FieldSmart® Makwa FDH

Installation Manual

CLEARFIELD

Manual 017526 REV E - April 2018

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Application

Providing 12-432 ports of connectivity for either PON or Cross-Connect, utilizing patch and splice or patch only technology in any network environment. The FieldSmart FSC Makwa is scalable to meet customer's specific requirements and has the ability to be mounted either above or below-ground, taking the potential above grade aesthetics issue out of the deployment equation

Description

The FieldSmart Makwa, incorporates all of the features found in our above ground cabinets and adds the ability to deploy the FieldSmart FSC Distribution Hub in a below grade application. Roughly 50% smaller than existing above grade cabinets, Makwa reduces real estate costs and improves density without compromising critical design elements of accessibility, bend radius protection, physical fiber protection and route path diversity.

Clearfield's FieldSmart Makwa consists of four basic elements; top over (dome), base plate, internal backplane and Clearview Black Cassettes. All components are pre-assembled and loaded into the Makwa – making it field ready for deployment. Scalable to meet customer requirements, Makwa can be configured to accept 12-48 feeder ports and 12-288 distribution ports in a PON application. It will accept up to nine (9) 1 x 32 ruggedized splitters and two (2) staging plates for PON networks. For cross connect scenarios, Makwa can accommodate 12-432 ports as required.

Technical Specifications

	288 PON Makwa	432 Cross-Connect Makwa
Dimensions	22 3/8" H x 16" W x 16" D	22 3/8" H x 16" W x 16" D
Splicing	Yes - Clearview Black Cassette	Yes - Clearview Black Cassette
Feeder/Express Ports	Up to 48	Up to 216
Distribution Ports	Up to 288	Up to 216
Cable Entrances	4	4
Splitter Slots	9	N/A
Jumper Length	N/A	1.2 meters

Product Packaging

Patch and Splice Packaging

Patch Only Packaging

Included Accessories List: (Some parts may already be installed for patch only configurations)

Quantity	Part Number	Description
1	017271	Makwa Key, T-Handle 5/16 Hex Wrench - 9” Length
4	017466	1” Sealcon Fitting with Various Grommet Inserts
4	017468	1” Plug Fitting
1	003042	30” Roll of 1” Wide Grommet Tape
1	016096	10 Feet of Snakeskin Sleeving (Patch and Splice)

Packaging Removal

Step 1: Open the enclosure following the dome removal procedure.

Step 2: Remove the foam inserts holding the cassettes in place **(Figure 1)**.

Note: *The foam inserts can be saved and used as supports if desired.*

Figure 1

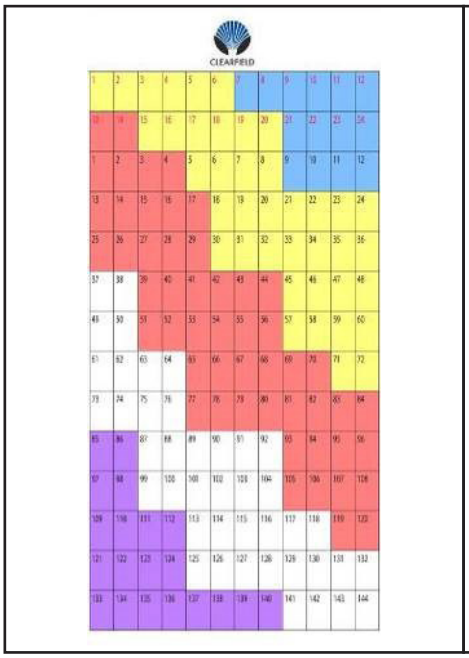
Step 3: Cut the zip ties holding the cassettes during shipping **(Figure 2)**.

Figure 2

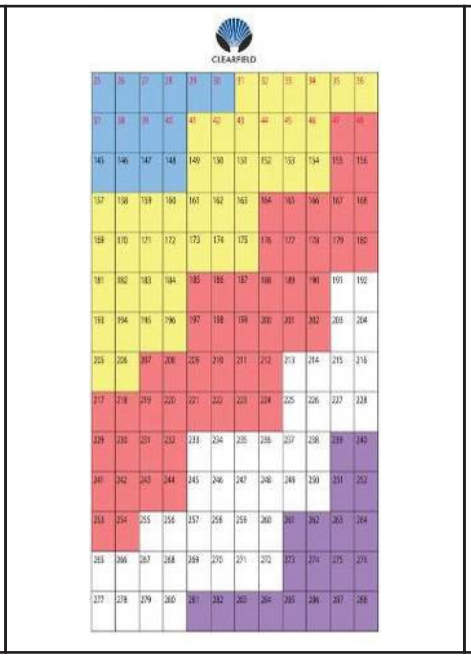
Designation Cards

The Makwa FDH is set up for either a PON or Cross-Connect application. Please refer to the appropriate designation and application cards that will be utilized for fiber protection when the dome lid is placed.

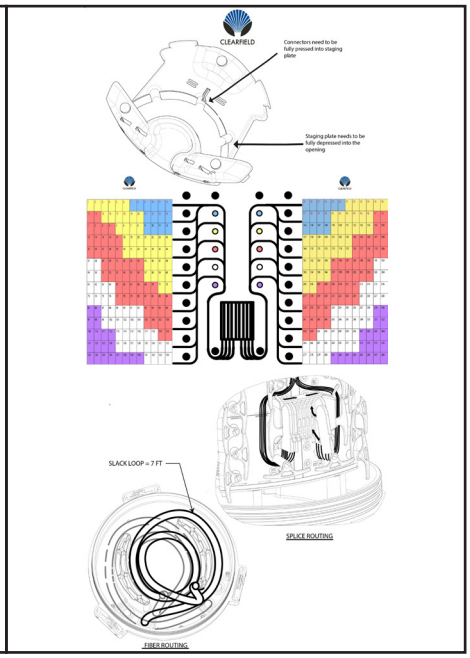
PON Designation Cards



Desi Card - Left

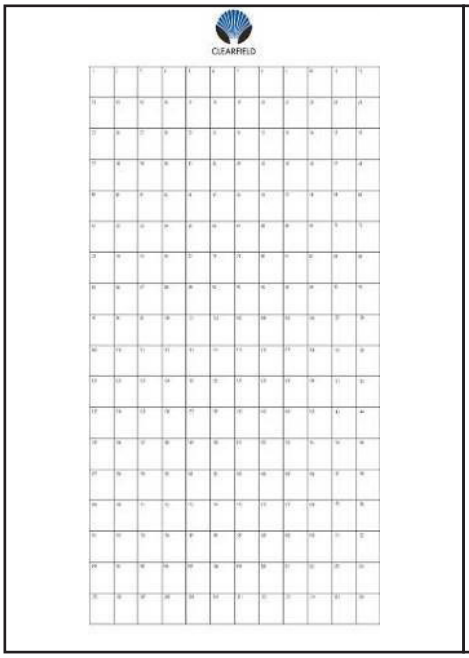


Desi Card - Right

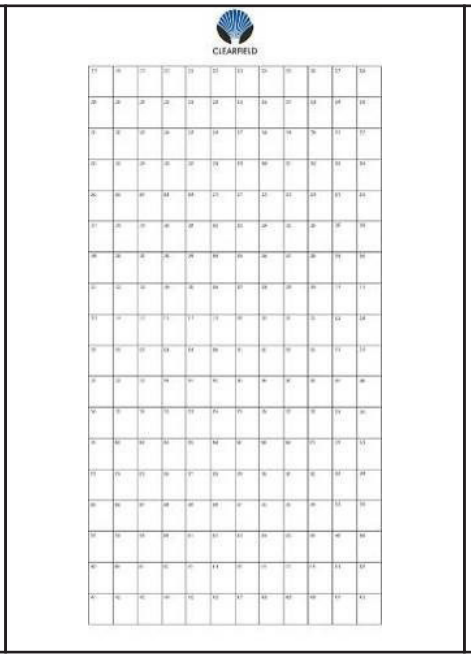


Application Card - Center

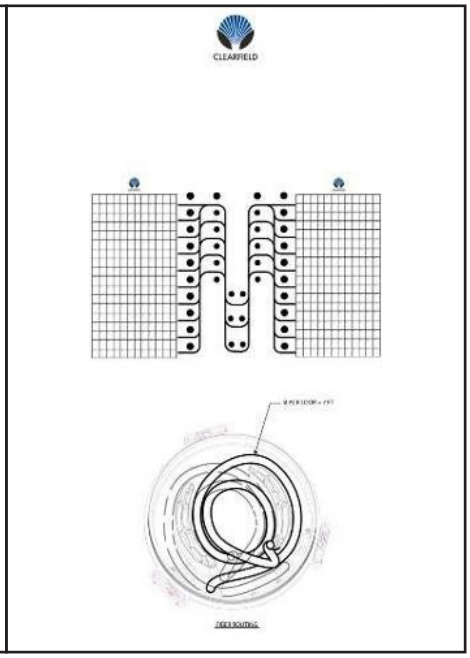
Cross-Connect Designation Cards



Desi Card - Left



Desi Card - Right



Application Card - Center

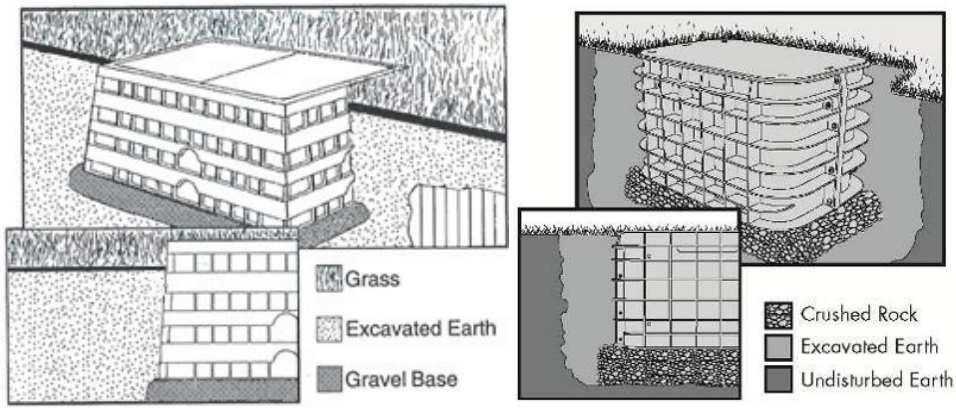
Below Grade Installation

Parkway Vault Installation

Installation instructions provide general information useful for parkway placement in “grass surround”, grass, dirt, or gravel applications. This guide cannot anticipate all situations that could develop in the field. Rather, it represents information applicable to common installation conditions.

Installation Location

Location alone should not dictate product selection. “Pedestrian loading,” sometimes referred to as “Greenbelt”, defines our HDPE thermoplastic body and covers vaults are intended for installation in landscape or grass surround areas where they will not be exposed to vehicular traffic. Exceptions to this rule include residential or light commercial mowers but do now include tractor/mowers in highway easements.



Site Preparation

Ensure that national – local electrical and building codes, OSHA and company safety work rules are observed and provisions made for street flags, barricades and cones. Secure permits as required by city and company.

Warning: Buried Telecommunications Cables. Be sure to call 811 at least 30 days in advance before digging. Calling 811 will route to the local one-call center and ensure that utilities in the area of installation will be located and marked.

Recommended Vault Sizes

Vault Size	HDPE Solid Lid	HDPE Split Lid	Polymer Concrete
30” W x 48” L x 36” D	V7B-AZP	V7B-BZP	V7B-EZP
36” W x 60” L x 36” D	N/A	V8B-BZP-F*	V8B-EZP-F*

Vaults must be **straight walled to use brackets and step rack on swing arm. These vaults are **flared walled** so Makwa will sit on bottom of vault (for vault with swing arm see page 17).*

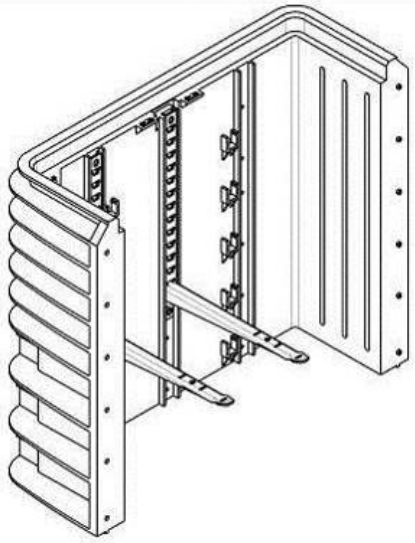
***Note:** Vault size is generally defined by the approximate cover dimensions. The vault actual measurements will differ. The dimensions above for determining the size of excavation provide sufficient volume for accommodating the maximum recommended select backfill.*

Optional Step Rack and Manual Mounting Brackets

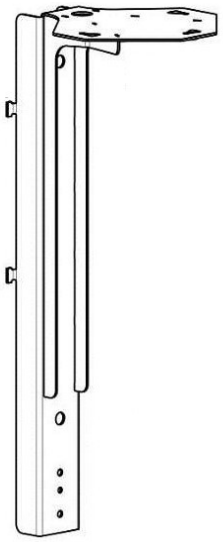
If the Makwa Swing Arm (see page 20) is not used, the optional Step Rack Mounting Bracket & Manual Mounting Bracket may be deployed to install Makwa inside of vault.

When using the optional step rack mounting bracket, the step racks need to be installed onto the vault before burying the vault in the ground.

Note: *The step rack mounting bracket kit comes with the required mounting hardware.*



Makwa Mounting Kit (P/N 017202)



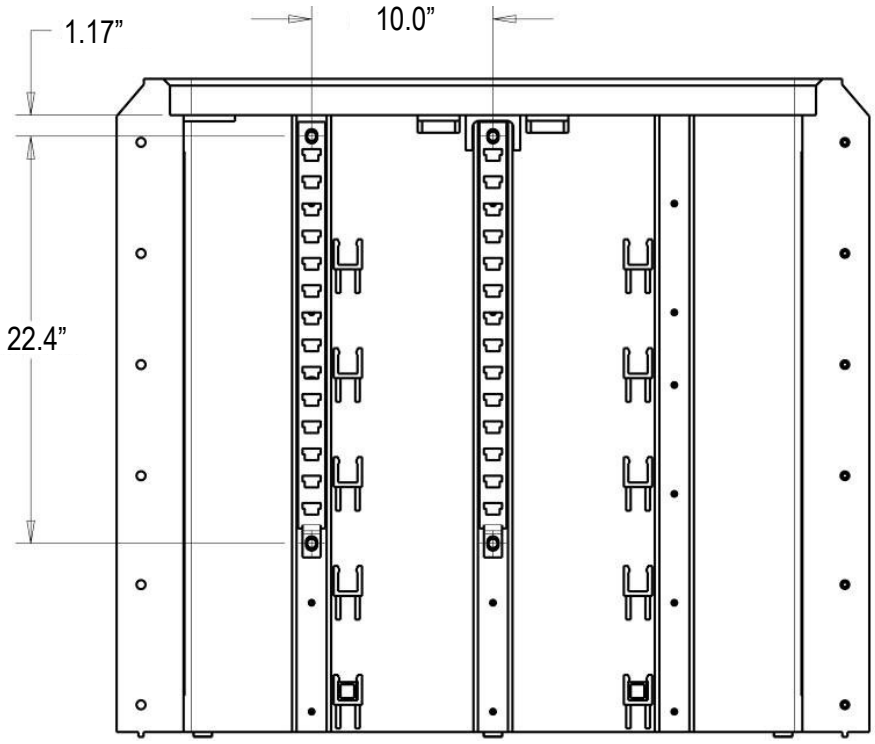
Makwa Manual Mounting Bracket (P/N 016897)

Part Number	Description
017202	Kit, In Vault Mounting Kit for Makwa, includes two 24” step racks and two 18” cable hooks *
016897	Bracket, In Vault Mounting Stand for Makwa *

** Both items need to be ordered together*

Step Rack Mounting Location

Note: *The step rack arms should be installed in one of the two bottom steps to ensure the enclosure fits with the vault lid installed.*



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Vault Installation Procedure

Step 1: Excavate hole to appropriate dimension with mechanical excavator or hand dig as appropriate **(Figure 1)**.

Note: *Plan excavation approximately twelve to sixteen inches longer and wider than the actual dimensions of the vault being installed. Similarly, excavate six to eight inches deeper than the overall dimensions of the vault with cover in place.*

Figure 1

Step 2: Use a minimum three to five inches of crushed rock to prevent subsidence over time **(Figure 2)**.

Note: *Base material shall be crushed rock 3/4" and smaller, and not "river rock" or "round stone." Desired compaction and equivalent resistance to lateral loading will not be achieved with round stone. The rock should be free of soil and organic material.*

Figure 2

Step 3: Set vault on top of backfill material and adjust height to grade **(Figure 3)**. Tamp base material to level with a mechanical tamper or hand tamper. When a vault must be installed on a hill, a retaining wall provision shall be made. The cover of the enclosure shall be at or to final grade as specified by the Owner/ Operator. Soil in the immediate vicinity shall be tamped and sloped away from the enclosure.

Figure 3

Step 4: Center the vault in the excavation parallel with side-walk or curb. Mark the vault for duct entry and step rack locations. The vault may be cut with a hole saw and drill **(Figure 4)**. The duct may also come up from underneath the vault, where-as no holes need to be drilled

Note: *Make sure to provide adequate clearance for ovality in ducts. The small clearance between the duct and vault may be sealed with expanding polyurethane foam*

Figure 4

Step 5: Replace the cover on the vault before backfilling **(Figure 5)**.

Note: *Bolting the cover in place is recommended, but not required during backfill.*

Figure 5

Step 6: Begin the backfilling operation by adding soil, crushed rock or dry lean mix in eight inch (8”) lifts or layers. A mechanical tamper may be used. The tamped crushed rock supports the vault, preventing subsidence and providing for drainage.

Note: *Backfill material can vary based on product and installation location. It is customary and acceptable in landscape installations where vehicles are prevented from traffic on or around a vault to use the soils removed during excavation for backfill* ***(Figure 6)****. Make sure to remove stones three inches and larger, prior to backfill.*

Take care not to damage vault during backfill. Cover may not fit properly if vault is damaged.

Figure 6

Vault Access and Storage

The following instructions apply only to Step Rack and Manual Bracket installation. Does not apply to Swing Arm installation.

Warning: : Make sure you read the warning labels before removing the enclosure. If there is water in the vault, the water must be completely drained or pumped out of the vault prior to removing/reinstalling the Makwa.

Step 1: Remove vault lid **(Figure 1)**.

Figure 1

Step 2: Remove vault lid support beam **(Figure 2)**.

Figure 2

Step 3: Lift the Makwa out of the vault **(Figure 3)**.

Figure 3

Step 4: Place Makwa on Mounting Bracket (P/N 016897) to perform maintenance **(Figure 4)**.

When you have completed your maintenance, follow the steps below to replace the Makwa back in the vault.

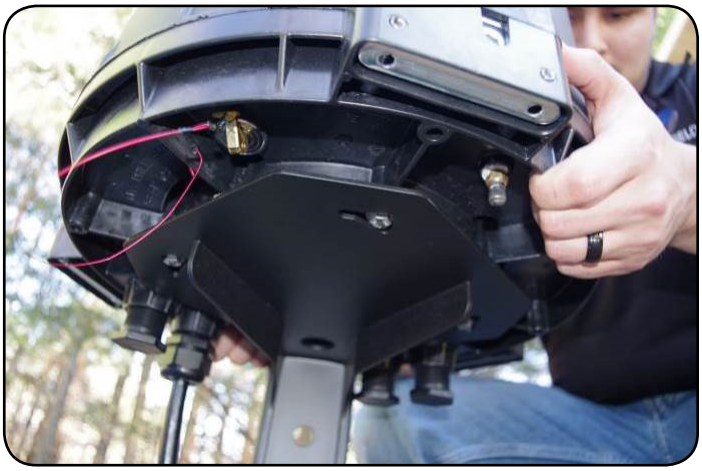

Figure 4

Step 5: Carefully lower the Makwa into the vault **(Figure 5)**.

Note: *Maintain proper cable bend radius when lowering the enclosure into the vault.*

Figure 5

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Step 6: Secure the enclosure to the step rack using zip ties **(Figure 6)**.

Figure 6

Step 7: Install vault lid support beam **(Figure 7)**.

Figure 7

Step 8: Install and secure the vault lid **(Figure 8)**.

Figure 8

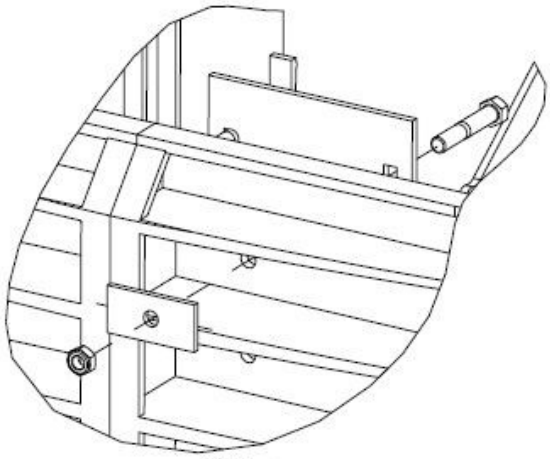
Makwa Swing Arm

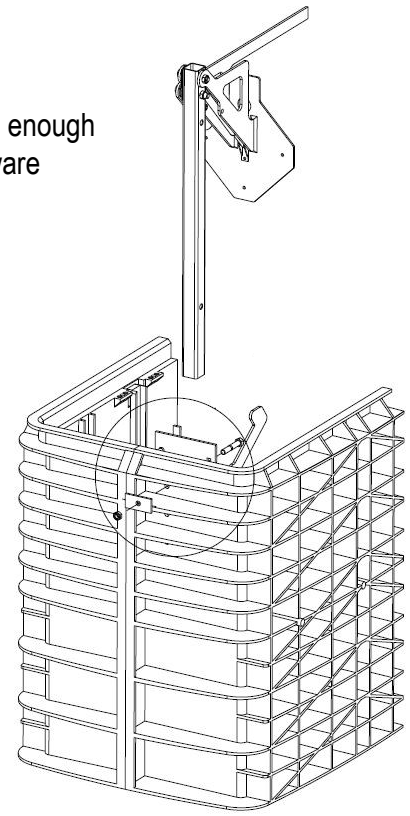
When below grade mounting is required, the Makwa swing arm provides below grade vault protection, while allowing easy access for fiber maintenance. The swing arm is available preinstalled in approved vault sizes or as a stand alone accessory that can be mounted into existing straight-sided vault.

Part Number	Description
V7B-AZP-SARM	Vault, below grade Pencell, 30 x 48 x 36”, solid HDPE lid, hex bolts, green, straight wall, with swing arm
V7B-BZP-SARM	Vault, below grade Pencell, 30 x 48 x 36”, split HDPE lid, hex bolts, green, straight wall, with swing arm
V7B-EZP-SARM	Vault, below grade Pencell, 30 x 48 x 36”, split polymer concrete lid, hex bolts, green, straight wall, with swing arm

Installing Swing Arm in an Existing Vault

The Makwa Swing Arm can be installed in any straight sided vault large enough to accommodate the Makwa and swing arm (dims?) by using the hardware provided in the vault mounting kit as shown below.





Part Number	Description
016897	Bracket, In Vault Mounting Stand for Makwa *
017202	Kit, In Vault Mounting Kit for Makwa, includes two 24” step racks and two 18” cable hooks *
VA-SWING-ARM	Swing arm for Makwa

* Both items need to be ordered together

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Raising the Makwa Swing Arm

Step 1: Remove the vault lid **(Figure 1)**.

Figure 1

Step 2: Remove vault lid support beam **(Figure 2)**.

Figure 2

Step 3: Disengage kick bar by pressing it away from central support beam **(Figure 3)**.

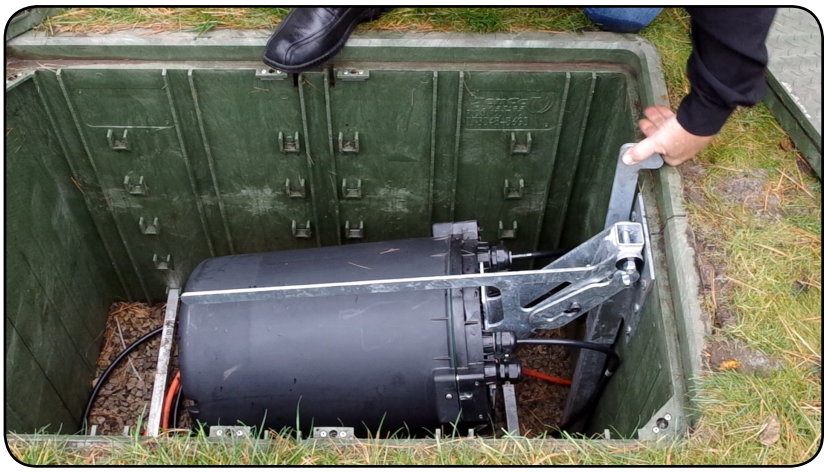

Figure 3

Step 4: With kick bar depressed, grip the swing arm near the base, between the horizontal support beam and the hinge, lift up on unit **(Figure 4)**.

Figure 4

Step 5: Continue lifting until unit locks into place **(Figure 5)**.

Figure 5

Step 6: Now, gripping the swing arm near the top, release the locking catch by pressing upward **(Figure 6)**.

Note: *If the swing arm piston becomes corroded, tap the arm lightly with a mallet until piston mechanism frees up.*

Figure 6

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Step 7: With the catch released, lift up on the swing arm until it locks in the vertical position **(Figures 7 & 8)**.

Figure 7

Figure 8

Lowering the Makwa Swing Arm

Step 1: Grip the swing arm near the top and push the unit forward.

Figure 1

Step 2: Pull back on locking catch to partially lower the unit **(Figure 2)**.

Figure 2

Step 3: Locking catch will engage again at the mid-point of descent. Lift up on the locking catch to continue descent to horizontal position. **(Figure 3)**.

Figure 3

Step 4: Grip the swing arm near the base, between the horizontal support beam and the hinge, and disengage kick bar by pressing it away from central support beam **(Figure 4)**.

Figure 4

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Step 5: Lower unit into vault **(Figure 5)**.

Figure 5

Step 6: Replace central strength member arm **(Figure 6)**.

Figure 6

Step 7: Replace and secure vault cover **(Figure 7)**.

Figure 7

Above Grade Installation

Pole Mount Kit

The FieldSmart Makwa FDH is approximately half the size of a conventional Fiber Distribution Hub, allowing the broadband service provider the choice of where to deploy the cabinet without sacrificing performance or access. The Makwa FDH Pole Mount Kit allows both the 288 port PON and 432 port cross-connect versions to be pole mounted, while providing access to the FDH for moves, adds, and changes.

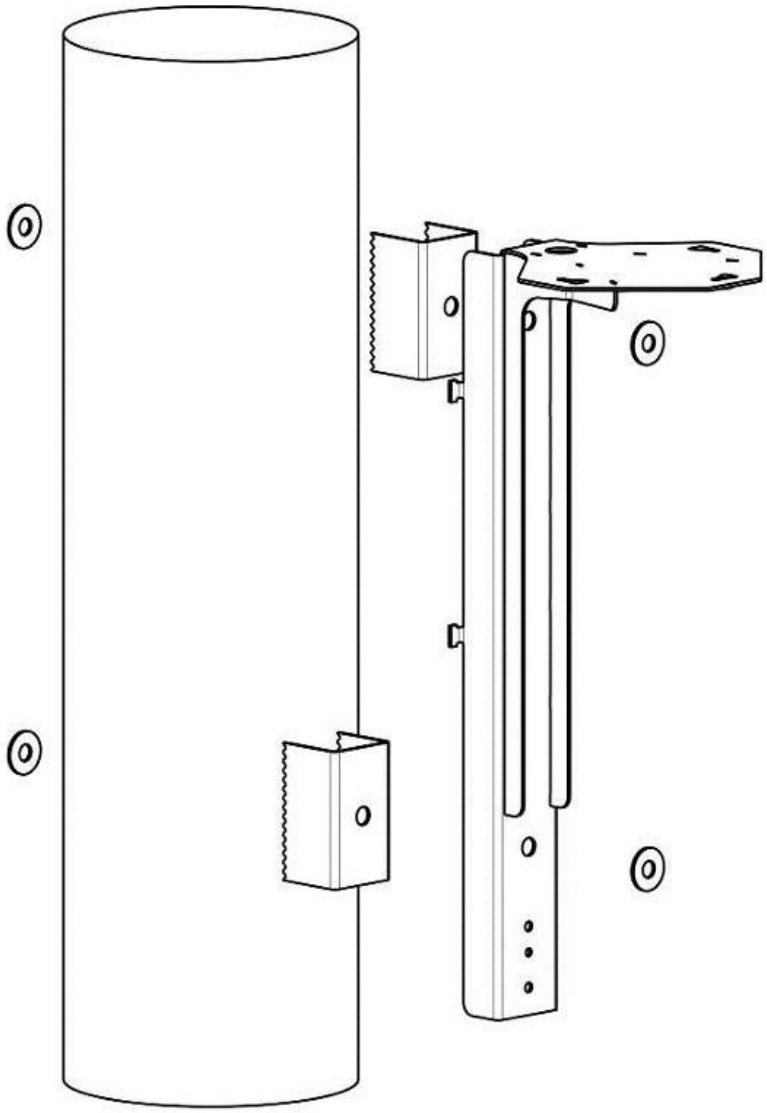
Required Items (Customer Supplied):

- Quantity 4 - Stainless Steel or Galvanized Washers and Nuts
- Quantity 2 - Stainless Steel or Galvanized 5/8" Threaded Rod (Minimum Diameter)

Note: *Length determined by diameter of pole - It is suggested to add 3" to the diameter of pole for rod length. Clearfield does not recommend using lag bolts to mount the bracket to the pole.*

Assembly Diagram

FieldSmart Makwa Pole Mount Kit (P/N 016902)



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Installation Procedure

Step 1: Determine the height and use the pole mount bracket to mark the drill locations on the pole. Remove the bracket and continue to drill the two holes using a 3/4" drill bit.

Place the top bracket and mounting plate to the pole and fasten with the required hardware (do not tighten). Next, slide the bottom toothed bracket up behind the bracket and attach with hardware. Tighten all hardware at this time **(Figure 1)**. Care should be taken to avoid over tightening and deforming the mounting brackets.

Note: *It is recommended to use (red) lock tight on nuts to prevent loosening.*

Figure 1

Step 2: Remove the 3 mounting bolts from the base of the Makwa enclosure, then remove the bushings from the bolts **(Figure 2)**.

Step 3: Carefully set the enclosure on the pole mount bracket and attach using the previously removed mounting bolts and washers **(Figure 3**).

Figure 2

Figure 3

Dome Removal

Step 1: Using a 5/16 hex wrench, turn the three latches counter clockwise until they stop to release the dome **(Figure 1)**.

Figure 1

Step 2: Lift the dome from the base to remove the cover **(Figure 2)**.

Note: *Schrader valve can be opened to relieve internal pressure.*

Figure 2

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Designation Card Installation

Designation cards provides a circuit diagram for the Makwa as well as bend radius protection for internal fibers.

Step 1: Insert bottom of card into bottom clips **(Figure 1)**.

Figure 1

Step 2: Insert top of card into top clips **(Figure 2)**.

Figure 2

Dome Installation

Step 1: With Designation Cards in place, wipe the gasket clean with water to remove any dirt or debris from the seal **(Figure 1)**.

Note: *Do not lubricate gasket.*

Figure 1

Step 2: Before reinstalling the lid, clean the inside lip of the dome to remove any debris deposits during maintenance/ Installation **(Figure 2)**.

Figure 2

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Step 3: Carefully slide the dome over the base **(Figures 3 & 4)**.

Figure 3

Figure 4

Step 4: Lock the dome in place by using the 5/16 hex wrench to turn all three latches clockwise **(Figure 5)**.

Figure 5

Step 5: If the enclosure is being placed below grade, use the provided Schrader valve on the base of the enclosure to perform a flash test following company procedures or local practices.

Note: *Failure to follow instructions may cause improper sealing and allow water intrusion.*

Schrader Valve

Flash Test Procedure

Step 1: Check all cabinet components for correct assembly. Verify all fittings are properly torqued and the locks are properly closed.

Step 2: Remove the cap from the Schrader Valve **(Figure 1).**

Figure 1

Step 3: With an air compressor regulated at 1 PSI max, pressurize the cabinet with clean, dry air to 1 PSI for at least 5 minutes.

Warning: To avoid a potentially hazardous situation that could result in product damage or serious injury, do not exceed 1 PSI gauge pressure. The enclosure could burst.

Step 4: Check gauge for pressure loss. Cabinet is sealed if no pressure is lost, go to **Step 7**.

Step 5: If pressure is lost. Spray soapy water around all sealed components and examine enclosure for signs of leaks (bubbling of soap).

Step 6: Once cause of leak is determined. Troubleshoot by:

A: Repeating **Step 2**.

B: Check for debris on sealing components.

When leak is fixed return to **Step 3**.

Step 7: Remove the pressure gauge. Depressurize the unit, then reinstall the Schrader Valve cap.

Patch and Splice

Step 1: Using thread sealant tape or pipe dope, cover threads of Sealcons being used or the plugs, if being used, to ensure an airtight/water tight fit when mating to the base **(Figure 1)**.

Figure 1

Step 2: Using the appropriate sized grommet insert for your cable size, place the Sealcon into the base for cable entrance ports **(Figure 2)**. After all Sealcons are seated and tightened to the appropriate torque (5.5 foot lbs), place plugs into any unused ports to seal the entrance ports.

Note: *For easier cable routing, utilize the two inner ports first, then use the outer ports as needed.*

Figure 2

Part Number	Description
013190	Deep Socket Wrench, 1” Sealcon Socket, 40 mm
013191	Deep Socket Wrench, 1” Sealcon Socket, 42 mm

Step 3: Once Sealcons and plugs are seated and appropriately tightened to the base you will now mount the Makwa to the work bracket.

Align the three (3) studs on the base to the three (3) locations on the plate, then quarter turn clockwise to secure in place **(Figure 3)**.

Figure 3

Step 4: Now you are ready to bring cable into the Sealcon. Place the dome cap onto the cable and insert into appropriate sized grommet from the bottom, bringing the cable into the top of the Makwa base for cable prepping and splicing **(Figure 4)**.

Note: *Clearfield recommends a cable opening with nine (9) feet exposed buffer tube. Two (2) feet for slack and splicing fiber in the cassette and the remaining 7 feet for slack storage in base of Makwa.*

Figure 4

Step 5: Once you have brought in enough cable and tightened the Sealcon domes to the recommended torque (5.5 foot lbs), you are now ready to prep the fiber **(Figure 5)**.

Starting with the distribution fiber, measure from the cable opening and mark on the buffer tube of highest count at 7 feet. Continue to mark the remaining buffer tubes, subtracting 1” as you move down cassettes.

Note: *Ten feet of expandable snakeskin sleeving is provided with Patch and Splice versions to help dress the incoming cables.*

Figure 5

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Step 6: When using tape for cable prep, we recommend the following, as tape can interfere with the proper sealing within the Sealcon:

Total of 4" of tape, 2" for protecting buffer tube with bond clamps and 2" onto the cable sheath itself **(Figure 6)**.

Figure 6

Step 7: Place the strength member into the bracket and tighten with can wrench. Cut flush to top of bracket **(Figure 7)**.

Note: *The enclosure ships with a ½" and 1" screw included for attaching the strength member. Use the correct screw for the size of the strength member on the cable.*

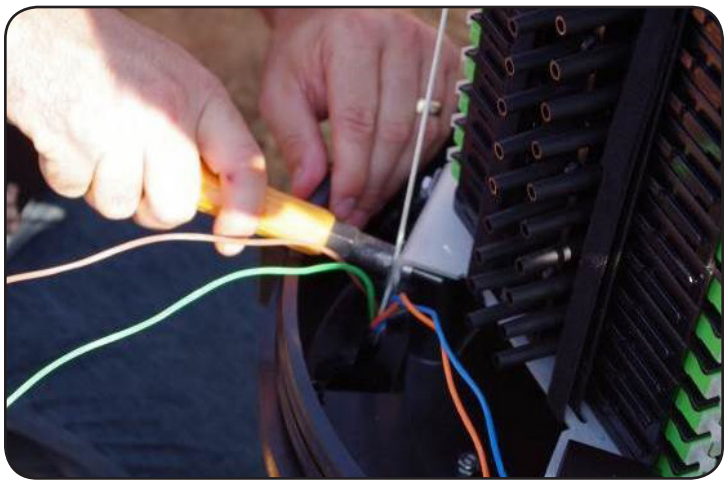

Figure 7

Step 8: Use the ground lug located in the center of the cable entrance ports to bond the cables when required **(Figure 8)**.

Note: *Clearfield provides a ground stud for your bonding needs, but does not give any recommendations. Bonding or grounding is completed per your local work practice.*

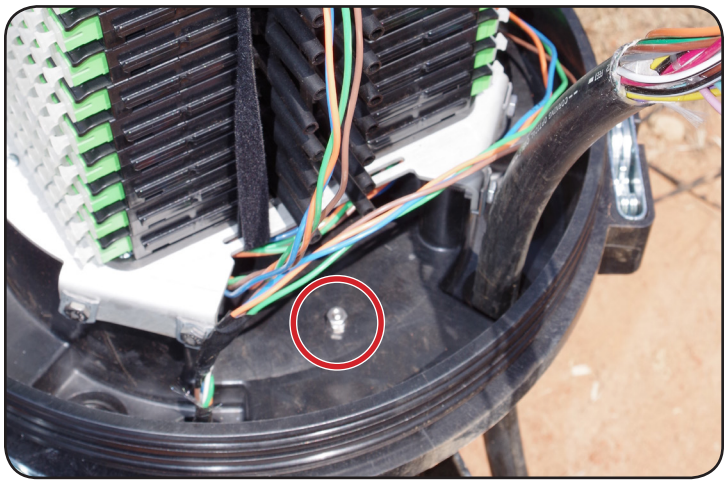

Figure 8

Step 9: If desired, a multiple location grounding plate can be attached to the grounding stud **(Figure 9)**.

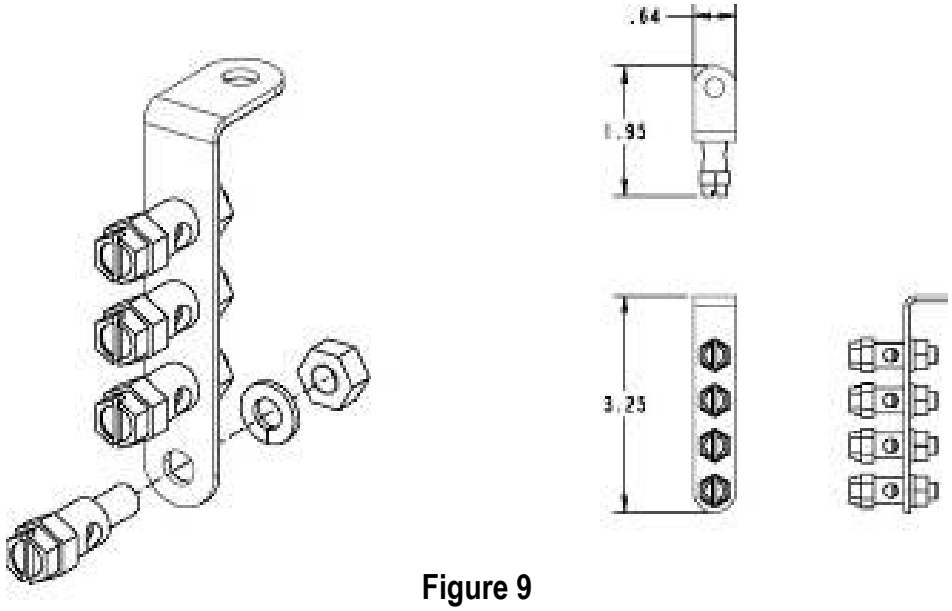

Figure 9

Step 10: Route the cable bundle across the front of the Makwa to the opposite side and continue along the outside slack loop to the back of the Makwa. Next, feed the entire bundle under the plate, through the base so that you can pull it through to the front for splicing **(Figure 10)**.

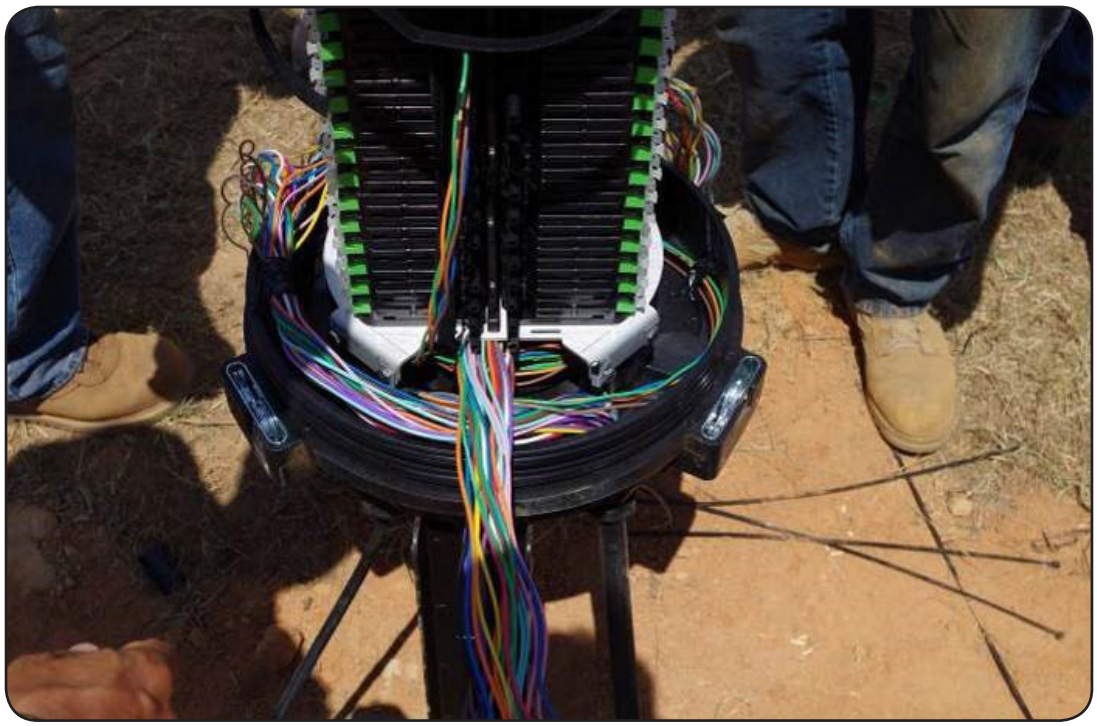

Figure 10

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Step 11: The cassettes are loaded onto the back plane with feed cassettes as the top two positions on each side and the remaining cassettes are considered the distribution cassettes **(Figure 11)**. Take note of how the cassettes are organized based on the desi card so that fiber cables are spliced according to the designation card.

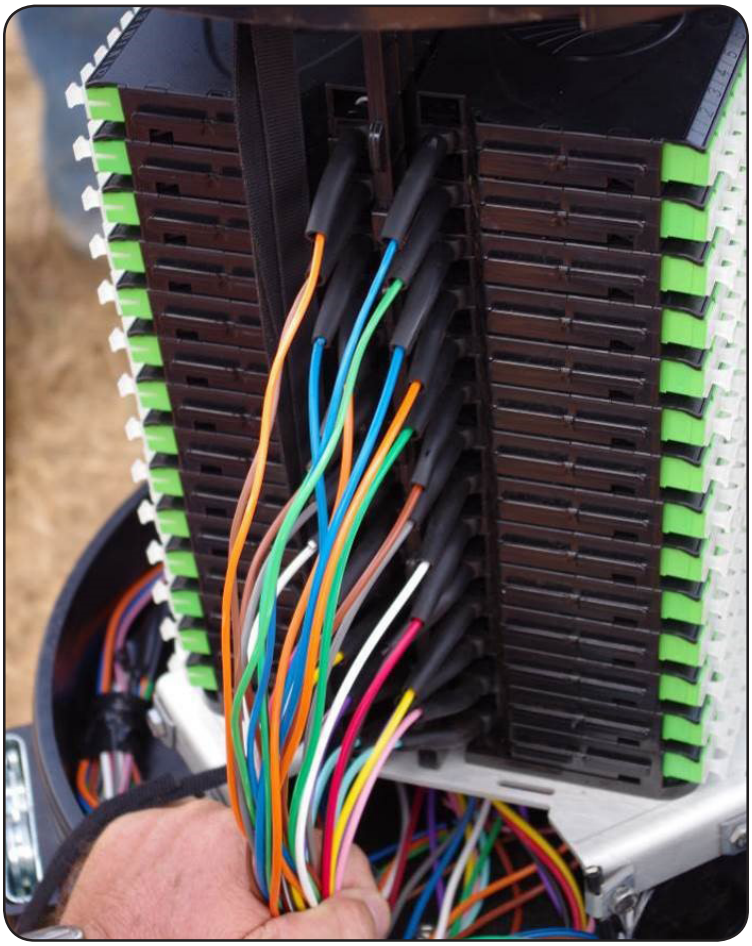

Figure 10

Step 12: The Clearview Black Cassette is designed for ribbon/mass splicing only.

Note: *If bringing loose tube cable in for splicing, you must "ribbonize" the fibers to be spliced. Each Clearview Black Patch and Splice Cassette has a "ribbonizing tool" provided for your needs, in case you currently do not have access to a ribbonizing jig.*

Consult the Clearview Black Cassette Installation Manual for splicing instructions. Viewable in the Installation Manual section, under the Resources tab, of the Clearfield website. Link here:

https://www.seeclearfield.com/assets/documents/installation-manuals/clearview-black-cassette-install-manual.pdf

Clearview Black Cassette

Cassette Removal

Step 1: Loosen Velcro strap and remove support clip **(Figure 1)**.

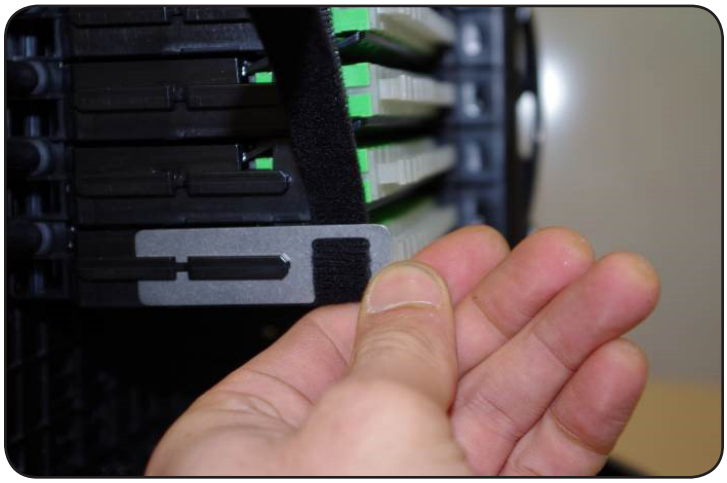

Figure 1

Step 2: Place finger on the rear of the cassette and pull forward to release **(Figure 2)**.

Figure 2

Step 3: The cassette will swing forward on the swing arm **(Figure 3)**.

Figure 3

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Step 4: Slide the cassette forward off the swing arm for splicing, troubleshooting, cleaning or inspection **(Figure 4)**.

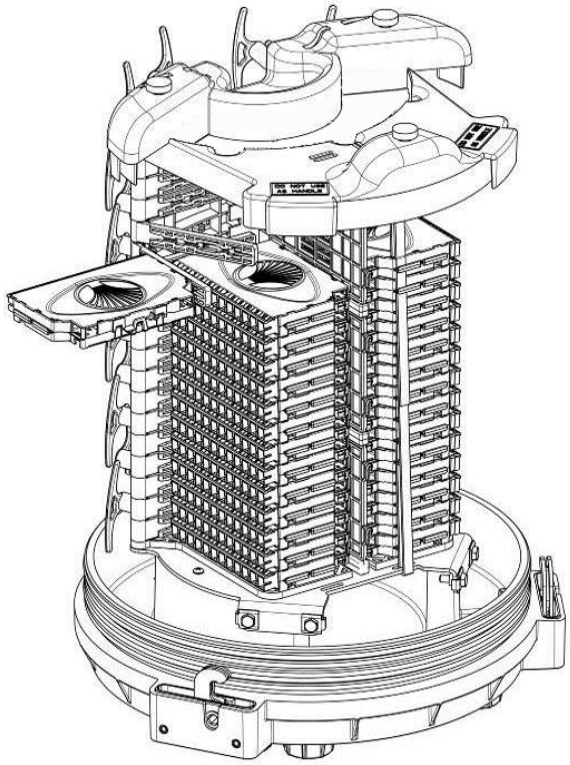

Figure 4

Consult the Clearview Black Cassette Installation Manual for splicing instructions. Viewable in the Installation Manual section, under the Resources tab, of the Clearfield website. Link here:

https://www.seeclearfield.com/assets/documents/installation-manuals/clearview-black-cassette-install-manual.pdf

Cassette Installation

Step 1: Slide the cassette on the swing arm rail, then swing the cassette into the enclosure **(Figure 1)**.

Figure 1

Step 2: Press on the rear of the cassette to snap the swing arm in place **(Figure 2)**.

Figure 2

Step 3: Slide the cassette support clip onto the rail of the **bottom** cassette **(Figure 3)**.

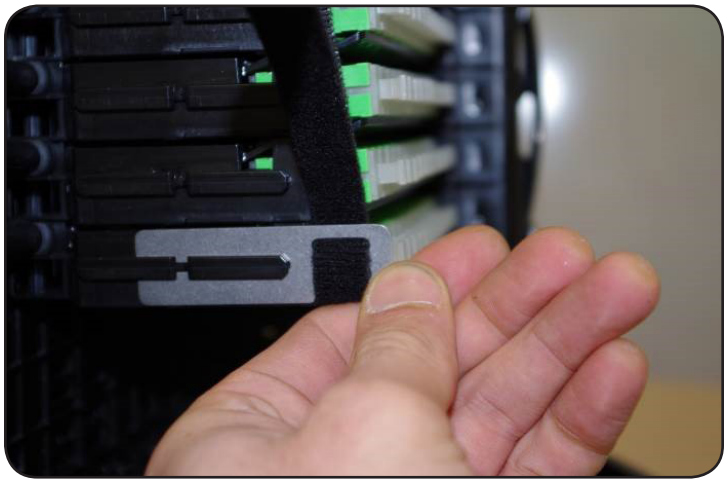

Figure 3

Step 4: Tighten the Velcro strap **(Figure 4)**.

Figure 4

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Storing Buffer Tube After Splicing

Once splicing is complete, feed all buffer tubes to rear (splitter side of Makwa) to be stored. To store buffer tube, begin with the larger count cables first.

Step 1: Twist bundle, holding the twist with a finger **(Figure 1)**.

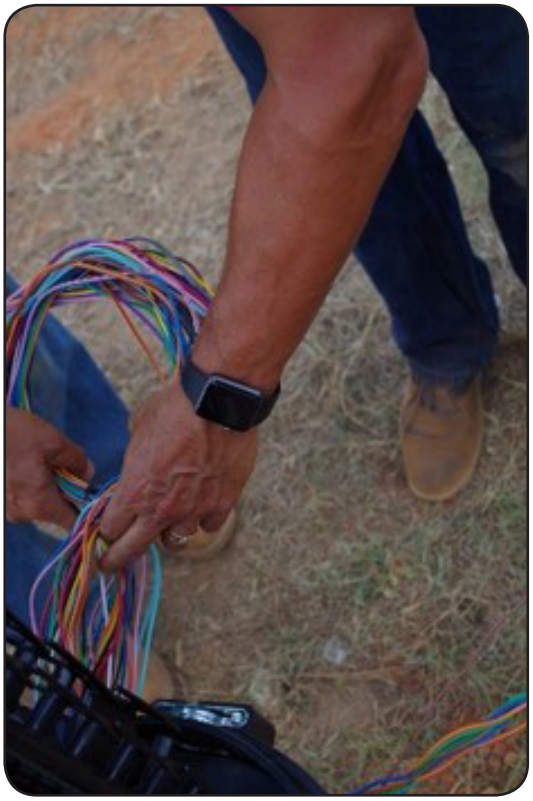

Figure 1

Step 2: Flip (or fold over) to center **(Figure 2)**. Add another twist **(Figure 3)**.

Figure 2

Figure 3

Step 3: Add another flip (or fold over) **(Figure 4)**.

Figure 4

Step 4: Then proceed to feed the bundle under the bulkhead base **(Figure 5)**.

Figure 5

Store remaining cables in the same manner.

Follow instructions on proper desicard/lid installation.

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PON Splitters

Splitter Installation

Step 1: Install the splitter into the left or right most usable slot in the splitter cage. Splitters install by inserting the top of the splitter into the cage first, then hinging the bottom and snapping into place **(Figure 1)**.

Note: *The 4 left splitter locations are designed to feed the left side cassettes and the 4 right splitter locations are designed to feed the right cassettes. The last (middle) splitter spot is then used to fill the remaining ports on either side.*

Figure 1

Step 2: Route the cable under the bottom radius finger **(Figure 2)**.

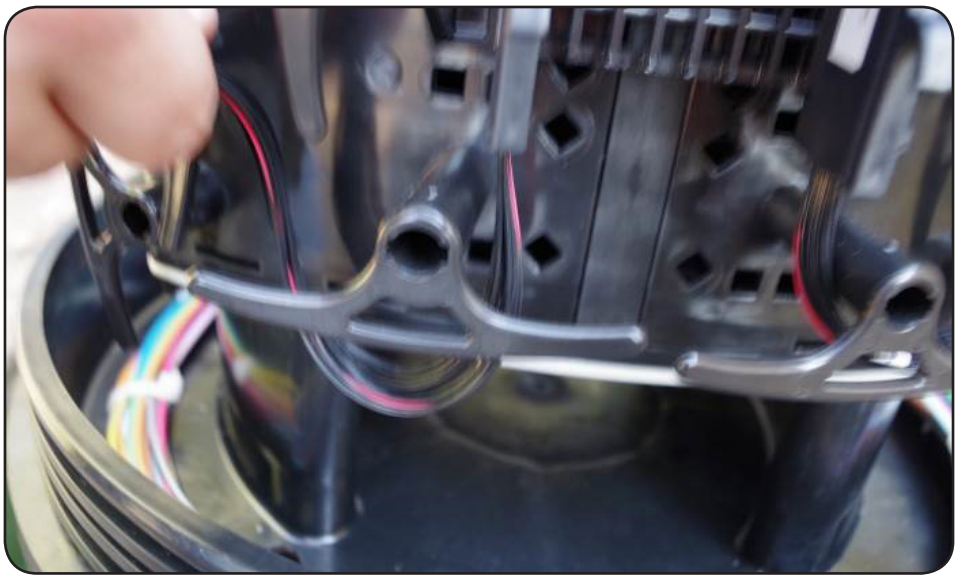

Figure 2

Step 3: Then, continue over the splitter cage to route the splitter legs to the middle channel between the two sets of fiber management fingers **(Figure 3)**.

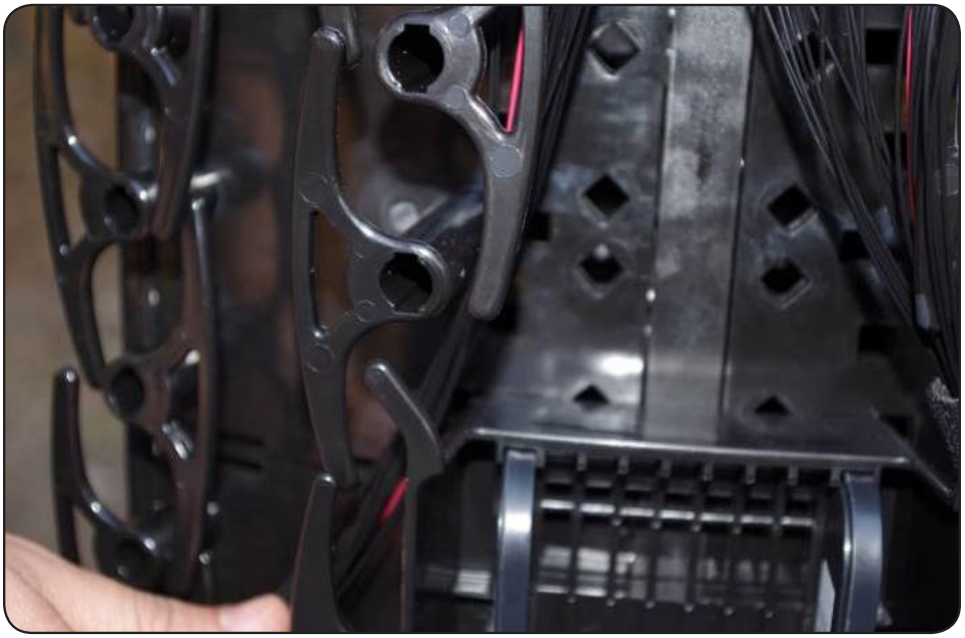

Figure 3

Step 4: Insert the staging plate into the available staging plate location **(Figure 4)**.

Note: *Bend the staging plate into place and ensure the staging plate is fully depressed into the opening before reinstalling the dome lid.*

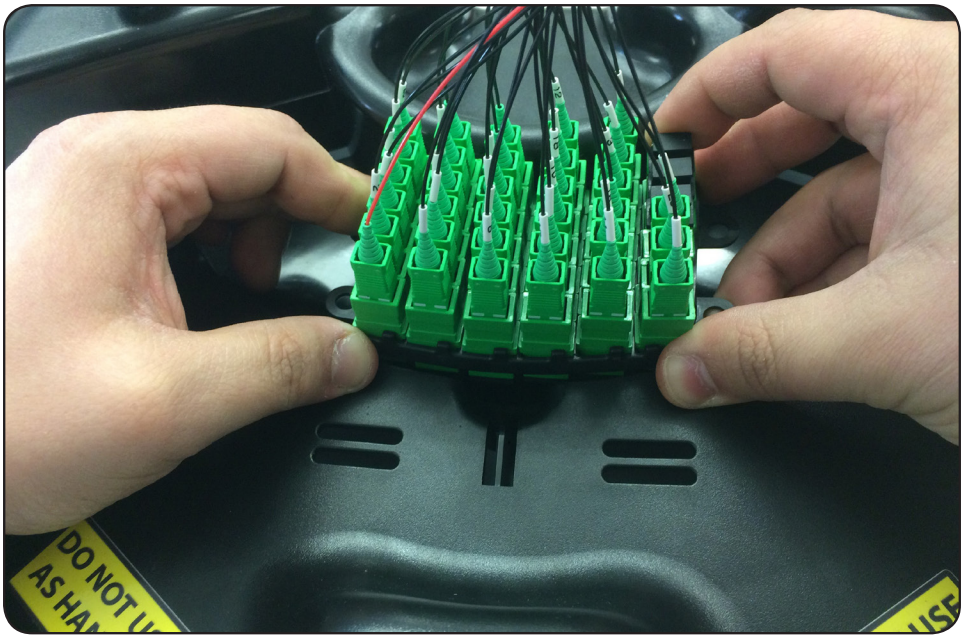

Figure 4

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Splitter Routing

Step 1: Remove the red input leg or black splitter leg from the staging plate **(Figure 1)**.

Note: *The input and output pigtails for the fiber splitter are stored and accessed in one of the two staging plates located on top of the enclosure and each leg is labeled with the splitter leg number.*

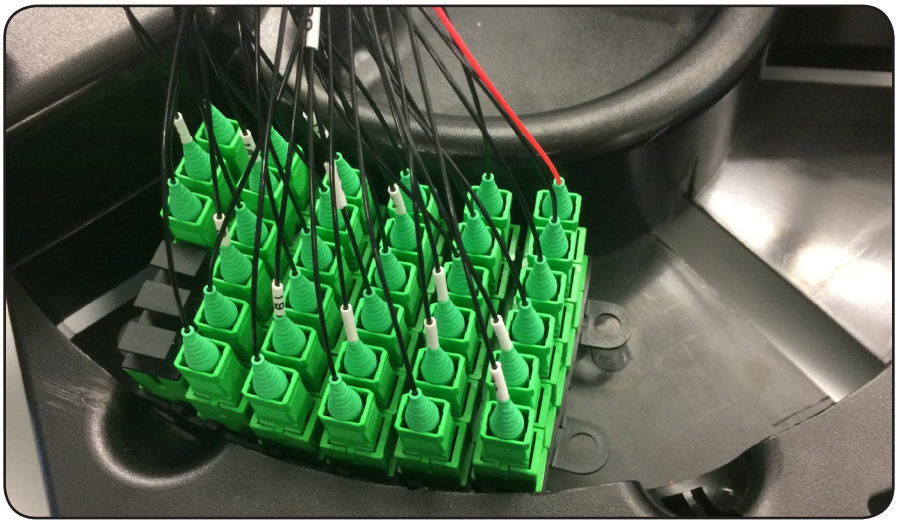

Figure 1

Step 2: Route the cable to the desired port following the routing diagram **(Figure 2)**.

Note: *The top two cassettes on each side of the cabinet are feeder cassettes and the bottom 12 are used for distribution.*

Note: *When routing the splitter legs, each radius finger channel (the radius fingers closest to the cassettes) is designed to manage the fiber for two cassettes and hold up to 24 splitter legs.*

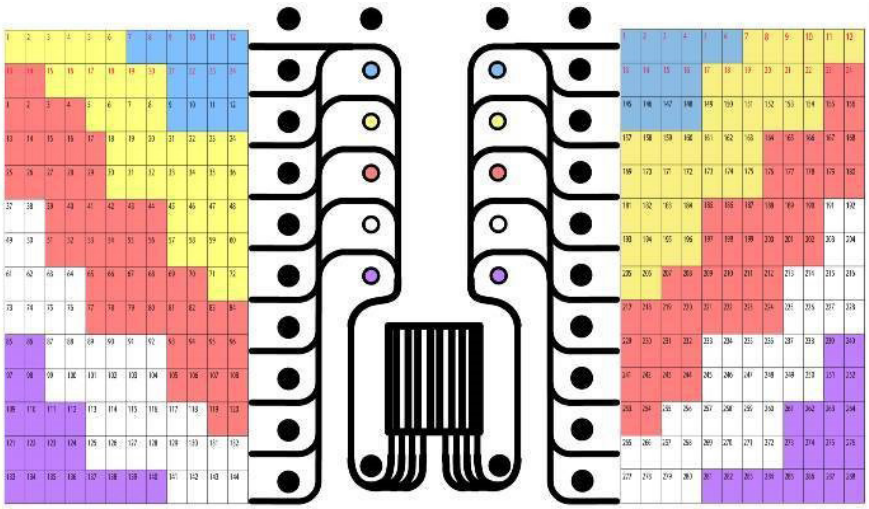

Figure 2

Step 3: Plug the connector into the desired port **(Figure 3)**.

Note: *Make sure to properly clean the connectors and adapters prior to mating following company practice or local procedure.*

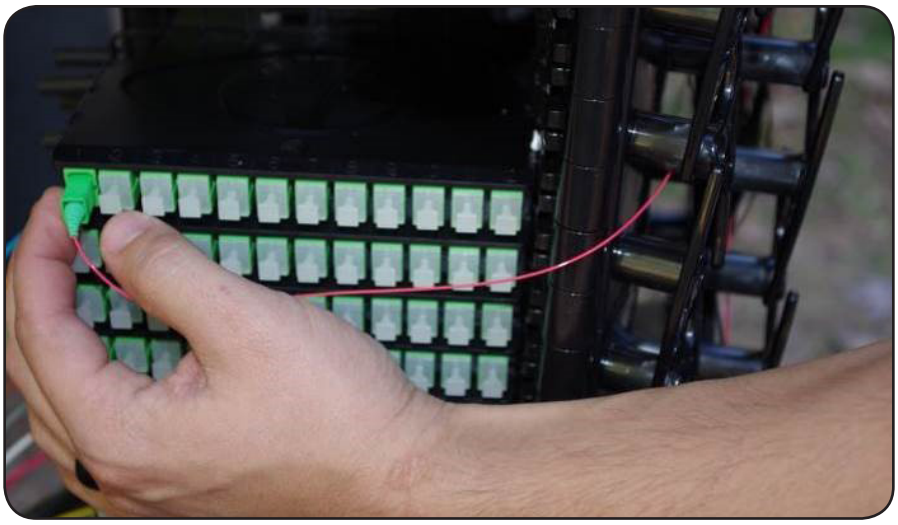

Figure 3

Step 4: Once an input leg has been installed, continue with the splitter legs to turn up service **(Figure 4)**.

Figure 4

Step 5: Slide any excess slack back towards the bottom of the cabinet.

Note: *When installed correctly, the fiber will hang from the splitter module and not rest on the floor of the cabinet.*

Step 6: Record the fiber splitter number and port designation in the space provided on the designation card.

Cross-Connect Patch Cords

Patch Cord/Jumper Installation

Step 1: Remove the dust cap from the adapter port **(Figure 1)**.

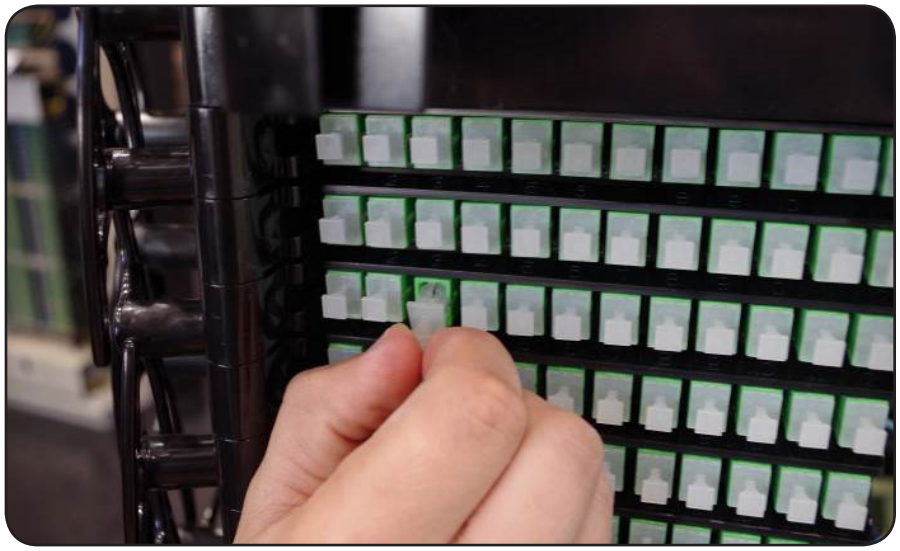

Figure 1

Step 2: Clean the adapter and connecter per company practice, then plug the jumper into the port. Route the jumper over the nearest radius finger **(Figure 2)**.

Note: *Each radius finger channel (the radius fingers closest to the cassettes) is designed to manage the fiber for two cassettes and hold up to 24 jumper cables.*

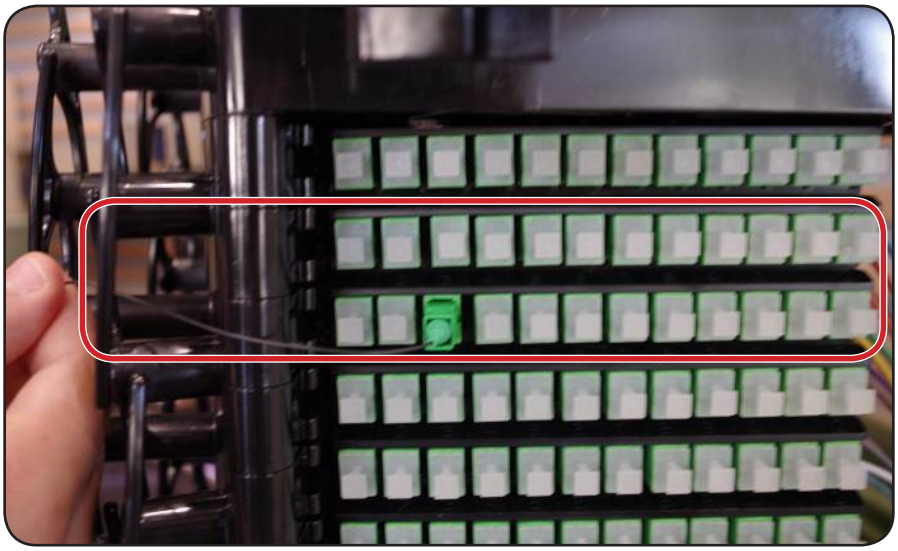

Figure 2

Step 3: Route the other end of the jumper to the desired port following the routing diagram **(Figure 3)**.

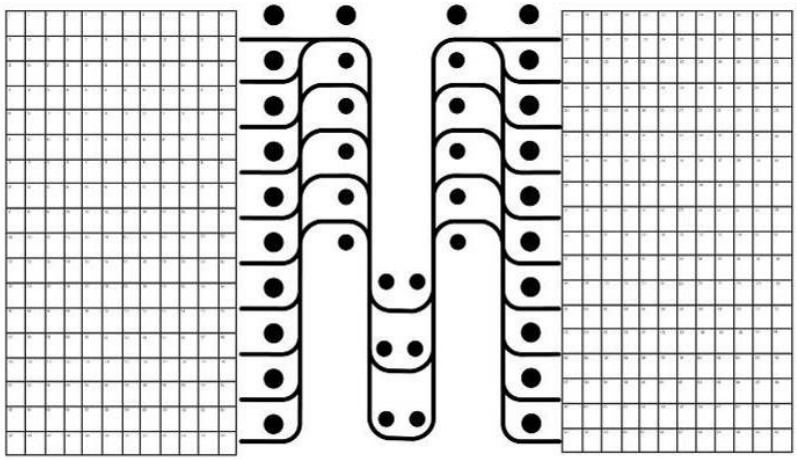

Figure 3

Step 4: Make sure the jumper cable is properly routed with all of the slack taken up by the fiber management fingers **(Figure 4)**.

Then, clean the adapter and connecter and plug it into the desired port.

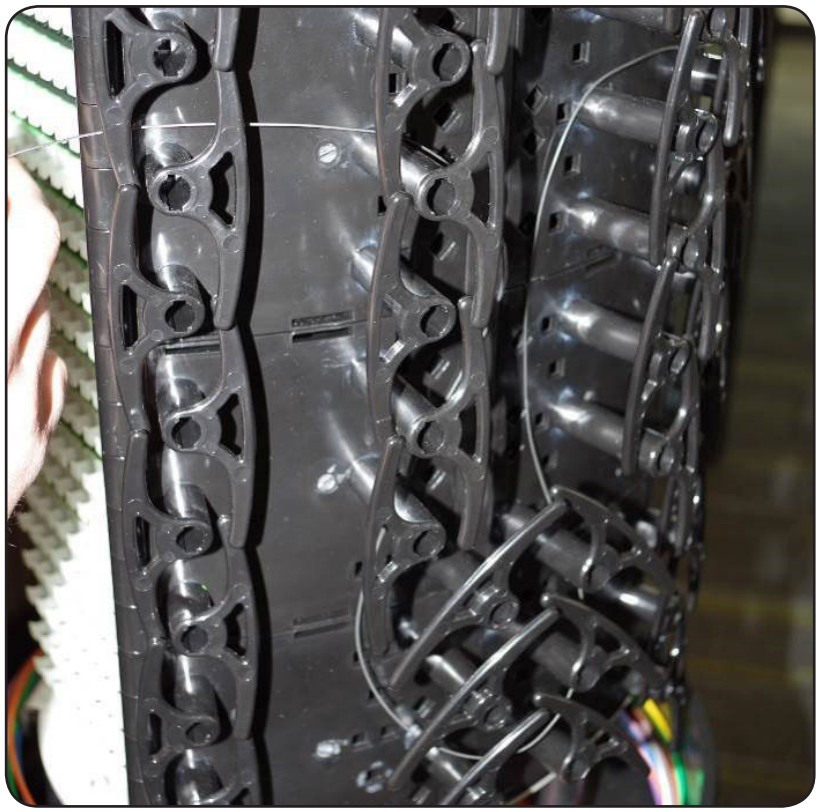

Figure 4

Step 5: Record the port in the space provided on the designation card.

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Connector Cleaning Procedure

Whether factory terminated or field spliced, clean connectors are essential for proper system operation. Even the smallest dust particle can cause transmission problems, so for optimal network performance inspect, and if necessary, clean connectors and adapters prior to mating.

Inspect Then Connect

These are Clearfield recommended products/applications. Use the product you feel will complete your cleaning procedures. Create a “best practice” for your company and follow those procedures.

The use of Chemtronics end face and bulkhead cleaning products and techniques ensures a clean end face, no matter the type of contamination.

Before cleaning any connector, be sure you know what type of contaminate you are cleaning (dry, fluidic, or combination). All the available products are good, it’s the process that you need to be aware of. Using a dry cleaning method to clean “dirt” can lead to scratching of the end face. Learn the process of cleaning properly.

Note: *It is* ***NOT*** *recommended to use isopropyl alcohol to clean the end face.*

Figure 1

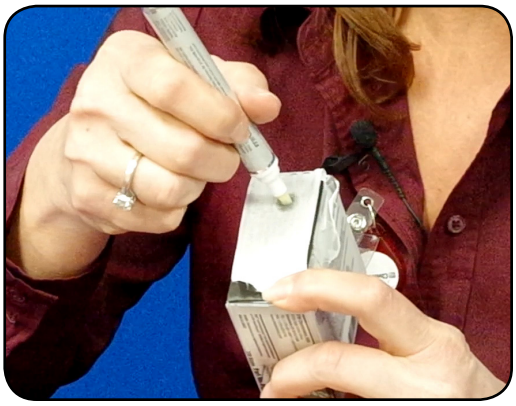

Figure 2

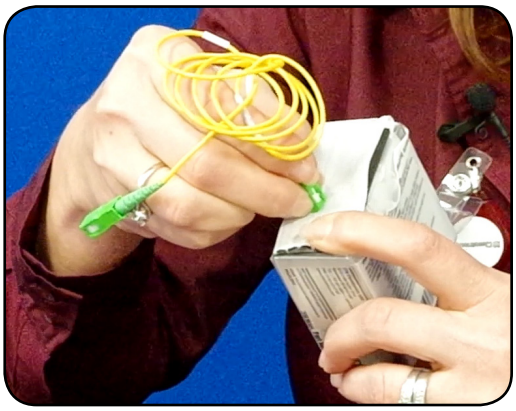

Figure 3

Cleaning an SC/LC Connector

Cleaning the End Face

- Place one wiping paper on QbE-2 FiberSafe™ Cleaning Platen. (**Figure 1)**
- Apply small amount of precision cleaner (about 1” in diameter) with Electro-Wash MX pen on to one end of the wipe. (**Figure 2)**
- Hold end face at a 90 degree angle. For APC connection, adjust by slightly tilting the container or end face. Angle is correct when no drag is felt on the end face. (**Figure 3)**
- Draw end face from wet to dry part of the wipe 3 times. Use just enough pressure to ensure complete contact between end face and the wipe.

Note: DO NOT *retrace previous step.*

Cleaning the Ferrule

- Lightly moisten the fiber optic swab (2.5mm/38542F or 1.25mm/38040) by spotting a small amount (about 1") of Electro-Wash PX or Electro-Wash MX pen onto the QbE. Hold the swab, 1 side down to the wetted area and hold for a count of 1-2-3-4-5. (**Figure 4)**

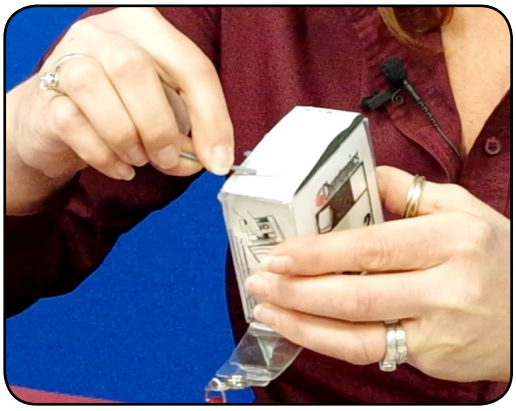

Figure 4

- Insert swab into side of ferrule, wet side to the ceramic ferrule and circle around 2-3 times and remove. Turn swab to dry side and repeat. (**Figure 5)**

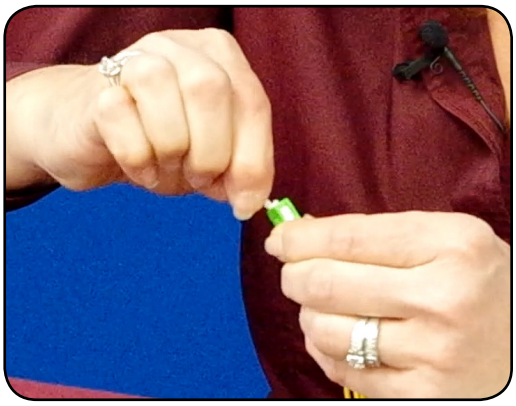

Figure 5

Cleaning the Mate Through an Adapter AND the Adapter Itself

- Lightly moisten the fiber optic swab (2.5mm/38542F or 1.25mm/38040) by spotting a small amount (about 1") of Electro-Wash PX or Electro-Wash MX pen onto the QbE. Hold the tip of the swab onto the wetted area and hold for a count of 1-2-3-4-5.
- Insert the swab into the adapter to the connector, press lightly against the connector, twist 2-3 times, remove and discard.
- Dry with a second dry swab.
- Inspect, repeat cleaning if necessary, and test for signal strength.
- Use additional swabs to clean inside the actual adapter. Moisten swab, like above, and insert through hole and remove while twisting. (**Figure 6)**

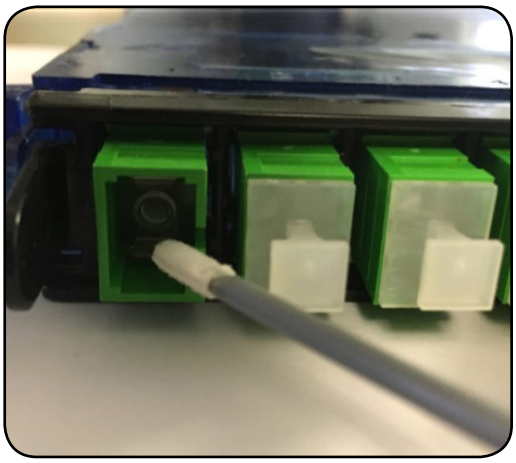

Figure 6

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Cleaning an MPO/MTP Connector

Female Connector

- Place one wiping paper on QbE-2 FiberSafe™ Cleaning Platen and apply small amount of precision cleaner (about 1" in diameter) with Electro-Wash MX pen on to one end of the wipe. (**Figure 1)**

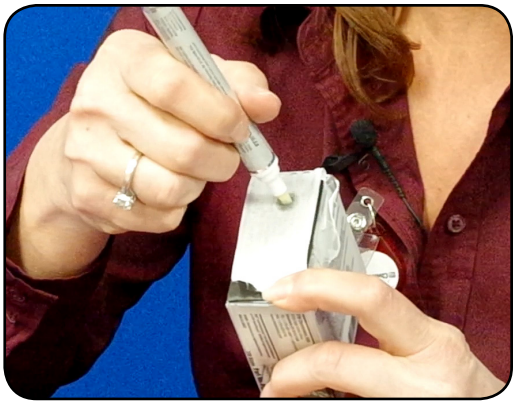

Figure 1

- Hold end face at a 90 degree angle. For APC connection, adjust by slightly tilting the container or end face. Angle is correct when no drag is felt on the end face. (**Figure 2)**

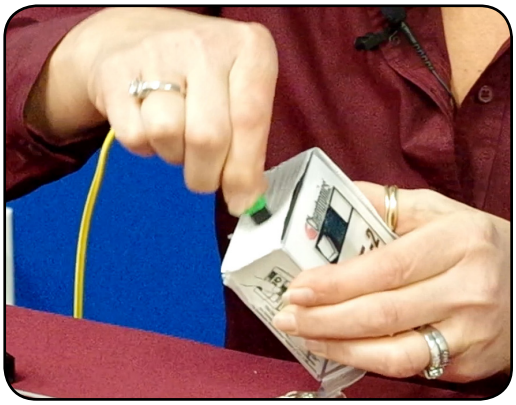

Figure 2

Male Connector

- Lightly moisten one side of the fiber optic swab (CC505F) by spotting a small amount (about 1") of Electro-Wash PX or Electro-Wash MX pen onto the QbE. Hold the swab, 1 side down to the wetted area and hold for a count of 1-2-3-4-5.

- Place swab, wet side down, at one end of connector end face and draw across in a diagonal sweep; i.e., from fiber 1 up and across to fiber 12. Turn swab over to dry and draw back from fiber 12 to fiber 1. (**Figure 3)**

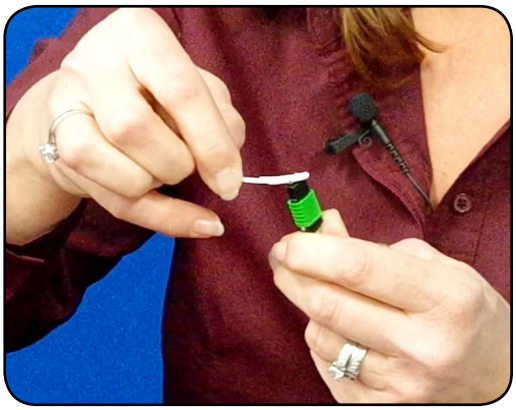

Figure 3

Standard Warranty

Clearfield warrants to the original purchaser of the Product sold hereunder is free from defects in material and workmanship under normal use and service, subject to exceptions stated herein. Product purchased is warranted as follows: Clearfield designed and branded Products are warranted for three (3) years: Products manufactured by Clearfield to customer prints and/or specifications are warranted for one (1) year; and any Product Clearfield acquires from or through a third-party manufacturer or distributor and resells to Customer as the original customer will carry the manufacturer's pass-through warranty, if any. In all cases, the warranty period commences on the date of shipment to the original purchaser.

Warranty Claim Procedure

If any Product purchased from Clearfield is found defective under the above warranty, the following basic procedure must be followed:

1. Customer must contact Clearfield and obtain a Return Materials Authorization
2. Following authorization, the Customer ships the product-freight collect-to Clearfield's manufacturing facility
3. Clearfield shall repair or replace the defective Product at its sole option and discretion, and return the repaired or replacement Product to Customer's site, freight prepaid

Note: If the Product is not found to be defective by Clearfield, the product will be returned to the Customer and the customer billed for freight in both directions.

View our warranty policy here: https://www.seeclearfield.com/warranty.html

Limitations of Warranty

Correction of defects by repair or replacement, at the option of Clearfield Inc, shall constitute the exclusive sole remedy for a breach of this limited warranty. Clearfield shall not be liable under any circumstances for any special, consequential, incidental, punitive, or exemplary damages arising out of or in any way connected with the product or with agreement to sell product to buyer, including, but not limited to damages for lost profits, loss of use, or for any damages or sums paid by buyer to third parties. The foregoing limitation of liability shall apply whether the claim is based upon principles of contract, warranty, negligence or other tort, breach of statutory duty, principles of indemnity or contribution, the failure of any limited or exclusive remedy to achieve its essential purpose, or otherwise.

Clearfield will not be responsible for any labor or materials costs associated with installation or incorporation of Clearfield products at customer sites, including any costs of alteration, replacement or defective product, or any field repairs.

Other Limitations

Clearfield assumes no warranty liability regarding defects caused by:

1. Customer's modification of Product, excepting installation activities described in Clearfield documentation
2. Customer re-packaging of Product for shipment to third parties or destinations other than those originally shipped to by Clearfield, or any defects suffered during shipping where the Product has been re-packaged
3. Customer's installation or maintenance, excepting activities described in and performed in accordance with Clearfield documentation
4. Customer's improper or negligent use or application of Product
5. Other causes external to the Product, including but not limited to accidents, catastrophe, acts of God, government action, war, riot, strikes, civil commotion, sovereign conduct, or the acts or conduct of any person or persons not party to or associated with Clearfield
6. Environmental factors and weathering resulting in aging and damage not necessary or applicable to the function of the product

Proprietary Notice

Its purpose is to provide the user with adequately detailed documentation to efficiently install the equipment supplied. Every effort has been made to keep the information contained in this document current and accurate as of the date of publication or revision.

However, no guarantee is given or implied that the document is error free or that it is accurate with regard to any specification.

Technical Support

Clearfield, Inc. can be contacted for any issues that arise with the supplied product.

If you need to return the supplied product, you must contact the Clearfield, Inc. Customer Service Department to request a Returned Materials Authorization (RMA) number.

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Technical Support: techsupport@clfd.net