

4.2.5.3.2 - INTERCONNECTION - FIBER OPTIC CABLE

City of Suffolk Fiber Optics Interconnect Standards

Communications Pull Boxes

Fiber optic pull boxes shall be utilized for all communications cables. Pull boxes shall be spaced at a distance of 200 feet or as agreed by the engineer. The Fiber optic pull boxes shall be heavy duty and non-metallic with an open bottom and shall be rated for a static design load of at least 20,000 pounds over a 10 inch square area. The cover (lid) shall be extra heavy duty with 2 bolts with 2 lifting slots and shall be flush seated. Pull box dimensions are 24"X 36"X 30". One fiber optic pull box shall be installed at or within 10 feet of the traffic controller cabinet. Fiber optic pull box shall not contain any items other than communications cable or fiber optic (such as no electrical conductors). When pull box is to be placed in a sidewalk, removal, restoration and replacement of sidewalk slab is required. For drainage, 12" of drainage rock shall be required under the pull box similar to typical shown in VDOT Bridge and Road standard.. Pull box covers shall be stamped

"TRAFFIC SIGNAL FIBER OPTICS". For all fiber optic pull boxes in grassy areas, a concrete reinforced apron will be required. The concrete apron shall be 12" wide x 6" deep reinforced and sloped away around pull box similar to typical shown in VDOT Bridge and Road Standard. . Each pull box shall have 50 feet of spare fiber per run and 50 feet of spare fiber per run at the cabinet pull box.

Communications Cable

This paragraph applies to conduit installed for all the communications cables, as to provide for a "fiber friendly" installation. The Conduit shall enter communications pull boxes at a 45 degree angle relative to the vertical wall of the pull box. Conduit ends must be plugged to allow fiber to enter the conduit but keep water from conduit from entering the pull box. Further, the conduit shall terminate in each communications pull box at diagonally opposed corners. Two 2" conduits shall be installed from the communications pull box most adjacent to the traffic controller cabinet and shall terminate within the cabinet. Communications conduit shall include no more than 180 degrees of total bend, and shall have a bending radius of at least 10 times the conduit diameter. All conduits shall be placed at a minimum level of 36" below the finished grade. A City of Suffolk traffic signal inspector shall be notified and be present on site to check the depth of the conduit during the installation. A warning tape 4" in width shall be installed 18" below the finished grade. The warning tape shall read "WARNING FIBER, BURIED COMMUNICATIONS CABLE BELOW". A midpoint splice shall be made at each traffic cabinet location allowing 2 fibers to enter the traffic cabinet and be terminated inside the cabinet using an Iris connector and then to the fiber splice enclosure.. Fiber cables shall be clearly marked indicating direction and locations. Upon completion of fiber installation an OTDR report shall be provided to the City of Suffolk Traffic Engineering Department for review.

**Special Requirements for Traffic Control Signal Devices and ITS Devices
Municipal Services Department/ Traffic Division
City of Suffolk**

Fiber cable Specification –

Environment Outdoor
Application Aerial, Direct Buried, Duct
Cable Type Loose Tube
Product Type Armored
Fiber Category Single-mode (OS2)

Standards

Common Installations Outdoor lashed aerial, duct and direct-buried; indoor when installed according to National Electrical Code® (NEC®) Article 770
Design and Test Criteria ANSI/ICEA S-87-640

Cable Design

Central Element	Dielectric
Fiber Count	12
Fiber Coloring	Blue, Orange, Green, Brown, Slate, White, Red, Black, Yellow, Violet, Rose, Aqua
Maximum Fibers per Tube	12
Number of Tube Positions	6
Number of Active Tubes	1
Buffer Tube Color Coding	Blue
Buffer Tube Diameter	2.5 mm (0.1 in)
Number of Filling Elements	5
Tape	Water-swellable
Number of Ripcords	2
Tensile Strength Elements and/or Armoring - Layer 1	Corrugated steel tape armor
Outer Jacket Material	Polyethylene (PE)
Outer Jacket Color	Black

Temperature Range

Storage -40 °C to 70 °C (-40 °F to 158 °F)
Installation-30 °C to 70 °C (-22 °F to 158 °F)
Operation -40 °C to 70 °C (-40 °F to 158 °F)

Mechanical Characteristics Cable

Max. Tensile Strengths, Short-Term 2700 N (600 lbf)
Max. Tensile Strengths, Long-Term 890 N (200 lbf)
Weight 129 kg/km (87 lb/1000 ft)
Nominal Outer Diameter 12.1 mm (0.48 in)
Min. Bend Radius Installation 182 mm (7.2 in)
Min. Bend Radius Operation 121 mm (4.8 in)

Chemical Characteristics

RoHS Free of hazardous substances according to RoHS 2002/95/EG

Optical Characteristics (cabled)

Fiber Type Single-mode
Fiber Core Diameter 8.2 μm
Fiber Category OS2
Fiber Code E
Performance Option Code 01
Wavelengths 1310 nm / 1383 nm / 1550 nm
Maximum Attenuation 0.4 dB/km / 0.4 dB/km / 0.3 dB/km
Serial 1 Gigabit Ethernet 5000 m / - m / - m
Serial 10 Gigabit Ethernet 10000 m / - m / 40000 m

Ground kit

Product Type FOH Closures
Order Number SCF-KT-GND

Splice spec

- Compact Size: 17" L x 8.6" W x 7.2" H (43.2 cm x 21.9 cm x 18.4 cm)
- Two end plate options – 4 Port and 6 Port
 - 6 Port provides (4) 7/8" (22mm) ports and (2) 3/4" (19mm) ports
 - 4 Port provides (2) 1 1/4" (32mm) ports and (2) 1" (25mm) ports
- Can be configured for butt or in-line applications
- Organizers designed for loose buffer tube and ribbon applications

- Size allows for mounting in small hand holes
 - Provided with LOCK-TAPE Sealing System
 - Accepts a wide variety of grommets for multi drop applications
 - Permanent neoprene gasket system requires no re-entry kits
 - Future cable ports provide capability for future cable installation, without end plate removal
 - Integrated air valve to confirm integrity of final assembly
 - Full line of mounting hardware
 - **UL Approved, RUS Listed**
 - Tested in accordance to Telcordia GR-771 CORE
- COYOTE PUP Closure Kits**

8006622

COYOTE PUP Closure Kit for Buffer Tube – includes (1) 3 section 6 Port End Plate, (1) blank end plate and organizer

8006621

COYOTE PUP Closure Kit for Unitube – includes (1) 3 section 6 Port End Plate, (1) blank end plate, transport tube kit and organizer

8006661

RUS Listed COYOTE PUP Closure Kit for Buffer Tube – includes (1) 3 section 6 Port End Plate, (1) blank end plate, organizer and (2) RUS listed shield connectors.

Splice Tray Kits

80807701 12 Count Low Profile Tray w/plastic splice block
- single fusion splices

80806033 12 Count Standard Tray w/elastomeric splice block
- fusion & mechanical splices

80807114 72 Count Ribbon Tray w/elastomeric splice block for mass fusion

Mounting Hardware Kits

8003325 Aerial hanger bracket

8003279 Manhole support bracket

8003372 Pole/wall mount bracket (vertical)

Accessories Kits

End Plate

Grommets

See Grommet Chart in COYOTE Closure End Plate and Accessories Section

80805795 Shell Kit 6" x 17"

80805771 Buffer Tube Storage Compartment

80805775 Unitube Storage (Transition) Compartment

80805105 6 Port End Plate Kit, Includes (1) end plate assembly, (1) full set of plugs, and LOCK-Tape Sealing material

80805739 4 Port End Plate Kit, Includes (1) end plate assembly, (1) full set of plugs, and LOCK-Tape sealing material

80805260 Blank end plate kit

8003371

Future Cable Port Kit, Includes Future Cable Port for 7/8" port, plug and clamps for installation of future cable port during initial assembly

8003291

Future Cable Installation Kit, includes LOCK-TAPE Sealant, bead sealant and L-bracket for preparation of future cable up to .86" in diameter

8003289 Future Cable Port/Cable Installation Kit. Complete kit includes Cat. Nos. 8003289 and 8003291

80806037 3/4" Plug Kit (contains 2 plugs)

80806180 7/8" Plug Kit (contains 2 plugs)

80806038 1" Plug Kit (contains 2 plugs)

80806181 1 1/4" Plug Kit (contains 2 plugs)

80805293 Transport Tube Kit (contains 6 tubes)

8003280 Transition Tube Kit, used to transition fibers from top section of end plate to the transition compartment

8003418 Heat Shield for PUP Closure

Installation Materials

80805238 C-Cement, 1 oz. tube

80805925 LOCK-TAPE Sealant 1" W x 15" L Roll

Splice Tray/Closure Capacities

Low Profile Single Fusion 12 6 72

Standard Single Fusion &

Single Mechanical 12 4 48

Ribbon Mass Fusion 72 2 144

Traffic cabinet splice enclosure - Single-panel Housing (SPH-01P) using CCH-CP12-A9 connector panel

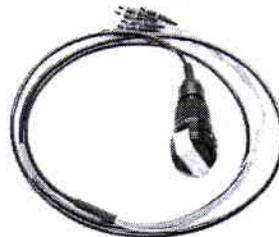
IRIS INSTALLATION INSTRUCTIONS

CONNECTOR PARTS LIST

1) Upper shell breakout assembly

Note: The upper shell breakout assembly is fitted with dust caps on both ends to prevent contamination.

After removing packaging material from the shell body and two meter pre-terminated cable assembly, be sure that all dust caps are secure.



<p>2) Lower shell drop cable assembly</p> <p>Note: The lower shell drop cable assembly is comprised of the connector with individual connector ferrule dust caps on one end and is un-terminated on the opposite end of the drop cable in order to facilitate rigging for cable pull.</p>	
<p>3) Compression spring threaded connection</p> <p>The compression spring threaded connection is part of the upper shell breakout assembly. It is the part that holds the top shell to the bottom shell in place under tension</p>	
<p>4) Compression spring bearing trip ring</p> <p>The compression spring bearing trip ring snaps over the ball bearings of the compression spring threaded connection to hold the top and bottom connector shells in the trip position.</p>	
<p>5) The trip safety ring is used to prevent accidental trip during connector assembly and while working in an operational cabinet.</p>	
<p>6) Halo trip cage</p> <p>The halo trip cage assembly attaches to the compression spring bearing trip ring and provides the necessary leverage to activate the trip function when side pressure is applied to the upper ring.</p>	

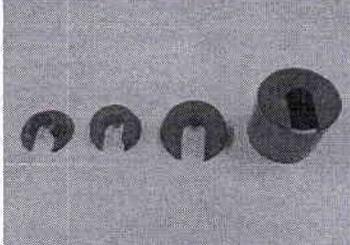


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4401 E. Baseline, Suite 110, Phoenix, Arizona 85042
 (602) 414-4677

(602) 414-0707 Fax

IRIS INSTALLATION ACCESSORIES

<p>1) Connector assembly compression tool and cradle assembly is comprised of a common, off the shelf bar clamp and a specially designed slip cradle connector holder which conveniently fits bar clamp.</p>	
<p>2) Nine feet of braided steel trip wire, trip wire crimp barrels and anchor clamps are included in the connector installation kit.</p>	
<p>3) Butyl rubber splicing tape is included with the installation kit to facilitate final conduit cap seal for water proofing specifications.</p>	
<p>4) Conduit cap plates (for 2", 3" and 4" electrical rated conduits) can be slid on after the cable is pulled and also allow for additional cables to bypass the IRIS in the same conduit for retrofit or permanent cable placement.</p>	
<p>5) Connector pin cleaning kit includes special optical cleaning solution, fiber optic lint free cleaning sticks and fiber optic lint free cloth for IRIS and conventional connector cleaning. (Sold separately)</p>	
<p>6) "Caution Fiber Optic Trip Sensitive Device" ring markers are included and should be attached to the halo trip cage after the installation is complete.</p>	

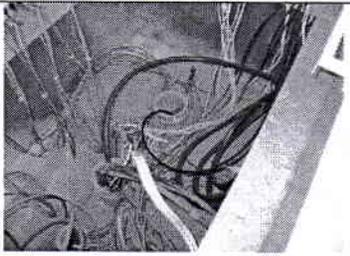


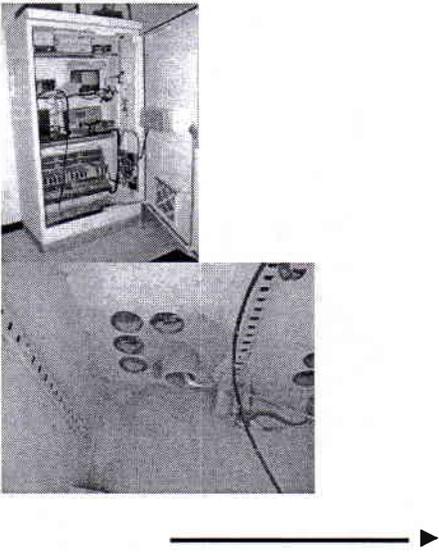
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INSTALLATION GUIDE FOR LOWER SHELL DROP CABLE ASSEMBLY

<p>1) Remove contents of package and inventory parts.</p>	
<p>2) Prepare lower shell drop cable assembly by removing protective plastic wrap and (when provided) securing pre-installed pulling eye to the JET line or mule tape. If no pulling eye is provided, secure a basket grip swivel eye to the cable end prior to pulling. Note: Never use cinch knots direct on fiber optic jackets as this can damage the fiber.</p>	
<p>FOR PVC ELECTRICAL CONDUIT STUB-UPS</p> <p>3) Prepare cabinet conduit stub-up by cutting it flush to the concrete level. By design specifications, if no fixed cabinet parts are to protrude above the top of the concrete slab, after cutting conduit flush to the top of the slab, use a router and a 1 1/2 inch end cut router bit to hone out the conduit below the</p>	

<p>slab level.</p> <p>4) Position one individual at cabinet feed location and one individual at trunk-line interface location.</p> <p>5) Pull the drop cable in accordance with Industry Standards guidelines or customer requirements from the cabinet location to the trunk-line splice location.</p> <p>6) As the pulling end of the fiber drop cable reaches the trunk-line interface location, most of the additional slack or excess cable will need to be pulled forward toward the splice point.</p> <p>Temporarily leave approximately 24 inches of excess cable at the cabinet end in order to facilitate final assembly and mounting of the lower shell portion of the connector.</p>	
<p>7) Use the appropriate sized conduit cap for the conduit stub-up size (2 inch, 3 inch or 4 inch) as specified in the product order form. Attach the conduit cap to the bottom of the lower shell connector flange with the #8 machine screws included in the installation package.</p> <p>The conduit cap is slit on one side for easy installation. (This slit can also be used for retro-fit of an existing non-breakaway connection, eliminating cut-over modification time, as well as when additional cable is in the same conduit.)</p>	

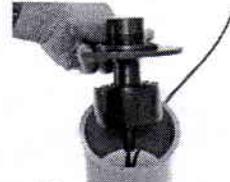
INSTALLATION GUIDE (Continued)

8) Pull the remainder of the cable slack to the splice location. Carefully slide the lower shell connector into the conduit until the flange slides down into the conduit or penetration stub up.

NOTE: Although the bottom part of the connector assembly has a fairly strong pull tension, carefully monitor the final 24" of pulling to ensure connector is not stressed during final fit-up.



Standard Installation

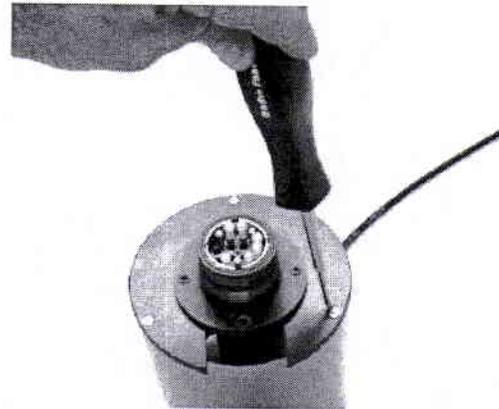


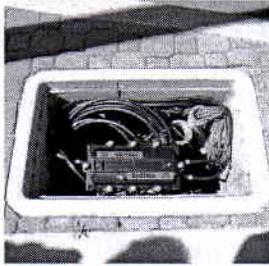
Water proof Installation

9) The conduit cap assembly provided is designed to be self holding when lateral movement is applied. However, some installation specifications may require that you drill and secure the cap to the top or side of the conduit stub-up. In this situation, the aluminum cap will drill fairly easy and fit-up can be accomplished using (3) #6 x 5/8" pan-head screws.

a) Where installation specifications require the conduit stub-up to be recessed or flush with the concrete pad, securing the cap from the top as described above is your only option.

b) For installations where the conduit stub-up is allowed to extend beyond the surface of



<p>the concrete pad, #8 side tap threads are provided in the conduit cap for easy fit-up.</p>	
<p>10) At the trunk-line splice location be sure to leave sufficient slack for splicing operations (usually a minimum of 12 feet plus the amount specified by the client or Standards) for stored slack. Remember, this is a breakaway connection so the normal amount of stored slack is not required.</p>	
<p>11) Fusion splice or connect the drop cable to trunk-line cable in accordance with client requirements and Industry Standards.</p>	



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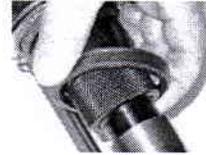
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INSTALLATION GUIDE FOR FACTORY PREASSEMBLED UPPER SHELL BREAKOUT
ASSEMBLY

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1) The upper shell breakout assembly comes pre-configured for quick fit-up installation.

NOTE: The assembly will not accidentally trip as long as the trip safety ring is engaged (shown here in hand for easy identification).

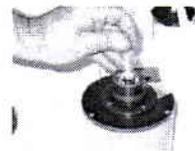


Trip safety ring in the removed position for ease of recognition.

2) Remove both bottom and top connector dust caps (bottom is comprised of several individual translucent dust caps and top is one larger red dust cap).



3) Clean both connector mating surfaces (upper and lower connector shells) with cleaning sticks provided.



4) Immediately join the upper and lower connector shells by holding the top crown of the upper connector shell or assembly.

5) Without exerting downward pressure, spin the upper shell connector assembly until you feel it catch in the lower assembly alignment holes. Once it has caught the alignment holes, you should not be able to rotate the upper connector assembly in either direction.



6) Grasp the halo trip cage assembly and rotate in a clockwise direction to engage captivating threads to the lower shell connector body. It takes 15 to 20 full 360 degree turns to fully engage and tighten the threads in order to make this connector water and dust proof.

NOTE: While rotating the halo trip cage and



lower part of the connector assembly, be sure that the breakout connectors are free to rotate as well.



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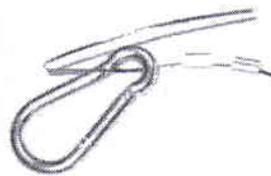
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INSTALLATION GUIDE FOR FACTORY PREASSEMBLED UPPER SHELL BREAKOUT ASSEMBLY (continued)

7) Construct the stainless steel trip cable using a 0.190" die and crimp tool or channel lock pliers. Attach a trip line from the top ring of the halo trip cage assembly to a cabinet anchor point leaving approximately 2 inches of slack in the trip line. It may be necessary to drill a 1/2 inch hole in a cabinet flange to create an anchor point.

NOTE: It is only necessary to establish one cabinet anchor point. Additional anchor points are strictly at the discretion of the owner and their installation specifications.

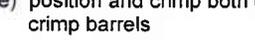


a) slide wire and (2) dual crimp barrels through anchor clamp



b) loop wire back through crimp barrels



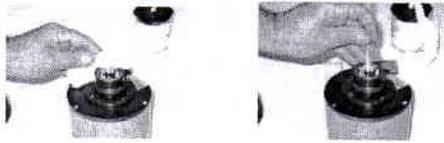
	 <p>c) slide single cavity crimp barrel on loose end of trip wire</p>  <p>d) first crimp single cavity barrel</p>  <p>e) position and crimp both dual crimp barrels</p>
<p>8) Apply the "Caution Fiber Optic" tag to the upper housing where it exits the halo cage.</p>	
<p>9) If not immediately performing fiber tests, clean and plug the breakout connectors into the appropriate cabinet interface device then dress remaining cable slack using cable ties or hook and loop straps as specified. Be sure to secure the connector top side cable within 2 feet from the halo trip cage to prevent projectile collateral damage in the event of an impact.</p> <p>WARNING: To avoid damage to valuable electronics, always disconnect fiber from active equipment prior to performing any testing.</p>	 <p>Disengage trip Safety and apply caution labels before exiting the cabinet.</p>



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IRIS TRIP RESET INSTRUCTIONS

Note: After an accidental or intentional trip, the re-set procedure takes approximately 5 minutes.

<p>1) Remove lower trip ring from trip cage assembly and inspect the cage assembly and ring for impact damage.</p>	
<p>2) Unscrew and remove the compression spring threaded connection from the connector base located on top of the conduit stub-up.</p> <p>NOTE: Damaged components should be replaced prior to proceeding.</p>	
<p>3) Clean all connector seal rings and ferrule tips prior to re-assembly.</p>	
<p>4) Place upper connector breakout assembly along with the stainless steel trip and safety rings (flat portion of flange facing top of connector) in the compression tool slip cradle and bar clamp.</p>	
<p>5) Place the compression spring threaded connection in the base of the compression tool slip cradle, opposite the connector top shell with the ball</p>	

<p>bearings facing the connector top. (Slip cradle not shown)</p>	
<p>6) Pump the tool compression lever until the connector and compression spring threaded connection are close to final mate-up, then perform any slight adjustments so that upper connector shell steel pins align with grooves in the compression spring-threaded ring housing. Continue pumping the compression lever until the bottom compression bearing threaded ring and top shell breakout connector assembly are tightly fitted together.</p>	 <p>(slip cradle not shown)</p>

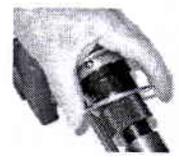
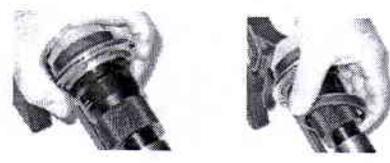


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IRIS TRIP RESET INSTRUCTIONS (continued)

<p>7) Snap the compression bearing spring trip ring over exposed bearings until you hear it snap.</p>	
<p>8) Slide trip safety ring into place and thread on until it locks in place.</p>	
<p>9) Depress the release lever on the compression tool and remove the slip cradle and assembled connector. (slip cradle not shown)</p>	
<p>10) Without exerting any downward pressure, spin</p>	

<p>the upper shell connector assembly until you feel the alignment pins catch on the lower assembly alignment pins. Once it has caught the alignment pins, you should not be able to rotate the upper connector assembly in either direction.</p>	
<p>11) Grasp the lower body of the connector and rotate in a clockwise direction to engage captivating threads to the lower shell connector body.</p> <p>It takes about 20 full 360 degree turns to fully engage and tighten the threads in order to properly align the connector ferrules and make the connector water and dust proof.</p>	
<p>12) Slide the halo trip cage assembly up over the upper connector shell and lock in place by rotating one quarter turn in the captivating key locks.</p>	
<p>13) With the halo trip cage assembly locked in place, re-attach the trip wire to the upper ring and the cabinet anchor point(s).</p> <p>NOTE: Be sure to remove the trip safety ring prior to leaving the cabinet to activate the connector.</p>	

IRIS INSTALLATION INSTRUCTIONS

CONNECTOR PARTS LIST

<p>1) Upper shell breakout assembly</p> <p>Note: The upper shell breakout assembly is fitted with dust caps on both ends to prevent</p>	
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<p>contamination.</p> <p>After removing packaging material from the shell body and two meter pre-terminated cable assembly, be sure that all dust caps are secure.</p>	
<p>2) Lower shell drop cable assembly</p> <p>Note: The lower shell drop cable assembly is comprised of the connector with individual connector ferrule dust caps on one end and is un-terminated on the opposite end of the drop cable in order to facilitate rigging for cable pull.</p>	
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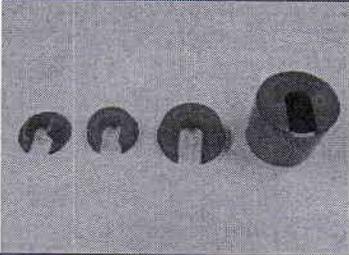


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<p>3) Butyl rubber splicing tape is included with the installation kit to facilitate final conduit cap seal for water proofing specifications.</p>	
<p>4) Conduit cap plates (for 2", 3" and 4" electrical rated conduits) can be slid on after the cable is pulled and also allow for additional cables to bypass the IRIS in the same conduit for retrofit or permanent cable placement.</p>	
<p>5) Connector pin cleaning kit includes special optical cleaning solution, fiber optic lint free cleaning sticks and fiber optic lint free cloth for IRIS and conventional connector cleaning. (Sold separately)</p>	

6) "Caution Fiber Optic Trip Sensitive Device" ring markers are included and should be attached to the halo trip cage after the installation is complete.



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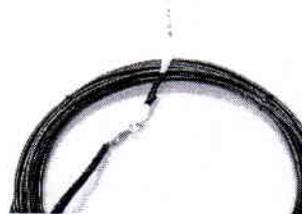
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INSTALLATION GUIDE FOR LOWER SHELL DROP CABLE ASSEMBLY

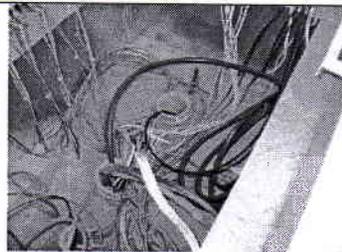
1) Remove contents of package and inventory parts.

2) Prepare lower shell drop cable assembly by removing protective plastic wrap and (when provided) securing pre-installed pulling eye to the JET line or mule tape. If no pulling eye is provided, secure a basket grip swivel eye to the cable end prior to pulling. Note: Never use cinch knots direct on fiber optic jackets as this can damage the fiber.



FOR PVC ELECTRICAL CONDUIT STUB-UPS

3) Prepare cabinet conduit stub-up by cutting it flush to the concrete level. By design specifications, if no fixed cabinet parts are to protrude above the top of the concrete slab, after cutting conduit flush to the top of the slab, use a router and a 1 1/2 inch end cut router bit to hone out the conduit below the slab level.

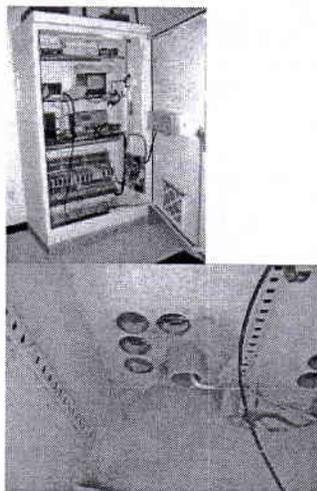


4) Position one individual at cabinet feed location and one individual at trunk-line interface location.

5) Pull the drop cable in accordance with Industry Standards guidelines or customer requirements from the cabinet location to the trunk-line splice location.

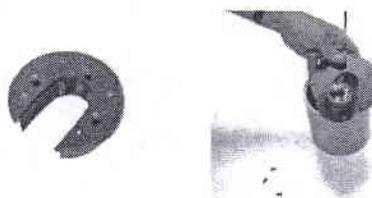
6) As the pulling end of the fiber drop cable reaches the trunk-line interface location, most of the additional slack or excess cable will need to be pulled forward toward the splice point.

Temporarily leave approximately 24 inches of excess cable at the cabinet end in order to facilitate final assembly and mounting of the lower shell portion of the connector.



7) Use the appropriate sized conduit cap for the conduit stub-up size (2 inch, 3 inch or 4 inch) as specified in the product order form. Attach the conduit cap to the bottom of the lower shell connector flange with the #8 machine screws included in the installation package.

The conduit cap is slit on one side for easy installation. (This slit can also be used for retro-fit of



an existing non-breakaway connection, eliminating cut-over modification time, as well as when additional cable is in the same conduit.)



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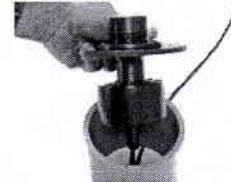
INSTALLATION GUIDE (Continued)

8) Pull the remainder of the cable slack to the splice location. Carefully slide the lower shell connector into the conduit until the flange slides down into the conduit or penetration stub up.

NOTE: Although the bottom part of the connector assembly has a fairly strong pull tension, carefully monitor the final 24" of pulling to ensure connector is not stressed during final fit-up.



Standard Installation

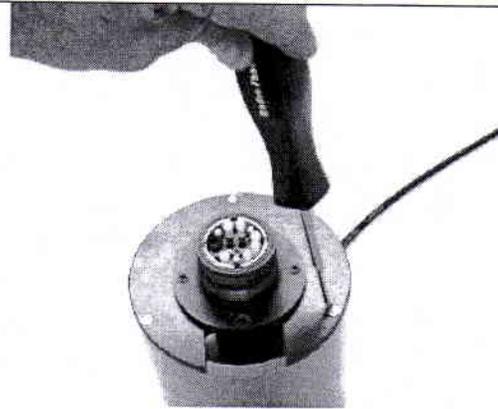


Water proof Installation

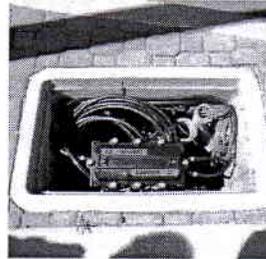
9) The conduit cap assembly provided is designed to be self holding when lateral movement is applied. However, some installation specifications may require that you drill and secure the cap to the top or side of the conduit stub-up. In this situation, the aluminum cap will drill fairly easy and fit-up can be accomplished using (3) #6 x 5/8" pan-head screws.

a) Where installation specifications require the conduit stub-up to be recessed or flush with the concrete pad, securing the cap from the top as described above is your only option.

b) For installations where the conduit stub-up is allowed to extend beyond the surface of the concrete pad, #8 side tap threads are provided in the conduit cap for easy fit-up.



10) At the trunk-line splice location be sure to leave sufficient slack for splicing operations (usually a minimum of 12 feet plus the amount specified by the client or Standards) for stored slack. Remember, this is a breakaway connection so the normal amount of stored slack is not required.



11) Fusion splice or connect the drop cable to trunk-line cable in accordance with client requirements and Industry Standards.



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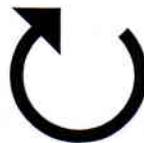
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INSTALLATION GUIDE FOR FACTORY PREASSEMBLED UPPER SHELL BREAKOUT ASSEMBLY

<p>1) The upper shell breakout assembly comes pre-configured for quick fit-up installation.</p> <p>NOTE: The assembly will not accidentally trip as long as the trip safety ring is engaged (shown here in hand for easy identification).</p>	 <p style="text-align: center;">Trip safety ring in the removed position for ease of recognition.</p>
<p>2) Remove both bottom and top connector dust caps (bottom is comprised of several individual translucent dust caps and top is one larger red dust cap).</p>	
<p>3) Clean both connector mating surfaces (upper and lower connector shells) with cleaning sticks provided.</p>	
<p>4) Immediately join the upper and lower connector shells by holding the top crown of the upper connector shell or assembly.</p> <p>5) Without exerting downward pressure, spin the upper shell connector assembly until you feel it catch in the lower assembly alignment holes. Once it has caught the alignment holes, you should not be able to rotate the upper connector assembly in either direction.</p>	
<p>6) Grasp the halo trip cage assembly and rotate in a</p>	

clockwise direction to engage captivating threads to the lower shell connector body. It takes 15 to 20 full 360 degree turns to fully engage and tighten the threads in order to make this connector water and dust proof.

NOTE: While rotating the halo trip cage and lower part of the connector assembly, be sure that the breakout connectors are free to rotate as well.



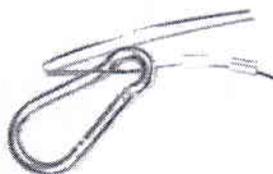
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INSTALLATION GUIDE FOR FACTORY PREASSEMBLED UPPER SHELL BREAKOUT ASSEMBLY (continued)

7) Construct the stainless steel trip cable using a 0.190" die and crimp tool or channel lock pliers. Attach a trip line from the top ring of the halo trip cage assembly to a cabinet anchor point leaving approximately 2 inches of slack in the trip line. It may be necessary to



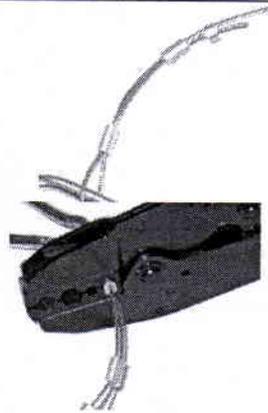
a) slide wire and (2) dual crimp barrels through anchor clamp



b) loop wire back through crimp barrels

drill a 1/2 inch hole in a cabinet flange to create an anchor point.

NOTE: It is only necessary to establish one cabinet anchor point. Additional anchor points are strictly at the discretion of the owner and their installation specifications.



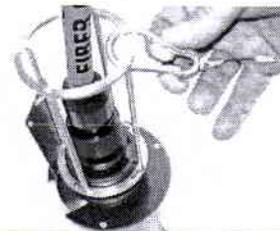
c) slide single cavity crimp barrel on loose end of trip wire

d) first crimp single cavity barrel



e) position and crimp both dual crimp barrels

8) Apply the "Caution Fiber Optic" tag to the upper housing where it exits the halo cage.



9) If not immediately performing fiber tests, clean and plug the breakout connectors into the appropriate cabinet interface device then dress remaining cable slack using cable ties or hook and loop straps as specified. Be sure to secure the connector top side cable within 2 feet from the halo trip cage to prevent projectile collateral damage in the event of an impact.



Disengage trip Safety and apply caution labels before exiting the cabinet.

WARNING: To avoid damage to valuable electronics, always disconnect fiber from active equipment prior to performing any testing.



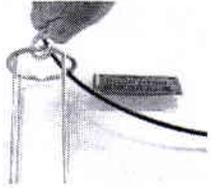
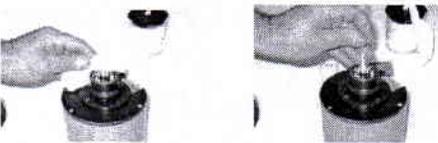
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IRIS TRIP RESET INSTRUCTIONS

Note: After an accidental or intentional trip, the re-set procedure takes approximately 5 minutes.

<p>1) Remove lower trip ring from trip cage assembly and inspect the cage assembly and ring for impact damage.</p>	
<p>2) Unscrew and remove the compression spring threaded connection from the connector base located on top of the conduit stub-up.</p> <p>NOTE: Damaged components should be replaced prior to proceeding.</p>	
<p>3) Clean all connector seal rings and ferrule tips prior to re-assembly.</p>	
<p>4) Place upper connector breakout assembly along with the stainless steel trip and safety rings (flat portion of flange facing top of connector) in the compression tool slip cradle and bar clamp.</p>	

<p>5) Place the compression spring threaded connection in the base of the compression tool slip cradle, opposite the connector top shell with the ball bearings facing the connector top. (Slip cradle not shown)</p>	
<p>6) Pump the tool compression lever until the connector and compression spring threaded connection are close to final mate-up, then perform any slight adjustments so that upper connector shell steel pins align with grooves in the compression spring-threaded ring housing. Continue pumping the compression lever until the bottom compression bearing threaded ring and top shell breakout connector assembly are tightly fitted together.</p>	 <p>(slip cradle not shown)</p>

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IRIS TRIP RESET INSTRUCTIONS (continued)

<p>7) Snap the compression bearing spring trip ring over exposed bearings until you hear it snap.</p>	
<p>8) Slide trip safety ring into place and thread on until it locks in place.</p>	

<p>9) Depress the release lever on the compression tool and remove the slip cradle and assembled connector. (slip cradle not shown)</p>	
<p>10) Without exerting any downward pressure, spin the upper shell connector assembly until you feel the alignment pins catch on the lower assembly alignment pins. Once it has caught the alignment pins, you should not be able to rotate the upper connector assembly in either direction.</p>	
<p>11) Grasp the lower body of the connector and rotate in a clockwise direction to engage captivating threads to the lower shell connector body.</p> <p>It takes about 20 full 360 degree turns to fully engage and tighten the threads in order to properly align the connector ferrules and make the connector water and dust proof.</p>	
<p>12) Slide the halo trip cage assembly up over the upper connector shell and lock in place by rotating one quarter turn in the captivating key locks.</p>	
<p>13) With the halo trip cage assembly locked in place, re-attach the trip wire to the upper ring and the cabinet anchor point(s).</p> <p>NOTE: Be sure to remove the trip safety ring prior to leaving the cabinet to activate the connector.</p>	