Installation Guidelines - – HELIAX® FiberFeed Solutions for RRH Systems

Fiber/Copper Cables: RFF-16SM-812-APE | RFF-16SM-810-APE | RFF-16SM-808-APE

Related Support and Learning Opportunities Offered by the Andrew Institute

The insights and expertise contained in this manual represent just one small part of Andrew Solutions global learning initiative. Few industries are evolving as quickly as wireless communications. Every technological innovation impacts what happens in the field. Our customers look to the Andrew Institute to make sure their technicians and installers are well trained, well-prepared, and well-educated to take advantage of opportunities as they evolve. Here are a few groups within Andrew Solutions that are working to make it happen:

Field Engineering Services (FES)

Support services, such as our Field Engineering Services (FES) Group gives Andrew Solutions' customers access to technical support where and when it is needed the most — in the field. The FES team is staffed by an expert team of technicians who, in turn, are supported by some of the brightest and most experienced product line managers. With all of this knowledge and support FES' Andrew Institute offers our customers access to hands-on, specialized training classes.

Customer Service Center

United States and Mexico 1-800-255-1479 or 1-888-235-5732
International: +1-779-435-8579

For the most current, up-to-date information on all our products and product information please visit our eCatalog section at www.commscope.com.

Tools Required

- Fiber Optic Continuity Tester
- Fiber Optic Cleaning Kit
- Electrician Scissors
- Shear Cutter – small
- Long Nose Pliers
- Flat Head Screwdriver – jewelry
- Flat Head Screwdriver – large
- Torx key set (Ti5)
- Voltmeter
- Safety Glasses
- Safety Gloves
- Knife – blunt end preferred
- Wire Brush or Low Grit Emery Cloth
- 1/2" Nut driver
- Two adjustable wrenches (or M25 & M28 wrenches)

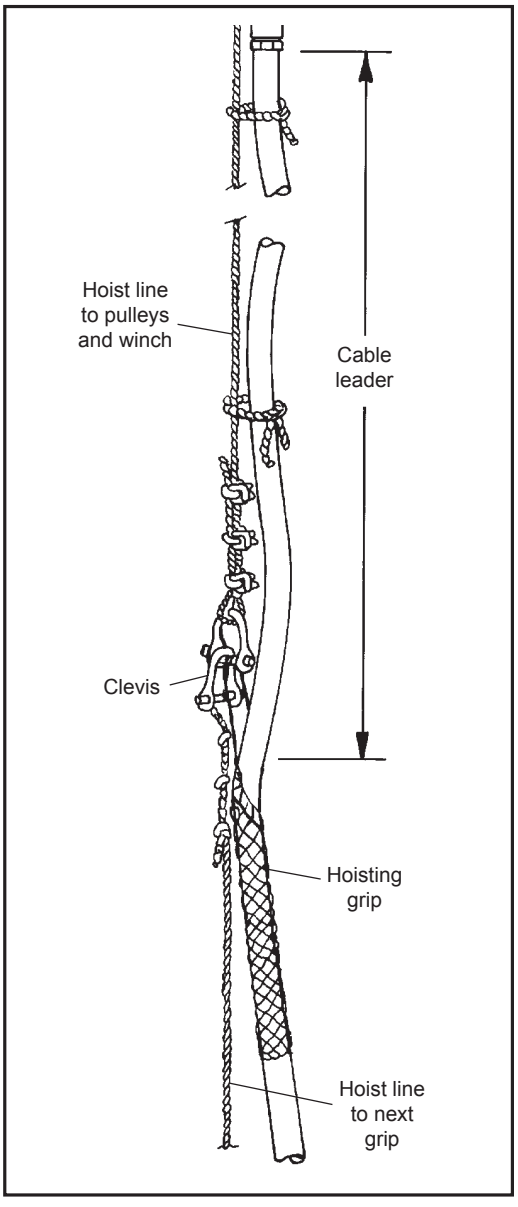
System Overview

Hybrid Configuration

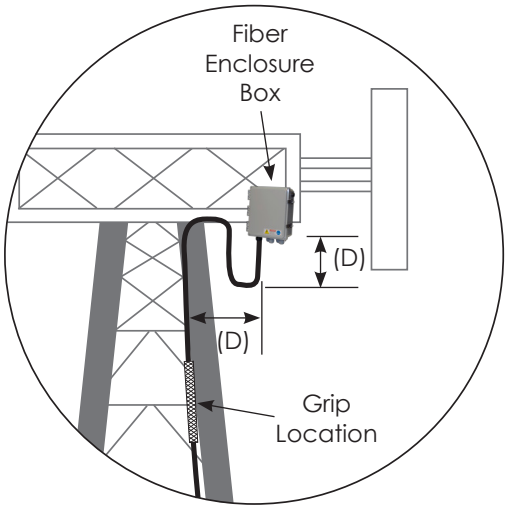
- Up to 4 RRUs per sector, 12 RRUs site max
- One to three vertical hybrid cables
- Main Hybrid Cable is Terminated at both Ends
- Armored jumpers from Junction Box to RRU
- Fully Armored Cables from BBU to RRU
- Lockable Junction Boxes
- Quantity sixteen Singlemode Fiber
- 24 Fiber BBU patch panel kit
- Install with standard tools and simple fiber tester

Trunk Fiber Feeder

- In general this cable will handle similarly to 7/8" coaxial cable, and similar installation techniques apply. **All cables are individually serialized, be sure to write down the cable serial number for future reference.**
- The terminated fiber ends (the broken out fibers plus connectors) however are fragile, and these must be protected during the installation process.
- Leave the protective tube and sock around the fiber tails and connectors in place during hoisting and securing the cable. Remove this only just prior to making the final connections to the Junction box.
- DO NOT BEND THE FIBER ENDS (in the orange furcation tubes) TIGHTER THAN 1.18" (30mm) BEND RADIUS ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
- Be sure that the lace up ends and fiber connectors are not damaged by attachment of a hoisting grip or during the hoisting process. Attach a hoisting grip on the jacketed cable no less than 6" below the fiber breakout point. If a hoisting grip is not easily attached, use a simple line attached below the fiber break-out point (i.e. at the cable outer jacket). Prevent the fiber tails (in protective tube) at the cable end from undue movement during hoisting by securing the protective tube (with outer sock) to the hoisting line.
- During hoisting ensure that there is a free path and that the cable, and especially the fiber ends, will not be snagged on tower members or other obstacles.
- Installation temperature range is -22F to 158F (-30C to +70C).
- Minimum cable bend radii are 22.2" (565mm) loaded (with tension on the cable) and 11.1" (280mm) unloaded.
- Maximum cable tensile load is 3560 N (800lb) short term (during installation) and 240lb (1070N) long term.
- CommScope non Lace Up Grip recommended for Monopole installations.
- **Maximum hanger spacing 3ft (0.9m).**



Hoisting Recommendations



Reminder: Plan grip location by measuring distance (D) from Fiber Enclosure Box to tower support member.

General Specifications

Cable Type	RFF-16SM-812-APE	RFF-16SM-810-APE	RFF-16SM-808-APE
Construction Type	Armored	Armored	Armored
Application	Remote radio head	Remote radio head	Remote radio head
Brand	Heliax® FiberFeed	Heliax® FiberFeed	Heliax® FiberFeed
Center Conductor Gauge	12 AWG	10 AWG	8 AWG
Conductors, quantity	8	8	8
Corrosion Protection	Water blocking tape	Water blocking tape	Water blocking tape
Inner Shield (Tape) Material	Corrugated aluminum	Corrugated aluminum	Corrugated aluminum
Outer Shield (Tape) Material	PE	PE	PE
Ripcord Material	Para-aramid synthetic fiber	Para-aramid synthetic fiber	Para-aramid synthetic fiber
Strength Member	Glass reinforced plastic rod	Glass reinforced plastic rod	Glass reinforced plastic rod

Construction Materials

Fiber Type Solution	Singlemode G.652.D fiber	Singlemode G.652.D fiber	Singlemode G.652.D fiber
Total Fiber Quantity	16	16	16
Armor Type	Corrugated aluminum	Corrugated aluminum	Corrugated aluminum
Fiber Type	TeraSPEED® Singlemode fiber	TeraSPEED® Singlemode fiber	TeraSPEED® Singlemode fiber
Fiber Type, quantity	16	16	16
Fibers Per Subunit, quantity	2	2	4
Jacket Color	Black	Black	Black

Dimensions

Cable Weight	516.0 kg/km | 347.0 lb/kft	750.0 kg/km | 510.0 lb/kft	1094.0 kg/km | 735.0 lb/kft
Diameter Over Jacket	19.81 mm | 0.78 in	23.90 mm | 0.94 in	27.90 mm | 1.1 in
Subunit, quantity	8	8	4

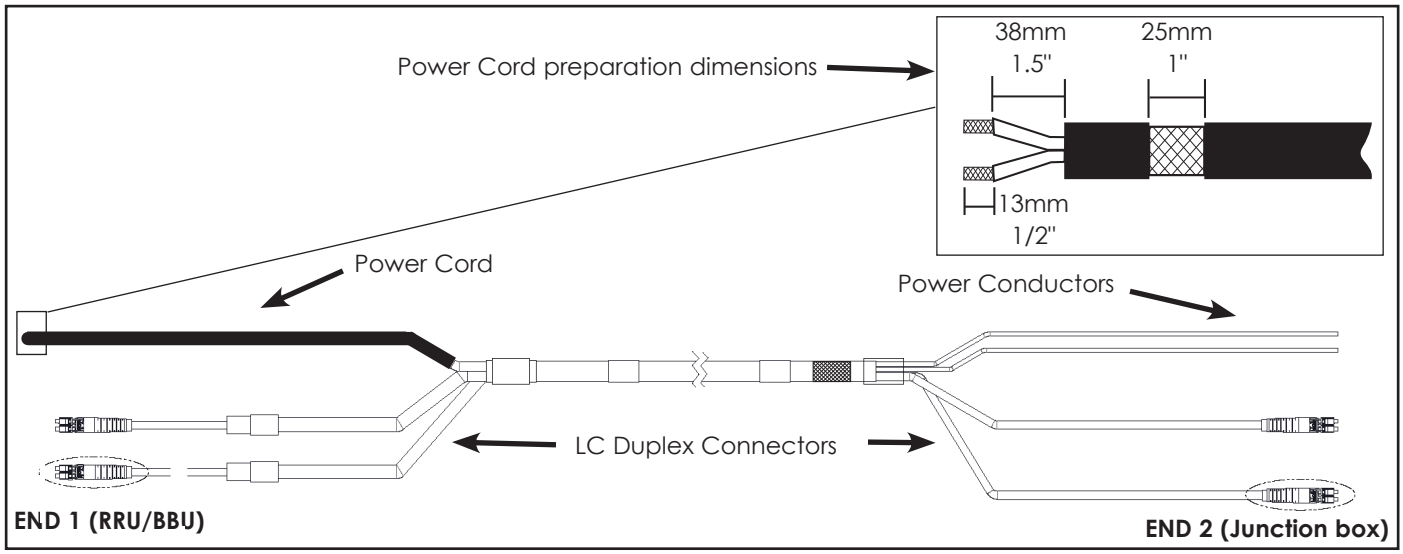
Physical Specifications

Minimum Bend Radius, loaded	396.2 mm | 15.6 in	477.5 mm | 18.8 in	558.8 mm | 22.0 in
Minimum Bend Radius, unloaded	198.1 mm | 7.8 in	238.8 mm | 9.4 in	279 mm | 11.0 in
Tensile Load, long term, maximum	801 N | 180 lbf	801 N | 180 lbf	1068 N | 240 lbf
Tensile Load, short term, maximum	2669 N | 600 lbf	2669 N | 600 lbf	3559 N | 800 lbf

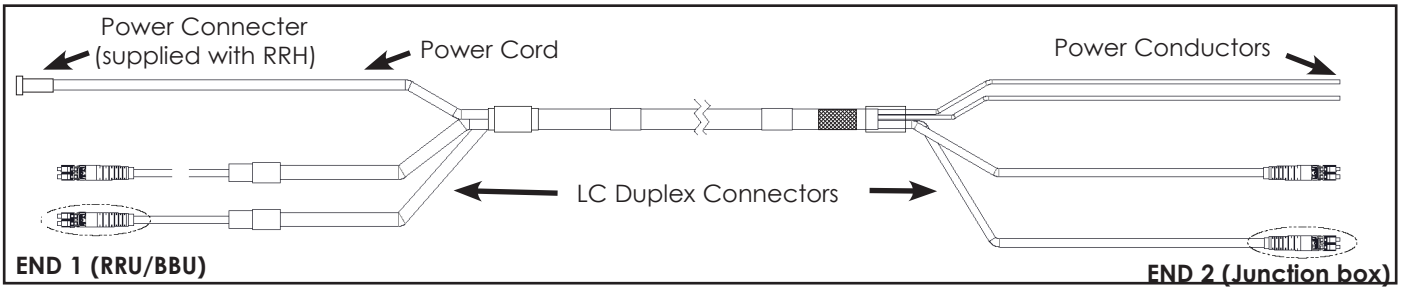
Jumper Assemblies

- In general this cable will handle similarly to a 3/8" coaxial cable.
- The terminated fiber ends however are fragile and must be protected during installation. Leave the packaging around the fiber ends in place until ready to connect the jumper between junction box and RRU or BBU.
- DO NOT BEND THE FIBER ENDS (in the orange furcation tubes) TIGHTER THAN 1.18" (30mm) BEND RADIUS ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
- Attach the main cable securely to the structure or equipment using hangers and/or cable ties to prevent strain on connections from movement in wind or snow/ice conditions.
- Ensure the LC fiber connectors are seated firmly in panel in junction box or in equipment.
- All RRU ensure the weatherproof boots for both fiber and power connections and seated firmly in the radio frame.
- Shrink tube of the jumper should be 1" (25.40mm) inside of the Junction box.
- Installation temperature range is -22F to 158F (-30C to 70C).
- Minimum cable bend radii are 10.3" (265mm) loaded (with tension on the cable) and 5.2" (130mm) unloaded.
- Maximum cable tensile load is 350lb (1560N) short term (during installation) and 105lb (470N) long term.
- Standard lengths available are 6 feet, 12 feet and 20 feet - others are available on request.
- All jumpers are individually serialized, for immediate access to test results visit www.commscope.com/webtrak/

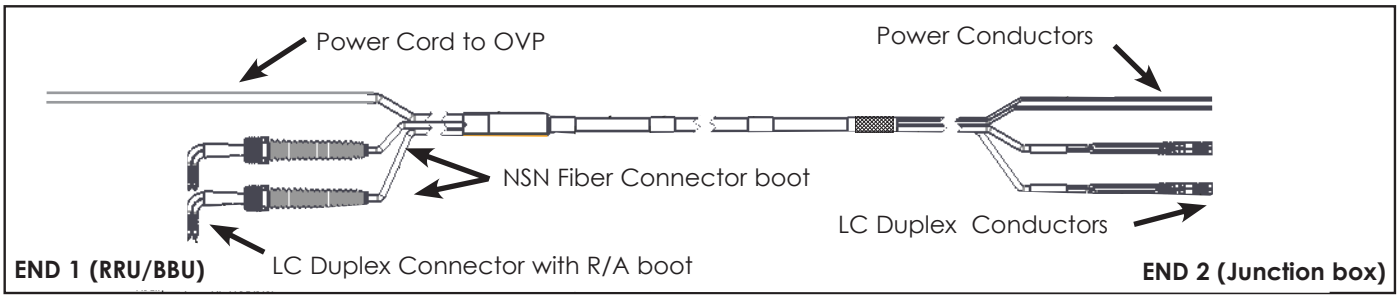
Huawei Radio



Ericsson Radio



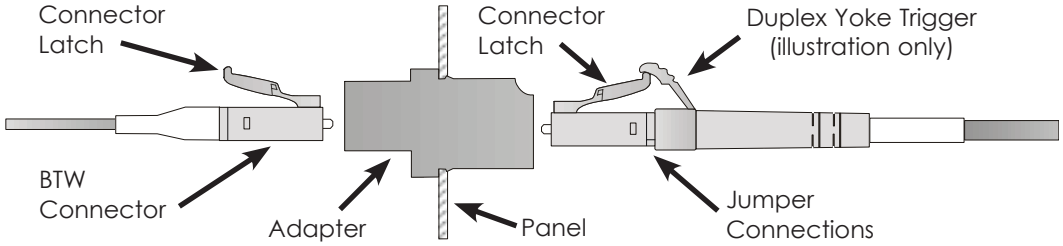
NSN Radio



LC Connectors Instructions

Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector.

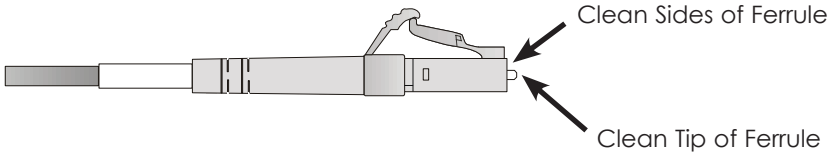
When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors.



Clean the LC Connectors and Adapter

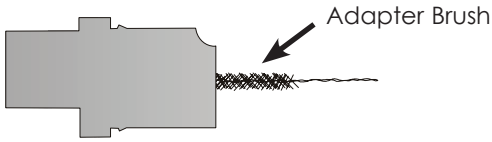
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

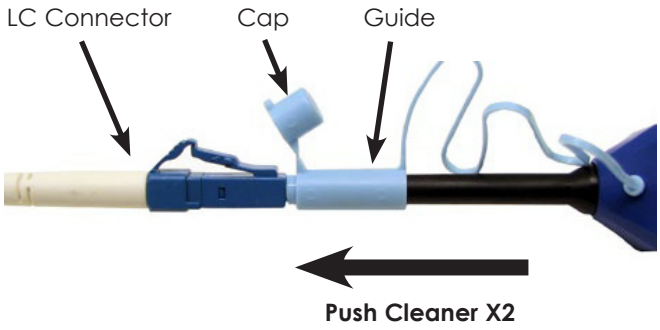


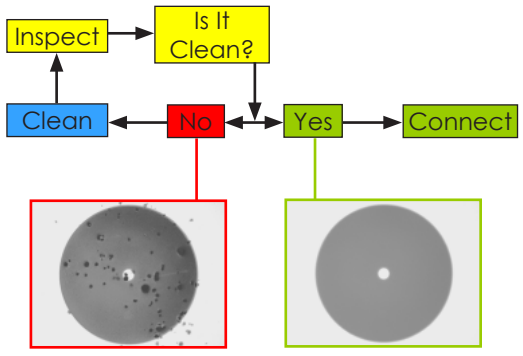
All in one cleaner

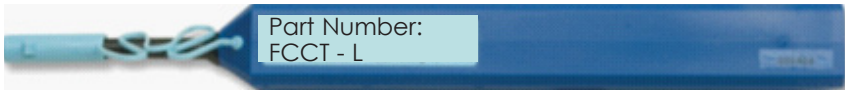
Device designed for cleaning the ferrule end faces of LC connectors

Open guide cap, insert LC connector into guide, push the outer shell to start cleaning the LC connector interface, a "click" sound indicates end of a cleaning process, repeat, close cap immediately after use.

Caution: Be careful not to slant LC connector while inserting into the Guide cap. Do not overly exert force during insertion as this may cause damage to both the connector and the cleaner.





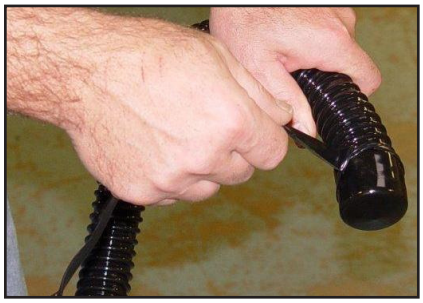


Breakout Procedure: Removal of Fiber Protection Tube

1

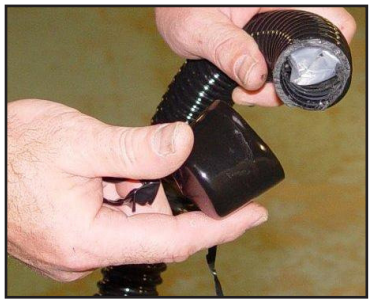
Remove electrical tape from corrugated protection tube

2



Remove electrical tape from cap and protection tube

3



Remove cap from protection tube

4

Access front section of the clear poly tube from the protection tube. While holding the clear tube, gently push the protection tube toward cable. Make sure protection tube is straight while pushing.

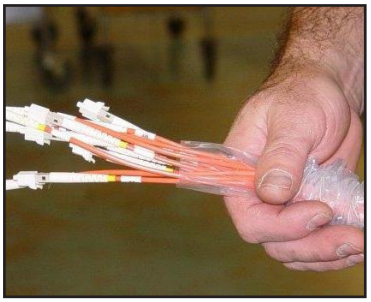
5

Expose just enough clear tube outside the protection tube for access all optical connectors.

6

Remove electrical tape from the clear poly tube.

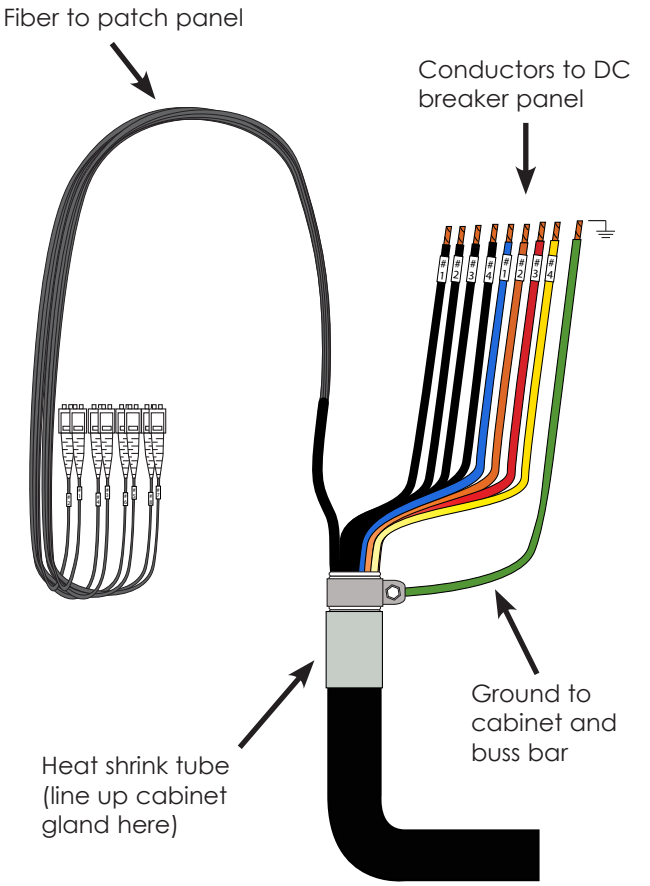
7



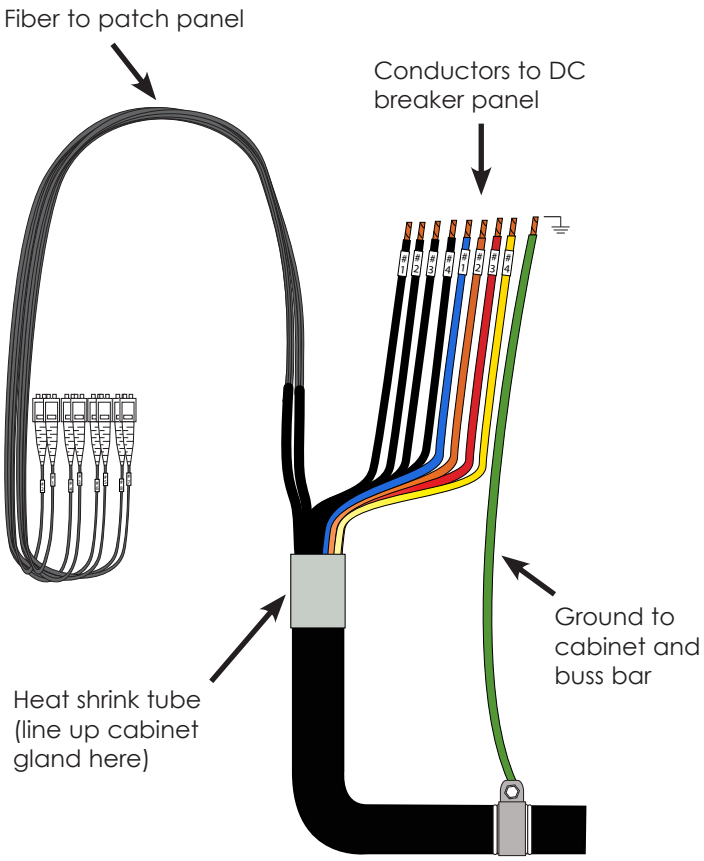
Push back poly tube to expose optical connectors. All Fiber bends minimum 1.18" (30mm) radius.

****To reinstall protection kit reverse steps****

BBU Breakout 812 / 810



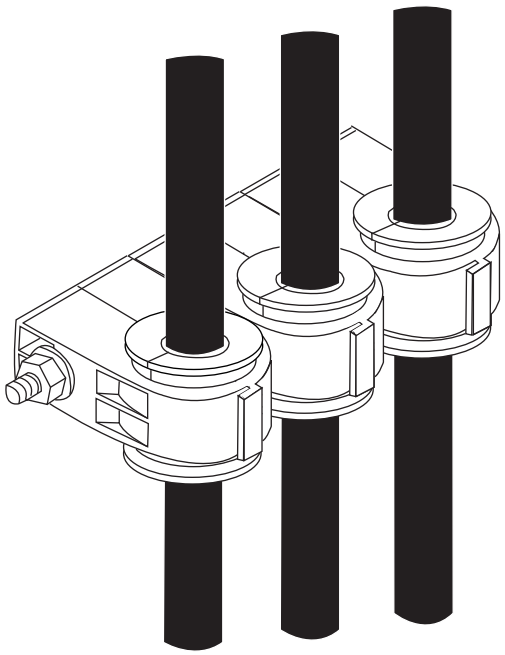
BBU Breakout 808



Hanger - Grommet

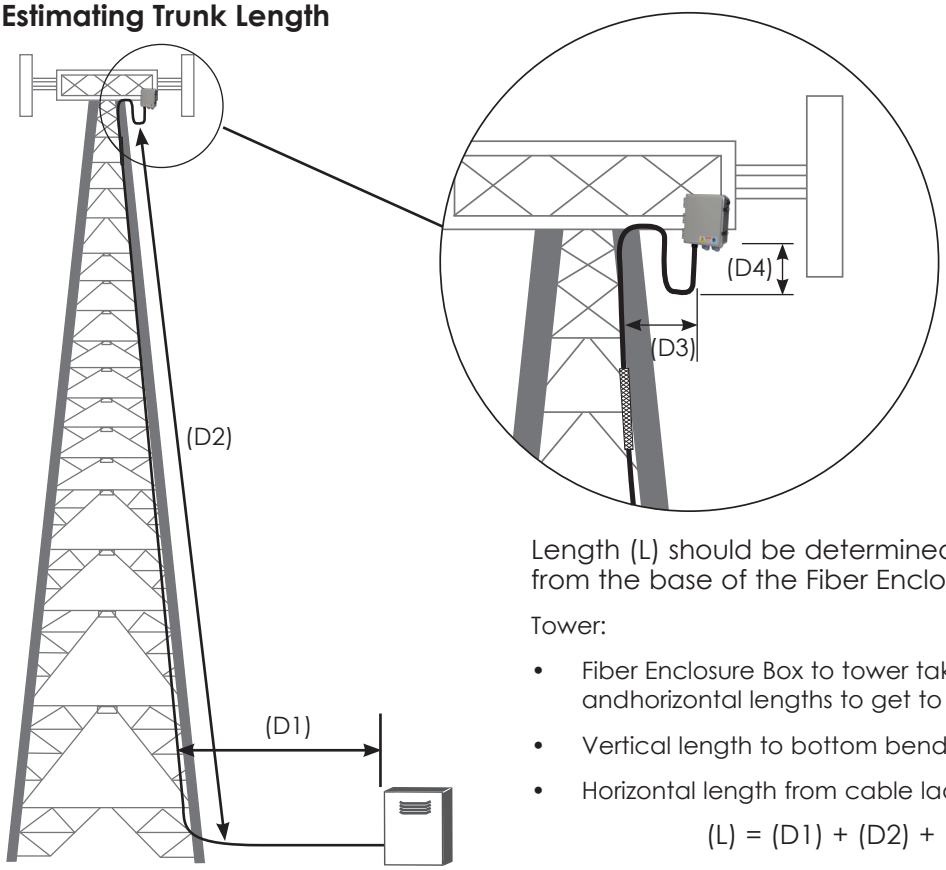
Kit includes:

Qty 10: SHK-78-3-P (hanger)
Qty 30: RFFG-19-1 (grommet 812 cable)
RFFG-24-1 (grommet 810 cable)
*No grommet required for 808 cable



- 1 Hanger required every 1m (3ft)

Estimating Trunk Length



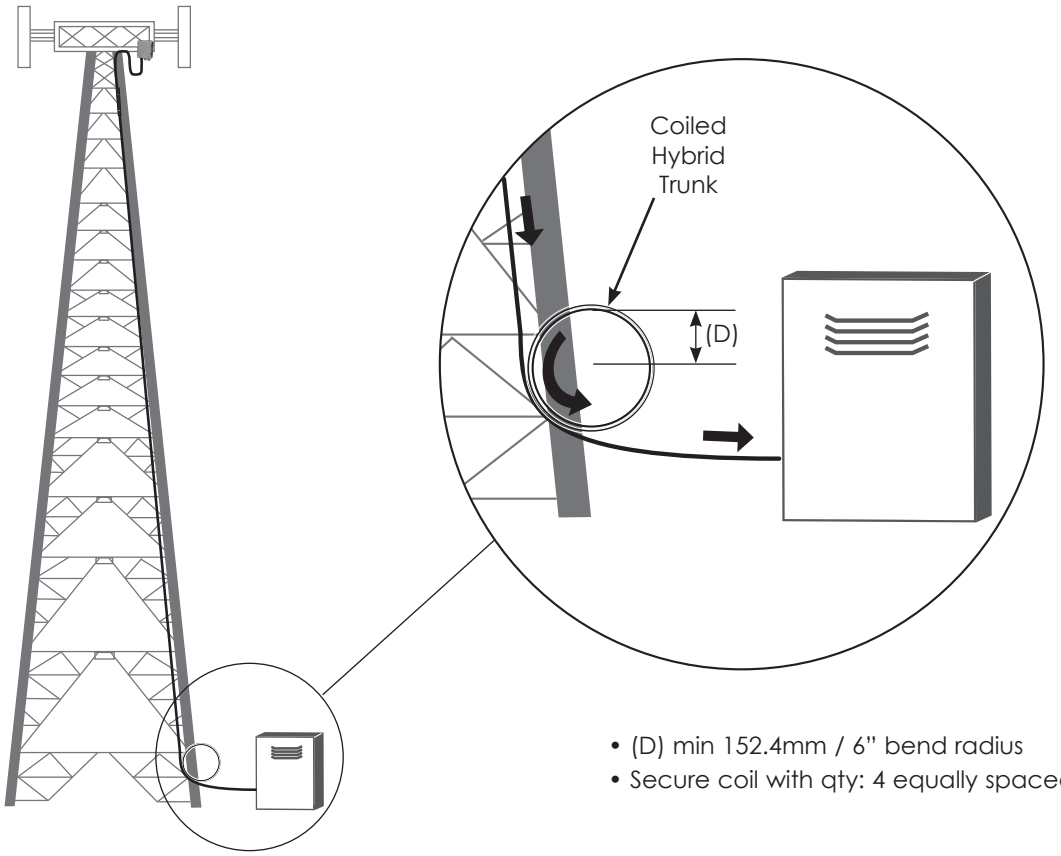
Length (L) should be determined by measuring the trunk cable from the base of the Fiber Enclosure Box to the Cabinet.

Tower:

- Fiber Enclosure Box to tower taking in account vertical andhorizontal lengths to get to the cable ladder
- Vertical length to bottom bend towards cabinet
- Horizontal length from cable ladder to cabinet base

(L) = (D1) + (D2) + (D3) + (D4)

Excess Cable Handling



- (D) min 152.4mm / 6" bend radius
- Secure coil with qty: 4 equally spaced 50 lb UV rated tie wraps

Installation Check List

- ☐ Proper Fiber Connections keeping sectors consistent
- ☐ Double check all Electrical Terminals for proper torque, screw in all empty terminals
- ☐ Double check all Box compression fittings for proper torque (per installation bulletin)
- ☐ Proper grounding of both Boxes with 6 AWG (min) to 2 AWG (max) cables
- ☐ Double Check all outdoor RRU Connections (fiber, power and connectors) are properly seated
- ☐ Latch top and bottom of boxes – both latched
- ☐ Properly support all jumpers to prevent strain on fiber during severe weather
- ☐ Cable serial numbers have been documented in the closeout paperwork and a copy has been left on-site

Fiber Troubleshooting

- Clean First! Clean optical end face with appropriate all in one cleaner. Clean all connector end faces
- Visually inspect end face for residual dirt and damage
- Avoid migration of contaminations from one connector to another
- Check continuity by using LED or lazer light source from one end face and look for light from other end to identify any broken fiber (Do not look directly at cable with lazer source)
- Check end face again for cleanliness before attachment. If needed, clean again
- Scan QR code to visit Webtrak online for fast, easy access to test data or download the cTrak app from www.commscope.com/apps

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