Part III: Appendices

Topics:

- Safety
- Installation troubleshooting
- Specifications
- Field Replaceable Units
- Cable installation and power separation guidelines

Safety

This appendix contains specifications for CommScope ONECELL, including FCC information and technical data.

Radiation Exposure Statement

Important: Changes or modifications not expressly approved by CommScope LLC could void your authority to operate the equipment.

FCC Part 15

The Baseband Controller and RP5100 have been tested and found to comply with the limits for Class A equipment, pursuant to Part 15 of the FCC Rules.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For more information, see the publication femtocells and Health at https://www.smallcellforum.org/ or visit the FCC website at https://www.fcc.gov/.

EN55032

WARNING: This equipment is compliant with Class A of EN55032. In a residential environment, this equipment may cause radio interference.

Human exposure limits for ONECELL deployments

The human exposure limits for the ONECELL product is calculated by using the Maximum Permissible Exposure (MPE) method associated with fixed-type transmitter devices at a minimum exposure distance of 20 cm.

WARNING: This equipment is not suitable for use in locations where children are likely to be present.

The following table includes values for one Radio Point (RP5000 series) and four Radio Points per chassis.

TABLE 3: RF exposure for ONECELL at maximum power internal antennas for RP5100 series

Parameter	RPM-A5A11-B13	RPM-A5A11-B66	RPM-A5A11-B02	RPM-A5A11-B01	RPM-A5A11-B03	RPM-A5A11-B07
Tx Power (dBm) per antenna	21.48	24.13	24.23	24.25	24.00	24.70
Tx Loss (dB)	0	0	0	0	0	0
Tx Antenna Gain (dBi)	4	4	4	4	4	4
Transmitter Duty Cycle %	100	100	100	100	100	100
Number of Antennas (MIMO)	2	2	2	2	2	2
Contribution due to multiple antennas (dB)	3.0103	3.0103	3.0103	3.0103	3.0103	3.0103
Derived Total EIRP (dBW)	-1.510	1.140	1.240	1.260	1.010	1.710
Bands	13	66	2	1	3	7
Frequency Range (MHz)	746-756	2110-2200	1930-1990	2110-2170	1805-1880	2620-2690
Point Source Total EIRP (watts)	0.706	1.300	1.331	1.337	1.262	1.483
Power Density (W/ m2) @ 20 cm	1.405	2.587	2.647	2.569	2.510	2.950

1. For persons with implants, the maximum calculated distance of 30cm. This applies to any combination of up to four radio modules in Bands 1,3 and 7.
2. For general public and workers, a measured distance of 5mm was determined. This applies to any combination of up to four radio modules in Bands 1,3 and 7.
3. For general public and workers, a calculated distance of 20cm was determined. This applies to any combination of up to four radio modules in Bands 2 and 66.

Parameter	RPM-I5A11-B17	RPM-A5A11-B12	RPM-A5A11-B14	RPM-A5A11-B05	RPM-A5A11-B30
Tx Power (dBm) per antenna	21.70	21.88	21.45	21.58	20.99
Tx Loss (dB)	0	0	0	0	0
Tx Antenna Gain (dBi)	4	4	4	2	5
Transmitter Duty Cycle %	100	100	100	100	100
Number of Antennas (MIMO)	2	2	2	2	2
Contribution due to multiple antennas (dB)	3.0103	3.0103	3.0103	3.0103	3.0103
Derived Total EIRP (dBW)	-1.290	-1.110	-1.540	-3.410	-1.000
Bands	12	12	14	5	30
Frequency Range (MHz)	734-746	729-746	758-768	869-894	2350-2360
Point Source Total EIRP (watts)	0.743	0.775	0.702	0.456	0.794
Power Density (W/ m2) @ 20 cm	1.478	1.541	1.396	0.907	1.58

The following table includes values for one Radio Point (RP5200) and four Radio Points per chassis.

TABLE 4: RF exposure for ONECELL at maximum power internal antennas for RP5200 series

Parameter	RPMA5A11-B66	RPMA5A11-B02	RPMI5A11-B01	RPMI5A11-B03	RPMI5A11-B07
Tx Power (dBm) per antenna	24.13	24.23	24.25	24.00	24.70
Tx Loss (dB)	0	0	0	0	0
Tx Antenna Gain (dBi)	4	4	4	4	4
Transmitter Duty Cycle %	100	100	100	100	100

TABLE 4: RF exposure for ONECELL at maximum power internal antennas for RP5200 series (continued)

Parameter	RPMA5A11-B66	RPMA5A11-B02	RPMI5A11-B01	RPMI5A11-B03	RPMI5A11-B07
Number of Antennas (MIMO)	2	2	2	2	2
Contribution due to multiple antennas (dB)	3.0103	3.0103	3.0103	3.0103	3.0103
Derived Total EIRP (dBW)	1.140	1.240	1.260	1.010	1.710
Bands	66	2	1	3	7
Frequency Range (MHz)	2110-2200	1930-1990	2110-2170	1805-1880	2620-2690
Point Source Total EIRP (watts)	1.300	1.331	1.337	1.262	1.483
Power Density (W/m2) @ 20 cm	2.587	2.647	2.569	2.510	2.950

1. For persons with implants, the maximum calculated distance of 30cm. This applies to any combination of up to four radio modules in Bands 1,3 and 7.
2. For general public and workers, a measured distance of 5mm was determined. This applies to any combination of up to four radio modules in Bands 1,3 and 7.
3. For general public and workers, a calculated distance of 20cm was determined. This applies to any combination of up to four radio modules in Bands 2 and 66.

Parameter	RPMI5A11-B17	RPMA5A11-B12	RPM-A5A11-B14	RPM-A5A11-B05	RPM-A5A11-B30
Tx Power (dBm) per antenna	21.70	21.88	21.45	21.58	20.99
Tx Loss (dB)	0	0	0	0	0
Tx Antenna Gain (dBi)	4	4	4	2	5
Transmitter Duty Cycle %	100	100	100	100	100
Number of Antennas (MIMO)	2	2	2	2	2
Contribution due to multiple antennas (dB)	3.0103	3.0103	3.0103	3.0103	3.0103

Parameter	RPMI5A11-B17	RPMA5A11-B12	RPM-A5A11-B14	RPM-A5A11-B05	RPM-A5A11-B30
Derived Total EIRP (dBW)	-1.290	-1.110	-1.540	-3.410	-1.000
Bands	17	12	14	5	30
Frequency Range (MHz)	734-746	729 - 746	758 - 768	869-894	2350-2360
Point Source Total EIRP (watts)	0.743	0.775	0.702	0.456	0.794
Power Density (W/m2) @ 20 cm	1.478	1.541	0.702	0.456	0.794
Tx Power (dBm) per antenna	1.478	1.541	1.396	0.907	1.58

Parameter	RPM-I5A11-B13	RPM-I5A11-B25	RPM-A5A11-N77C*
Tx Power (dBm) per antenna	21.75	23.30	29.50
Tx Loss (dB)	0	0	0
Tx Antenna Gain (dBi)	4	4	4
Transmitter Duty Cycle %	100	100	Variable
Number of Antennas (MIMO)	2	2	4
Contribution due to multiple antennas (dB)	3.0103	3.0103	0.0000
Derived Total EIRP (dBW)	-1.240	0.310	3.500
Bands	13	25	n77
Frequency Range (MHz)	746 - 756	1930-1990 1930-1995	3700-3980
Point Source Total EIRP (watts)	0.752	1.074	2.239
Power Density (W/m2) @ 20 cm	1.495	2.137	4.454
* N77C Tx power is sum of all 4 antenna port measurements.			

The following table includes values for one Radio Point (RP2000 and RP2100) and four Radio Points per chassis.

TABLE 5: RF exposure for ONECELL at maximum power internal antennas for RP2000 series

Parameter	Indoor RP-A2014 & RP-I2014		Rugged RP-A2114 & RP-I2114			
Tx Power (dBm) per antenna	21	21	21	21	21	21
Tx Loss (dB)	0	0	0	0	0	0
Tx Antenna Gain (dBi)	0	5	11.8	12	12.5	13.5
Transmitter Duty Cycle %	100	100	100	100	100	100
Number of Antennas (MIMO)	2	2	2	2	2	2
Contribution due to multiple antennas (dB)	3.0103	3.0103	3.0103	3.0103	3.0103	3.0103
Derived Total EIRP (dBW)	-5.990	-0.990	5.810	6.010	6.510	7.510
Bands	12,13,17	1,2,3,4,7,10,25	12,13,17	3	1,2,4,10,25	2620-2690
Frequency Range (MHz)	729-756	1805-2690	729-756	1805-1880	1930-2170	2620-2690
Point Source Total EIRP (watts)	0.252	0.796	3.811	3.991	4.477	5.637
Power Density (W/m2) @ 20 cm	0.501	1.584	7.582	7.939	8.908	11.214

Reference documents

1. Federal Communications Commission Document OET Bulletin 65, Supplement C, 2001, Evaluating Compliance with FCC guidelines for Human Exposure to radio frequency Electromagnetic Fields, US Federal Communications Commission, Office of Engineering and Technology June 2001.
2. Federal Communications Commission Document OET Bulletin 56, “Questions and answers about biological effects and potential hazards of radio frequency electromagnetic fields”, Federal Communications Commission Office of Engineering and Technology, August 1999.

3. ICNIRP Guidelines for limiting exposure to time varying electric, magnetic and electromagnetic fields up to 300 GHz. International Commission on Non Ionizing Radiation, published in Health Physics 74 (4): 494-522; 1998
4. ICNIRP Statement on EMF-Emitting New Technologies, International Commission on Non-Ionizing Radiation, published in Health Physics 94 (4):376-392, 2008
5. 3GPP Document 3GPP TS 36.104 version 10.11.0 Release 10," LTE Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception"

FCC ID

The FCC ID is available on the information labels attached to the RPs.

RP5100i and RP5200i series

For the RP5100i and RP5200i , the FCC ID for each of the installed radio modules is visible when the cover or the Radio Module is removed from the RP. The drawing below shows the label on the radio module.

FIGURE 18: RP5200i C-Band Radio Module label

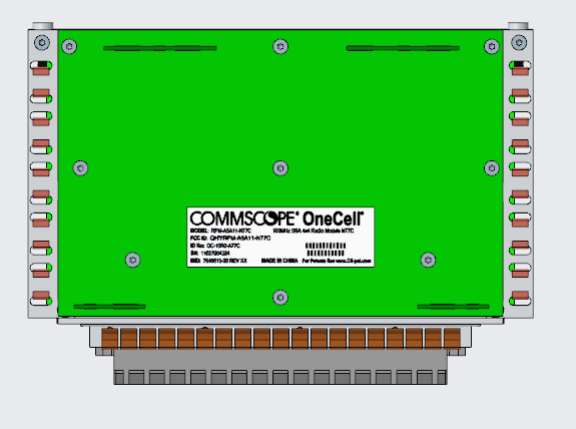
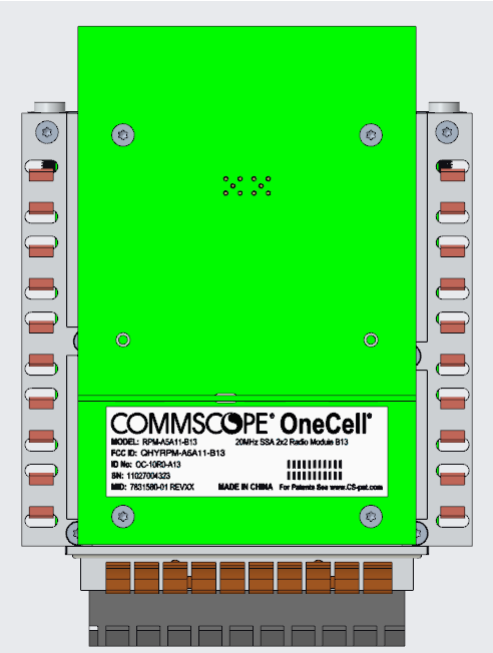
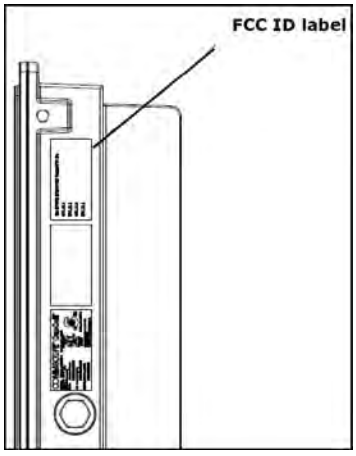


FIGURE 19: RP5100i and RP5200i LTE Radio Module label

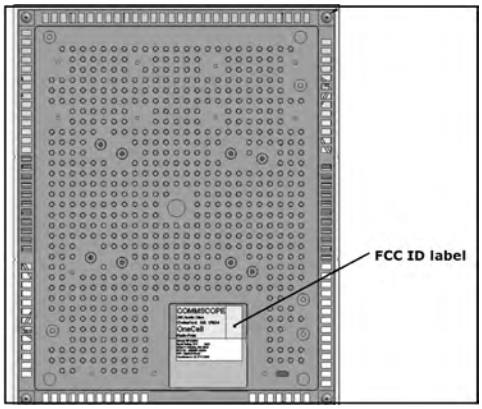


The RP5100r FCC ID is on the label located on the side of device as shown in the drawing below.

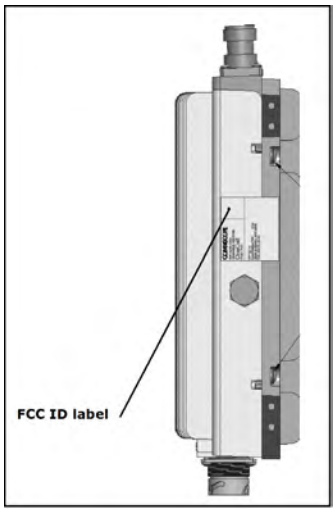


RP2000 series

The RP2000 FCC ID is on the label located on the back of the device as shown in the drawing below.



The RP2100 FCC ID is on the label located on the side of the device as shown in the drawing below.



Installation troubleshooting

Overview

This section contains information on troubleshooting the ONECELL installation. It includes the LED patterns for the Baseband Controller and Radio points.

Baseband Controller LED patterns

The Baseband Controller has four LEDs on the front panel. The following table shows

- Display pattern for each LED
- What the pattern indicates
- Action to take, if any, to resolve the issue

LED	Display Pattern	Indicates	Action to Take
STATUS	Green, solid	Power On Sectors up	None
	Amber, solid	Self-test failure	Replace Baseband Controller
	Green, blinking	Firmware upgrade from DMS Sectors not up	None
	Amber, blinking	No configuration from DMS	■ Check DMS availability ■ Check if the provisioning is correct ■ Escalate to operator
	OFF	BC rebooting after upgrade	None
	Red, solid*	Error in system - software or hardware issues detected	Replace Baseband Controller Module

LED	Display Pattern	Indicates	Action to Take
RP ERROR	Green, solid	Power On	None
	Amber, solid	Self-test failure	Replace Baseband Controller
	Amber, blinking	No Radio Points connected	Check RP cable
	Off	Radio Points connected, firmware upgrade from DMS	None
	Red, blinking	Radio Point alarm - PLL state unlock; service impacting alarm from Radio Point (alarm in one or more RP)	Check 1588 VLAN configuration
TIMING LED	Green, solid	Power On, timing	None
	Amber, solid	Self-test failure	Replace Baseband Controller
	Amber, blinking	No timing	Check GPS antenna connection feed
	Off	Firmware upgrade from DMS	None
	Red, solid*	Error in system GPS module down Software/Hardware issues	Replace Baseband Controller Module

LED	Display Pattern	Indicates	Action to Take
CORE LED	Green, solid	Power On Connection to MME	None
	Amber, solid	Self-test failure	Replace Baseband Controller
	Amber, blinking	No connection to MME IPsec is up	■ Check the MME configuration on the BC ■ Check if MME is reachable
	Off	Firmware upgrade from DMS	None
	Red, blinking	Internet connection IPsec down	■ Check if Security Gateway is reachable ■ Check security credentials
	Red, solid*	No Internet Interface hardware issues	Replace Baseband Controller Module
Note: * When all of the LEDs are solid red, there is a BC hardware failure.			

Radio Point LED patterns

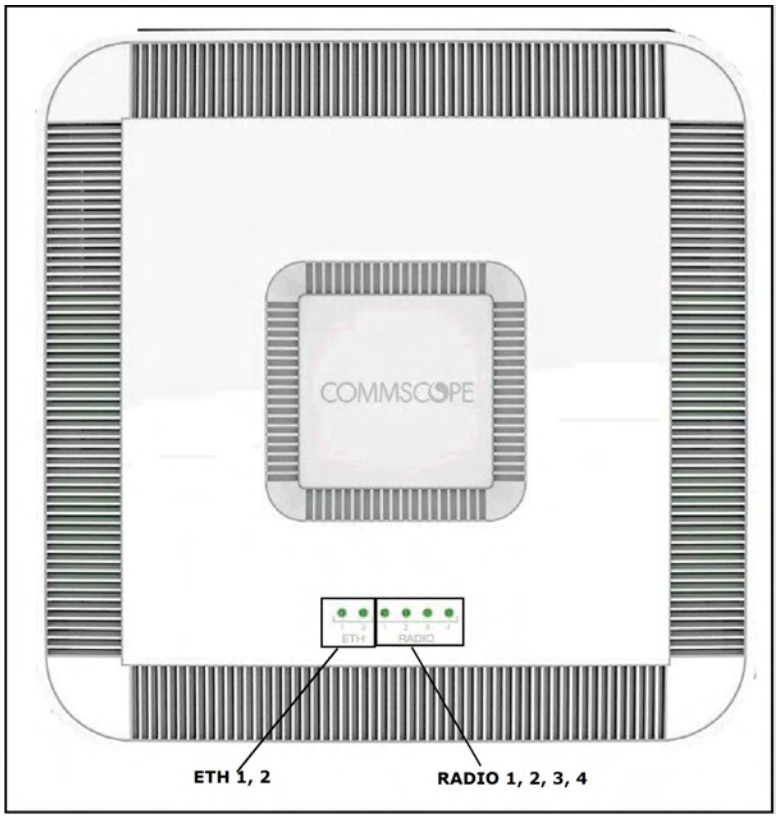
This section contains LED patterns for RP5100 series and RP2000 series.

RP5100i LED patterns

The Radio Point RP5100i/RP5200i supports six LEDs on the front cover.

Indicators are for

- four radios (one for each)
- ETH 1 – MR PORT:POE++, POE+, Ethernet link
- ETH 2– SR PORT:POE++, POE+, Ethernet link



The following table shows:

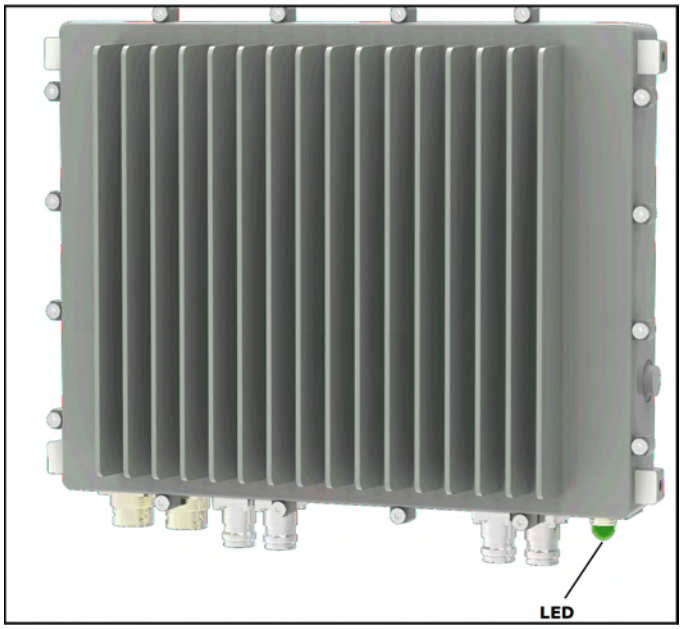
- Display pattern for each LED
- What the pattern indicates
- Action to take, if any, to resolve the issue

LED	Display Pattern	Indicates	Action to Take
RADIO 1 RADIO 2 RADIO 3 RADIO 4	Green, solid	Power On, transmitting	None
	Amber, solid	■ RFTxState OFF ■ No Controller Assigned ■ No Timing	■ Check 1588 VLAN configuration ■ Verify that the Radio Point is in STANDBY because more than 32 RPs are connected
	Red, solid	■ No connection to Controller ■ HW error ■ Low Power	Hardware error – replace Radio Point
	Green, blinking	Firmware upgrade	None
	Amber, blinking	RF module Self-Test Failure	Replace Radio Module
Eth 1	Green, solid	Power On, PoE++ power	None
	Amber, solid	Link up, no power	Check that the Ethernet cable is connected to the Radio Point
	Green, blinking	PoE+ power	None
	Amber, blinking	Platform Self-Test Failure	Replace Radio Point
	Red, solid	Ethernet port error	■ Connect the Ethernet cable between the Baseband Controller and Radio Point ■ Replace Radio Point
Eth 2	Green, solid	Power On, PoE++ power	None
	Amber, solid	Link up, no power	Check that the Ethernet cable is connected to the Radio Point
	Green, blinking	PoE+ power	None
	Amber, blinking	Platform Self-Test Failure	Replace Radio Point
	Red, solid	Ethernet port error	■ Connect the Ethernet cable between the Baseband Controller and Radio Point ■ Replace Radio Point

LED	Display Pattern	Indicates	Action to Take
Note: * When all of the LEDs are solid red, there is an RP hardware failure.			

RP5100r LED patterns

The Radio Point RP5100r has one LED. The following table includes the LED patterns.



Display Pattern	Indicates	Action to Take
Green, blinking	■ Not all available radio modules are in use ■ RFTx ON for all radio modules	No action required
Green, solid	■ All available radio modules are in use ■ RFTx ON for all radio modules	No action required
Red, solid	Error in the system. ■ No module connected to the BC ■ All modules have low power	Replace Radio Point
Red, blinking	No modules in use **Note:** The radio modules may be connected to the BC.	■ Check the connection between the RP and BC. ■ Check that the BC admin status is UP.
Green, fast blinking	Software upgrade	No action required

RP2000 series LED patterns

The RP2000 and RP2100 Radio Points have one LED. The LED for the RP2000 (Indoor) is on the front cover. The LED for the RP2100 (Rugged) is on the bottom of the Radio Point where the Ethernet cable port is located. The following table shows:

- Display pattern for each LED
- What the pattern indicates
- Action to take, if any, to resolve the issue

LED	Display Pattern	Indicates	Action to Take
STATUS	Green, solid	Power On RFTx state is ON	None
	Amber, solid	Self-test failure	Replace RP
	Green, blinking	Firmware upgrade Connected to Baseband Controller	None
	Amber, blinking	PLL state – unlock RFTx state – OFF or suspended L2 path verification failed Admin state – STANDBY	■ Check 1588 VLAN configuration ■ Verify RP is in STANDBY because more than 32 Radio Points are connected to the same Baseband Controller
	Red, blinking	No connection to Baseband Controller (http)	■ Connect the Ethernet cable between the Baseband Controller and Radio Point ■ Replace RP
	Red, solid	Error in system – software or hardware issues Interface issues detected AdminState – UNLOCKED	■ Connect the Ethernet cable between the Baseband Controller and Radio Point ■ Upgrade Radio Point ■ Replace Radio Point

Specifications

Overview

This appendix contains specifications for CommScope ONECELL, including FCC information and technical data.

Environmental and physical specifications

The following table lists the electrical ratings and technical data for the Baseband Controller, RP5100 series and RP2000/RP2100.

TABLE 6: Environmental and Physical specifications

Baseband Controller	
Environmental	■ Operating Temperatures: 0°C to 40°C ■ Operating Humidity 10%-90% Non-Condensing
Power Requirements	120/230 VAC,1.7/0.85 A, 50/60 Hz
Power Consumption	204W Typical / 216W Maximum
Dimensions	1 Rack Unit Chassis hosts 2 Baseband Controller module units 19" W x 1.75" H x 18.8" D (483mm W x 44.4mm H x 477mm D)
Weight	Single BC 13.1 lbs (5.9 kg) Dual BC 19.1 lbs. (8.7 kg)
RP5100i	
Environmental	Operating Temperatures: 0 to 50°C (Plenum rated: UL-2043) Operating Humidity 10%-95% Non-Condensing Operating temperatures: 0°C to 50°C Active Cooling/Fans, acoustic noise: 39.5 dBA at 25C
Power Requirements	IEEE802.3bt-type 4 PoE++
Power Consumption	Up to: 72W (26W + 11.5W per RM)
Dimensions	13.54" W x13.54 H x 3.35" D (344.0 mm W x 344.0 mm H x 85.0 mm D)
Weight	8.82 lbs (4 kg)

RP5100r	
Environmental	Operating Temperatures: 0 to 50°C (Plenum rated: UL-2043) Operating Humidity 10%-95% Non-Condensing Operating temperatures: 0°C to 50°C Active Cooling/Fans, acoustic noise: 39.5 dBA at 25C
Power Requirements	IEEE802.3bt-type4 PoE++
Power Consumption	Up to: 72W (26W + 11.5W per RM)
Dimensions	14.9" W x 12.64" H x 4.06" D (378.7 mm W x 321.1 mm H x 102.5 mm D)
Weight	21.7 lbs (9.85 kg)
RP2000	
Environmental	Operating Temperatures:0°C to 50°C (Plenum rated: UL-2043) Operating Humidity: 10%-95% Non-Condensing
Power Requirements	802.3at PoE+
Power Consumption	22W Typical / 25.5W Maximum
Dimensions	7.4" W x 9.25" H x 1.75" D (188mm W x 235mm H x 45mm D)
Weight	2.6 lbs (1.2 kg)
RP2100	
Environmental	Operating Temperatures: -40C to 60°C
Power Requirements	802.3at PoE+
Power Consumption	22W Typical / 25.5W Maximum
Dimensions	9.3" W x 9.1" H x 3.0" D (236mm W x 230mm H x 76mm D)
Weight	8 lbs (0.6 kg)

SPF/SPF+ specifications

The following table lists the SPF and SPF+ specifications required for the Baseband Controller.

1G SFP LC SX Transceiver; 220M to 1K M

1G SFP LC LX transceiver, 550M 10K M
10G SFP+ LC SR Transceiver; Multi mode 26M to 300M
SFP-10G-LR Transceiver; Single mode 10KM
10G Direct attach SFP+ cable; Twin ax Cable; 7M (must be compatible with HP and Cisco switches

Field Replaceable Units

Overview

This appendix contains instructions for replacing Baseband Controller modules and Radio Points in the ONECELL system.

Field Replaceable Units (FRUs) are modules that can be replaced on-site in case of equipment failure. On-site and off-site activities are required when replacing modules. The off-site activities are achieved by using DMS.

This appendix contains details for replacing Baseband Controller (BC) modules and Radio Points (RP).

Replacing Baseband Controller modules

The following procedure provides instructions for replacing the ONECELL Baseband Controller (BC) module in a live network environment.

This procedure is divided into four sections:

- Prerequisites (page 116)
- Off-site activities (page 117)
- On-site activities (page 121)
- Post-Install Verification (page 124)

Prerequisites

The following table contains a checklist of prerequisites for replacing a BC.

Step	Prerequisite	Completed
1	UDEF file for DMS import	
2	SSH password	
3	Replacement ONECELL BC module	
4	Laptop for Web GUI access	
5	Config.tar file containing operator information **Note:** This file should be saved on the Laptop that will be used for WebGUI access.	

Step	Prerequisite	Completed
6	License file (if applicable) **Note:** This file should be saved on the Laptop that will be used for WebGUI access.	
7	Configuration details for WebGUI commissioning **Note:** These parameters are derived from the failed unit being replaced.	
8	Ethernet cable **Note:** Required for connecting the laptop to the ONECELL Baseband Controller Management port	
9	DMS FTP IP address	

Off-site activities

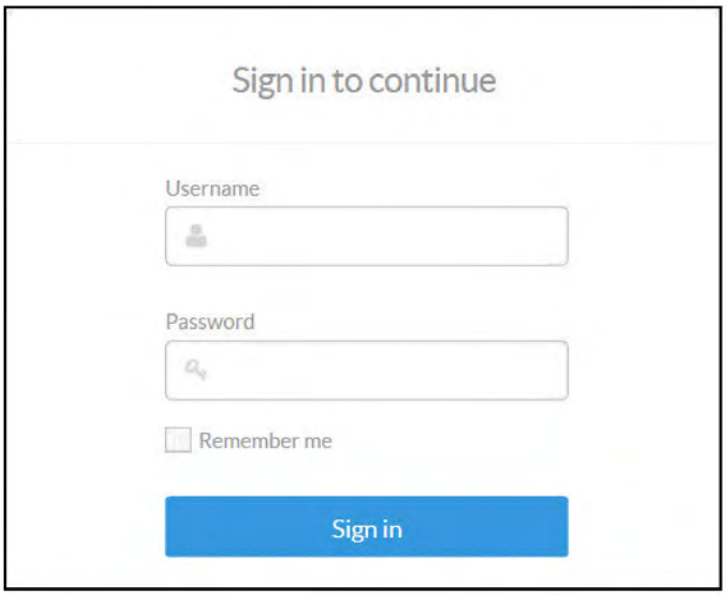
Before replacing the BC module, import a new EDF file to the DMS. This file contains the BC MAC address and HeMs password specific to the new BC.

1. Access the FTP location on DMS using ftp protocol, port 2100.
2. Upload the EDF file to /appdata/dms/import/factory.
3. Access the DMS Network console from a supported Web Browser.

   Note: The DMS GUI supports Microsoft Edge 81 and later, Google Chrome 81 and later, and Mozilla Firefox Quantum 68 and later.
4. Enter the IP address for the Network Management portal.

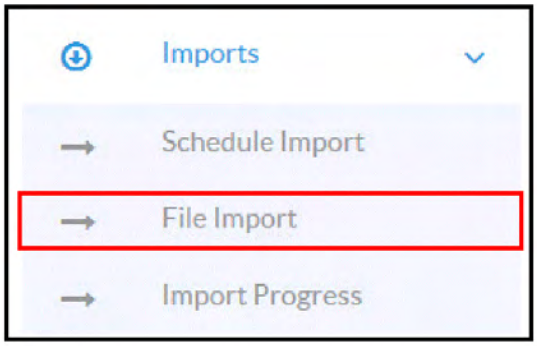
   ```
   http://<IP Address DMS server>/networkconsole
   ```

   The Sign In dialog box displays.

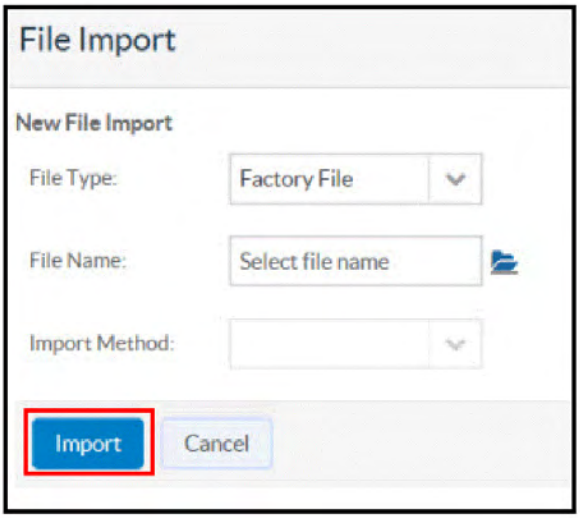


5. Enter Username and Password. The Search Device screen displays.
6. Enter the device Mac ID.

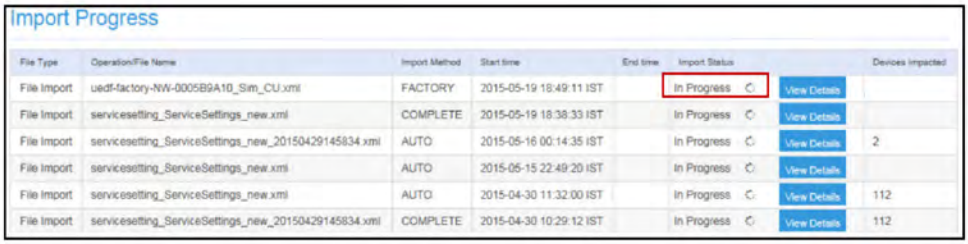
   The Network Management Portal opens.
7. Select Import tab located in the left margin of the Device console.
8. Select File Import.



9. Browse and select the desired import file. The EDF file format is xml.

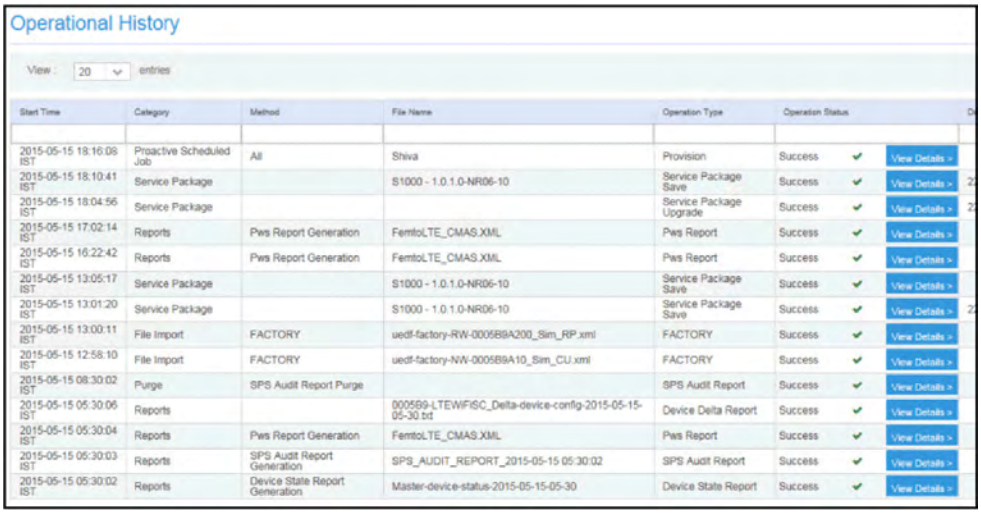


10. Click **Import**.
11. Click **Import Progress**. Wait for the import to be completed.

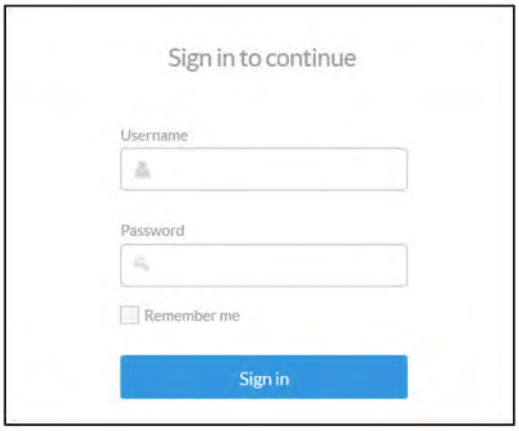


12. Click the Operational History icon in the upper right corner of the page.

The Operational History page displays. Check that the file import was successful.

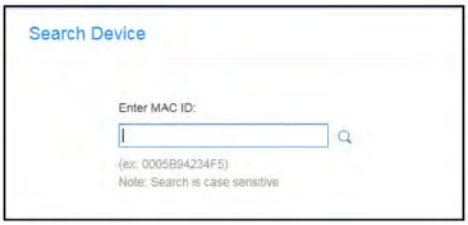


13. Login to the Device console.



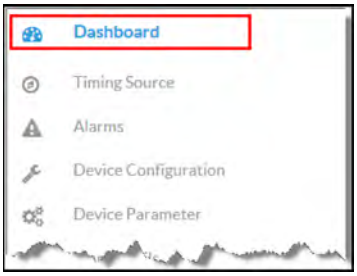
14. Enter the MAC ID of the replacement Baseband Controller.

Note: Your CommScope service engineer will provide the new BC MAC ID.

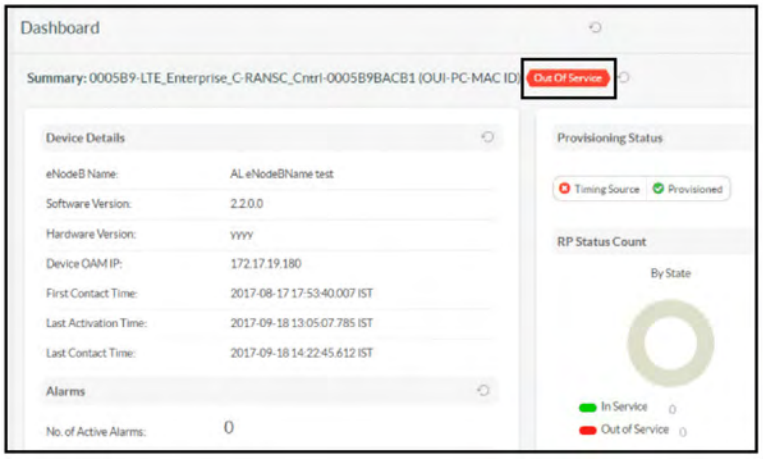


15. Select the Device configuration tab on the left margin.

16. Configure the same parameters from the BC being replaced.
17. Select the Dashboard menu item.



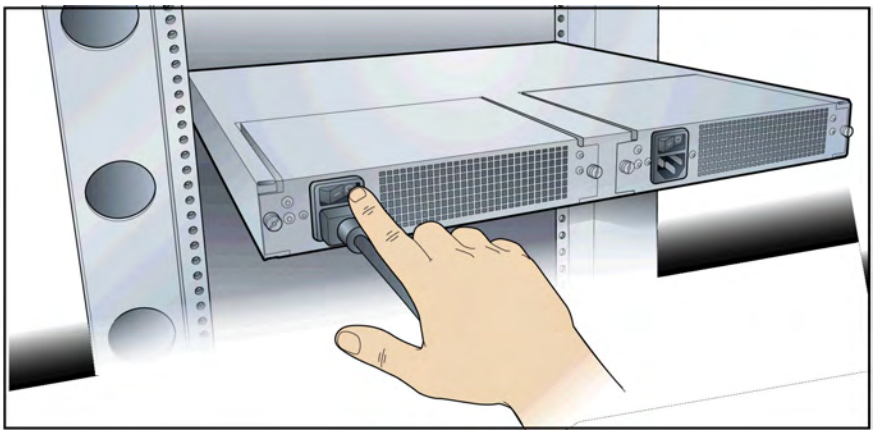
The Controller will display "Out of Service" until the On-site installation is completed.



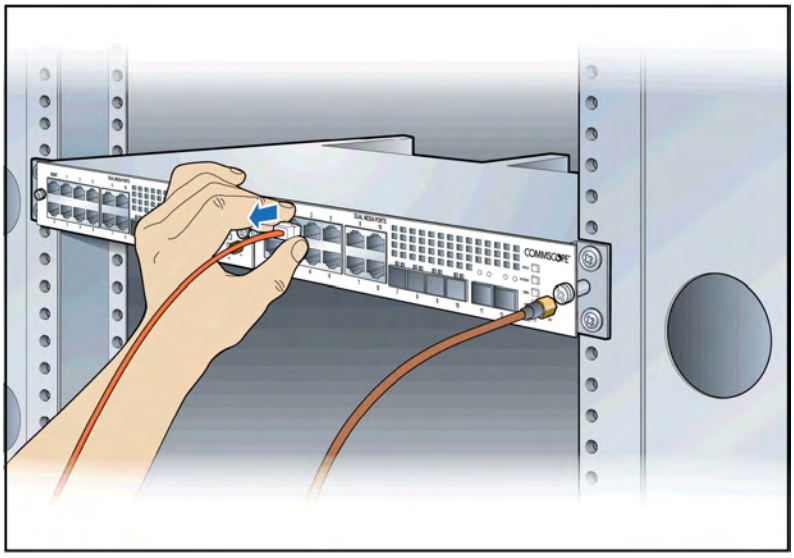
On-site activities

After the off-site activities are complete, you are ready to replace the BC module on-site.

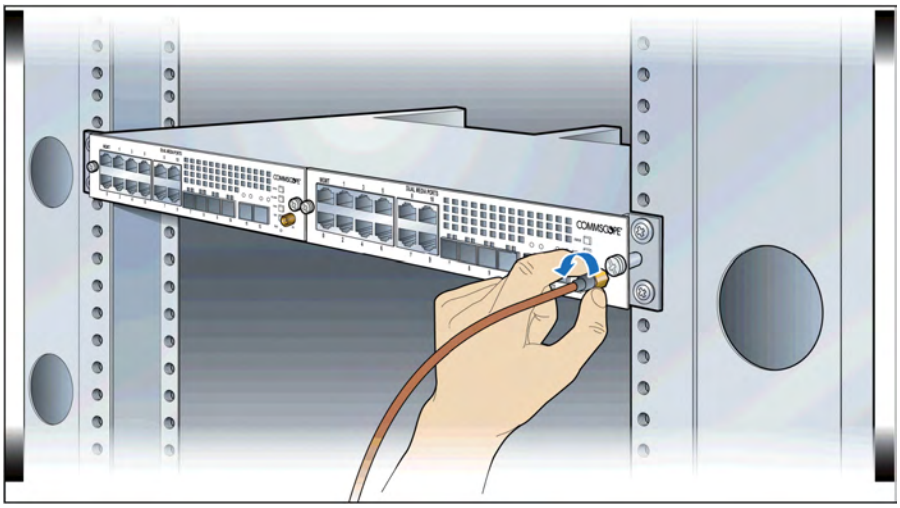
1. Power off the ONECELL Baseband Controller.



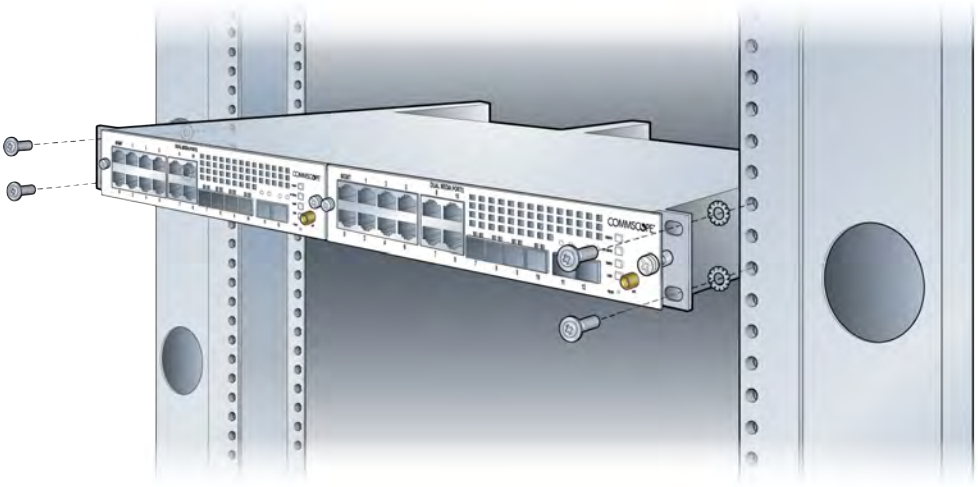
2. Make a note of the existing cables connected to the failed ONECELL BC.
3. Label the cables identifying the port locations on the BC. Disconnect the cables.



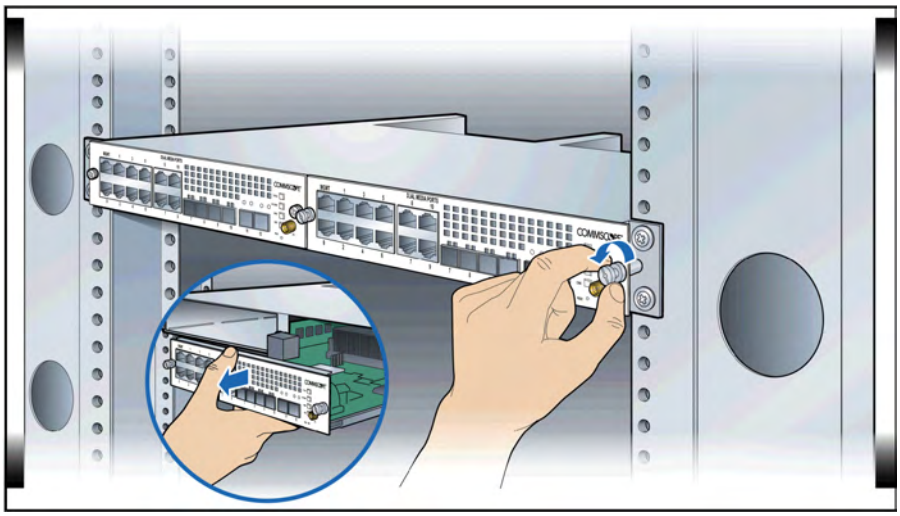
4. Remove the GPS antenna cable from the BC (if applicable).



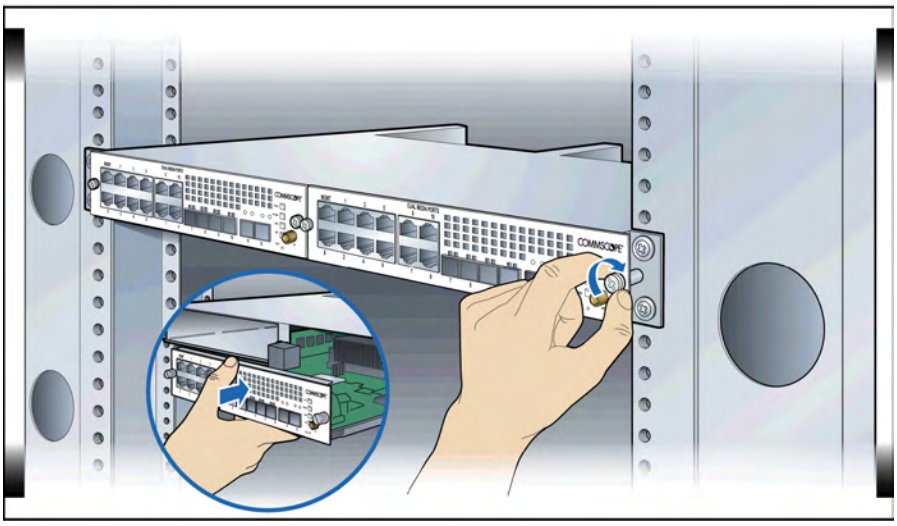
5. If star washers (#12) are not installed between the BC and the rack, remove the BC and in stall the washers. If they are installed, skip this step.



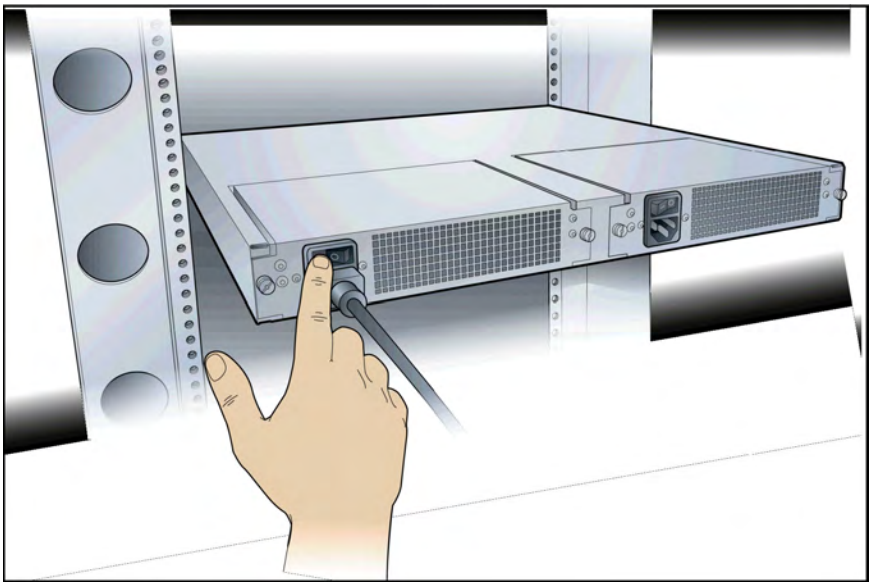
6. Turn the mounting screws on the BC front panel counterclockwise to loosen them and remove the BC module.



7. Insert the new BC module into the chassis and tighten the mounting screws.



8. Re-connect the cables as noted in step 3
9. Power on the controller.



10. Configure the BC.

Post-Install Verification

On-site

The operational state of the ONECELL system can be determined by the LED status on the BC's front panel. Additional information can be attained from the WebGUI status screens.

Off-site

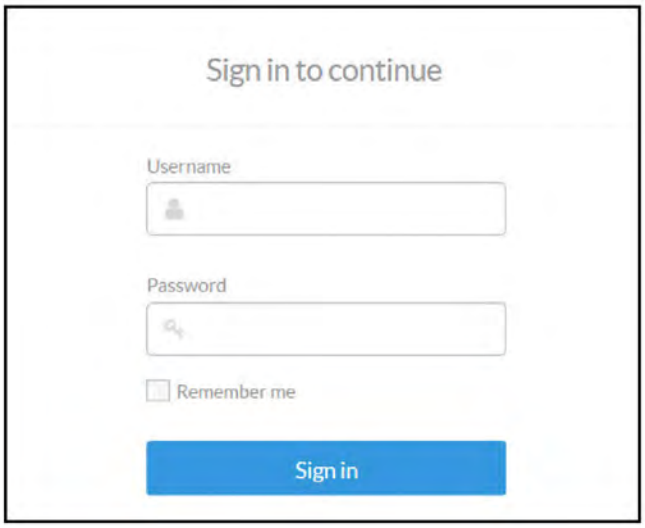
1. Open a supported Web browser.

Note: The DMS GUI supports Microsoft Edge 81 and later, Google Chrome 81 and later, and Mozilla Firefox Quantum 68 and later.

2. Enter the IP address for the Device Management portal.

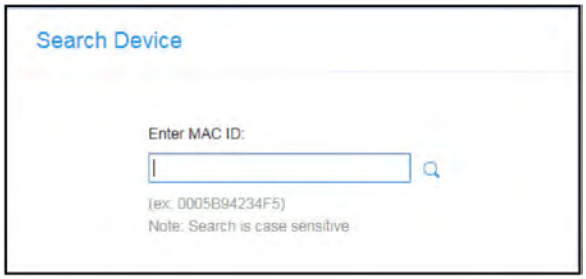
```
http://<IP Address DMS server>/deviceconsole
```

The Sign In dialog box displays.



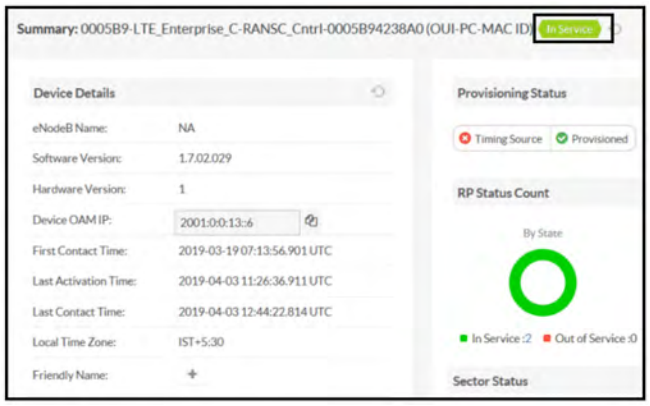
3. Enter Username and Password.

The Search Device screen displays.



4. Enter the MAC ID of the new BC.

The BC Dashboard displays. The Summary at the top of the page should show “Ready.”



Note: Provision the remaining Device configurations to align with the failed BC configuration on the DMS Device Configuration page.

5. Scroll to the bottom of the page to view the Device PnP status.

   If all of the PnP boxes have green checks, the BC replacement is successful. Stop here.

   If one or more of the PnP boxes are red, those activities failed. Go to the Device PnP page to identify the failed activity.

Replacing Radio Points prerequisites and on-site activities

Prepare the network for the Radio Point replacement.

- Prerequisites (page 126)
- On-site activities (page 126)

Prerequisites

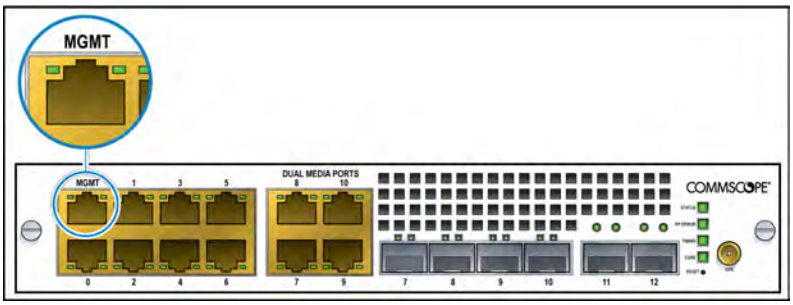
The following table contains a checklist of prerequisites for replacing an RP.

Sl no	Prerequisite
1	SSH password
2	Replacement ONECELL RP module
3	Laptop for Web GUI access
4	Ethernet cable **Note:** Required for connecting the laptop to the ONECELL Baseband Controller Management port

On-site activities

Before replacing the RP, delete the RP from the system using the WebGUI.

1. Connect the Ethernet cable to the MGMT port on the BC's front panel.



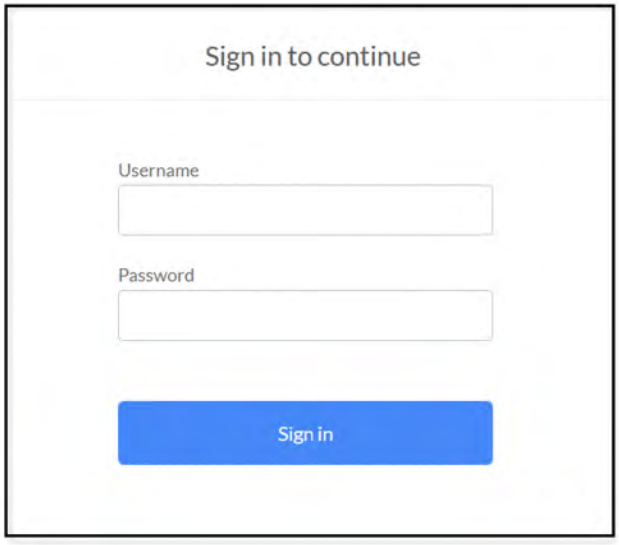
2. Open a supported browser.
3. Enter the IP address for the GUI, using the format below.

```
https://<IP address of Management Interface>:6002
```

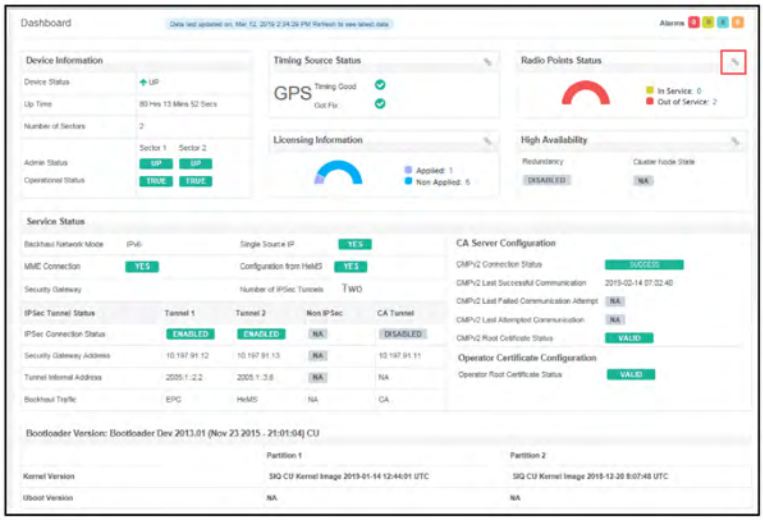
Example:

```
https://192.168.8.1:6002
```

The Sign In dialog box appears.

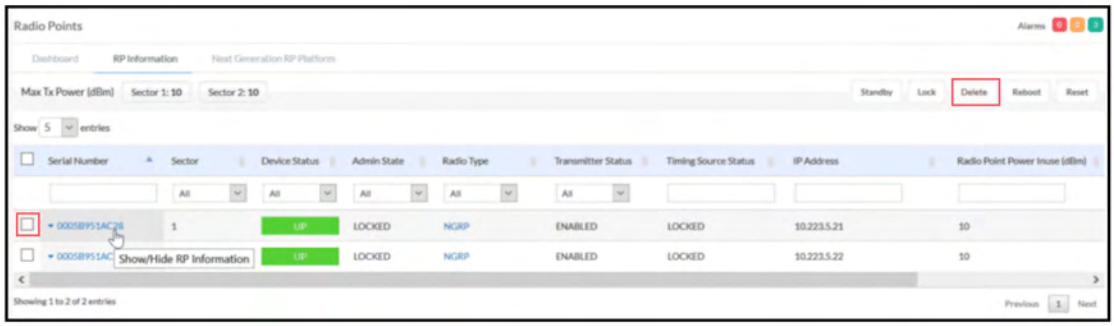


The Dashboard displays.



4. On the Dashboard, click the Radio Points link. The Radio Points Dashboard displays.

5. Click the RP Information tab.



6. If one of the Radio Points is Down, select that RP by checking the box next to it.
7. Click **Delete**.
8. Check the Radio Point Information table to ensure the RP is deleted.

Replacing RP5200i Radio Points

The following procedures provide instructions for replacing a ONECELL RP5200i radio point.

- Ceiling Mount

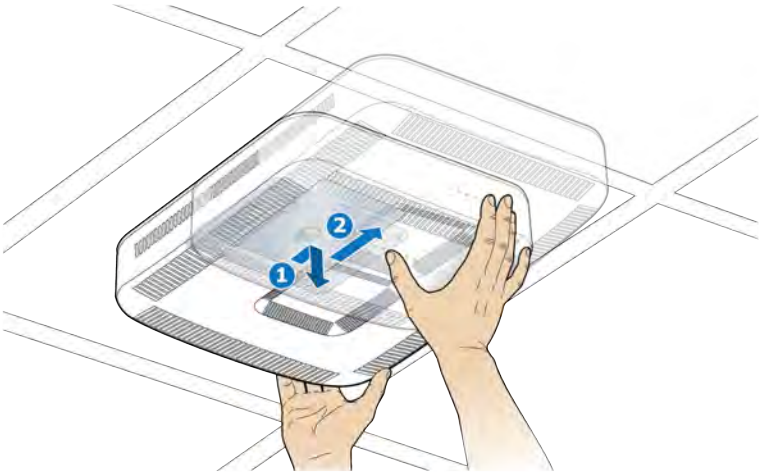
- Wall mount
- Flown mount
- Pole mount

Ceiling Mount

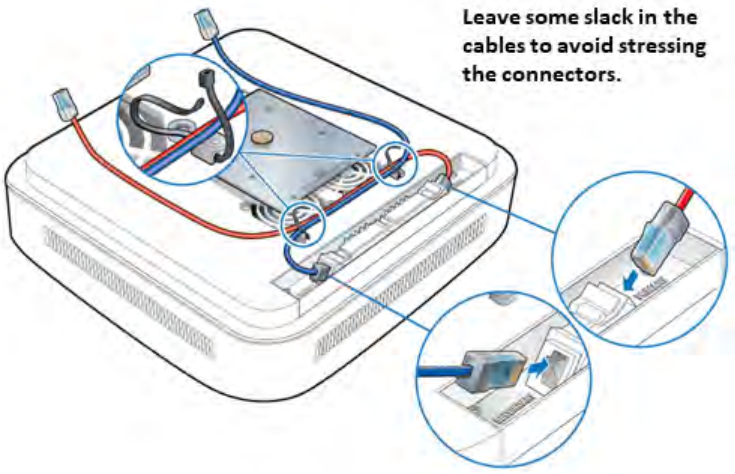
CAUTION: Disconnect the Ethernet cable(s) on the RP to remove the power. Failure to do so will cause damage to the RP.

1. Remove the ceiling that is adjacent to the RP.
2. Remove the RP from the ceiling. Slide the RP in the direction of the LEDs.

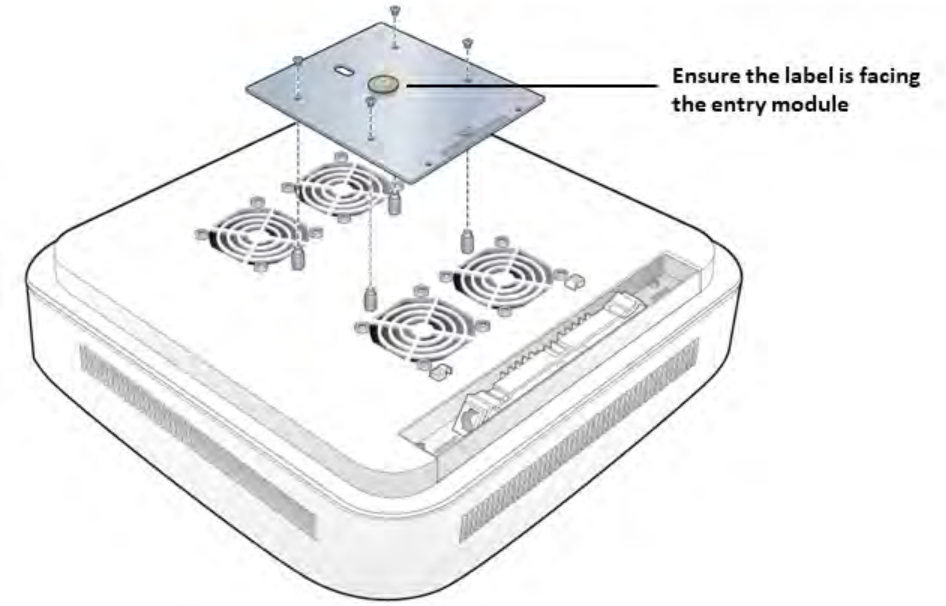
   When the RP reaches the end of the key, tilt down to remove.



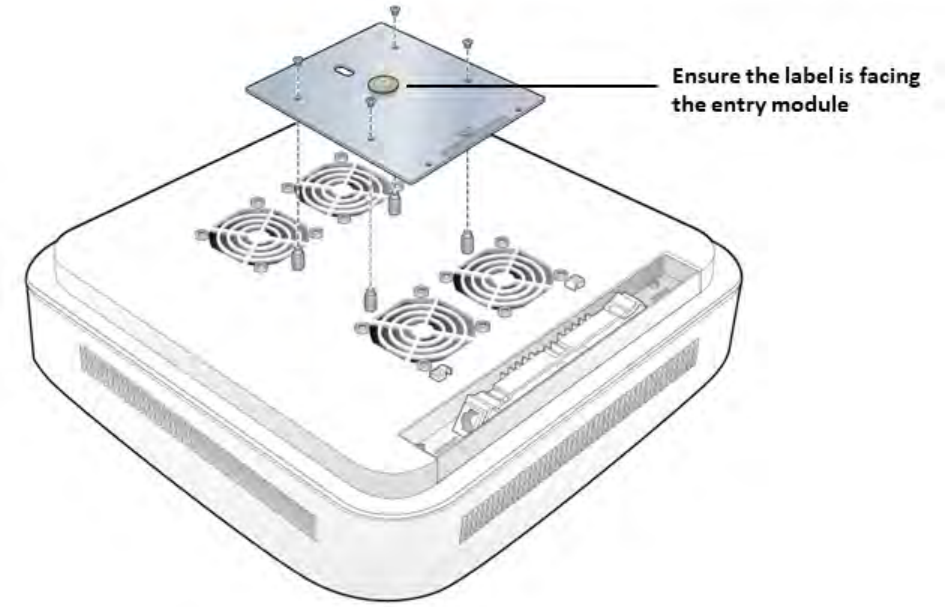
3. Disconnect the Ethernet cables on the RP.



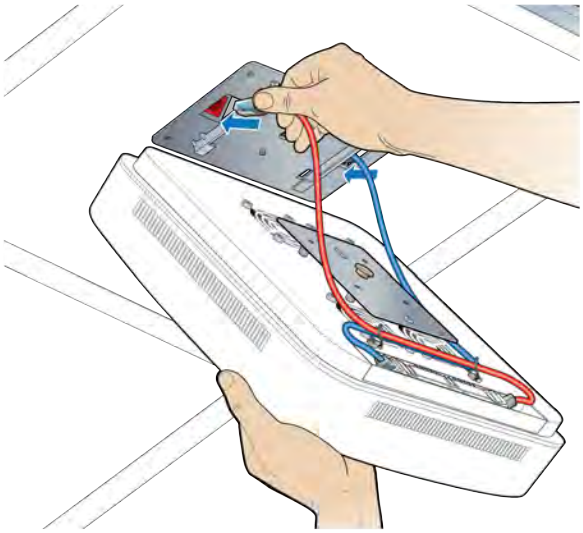
4. Remove the RP plate from the RP5200i. Set RP5200i aside.
5. Attach the RP plate to the replacement RP5200i.



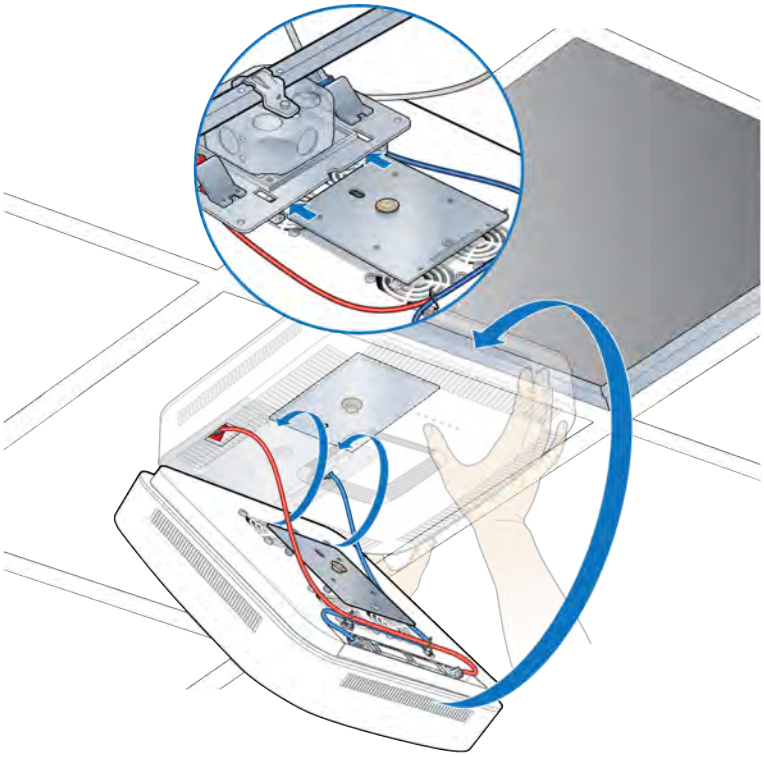
6. Connect the Red and Blue Ethernet cables to the RP as shown below.



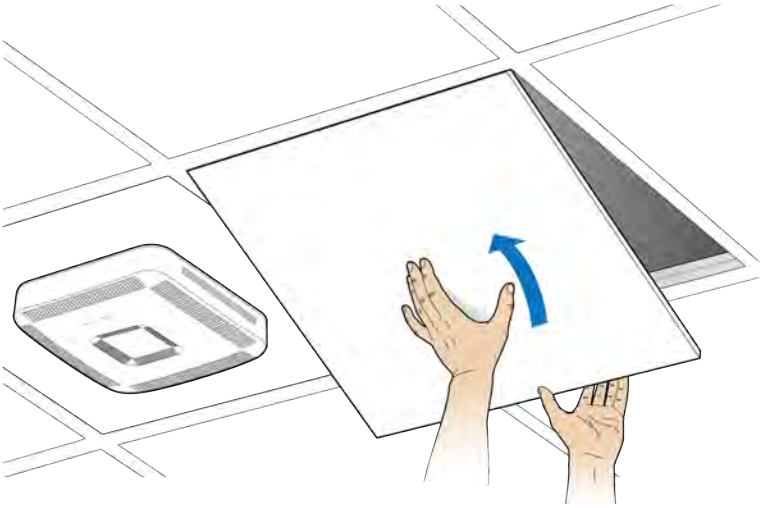
7. Connect the Blue and Red Ethernet cables from the RP to the connectors on the ceiling plate.



8. Attach the RP to the octagon plate.
   a. Align the keyhole opening on the octagon mounting plate with the button on the RP mounting plate.
   b. Insert the RP into the octagon box mounting plate slot and slide until the RP plate meets the tabs on the octagon box plate.
   c. Lift the RP vertically and slide it into the locked position.



9. Replace the ceiling tile next to the Radio Point.

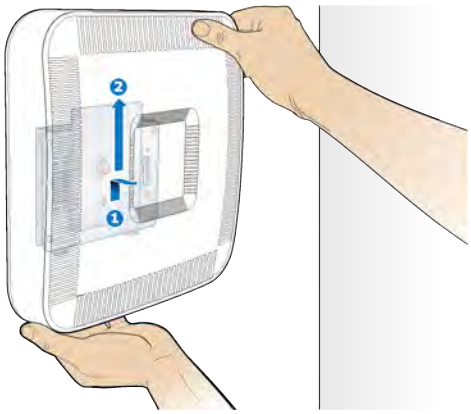


10. Verify the RP5200i installation. The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens. See Post-Install Verification (page 124).

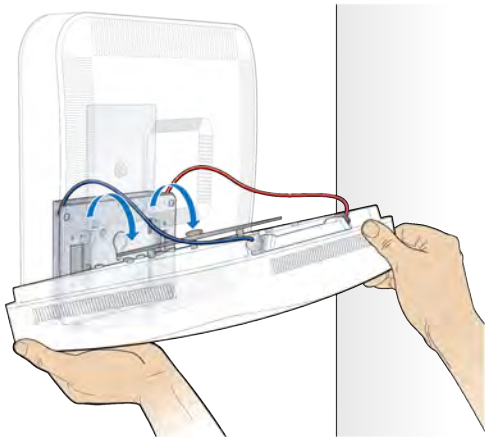
Wall mount

CAUTION: Disconnect the Ethernet cable(s) on the RP to remove the power. Failure to do so will cause damage to the RP.

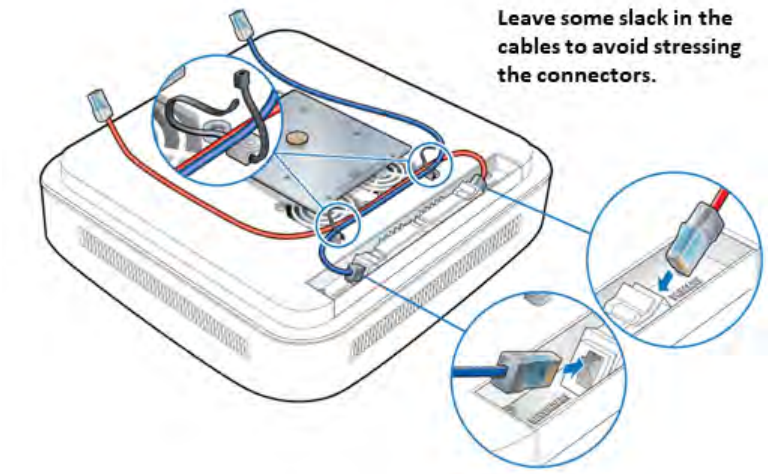
1. Gently pull the RP away from the wall and lift upward.



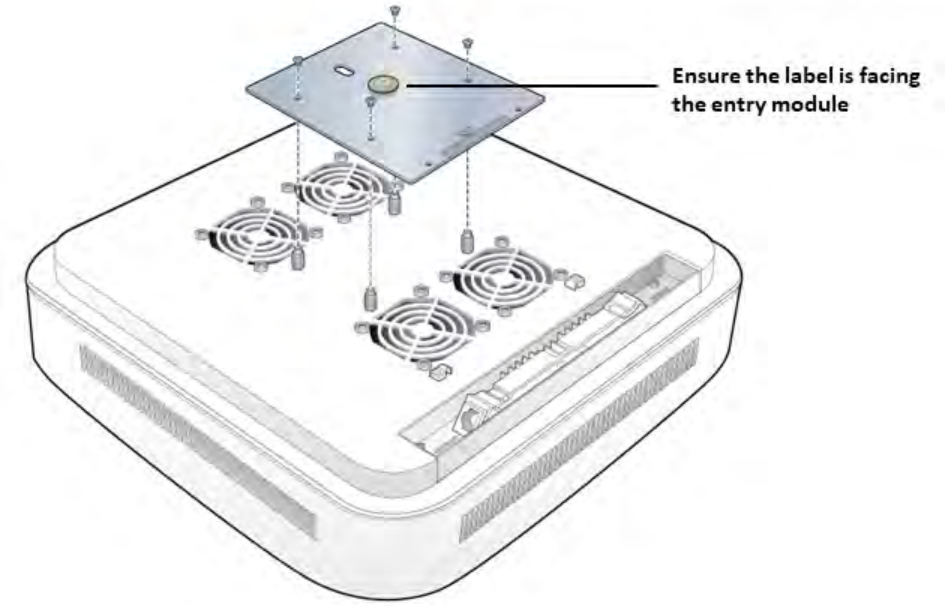
2. When the button on the RP plate is disengaged from the wall plate, tilt the RP downward.



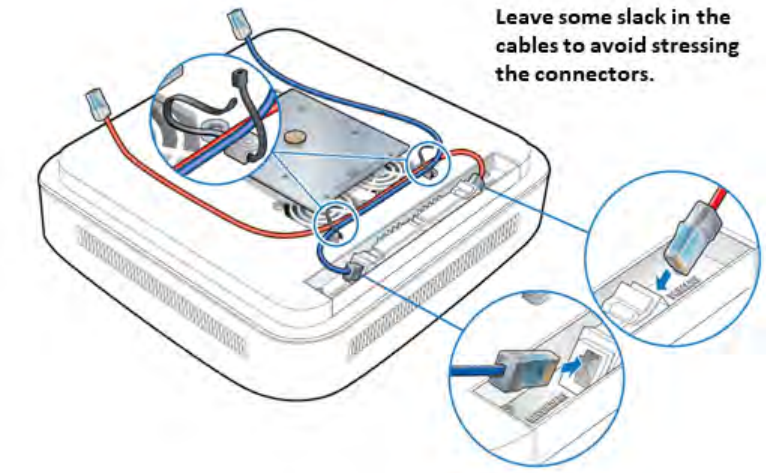
3. Disconnect the Red and Blue cables from the RP.



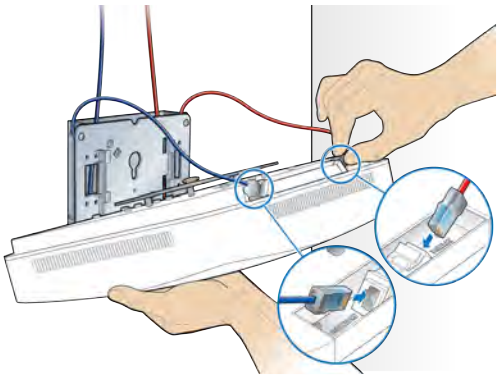
4. Remove the RP plate and set the RP, plate and screws aside.
5. Attach the RP plate to the replacement RP.



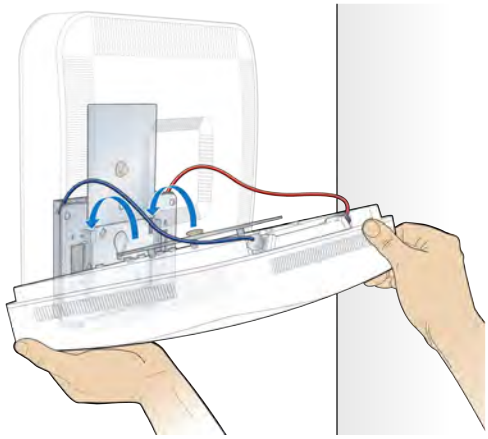
6. Connect the Red Primary and Blue Secondary Ethernet cables to the RP corresponding ports, as shown below.

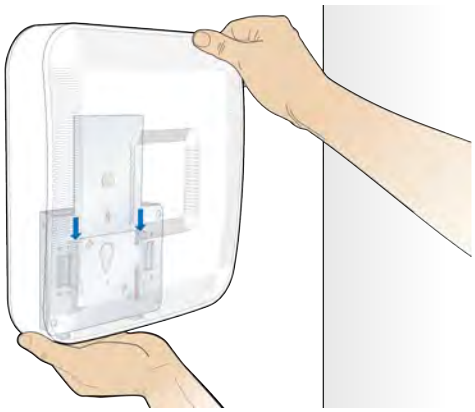


7. Lift the RP near the wall plate and attach the Red and Blue cables to the corresponding Red and Blue ports.

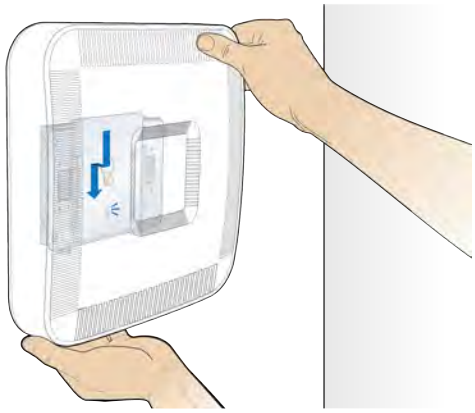


8. Attach the RP to the mounting plate.
   a. Align the keyhole opening on the mounting plate with the button on the RP mounting plate.
   b. Insert the RP into the mounting plate slot and slide until the RP plate meets the tabs on the octagon box plate.





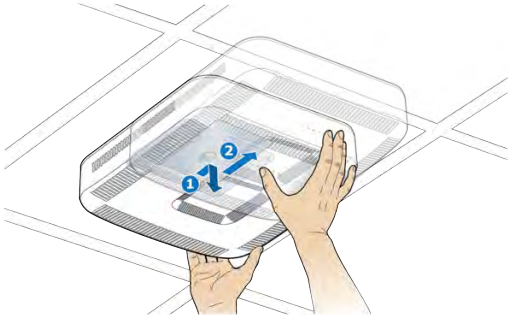
9. Gently slide the RP downward ad lock it into place.



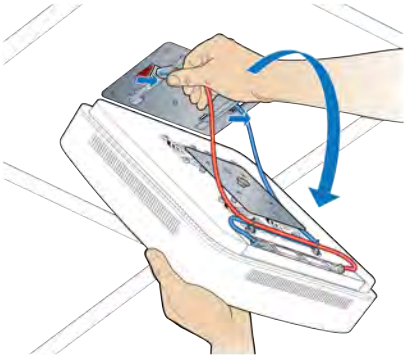
10. Verify the RP5200i installation. The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens. See Post-Install Verification (page 124).

Flown mount

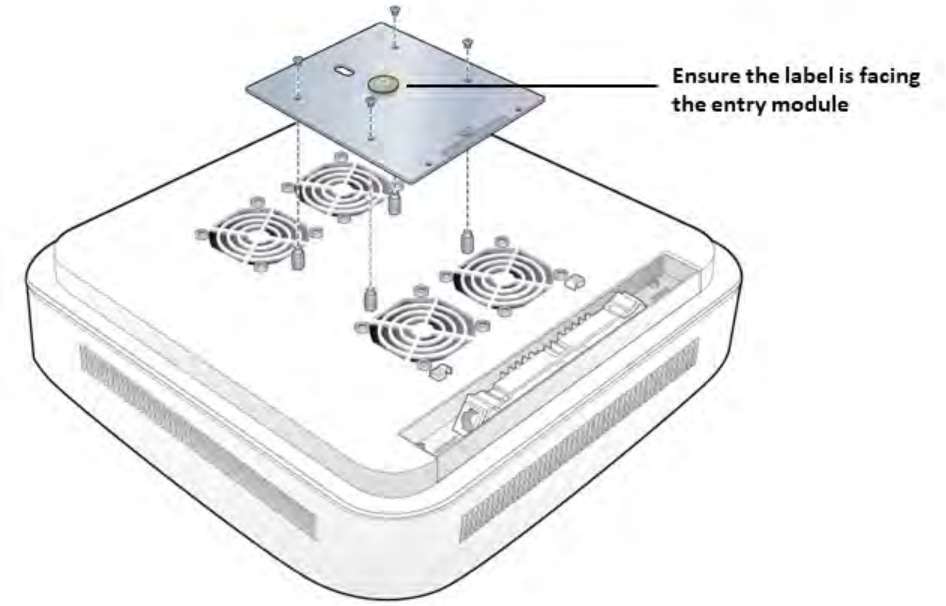
1. Remove the RP. Pull downward gently and push in the direction of the LEDs.



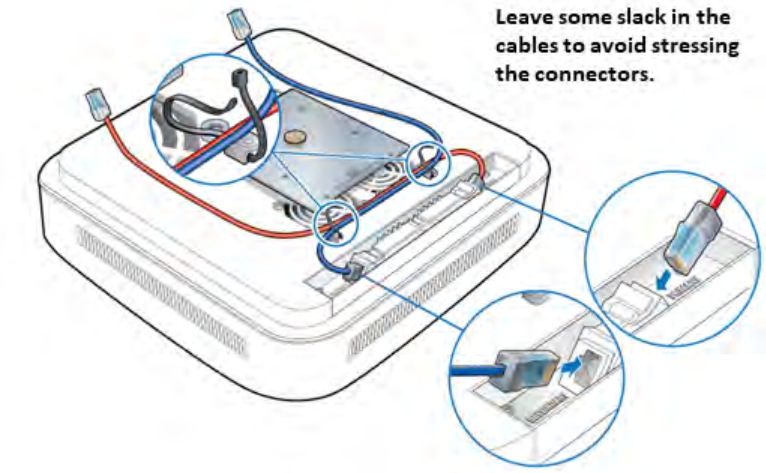
2. Disconnect the Red and Blue cables from the RJ45 jacks.



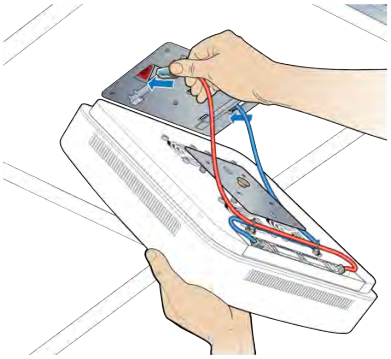
3. Remove the RP plate from the failed RP. Set the RP, plate and screws aside.
4. Attach the RP plate to the replacement RP.



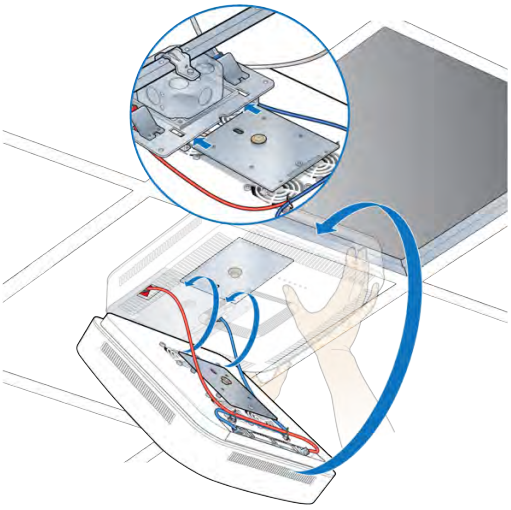
5. Connect the Red Primary and Blue Secondary Ethernet cables to the RP corresponding ports, as shown below.



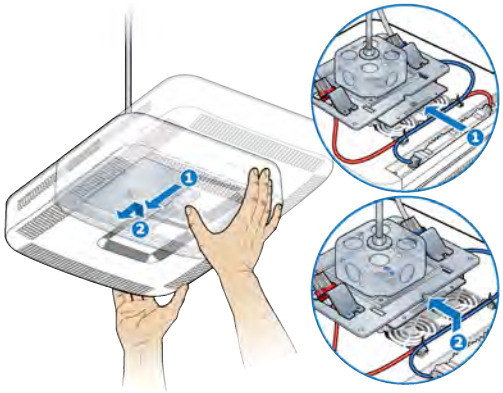
6. Lift the RP and insert the Red and Blue RP cables into the Red and Blue RJ45 jacks, respectively.



7. Attach the RP to the mounting plate.
   a. Align the keyhole opening on the mounting plate with the button on the RP mounting plate.
   b. Insert the RP into the mounting plate slot and slide until the RP plate meets the tabs on the octagon box plate.



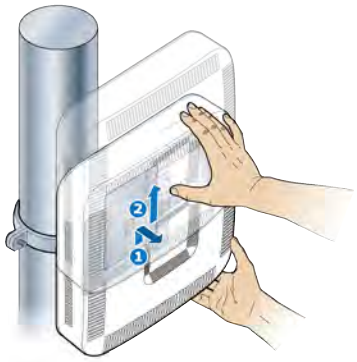
8. Lift the RP vertically and slide it into the locked position.



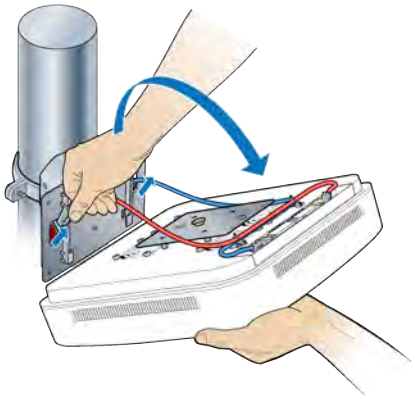
9. Verify the RF module installation. The operational state of the RF module can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens. See Post-Install Verification (page 124).

Pole mount

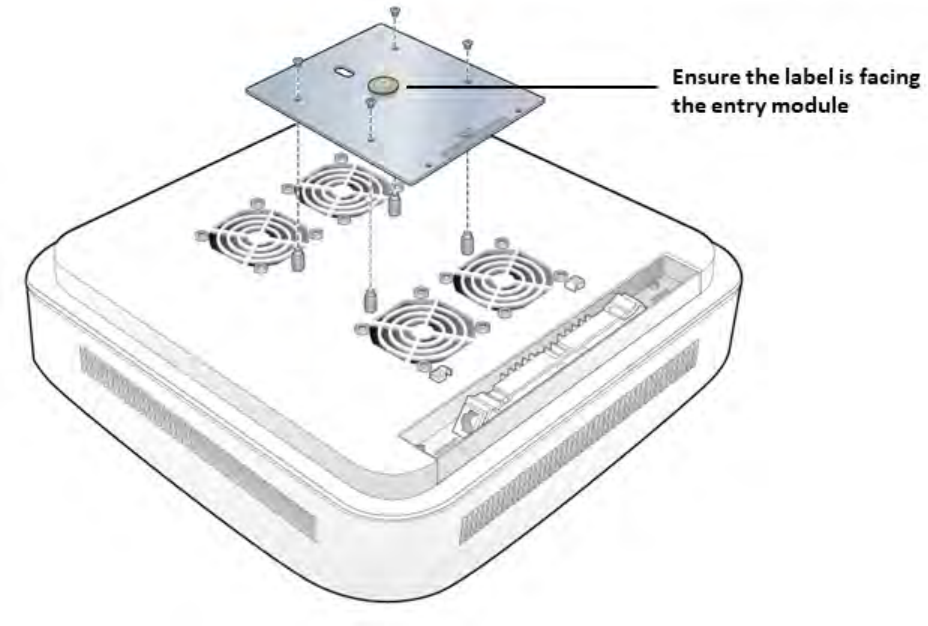
1. Gently pull the RP forward and slide it upward.



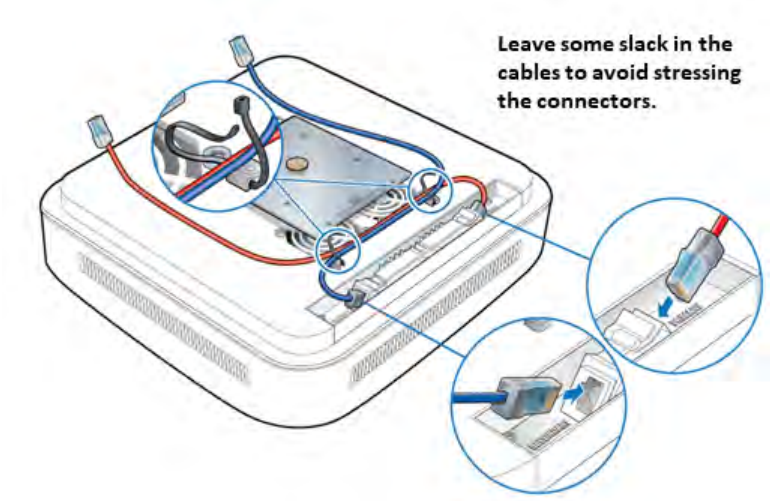
2. Tilt the RP forward and disconnect the cables from the RJ45 jacks. Set the RP aside.



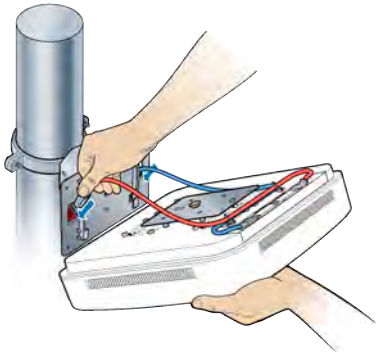
3. Attach the plate to the RP.



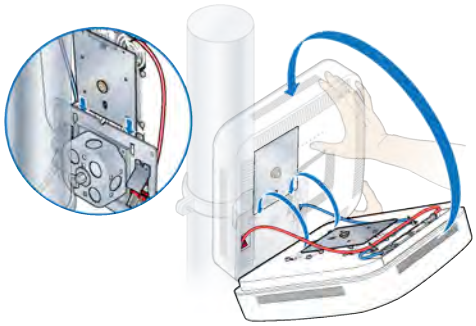
4. Connect the Red Primary and Blue Secondary cables to the corresponding ports on the RP.



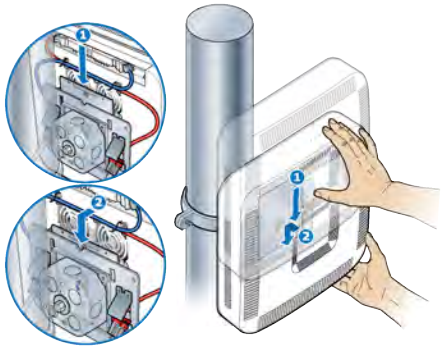
5. Lift the RP to the pole plate and connect the Red Primary and Blue Secondary cables to the corresponding connectors on the plate.



6. Lift the RP and gently slide it onto the pole mounting plate.



7. Slide the RP down and lock into place.



8. Verify the RF module installation. The operational state of the RF module can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens. See Post-Install Verification (page 124).

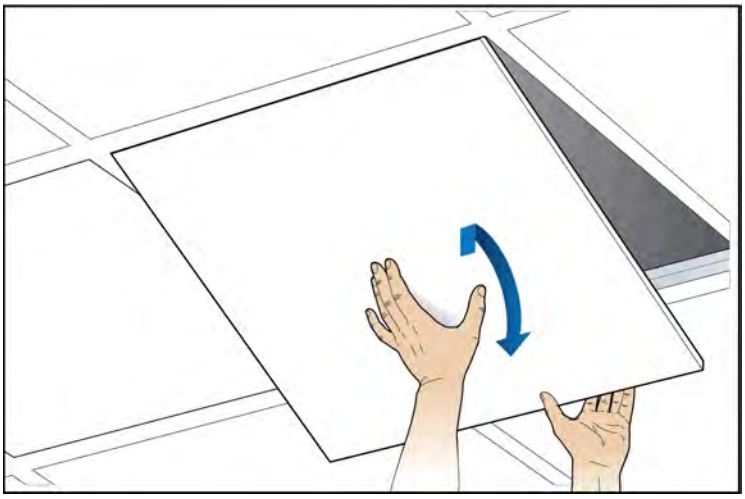
Replacing RP5100 series Radio Points

The following procedures provide instructions for replacing a ONECELL Radio Point (RP) module in a live network environment.

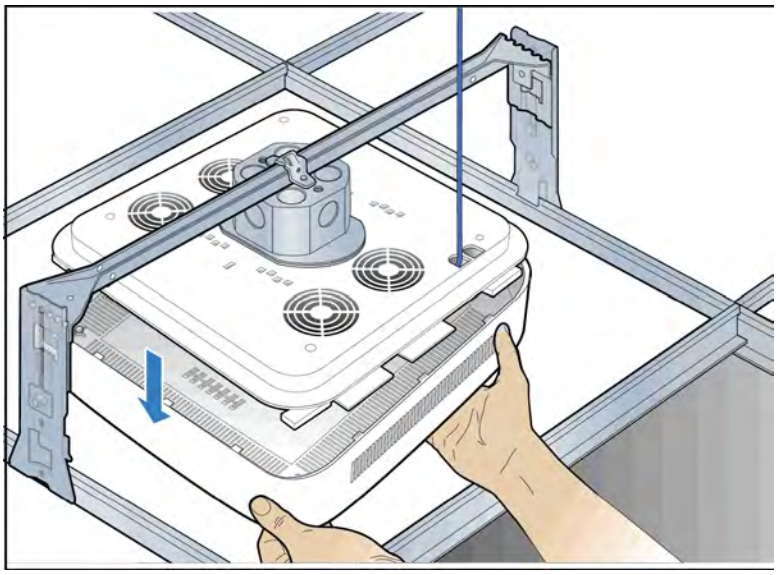
- Replacing a ceiling RP5100i (above tile) (page 141)
- Replacing a flown mounted RP5100i (page 149)
- Replacing a pole mounted RP5100i (page 155)
- RP post-replacement verification (page 185)

Replacing a ceiling RP5100i (above tile)

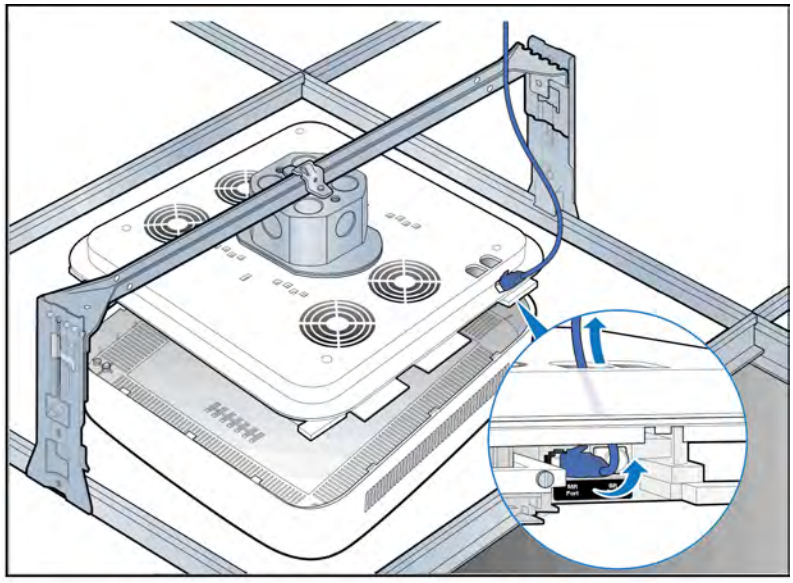
1. Remove the ceiling tile next to the mounted RP to allow access to the mounting hardware and Ethernet cable.



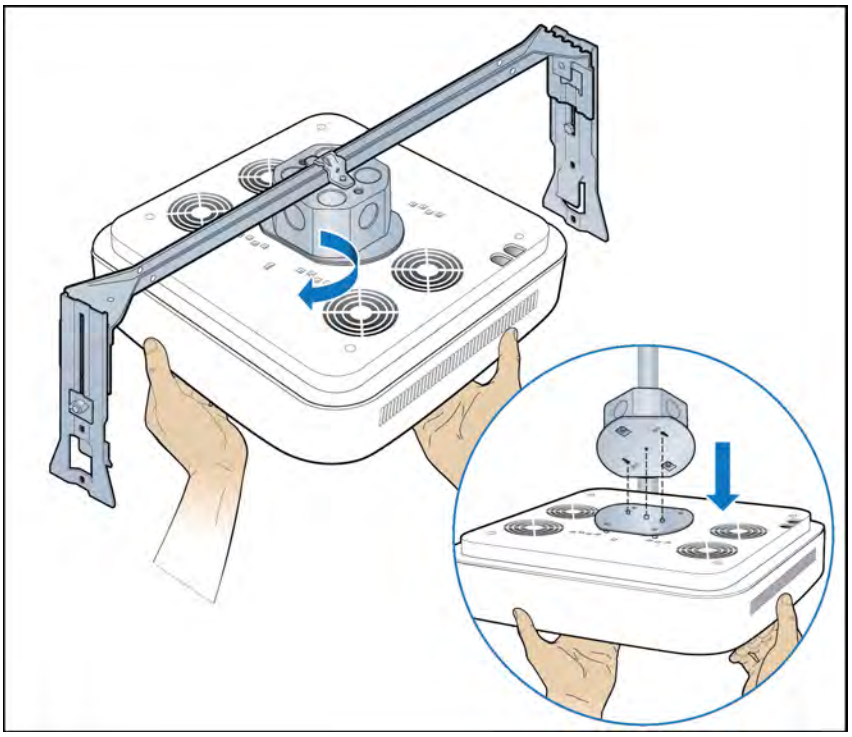
2. Remove the RP cover.



3. Disconnect the Ethernet cable.

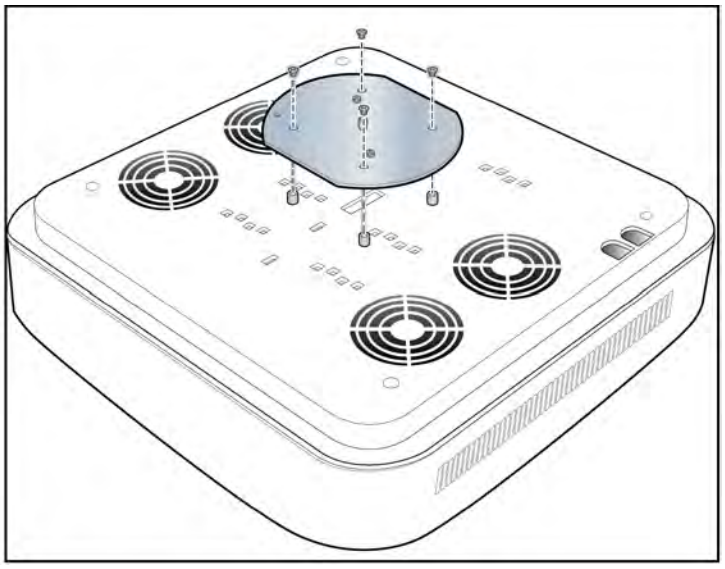


4. Replace the cover and twist the RP clockwise to remove it. Set the failed RP aside.

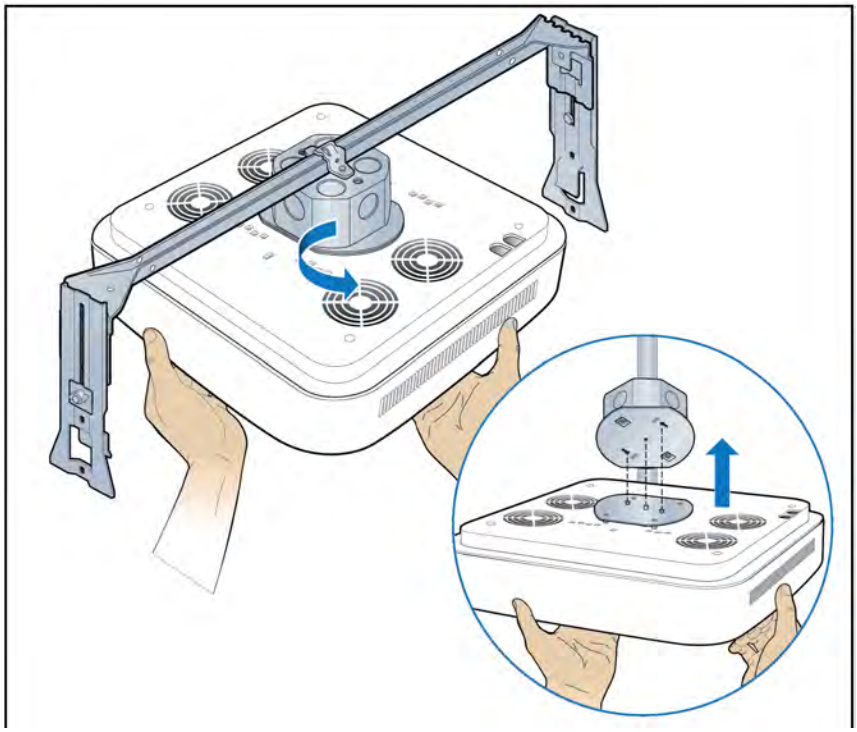


5. Attach the mounting plate to the replacement RP.

Note: Apply thread locking compound to the screws prior to installation.

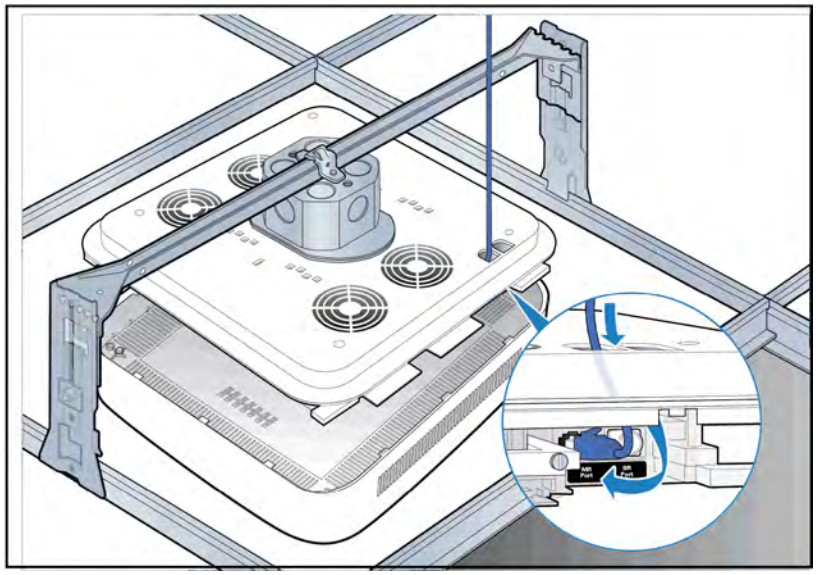


6. Attach the RP to the octagonal mounting plate and twist to engage.

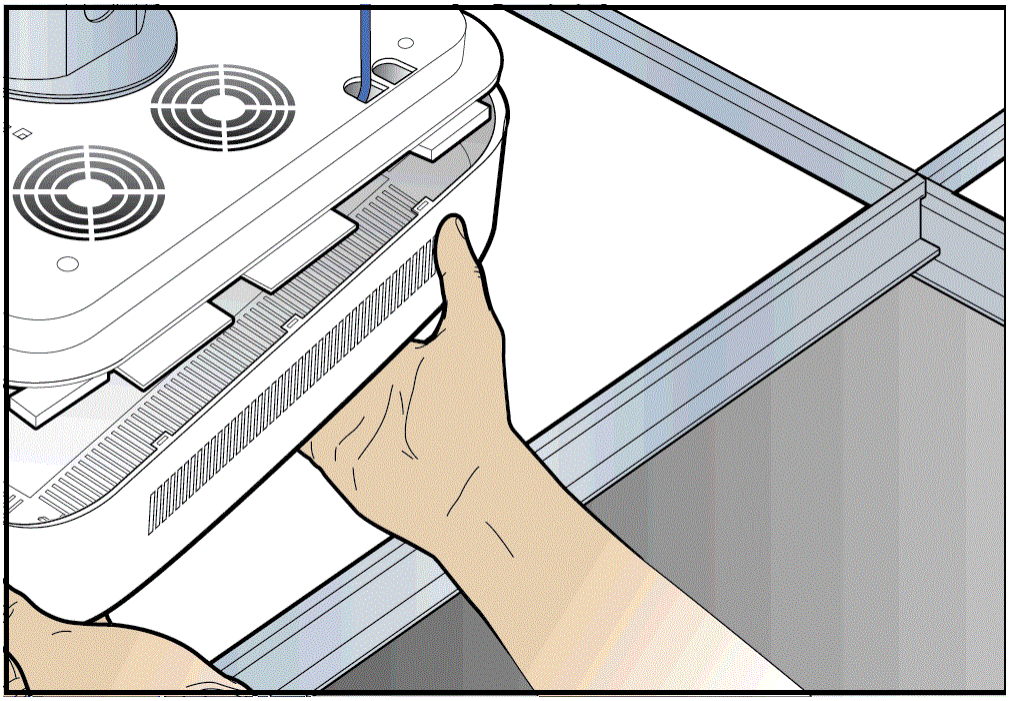


7. Remove the cover and connect the Ethernet cable to the MR port.

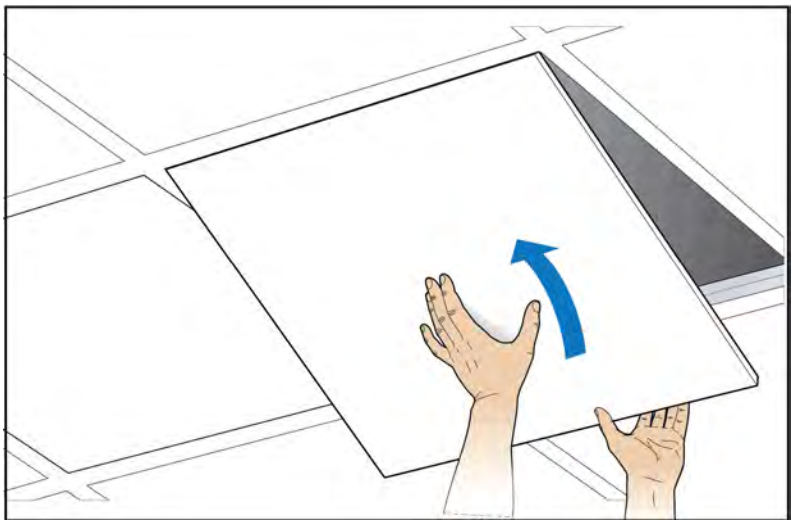
Note: The cover is attached to the RP with two lanyards.



8. Attach the plastic cover to the RP



9. Replace the ceiling tile.



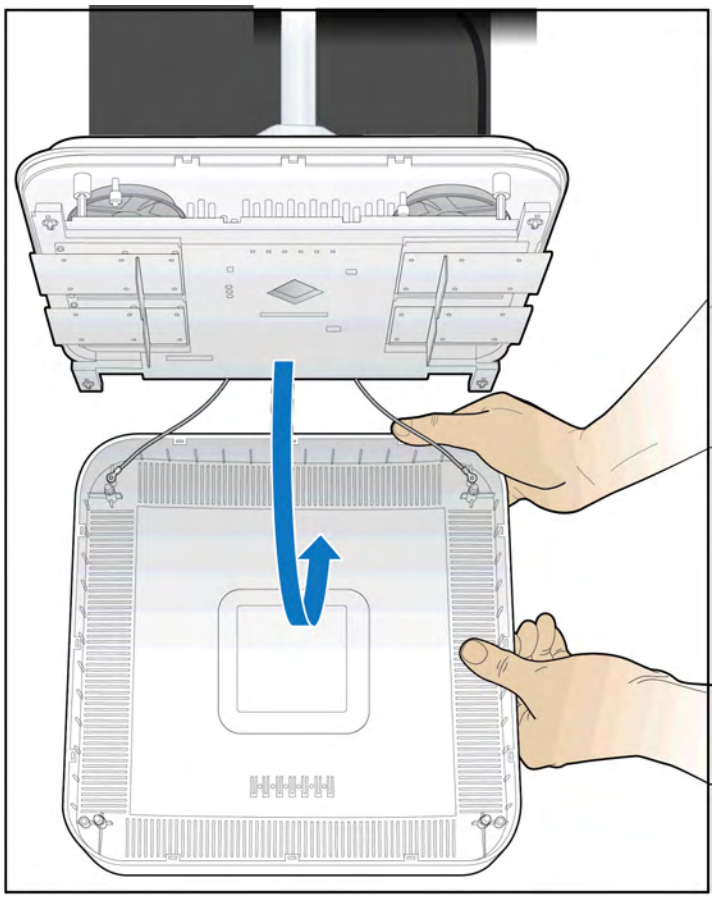
10. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

    For verification procedures, see RP post-replacement verification.

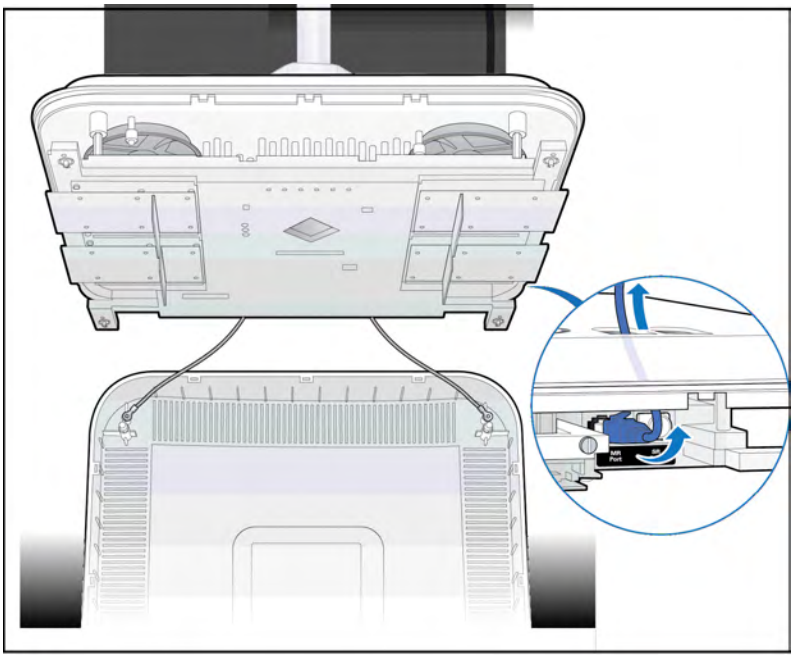
Replacing a ceiling Indoor RP (on tile)

1. Remove the RP cover.

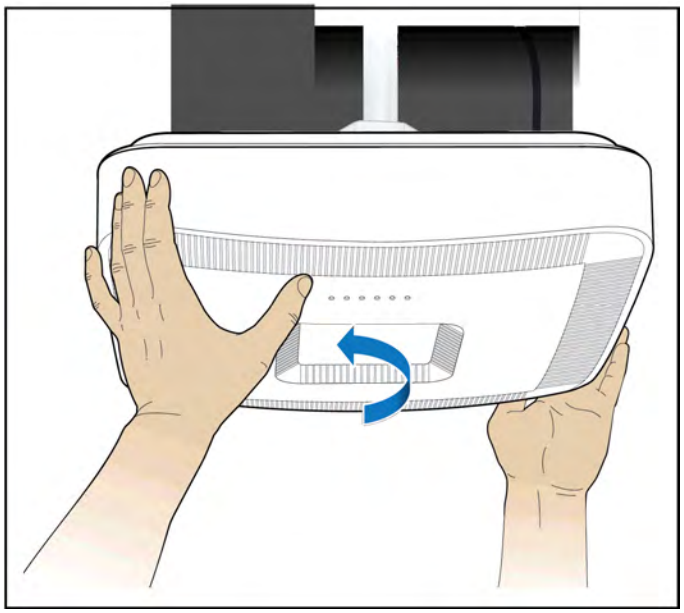
Note: The cover is attached to the RP with two lanyards.



2. Disconnect the Ethernet cable from the RP.

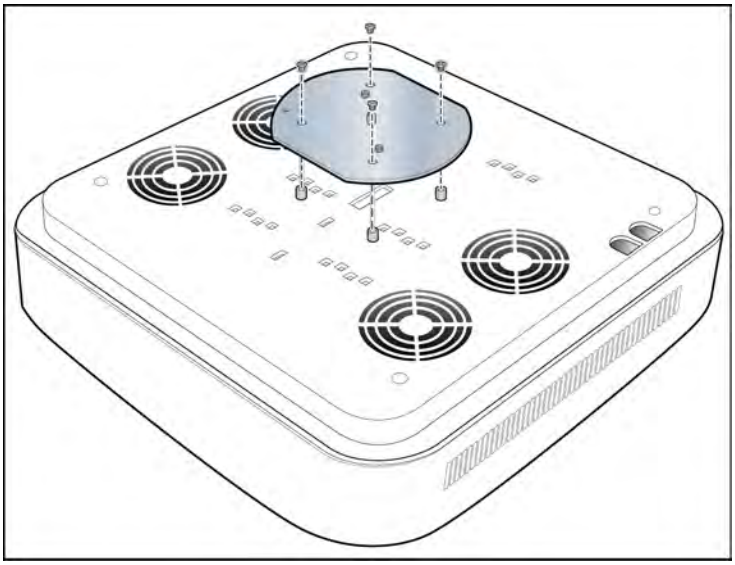


3. Replace the cover and twist the RP clockwise and remove the failed RP.

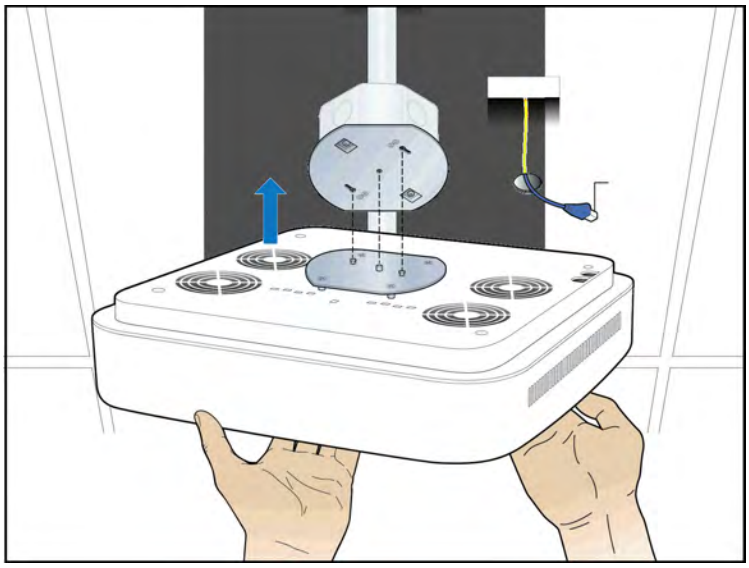


4. Attach the plate to the replacement RP.

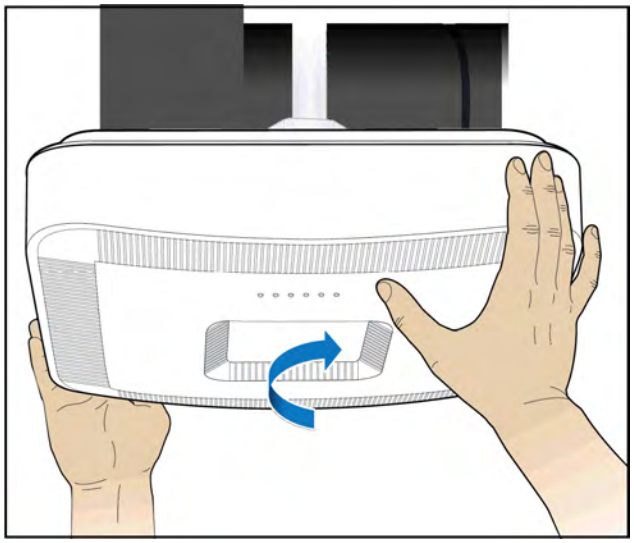
Note: Apply thread locking compound to the screws prior to installation.



5. Attach the RP to the octagonal mounting plate.

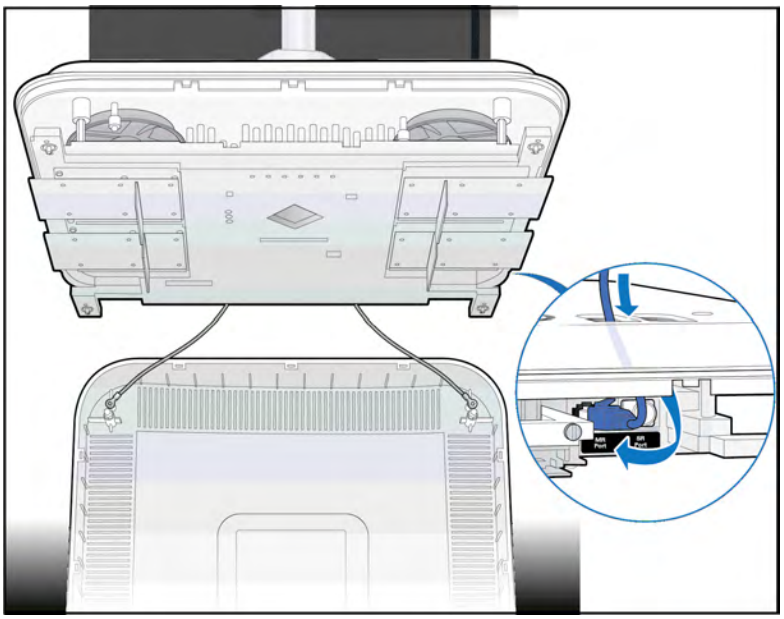


6. Secure the RP to the plate by twisting the RP counterclockwise.

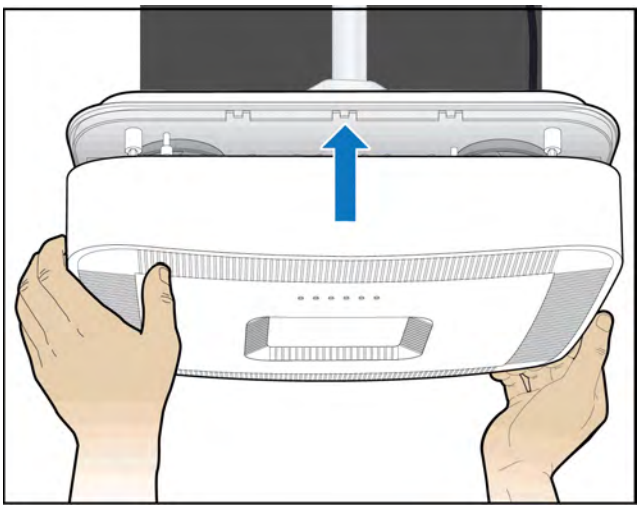


7. Remove the cover and connect the Ethernet cable to the MR port.

Note: The cover is attached to the RP with two lanyards.



8. Attach the plastic cover to the Radio Point.



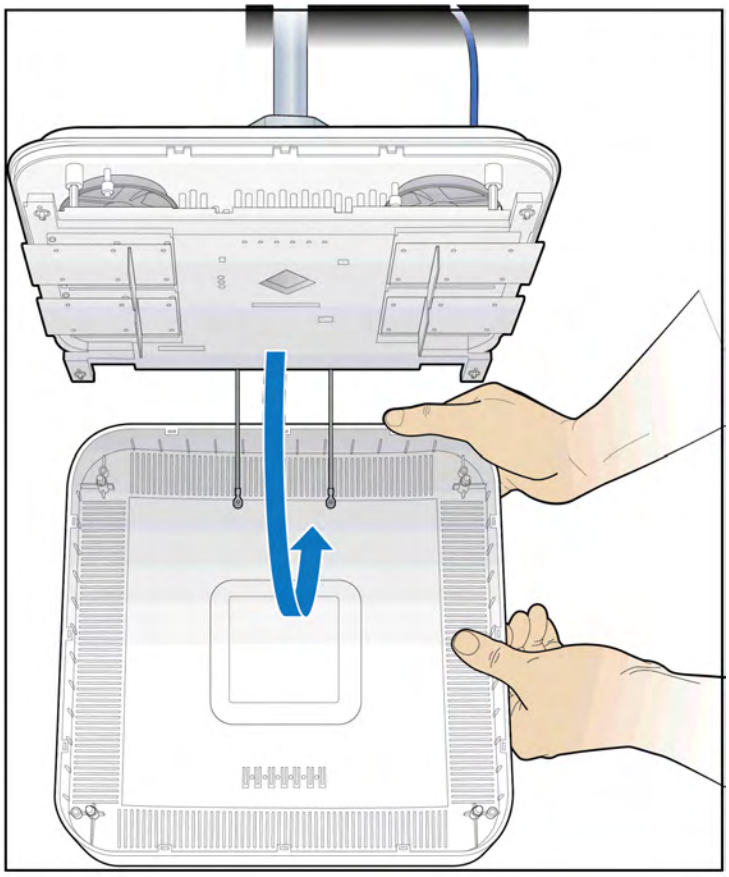
9. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

   For verification procedures, see RP post-replacement verification

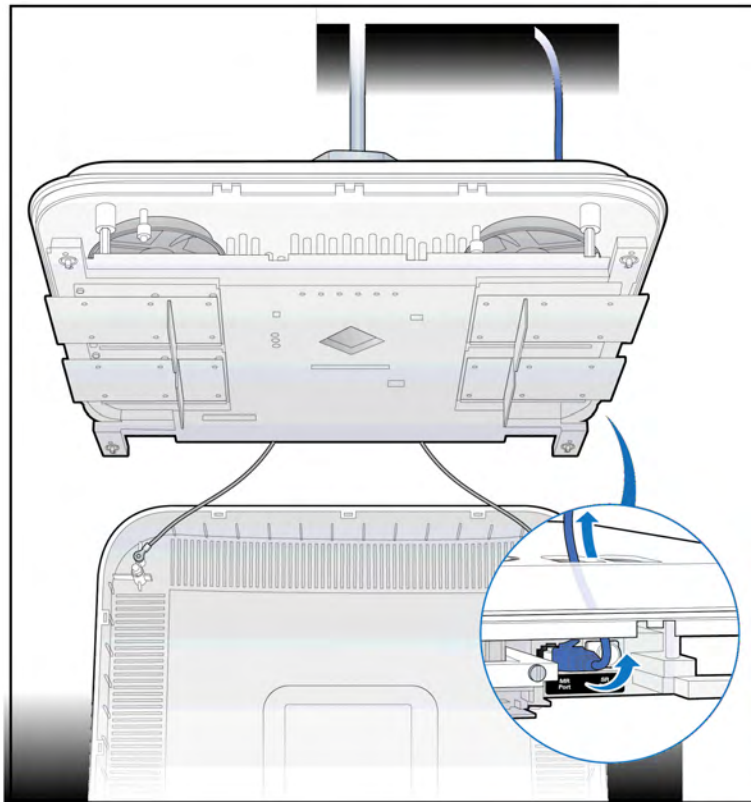
Replacing a flown mounted RP5100i

1. Remove the RP cover.

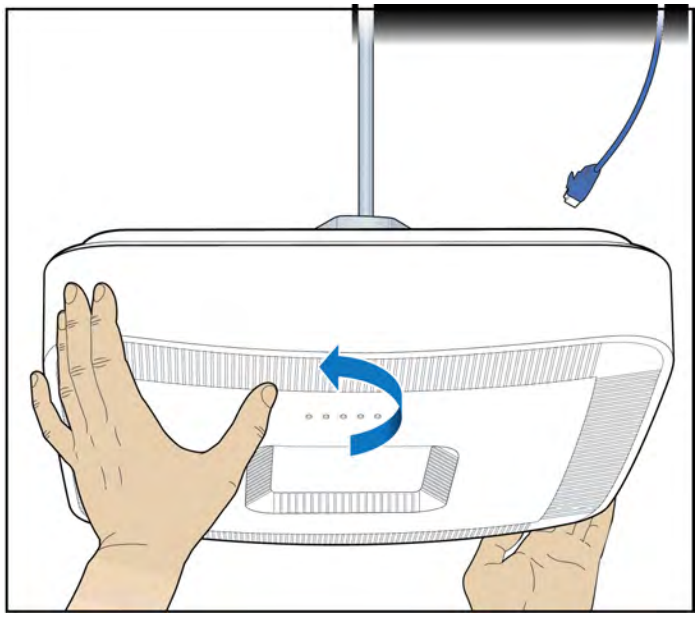
   Note: The cover is attached to the RP with two lanyards.



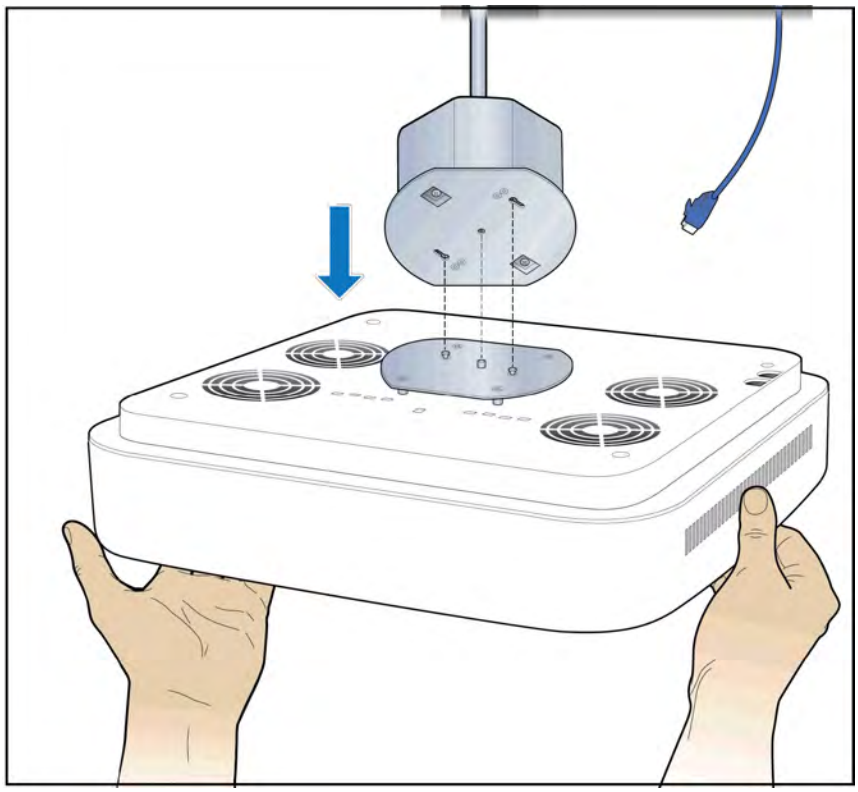
2. Disconnect the Ethernet cable.



3. Replace the cover and twist the RP clockwise.

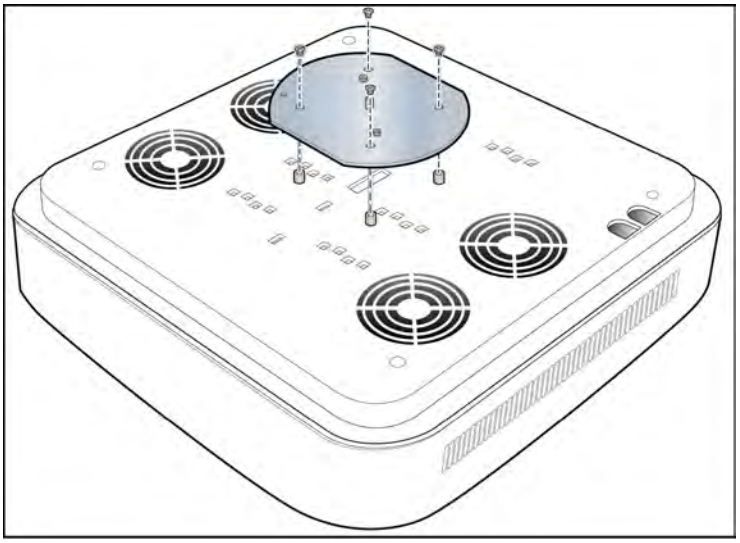


4. Remove the failed RP.

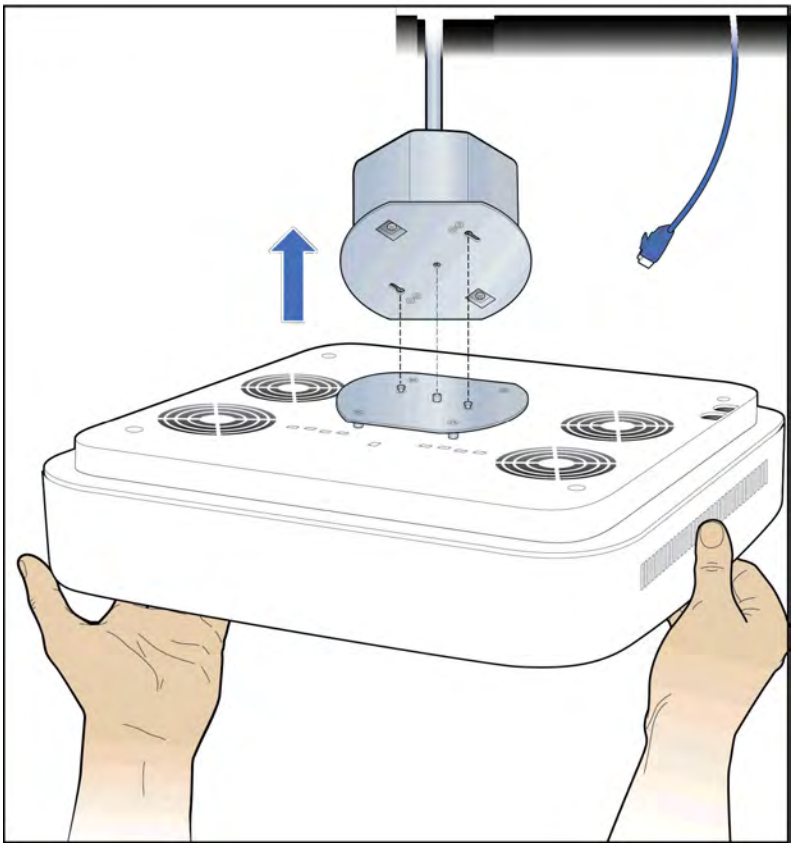


5. Attach the mounting plate to the RP.

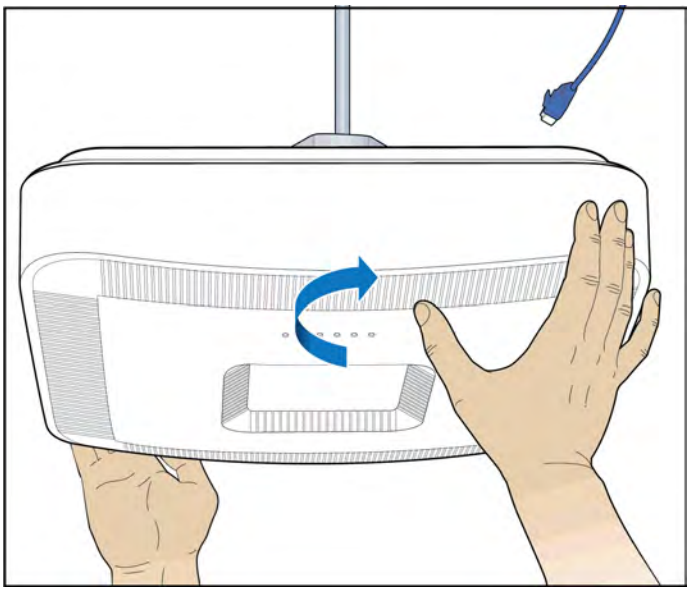
Note: Apply thread locking compound to the screws prior to installation.



6. Attach the RP to the octagon box.

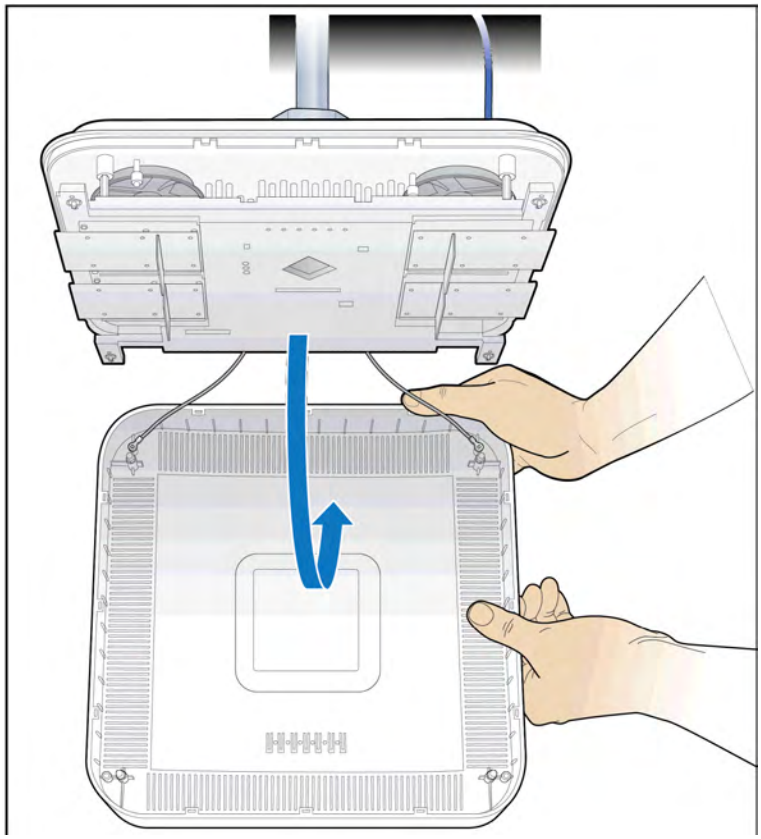


7. Twist the RP counterclockwise.

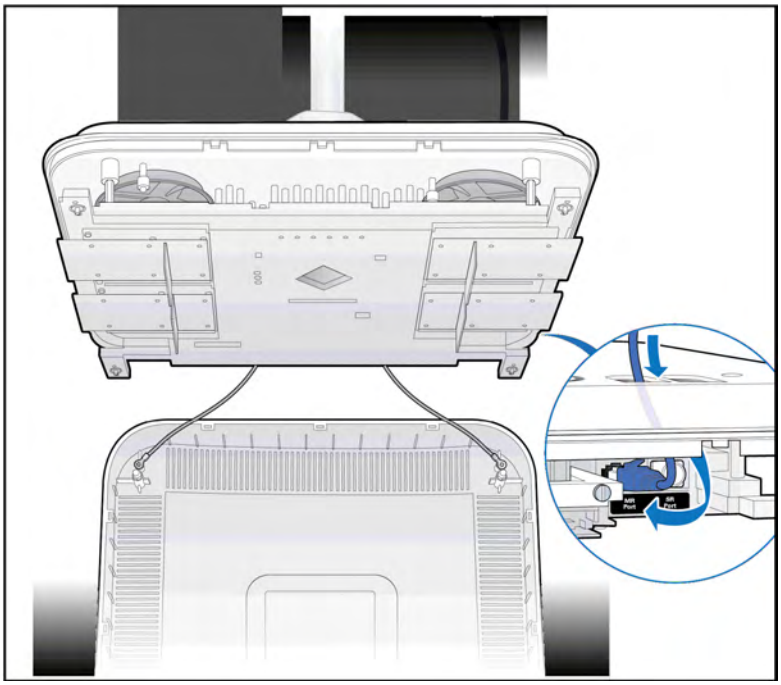


8. Remove the RP cover.

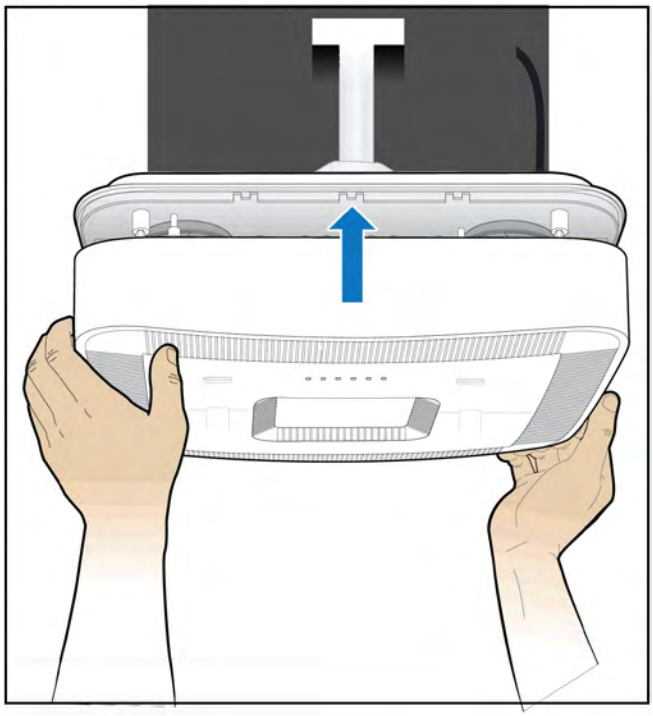
Note: The cover is attached to the RP with two lanyards.



9. Connect the Ethernet cable to the MR port.



10. Replace the RP cover.



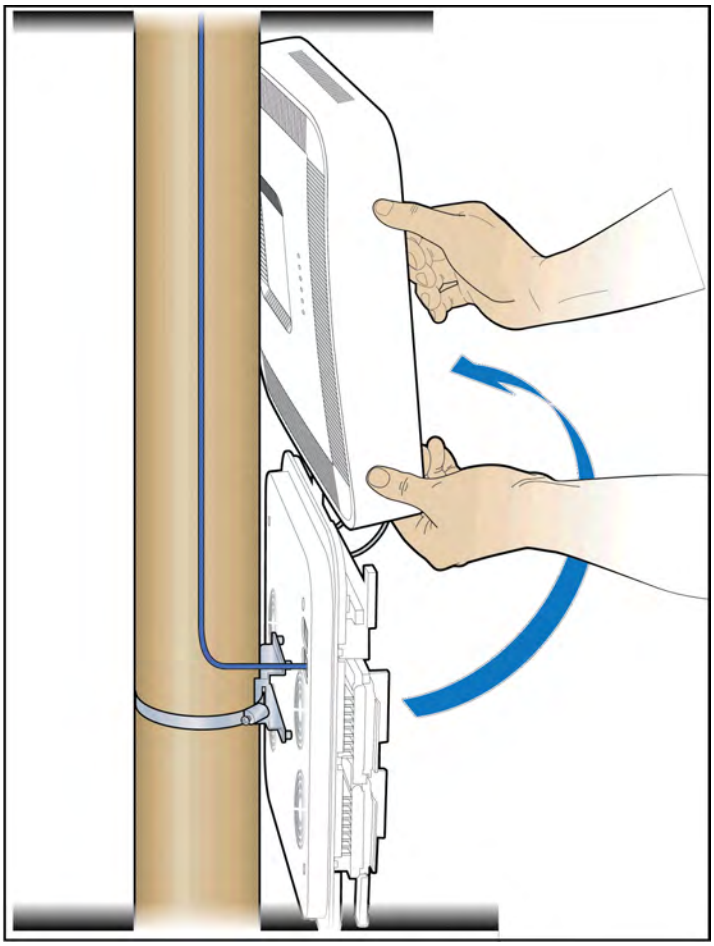
11. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

    For verification procedures, see RP post-replacement verification

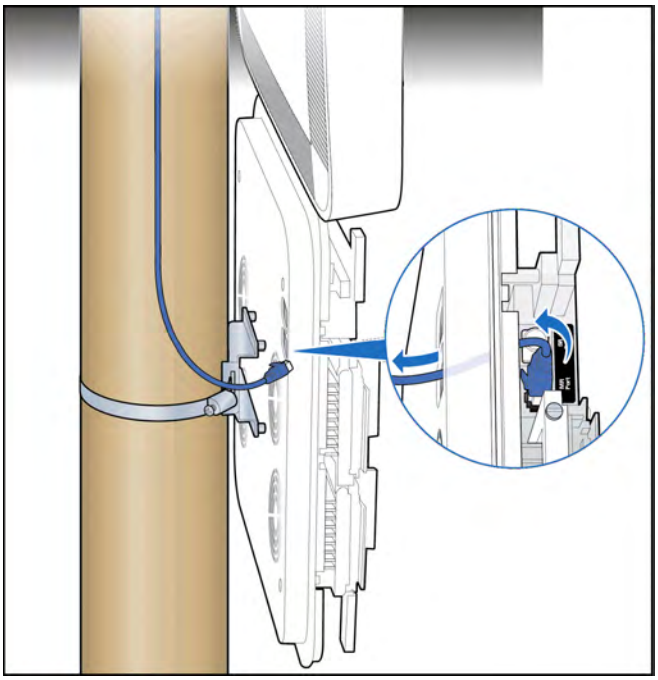
Replacing a pole mounted RP5100i

1. Remove the RP cover.

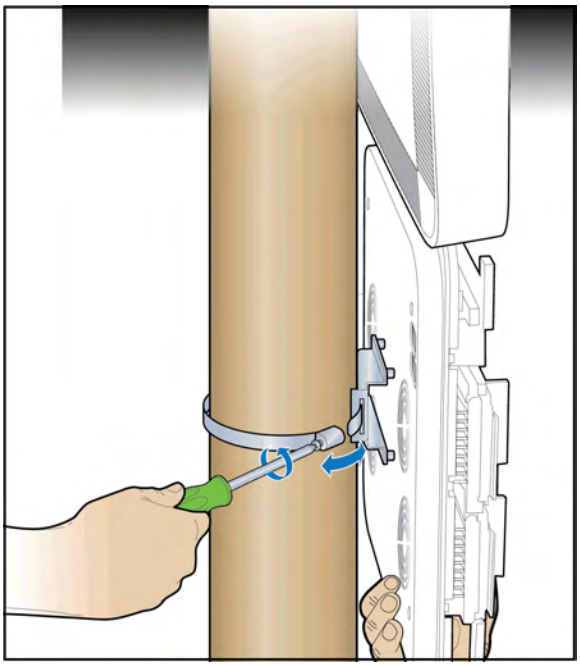
Note: The cover is attached to the RP with two lanyards.



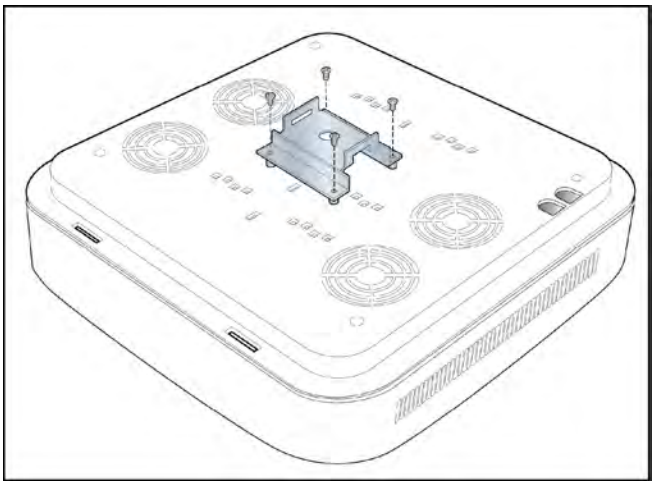
2. Disconnect the Ethernet cable.



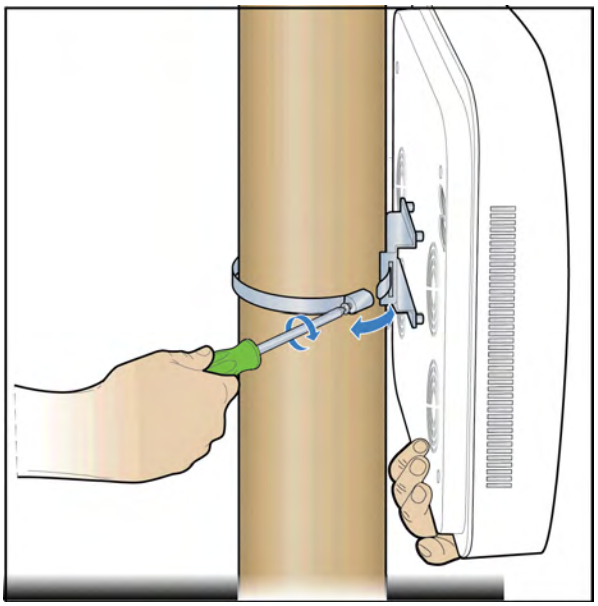
3. Loosen the clamp and remove the RP.



4. Attach the bracket to the replacement RP.

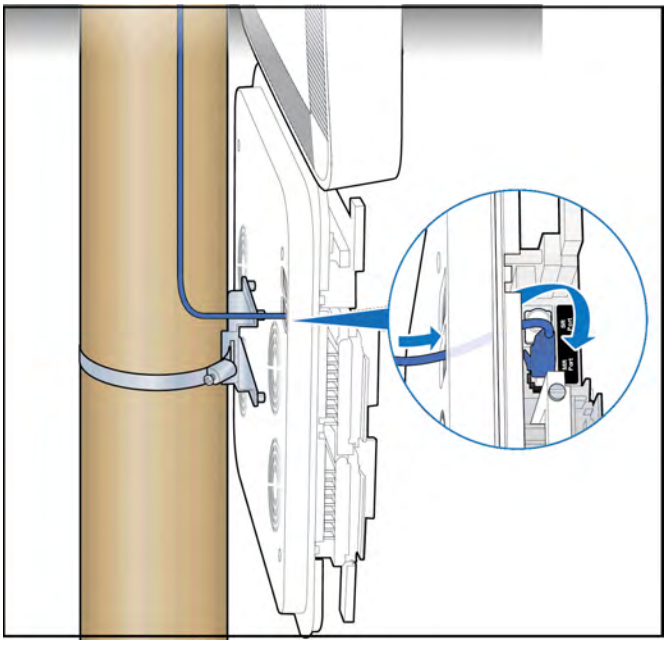


5. Attach the replacement RP to the pole using the clamp.

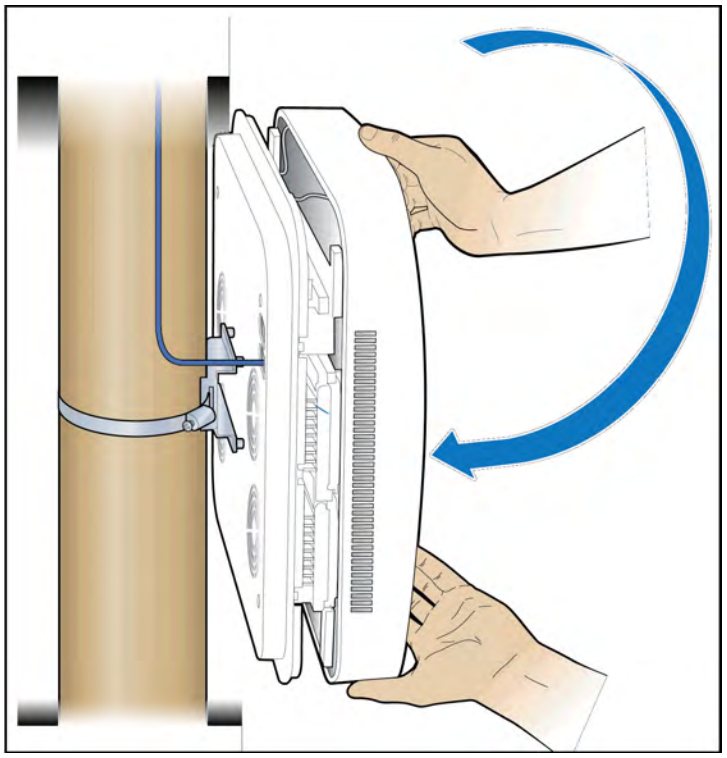


6. Remove the cover and connect the Ethernet cable to the RP.

Note: The cover is attached to the RP with two lanyards.



7. Replace the cover on the RP.



8. Verify the RP installation. The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

   For verification procedures, see RP post-replacement verification

Replacing RP5100i/RP5200i RF modules

The following procedures provide instructions for replacing a ONECELL Radio Point RF module.

WARNING: Disconnect the Ethernet cable(s) on the RP to remove the power. Failure to do so will cause damage to the RP.

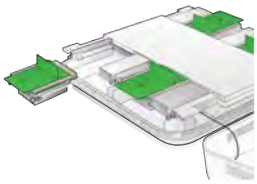
Replacing RP5200i Radio Modules

The following procedures provide instructions for replacing a ONECELL RP5200i Radio Point radio module.

WARNING: Disconnect the Ethernet cable(s) on the RP to remove the power. Failure to do so will cause damage to the RP.

1. Remove the RP
   - from the ceiling, see Ceiling Mount (page 129)
   - from the wall, see Wall mount (page 132)
   - from a rod, see Flown mount (page 136)
   - from a pole, see Pole mount (page 138)
2. Remove the RP cover.

3. Using a Torx T10 screwdriver, loosen the screws on the Radio Module and remove it.



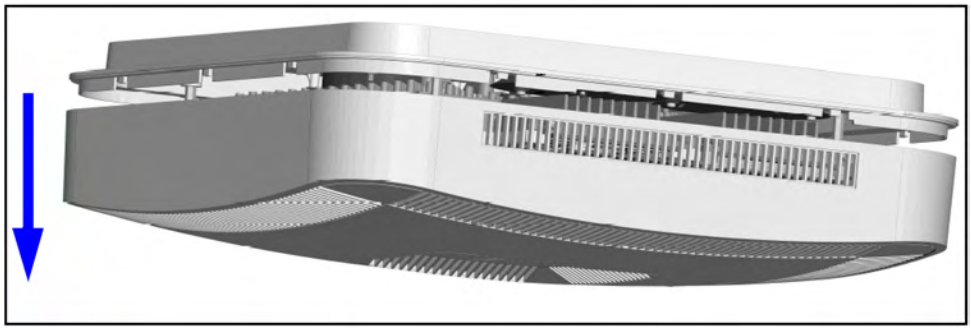
4. Insert the replacement RF module and tighten the screws.
5. Replace the RP cover.

6. Reinstall the RP. See
   - Ceiling Mount (page 129)
   - Wall mount (page 132)
   - Flown mount (page 136)
   - Pole mount (page 138)
7. Verify the RF module installation. The operational state of the RF module can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens. See RP post-replacement verification (page 185).

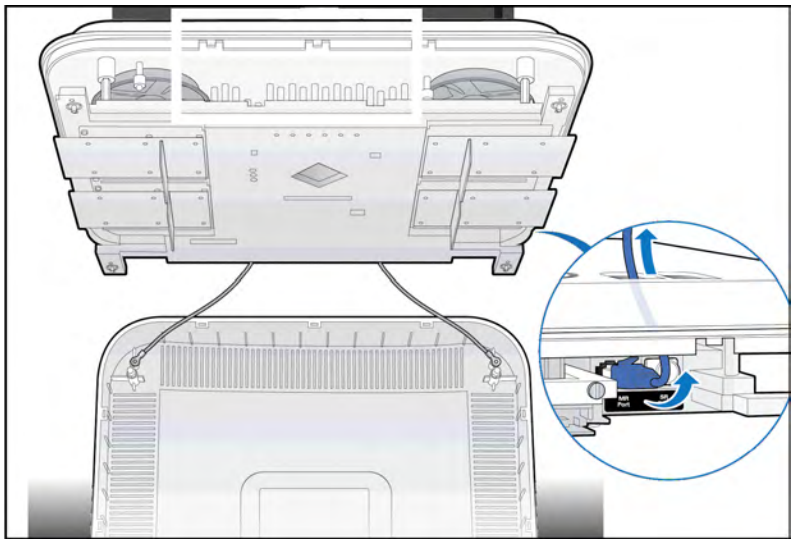
Replacing RP5100i Radio Modules

WARNING: Disconnect the Ethernet cable(s) on the RP to remove the power. Failure to do so will cause damage to the RP.

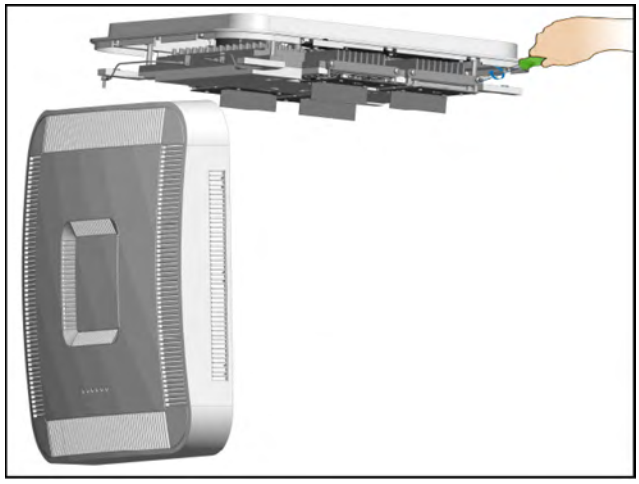
1. Remove the RP. See
   - Replacing a ceiling RP5100i (above tile) (page 141)
   - Replacing a flown mounted Indoor RP (page 170)
   - Replacing a pole mounted Indoor RP (page 173)
2. Remove the RP cover.



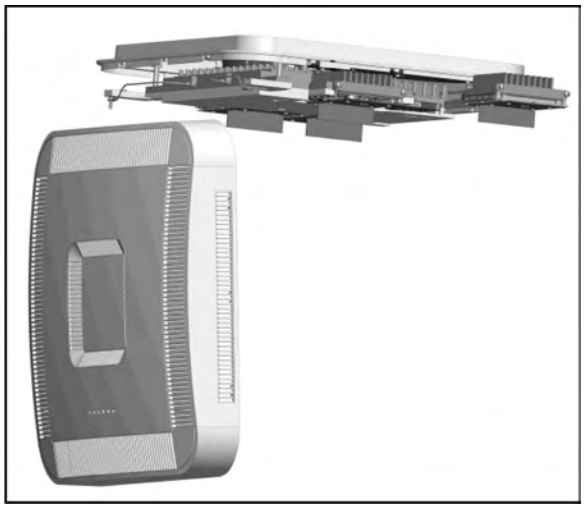
3. Disconnect the Ethernet cable on the RP.



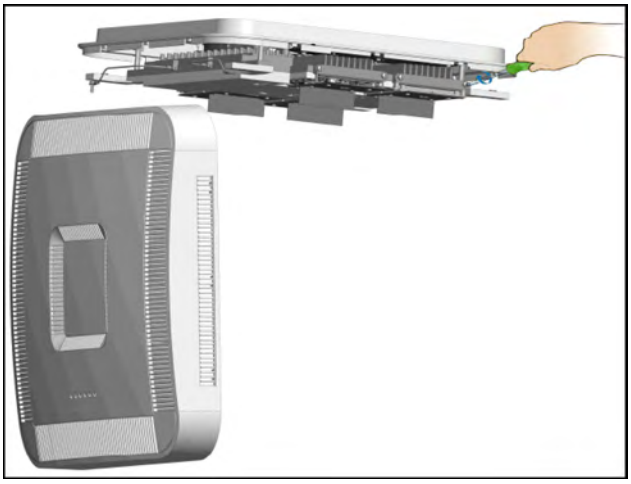
4. Unscrew the RF module.



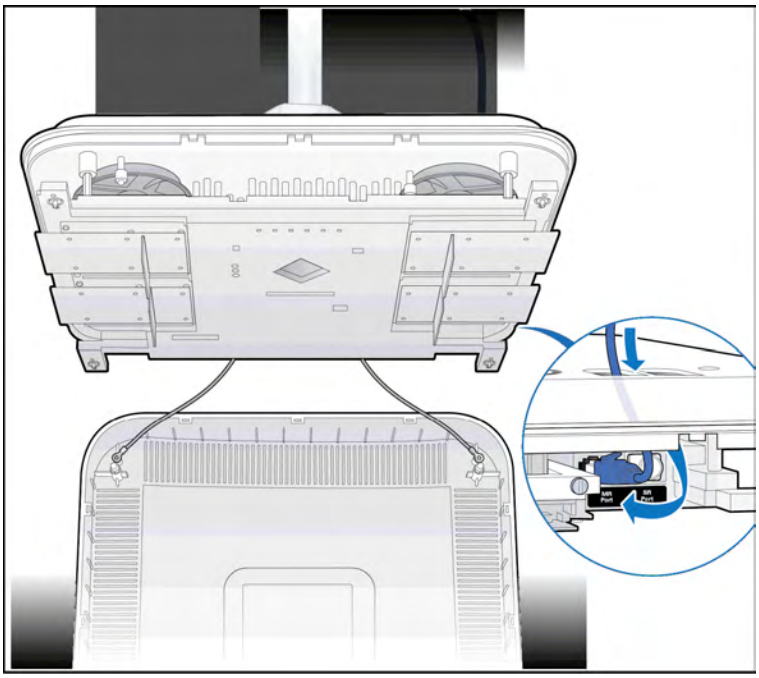
5. Remove the RF module.



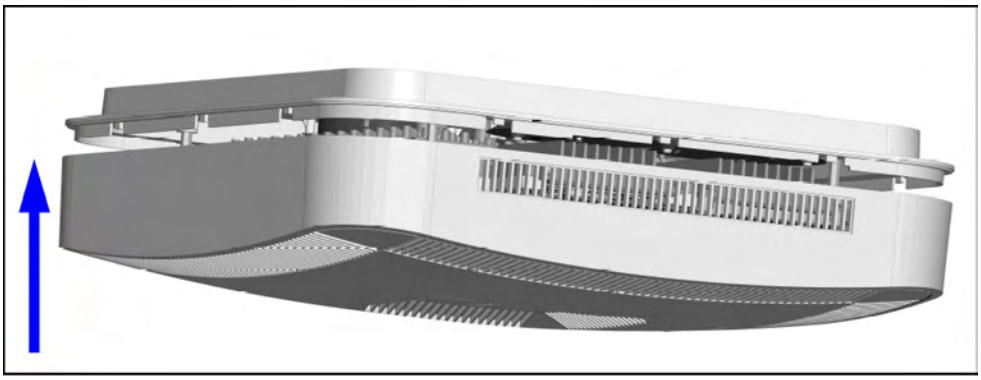
6. Install the replacement RF module.
7. Secure it in the slot.



8. Connect the Ethernet cable.



9. Attach the RP cover.



10. Verify the RF module installation. The operational state of the RF module can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

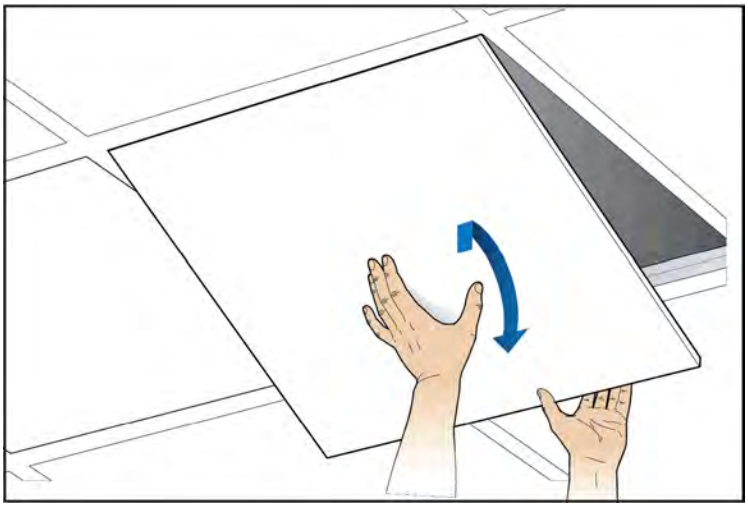
    For verification procedures, see RP post-replacement verification.

Replacing RP2000 series Radio Points

This procedure provides instructions for replacing a ONECELL RP2000 series Radio Point in a live network environment.

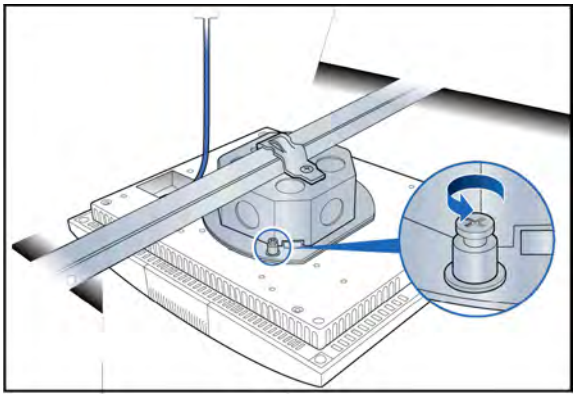
Replacing a ceiling Indoor RP (above tile)

1. Remove the ceiling tile below the mounted RP to allow access to the mounting hardware and Ethernet cable.

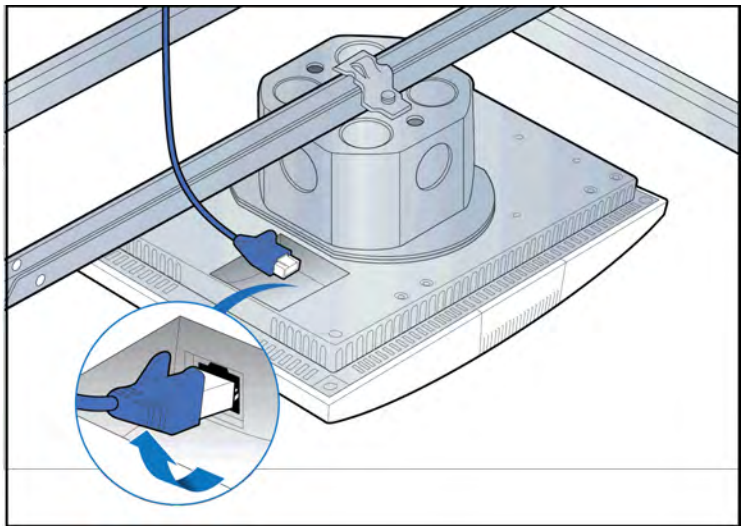


2. Loosen the locking screw.

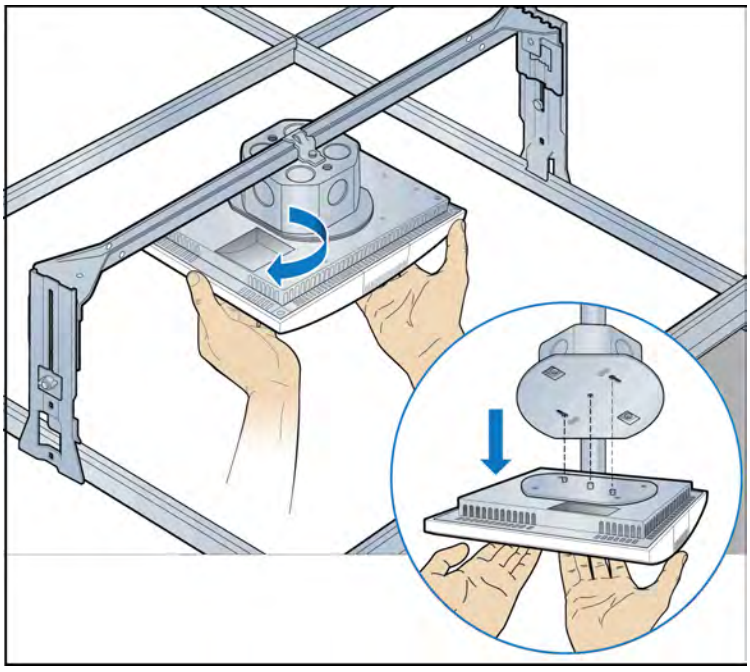
Note: The locking screw is not on newer RP2000s.



3. Disconnect the Ethernet cable.



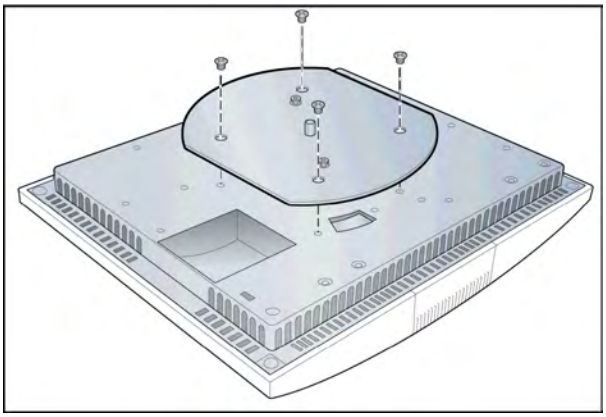
4. Twist the RP to remove it.



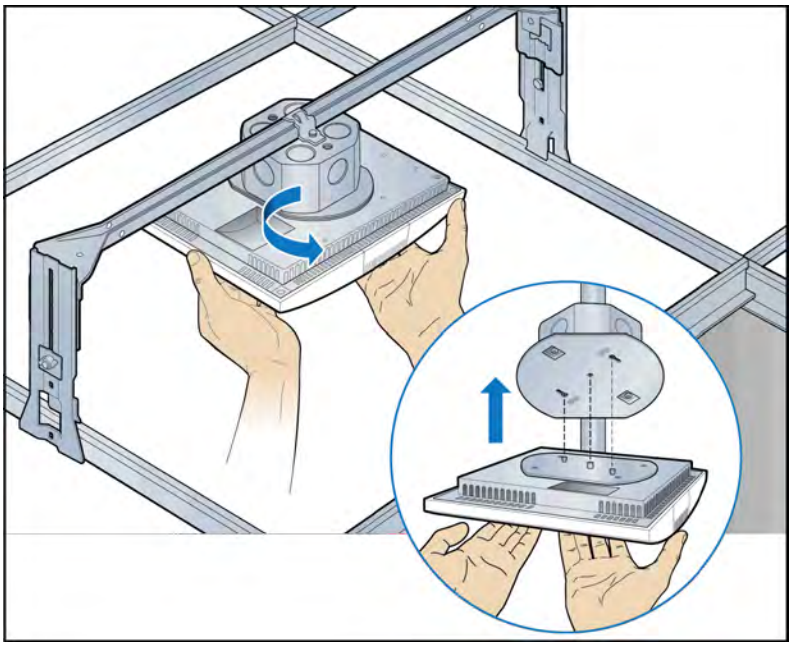
5. Remove the mounting plate from the failed RP and attach it to the replacement RP.

   Set the failed RP aside.

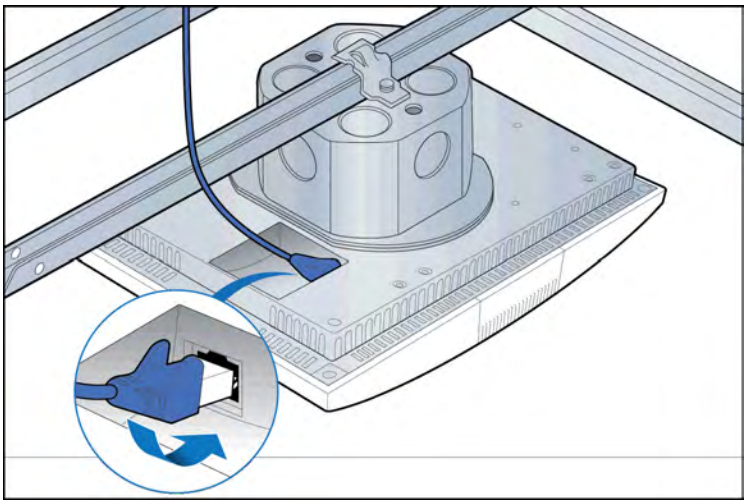
Note: Apply thread locking compound to the screws prior to installation.



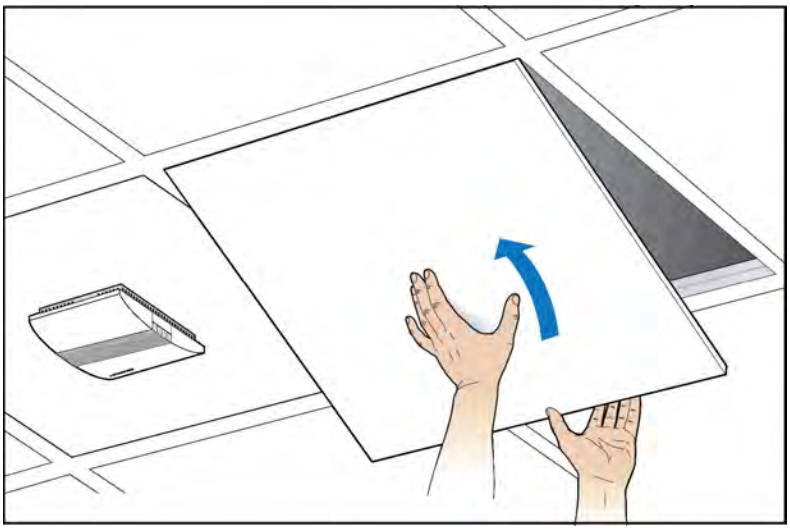
6. Attach the RP to the octagonal mounting plate and twist to engage.



7. Connect the Ethernet cable to the RP.



8. Replace the ceiling tile.

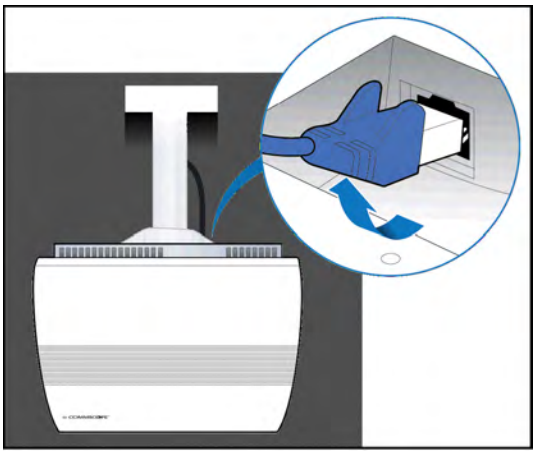


9. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

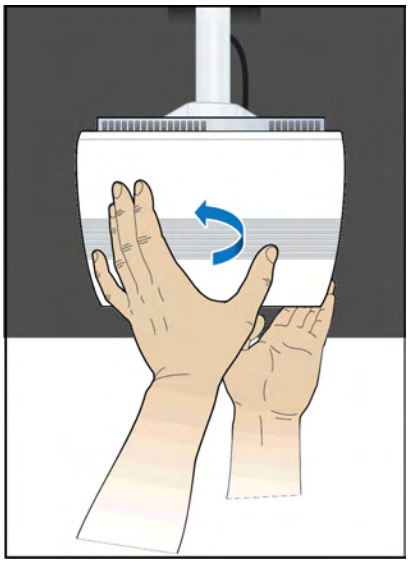
   For verification procedures, see RP post-replacement verification.

Replacing a ceiling Indoor RP (on tile)

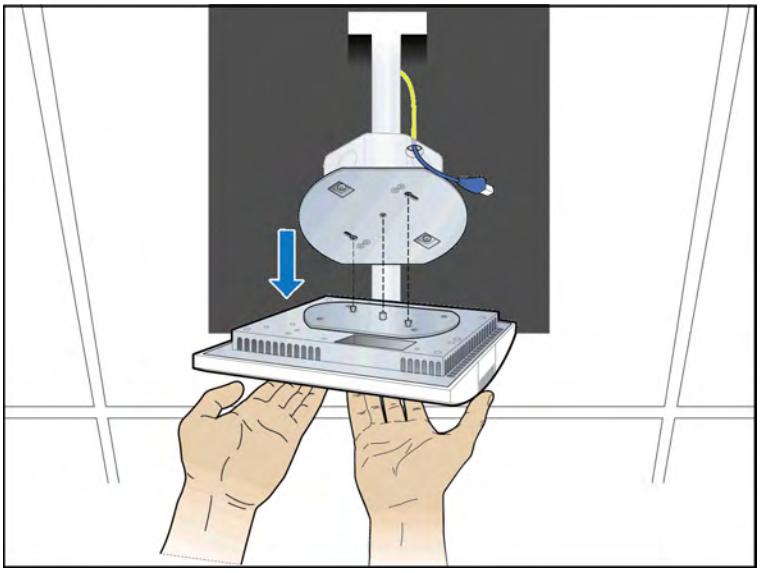
1. Disconnect the Ethernet cable from the RP.



2. If there is a locking screw, loosen it.
3. Twist the RP.

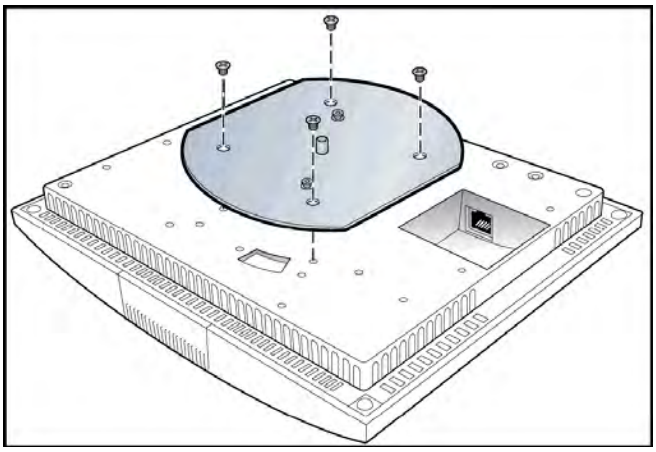


4. Remove the RP. Remove the mounting plate from the RP and set the RP aside.

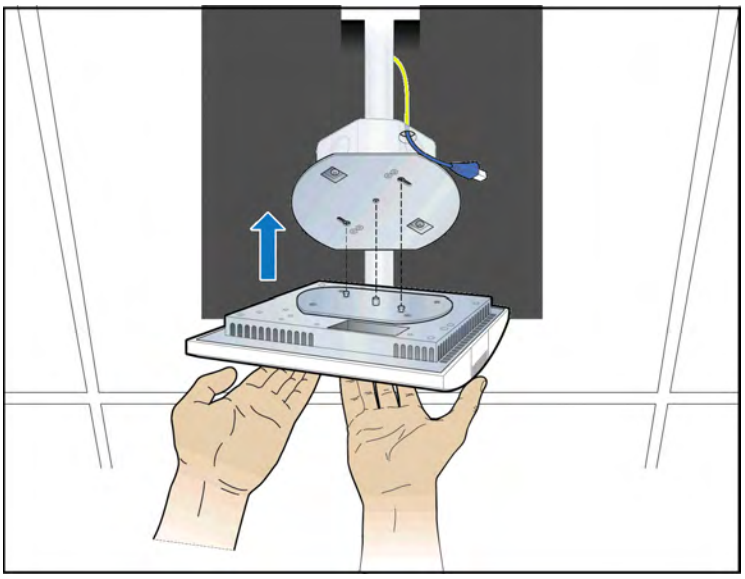


5. Attach the plate to the replacement RP.

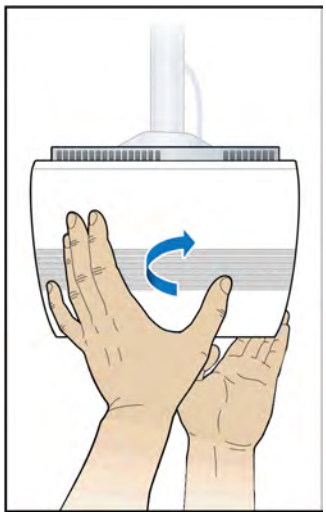
Note: Apply thread locking compound to the screws prior to installation.



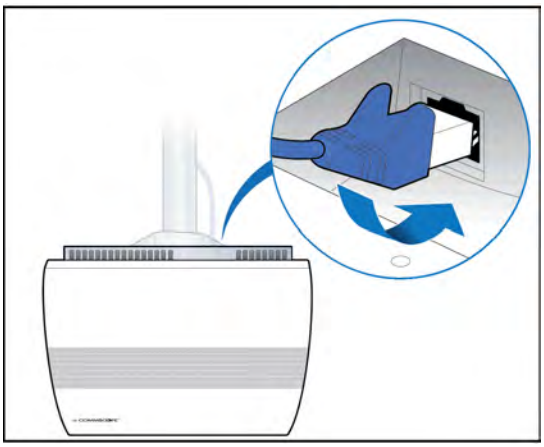
6. Attach the RP to the octagonal mounting plate.



7. Secure RP to octagon plate.



8. Connect the Ethernet cable to the RP.

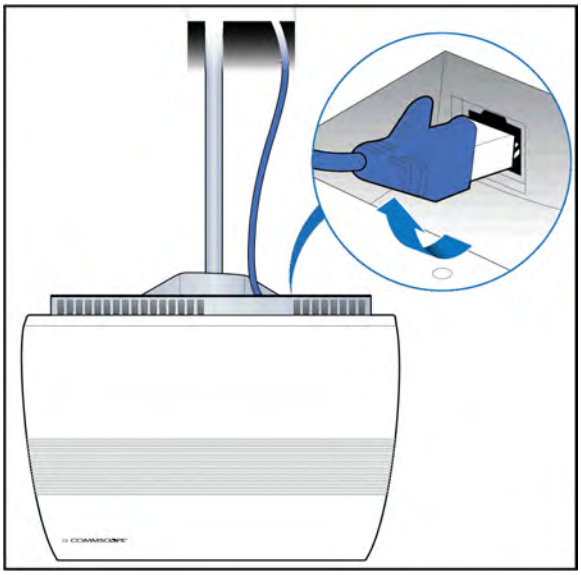


9. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

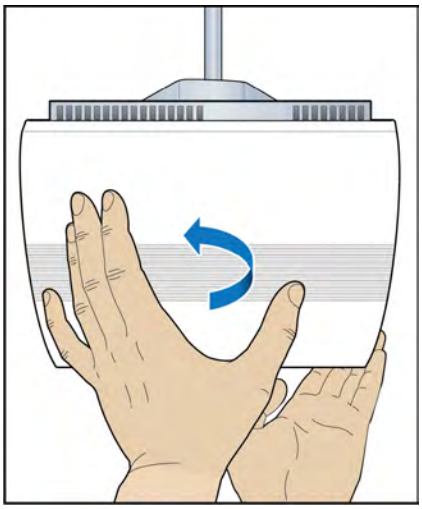
   For verification procedures, see RP post-replacement verification.

Replacing a flown mounted Indoor RP

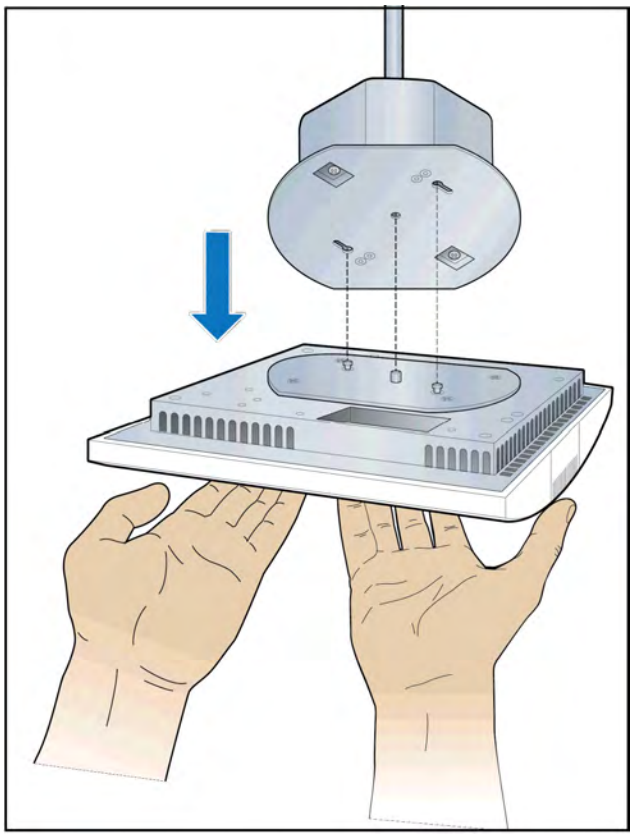
1. Disconnect the Ethernet cable.



2. Remove the RP.

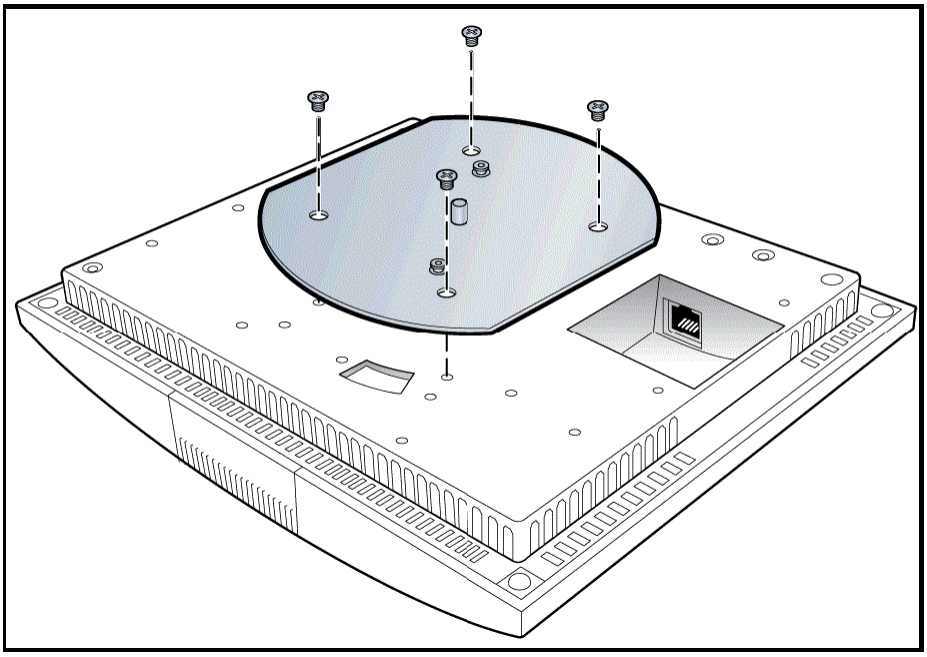


3. Remove the mounting plate from the RP and set the failed RP aside.

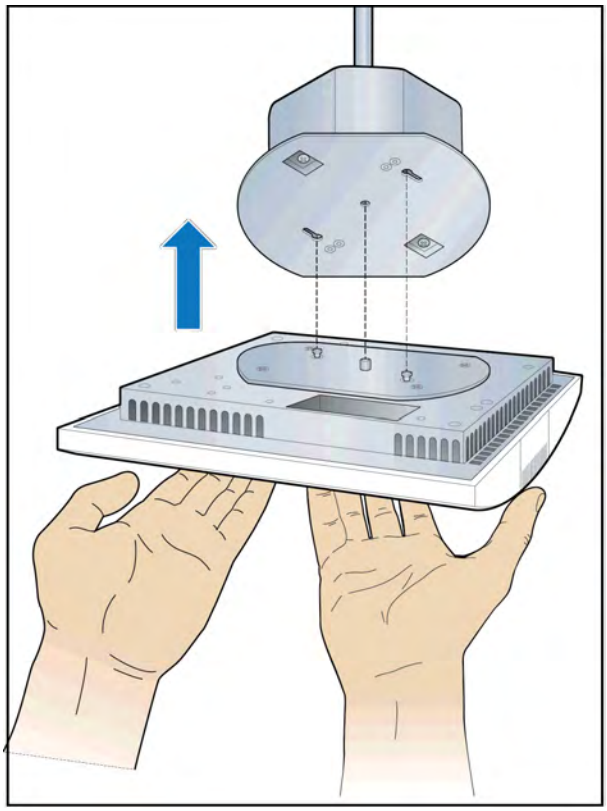


4. Attach the mounting plate to the replacement RP.

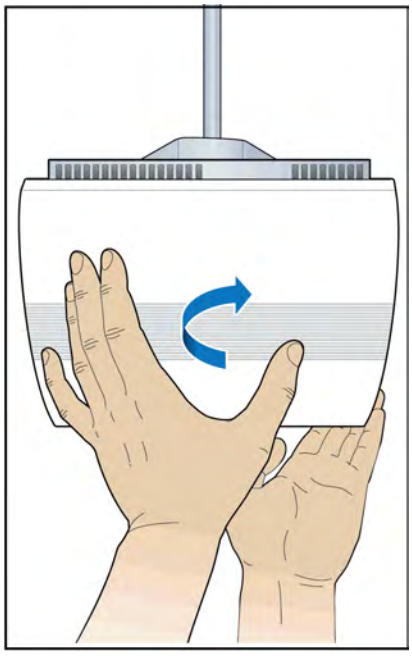
Note: Apply thread locking compound to the screws prior to installation.



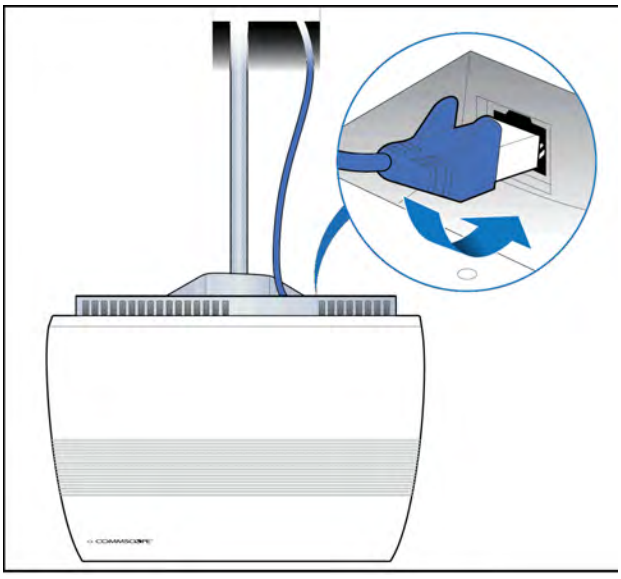
5. Attach the RP to the octagon plate.



6. Secure the RP.



7. Connect the Ethernet cable to the RP.

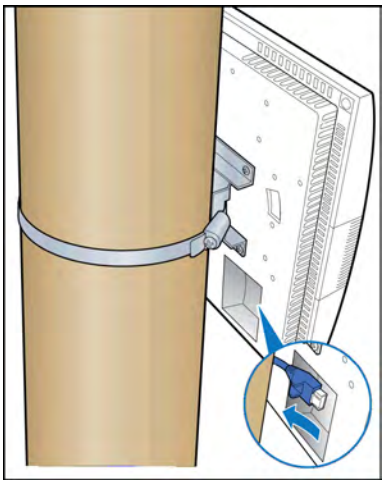


8. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

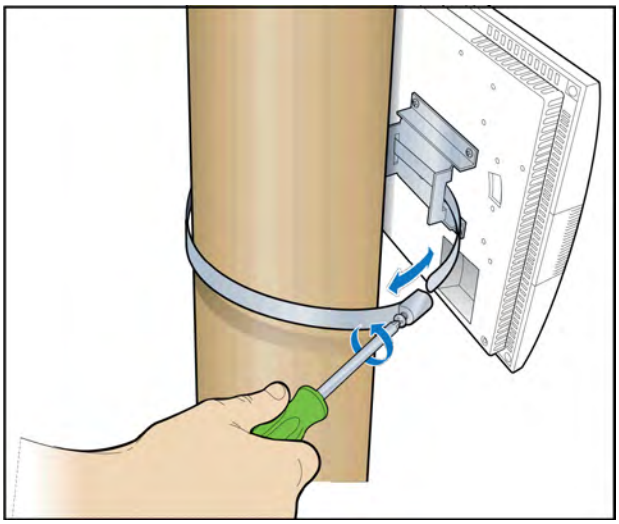
   For verification procedures, see RP post-replacement verification.

Replacing a pole mounted Indoor RP

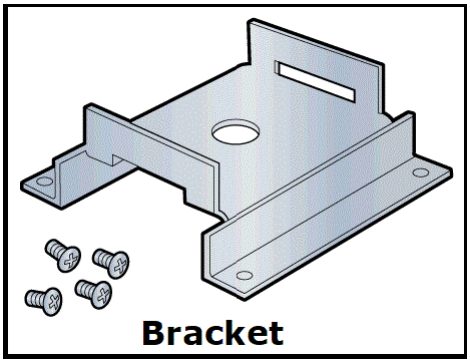
1. Disconnect the Ethernet cable.



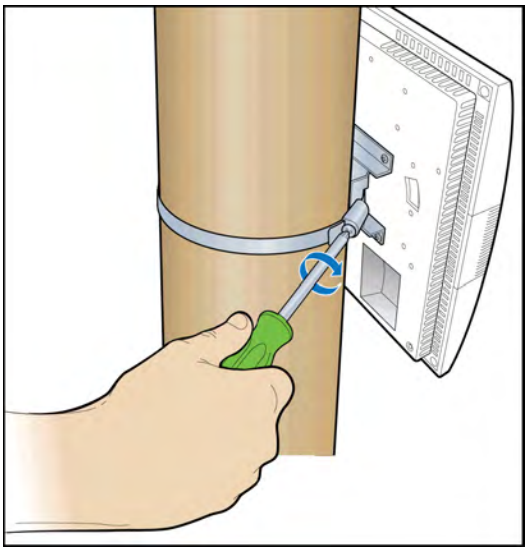
2. Loosen the clamp, remove the RP and set it aside.



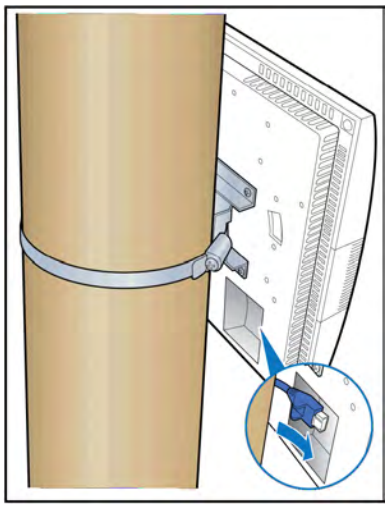
3. Remove the bracket from the failed RP and attach it to the replacement RP.



4. Attach the replacement RP to the pole using the clamp.



5. Connect the Ethernet cable to the RP.

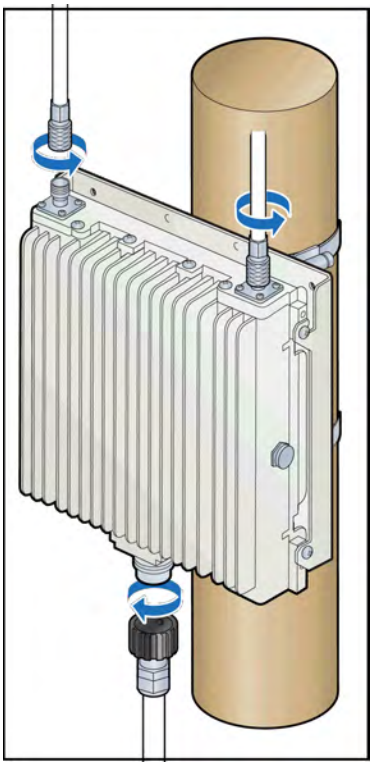


6. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

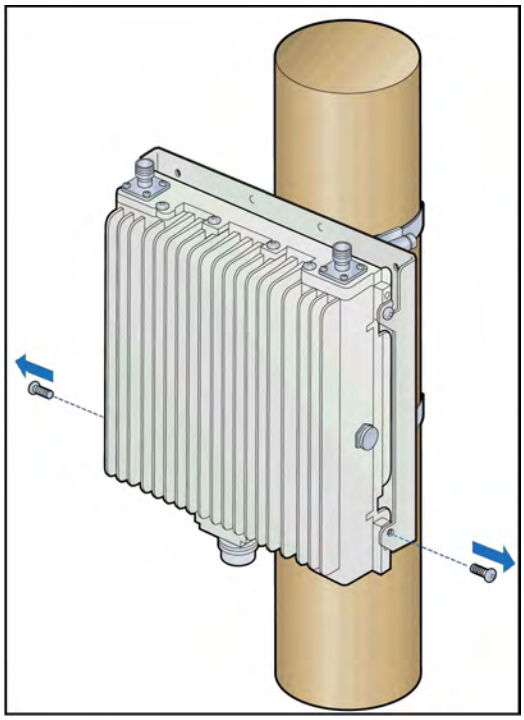
   For verification procedures, see RP post-replacement verification.

Replacing a vertical pole mounted Rugged RP

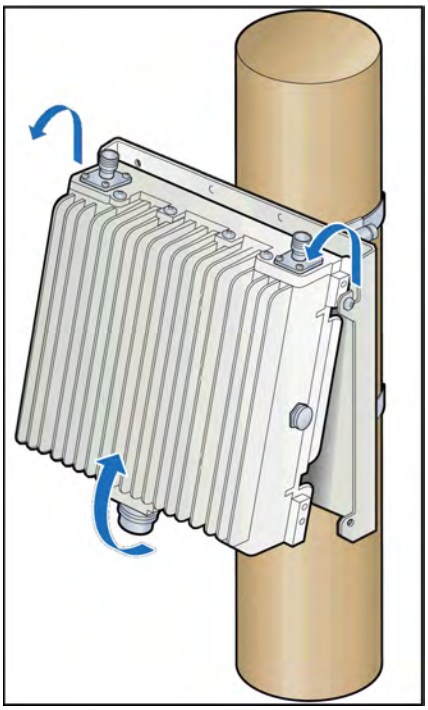
1. Disconnect the Ethernet cable and the antenna couplers from the RP.



2. Remove the screws on the bottom of the RP and loosen the top screws.



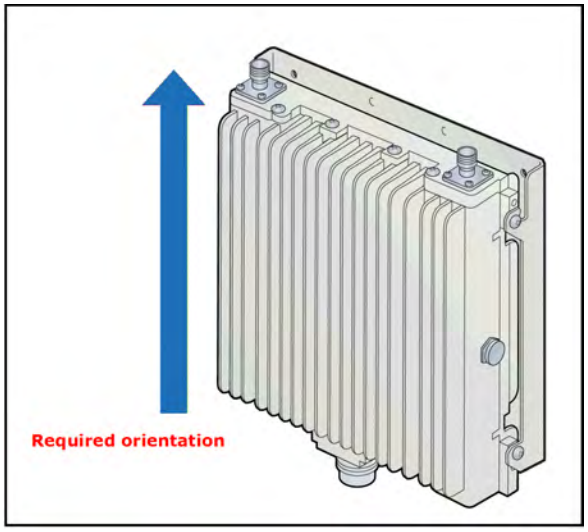
3. Lift the RP off of the mounting plate and set it aside.



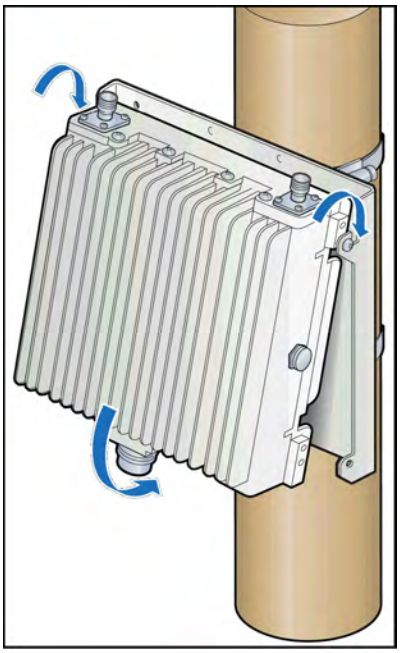
4. Insert two screws into the upper holes on the replacement RP.

Note: Do not tighten the screws.

CAUTION: Ensure that the RP is oriented correctly with the two antenna connectors at the top of the RP.

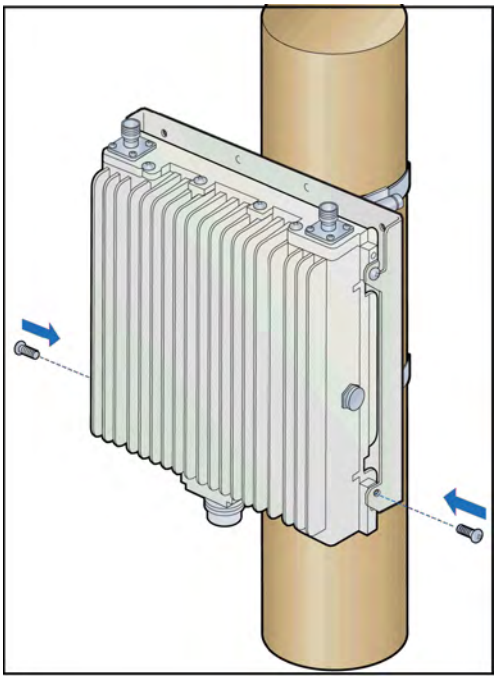


5. Hang the RP to the mounting bracket using the installed screws. Align holes at bottom location of bracket and install two additional screws.



6. Insert two screws on the bottom of the RP and tighten all four screws.

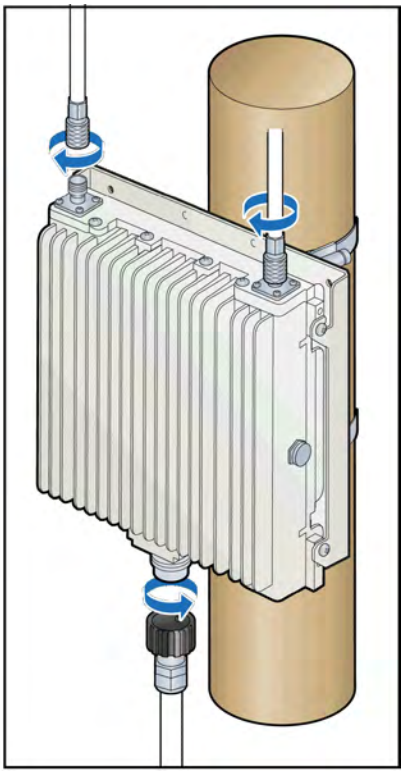
Note: The torque requirement for the mounting screws is 20-21 in-lbs.



7. Connect the antenna couplers on the top of the RP.

Note: Check the antenna coupler manufacturer's documentation for torque requirements.

8. Connect the Ethernet cable RJ45 end to the bottom of the RP.

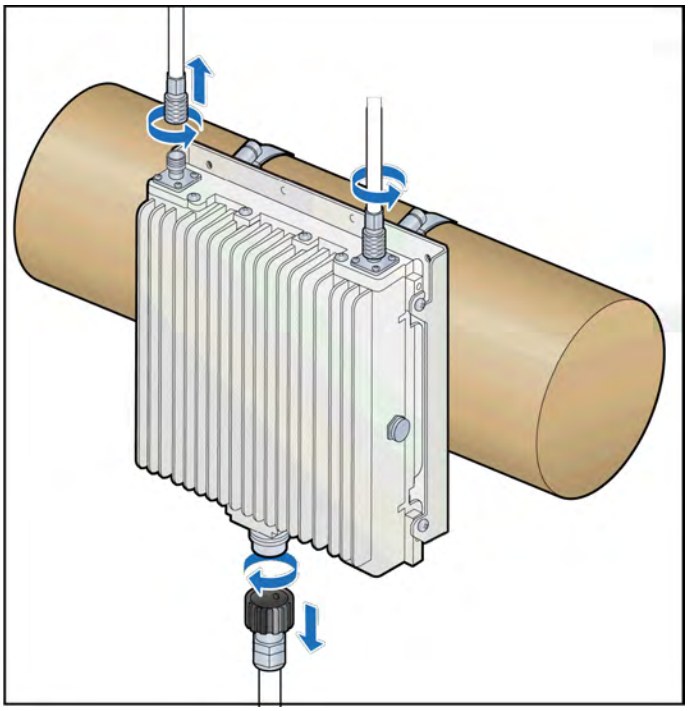


9. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

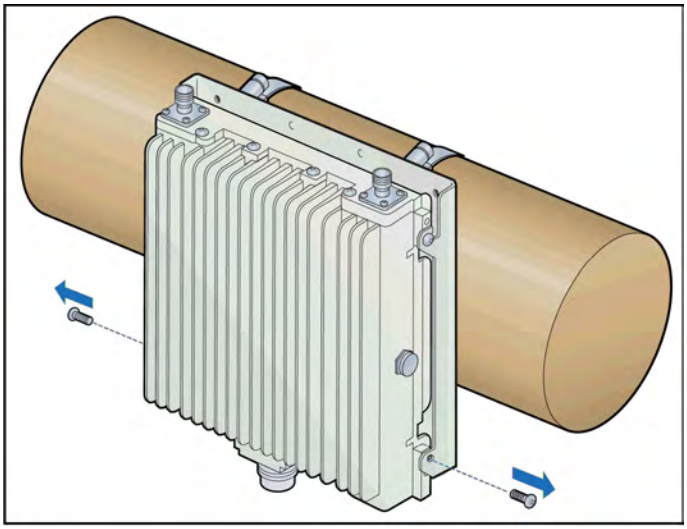
   For verification procedures, see RP post-replacement verification.

Replacing a horizontal pole mounted Rugged RP

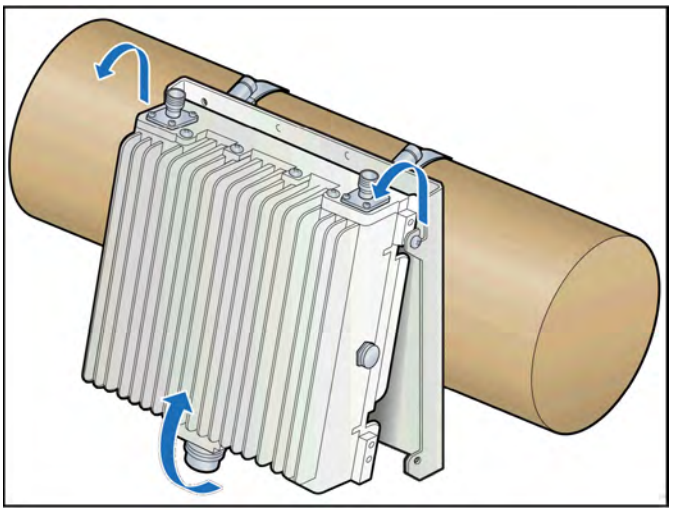
1. Disconnect the Ethernet cable and the antenna couplers from the RP.



2. Remove the screws on the bottom of the RP and loosen the top screws.



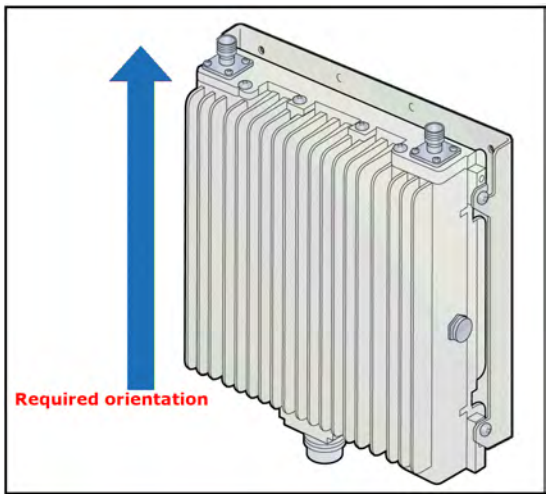
3. Lift the failed RP off of the mounting plate and set it aside.



4. Insert two screws into the upper holes on the replacement RP.

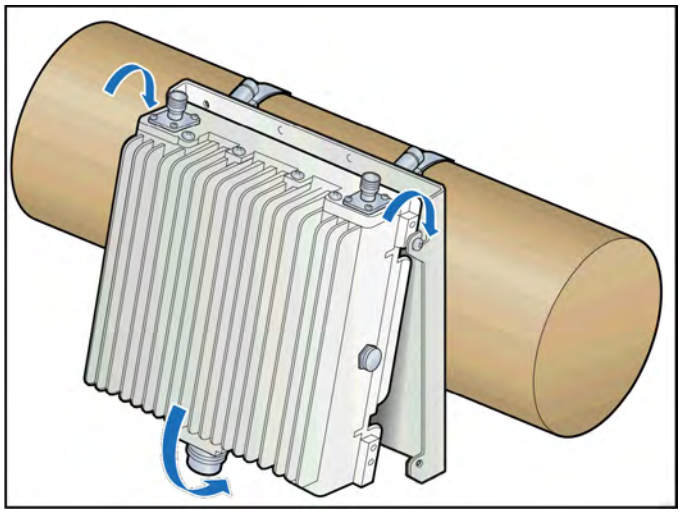
Note: Do not tighten the screws.

CAUTION: Ensure that the RP is oriented correctly with the two antenna connectors at the top of the RP.



5. Attach the RP to the mounting plate. Tighten the top screws on the RP and insert and tighten the bottom screws on the RP.

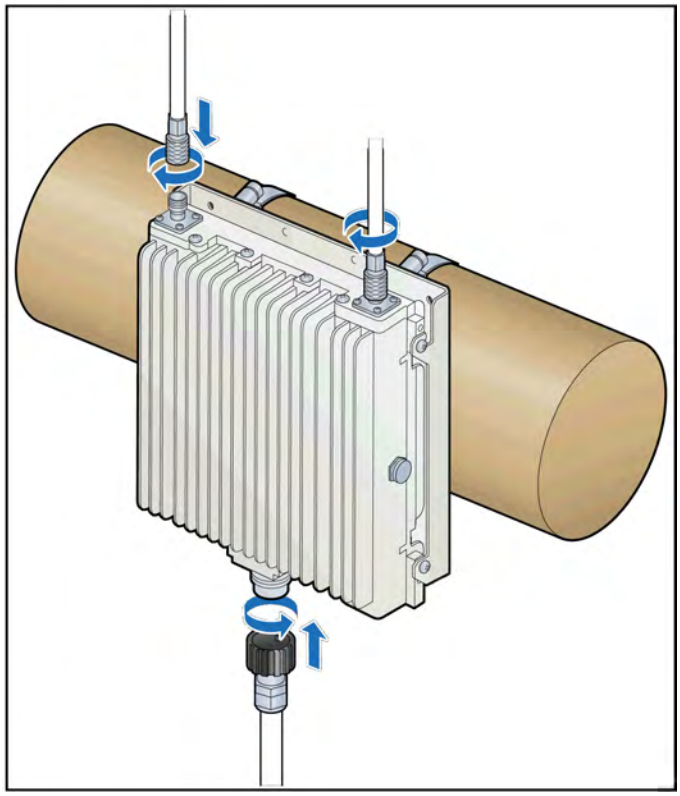
Note: The torque requirement for the mounting screws is 20-21 in-lbs.



6. Connect the antenna couplers on the top of the RP.

   Note: Check the antenna coupler manufacturer's documentation for torque requirements.

7. Connect the Ethernet cable RJ45 end to the bottom of the RP.

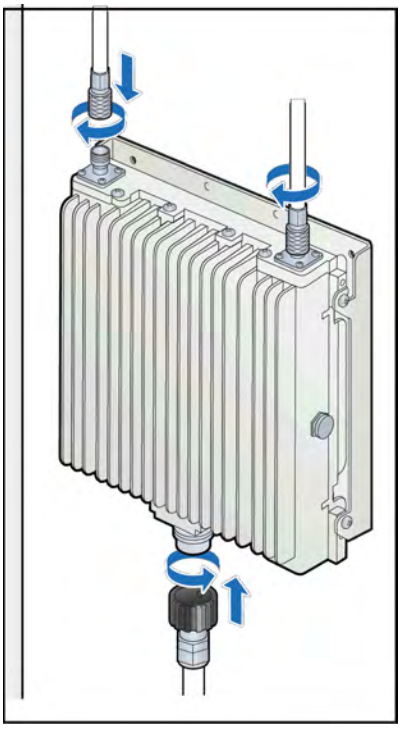


8. Verify the RP installation. See The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

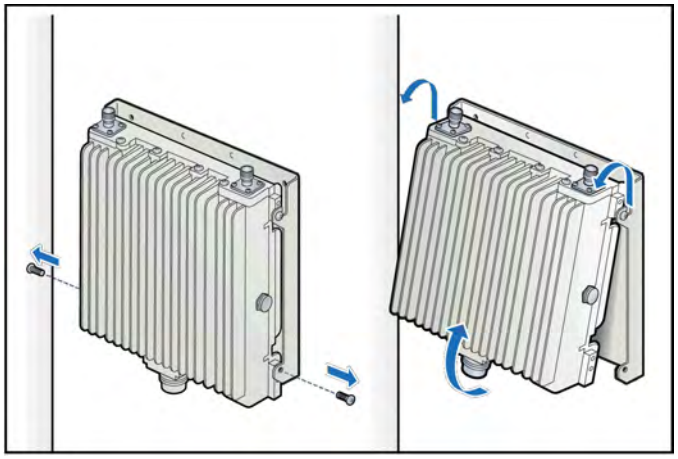
   For verification procedures, see RP post-replacement verification.

Replacing a wall mounted Rugged RP

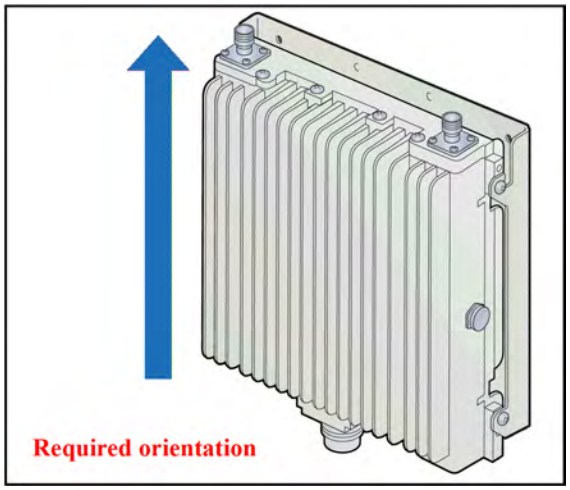
1. Disconnect the Ethernet cable and the antenna couplers from the RP.



2. Remove the screws on the bottom of the RP, loosen the top screws and remove the RP from the mounting plate. Set the RP aside.

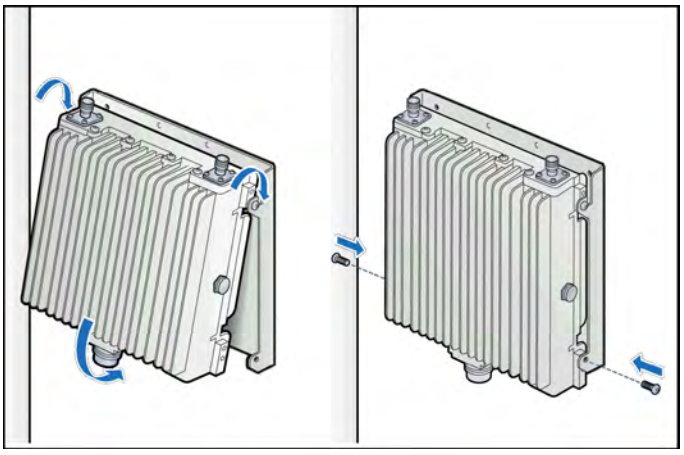


3. On the replacement RP, insert two screws into the upper holes.



4. Attach the RP to the mounting plate. Tighten the top screws on the RP and insert the bottom screws on the RP.

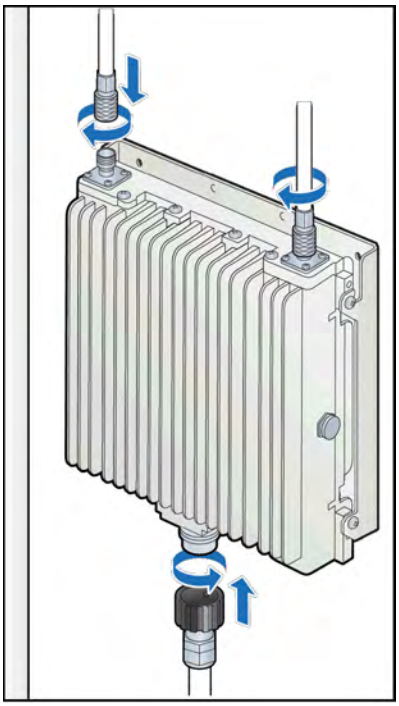
Note: The torque requirement for the mounting screws is 20-21 in-lbs.



5. Connect the antenna couplers on the top of the RP.

Note: Check the antenna coupler manufacturer's documentation for torque requirements.

6. Connect the Ethernet cable RJ45 end to the bottom of the RP.



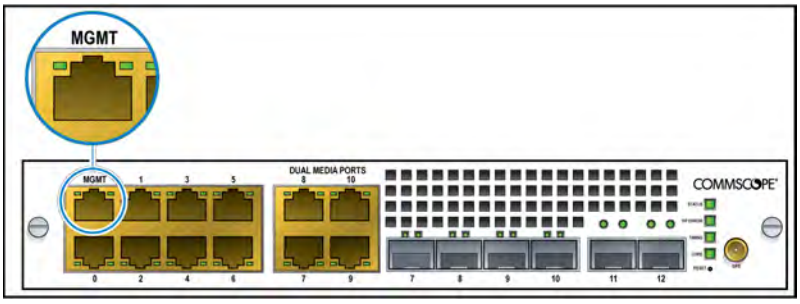
7. The operational state of the RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

   For verification procedures, see RP post-replacement verification.

RP post-replacement verification

The operational state of the replaced RP can be determined by the LED status on the RP. Additional information can be attained from the WebGUI status screens.

1. Connect the Ethernet cable to the MGMT port on the BC's front panel.



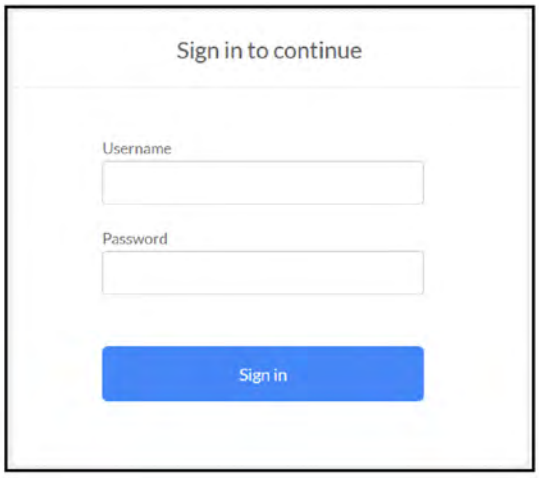
2. Open a supported browser.
3. Enter the IP address for the GUI, using the format below.

```
https://<IP address of Management Interface>:6002
```

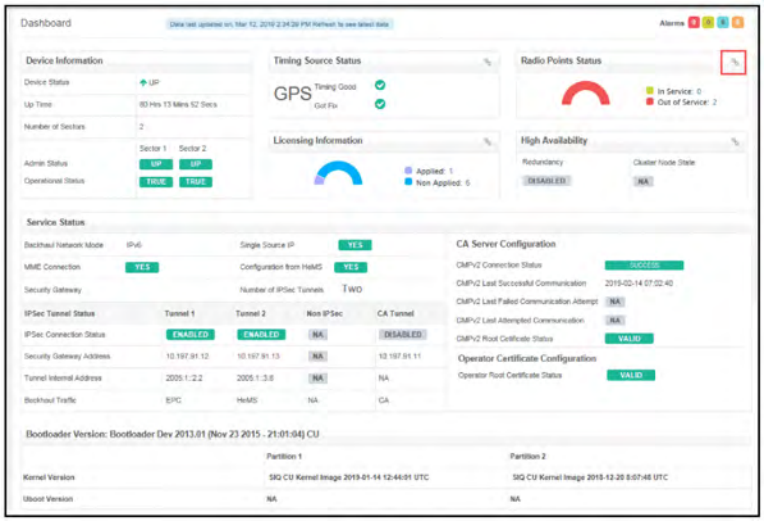
Example:

```
https://192.168.8.1:6002
```

The Sign In dialog box appears.

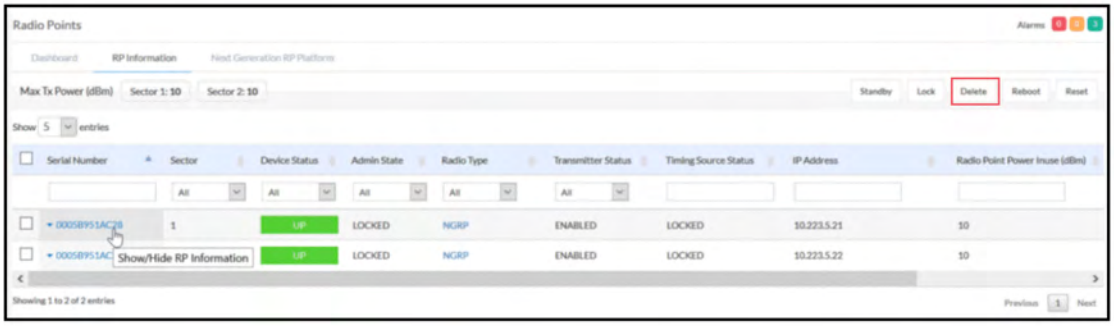


4. Ensure the WebGUI is operating in Management Mode. The Dashboard displays.



5. On the Dashboard, click the Radio Points link. The Radio Points Dashboard displays.

6. Click the RP Information tab. The RP Information page displays.



7. Make sure the replaced RP is UP.

Cable installation and power separation guidelines

Overview

This section contains best practices for installing Ethernet cables and connecting them to RPs.

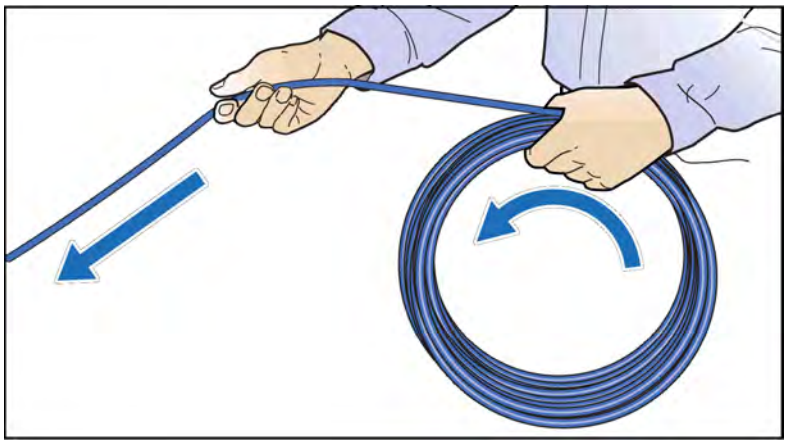
When installing Rugged RPs, cables that can withstand temperature extremes and inclement weather should be used. In outside environments, avoid contamination or damage to plugs. Plugs must be protected from sunlight and water in a suitable equipment housing or NEMA 4 rated box. It is also important to avoid exposure to water at cut ends of unfilled cables and cords. The following information is available to help you extend the operation of your RP and switches.

Cable handling

Indoor/outdoor cords can be routed outdoors above ground and indoors, and can be ordered in lengths long enough for direct (home-run) installations from switch to end equipment. Cords have 20% Insertion Loss De-rating so only 85 meters total can be supported. Extended lengths can be cut in two for terminating the indoor ends at protectors or panels. Terminations are similar to typical 4-pair indoor cables.

Unreel long lengths of cable to ensure the cable does not become twisted or caught on objects.

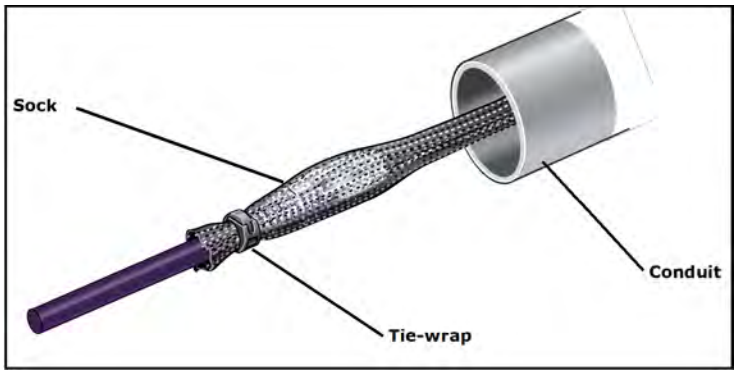
FIGURE 20: Unreel cable



CommScope recommends using a sock fitted and secured over the plug to pull cable through long conduits.

- Sock information
- Tie wrap information

FIGURE 21: Cable with sock attached using tie wrap

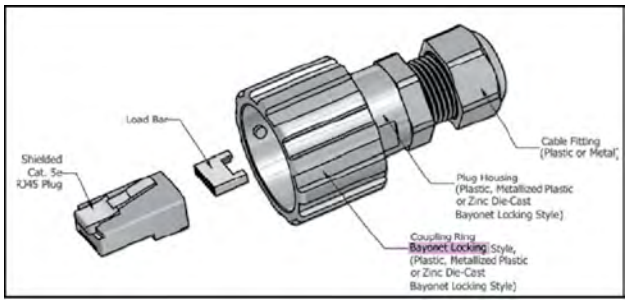


Feed the sock through the conduit and secure the sock on the terminal end of the cable with the tie-wrap. Once the sock and tie-wrap are in place, pull the cable through the conduit.

Cable termination

Before installing the Rugged RP, terminate the RP end of the Ethernet cable with the RJ45, IP67 connector provided in the box.

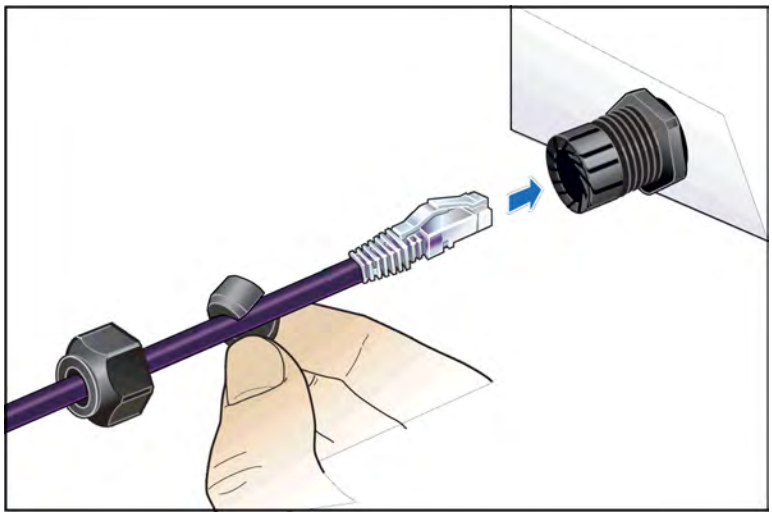
FIGURE 22: RJ45, IP67 connector



Flip the plug anti-snag to make it easier to push through the cord grips (flip it back before plugging in).

Use the split grommet provided. Once it is in place, coat it with silicone to ensure the connector is sealed.

FIGURE 23: Assembling the connector on the RP end

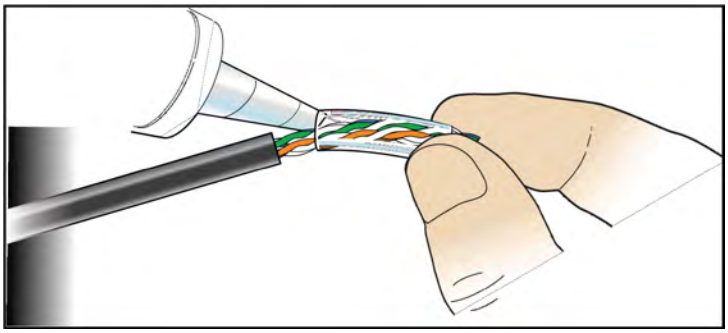


Cable splicing

Some cables are run in one piece from source to destination and have connector terminations. In other cases, two shorter pieces of cable need to be spliced together. When a cable is run to outdoor devices, you should take measures to ensure that cables are properly protected against moisture entering the cable. This is especially important when the jacket is stripped back from the wires.

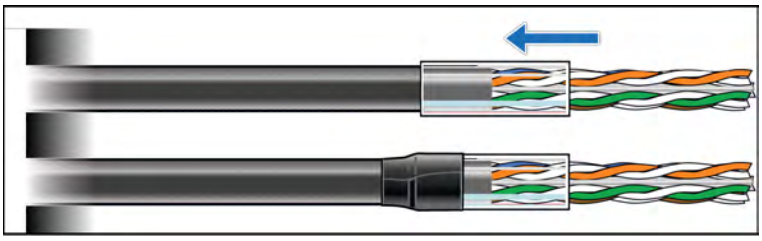
Some cables are gel filled and the termination includes cleaning the excess gel and blocking the end with silicone sealant to prevent future leakage. A typical blocking method uses a 2 cm length of Alpha Wire PVC-105-2 tubing or equivalent.

1. Fill all space inside the tubing with B-sealant.



2. Position the filled tube to overlap the end of the inner jacket and seal the gel. Clean off all excess sealant.

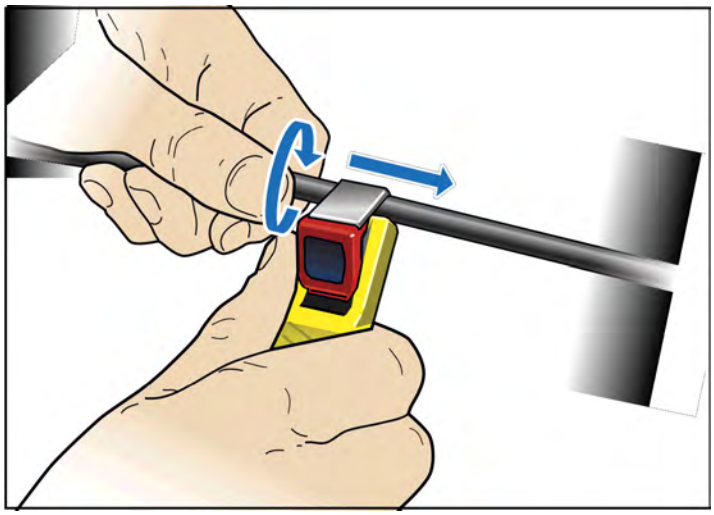
Note: Tape can be used to stabilize the tube for immediate termination before the sealant sets.



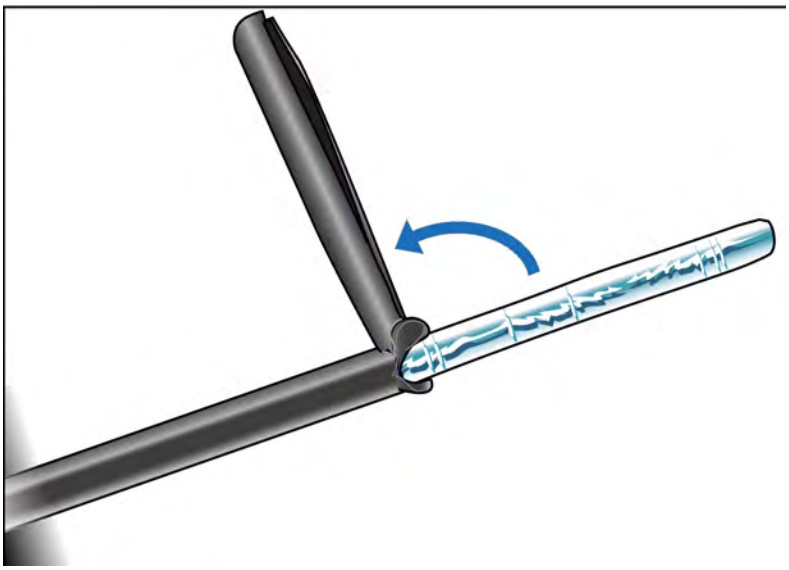
Cable termination

Shielded cables must be properly terminated, either grounded or isolated. For exposed installations requiring protection, the end of the shield can be bonded in various ways. The following procedure is an example of one method.

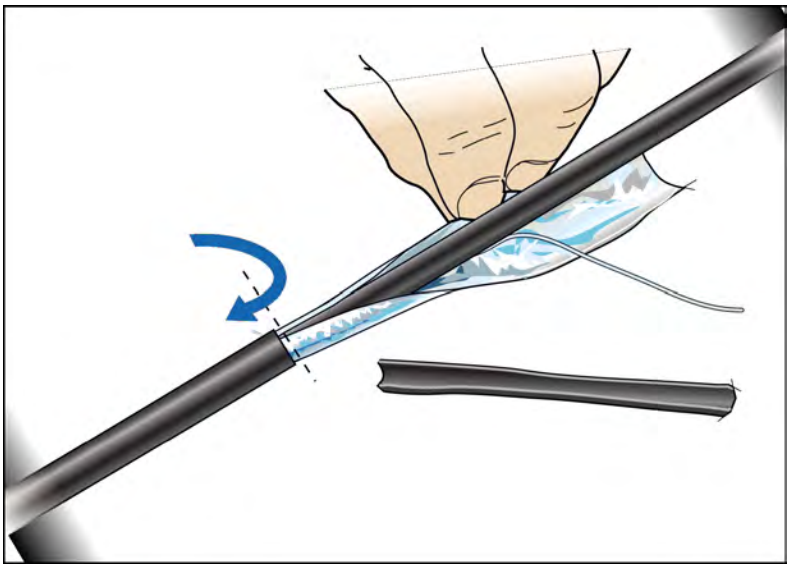
1. Make a slit along the length of the jacket. Be careful not to tear the underlying shielding.



2. Pull back the jacket along the slit and remove.

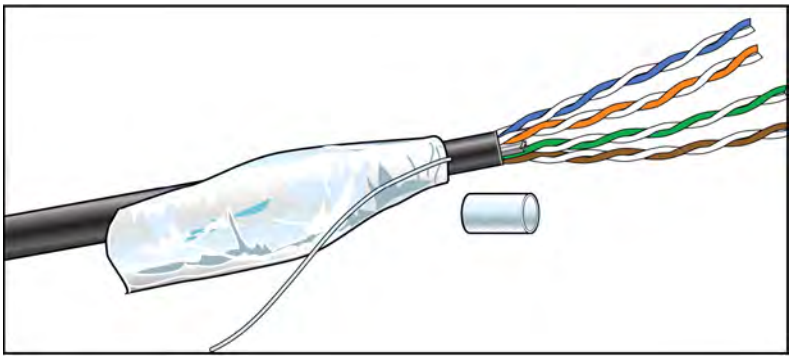


3. Fold back the foil shielding and drain wire to expose the inner jacket.

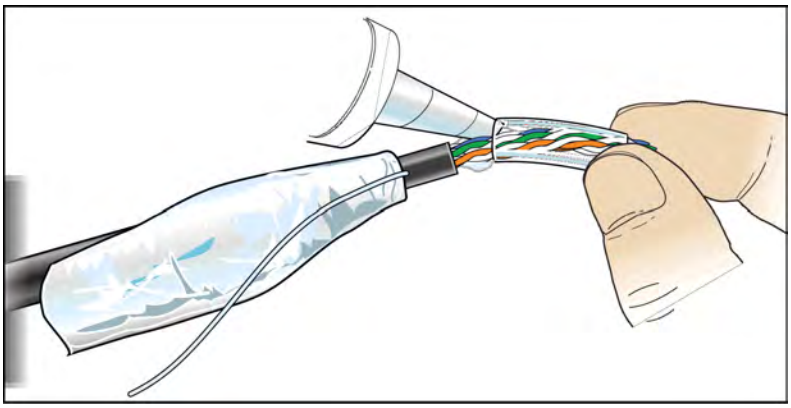


4. Prepare the inner jacket for blocking the gel and direct burial.
   a. Cut back the inner jacket
   b. Trim the flute
   c. Clean the excess gel

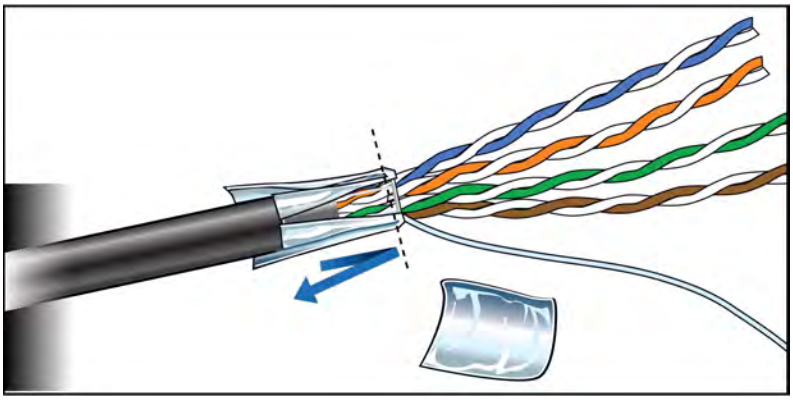
Note: The flute can be cut longer to match the blocking tube length.



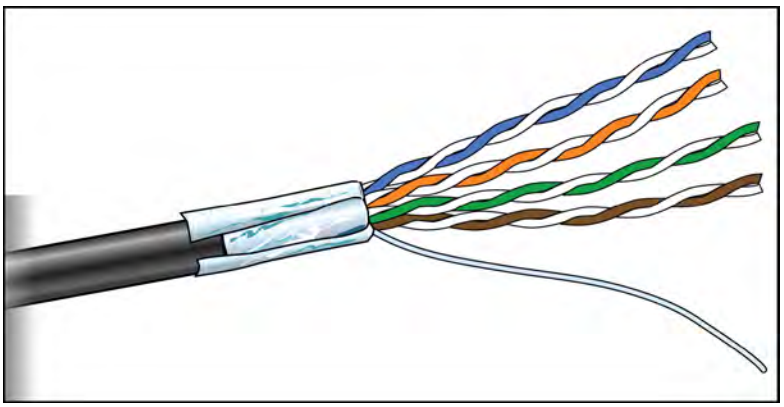
5. Fill all space inside the tubing with B-sealant and position the filled tube to overlap the end of the inner jacket and seal the gel.



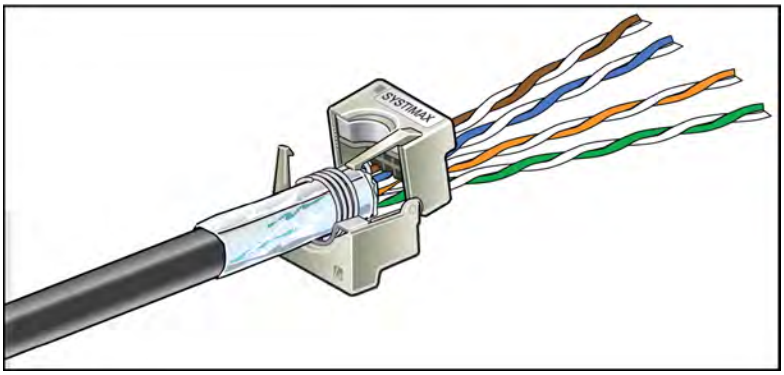
6. Fold the drain wire and foil back over the tube and position the foil to be folded back over the tube.



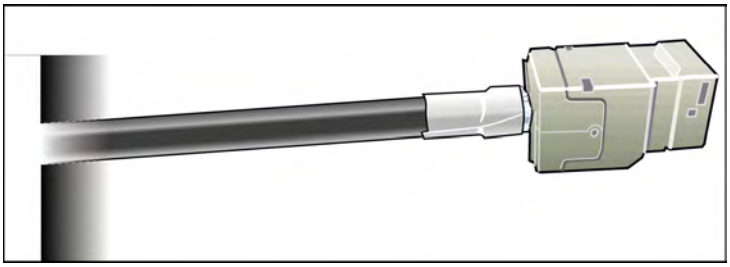
7. An extra piece of foil can be used to cover the foil seam.



8. For an HGS620 termination, wrap the drain wire at least two times around and position it where the spring clips will capture them.



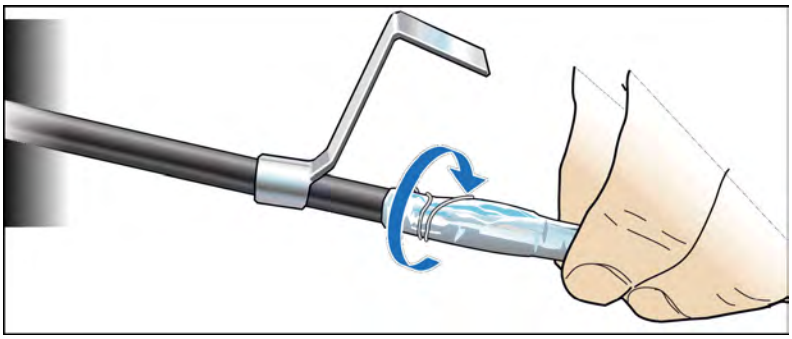
9. Tape over the foil for stability.
10. Trim the wire ends.



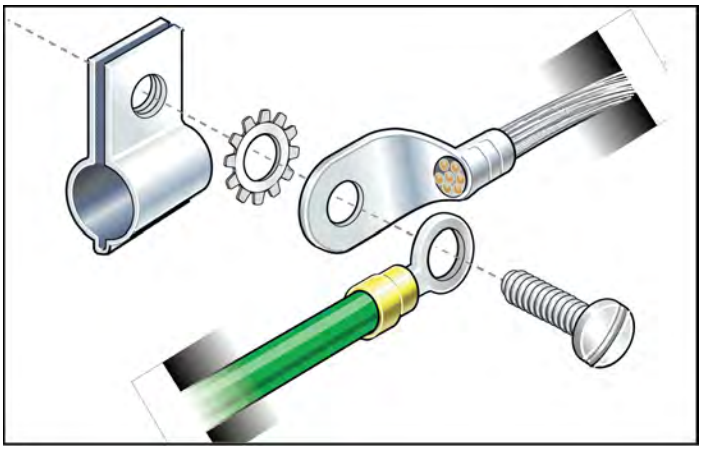
Cable grounding

For CAT-6A cables, the shield termination method is to use the ground lug and B-bond clip that are available in the 12A1 Grounding Kit.

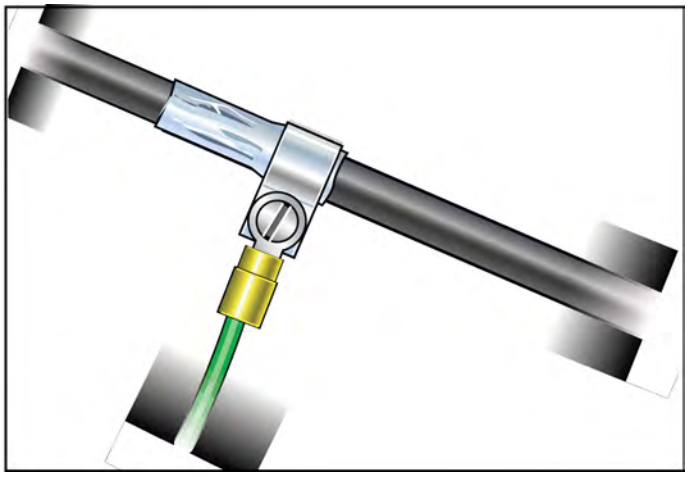
1. Fold the foil back over the jacket end and wrap the drain wire around the end and push the ground lug over the wrap.



2. Open the B-bonding clip to be placed and closed over the grounding lug.

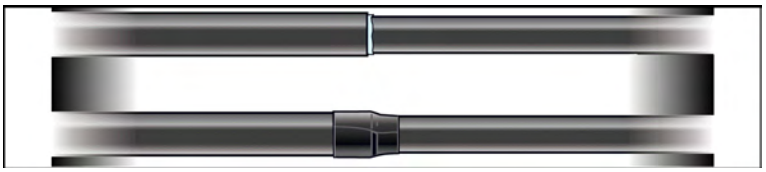


3. The lug tail can be cut off or used for ground attachment.



4. Treat the inner jacket as described in Step 4 of Cable termination .

   For an isolated shield termination, the 1572A and 1592A outer jacket foil and drain wire are removed a short distance back from the termination and electrical tape is used to isolate the foil end.



Lightning protection

CommScope recommends including lightning protection in your ONECELL system to isolate equipment from surge damage.

Important guidelines

- Verify hole diameter – blocking may need to remain outside the cover
- Maintain pair twists up to termination points

- Avoid having pairs crossing over each other

Indoor box

To protect the cables in an indoor installation from lightning damage, CommScope recommends using the ITW Linx CAT6-A-LAN protector.

CAUTION: Grounding:

- If new equipment has grounding lugs, connect to rack ground bar or C-Tap to ground drop cable.
- When installing all equipment to the supporting rack, you MUST install the designated external star washers (#12), between the equipment chassis and the rack, to ensure metal to metal contact and confirm grounding of equipment to the rack.

Surge Protection: When installing the Baseband Controller into a rack, you MUST ensure that the following Surge Protection is also installed in between the power source and system rack power.

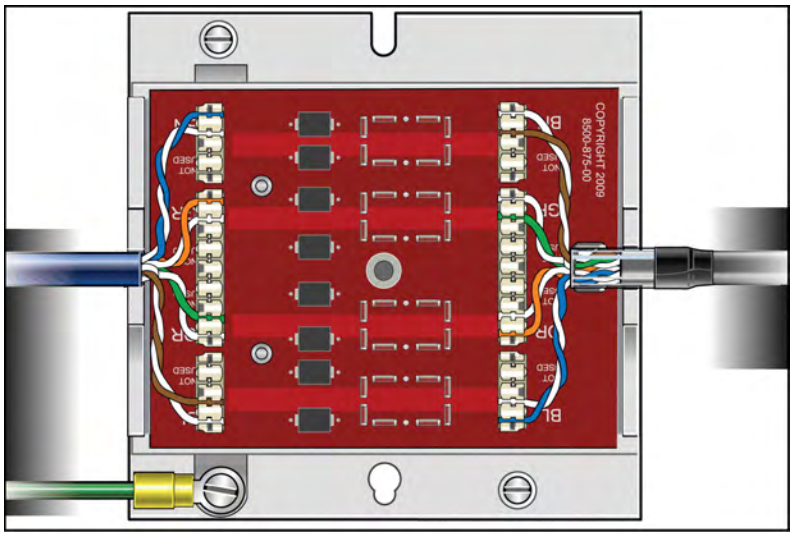
Specifications:

- Tripp-lite ISOBAR12ULTRA is a 12-Outlet Network Server Surge Protector, 3840 Joules, with Diagnostic LEDs, and is 1U Rackmount to support up to 15A.
- The Tripp-lite IBAR12-20ULTRA is a 12-Outlet Network Server Surge Protector, 3840 Joules, with Diagnostic LEDs, and is 1U Rackmount to support up to 20A.

These surge protector panels must be well grounded.

Note: The gel filled outdoor cable types will still need blocking. See Cable splicing and Cable termination for instructions on blocking cable.

FIGURE 24: CAT6-A lightning protector



Outdoor protection

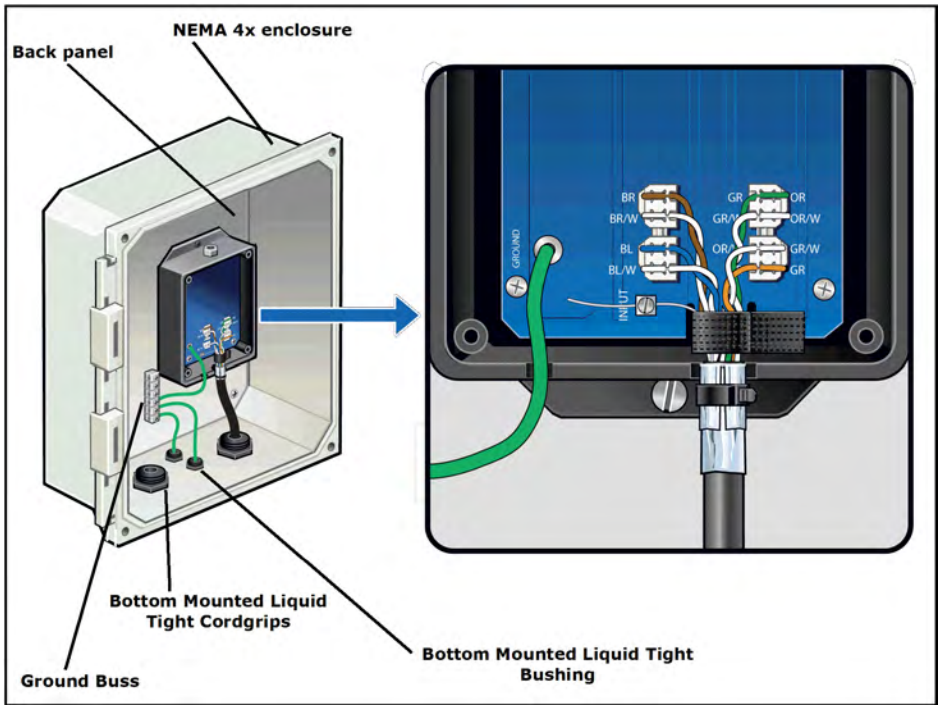
The following is an example of a pole mounted CAT-6A configuration for protecting remote equipment installed outdoors.

The below table lists the recommended parts for installing the protection equipment.

TABLE 7: CAT-6A protection equipment parts list

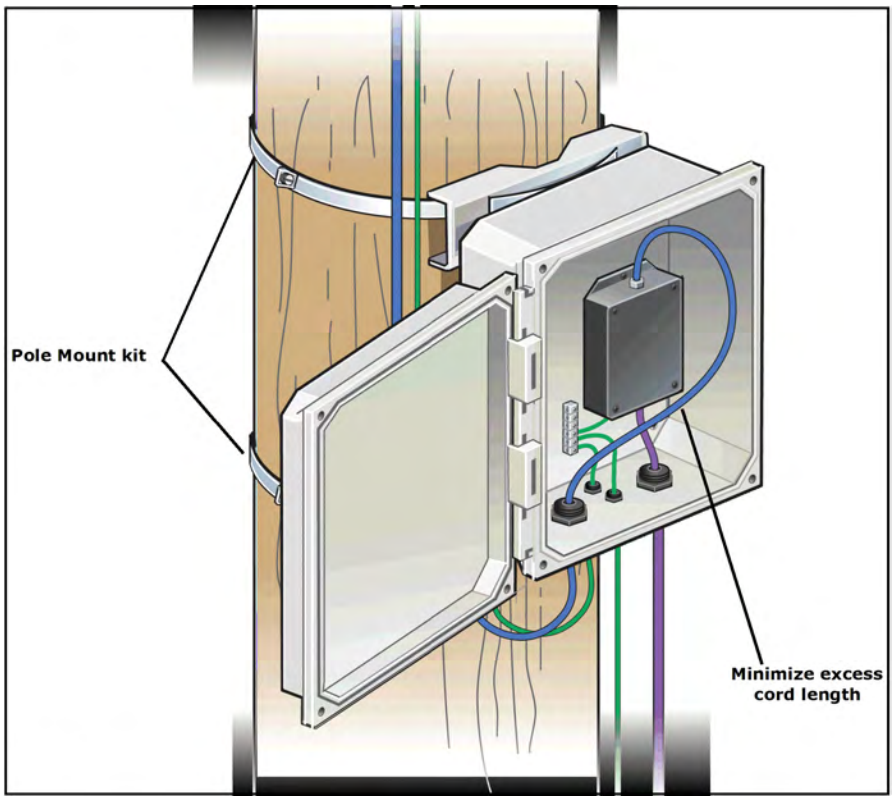
Part Name	Link to Part on Distributor's Web site
NEMA 4x enclosure	Allied Moulded fiberglass enclosure
Back panel	Allied Moulded back panel
Ground buss	Ditek surge protection buss
Bottom Mounted Liquid Tight Cordgrips	Heyco pre-assembled cordgrips
Bottom Mounted Liquid Tight Bushing	Heyco liquid tight bushings – snap-in
Protector	Ditek 110RJC6APOE Protector
Pole mount kit	Allied Moulded pole mount kit

FIGURE 25: Remote equipment protection for outdoor devices



Note: Enclosure should be mounted close to the equipment for the best protection.

FIGURE 26: Protector box mounted to pole

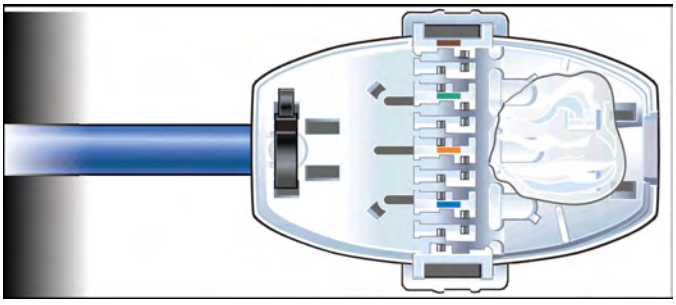


Ceiling connector

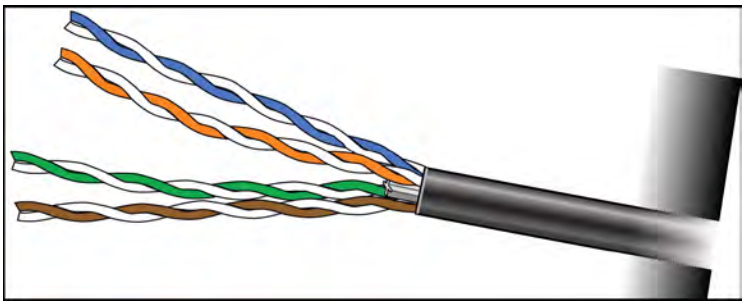
If surge protection is not needed, gel flooded cables can be blocked and transitioned to indoor cable using a ceiling connector. The following link is for the recommended CommScope part.

Ceiling connector

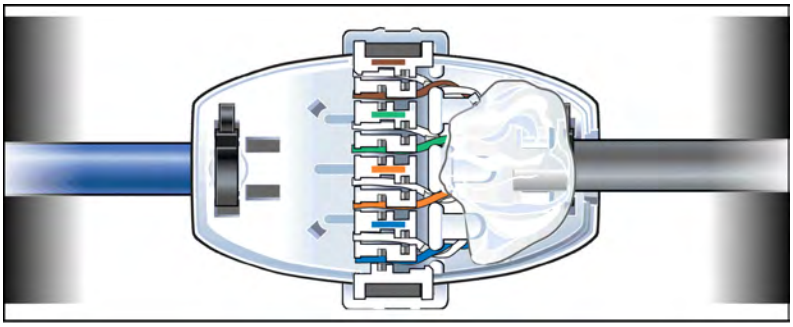
1. Terminate the indoor cable first – then lay down a bed of B sealant.



2. Clean all gel from the end of the OSP cable.



3. After the cable and conductors are positioned, fill the area around the cable end with sealant and close the connector housing.



Patch panel

CommScope recommends installing a patch panel in the NOC to connect and manage CAT-6A cables. The following is a list of recommended CommScope 24 and 48 port patch panels and high density information outlets.

- 760163436_HFTP-HD6B-1U-24
- 760163444_HFTP-HD6B-2U-48
- 760163451_HFTPA-HD6B-1U-24
- 760163469_HFTPA-HD6B-2U-48
- 760163519_HFTP-J6
- 760163527_HFTP-J10G

For more information, go to CommScope.com or contact your CommScope customer representative.

Power separation guidelines

For power separation best guidelines, refer to the following standards:

- Telecommunications Pathways and Spaces, TIA-569-C
- Information technology – Implementation and operation of customer premises cabling – Part 2: Planning and installation, ISO/IEC 14763-2
- Information Technology – Cabling Installation – Part 2: Installation Planning and practices inside buildings, BS EN 50174-2

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