. Bringing in Items

To bring in items, follow these guidelines:

- Carry boards in a packed state and only unpack them during installation or mounting.
- When carrying a system, use a lift to prevent accidents. If manual lifting is necessary, ensure a sufficient number of individuals are available to carry the system.
- Before moving the system, inspect the storage place and remove obstacles.
- While moving the system, protect it from physical shock.
- The system must be protected from dust, moisture, and static electricity.

4.1.3.2. Unpacking Items

To unpack items, follow these guidelines:

- The items must be packed until they reach the installation site.
- The items are classified by the job specification and stored in a place that does not interfere with work.
- Install unpacked systems immediately. If that's not possible, store them temporarily at the installation site.
- Unpack the outer packaging, leaving the inner packaging intact.
- Unpack the internal packaging after placing each system at its installation location.
- Dispose of packaging trash according to waste management rules and refrain from recycling it.

4.1.4. Installation Tools

The basic tools required for installation are listed in the following table. The additional tools required for each site should be identified and arranged during a site survey before starting the installation.

No.	Item	Specification	Purpose
1	Torque Driver Set 	No.0 – + No.3 (M2.6–M6 ‘+’ Driver) 0.07–4.34 lbf*ft (1.0–60 Kg*cm)	For fastening the M3–M6 screws
2	Drill/Bit Set 	0.12–0.4 in (3–10 mm)	For drilling plastic anchors
3	Cutter Knife 	More than 18 mm	For cutting

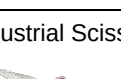
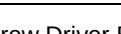
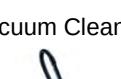
No.	Item	Specification	Purpose
4	Tape Measure 	16.4 ft (5 M)	For size measurement
5	Horizontal Ruler 	Spirit level 11.8 in (300 mm)	For horizontal/vertical measurement
6	Power Extension Cable 	98.42 ft (30 M)	Basic tool
7	Safety Gloves 	Normal	Electrostatic protection
8	Cable Cutter 	9.5 in (240 mm)	For cable cutting
9	Wire Stripper 	Basic tool	For removing the outer cable sheath
10	Industrial Scissor 	Basic tool	For cutting
11	Screw Driver Bit 	'+', No. 2	For fastening M3, M4, and M6 screws
12	Electric Drill 	Normal	For fastening M3, M4, and M6 screws
13	Vacuum Cleaner 	Normal	For removing dust during the drilling work

Table 4-1 Basic Installation Tools


The tools required for installation may vary depending on site conditions. In addition to the basic tools, a protractor, ladder, safety equipment, and cleaning tools should also be arranged, considering the site conditions.

4.2 Installing the HE

The HE can be mounted vertically or horizontally, depending on site requirements.



The wall-mount bracket comes pre-installed on the unit



The rack-mount bracket is optional and must be purchased separately if needed.



Before drilling, ensure the area behind the surface is clear of electrical wires and other hazards.

4.2.1. Wall Mounting_HE

To wall-mount the HE, follow these steps:

1. Ensure you have the items described in the following table.

Category	Description	
Part	HE Wall-Mount Bracket	1 EA
Bolts/Screws	FH M6 x L8 Low Profile Screw (attached to the bracket)	4 EA
	10mm x 40mm Plastic Anchor Plug (for wall)	4 EA
	M6 x L30 Tapping Screw (for wall)	4 EA
Tools/Part Image	• Torque Driver (44–106 in·lbf) • Screw Driver Bit ('+', No. 3)	

Table 4-2 HE_Mounting Kits & Tools

2. Check the distance between the unit and the anchor bolt hole.
3. Place the mount bracket at the designated location.

Unit: in. (mm)

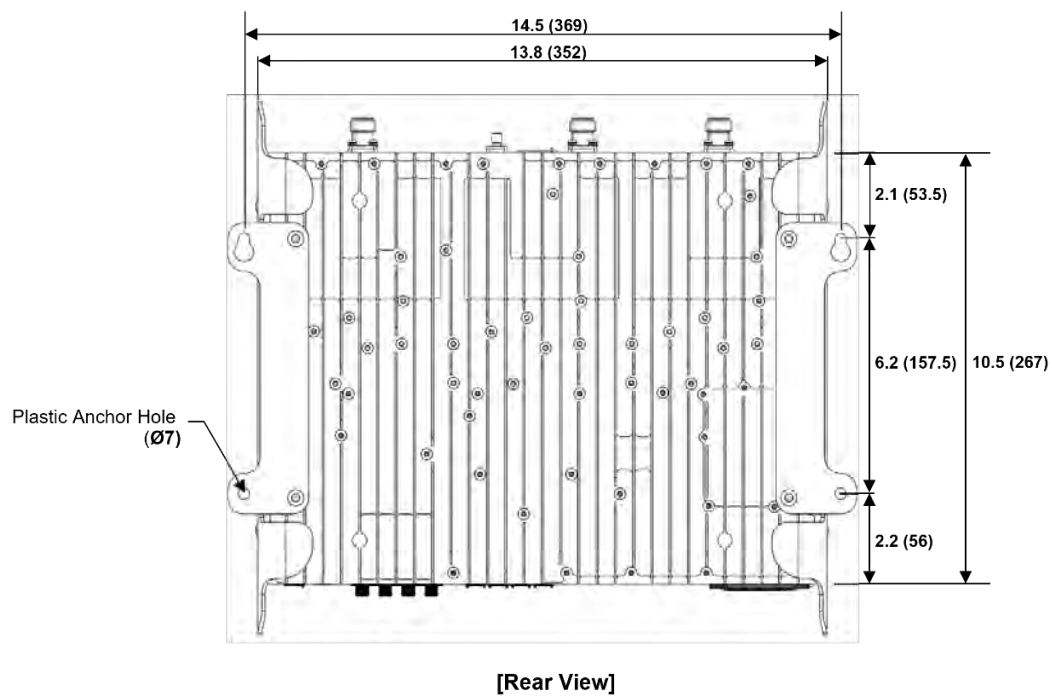


Figure 4-1 Marking Dimension_HE

- Securely attach the mount bracket to the unit using the provided fasteners. Check and adjust its level as needed.

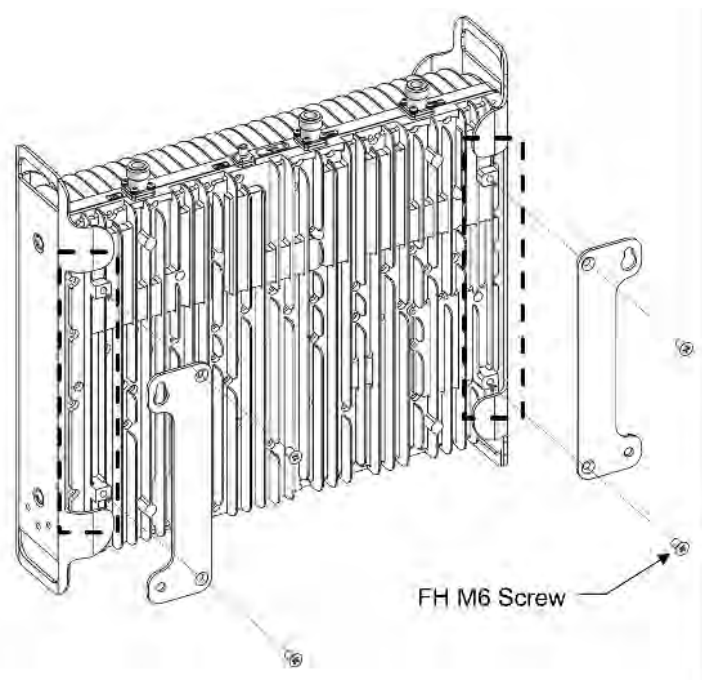


Figure 4-2 Attaching the Bracket to the HE

5. If the bracket is level, mark the anchor bolt holes on the wall.

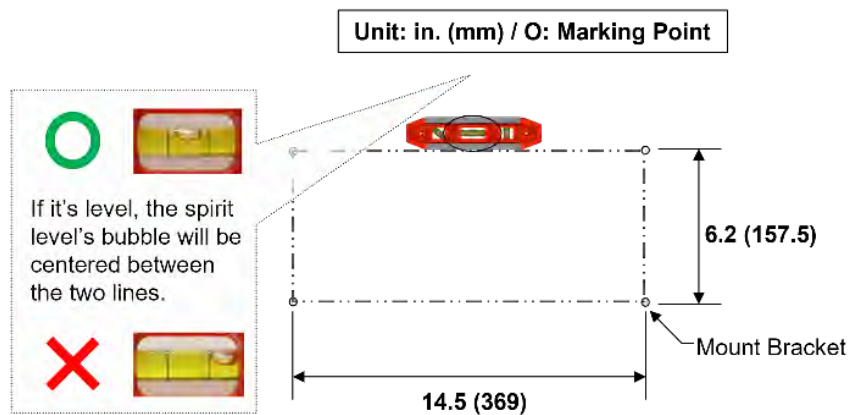


Figure 4-3 Checking the Marking Points_HE



To mount the unit on the wall, perform a leveling test and check the marked positions for horizontal and vertical alignment before drilling. If they are not properly aligned, adjust the markings accordingly.



Once the position for the unit is determined, place the unit in that position and mark where the anchor bolts will be fixed. This minimizes marking errors.

6. Drill anchor holes at marked points.
Additionally, remove dust from the holes using a cleaner.

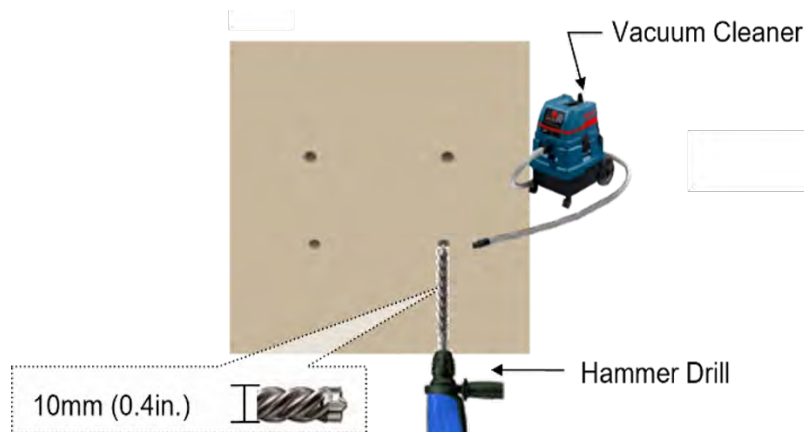


Figure 4-4 Drilling Holes for Anchors_HE

7. Fix the plastic anchors to the drilled holes.

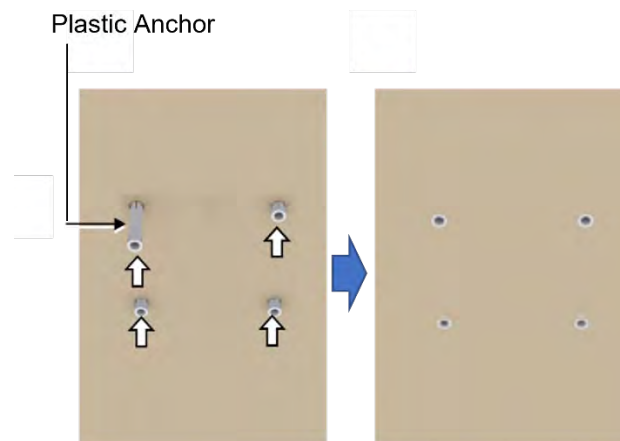


Figure 4-5 Securing the Plastic Anchors_HE



Direct ceiling installation should be on a rigid surface, such as concrete.

8. Mount the unit onto the wall.

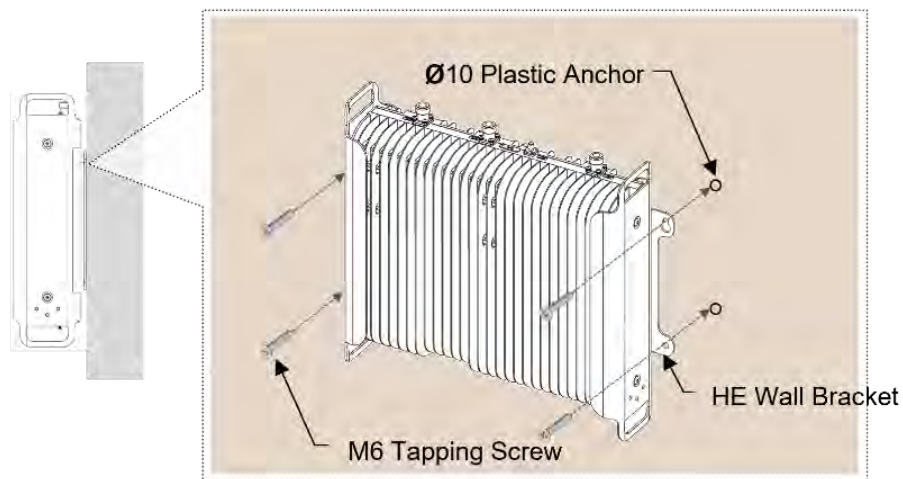


Figure 4-6 Mounting the Wall Mount Bracket_HE

9. The figure below shows the distance between the wall and the unit.

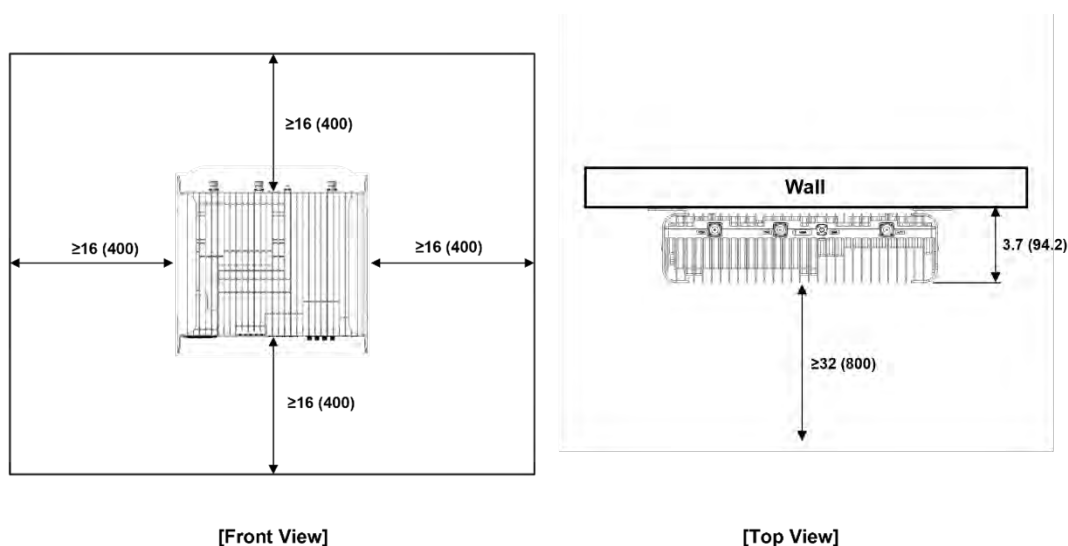


Figure 4-7 Measurement for HE Wall Mount Bracket

4.2.2. Rack Mounting_HE

To install the HE in racks or cabinets, follow these steps:

1. Ensure that the items listed in the following table are available:

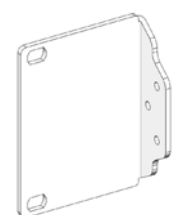
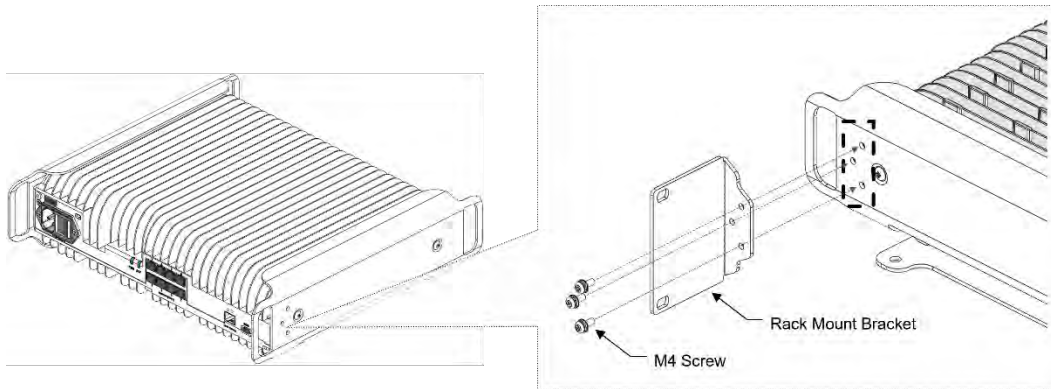
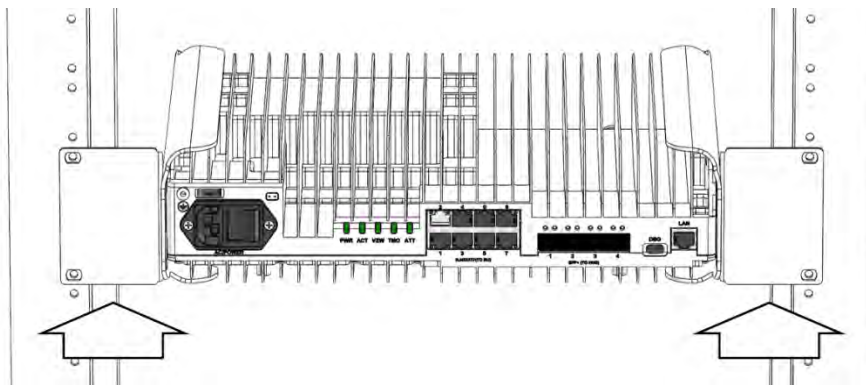
Category	Description	
Part	SOLiD_BARS_RMBRK	2 EA
Bolts/Screws	M4 x L12 (attached to the bracket)	6 EA
	M6 x L16 (for Rack)	4 EA
Tools/Part Image	• Torque Driver (70.8–88.5 in lbf) • Screw Driver Bit ('+', No. 3)	

Table 4-3 Parts and Tools for HE Horizontal Installation

2. Attach the rack mount bracket to the unit. Secure the bracket on both the right and left sides using M4 screws, as shown below.

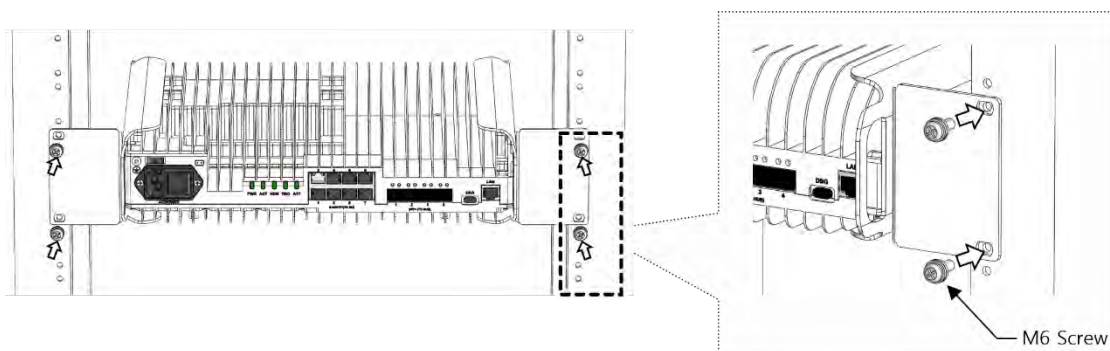
**Figure 4-8 HE_Rack Installation (1)**

3. Mount the unit at your desired location within the rack. Align the unit with the screw holes on both sides and gently slide it in from the front to the back until it's securely in place.

**Figure 4-9 HE_Rack Installation (2)**

Ensure that the pre-installed mount bracket on the unit has been removed.

4. Secure the unit firmly by using four M6 screws.

**Figure 4-10 HE_Rack Installation (3)**

5. Use a spirit level to check leveling and confirm that the unit is securely installed in the rack as shown below.

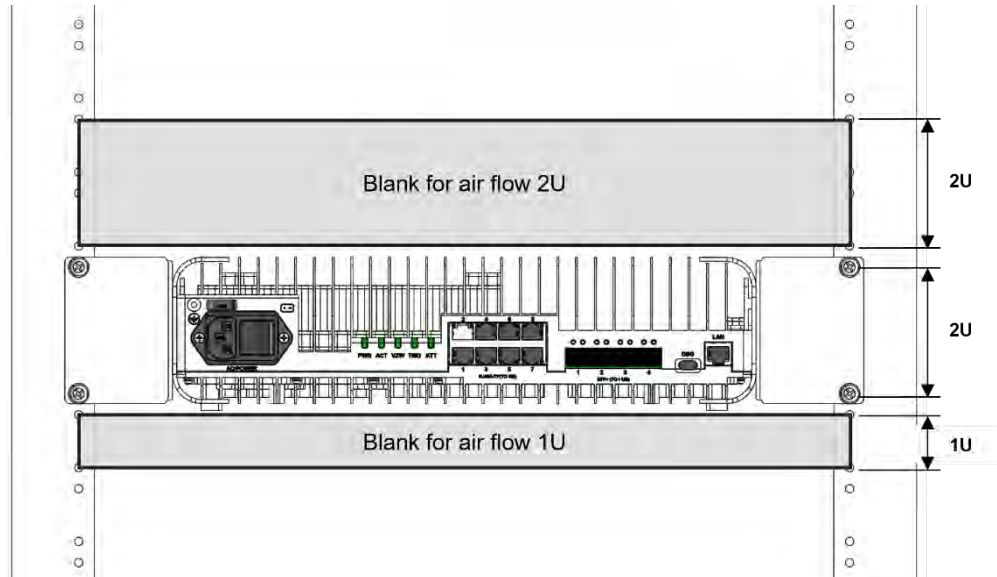


Figure 4-11 HE_Rack Installation (4)

4.3 Installing the HUB

The HUB can be mounted vertically or horizontally, depending on site requirements.



The wall-mount bracket comes pre-installed on the unit



The rack mount bracket is optional and must be purchased separately, if needed.



Before drilling, ensure the area behind the surface is clear of electrical wires and other hazards.

4.3.1. Wall Mounting_HUB

The installation procedure for the HUB on the wall is identical to that of the HE. Please refer to [4.2.1](#) for further details.

4.3.2. Rack Mounting_HUB

The installation procedure for the HUB on the rack is identical to that of the HE. Please refer to [4.2.2](#) for further details.

4.4 Installing the RU

The RU can be mounted vertically on a concrete wall or horizontally on a ceiling or ceiling tile, depending on the installation environment.



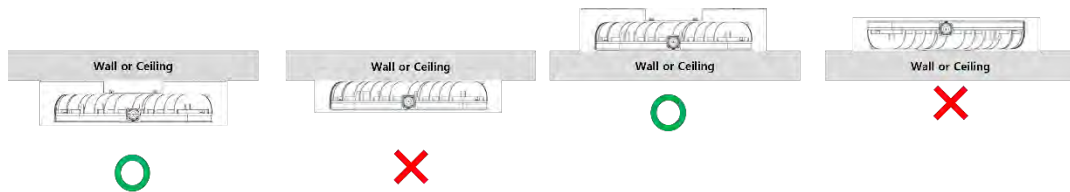
The wall & ceiling mount bracket comes pre-installed on the unit.



The ceiling tile bracket is optional and must be purchased separately, if needed.

4.4.1. Wall & Ceiling Mounting_RU

The ceiling or wall where the remote unit is installed must support four times the weight of the unit and its components without being damaged.



To mount the remote unit, follow these steps:

1. Ensure you have the items described in the following table.

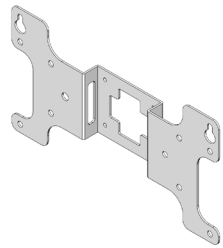
Category	Description	
Part	RU Wall & Ceiling Mount Bracket	1 EA
Bolts/Screws	M4 x L10 (attached to the bracket)	4 EA
	10mm x 40mm Plastic Anchor Plug (for wall)	4 EA
	M6 x L30 Tapping Screw (for wall)	4 EA
Tools/Part Image	• Torque Driver (44–106 in lbf) • Screw Driver Bit ('+', No. 3)	

Table 4-4 RU_ Wall & Ceiling Mounting Kits & Tools

2. Check the distance between the unit and the anchor bolt hole, and place the mount bracket at the designated location.

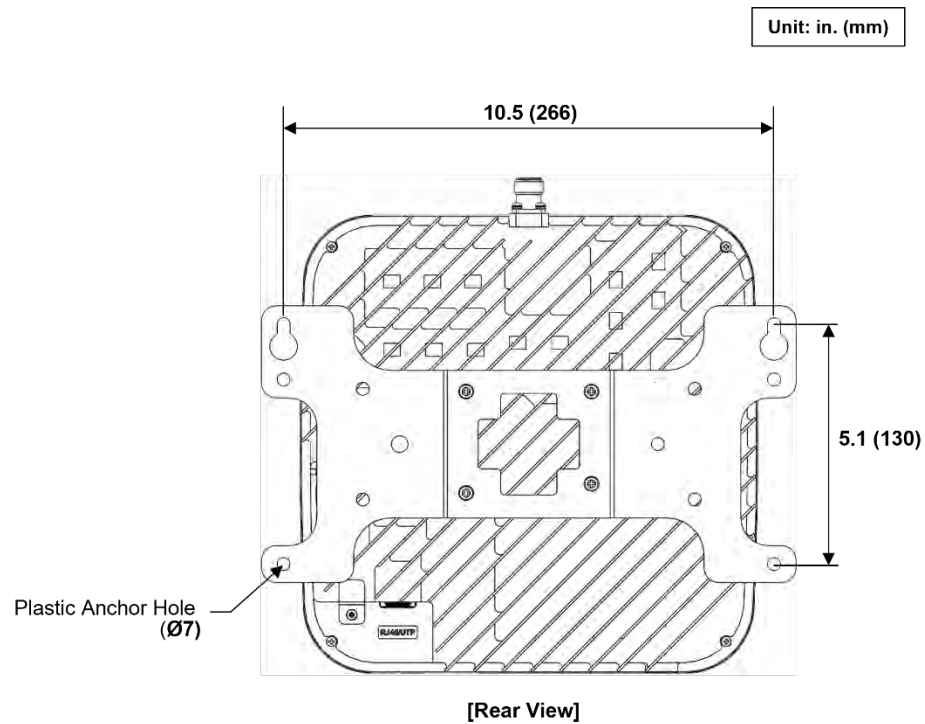


Figure 4-12 Marking Dimension_RU

- Securely attach the mount bracket to the HE unit using the provided fasteners. Check and adjust its level as needed.

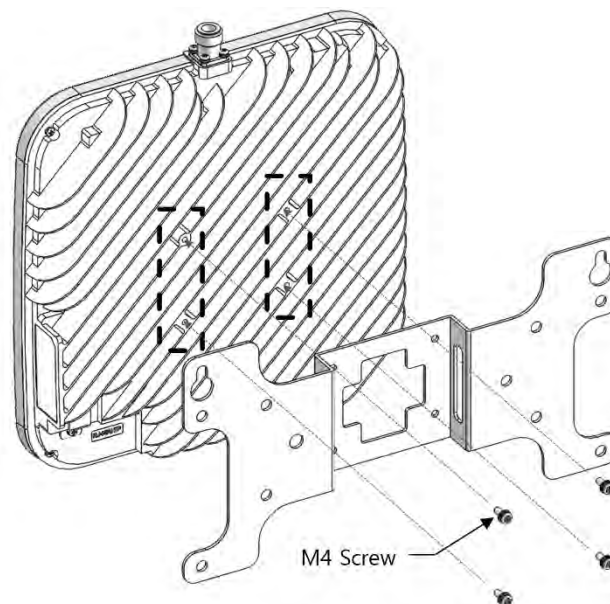


Figure 4-13 Attaching the Bracket to the RU

- If the mount bracket is level, mark the anchor bolt holes on the wall or ceiling.

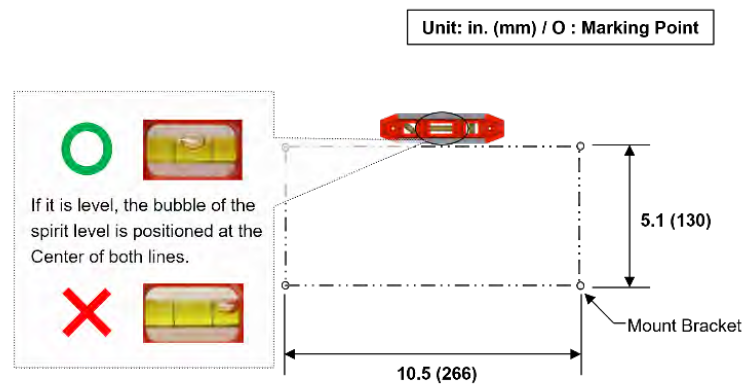


Figure 4-14 Checking the Marking Points_RU



While securing the mount bracket, perform a level test on the bracket, as only minor adjustments can be made after installation. (This applies only to wall installations.)

5. Drill anchor holes at marked points.
Additionally, remove dust from the holes using a cleaner.

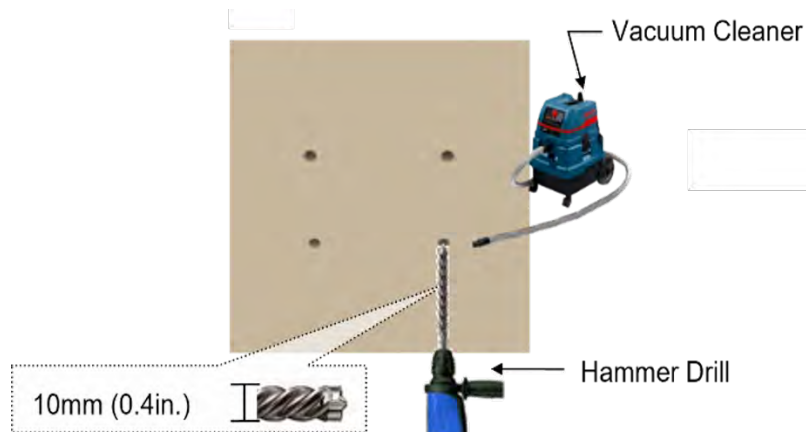


Figure 4-15 Drilling Holes for Anchors

6. Fix the plastic anchors to the drilled holes.

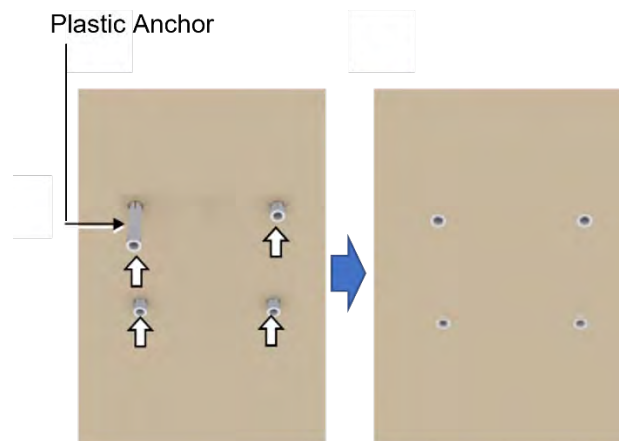


Figure 4-16 Securing the Plastic Anchors



Direct ceiling installation should be on a rigid surface, such as concrete.

7. After completing the drilling and anchoring at the installation site, mount the remote unit to the wall or ceiling using the M6 screws.

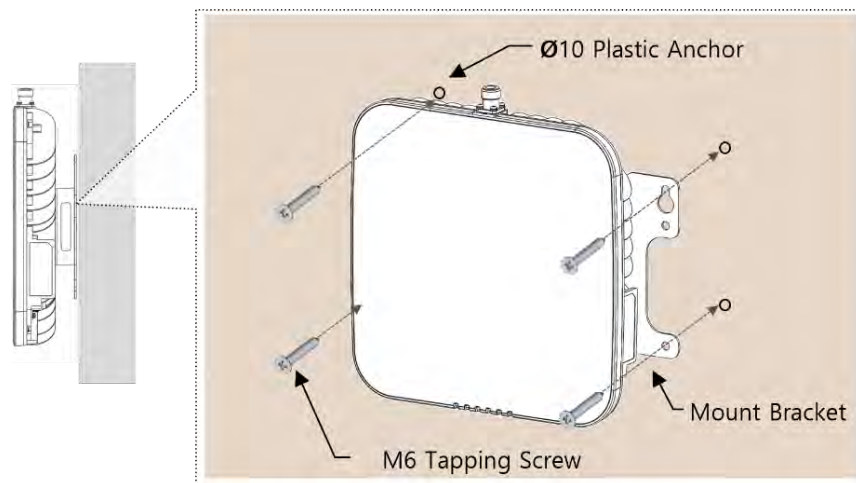


Figure 4-17 Mounting the Wall & Ceiling Mount Bracket_RU

8. Verify the distance between the wall/ceiling and the remote unit.

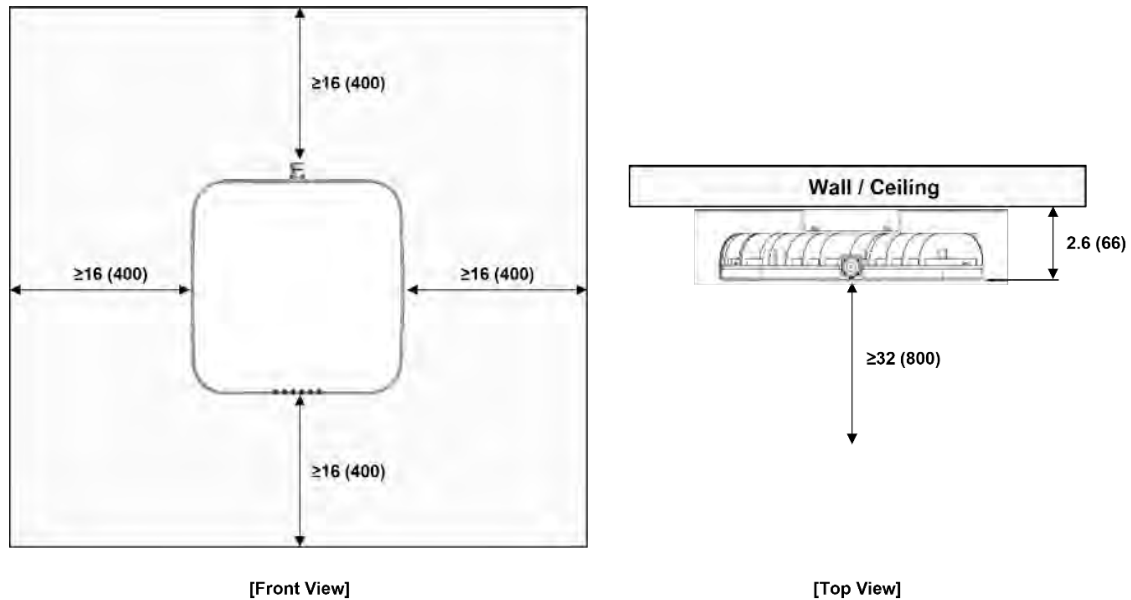


Figure 4-18 Arrangement Wall/Ceiling Type Installation

4.4.1.1. Using a Threaded Rod for Ceiling Installation

In structures like warehouses, factories, and garages, suspended ceilings are often absent. Instead, the space below the roof is usually filled with metal piping for fire safety, ventilation, and electrical systems. These dense installations can interfere with device signals, making threaded rod mounting a practical and effective solution.



The threaded rod is not included and must be purchased separately, if required.

To mount the remote unit on the ceiling using a threaded rod, follow these steps:

1. Before installation, ensure the necessary cable is positioned correctly and the threaded rod is firmly attached to the concrete ceiling where the cable ends.
2. Attach the mount bracket to the remote unit as shown below.

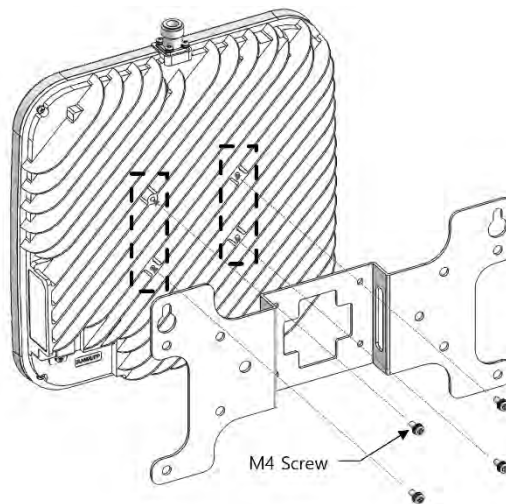
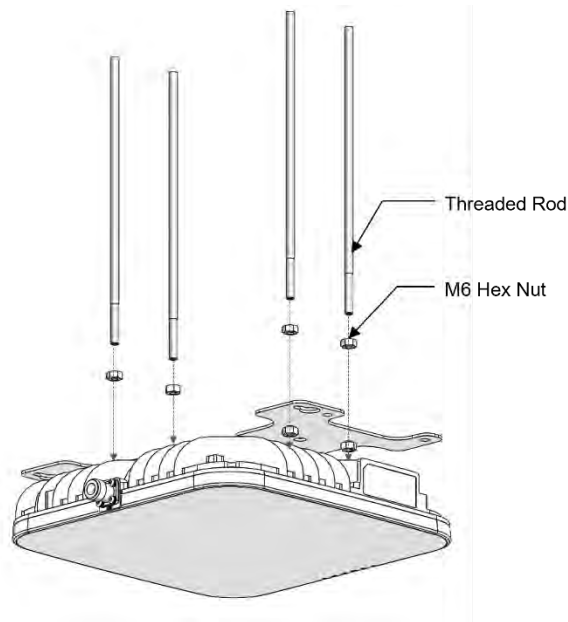
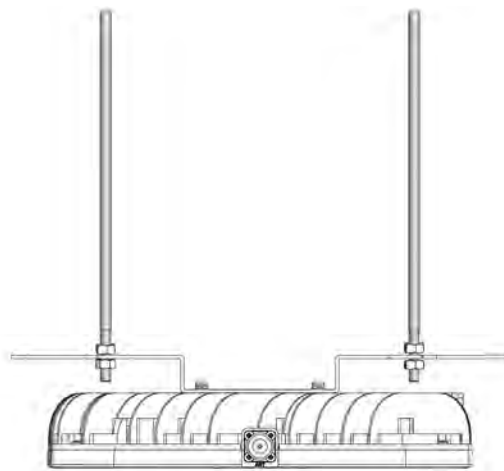


Figure 4-19 Threaded Rod for Ceiling Installation (1)

3. Install the mount bracket at the end of the threaded rod, and tighten the screws.

**Figure 4-20 Threaded Rod for Ceiling Installation (2)**

4. Ensure that the threaded rod and mount bracket are securely fastened, as shown below.

**Figure 4-21 Threaded Rod for Ceiling Installation (3)**

5. The following images show the completed installation of the threaded rod on the ceiling.

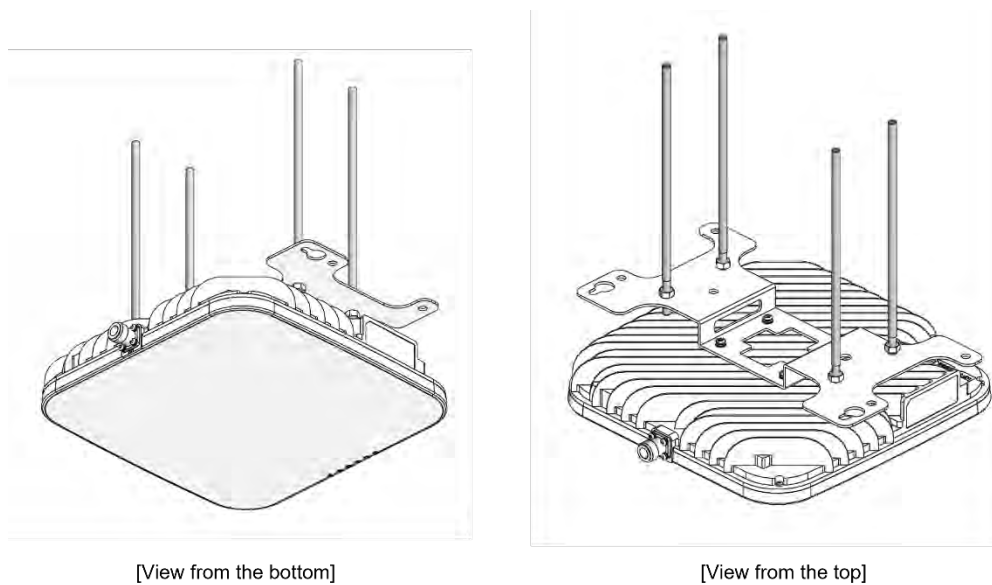


Figure 4-22 Threaded Rod for Ceiling Installation (4)

4.4.2. Suspended Ceiling Mounting_RU

Suspended ceilings are frequently used in various environments, providing an effective solution for installing remote units while enhancing the comfort of large, open spaces. This section will guide you on how to install a remote unit on a suspended ceiling using a Ceiling Mount Bracket.

To mount the remote unit, follow these steps:

1. Ensure that the items described in the following table are available.

Category		Description
Part	SOLiD_BARS_ACBRK	
Bolts/Screws	M4 x L10 (attached to the bracket)	4 EA
	M4 x L15 Tapping Screw (fix to the ceiling tile)	4 EA
Tools/Part Image	• Torque Driver (6–22 lbf in) • Screw Driver Bit ('+', No. 2)	

Table 4-5 RU_ Wall & Ceiling Mounting Kits & Tools

2. When mounting the remote unit on a grid ceiling, open at least one ceiling tile on the grid.

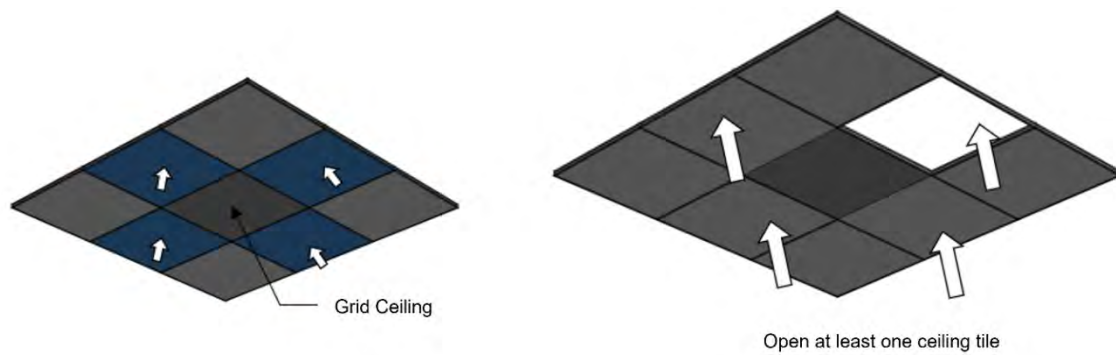


Figure 4-23 Opening Ceiling Tile

3. Place the Ceiling Mount Bracket onto the ceiling tile and adjust it to fit.

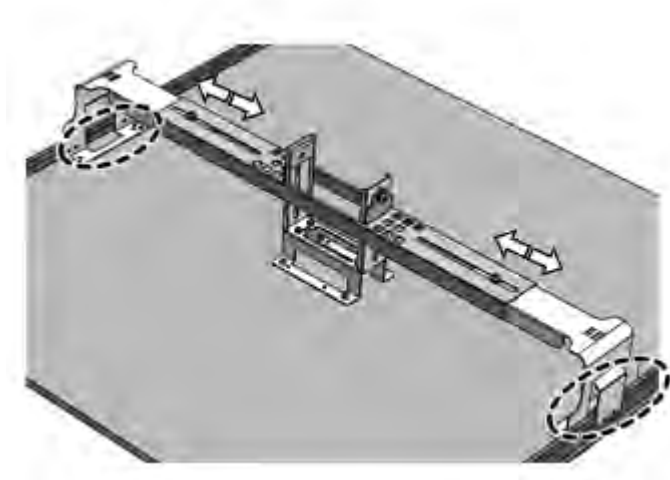


Figure 4-24 Attaching the Ceiling Mount Bracket to the Ceiling Tile

4. Attach the RU to the Ceiling Mount Bracket installed on the ceiling tile, as shown in the image below.



Ensure that the pre-installed wall & ceiling mount bracket on the unit has been removed.

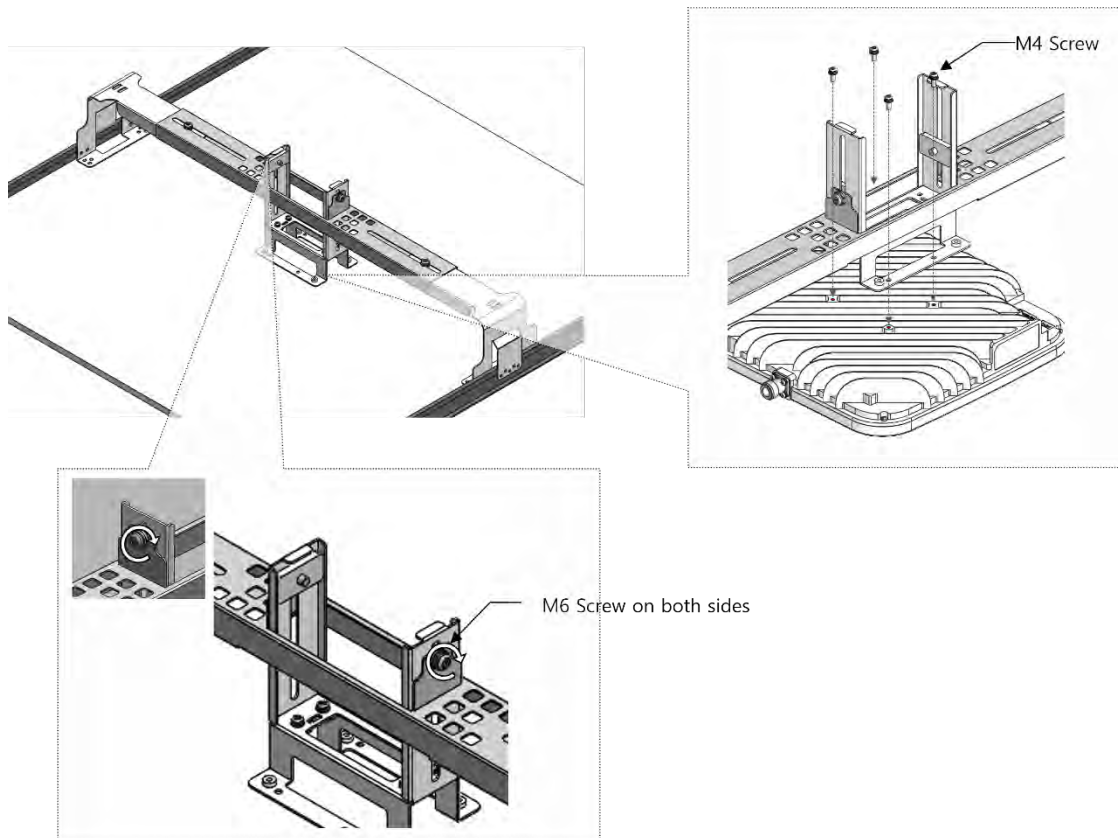


Figure 4-25 Installing Ceiling Mount Kit (1)

5. The following figure shows the completed installation of the unit on the ceiling tile.

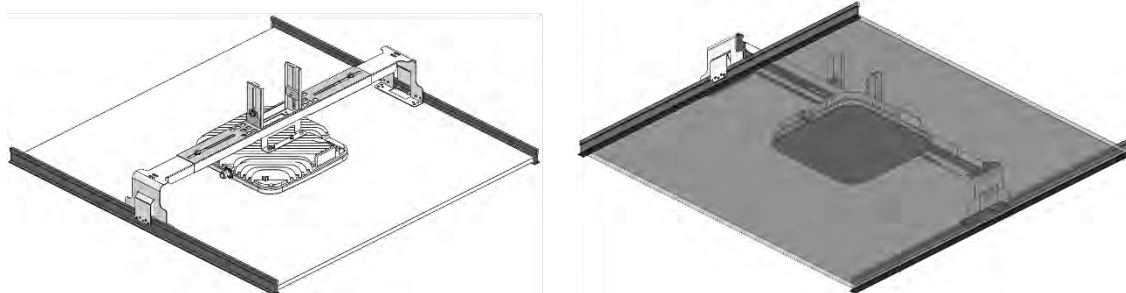


Figure 4-26 Installing Ceiling Mount Kit (2)

4.4.2.1. Using a Suspended Ceiling Wire for Additional Support (Optional)

When installing a remote unit on the ceiling tile, use a suspended ceiling wire for extra support to ensure stability.



The steel wire is not included and must be purchased separately, if required.

1. Ensure that the items described in the following table are available:

Category	Description	
Part	M4 × L15 (taptite screw)	4 EA

Category	Description	
Recommended Torque Value	M4 Taptite Screw	13 lbf-in
Tools	• Torque Driver (6–22 lbf-in) • Screw Driver Bit ('+', No. 2) • Screw Driver ('+', No. 2)	

Table 4-6 Parts and Tools for Ceiling Wire Installation

- Securely fix the ceiling wire to the ceiling frame.

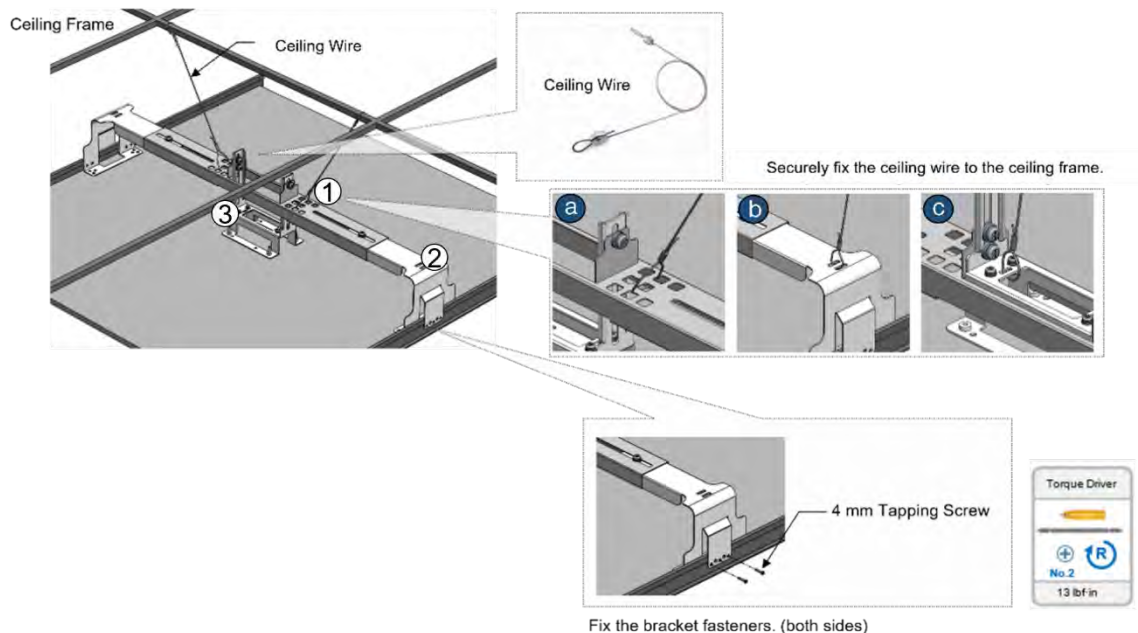


Figure 4-27 Installing a Ceiling Wire for Extra Support



The Mount Bracket has three positions: ①, ②, ③ for installing the ceiling wire. Choose any of these positions.

- The following shows the completed installation of the ceiling wire.

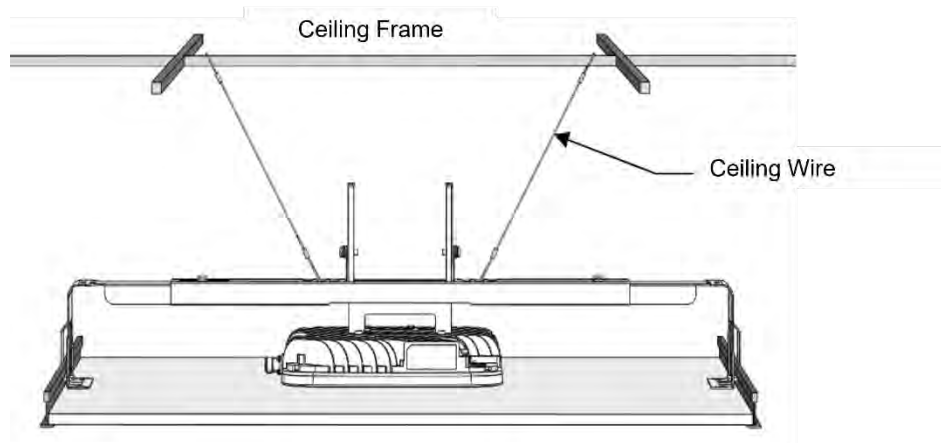


Figure 4-28 Completed Installation of the Ceiling Wire

4.5 Installing Antennas

The HE system supports two types of off-air antennas: donor and DAS antennas. This chapter describes the installation procedure for the donor antenna. Installation accessories for the DAS antenna are not provided.



Please note that all antenna installation kits are optional and must be purchased separately if needed.

4.5.1. Donor Antenna Installation

The donor antenna can be installed on the ceiling, wall, or pole using SOLiD_BARS_RAK (ceiling, wall, and pole compatible) or SOLiD_BARS_PMK (pole only), as needed.

- For wall installation of the donor antenna, see [Donor Antenna Installation Wall](#).
- For ceiling tile installation of the donor antenna, see [Donor Antenna Installation Ceiling Tile](#).
- For pole installation of the donor antenna, see [Donor Antenna Installation Pole](#).

Donor antennas are not included with the product. To purchase a compatible antenna for use with the SOLiD BARS™, refer to the 'Maximum Coupled Gain (Antenna + Cable)' specification provided below.

Radio	Uplink (Donor)(dBi)	Downlink (Service)(dBi)
LTE Band 4	4.16	-0.09
LTE Band 5	5.35	-1.22
LTE Band 12	5.93	-0.91
LTE Band 13	5.61	-0.93
LTE Band 25	3.67	0.12

Table 4-7 Maximum Coupled Gain Specification



The SOLiD BARST[™] should only be used with antennas intended for certification or those that comply with the Maximum Coupled Gain specifications.

4.5.1.1. Donor Antenna Installation_Wall

To install the donor antenna on the wall, follow the procedure below.

1. Ensure you have the items described in the following table.

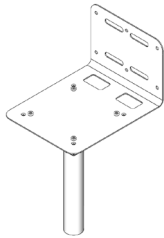
Category	Description	
Part	SOLiD_BARS_RAK	1 EA
Bolts/Screws	10 mm x 40 mm Plastic Anchor Plug	6 EA
	M6 x L30 Tapping Screw	6 EA
Tools/Part Image	Torque Driver (44–106 lbf in)	

Table 4-8 Donor Antenna Mounting Kit & Tools_Wall

2. Place the mount bracket at the designated location. Check and adjust its level as needed.
3. If the bracket is level, mark the anchor bolt holes on the wall.

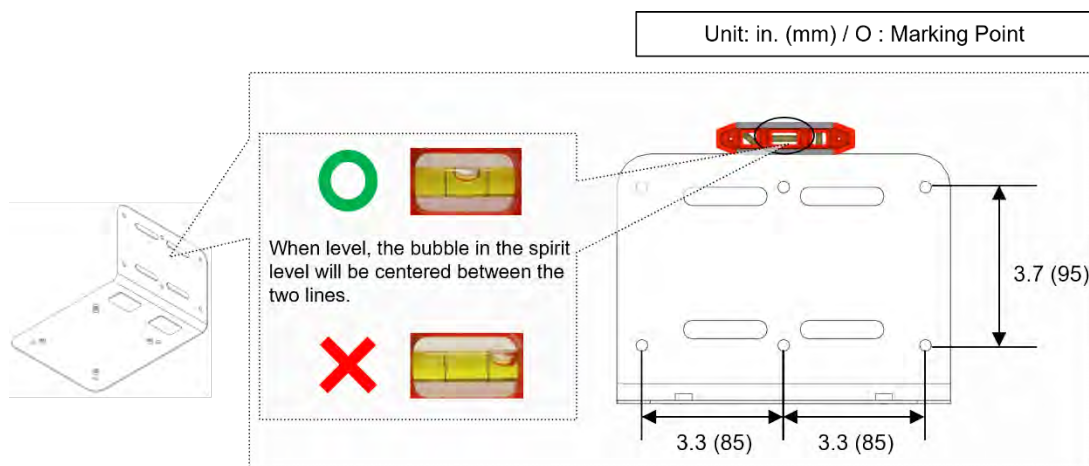


Figure 4-29 Checking the Marking Points_Wall

4. Securely attach the mount bracket to the wall using the provided fasteners.

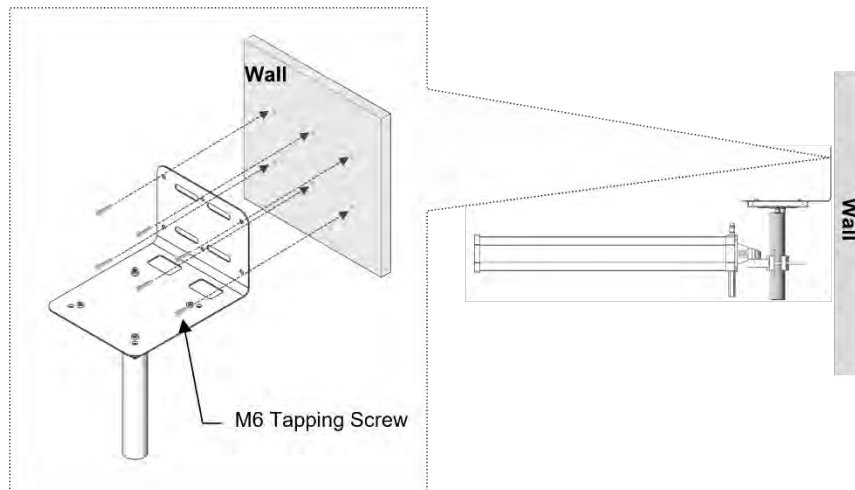


Figure 4-30 Securing the Mount Bracket_Wall

- Securely attach the donor antenna to the mount bracket using the provided fasteners.

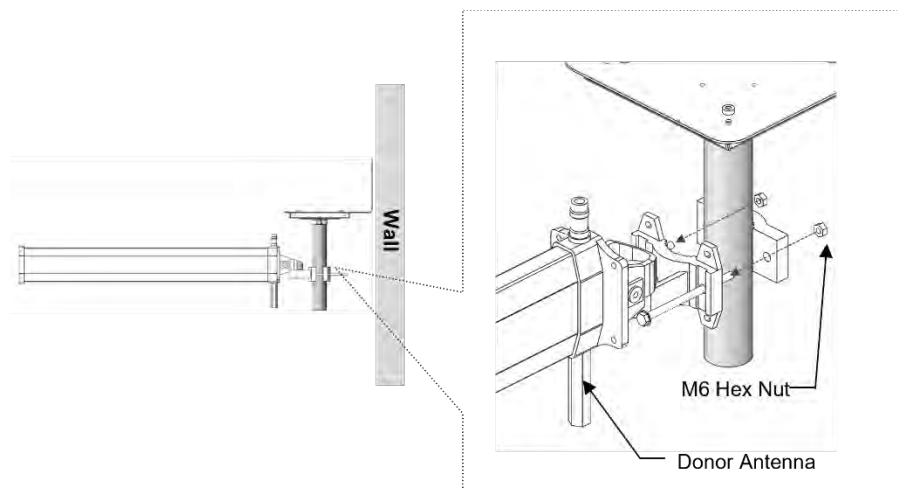


Figure 4-31 Securing the Donor Antenna_Wall

- After installing the donor antenna, adjust its angle by repositioning the bracket. For detailed instructions, refer to [Adjusting the Donor Antenna Position](#)

4.5.1.2. Donor Antenna Installation_Ceiling Tile

To install the donor antenna on the ceiling tile, follow the procedure below.

- Ensure you have the items described in the following table.

Category	Description	
Part	SOLiD_BARS_RAK	1 EA
Bolts/Screws	10 mm x 40 mm Plastic Anchor Plug	6 EA
	M6 x L30 Tapping Screw	6 EA

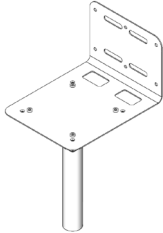
Tools/Part Image	Torque Driver (44–106 lbf in)	
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Table 4-9 Donor Antenna Mounting Kit & Tools_Ceiling

2. Place the mount bracket at the designated location. Check and adjust its level as needed.
3. If the bracket is level, mark the anchor bolt holes on the ceiling.

Unit: in. (mm) / O : Marking Point

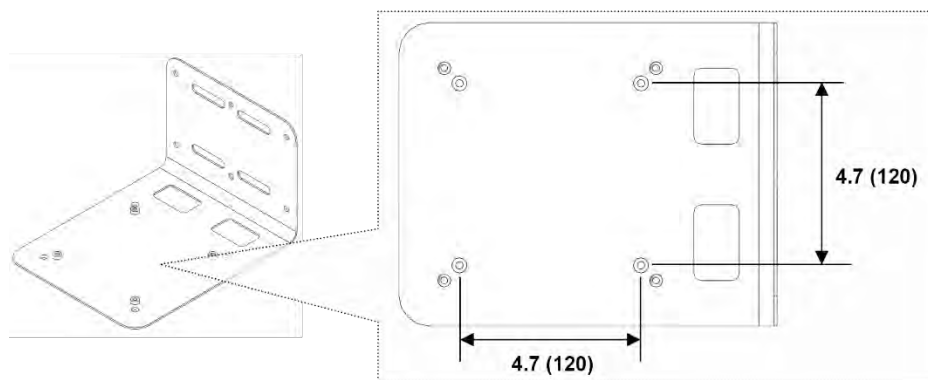


Figure 4-32 Checking the Marking Points_Ceiling

4. Drill holes in the ceiling at the marked anchor bolt positions.
5. Separate the top and base parts of the bracket, then place the ceiling tile between them as shown below.

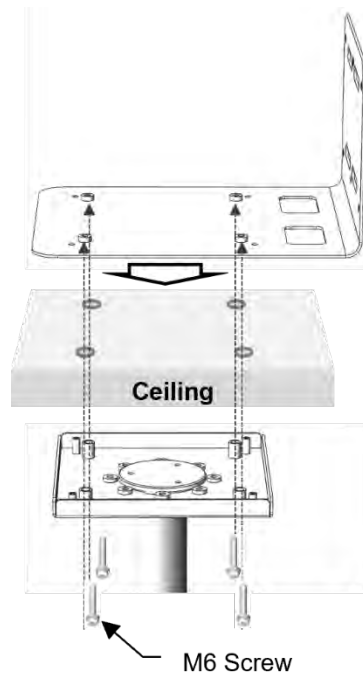


Figure 4-33 Securing the Mount Bracket (1)_Ceiling

6. Securely attach the mount bracket to the ceiling tile using the provided fasteners.

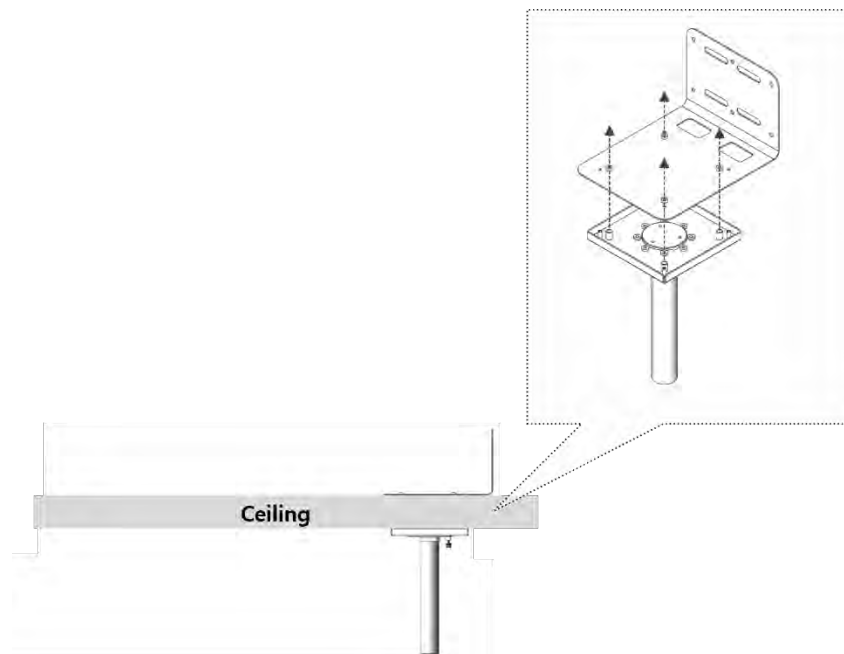


Figure 4-34 Securing the Mount Bracket (2)_Ceiling

7. Securely attach the donor antenna to the mount bracket using the provided fasteners.

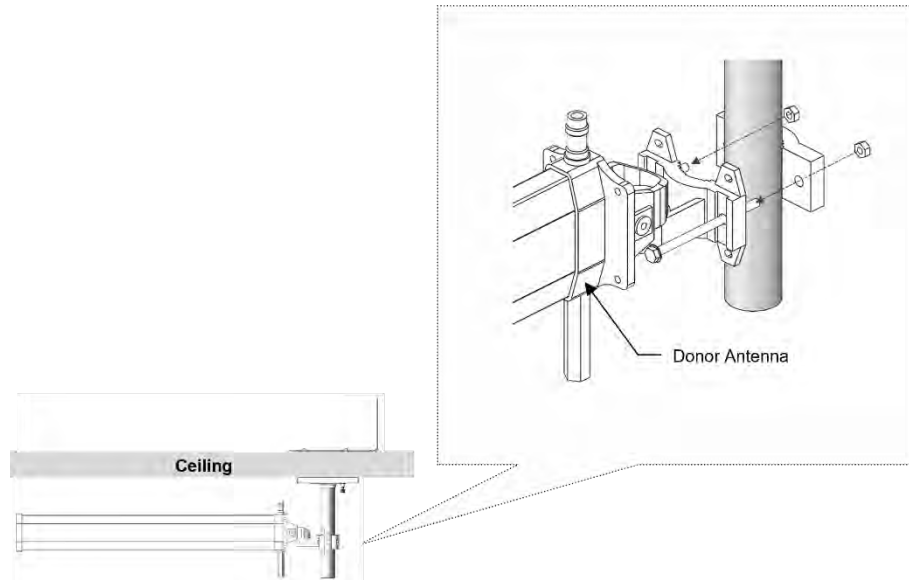


Figure 4-35 Securing the Donor Antenna (3)_Ceiling

Adjusting the Donor Antenna Position

To adjust the angle of the donor antenna after installing it at the desired location, follow the steps below:

1. Locate the M6 screw at the bottom of the mounting bracket, marked by the red circle in the image below.

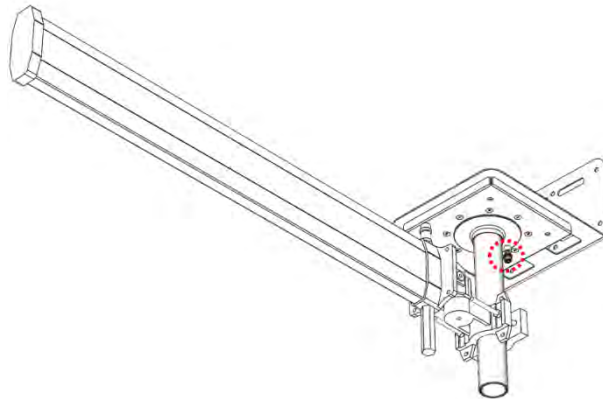


Figure 4-36 Adjusting the Donor Antenna Position (1)_Ceiling

2. Loosen the screw to slightly free the fixed mounting bracket.

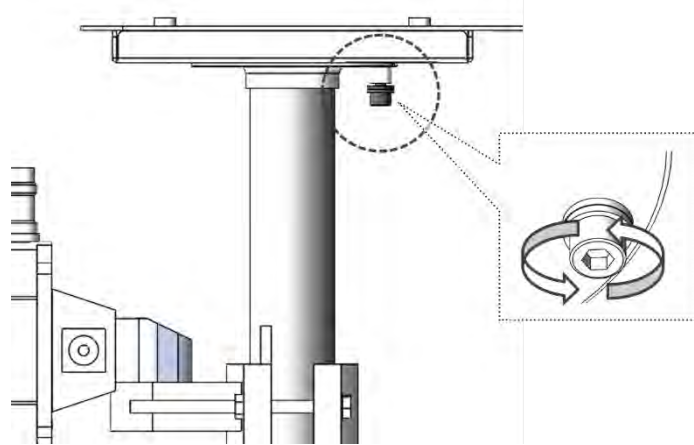


Figure 4-37 Adjusting the Donor Antenna Position (2)_Ceiling

3. Set the donor antenna to the desired angle by moving it to one of the positions labeled 1 through 8 on the bracket.

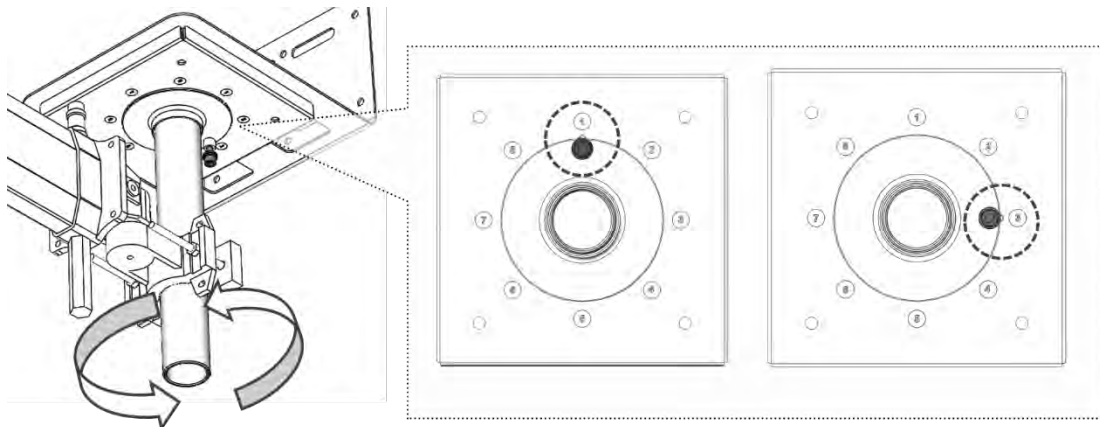


Figure 4-38 Adjusting the Donor Antenna Position (3)_Ceiling

4. After adjusting the bracket to the desired angle, securely tighten the M6 screw.

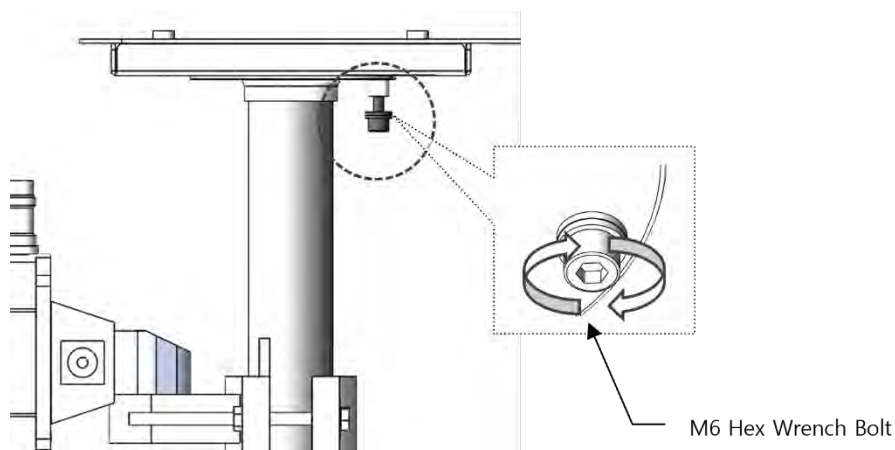


Figure 4-39 Adjusting the Donor Antenna Position (4)_Ceiling

4.5.1.3. Donor Antenna Installation_Pole

To install the donor antenna on a pole, use the SOLiD_BARS_RAK (compatible with wall, ceiling, and pole installations) or the SOLiD_BARS_PMK (pole installations only)

Pole-Mount Donor Antenna (RAK)

To install the donor antenna on a pole using the SOLiD_BARS_RAK, follow the steps below.



The default U-Bolt provided is the U-Bolt_W5/16_1 1/2. If you purchase additional U-Bolts separately, you can install pipes up to 3 inches in diameter.

1. Ensure you have the items described in the following table.

Category	Description	
Part	SOLiD_BARS_RAK	1 EA
Bolts/Screws	U-Bolt_W5/16_1 1/2 (U-Bolt M8 40A)	2 EA
	M8 HEX Nut, Plain Washer, Spring Washer	4 EA
Tools/Part Image	Torque Driver (221–531 lbf in)	

Table 4-10 SOLiD_BARS_RAK & Tools_Pole

2. Firmly secure the mount bracket to the pole using the two U-bolts provided.

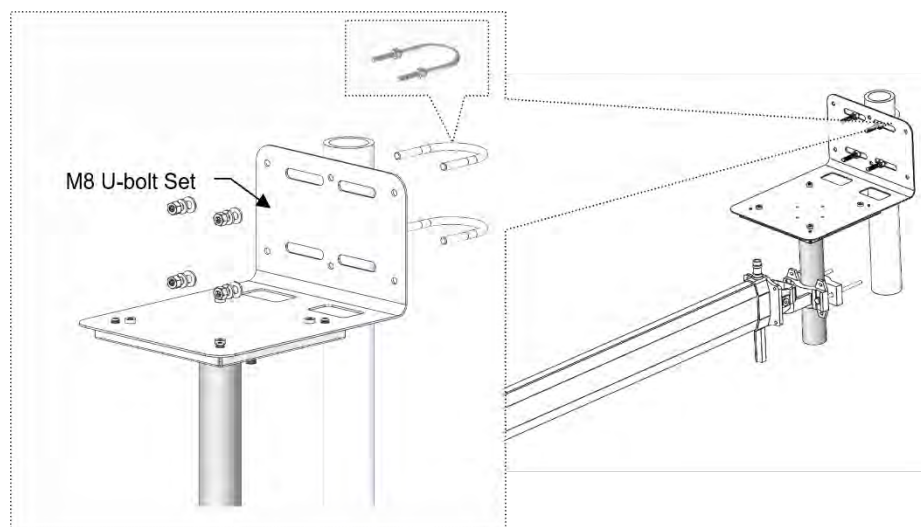


Figure 4-40 Installing the Donor Antenna (1)_Pole

3. Firmly secure the donor antenna to the base of the mount bracket with the provided fasteners.

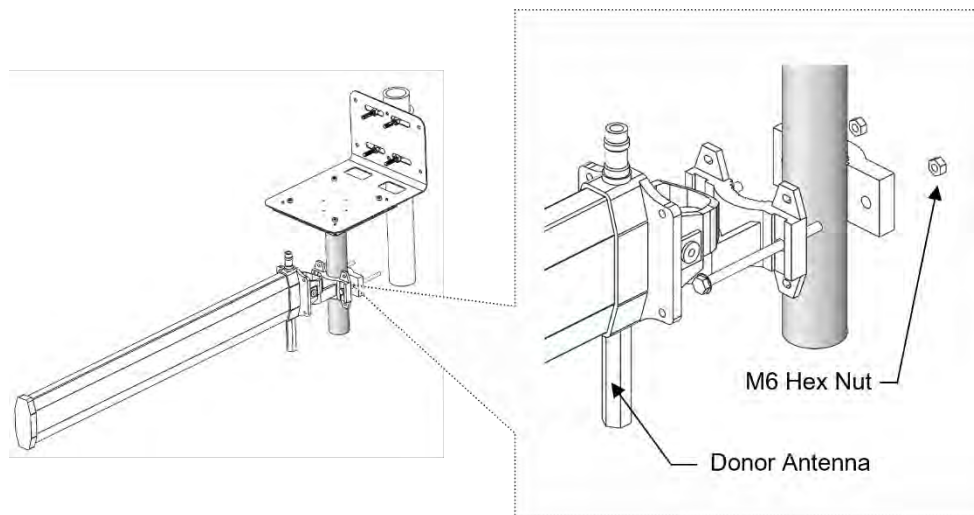


Figure 4-41 Installing the Donor Antenna (2)_Pole

4. After installing the donor antenna, adjust its angle by repositioning the bracket. For detailed instructions, refer to [Adjusting the Donor Antenna Position](#)

Pole-Mount Donor Antenna (PMK)

To install the donor antenna on a pole using the SOLiD_BARS_PMK, follow the steps below.



The default U-Bolt provided is the U-Bolt_W5/16_1 1/2. When purchasing additional U-Bolts separately, you can install pipes up to 1.5 inches in diameter.

1. Ensure you have the items described in the following table.

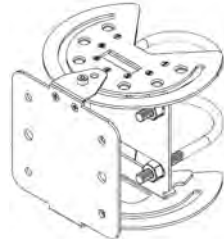
Category	Description	
Part	SOLiD_BARS_PMK	1 EA
Bolts/Screws	U-Bolt_W5/16_1 1/2 (U-Bolt_M8_40A)	2 EA
	M8 HEX Nut, Plain Washer, Spring Washer	4 EA
Tools/Part Image	Torque Driver (221–531 lbf in)	

Table 4-11 SOLiD_BARS_PMK & Tools_Pole

2. Install the mount bracket onto the pole. Secure it firmly using the two U-bolts as shown below.

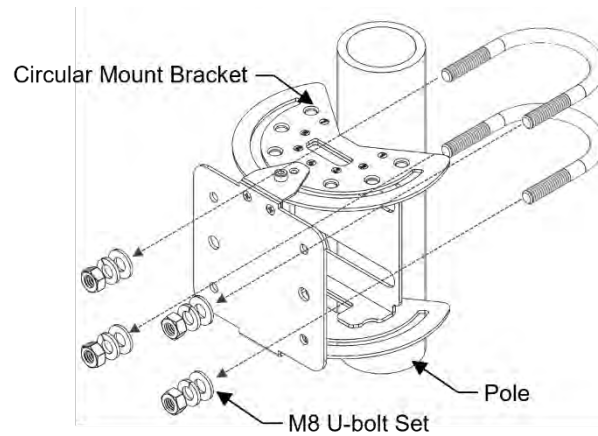


Figure 4-42 Adjusting the Donor Antenna Position (1)_ Pole

3. Use four M6 hex bolts to securely fasten the donor antenna to the mount bracket as shown below.

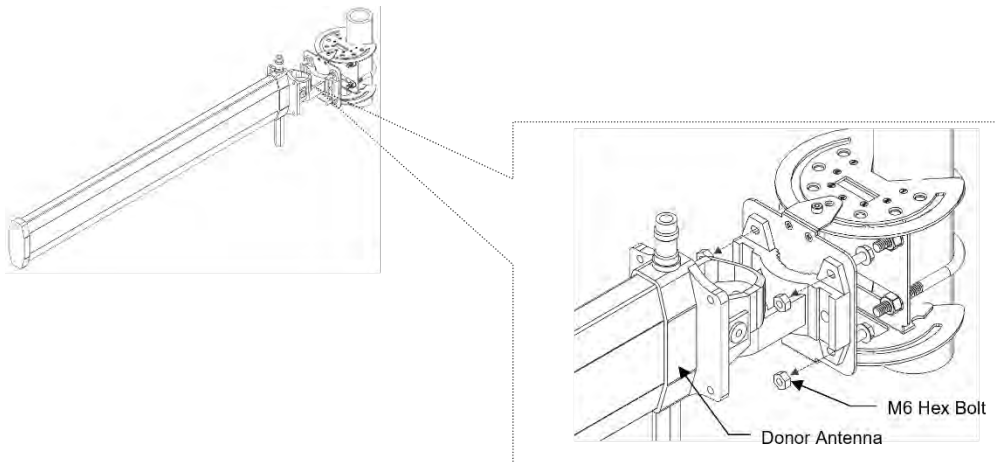


Figure 4-43 Adjusting the Donor Antenna Position (2)_ Pole

4. After installing the donor antenna, adjust its angle by repositioning the bracket.
5. You will find two M6 hex bolts securing the mount bracket at the top and bottom, marked by red circles in the illustration.

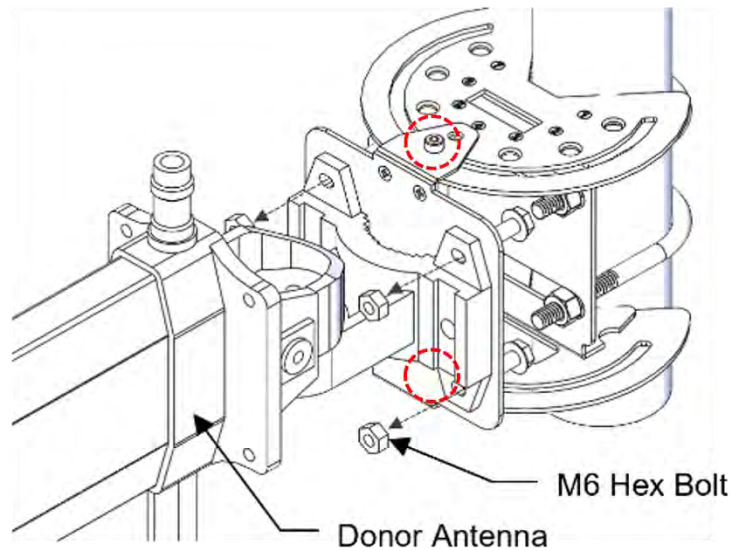


Figure 4-44 Adjusting the Donor Antenna Position (3)_Pole

6. Loosen the two M6 hex bolts at the top and bottom.

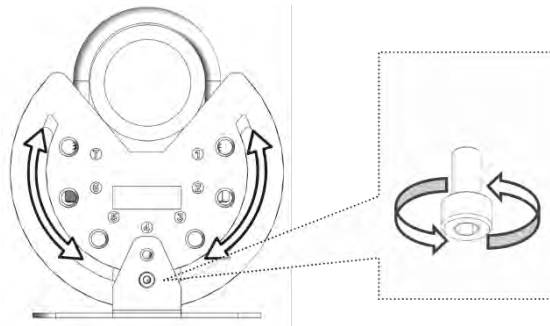


Figure 4-45 Adjusting the Donor Antenna Position (4)_Pole

7. Set the donor antenna to the desired angle by moving it to one of the positions labeled 1 through 7 on the bracket.

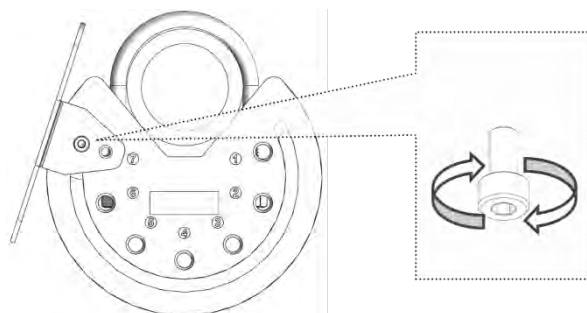


Figure 4-46 Adjusting the Donor Antenna Position (5)_Pole

8. After adjusting the angle, firmly tighten the two M6 hex bolts at the top and bottom.

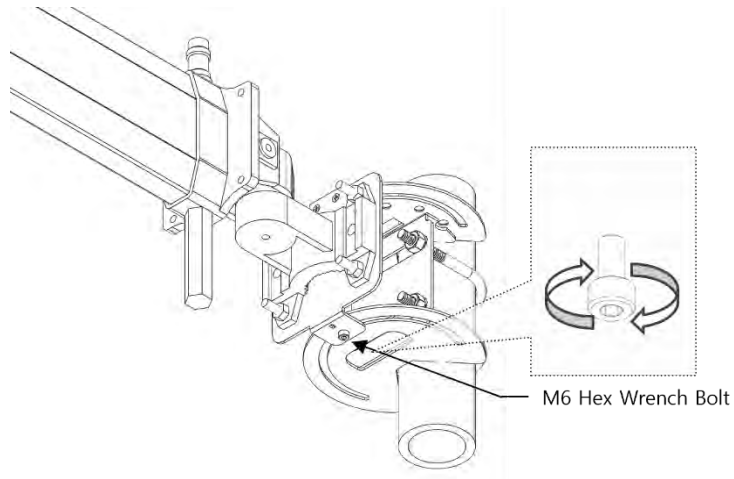


Figure 4-47 Adjusting the Donor Antenna Position (6)_Pole

4.5.2. Service Antenna Installation

The service antenna can be installed on the ceiling, wall, or pole using various antenna kits as needed.

- For wall installation of the service antenna, refer to xx.
- For ceiling installation of the service antenna, refer to xx.
- For pole installation of the service antenna, refer to xx.

#	Type	Description
1	Service Antenna Rotating Kit for Wall & Ceiling	Rotating kit for wall and ceiling installation
2	Service Antenna Rotating Kit for Pole	Rotating kit for pole installation

Table 4-14 Service Antenna Installation Kits

The package includes one service antenna. To purchase additional units, see the specifications below for compatible options:

- **Antenna Type:** Indoor Whip Antenna
- **Model Number:** YECT002AA
- **Connector Type:** SMA-male

4.5.2.1. Service Antenna Installation_Wall

To install the service antenna on the wall, follow the procedure below.

1. Ensure you have the items described in the following table.

Category	Description	
Parts	Service Antenna Mount Bracket Kit	1 EA
Bolts/Screws	10 mm x 50 mm Plastic Anchor Plug (for wall)	4 EA
	M6 x L30 Tapping Screw (for wall)	4 EA
Tools/Part Image	Torque Driver (44–106 lbf in)	

Table 4-15 Service Antenna Mount Kit_Wall

2. Place the Mount Bracket at the designated location. Check and adjust its level as needed.
3. If the bracket is level, mark the anchor bolt holes on the wall.

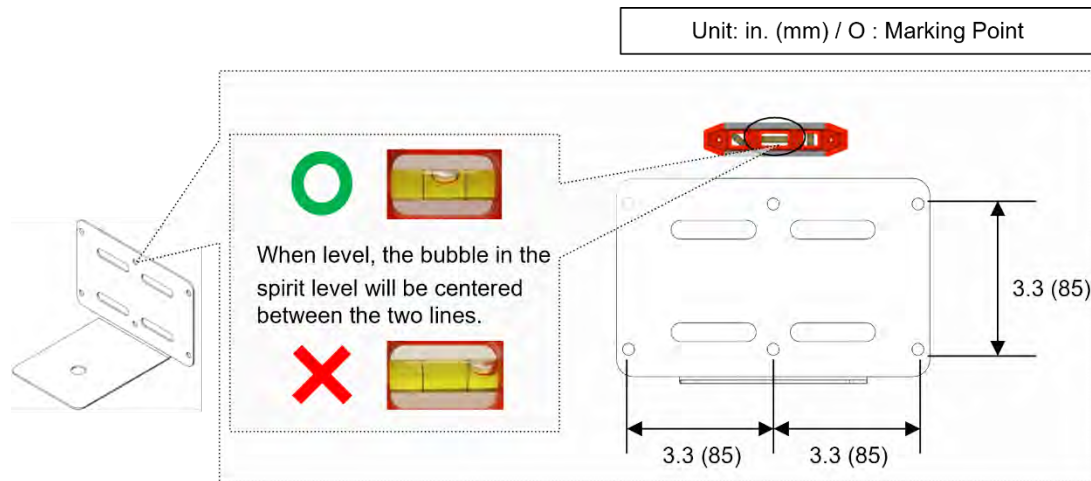


Figure 4-44 Checking the Marking Points_Wall

4. Securely attach the Mount Bracket to the wall using the provided fasteners.

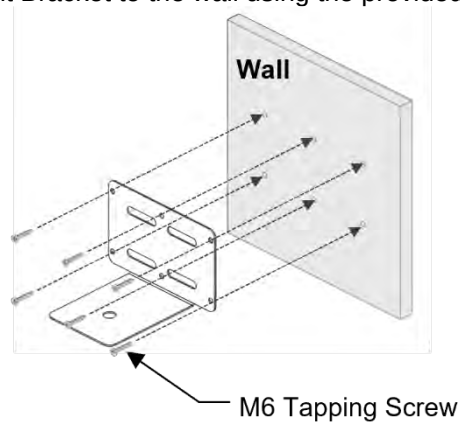


Figure 4-45 Securing the Mount Bracket_Wall

5. Firmly secure the donor antenna to the base of the mount bracket with the provided fasteners.

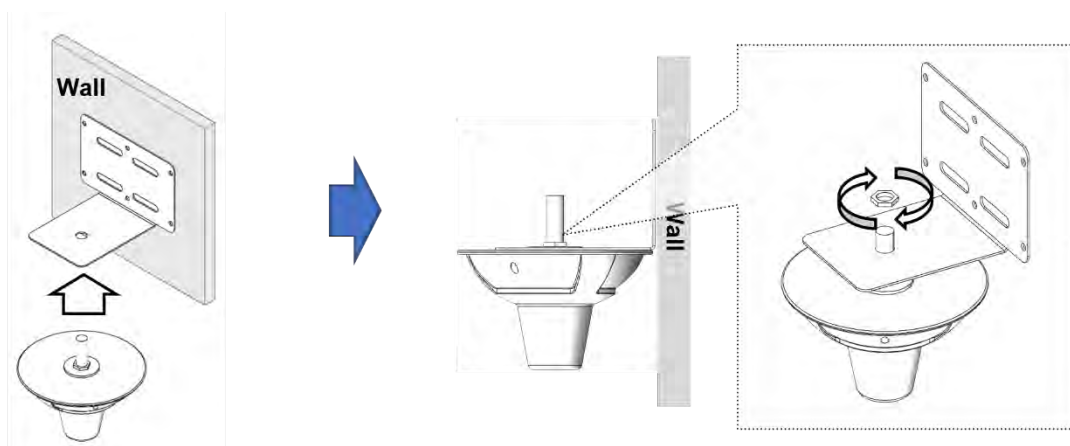


Figure 4-46 Securing the Service Antenna_Wall

4.5.2.2. Service Antenna Installation_Ceiling Tile

To install the service antenna on the ceiling tile, follow the procedure below.

1. Ensure you have the items described in the following table.

Category	Description	
Parts	Service Antenna Mount Bracket Kit	1 EA
Bolts/Screws	10 mm x 50 mm Plastic Anchor Plug (for ceiling??)	4 EA
	M6 x L30 Tapping Screw (for ceiling??)	6 EA
Tools/Part Image	Torque Driver (44–106 lbf in)	

Table 4-16 Service Antenna Mount Kit_Ceiling

2. Drill a hole in the ceiling aligned with the anchor bolt position marked on the bracket.

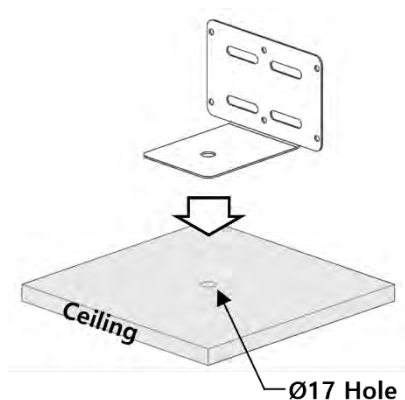


Figure 4-47 Securing the Mount Bracket (1)_Ceiling

3. Insert the service antenna through the ceiling hole from below and attach it to the bracket.

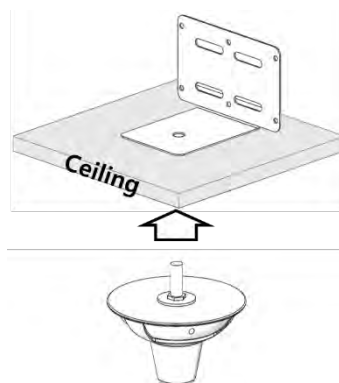


Figure 4-48 Securing the Mount Bracket (2)_Ceiling

4. Securely attach the service antenna to the Mount Bracket using the provided fastener.

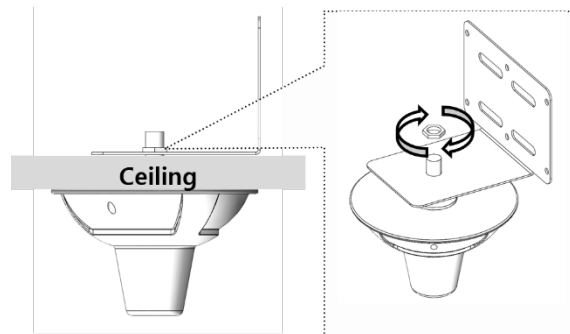


Figure 4-49 Securing the Mount Bracket (3)_Ceiling

5. You can install the service antenna directly on the ceiling without using a separate mount bracket. For more details, see xx

Installing the Service Antenna Directly on the Ceiling Tile

To install the service antenna directly on the ceiling tile without a mount bracket, follow the procedure below.

1. Drill holes in the ceiling tile aligned with the anchor bolt positions marked on the bracket.

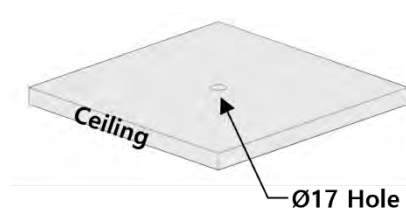


Figure 4-50 Installing Service Antenna on Ceiling Without Mount Bracket (1)

2. Insert the service antenna through the ceiling hole from below and attach it to the bracket.

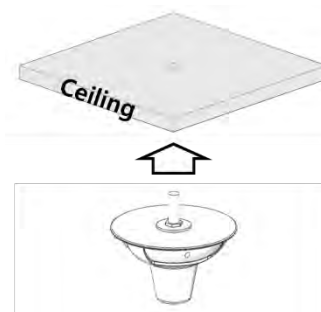


Figure 4-51 Installing Service Antenna on Ceiling Without Mount Bracket (2)

- Securely attach the service antenna to the ceiling using the provided fastener.

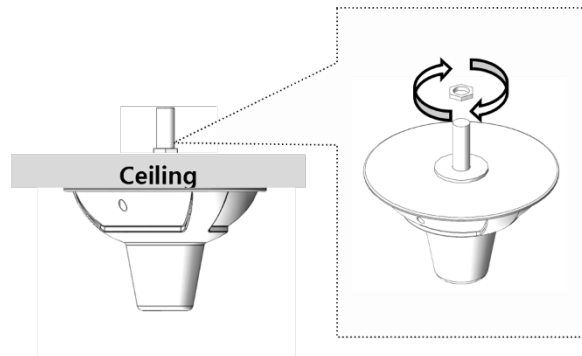


Figure 4-52 Installing Service Antenna on Ceiling Without Mount Bracket (3)

4.5.2.3. Service Antenna Installation_Pole

To install the service antenna on the pole, follow the procedure below.

- Ensure you have the items described in the following table.

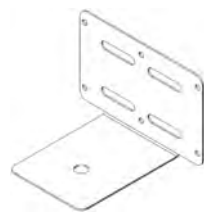
Category	Description	
Parts	Service Antenna Mount Bracket Kit	1 EA
Bolts/Screws	10mm x 50mm Plastic Anchor Plug (for pole??)	4 EA
	M6 x L30 Tapping Screw (for pole??)	6 EA
Tools/Part Image	Torque Driver (44–106 lbf in)	

Table 4-17 Service Antenna Mount Kit_Pole

- Firmly secure the Mount Bracket to the pole using the two U-bolts provided.

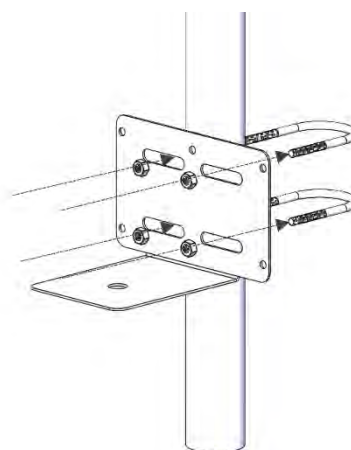
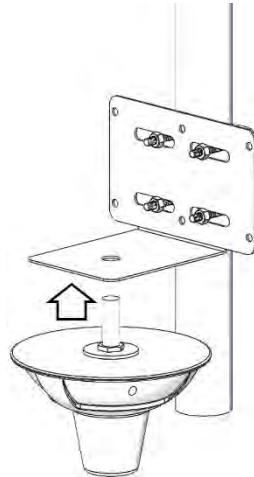
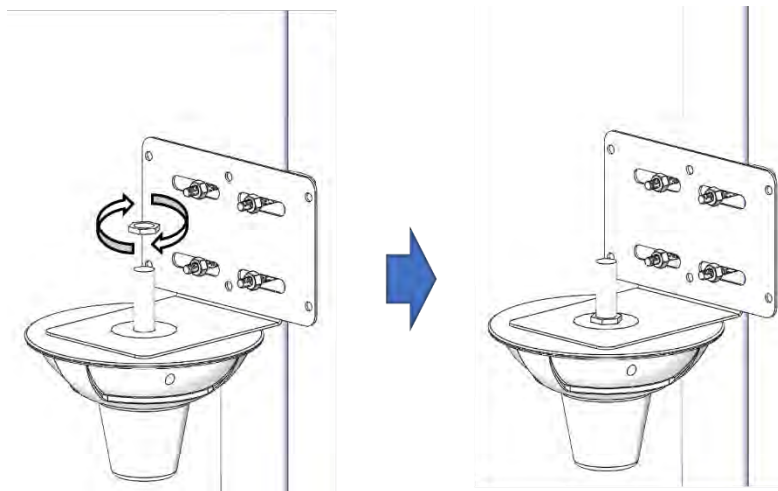


Figure 4-53 Securing the Mount Bracket (1)_Pole

3. Position the service antenna so that it aligns with the holes in the mount bracket, then secure it by attaching it from underneath.

**Figure 4-54 Securing the Mount Bracket (2)_Pole**

4. Securely attach the donor antenna to the Mount Bracket using the provided fasteners.

**Figure 4-55 Securing the Mount Bracket (3)_Pole**

4.6 Installing the PoE Range Extender (Optional)

The SOLiD BARS Range Extender is designed to extend the maximum transmission distance between the HE/HUB and the RU from the standard 100 meters to up to 200 meters when using Cat6A Ethernet cable. This device effectively doubles the allowable link length while maintaining signal integrity and performance in compliance with system specifications.

The PoE Extender can be mounted on a wall or ceiling, as shown in the image below.



1. Ensure you have the items described in the following table.

Category	Description	
Part	SOLiD_BARS_PoERE	1 EA
Bolts/Screws	6 mm x 30 mm Plastic Anchor Plug	4 EA
	M4 x L25 Tapping Screw	4 EA
Tools/Part Image	• Torque Driver (44–106 in·lbf) • Screw Driver Bit ('+', No. 3)	

Table 4-12 PoE Extender_Mounting Kits & Tools

2. Check the distance between the unit and the anchor bolt hole.

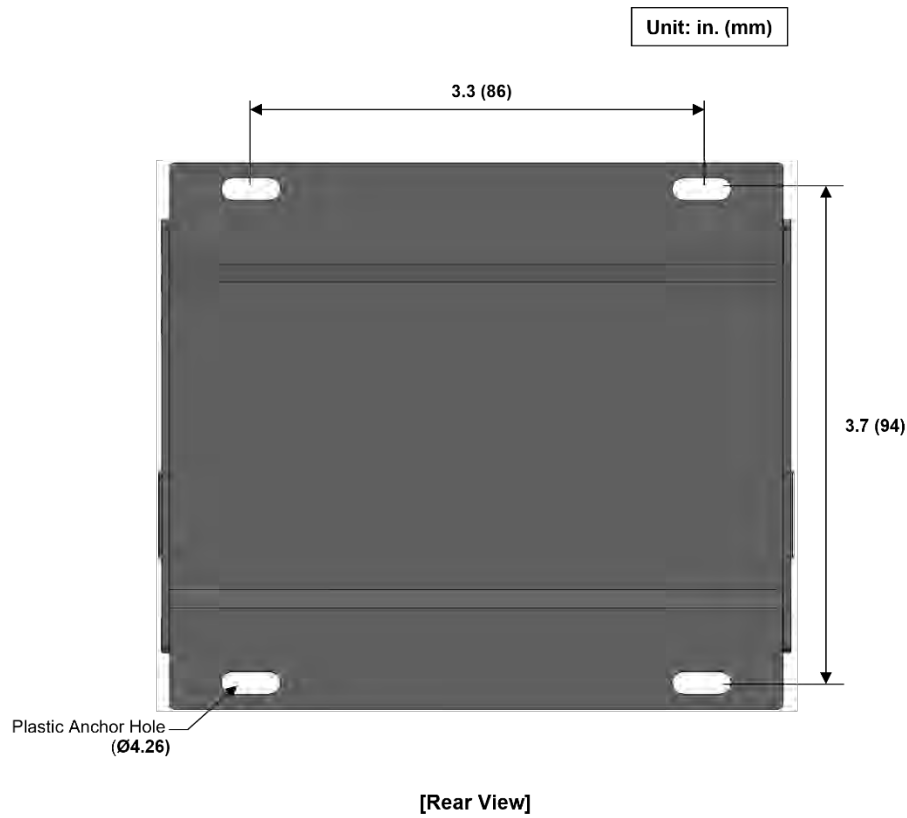


Figure 4-48 Installing the PoE Range Extender (1)

- If it is level, mark the anchor bolt holes on the wall or ceiling.

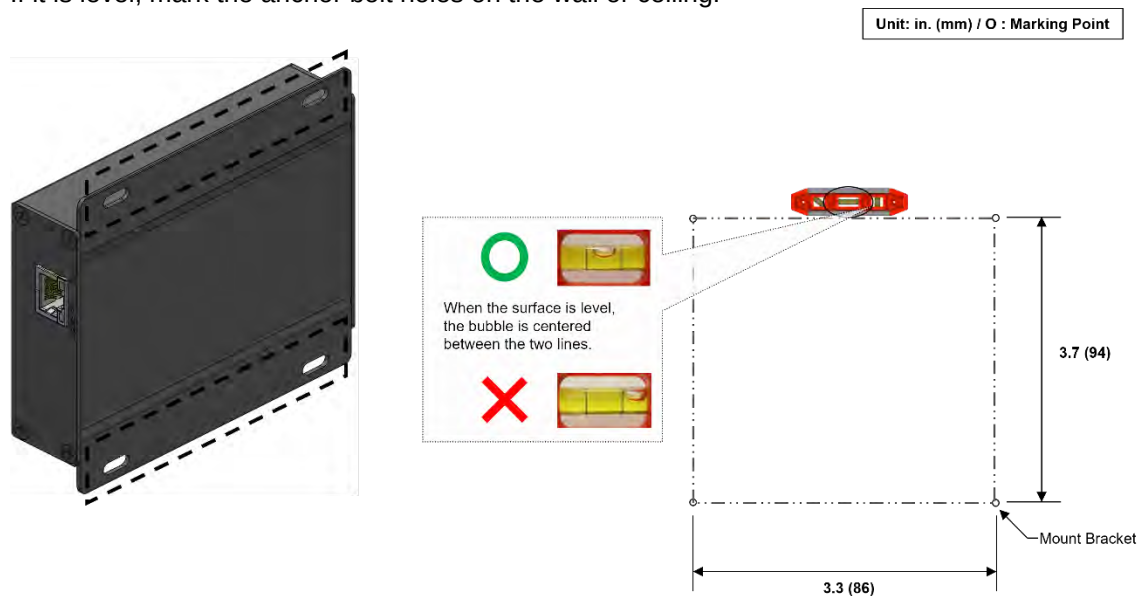


Figure 4-49 Installing the PoE Range Extender (2)

- Drill anchor holes at marked points. Additionally, remove dust from the holes using a cleaner.

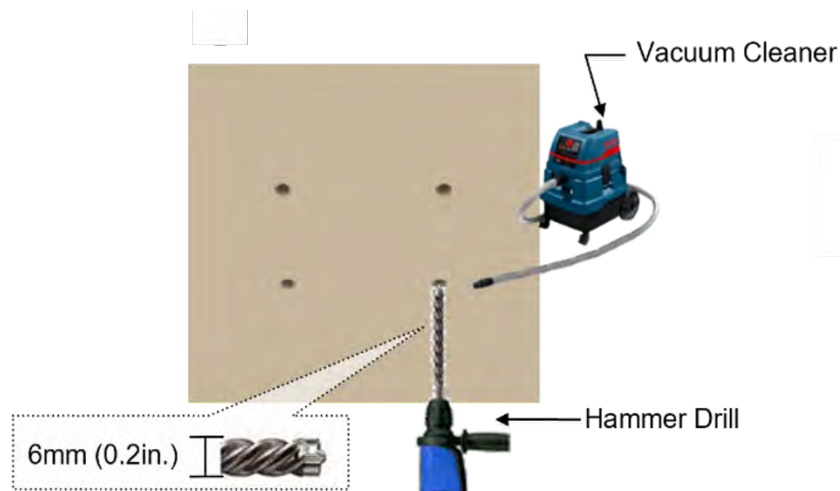


Figure 4-50 Installing the PoE Range Extender (3)

5. Fix the plastic anchors to the drilled holes.

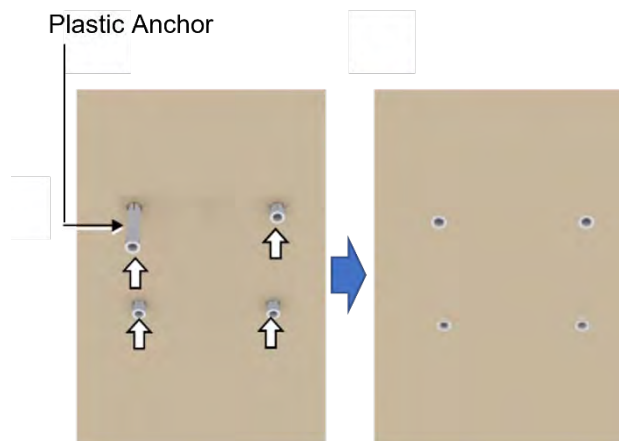


Figure 4-51 Installing the PoE Range Extender (4)

6. Secure the unit to the wall or ceiling with M4 screws.

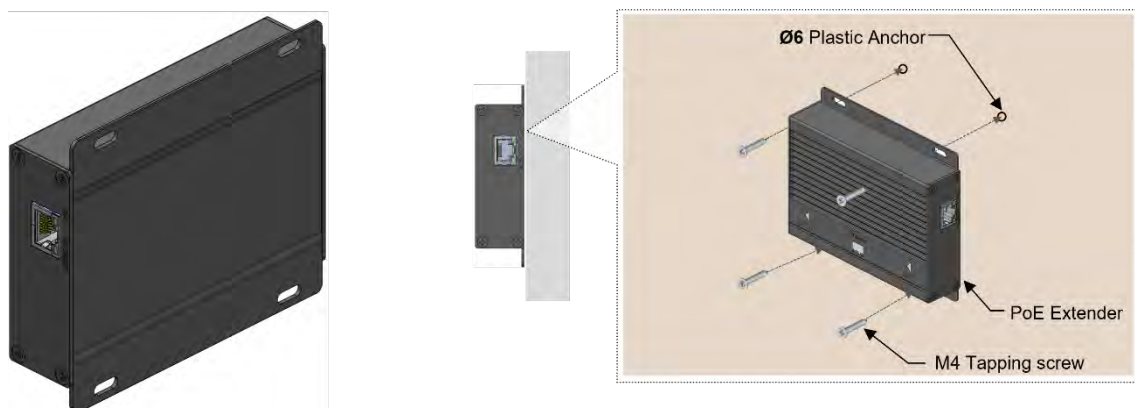


Figure 4-52 Installing the PoE Range Extender (5)

7. For details about cabling the PoE extender, see [*Using a PoE Range Extender*](#).



5 Cables and Connections

This chapter offers comprehensive information about the cabling system for the SOLiD BARS™.

5.1 Guidelines for Cabling

The following figure depicts the sequence of operations for connecting cables to the system:



Figure 5-1 Cabling Guidelines



- When cutting the cable after installation, ensure that the connector is disconnected.
- The installation of the cable with the connector connected to the system can cause contact failure or damage to the assembled connector and the cable due to cable tension or the operator's mistakes.
- Installing the cable while the connector is connected to the system can cause contact failure or may damage the assembled connector and cable.



The workflow sequence for cable cutting and installation can be changed depending on the field situation. The cable may be cut after installation or may be installed after cutting.

5.1.1. Cable Path Inspection

When installing cables within the system, inspect the cable path, length, and installation method.

While inspecting the cabling path, follow the guidelines below:

- A minimum cable length must be selected so that it does not affect the cable installation and maintenance.
- The cable should be installed in a location protected from external factors, such as power lines, flooding, and foot traffic.
- In areas where the cable could be damaged by external factors, ensure that protective measures, such as ducts and flexible pipes, are in place to safeguard the cable.

5.1.2. Cable Cutting

Measure the exact distance after carefully checking the route and cut the cable using a cutting tool.

While cutting the cable, follow the guidelines below:

- Use a cable-cutting tool specifically designed for the cable.
- Cut the cable at a right angle.
- Be careful to keep the cable away from any moisture, iron, lead, dust, or other foreign material when cutting.
- Remove any foreign material attached to the cable using solvent and a brush.



5.1.3. Cable Installation

This procedure involves running the cable along the designated path to the target connector of the system or an auxiliary device after completing the cable path inspection and cutting steps.

While installing a cable, follow the guidelines below:

- Ensure the cable is not damaged.
- If the cable is damaged, cut out the damaged section or replace the cable before installing.
- Route the cable carefully to prevent tangling. When transitioning from horizontal to vertical, ensure the upper and lower lines are not switched.
- Always utilize the largest curvature radius that meets the minimum curvature radius specification.
- If the cabling needs protection, use a PVC channel, spiral sleeve, or flexible conduit.
- Install the DC power cable and the data transmission cable away from the AC power cable to prevent electromagnetic induction.
- Be careful when removing cables located by the heatsink and wear protective gloves.
- The RF should be turned off during maintenance, and personnel should wait a few minutes before touching the unit to reduce surface temperature hazards.

The table below lists the recommended minimum bend radius for different types of cables.

No	Type	Allowed Cable Bend Radius	
1	Power Cable	Installed: $8 \times OD$	During Installation: $12 \times OD$
2	Optical Cable	Installed: $10 \times OD$	During Installation: $20 \times OD$
3	Category Cable	Installed: $10 \times OD$	During Installation: $20 \times OD$
4	Ground Wire	Installed: $10 \times OD$	During Installation: $20 \times OD$

Table 5-1 Recommended Minimum Allowed Cable Bending Radius



If the manufacturer specifies a bending radius for the cable, follow their guidance.
OD: Outer Diameter

5.1.4. Connector Attachment

This procedure involves attaching a connector to the installed cable or a device at the site.

While attaching a connector, follow the guidelines below:

- Ensure the operator understands how to correctly assemble the connector before beginning. Refer to the pin map for proper assembly.
- Each connector is equipped with a latch to prevent any changes to its core positions.
- Check for corresponding grooves before connecting the connector to another.
- For outdoor cables, such as feeder lines, use heat shrink tubing at all connection points to prevent water leakage and corrosion.
- Connect each cable of the connector assembly in a straight line.
- Exercise caution during cable connection to avoid tension that could cause contact failure at the connector.

5.1.5. Cable Binding

This procedure involves securing and organizing an installed cable using binding thread, cable ties, binding wire, and clamp brackets.

When binding a cable, follow the guidelines below:

- Be careful not to damage the cable during binding.
- Use proper cable binding tools according to the target location (indoor or outdoor) and the type of



- cable (power supply cable, optical cable, or feeder line).
- Ensure the cutting sections of the cable tie and the binding line are not exposed to the outside. This may cause damage to the cables or personal injury.
- Trim the cable thread, leaving about 50 mm to keep the knot secure.
- If there is a possibility of contact failure in the connector due to tension, secure the cable at the nearest point to the connector.

5.1.6. Identification Tag Attachment

This procedure involves attaching identification markers, such as cable ties, nameplates, and labels, to both ends of a cable to identify its purpose and path. When attaching the identification tags, follow the guidelines below:

- When installing an outdoor cable, use relief engraving and coated labels to prevent markings from being erased.
- Consult with the provider before attaching the tags, as the form and attachment method for identification tags may vary by provider.



When connecting the cables, always connect the ground cable first. If a worker comes in contact with the equipment, connects a cable, or performs maintenance without connecting the ground cable, the system can be damaged or the worker can be injured due to static electricity and a short circuit.



After completing cable installation, unused ports should be capped.



- When installing, take care not to overlap or entangle the cables. Also, consider future expansion. Install the DC power cable and the data transmission cable away from the AC power cable to prevent electromagnetic induction.
- The cable installation process requires trained and experienced personnel trained in industry-standard installation and field services procedures to include cable installation activities such as cable installation, securing, tying, and binding.

5.2 Ground Cabling

Grounding is crucial for the safe operation of electronic systems. It protects against risks like lightning, transient currents, voltage spikes, and electromagnetic interference (EMI), helping to prevent electric shock injuries. Proper grounding brings the electrical potential of electronic devices to zero, reducing the risk of damage or injury from electrical faults.

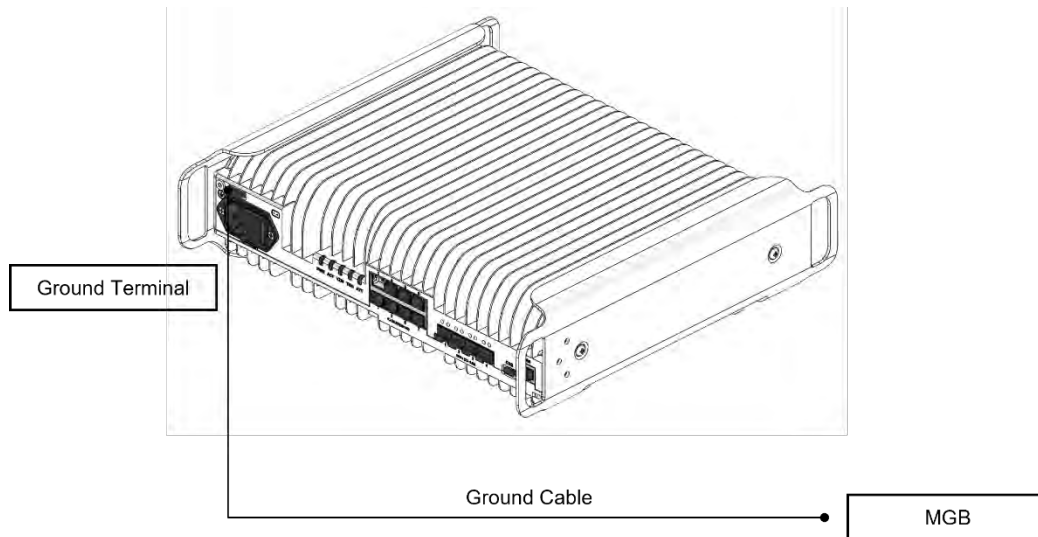


Figure 5-2 HE/HUB Ground Cabling

- **Protection Against Over-Current, Over-Voltage, and Lightning Strikes:** To protect both personnel and equipment from electrical hazards such as over-current, over-voltage, and lightning.
- **Surge Voltage Discharge Path:** To provide a safe path for surge voltages caused by lightning strikes and power surges, protecting the system from damage.
- **Static Electricity Protection:** To prevent static electricity build-up, which could harm sensitive electronic components.
- **Reducing High-Frequency Potential in System Housing:** To minimize or eliminate high-frequency potential in the system housing, ensuring optimal system performance.
- **Balance and Stability of High-Frequency Currents:** To help balance and stabilize high-frequency currents, improve system reliability.
- **Stabilization of Circuit Potential Relative to Ground:** To maintain a stable electrical potential between the circuit and ground, ensuring safe and reliable operation.

**Connect the Ground Cable First**

Always connect the ground cable first when wiring. Failing to do so can cause equipment damage or injury to people.

5.2.1. Ground Cabling for HE & HUB

To ground the HE or HUB, follow these steps:

1. Make sure you have all the items listed in the table below.

Category	Description	
Installation Path	MGB–HE or HUB Ground Terminal	
Cable	6-8 AWG (8-13 mm ²)	
Heat Shrink Tube (Spec/Color/Length)	• 4 AWG Cable: Φ 0.74 in. (19 mm)/Clear/1.96 in. (50 mm) • 6-8 AWG Cable: Φ 0.47 in. (12 mm)/Clear/1.96 in. (50 mm) • 10-12 AWG Cable: Φ 0.3 in. (8 mm)/Clear/1.96 in. (50 mm)	
Pressure Terminal	MGB	Verify MGB specifications at the site and prepare the necessary connection parts.
	HE/HUB	• 6-8 AWG (8-13 mm²), 1 Hole, 90° angle, • Hole diameter 5.3 mm $\pm$ 0.2 mm
Fastener	MGB	Verify MGB specifications at the site and prepare the

Category	Description	
		necessary connection parts.
	HE/HUB	M5 SEMS Screw / 1 ea (Included)
Recommended Torque Value	M5 SEMS	43 lbf·in (50 kgf·cm)
Tools	• Cable Cutter • Wire Stripper • Crimping Tool • Heating Gun • Nippers • Screwdriver ('+', No. 2-3) • Torque Driver (10-50 lbf·in) • Screwdriver Bits ('+', No. 2-3)	

Table 5-2 Parts and Tools for Ground Cable Connection



- For the cable pressure terminal, UL-listed products or equivalent certified components shall be used.
- The external grounding terminal of this equipment is designed to accommodate an M5 x L8 grounding screw. It is recommended to use a grounding wire with a gauge ranging from AWG 4 to AWG 12, depending on the specific installation environment.
- The configuration of the lug installation may vary based on on-site conditions.



2. Install a pressure terminal and heat shrink tube at the HE/HUB ground cable end.

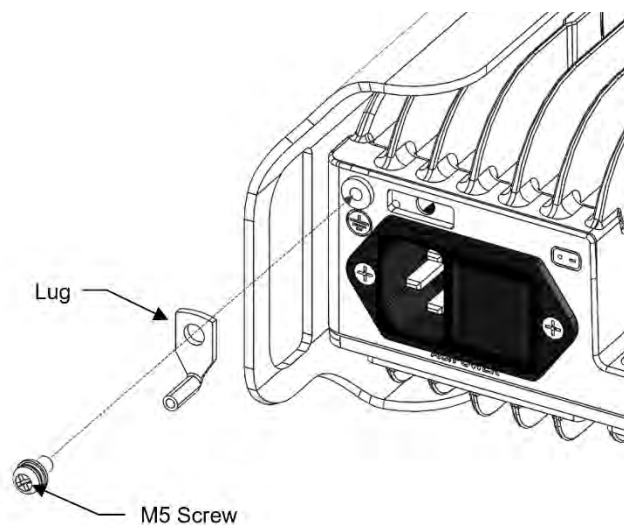


Figure 5-3 HE/HUB Ground Cable Connection (1)

3. Securely fasten the pressure terminal to the system ground terminal using the provided

fasteners, as shown in the figure below:

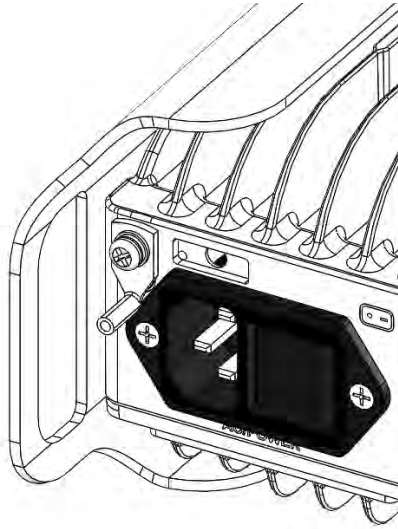


Figure 5-4 HE/HUB Ground Cable Connection (2)

5.3 HE Cabling

5.3.1. Power Cabling

The SOLiD BARS™ system is powered through the HE or HUB unit. The HE includes AC power accessories such as a power cord and plug.

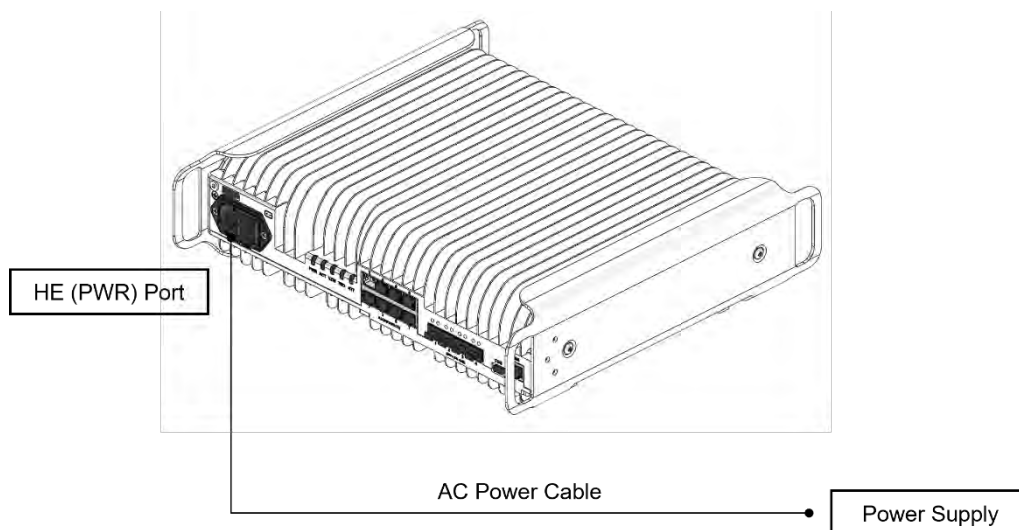


Figure 5-5 HE Power Cabling



- Improper handling of the power cable can damage the rack or cause an electrical short-circuit. Ensure that the rectifier power switch or system power is turned off before proceeding with any tasks.
- Ensure that power cable fasteners are securely tightened to prevent electrical accidents.
- The power cable must have a heat-resistant temperature rating of 90 °C or higher.
- When using the same DC power source with an outdoor device, consult with the installation engineer or manufacturer to implement surge protection for the system.



For stable power, use a UL-certified 8A circuit breaker on the rectifier or power distributor.

Prerequisites

Before connecting the power cables, make sure you have the items listed in the table below:

Category	Description			
Installation Section	Rectifier–HE (PWR) Port			
Cable	14 AWG (2.5 mm²)			
Bend Radius	Installed: 8 x OD	During Installation: 12 x OD		
Connector	-	Power inside the building		
	HE AC/Power	Pin No.	1	AC HOT
			2	AC Neutral
			3	F.Ground
Tools	• Cable Cutter • Wire Stripper • Crimping Tool • Heating Gun • Nipper			

Table 5-3 Parts & Tools for Connecting Power Cable

To connect the AC power cable to the HE, follow these steps:

1. Pass the AC power cable through the cable clamp and connect it to the AC power port.

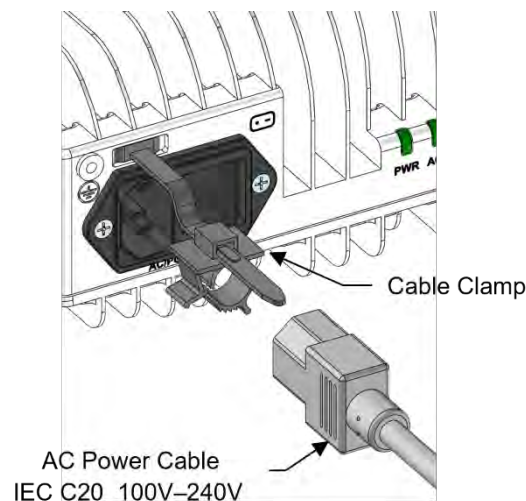


Figure 5-6 AC Power Cabling (1)_HE

2. Securely fasten the AC power cable with the cable clamp to ensure it is firmly fixed to the hardware.

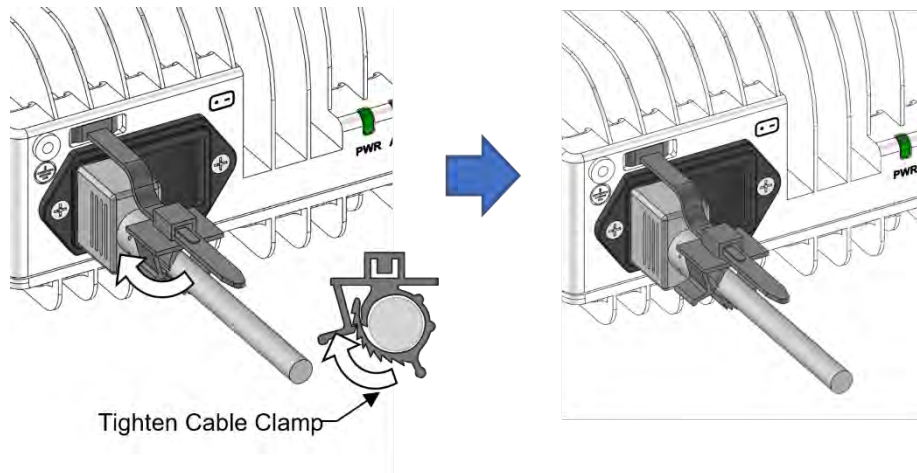


Figure 5-7 AC Power Cabling (2)_HE

5.3.2. Connecting HE and HUBs via Optical Cable

This section describes the procedure for connecting the HE to the HUB using an optical cable.

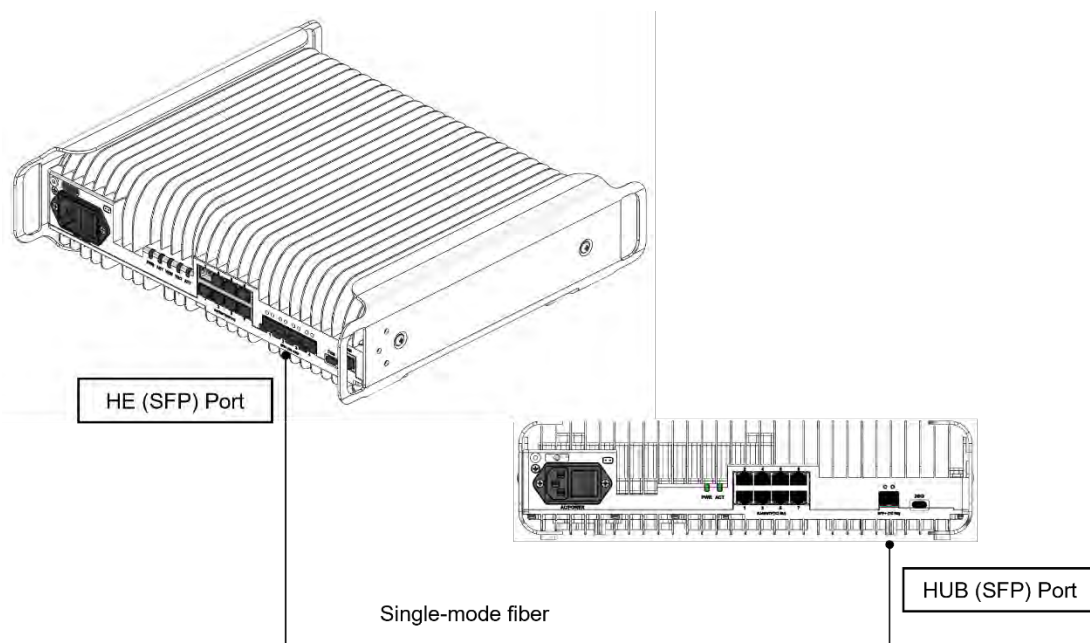


Figure 5-8 HE-HUB Cabling



Optical modules and cables used in the system have laser beams that emit light. Be careful with handling, as exposure to laser beams can cause serious damage to the eyes.

Remove the cap of the optical connector before connecting.
 Before connecting the optical cable, verify that the ferrule of the connector is clean. Be careful to keep the cutting section away from dust or foreign material.
 If the cable is contaminated with foreign material, do not attempt to blow it clean.
 Ensure to clean the connector according to the cleaning directions in Appendix B: Cleaning the Optical Connectors.
 Do not touch the ferrule at the end of the optical cable, as it can be easily damaged.



[Before Removing Cap]



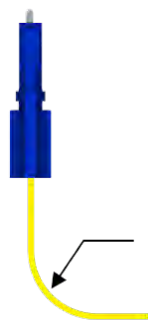
[After Removing Cap]



Before connecting the optical cable, clean the ferrule of the connector on the cable side using an optical connector cleaner.

To connect the fiber optic cable, follow these steps:

- Before connecting the power cables, make sure you have the items listed in the table below:

Category	Description	
Installation Section	HE-HUB	
Cable	Single-mode Fiber	
Bending Radius	Installed: 15 × OD	During Installation: 20 × OD
Connector	HE	SFP+ (To HUB)
	HUB	SFP+ (To HE)
Working Tools	- Optical Connector Cleaner - SFP Tool (Jig)	 Example: Cable diameter: 2 mm $2\text{ mm} \times 15 = 30$ → Bend radius $\geq 30\text{ r}$

[Single-Mode]

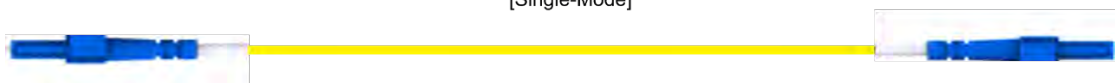


Table 5-4 Parts and Tools for SFP Connection

- Connect the fiber optic cable from the HE SFP+ (to HUB) to the HUB SFP+ (to HE).
 Remove the caps from the connectors on both the HE/HUB side and the cable end.

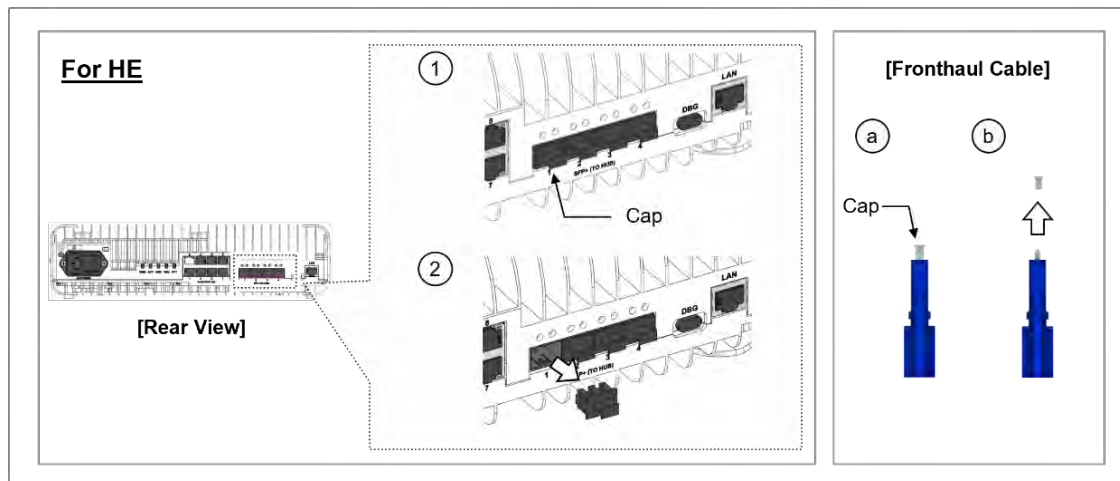


Figure 5-9 Removing the cap from the connector_HE

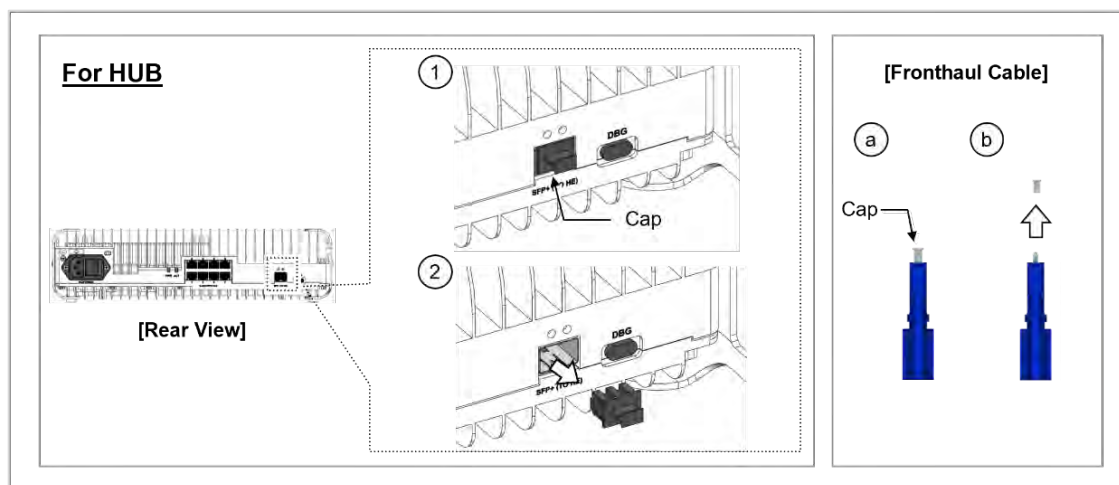


Figure 5-10 Removing the cap from the connector_HUB

3. For the fiber optic cable, install the SFP+ module at the HE/HUB fiber link end.

Refer to the table below for details on the SFP+ module:

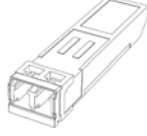
Port Name	Type	Item	Connector	Specifications	Image	Applications
SFP+ (To HUB)	Single	RSPX0S LE-xT3	SFP+	10Gb/s 1310nm SFP+ Transceiver for 10GBASE-L		10G SFP+ Distance: 10km Connector: LC/PC
SFP+ (To HE)	Multi	P85XR3 RLPCOD	SFP+	10Gbps LC/UPC SFP+ Duplex Transceiver (Receptacle type) Tx 850nm/Rx 850nm/ 300m		10G SFP+ Distance: 300m Connector: LC/PC

Table 5-5 SFP Connector Info

4. Connect the optical module to the HE/HUB optical port as shown in the diagram.

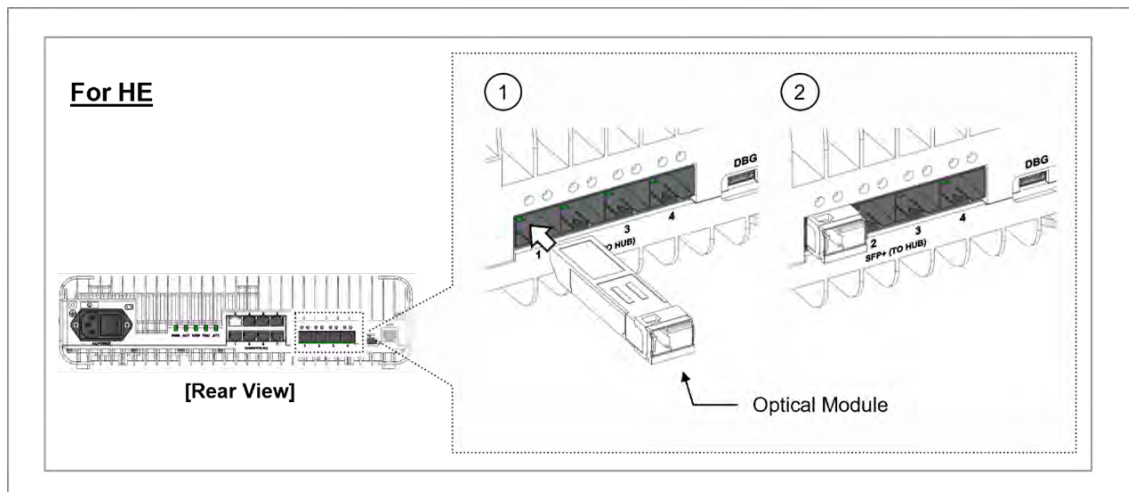


Figure 5-11 Connecting the optical module to the HE optical port

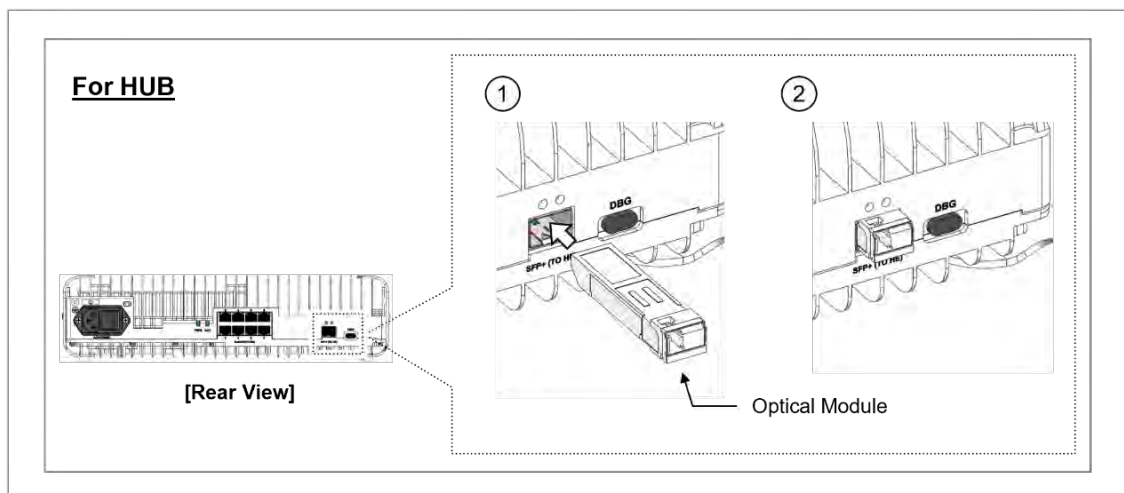


Figure 5-12 Connecting the optical module to the HUB optical port

5.3.2.1. How to Install/Remove an SFP Module

To remove or insert an SFP module (optical module), follow these steps.



Port quantity (Duplex) and bail of the optical module may differ from the figure.

To remove the optical module, do the following:

1. Hang the hook of the optical transceiver removal tool on the bail of the optical module within the system.

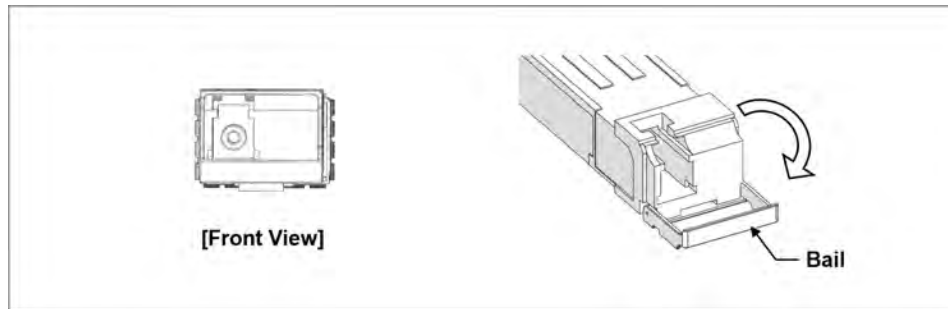


Figure 5-13 Optical Module Removal (1)

2. Completely remove the optical module from the optical module cage by pulling the optical module removal tool.

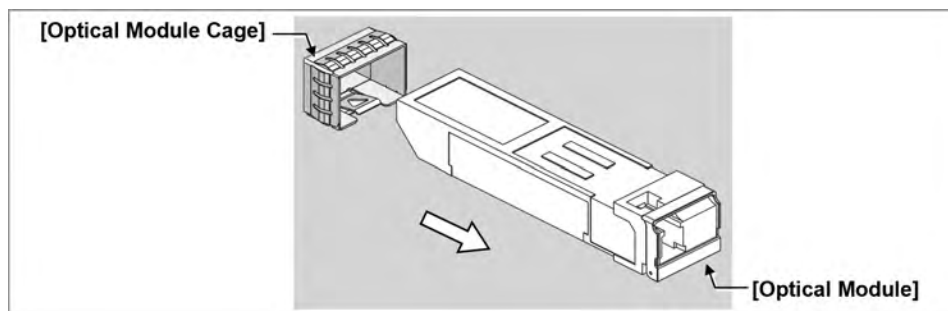
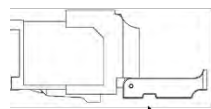
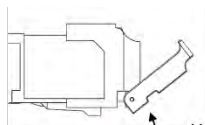


Figure 5-14 Optical Module Removal (2)

When removing an optical module, open the handle at approximately 90° and remove the optical module using the dedicated tool (optical module removing tool). If the optical module is detached without using a dedicated tool, the optical module may be jammed, and the handle may be damaged due to insufficient opening of the handle.



Handle 90° open



Handle 45° open



To insert the optical module, do the following:

1. Push the optical module into the optical module cage within the connector.

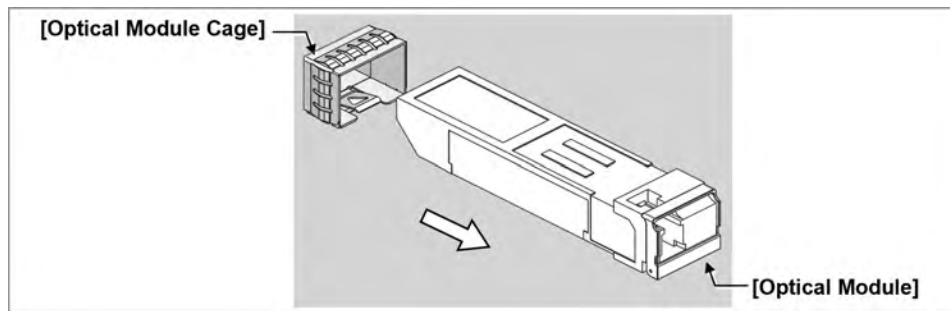
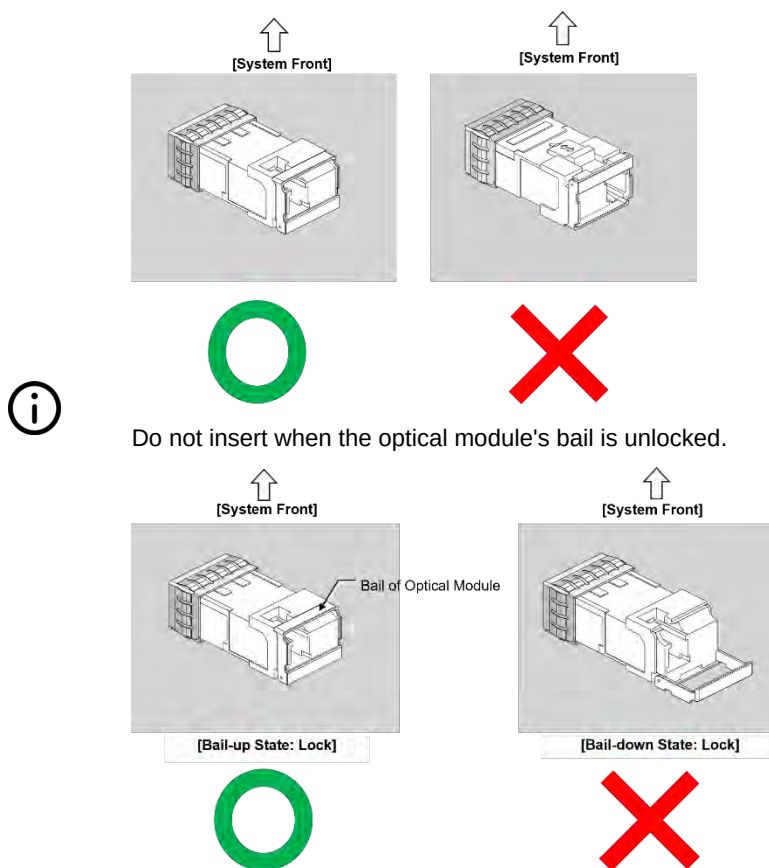


Figure 5-15 Optical Module Insert

Facing the front of the system, insert the optical module's bail into the port. (Do not turn it upside down.)



5.3.3. Connecting Donor Sources

The head-end has three RF ports for cellular signal output.

- N-type Female connector
- Specific to the supported carrier
- Designed to support a variety of band configurations



Donor antennas are optional and must be purchased separately, if needed.

5.3.3.1. Cellular Donor Antenna Input

The three RF ports on the head-end can receive cellular signals from external antennas or other signal sources such as small cells or DAS.

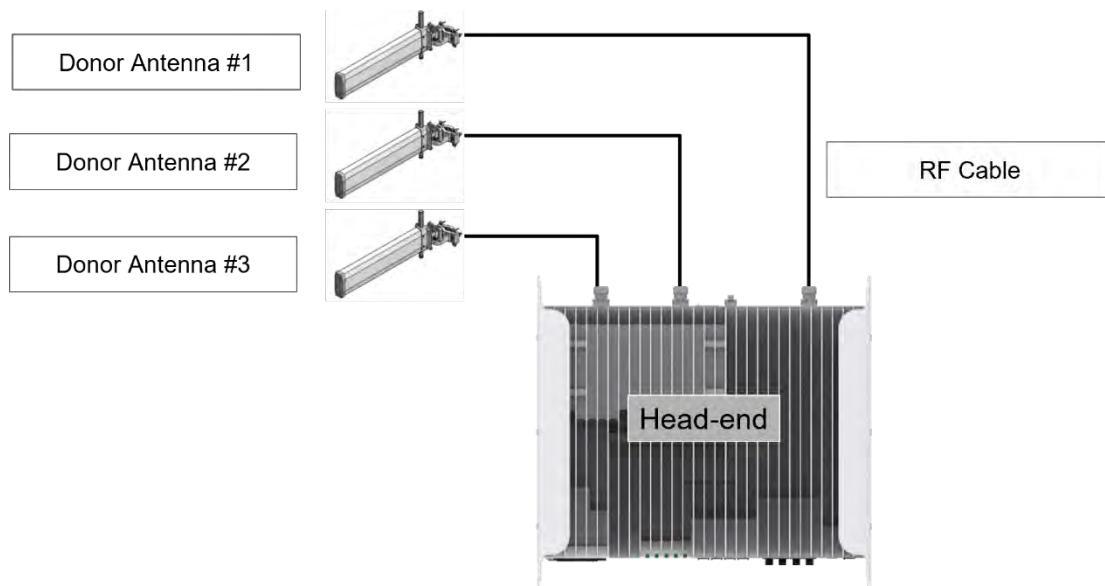


Figure 5-16 Connecting Donor Antennas

5.3.3.2. Other Signal Source Input

When using a signal source other than a donor antenna (e.g., a small cell or DAS), set the input signal level for each operator port to a value between -90 dBm and -20 dBm.



We recommend installing an external attenuator if the signal level exceeds -20 dBm.

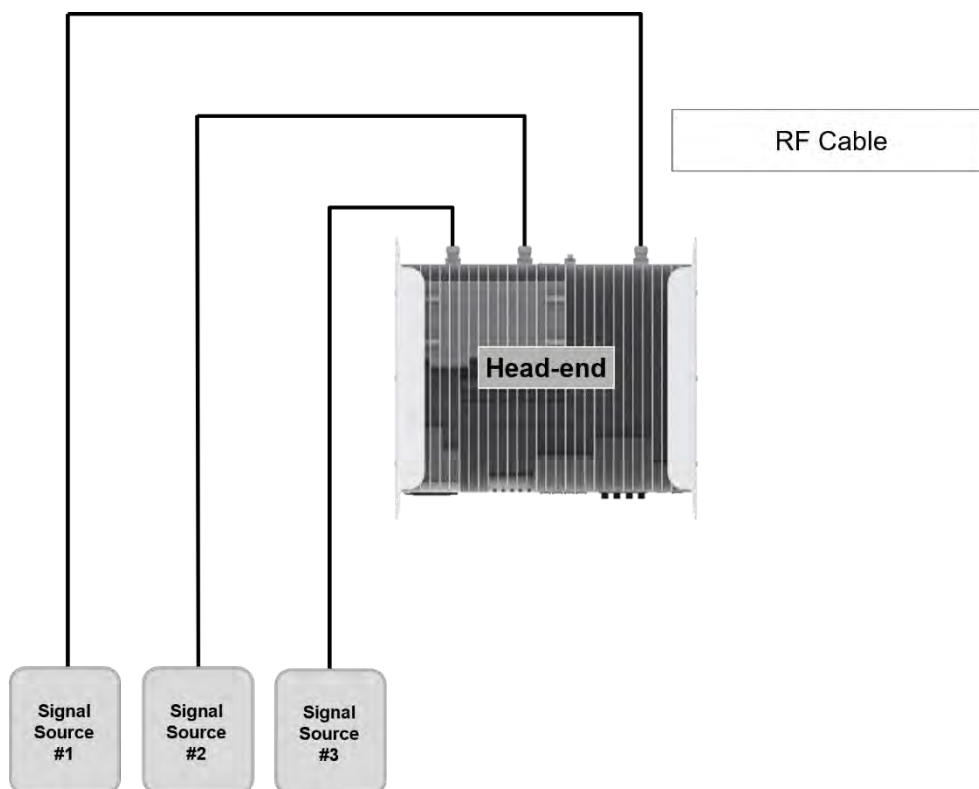


Figure 5-17 Connecting Other Signal Source

5.3.4. Connecting Wi-Fi Antenna(s)

The head-end package includes an additional Wi-Fi antenna that provides wireless access to the user interface, enabling you to monitor and manage the system over Wi-Fi.

The antenna serves two primary functions:

- **Access to the WebGUI**
Enables real-time system monitoring through a smartphone or other Wi-Fi-enabled device.
- **Access to the SOLiD BARS™ Portal**
Supports wireless modem access for real-time system monitoring and control.



- Be sure to connect the antenna before turning on the system to ensure stable operation and avoid hardware issues.
- The provided Wi-Fi antenna is non-detachable. Do not disconnect the adapter from the antenna.
- Use only the provided Wi-Fi antenna.

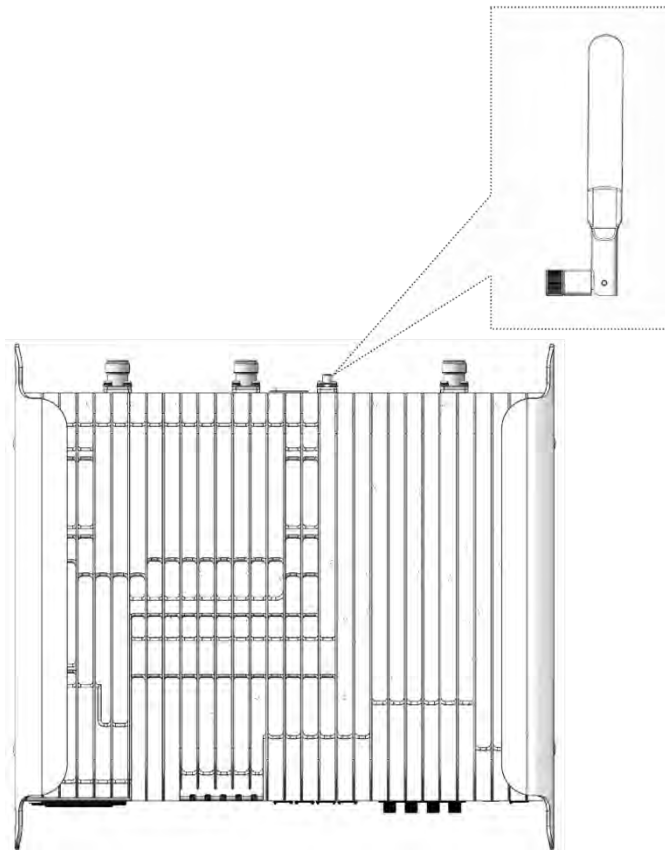


Figure 5-18 Connecting Wi-Fi Antennas

5.3.5. Connecting the LAN Cable

When accessing the BARS portal via LAN cable, connect the HE device to the network switch or router as shown in the image below.

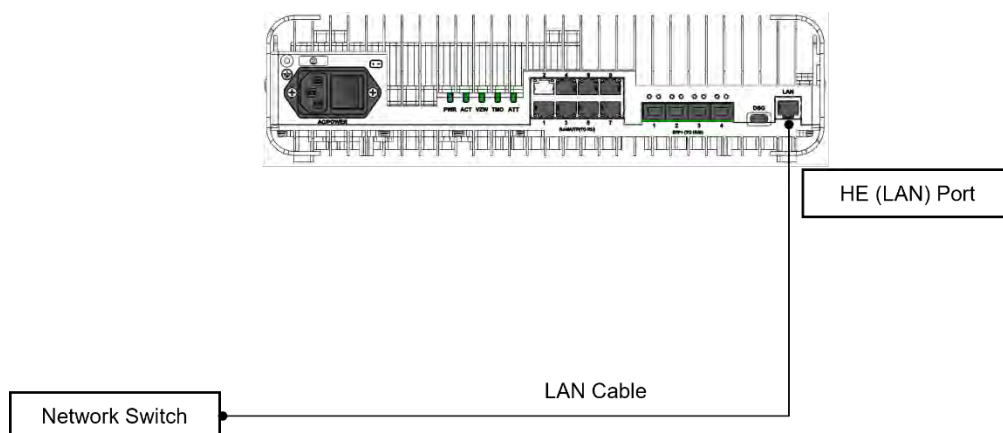


Figure 5-19 HE LAN Port Connections

5.4 HUB Cabling

5.4.1. Power Cabling

The SOLiD BARST™ system is powered through the HE or HUB unit. The HUB includes AC power accessories such as a cord and plug.

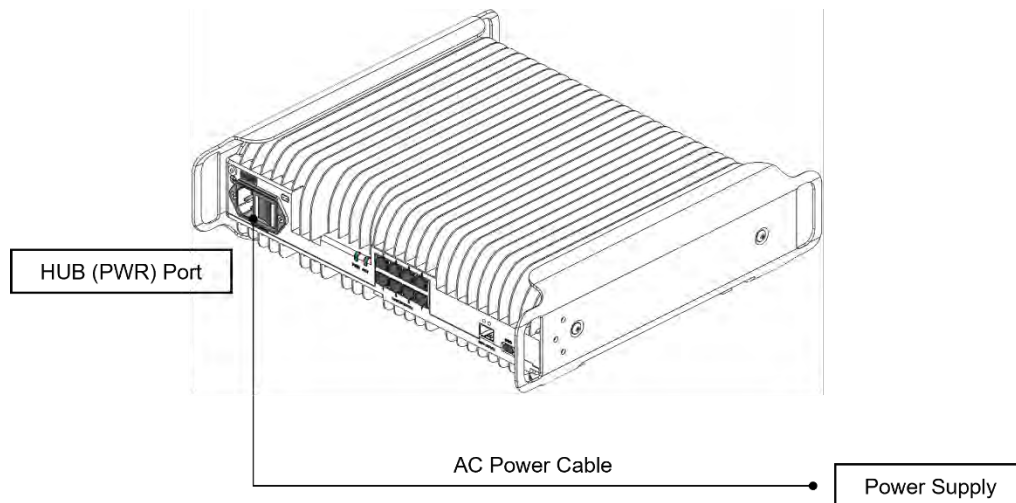


Figure 5-20 HUB Power Cabling

Prerequisites

Before connecting the power cables, make sure you have the items listed in the table below:

Category	Description			
Installation Path	Rectifier–HUB (PWR) Port			
Cable	14 AWG (2.5 mm²)			
Bend Radius	Installed: 8 x OD	During Installation: 12 x OD		
Connector	-	Power inside the building		
	HUB AC/Power	Pin No.	1	AC HOT
			2	AC Neutral
			3	F.Ground
Tools	• Cable Cutter • Wire Stripper • Crimping Tool • Heating Gun • Nipper			

Table 5-6 Parts & Tools for Connecting Power Cable

To connect the AC power cable to the HUB, follow these steps:

1. Pass the AC power cable through the cable clamp and connect it to the AC power port.

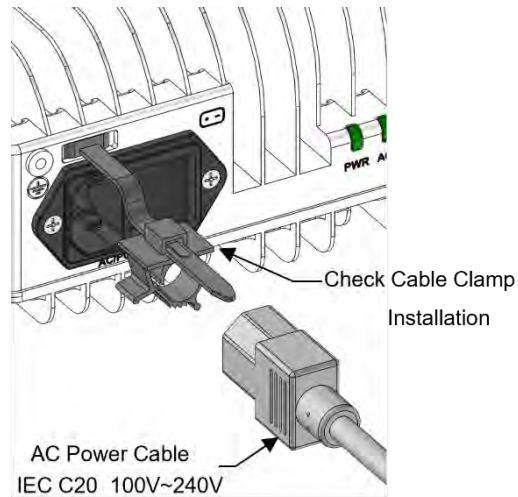


Figure 5-21 AC Power Cabling (1)_HUB

2. Securely fasten the AC power cable with the cable clamp to ensure it is firmly fixed to the hardware.

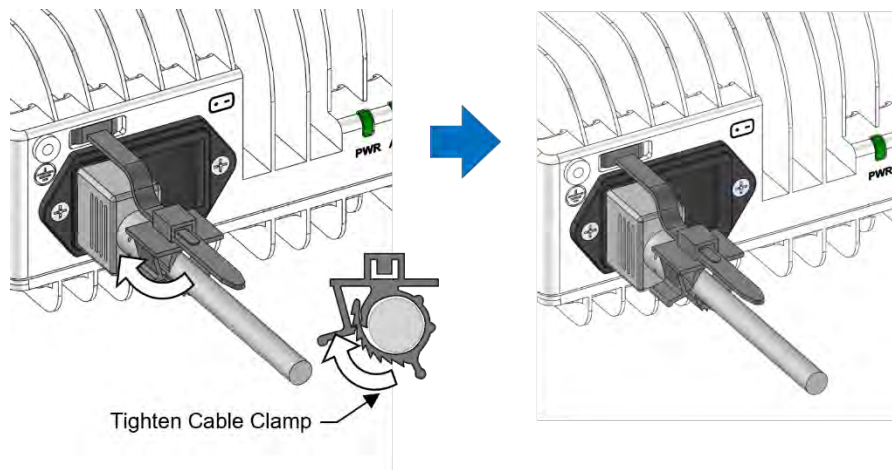


Figure 5-22 AC Power Cabling (2)_HUB

5.5 RU Cabling

5.5.1. Connecting RU to HE/HUB via PoE Cable

The RU is powered via PoE from the HE or HUB, so no separate power supply is needed.

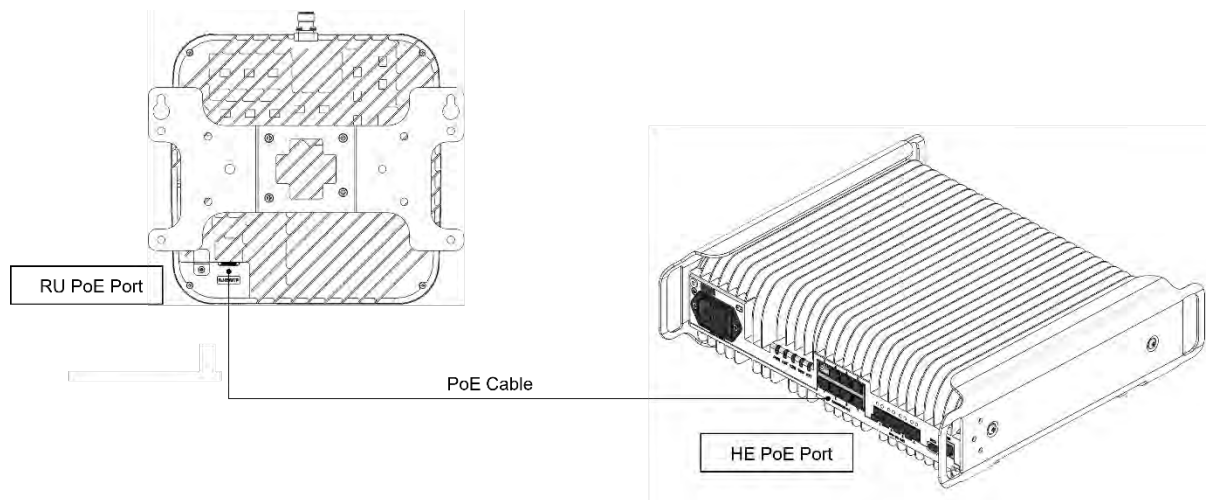


Figure 5-23 HE/HUB-RU Cabling



The HE or HUB transmits both data and power to the RU over a single category cable, up to 100 meters. Be sure to use a CL2-rated cable.

This section explains how to connect the RU to the HE or HUB using a PoE cable. Follow these steps:

1. Before connecting the power cables, make sure you have the items listed in the table below.

Category	Description	
Installation Section	HE or HUB–RU	
Cable	Cat6A, AWG 23 (0.25 mm ²), 4 Pairs	
Bend Radius	Installed: 10 × OD	During Installation: 20 × OD
Connector	RU	RJ45
	HE/HUB	RJ45
Working Tools	• Cable Cutter • Wire Stripper • Crimping Tool • Heating Gun • Nipper	

Table 5-7 Parts and Tools for PoE Connection

2. On the RU side, remove the PoE port cap as shown below, then connect the PoE cable.

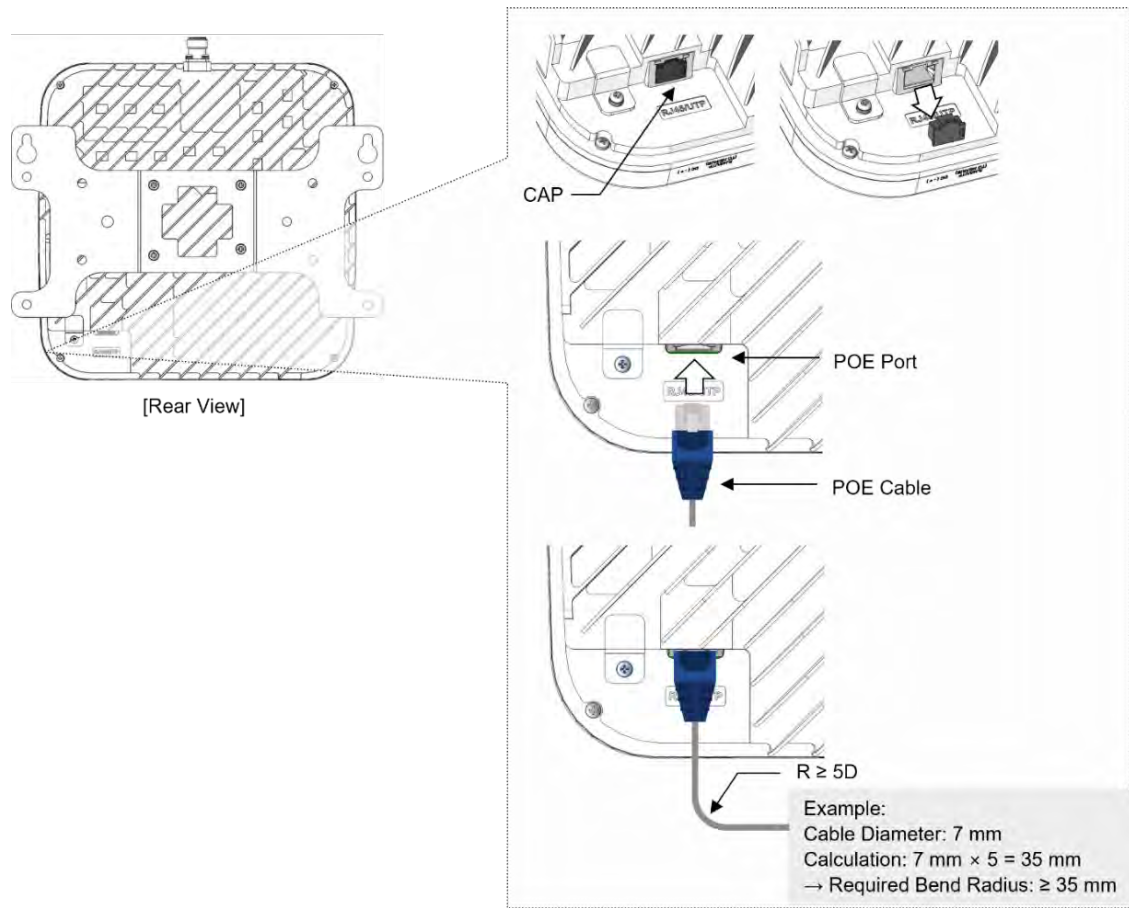


Figure 5-24 RU Side_PoE Cabling

3. On the HE side, remove the PoE port cap as shown below, then connect the PoE cable.

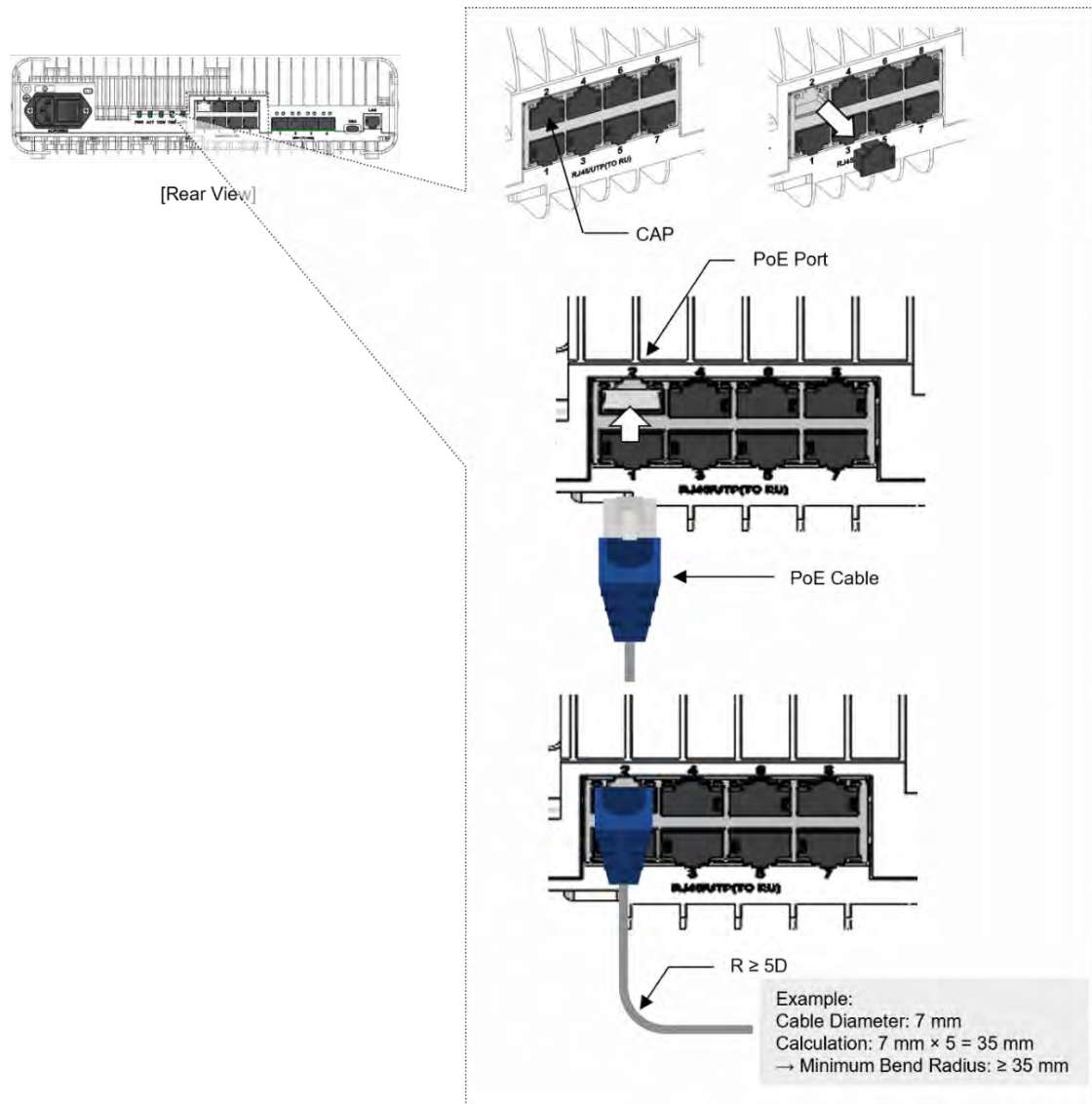


Figure 5-25 HE Side_PoE Cabling

4. On the HUB side, remove the PoE port cap as shown below, then connect the PoE cable.

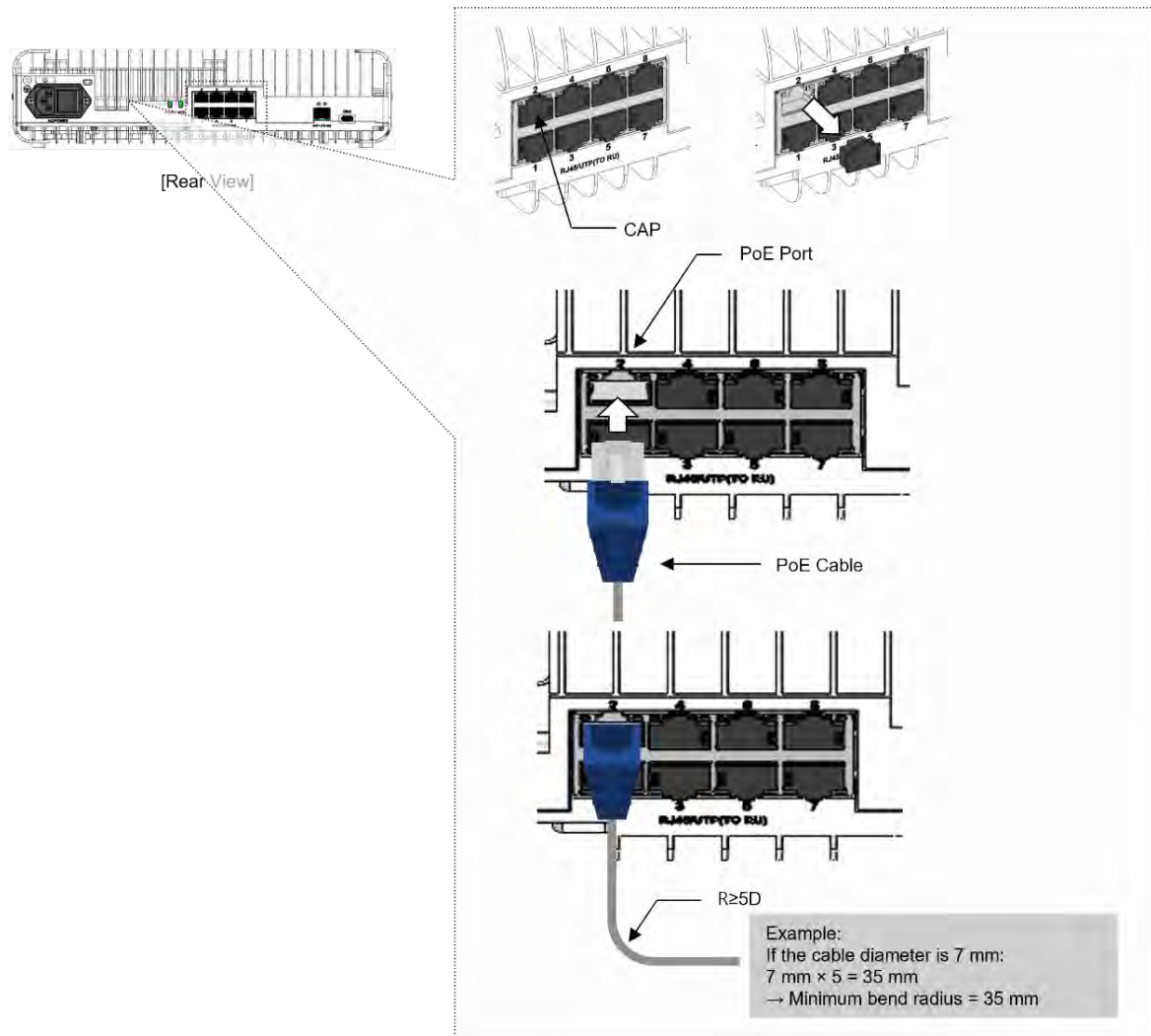


Figure 5-26 HUB Side_PoE Cabling

5.5.1.1. Using a PoE Range Extender

The PoE Range Extender for the SOLiD BARS™ is a device that extends the connection from the HE/HUB to the RU up to 200 meters using Cat6A cable, doubling the standard 100-meter limit.

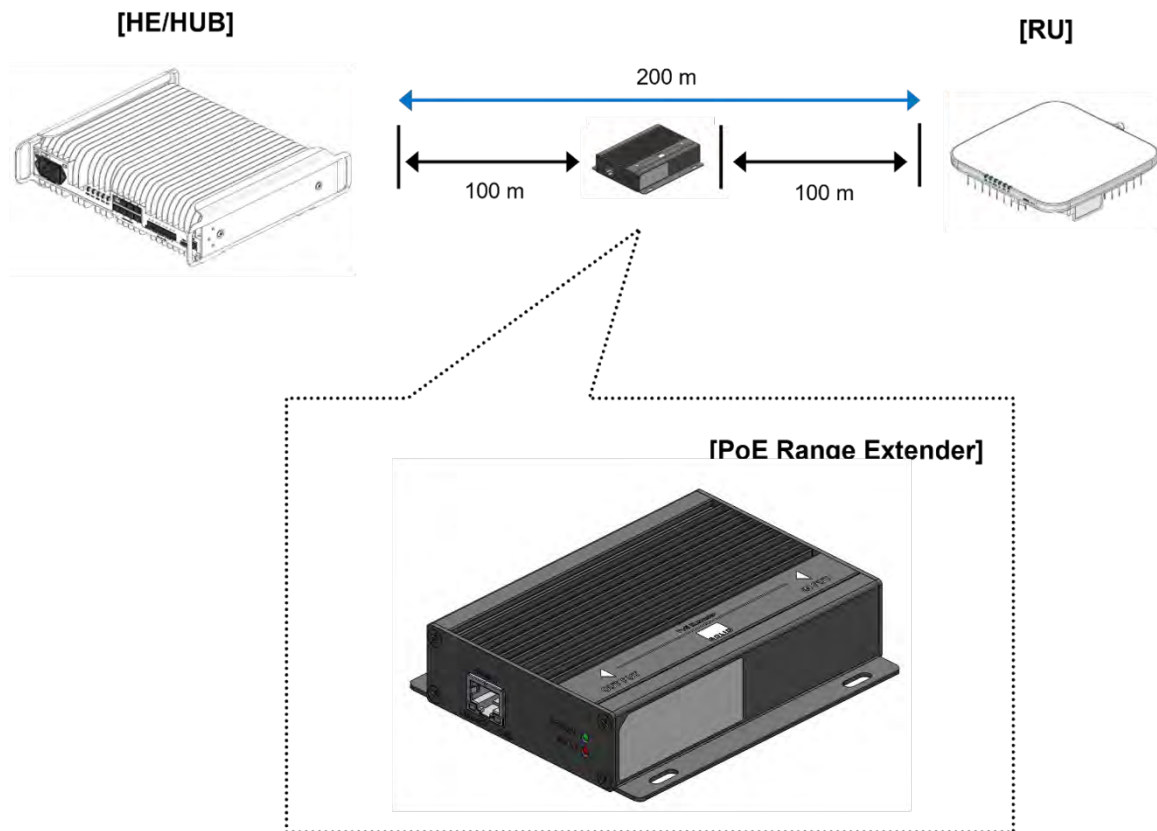


Figure 5-27 BARS_PoE Range Extender



The range extender is optional and must be purchased separately, if needed.

5.5.2. Connecting DAS Antenna(s)

The RU features a top-mounted N-type female connector that supports N-type antennas. Multiple passive antennas can also be connected using N-type cables and an X-way splitter.

You can use two types of DAS antennas: a dome antenna or a bar-type antenna



The package includes one bar-type antenna and an adapter.

5.5.2.1. Connecting Bar-type Antennas

The bar-type antenna may be connected either directly to the RU's antenna port or using an RF cable.

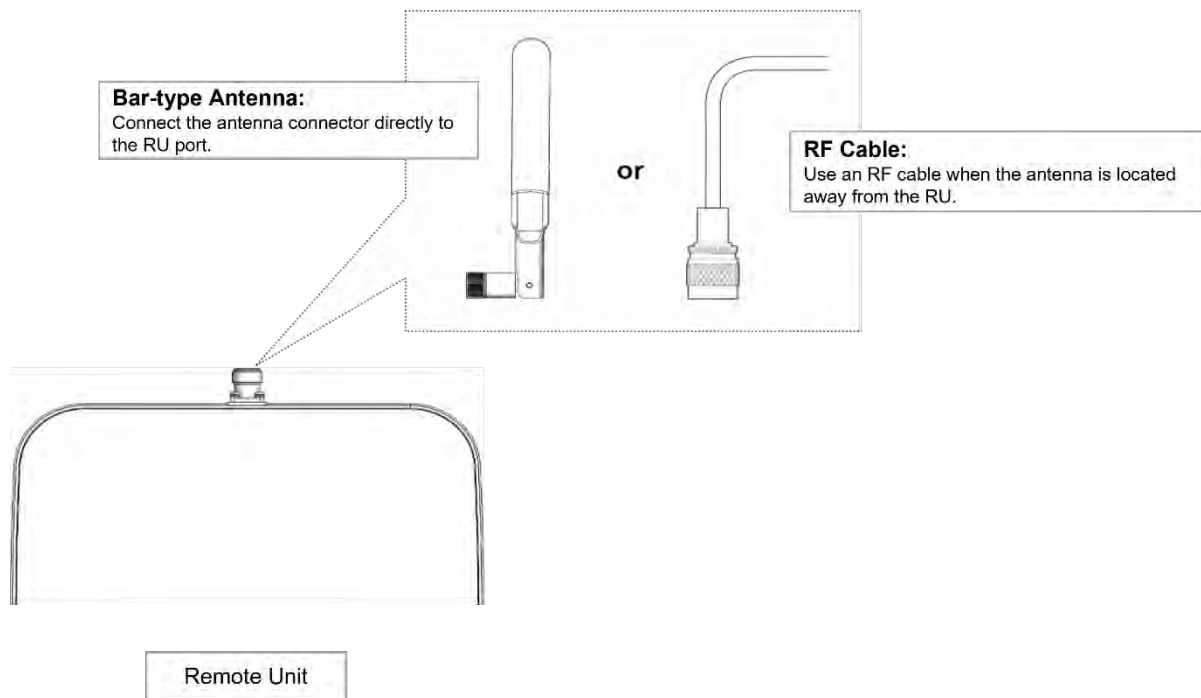


Figure 5-28 Connecting Bar-type Antennas



The provided DAS antenna is non-detachable. Do not disconnect the adapter from the antenna.

5.5.2.2. Connecting Dome Antennas

The dome antenna requires an RF cable for connection to the RU.

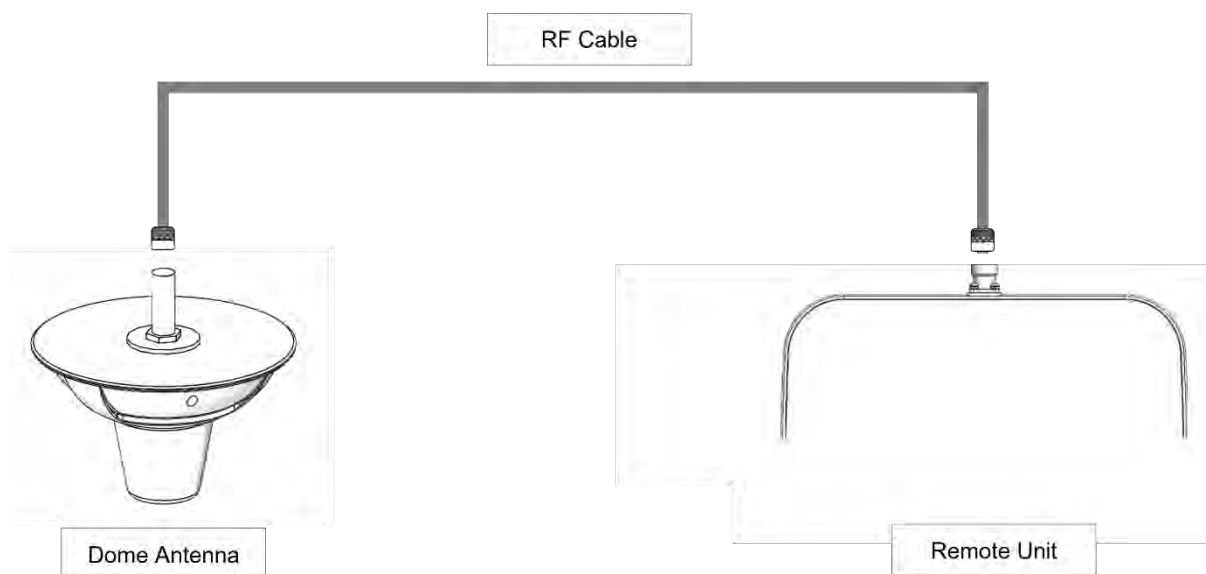


Figure 5-29 Connecting Dome Antennas



6 Overview of SOLiD BARS™ Portal

The portal provides real-time remote access for monitoring, configuring, and managing the BARS system. With built-in connectivity, you can access the system directly from a PC without additional hardware. Through the portal, you register devices, apply configuration settings, and execute commissioning procedures. The real-time dashboard offers a clear view of the site to enable efficient system management. Additionally, the portal monitors system status, detects faults, and sends alerts to help prevent network failures and equipment issues.



The SOLiD BARS™ Portal provides an online user guide. Please follow the link below and see the guide for detailed instructions.

<https://www.solidbarsportal.com/en/ems-c/Default.htm>

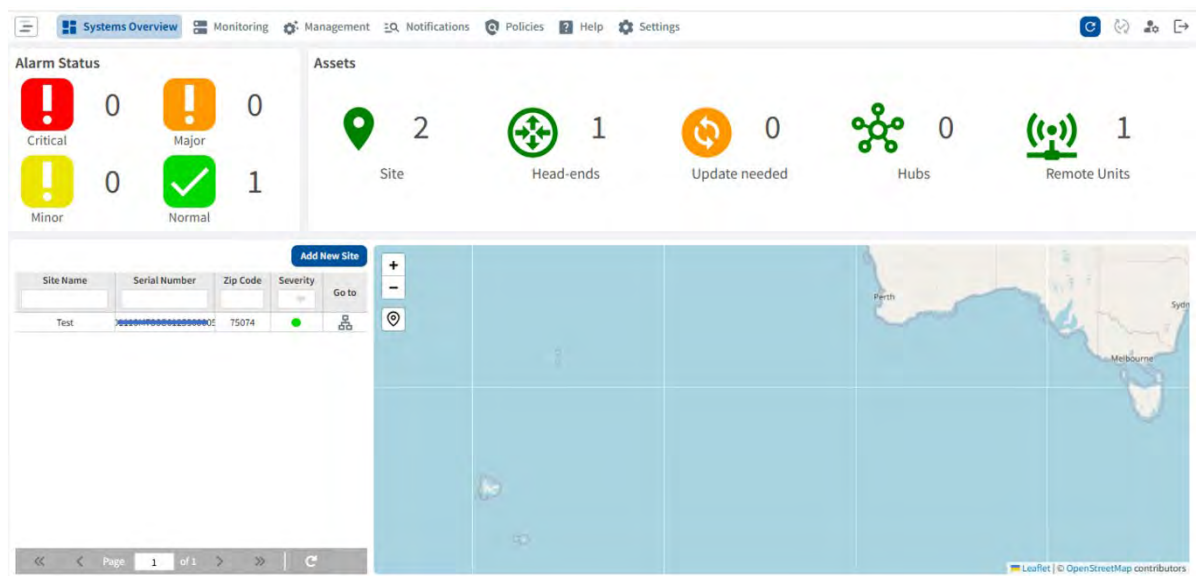


Figure 6-1 BARS Dashboard

SOLiD BARS Portal key features include:

- Real-time system operation monitoring
- Site registration status and information review
- Alarm statistics reporting
- Alarm notification configuration
- Software updates
- Trend analysis of the device radio environment and status
- Remote system diagnostics (isolation measures)
- System performance and operational status information
- System configuration and control
- Commissioning functions



6.1 Accessing the SOLiD BARS Portal

You can access the BARS Portal through either a modem or LAN connection.



- Please note that the Wi-Fi antenna and LAN cable cannot be connected simultaneously, as this may cause network errors.
- Always reboot the system after switching between the modem and LAN connections to ensure proper operation.

6.1.1. Accessing the SOLiD BARS Portal via LAN

To access the SOLiD BARS Portal via LAN, do the following:

1. Make sure the HE device is powered off.
2. Remove the SIM card from the HE.
3. Connect a LAN cable to the HE's LAN port.
For instructions on connecting the LAN cable to the HE, see [5.3.5](#)
4. Turn on the HE.

6.1.2. Accessing the SOLiD BARS Portal via Modem

To access the SOLiD BARS Portal via Modem, do the following:

1. Make sure the HE is powered off.
2. Install the Wi-Fi antenna on the HE.
For instructions on installing the Wi-Fi antenna on the HE, see [5.3.4](#).
3. Ensure a valid SIM card is inserted in the HE.
4. Turn on the HE.

6.2 Signing Up for SOLiD BARS Portal

To manage the BARS system, register your product on the portal using a PC. You will need the serial number displayed on the head-end unit to create an account.

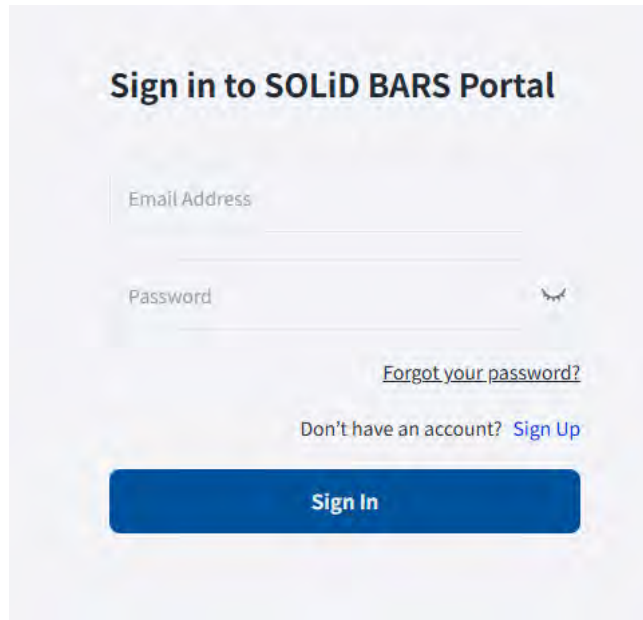


The serial number can be found on the side of the HE unit.

To create a new BARS portal account, follow these steps:

1. Open a browser on your PC or mobile device and enter the web address:
<https://www.solidbarsportal.com>

The login screen will appear as shown below.



Sign in to SOLiD BARS Portal

Email Address

Password

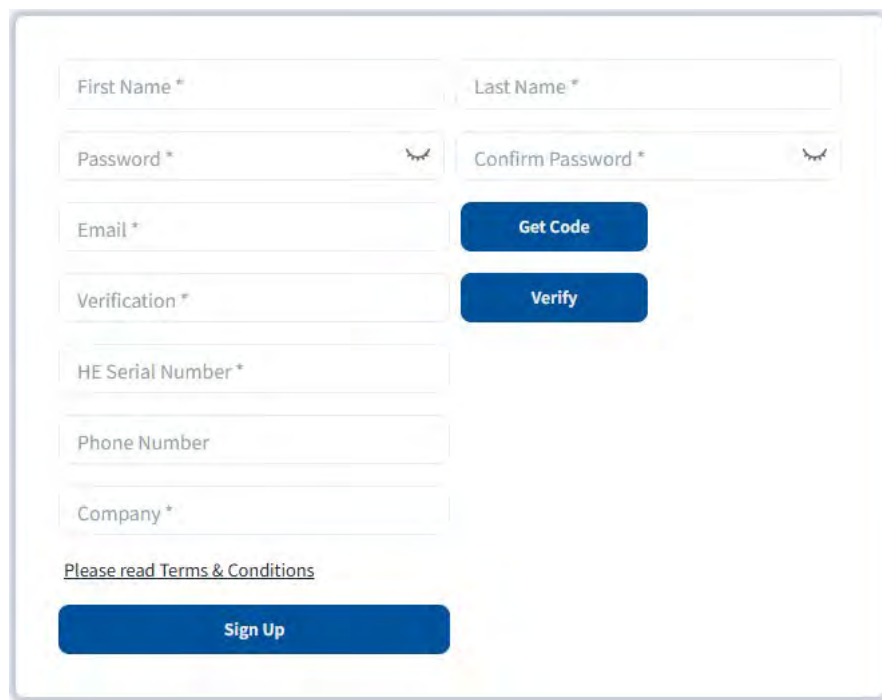
[Forgot your password?](#)

Don't have an account? [Sign Up](#)

Sign In

Figure 6-2 Signing Up SOLiD BARS Portal (1)

2. Click the blue **Sign Up** button in the bottom right to create a new account.
3. When the sign-up form appears, enter your name, password, product serial number, contact info, and company details.
 - ※ Password must be at least 8 characters, including letters, numbers, and special characters.



First Name *

Last Name *

Password *

Confirm Password *

Email *

Get Code

Verification *

Verify

HE Serial Number *

Phone Number

Company *

[Please read Terms & Conditions](#)

Sign Up

Figure 6-3 Signing Up SOLiD BARS Portal (2)

4. Enter your email address, then click the **Get Code** button to receive a verification code via email.

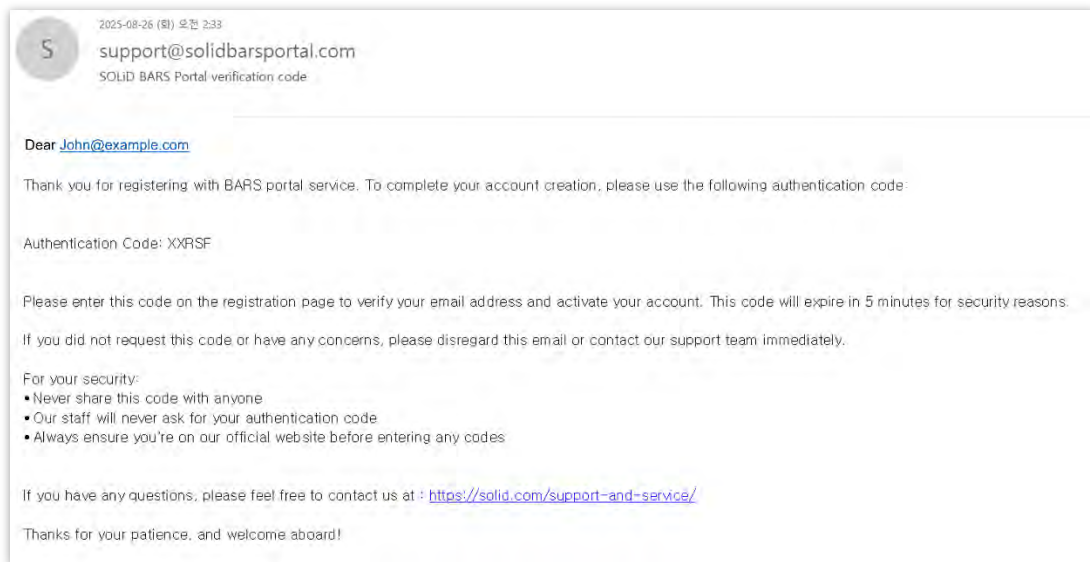


Figure 6-4 Signing Up SOLiD BARS Portal (3)

5. Enter the code you received into the verification box, then click the **Verify** button to complete verification.
6. After reviewing the Terms & Conditions at the bottom left, click **Sign Up** to finish registration.
7. After completing the registration, access the site via the link below, complete the training, and wait for administrator approval.
※ Access Link: <https://solid.com/bars/>
8. Once the administrator approves your account, you can log in to the SOLiD BARS Portal.

6.3 Logging into SOLiD BARS Portal

After registering on the BARS Portal, log in to the system by following these steps:

1. When you access the portal, the screen below will appear:

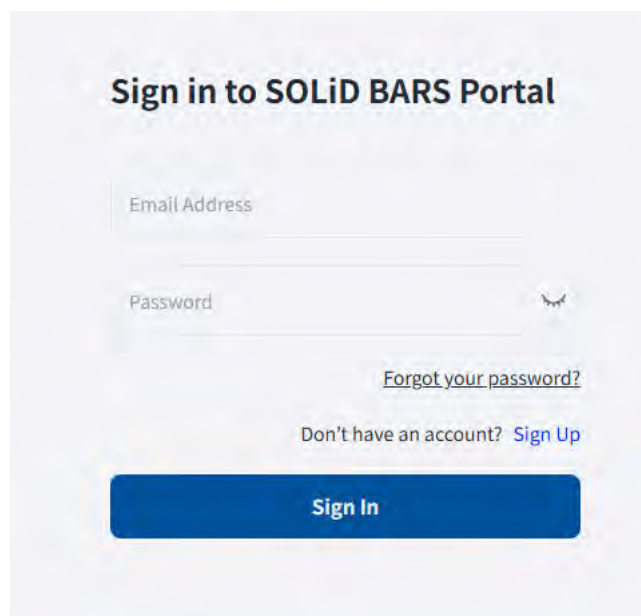


Figure 6-5 Accessing SOLiD BARS Portal (1)

2. Enter the email and password you registered with, then click the **Sign In** button below.
3. After a successful login, the system dashboard appears, as shown below.

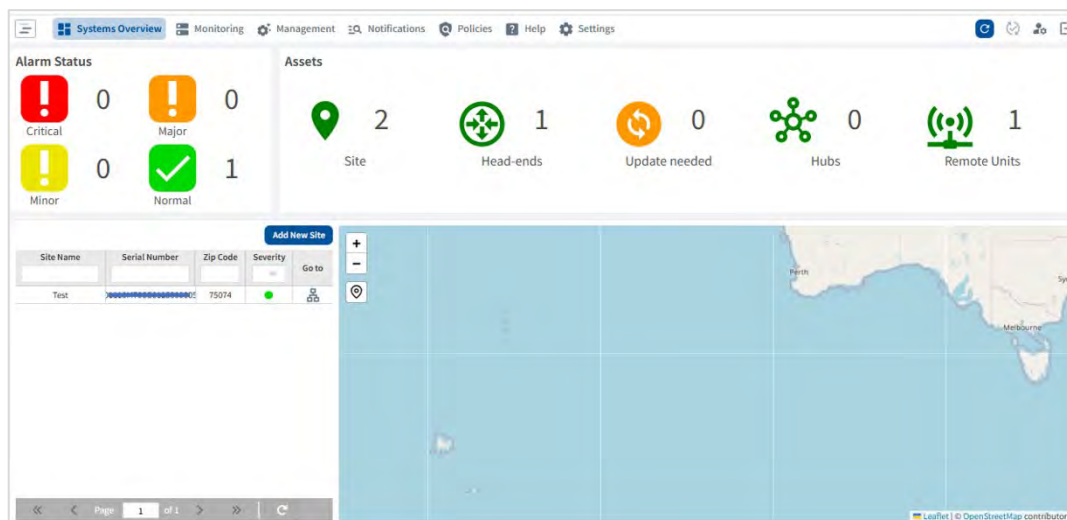


Figure 6-6 Accessing SOLiD BARS Portal (2)

6.4 Configuration and Commissioning

The BARS portal simplifies commissioning and provides real-time monitoring for efficient site management and control.

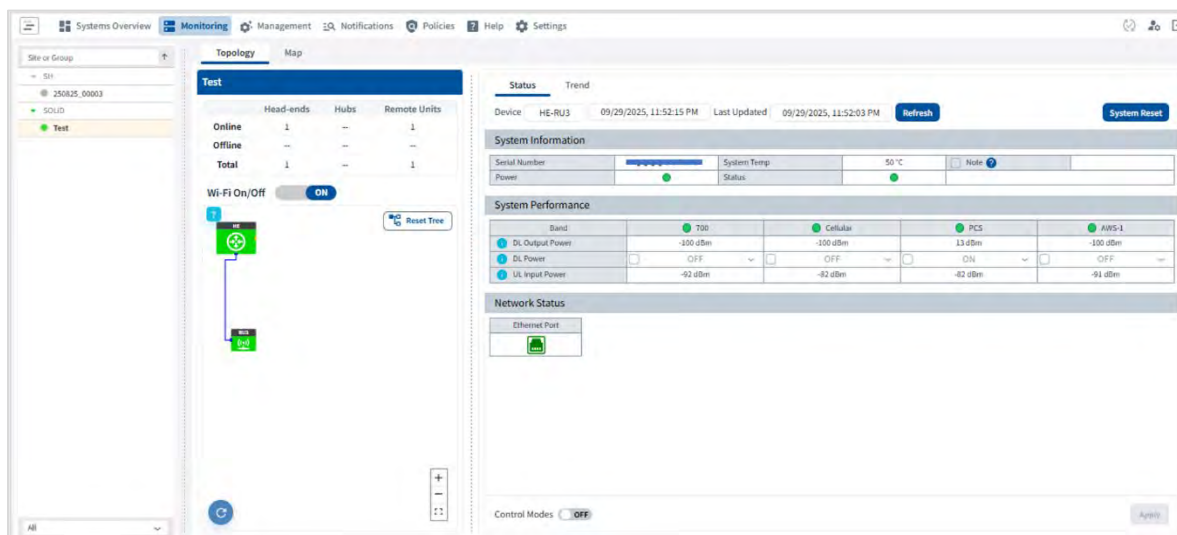


Figure 6-7 SOLiD BARS Portal UI

Perform commissioning in the portal by following the procedure below:

1. Log in to the system. (Refer to [Logging into SOLiD BARS Portal](#) for details.)
2. Go to the **Management Menu > Site** tab.
3. Click the **Add Site** button to register a new site.

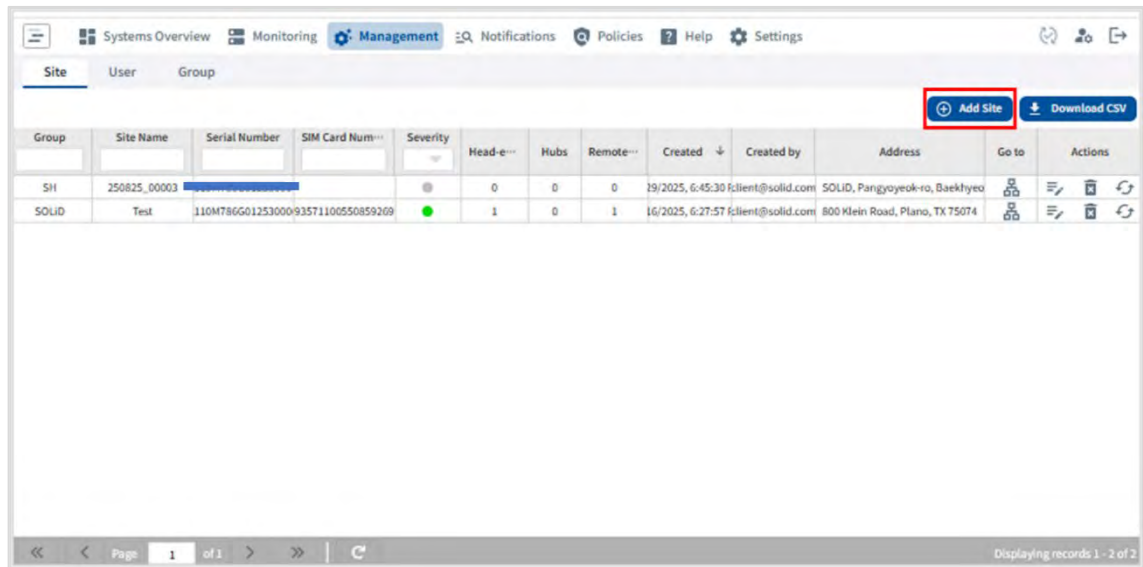


Figure 6-8 System Commissioning (1)

4. Enter the Site Name and Group, and accurately locate and select the installation site.
5. Input the Serial Number and the SIM card number included in the product box, then click **Verify** to confirm.

✘ Make sure the information is entered correctly to avoid registration failure.

The 'Add Site' form contains the following fields and controls:

- Site Name ***: Text input field.
- Group ***: Dropdown menu with the text 'Select a group' and a 'Create Group' link.
- Search ***: Text input field with a 'Search' button.
- Address**: A table with the following rows:
 - Address
 - Address Detail
 - Building Name
 - Street
 - City
 - State
 - ZIP Code
 - Country
- Time Zone**: Dropdown menu.
- Serial Number ***: Text input field.
- SIM Card Number ***: Text input field.
- Verify**: Blue button.
- Polling Intervals (hours)**: Dropdown menu with the value '24'.
- Comment**: Text area.
- Cancel**: Yellow button.
- Save**: Blue button.

Figure 6-9 System Commissioning (2)



6. Set the device update interval (default is 24 hours), then click **Save** to complete the site registration.
7. Navigate to the Dashboard to confirm that the site is registered and devices are properly mapped.
8. On the dashboard, click on the **Topology** icon  to go to the Topology screen and check device status.

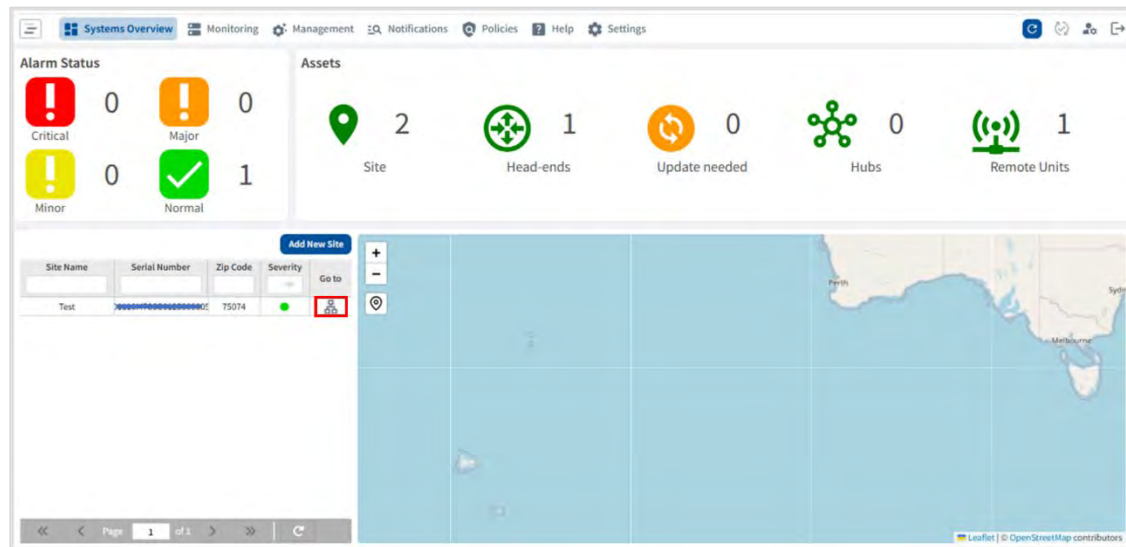


Figure 6-10 System Commissioning (3)

9. To enable **Trend Logging**, select the HE device in Topology and activate **Control Modes** at the bottom.

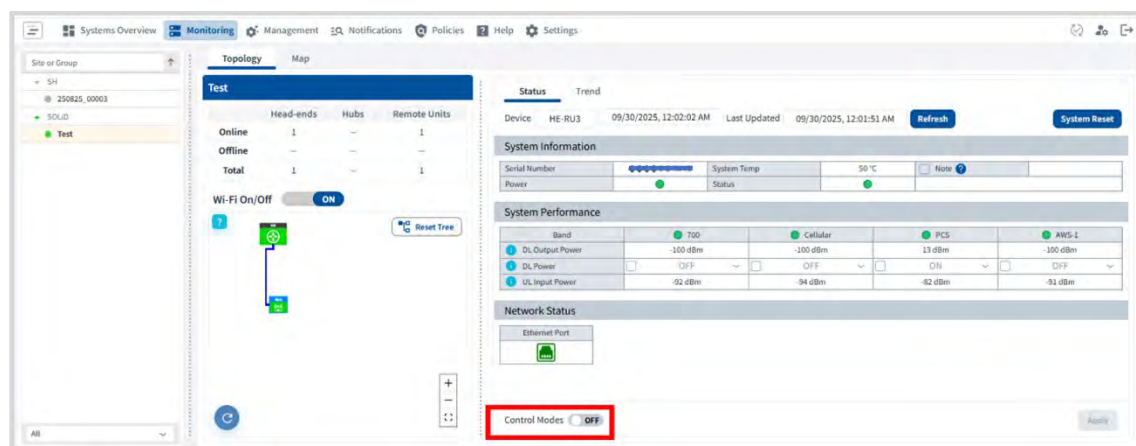


Figure 6-11 System Commissioning (4)

10. Then, check the **Trend Logging Enable** box, switch the setting to **ON**, and click **Apply**.

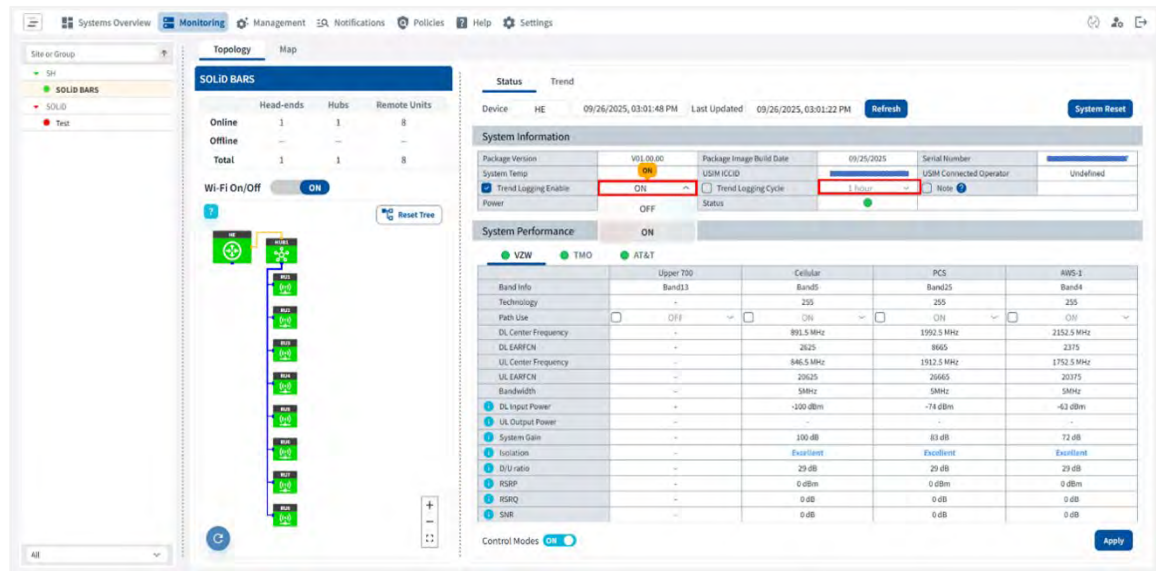


Figure 6-12 System Commissioning (5)

11. Set the logging interval using the **Trend Logging Cycle** option on the right.
 - ✂ Available Intervals: 30 minutes, 1 hour, 2 hours, 6 hours, 12 hours, or 24 hours.



7 Overview of WebGUI

The WebGUI allows you to monitor device status, align the antenna, and perform system diagnostics and testing using a mobile device. Simply connect a mobile phone to the Wi-Fi network near the head-end unit to access the system interface.



Must be near the target HE device to access the WebGUI on your mobile phone.

Key features of the WebGUI include:

- Real-time system operation monitoring
- Antenna positioning test function
- Software updates
- Remote system diagnostics (Isolation measures)
- System performance and status information
- System configuration and control

7.1 Accessing WebGUI

Access your WebGUI by following these steps:

1. Ensure a Wi-Fi antenna is installed on the HE before accessing the WebGUI. For instructions on installing the Wi-Fi antenna on the HE, see [5.3.4](#).
2. Search for the target HE's Wi-Fi network (SSID) on your mobile phone.
SSID: HE + Serial Number



Figure 7-1 Accessing WebGUI (1)

3. Enter the device's Wi-Fi password, then click **OK** to connect to the HE.

Password: *BARS1234*

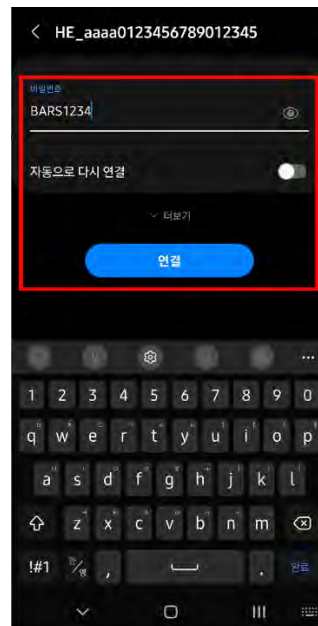


Figure 7-2 Accessing WebGUI (2)

4. Open a web browser (Chrome, Safari, etc.) and go to <http://192.168.88.1>. The system login screen will appear as shown below.

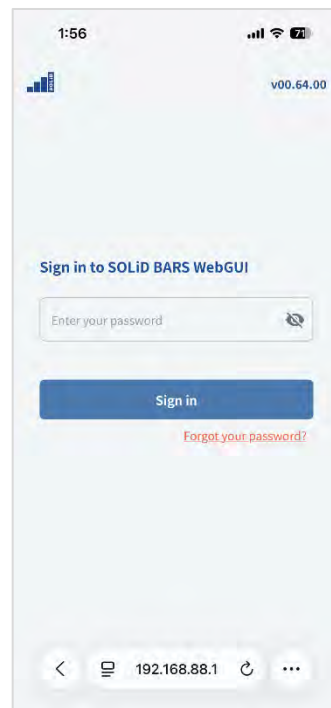


Figure 7-3 Accessing WebGUI (3)

5. Enter your password and click **Login**.
Default password: *BARS1234!*



- You can change the password in **Settings** after accessing the WebGUI.
- If you forget your password, you can reset it using the HE device's serial number.

6. Once logged in, the system monitoring screen will appear on your mobile.

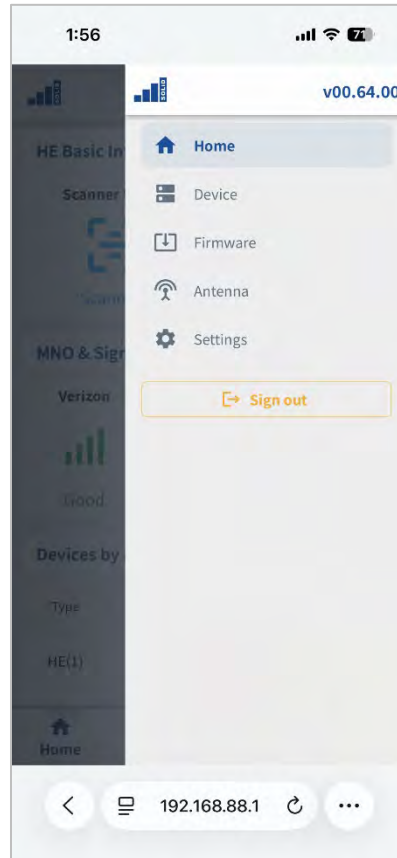


Figure 7-4 Accessing WebGUI (4)

7. On your first login, you'll see a prompt to perform antenna positioning.
8. For details, refer to [Antenna Positioning](#).

7.2 Antenna Positioning

Once you have installed the system and completed the cabling, the next step is to position the antenna. When you first open the WebGUI on your mobile device, you'll be prompted for antenna positioning like this.

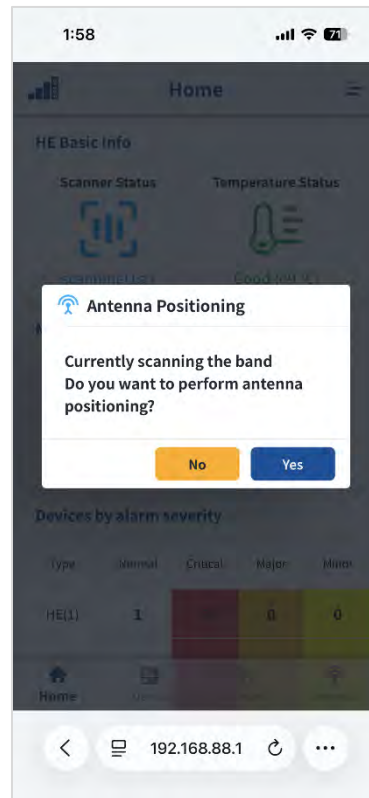


Figure 7-5 Antenna Positioning (1)

To scan a specific Antenna Position, click Yes

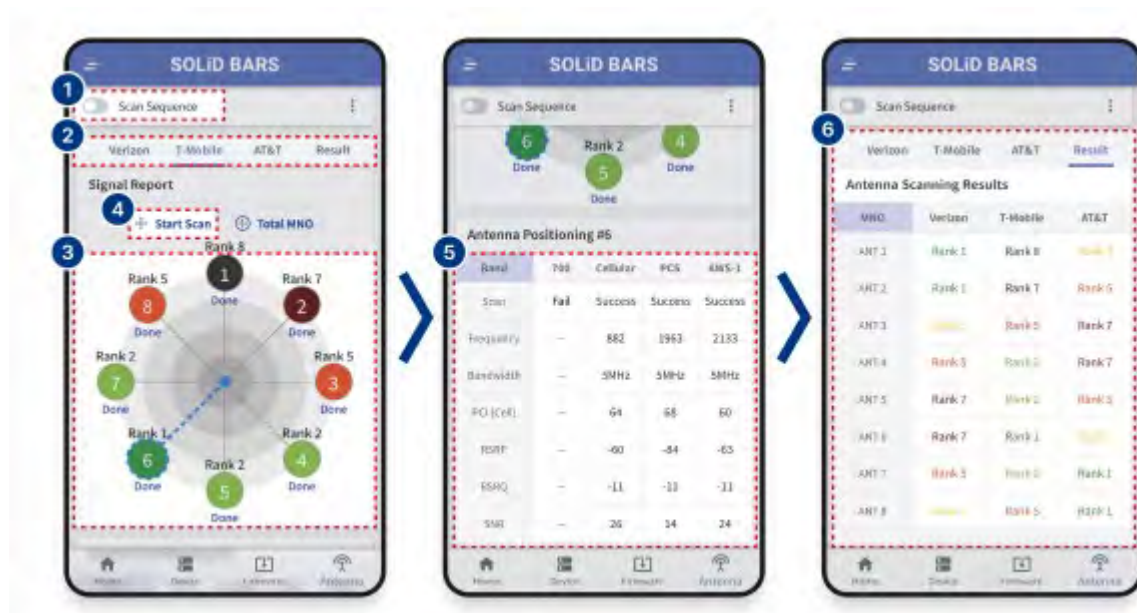


Figure 7-6 Antenna Positioning (2)

- ① Check the Scan Sequence option. If it's ON, switch it OFF before scanning.
- ② Select the target MNO: Verizon, T-Mobile, AT&T
- ③ In the Signal Report panel, choose the Antenna Position to scan.
- ④ Click **Start Scan** to begin scanning the selected Antenna Position.



- ⑤ Check the scan results in the Antenna Positioning panel.
- ⑥ Select the **Result** tab at the top to view scan results from all operators, ranked accordingly.

To scan the selected Antenna Position, click No:

A pop-up message will appear, and the process will take approximately three minutes.

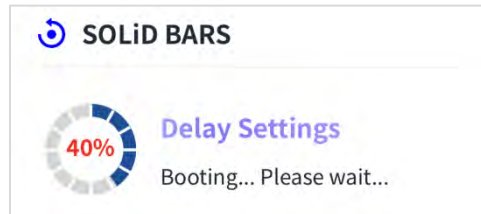


Figure 7-7 Antenna Positioning (3)



7.3 Diagnostics and Testing

The SOLiD BARS™ provides the Isolation Measure feature to optimize installation conditions that may affect system performance. If the distance between the Donor and DAS antennas is too short, the system can still run using Echo Cancellation. However, the Isolation Measure helps improve the setup for optimal performance. It measures isolation values for each RU under the HE and identifies units that may affect overall system operation. Results are displayed in the WebGUI as Pass or Fail.



For more details about WebGUI, see [Overview of WebGUI](#)

1. Log in to the WebGUI. (Refer to [Accessing](#) for details.)
2. Click **Equipment** at the bottom, then click the **Start** button in Isolation Check.

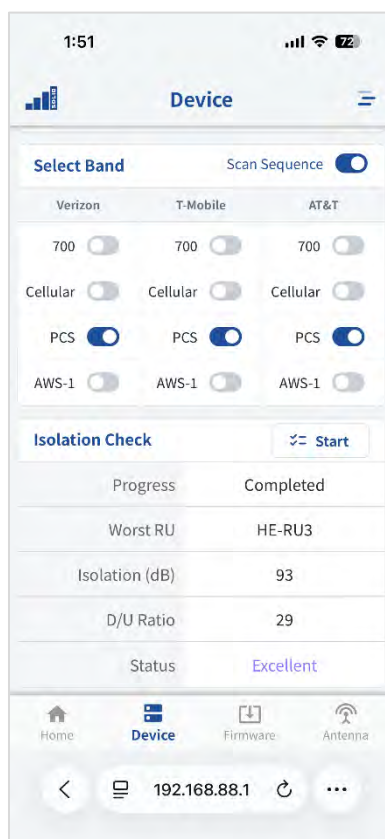


Figure 7-8 System Diagnostics and Testing

3. Review the measurement results for the D/U Ratio and Status.
- ※ Status levels correspond to the D/U Ratio.

D/U Ratio	Status
25 < D/U Ratio	Excellent
15 < D/U Ratio ≤ 25	Good
5 < D/U Ratio ≤ 15	Fair
D/U Ratio ≤ 5	Poor

4. If the Status displays “Poor,” adjust the Worst RU and DAS antenna positions, then repeat the process until the Status shows “Fair” or better.

8 Alarms & Troubleshooting

8.1 Alarm Conditions

The table below lists the common alarm conditions of the BARS system:

Type	Alarm Condition	Description
Power	12 VDC Out Voltage High	When the device (HE, HUB, RU) runs above the voltage threshold.
	12 VDC Over Current	When the device (HE, HUB, RU) runs above the current threshold.
ACT	Temp Over Alarm	When the device (HE, HUB, RU) runs above the temperature threshold.
	Temp Low Alarm	When the device (HE, HUB, RU) runs below the temperature threshold.
	Scan Fail	When the HE is connected to the donor antenna, it finds no signal or only weak signals during the scan.
	EMS Connect Fail	When the HE cannot connect to the server (e.g., SIM service expired).
	Wi-Fi Connect Fail	When the Wi-Fi module fails.
SFP Comm	SFP Insert	When the SFP is removed from the HE while in use.
SFP	HUB Comm Error	When the HE cannot communicate with connected devices.
	SFP LOS	When the optical level from a connected device (HE, HUB) is below the threshold.
	SFP LOF	When data or communication with a connected device (HE, HUB) fails.
UTP Comm	UTP Insert	When the UTP between the device (HE, HUB) and a connected RU is disconnected or RU power fails.
UTP	RU Comm Error	When the HE or HUB cannot communicate with a connected RU.
	UTP SNR	When the signal quality between devices (HE, HUB, RU) is below the threshold.
	UTP LOF	When data transfer between devices (HE, HUB, RU) fails.
	UTP Over Voltage	When a connected device uses a voltage above the set threshold.
	UTP Low Voltage	When a connected device uses a voltage below the set threshold.
	UTP Over Current	When a connected device uses current above the set threshold.
	UTP Low Current	When a connected device uses current below the set threshold.
	UTP Cable Length Upper	When the UTP length between devices (HE, HUB) and connected devices exceeds the max supported length by more than 10%.

Type	Alarm Condition	Description
MNO	DL Over Input	When the DL service signal is above the maximum input threshold of the HE.
	Unwanted Signal	When an outside operator's signal is stronger than the service signal in the band.
	DL / UL Isolation (Anti-Oscillation)	When service is running in an area with poor isolation between the donor and DAS antennas.
	UL Over Output	When the UL service signal is above the maximum output threshold of the HE.
	DL / UL Shutdown	When the HE protection function blocks the DL or UL path.
MNO No Signal	DL Low Input	When all service band signals are missing or too weak.
Band	DL Shutdown (RU)	When the RU protection function blocks the DL path.
	DL Over output	When the DL service signal is above the maximum output threshold of the RU.
	UL Over Input	When the UL service signal is above the maximum input threshold of the RU.

Table 8-1 System Alarm List

8.2 Troubleshooting Guide

The table below provides the alarm conditions and their suggested troubleshooting steps. Please follow these before returning the unit for service.

Type	Alarm Condition	Troubleshooting Guide
Power	12 VDC Out Voltage High 12 VDC Over Current	Power cycle the device that triggered the alarm. If the issue persists, return the unit for service.
ACT	Temp Over Alarm	Ensure proper placement of the device (HE or HUB): The device must be upright, and its air vents must remain unobstructed. Relocate the device (HE, HUB, RU) to a cooler environment if necessary.
	Temp Low Alarm	Allow the device to fully warm up. If the issue persists, move the device to a warmer location.
	- Scan Fail - EMS Connect Fail Wi-Fi - Connect Fail - Delay Alarm	Power cycle the device that triggered the alarm. If the issue persists, return the unit for service.
SFP Comm	SFP Insert	Check the SFP module and connector of the device (HE or HUB) that triggered the alarm. Try replacing the optical module. If the issue persists, return the unit for service.
SFP	- HUB Comm Error - SFP LOS / LOF	Inspect the optical cable between the HE and HUB that triggered the alarm.
UTP Comm	UTP Insert	Verify the UTP cable and connector connections on the device (HE, HUB, RU) that triggered the alarm. If the issue persists, return the unit for service.

Type	Alarm Condition	Troubleshooting Guide
UTP	- RU Comm Error - UTP SNR/LOF - UTP Over/Low Voltage - UTP Over/Low Current	Check the UTP cable connection between devices (HE-RU or HUB-RU) that triggered the alarm.
	UTP Cable Length Upper	Check the UTP cable length between devices. For cable lengths exceeding 100m, a PoE Range Extender is required.
MNO	DL Over Input	The downlink signal input to the HE is too strong. Adjust the donor antenna to reduce the input signal.
	- Unwanted Signal - DL/UL Isolation (Anti-Oscillation) - UL Over Output	Adjust the donor antenna on the HE. To resolve oscillation alarms, ensure sufficient isolation between the donor and DAS antennas.
	DL/UL Shutdown	An alarm has triggered a system shutdown. Manually restart the affected path or device. If the issue persists, identify the cause of the shutdown (e.g., DL/UL Isolation, UL Over Output) and perform the appropriate troubleshooting procedures.
MNO No Signal	DL Low Input	Weak signal to the HE. Move the HE to an area with a stronger signal or adjust the external antenna.
Band	- DL Over Output - DL Shutdown (RU)	Manually restart the affected path or device. If the issue persists, return the unit for service.
	UL Over Input	Uplink signal input to the RU is too strong. Reposition the DAS antenna; it may be too close to the mobile device.

Table 8-2 Troubleshooting Guide

Appendix A Used Abbreviations

The following table lists the abbreviations used in this document.

Abbreviations	Description
HE	BARS head-end Unit
HUB	BARS HUB Unit
RU	BARS Remote Unit
RAT	Radio Access Technology
TX	Transmitter
RX	Receiver
5G NR	5G New Radio
AWG	American Wire Gauge
DC	Direct Current
EMC	Electromagnetic Compatibility
EN	European Norm
FCC	Federal Communications Commission
IBW	Instantaneous Bandwidth
IEC	International Electrical Commission
IP40	International Protection 40
MGB	Main Ground Bar
OBW	Occupied Bandwidth
OD	Outer Diameter
PVC	Polyvinyl Chloride
RF	Radio Frequency
PWR	Power
RTN	Return
SFP	Small Form-factor Pluggable
TNV	Telephone Network Voltage
SELV	Safe Extra Low Voltage
UL	Underwriters Laboratories
WEEE	Waste Electrical and Electronic Equipment
SISO	Single Input Single Output
MIMO	Multiple Input Multiple Output
FH	Frequency Hopping
PTP	Precision Time Protocol
TDD	Time-division Duplexing
VDC	Volts Direct Current
BTS	Base Transceiver Station
Rev	Revision
N/A	Not Applicable/Not Available

Abbreviations	Description
LAN	Local Area Network
LED	Light-emitting Diode
PSU	Power Supply Unit
CE	Conformité Européenne
RoHS	Restriction of Hazardous Substances
REACH	Registration, Evaluation, Authorization, and Restriction of Chemicals

Table 8-3 Used Abbreviations

Appendix B Cleaning the Optical Connector

When connecting an optical cable to the system, the performance can be degraded or failures can occur if the core element of the optical connector is dirty due to dust or other foreign materials. Therefore, the operator must clean the optical connector before connecting an optical cable to the system.

When using an optical connector cleaner, use the products given in the following example or their equivalent.

Manufacturer-USCONEC (<http://www.thefibers.com/>)

- IBC™ Brand Cleaner (P/N: 9393): For LC-LC and MU Connector Cleaning
- IBC™ Brand Cleaner (P/N: 9392): For SC Connector Cleaning
- IBC™ Brand Cleaner (P/N: 12910): For ODC Connector Cleaning



Manufacturer-The Fibers (<http://www.thefibers.com/>)

- HuxCleaner 1.25 mm Type: For LC and MU Connector Cleaning
- HuxCleaner 2.5 mm Type: For SC, FC, and ST Connector Cleaning



Follow the instructions of the manufacturer for cleaning the optical connectors.

Measure the Optical Output and Connect the Optical Connector

To measure the optical output, follow these steps:

1. Using an optical power meter, check the optical output.
2. If the optical output measurement result meets the reference value, clean the connector again and connect it.
If the measurement result does not meet the reference value, replace the cable with a new one. Clean the new cable and connect it to the system.



[LC/PC Plug]



[Optical Power Meter]

3. The following is an example of optical cable testing devices:



[Optical Cable Tester]

Appendix C Standard Torque

Use the standard torque values below to avoid damaging the equipment and hardware and to properly secure the parts or systems. If a torque value is given in a procedure step, use that value instead.

Bolt Spec.	Torque Value (N·m)	Torque Value (lbf·in)	Torque Value (kgf·cm)
M3	0.5 to 0.8	4.5 to 6.7	5.1 to 7.7
M4	1.2 to 1.8	10 to 16	12 to 18
M5	2.2 to 3.4	20 to 30	23 to 35
M6	3.9 to 5.9	34 to 52	40 to 60
M8	10 to 14	88 to 132	102 to 152
M10	20 to 30	174 to 260	200 to 300
M12	34 to 50	298 to 446	342 to 514

Table 8-4 Standard Torque Value for Fastening Bolts

Connector	Torque Value (N·m)	Torque Value (lbf·in)	Torque Value (kgf·cm)
SMA connector	0.8 to 1.1	7 to 10	8.2 to 11.2
TNC connector	0.46 to 0.69	4.1 to 6.1	4.1 to 7
N-type connector	0.7 to 1.1	6.2 to 9.7	7.1 to 11.2
DIN-type connector	25 to 30	221 to 265	255 to 306
4.3-10-type connector	5 to 11	44 to 97	51 to 112

Table 8-5 Connector Connection Torque Value



The torque values can vary depending on the material, characteristics, and specifications of the equipment and fastener. Ensure you check the proper torque value for each specific equipment and fastener.

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