Attaching a Hybrid Fiber Splice Box for a Dual Mount Installation
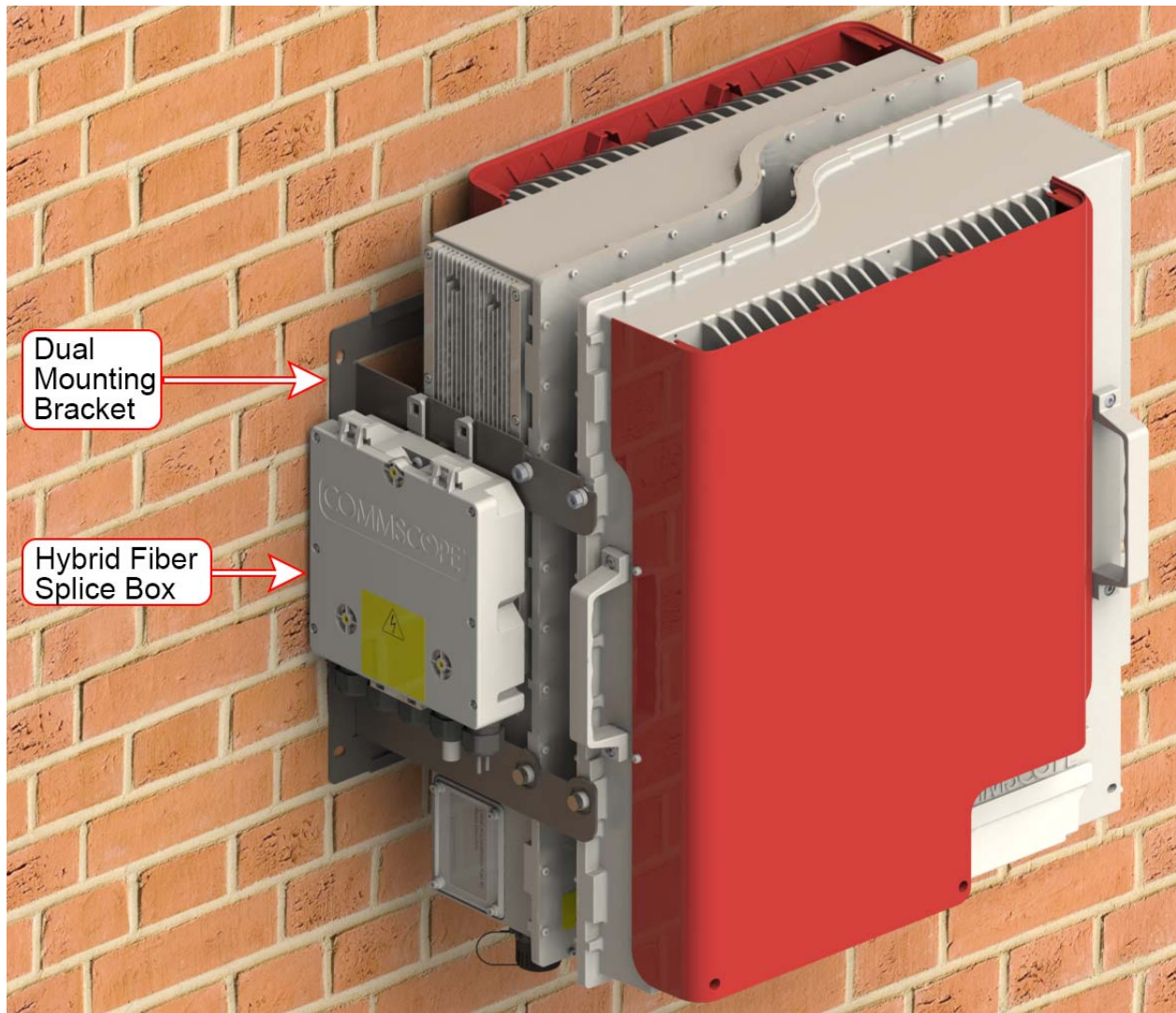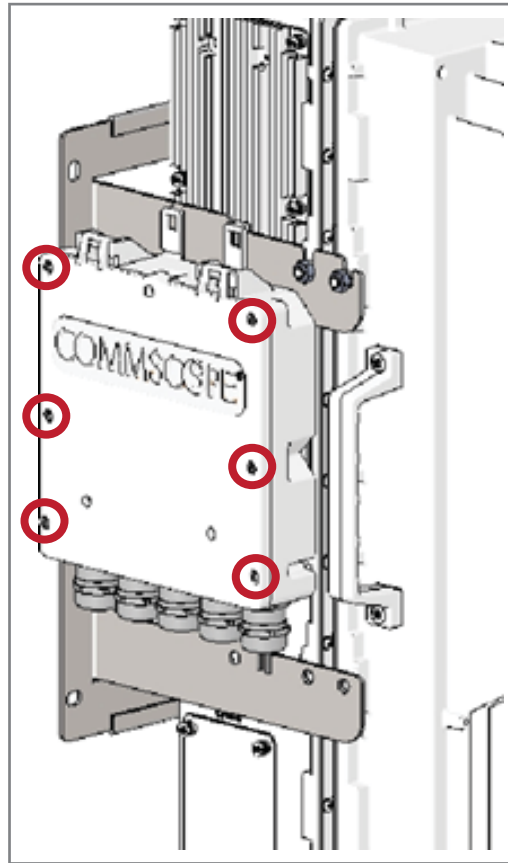
1   Break the left-hand side hook of the Splice Box bracket. This is necessary for proper mounting.

2   Hang the Splice Box onto the Dual Mounting Bracket on the left-hand side of the CAP M, as shown below.

3 Remove the six neck screws (shown below) from the front cover of the Splice Box.

4 Open the Splice Box.

5 Attach an M4 x 25 pan-head screw to the upper hole, and a second M4 x 25 pan-head to the hole on the lower, left-hand side (shown at right) of the Splice Box.

6 Close the Splice Box.

7 Replace the six neck screws that you removed from the front cover of the Splice Box in Step 3 on page 48.

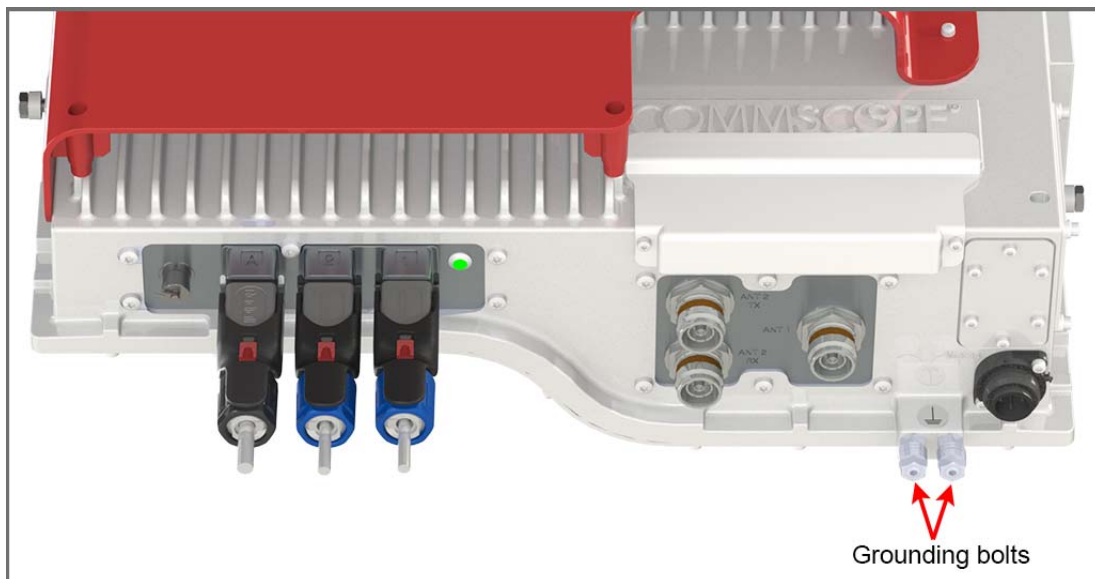**8** Go to "Grounding the CAP M" on page 49.
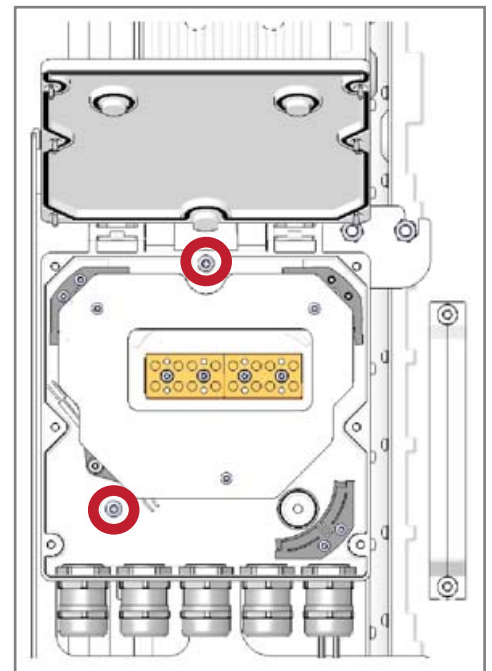
Grounding the CAP M

⚠️ **The CAP M must be grounded.**

⚠️ **Do not use the grounding bolts to connect an external device.**

1 Connect an earth-bonding cable to the grounding bolt connections on the outside of the CAP M chassis, as shown below.

Grounding bolts

2 Loosen the M6 hex nut(s), and then connect the earth-bonding cable between the two washers as shown to the right.

3 Secure the earth-bonding cable by tightening the M6hex nut(s) that you loosened in the preceding step.

4 Connect the other end of the earth-bonding cable to a suitable permanent ground per local electrical code practices.

5 Follow the steps in "Connect the CAP M Cables" on page 50.

Plain washers

Locking ring

M6 hex nut

M6 hex nut

Earth-Bounding cable
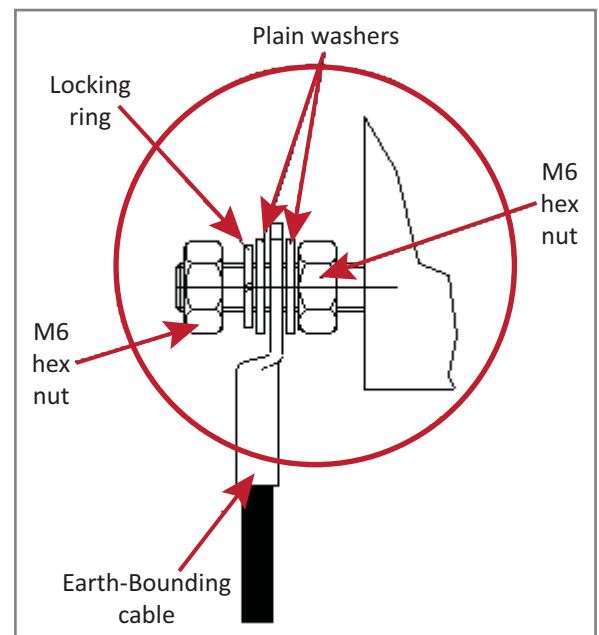
Connect the CAP M Cables

Complete the following procedures in the order in which they are presented. Unless otherwise noted, each procedure is applicable to a singular CAP M (not in a cascade), or to a Primary or Secondary CAP M in a cascade.

- "Obtain the Required Cable Material" on page 50

- "Connect the CAP M to an RF Antenna" on page 51

- "Connect the CAP M to a Classic CAN or TEN" on page 55

- "Connect a Secondary CAP M (Optional)" on page 55

- "Connect an External Ethernet Device (Optional)" on page 55.

⚠️ **Do not remove protective caps from any of the connectors until instructed to do so.**

Obtain the Required Cable Material

Contact your local CommScope sales representative to obtain the following components, as required, for this installation.

- Per the installation plan, obtain either Single Mode Fiber (SMF) or Multi Mode Fiber (MMF) that is of sufficient length to reach from the CAP M to the Classic CAN or TEN.

- Obtain at least one Optical OCTIS Kit (PN 7770612). All installations require one Optical OCTIS Kit, which is included in the CAP M shipment. If cascading a Secondary CAP M, a second Optical OCTIS Kit is required.

- Obtain SFP+ Module pairs that are appropriate for this installation. Table 11 lists a few of the available SFP+ Modules and the maximum range for each. Please see the *M0201ABF_Era_and_IONE_WCS_and_ePOI Subracks_and_PSU_InstallGuide.pdf* manual for a full list of SFP+ modules that have been tested for use with CAP M APs.

Table 11. Supported SFP+ Modules

CommScope PN	Description	Maximum Range		Notes
7660511	SFP+, 10GBase-SR, Multi Mode	**OM3** 300m	**OM4** 400m	One placed in the TEN and paired with another in the Classic CAN
7680813	SFP+, 10GBase-LR, Single Mode	10km		One placed in the TEN and paired with another in the Classic CAN

- If connecting an external Ethernet device such as WiFi or IP camera, an Ethernet OCTIS Kit (PN 7760652) and appropriate CAT cable for the device.

Connect the CAP M to an RF Antenna

The following sections guide you through connecting the CAP M; complete these procedures in the order in which they are presented.

- "Clean the RF Cable Connectors" on page 51

- "Connect the Antenna Cable(s)" on page 54.

Clean the RF Cable Connectors

This section tells you how to clean RF cable connectors. The graphics in this section illustrate the cleaning procedure and do not show the CAP M.

⚠️ **This procedure requires the use of compressed air. Wear protective clothing—especially protective glasses—to protect against injury from flying particles.**

🔥 **This procedure requires the use of flammable material. There is a risk of fire. Keep away from sources of ignition.**

⚠️ **This procedure requires the use of eye irritant product. There is a risk of eye irritation. Avoid contact with eyes and skin. Wear protective clothing—especially protective glasses.**

Do the following to clean the RF cable connectors.
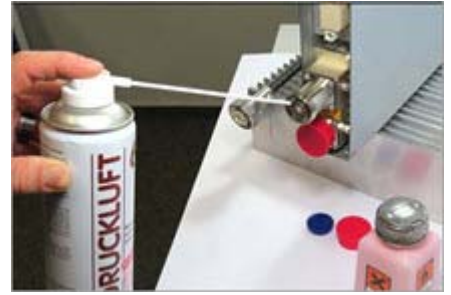
1 Gather the following cleaning tools:

- Isopropyl alcohol

- Compressed air

- Lint-free wipe

- Cotton buds.

2 Remove the protective cap from the RF connector.

3   Use compressed air to remove metal chips and small particles from the mating and inner surfaces of the connector.

4   Use a lint-free wipe drenched with isopropyl alcohol to clean the connector winding.

5   Use a cotton bud drenched with isopropyl alcohol to clean the lip of the inner ring.

6   Use a cotton bud drenched with isopropyl alcohol to clean the inside surface of the inner ring.

7   Use a cotton bud drenched with isopropyl alcohol to clean the inside of the center conductor spring tines.

8 Remove the protective caps from the unit connector, and then clean it the same way that you cleaned the cable connector.

9 Use compressed air to remove metal chips and small particles from the mating and inner surfaces of the connector.

10 Use a lint-free wipe drenched with isopropyl alcohol to clean the winding area.

11 Use a cotton bud drenched with isopropyl alcohol to clean the inside mating surface of the inner ring.

12 Use a cotton bud drenched with isopropyl alcohol to clean the outside surface of the center pin.

Connect the Antenna Cable(s)

The following information regarding antenna mapping and is relevant to all CAP M variants.

- For Non-MIMO bands, there is no channel mapping option for the transceiver/antenna port. The transceiver/antenna port relationship is fixed in hardware.

- For MIMO bands, the Era GUI maps MIMO channels according to their AP designation:
  - AP0 to antenna port ANT1
  - AP1 to antenna port ANT2.

- When using SISO channels on a CAP M that supports MIMO, the system will automatically balance the number of channels between the two antenna ports, where the first SISO channel is mapped to ANT1, the second SISO channel is mapped to ANT2, and so on.

Do the following to connect the antenna cables:

1 Obtain 50Ω coaxial cables that are of sufficient length to reach from the CAP M to the passive antenna. The end of the 50Ω coaxial cable that will connect to the ANT connectors can be either a push-pull connector or a threaded connector.

2 Install the passive antennas per the manufacturer's installation instructions. Use Table 12 to determine how to connect to the antenna correctly for each CAP M variation.

Table 12. *Mapping CAP M Models to Antennas*

Part Number	Model Name	ANT 1	ANT 2 TX	ANT 2 RX
7781125-000x	CAP M 4/70/80	RX/TX 700/800MHz	TX 400 MHz	RX 400 MHz

3 Remove the IP67/EMI blank plug from the ANT connectors.

4 Connect the passive multi-band antenna to the ANT connector using coaxial cable with the least amount of loss possible.

- If the 50Ω coaxial cable has a push-pull connector, make sure the cable is seated firmly in the ANT connector.

- If the 50Ω coaxial cable has a threaded connector, torque the connector 5 N-m (3.69 ft-lb). Do not over-tighten the connector.

5 Connect the other end of the 50Ω coaxial cable to the passive antenna installed in Step 2.

6 For a MIMO installation, repeat Step 1 through Step 5 to connect an antenna cable to ANT2.

Connect the CAP M to a Classic CAN or TEN

Connect the CAP M Optical Port 1 as appropriate for this installation. Note the maximum range listed in Table 11.

1 Remove the dust cap from the CAP M Optical Port 1 connector and the connectors on the SMF or MMF.

2 Follow the local cleaning technique to clean the optical port for each SFP+ Module.

3 Clean the connectors on the SMF or MMF following the fiber supplier's recommendations.

4 Install the SFP+ connector and Optical OCTIS Kit on the end of the SMF or MMF that will connect to the CAP M, and then connect that end of the fiber to the CAP M Optical Port 1 connector. (Refer to the technical data sheet that ships with the OCTIS Kit for further information.)

5 Use the other SFP+ Module to connect the other end of the SMF or MMF to an open port on the OPT Card.

> **If installing a CAP M with a Hybrid Fiber Splice Box (PN 7693816-xx), the optical fiber will be hanging from the Splice Box.**

Connect a Secondary CAP M (Optional)

If appropriate for this installation, connect the Optical Port 2 connector. Note the maximum range listed in Table 11 on page 50.

1 Raise the lever on the EMI/IP67 cap on Optical Port 2 connector and remove the cap.

2 Remove the caps from the connectors on the SMF or MMF.

3 Follow the local cleaning technique to clean the optical port for each SFP+ Module.

4 Clean the connectors on the SMF or MMF following the fiber supplier's recommendations.

5 Install the SFP+ and Optical OCTIS Kit on the end of the fiber that will connect to the CAP M and connect that end of the SMF or MMF to the CAP M Optical Port 2 connector. (Refer to the technical data sheet that ships with the OCTIS Kit for further information.)

6 Use another OCTIS Kit and the other SFP+ Module to connect the other end of the SMF or MMF to Optical Port 1 on the cascaded CAP M.

Connect an External Ethernet Device (Optional)

> ⚠ **If you are not connecting an Ethernet device, do not remove the plug from Port A.**

If connecting an Ethernet device to a cascaded pair, this must be the Primary Fiber CAP M.

1 Read and follow the rules in "Cat6A Cable Requirements for Ethernet Devices" on page 17.

2 Raise the lever on the EMI/IP67 cap on the Port A connector, and then remove the connector's plug.

3 Follow the local cleaning technique to clean Port A.

4 Install an Ethernet OCTIS Kit on the end of the CAT cable that will connect to the Fiber CAP M, and then connect that end of the cable to Port A on the Fiber CAP M. (Refer to the technical data sheet that ships with the OCTIS Kit for further information.)

> ⚠️ **Cat6A, including all Cat6A cables, Cat6A Patch Cords, and Patch Panels, between Port A on the Fiber CAP M and an auxiliary Ethernet device cannot exceed 3 meters (9.8 feet).**

5 Connect the other end of the CAT cable to the Ethernet port of the auxiliary device.

6 Go to "Power the CAP M" on page 56.

Power the CAP M

> ⚡ **The CAP M is powered on as soon as power is connected to it. The CAP M must therefore be grounded before you connect any electrical power to it. If you have not completed the steps in "Grounding the CAP M" on page 49, stop and do so before proceeding.**

> ⚡ **For the AC power supply connection, a minimum cross section of 1.5 mm2 is required and for the DC power supply connection, a minimum cross section of 2.5 mm2 is required. Each wire must observe the applicable local regulations regarding loop impedance, voltage drop, and methods of installation. Make sure to connect the correct voltage to the CAP M.**

For the CAP M to operate, the Mains power must be connected to the CAP M Mains connector. Either an AC or a DC power cable is delivered with each CAP M—the type of power cable delivered is dependent on the type of power supply in the CAP M.

CAP M AC Power Cable

The AC power cable is a 3.2 m (10.5 ft) 16 AWG cable with a 4-pin Amphenol C016 series plug on one end to connect to the CAP M Mains connector. The other end of the cable is unterminated with 3 end splices to connect to the AC power source. A 10 m (33.7 ft) AC power cable is also available as an option. The AC power cable is shown in Figure 9.
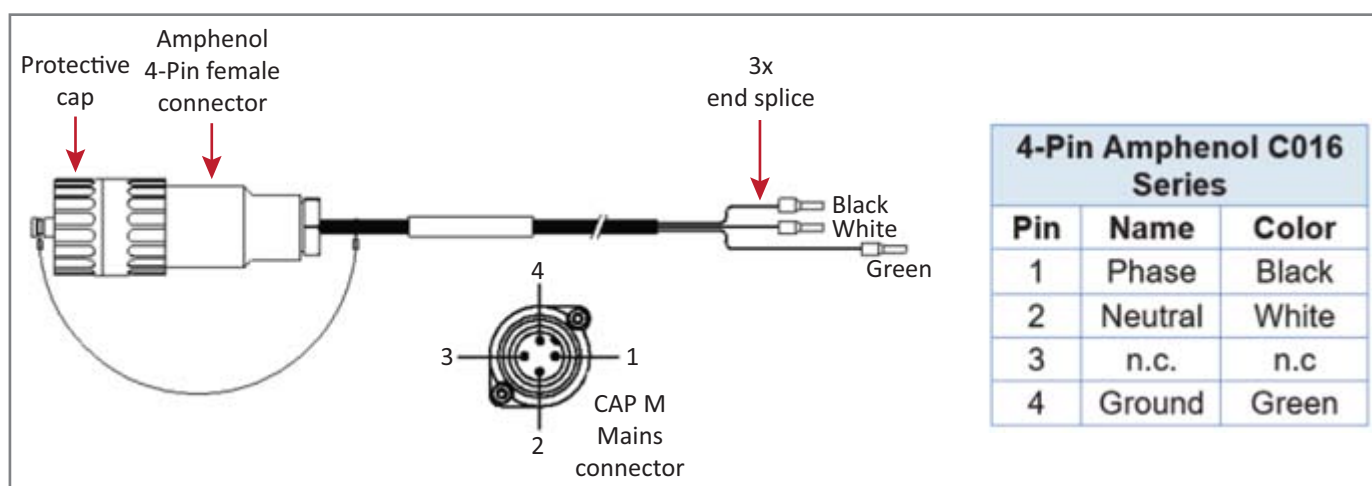

4-Pin Amphenol C016 Series

Pin	Name	Color
1	Phase	Black
2	Neutral	White
3	n.c.	n.c
4	Ground	Green

Figure 9. CAP M AC Power Cable

CAP M DC Power Cable

The standard CAP M DC power cable is a 3.2 m (10.5 ft) 13 AWG cable with a 4-pin Amphenol C016 series plug on one end to connect to the CAP M Mains connector. The other end of the cable is unterminated with 2 end splices to connect to the -48 Vdc power source. The standard DC power cable is shown in Figure 10.
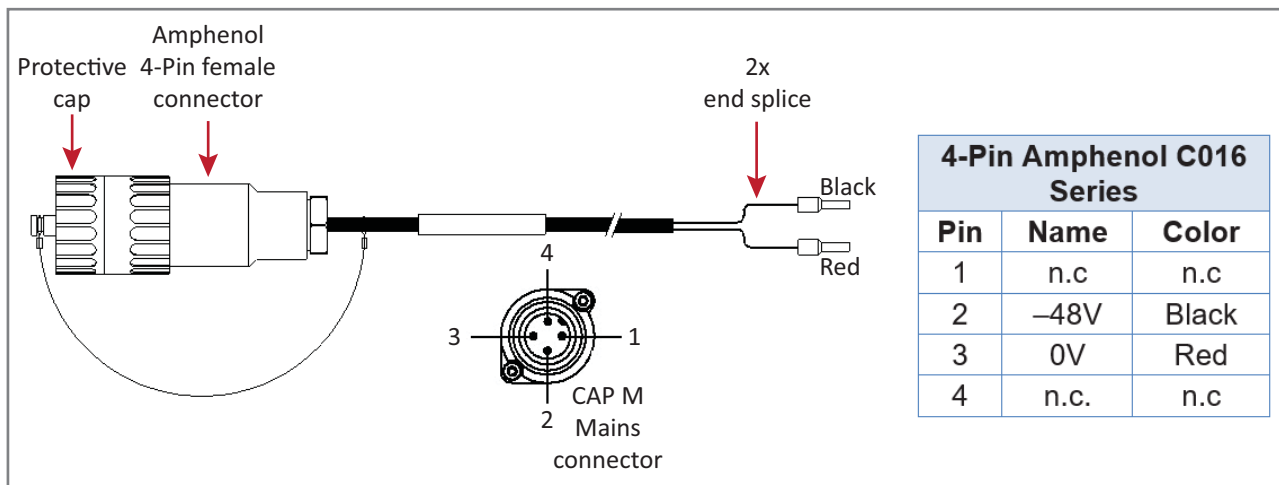
Figure 10. CAP M DC Power Cable

Connect the CAP M Power

⚠ **Do not connect or disconnect the power cable at the Mains connector while power is on. Turn off Mains power before connecting the power cable at the unit, then, engage mains power again.**

Connect the Power connector as appropriate for this installation:

- "Connect the Mains Power to the CAP M" on page 57
- "Connect a Hybrid Fiber Splice Box" on page 58.

Connect the Mains Power to the CAP M

1   Locate the Mains power cable that was delivered with the CAP M.

2   Locate or install a suitable power junction box or receptacle near the unit and route the power cable from the power source to the CAP M.

⚠ **Do not connect the cable to the unit's Mains connector at this time. The power source must be interruptible.**

⚠ **The Mains cable must be properly secured observing local regulations and electrical codes. Be sure to allow enough slack in the cable at the CAP M to plug or unplug the cable into the Mains connector.**

3   Dependent on the type of power supply used by the unit, wire the power cable to the junction box or receptacle. Refer to the color code and pin numbers shown in:

- Figure 9 on page 56 for the AC power cable
- Figure 10 on page 57 for the DC power cable.

4 With the cable's Mains plug disconnected from the CAP M, turn the circuit breaker on, unscrew the plug's protective cover, and carefully test the plug with a voltmeter to ensure that the voltage and polarity are correct.

5 Once the testing has been completed, turn off the circuit breaker.

6 Unscrew the protective cover from the Mains connector of the unit.

7 Insert the AC or DC power cable into the Mains connector as shown below; tighten the clamping ring until it is hand tight. Do not over-tighten the clamping ring.
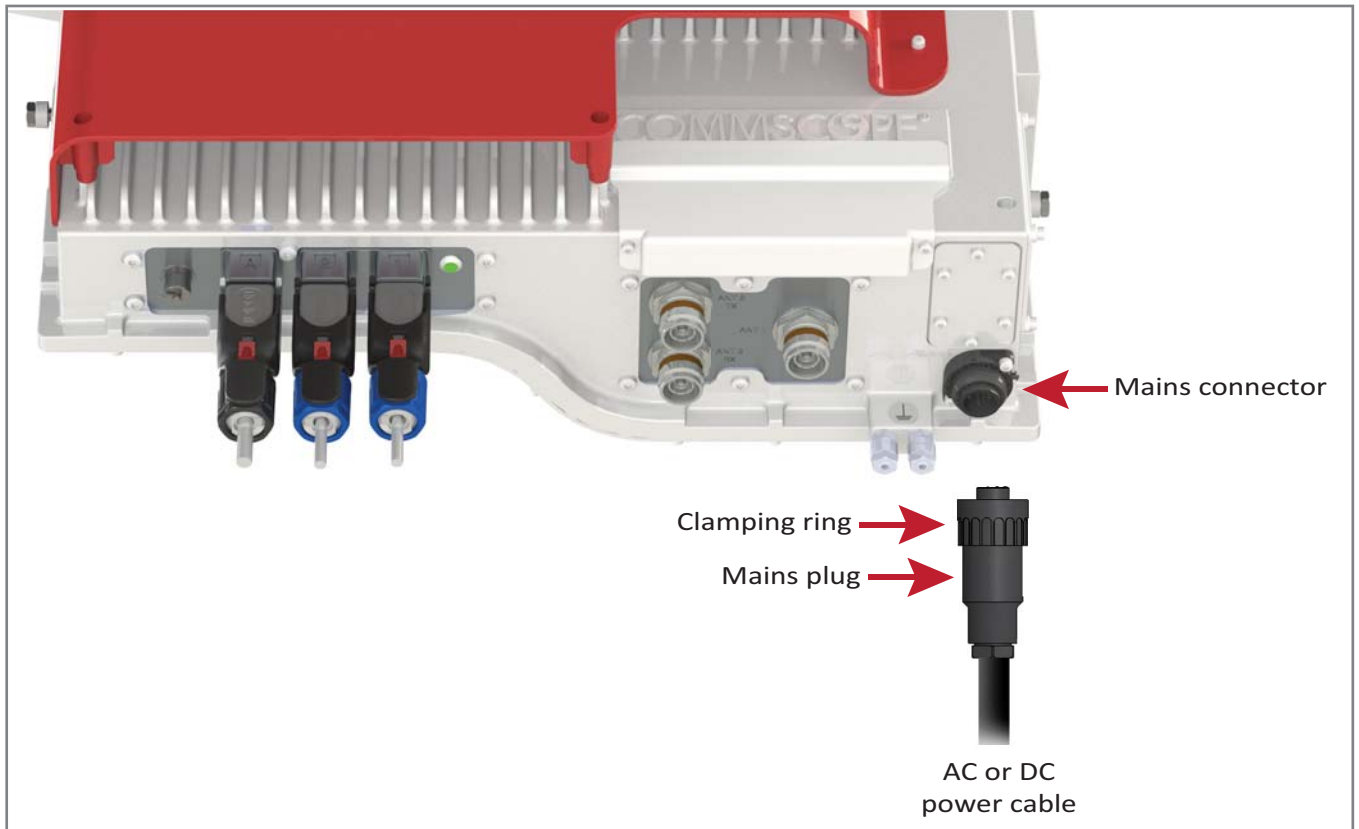
Connect a Hybrid Fiber Splice Box

For a CAP M powered by the Hybrid Fiber Splice Box (PN 7693816-xx):

- connect the power cable to the proprietary 4-pin, 36 to 60 Vdc Power connector on the CAP M, and terminate the other end to the CAP M Hybrid Fiber Splice Box.

- Install an SFP+ module of the desired type (same as used at the OPT Card port) into the OCTIS connector before connecting the LC Fiber pigtail.

- connect the LC Fiber Pigtail to the supplied OCTIS connector and splice the other end of the fiber pigtail inside the locally-mounted CAP M Hybrid Fiber Splice Box. The LC Fiber Pigtail, which is not included with the Fiber Splice Box for the CAP M must be obtained separately.

Power the CAP M

The CAP M is powered on as soon as power is connected to it. Under normal operating conditions, the Power LED turns on briefly when the unit is first detected. It will then go out briefly, followed by an initialization period during which the Power LED flashes slowly while the CAP M is configured. The Power LED remains a steady green (not flashing) once the unit reaches a fully operational state, which typically occurs within 45 seconds.

CAP M Power LED behavior is as follows:

- Off—CAP M is not powered on.

- Steady green—CAP M is powered on and operational.

- Slow flashing green—CAP M is powered on and initializing.

- Rapid flashing green—CAP M Unit Identifier active via the **Flash LED** function in the Era GUI.

CAP M Alarms Connector

The CAP M 4/70/80 has two sets of dry contacts that can be used to send CAP M alarms/status to a third party monitoring device? The connector is a Binder series M9. The connector drawing and pin numbering is show below in Table 13.
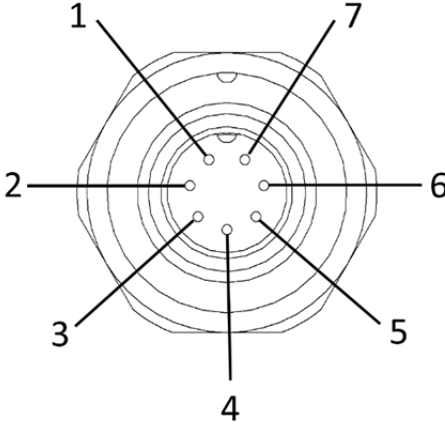
Alarms Output Connector Binder Series M9 IP67	Alarms Output Connector Pins Table	
	Pin 1	Normally Close 2
	Pin 2	Common 2
	Pin 3	Normally Open 2
	Pin 4	not used
	Pin 5	Normally Open 1
	Pin 6	Common 1
	Pin 7	Normally Close 1

Table 13. CAP M Alarms Connector

CONTACTING COMMSCOPE

The following sections tell you how to contact CommScope for additional information or for assistance.

CMS Global Technical Support

The following sections tell you how to contact the CommScope Mobility Solutions (CMS) Technical Support team. Support is available 7 days a week, 24 hours a day.

Telephone Helplines

Use the following Helpline telephone numbers to get live support, 24 hours a day:

24x7	+1 888-297-6433 (Toll free for U.S. and Canada)
EMEA 8:00-17:00 (UTC +1)	+ 800 73732837 (Toll free for parts of EMEA and Australia)
	+ 49 909969333 (Toll charge incurred)
	Calls to an EMEA Helpline outside of the 8:00 to 17:00 time frame will be forwarded to the 24x7 Helpline.

Online Support

To go to the CommScope Wireless Support Request web site from which you can initiate a Technical Support ticket, do one of the following:

- Scan the QR Code to the right.

- If viewing this document online as a PDF, click on the following URL link:

  http://www.commscope.com/wisupport

- Enter the preceding URL into your web browser, and then press **ENTER** on your keyboard.

Waste Electrical and Electronic Equipment Recycling

Country specific information about collection and recycling arrangements per the Waste Electrical and Electronic Equipment (WEEE) Directive and implementing regulations is available on CommScope's website.

To access information on the CommScope recycling program, do any of the following:

- Scan the QR Code to the right.

- If viewing this document online as a PDF, click on the following URL link:

  http://www.commscope.com/About-Us/Corporate-Responsibility-and-Sustainability/Environment/Recycling/

- Enter the preceding URL into your web browser, and then press **ENTER** on your keyboard.

Hardware to Software Mapping Information

1 Scan the QR Code to the right to view or download the minimum software requirements for each of the DCCS hardware modules. Alternatively, you can go to the following web address to access the portal:

http://www.commscope.com/collateral/DCCS_HW_SW_Mapping/

2 Click on a document link to open it, or right click on the link and select the **Save target as...** option from the contextual menu.

Mobility Solutions Technical Training

1 To access training on the online CommScope Mobility Solutions site, do one of the following:

- Scan the QR Code to the right.

- If viewing this document online as a PDF, click on the following URL link.

  https://commscope.netexam.com

- Enter the preceding URL into your web browser, and then press **ENTER** on your keyboard.

2 Review the courses listed in separate course panels; for further information on a course, click its **Full details** button. Instructor-led courses are conducted in North America and Europe. Before choosing a course, please verify the region.

3 To view the course schedule and register, click **Course Registration** at the top of the course page; this opens the **Partner Learning Center Login** page.

- If you have an account, enter your **Username** and **Password**, and then click **Login**. (Click on the **Reset Password** link if you do not have your login information.)

- If you don't have an account, click on the **Create New User Account** link under the **Login** button, and follow the prompts.

  Once you have logged in, you will see a list of available class dates.

4 Click the date you prefer and select the **Enroll** or **Register Now** button to enroll. Follow the prompts through the payment process.

5 Click either the **Available Training** or **Calendar** tab to view other training courses.

For training related questions, please contact the CommScope DAS and Small Cell Institute at one of the following emails, as appropriate for your location:

Americas: DASTrainingUS@CommScope.com

EMEA: DASTrainingEMEA@CommScope.com

Accessing CommScope Era Series User Documentation

1 Scan the QR Code to the right to go directly to the CommScope DCCS Customer Portal, where you can access the DCCS user documentation.

Alternatively, you can go to the following web address to access the portal:

https://www.mycommscope.com

2 Access to the Customer Portal requires a user account and password. On the Sign In page, do one of the following:

- If you have an account, enter your Email address and Password, and then click Sign In.

- If you don't have an account, click New user registration, and follow the prompts.

3 Click DCCS to open the site.

4 Select your site, and then click on a product link to open the product page.

5 Click on the title of any document to open it.