EUPEN CABLE USA, INC.

www.eupen.us

INNOVATION & TRADITION

100 Years of Cable Manufacturing

EUCAHYBRID

Installation Guide

for FTTA Site Builds

CONTACT
Ph: 1-800-419-5100
Fax: 1-727-528-0751
5181 110th Ave N, Unit D,
Clearwater, Florida 33760
customerservice@eupen.us

Copyright@Kabelwerk Eupen AG

About this document

This guide will give installers a step by step instruction on how to properly install the Eupen EUCA-HYBRID Solution and Accessories. This will include tooling, junction box installation, cable plant and jumper installation, connector cleaning and handling, and testing. Any liability or responsibility for the results of improper or unsafe installation is disclaimed.

Contact Eupen Cable USA, Inc. for field support at 1-800-419-5100 or on the web www.eupen.us

Eupen strongly recommends that installers be trained for working with Fiber Optics and related materials.

Safety Precautions

Safety on the job site must be the primary consideration and top priority at all times. Before beginning any installation, the appropriate OSHA safety guidelines should be reviewed with all onsite personnel and adhered to at all times. All personnel must wear the appropriate construction safety gear including eye protection whenever working with fiber.

Live Fiber: To be certain fibers are safe to inspect or work with, always check fibers in an operating network with a fiber optic power meter to ensure no light is present before inspecting any connector with a microscope.

VFL: When using an optical tracer or continuity checker, look at the fiber from an angle at least 6”away from your eye to determine if the visible light is present.

Chemicals: Fiber optic termination cleaning uses various chemicals as part of the cleaning process. Proper handling procedures for these substances should be observed.

Electric Shock: Be sure to disconnect or disable the DC power source before starting installation or maintenance work.

Contents

EUCAHYBRID Features 4
EUCAHYBRID Site Kit Information 5
Required Tools 6
Junction Box Installation (Raycap) 7
Fiber Optic Connector Cleaning and Inspection 8
Recommended Cleaning Process 9
Cable Plant Installation 10
Accessories 10
Protective Packaging 11
Hybrid In 11-12
Fiber In 13
DC In 14
DC Jumper Out Installation 15
Fiber Jumper Out Installation 16
Completed Box Installation 17
Adjusting EUCAHYBRID Cable Plant Armor Length 18-19
Testing and Test Equipment 20
Technical Data Sheets 21-33
EUCAHYBRID 58-2C6B-2MM5 | EUCAHYBRID 58-2C6B-2SM 22-23
EUCAHYBRID 78-6AWG6-18MM5-CP | EUCAHYBRID 78-6AWG6-18SM-CP 24-25
EUCAHYBRID 78-6C10-24MM5-CP | EUCAHYBRID 78-6C10-24SM5-CP 26-27
EUCAHYBRID 78-12C6-24MM5 | EUCAHYBRID 78-12C6-24SM 28-29
EUCAHYBRID 114-12AWG6-2x12MM5-CP | EUCAHYBRID 114-12AWG6-2x12SM-CP 30-31
EUCAHYBRID 114-12C10-2x12MM5 | CAHYBRID 114-12C10-2x12SM 32-33

EUCAHYBRID Features:

- Power and fiber (and optional dry contacts) integrated into a single assembly
- Configured for use with junction box
- All hybrids are offered with single-mode or multi-mode fiber
- Outdoor rated PE outer jacket for excellent environmental long term UV protection
- Extremely flexible, welded and corrugated aluminum armor protects fibers
- Metallic shield provides outstanding lightning protection
- Compatible with standard coax hoisting, mounting and grounding accessories
- Cables are shipped cut-to-length with fiber terminations factory installed
- Cables can be trim-to-length on site and will not damage fibers
- DC cables are tested for continuity and labeled numerically for ease of installation
- Fiber terminations are factory tested to industry standards
- Test results are attached to the spool (hardcopy) and also assigned a serial number

All factory test data can be downloaded from the
Eupen USA web site www.eupen.us

EUCAHYBRID Site Kit Information

- Packing Slip
- Site Labels
- Reel Information
- Fiber/Connector Test Measurements
- Accessories
- Packaging

Required Tools and Materials

- Drill (Not Pictured)
- Safety Glasses and Gloves
- Scissors
- Wire Strippers
- Needle Nose Pliers
- Wire Cutter
- Large & Small Flat Head Screw Driver
- Cross Head Screw Driver
- Adjustable Wrench
- Knife
- Tape Measure
- Fiber Testing Equipment (As Required)
- Wax String or Velcro for Fiber Managment
- Color Coding (Carrier Specific)

* Ground Stripping Tool (GKT78 or GKT114)

* Fiber Optic Connector Cleaning kit

* Rip Cord tool (RCT)

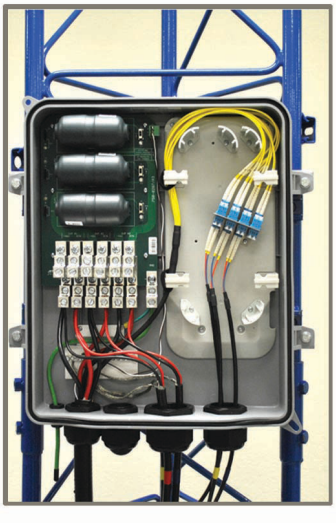
Part Number: KT-FIBER (*items included in kit)

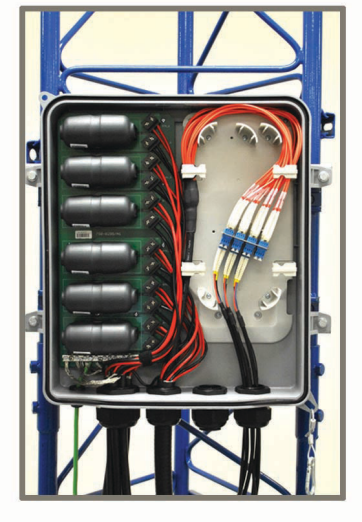
Junction Box Installation (Raycap)

The Raycap junction box comes with an installation instruction manual specific to each configuration offered. Each configuration is different. Installers are required to read and understand this guide as outlined by Raycap.

- **Mounting:** A mounting base comes with the Raycap junction box. This base allows either wall-ladder or pole mounted installations.
- **Port Configuration:** This will be determined before deployment and is carrier and cable specific. Ports will be for the following: GND (OUT), Hybrid (IN), DC jumpers (OUT), and fiber jumpers (OUT).
- **SPDs:** Surge Protection Devices (Strikesorb). Disconnect DC power before removing the module. Note: if there is no Strikesorb installed and DC power is on, the radio circuit will operate but will NOT be protected.
- **Grounding:** Feed enough ground cable through the GND (OUT) port. Strip and connect ground cable to the main grounding point in junction box, and attach other end of ground cable to structure buss bar.

Common Box Configurations



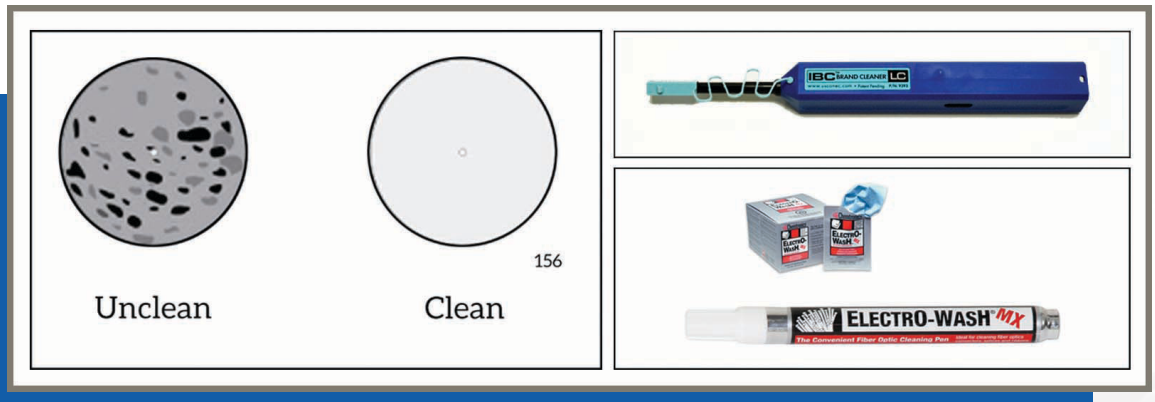


Fiber Optic Connector Cleaning and Inspection

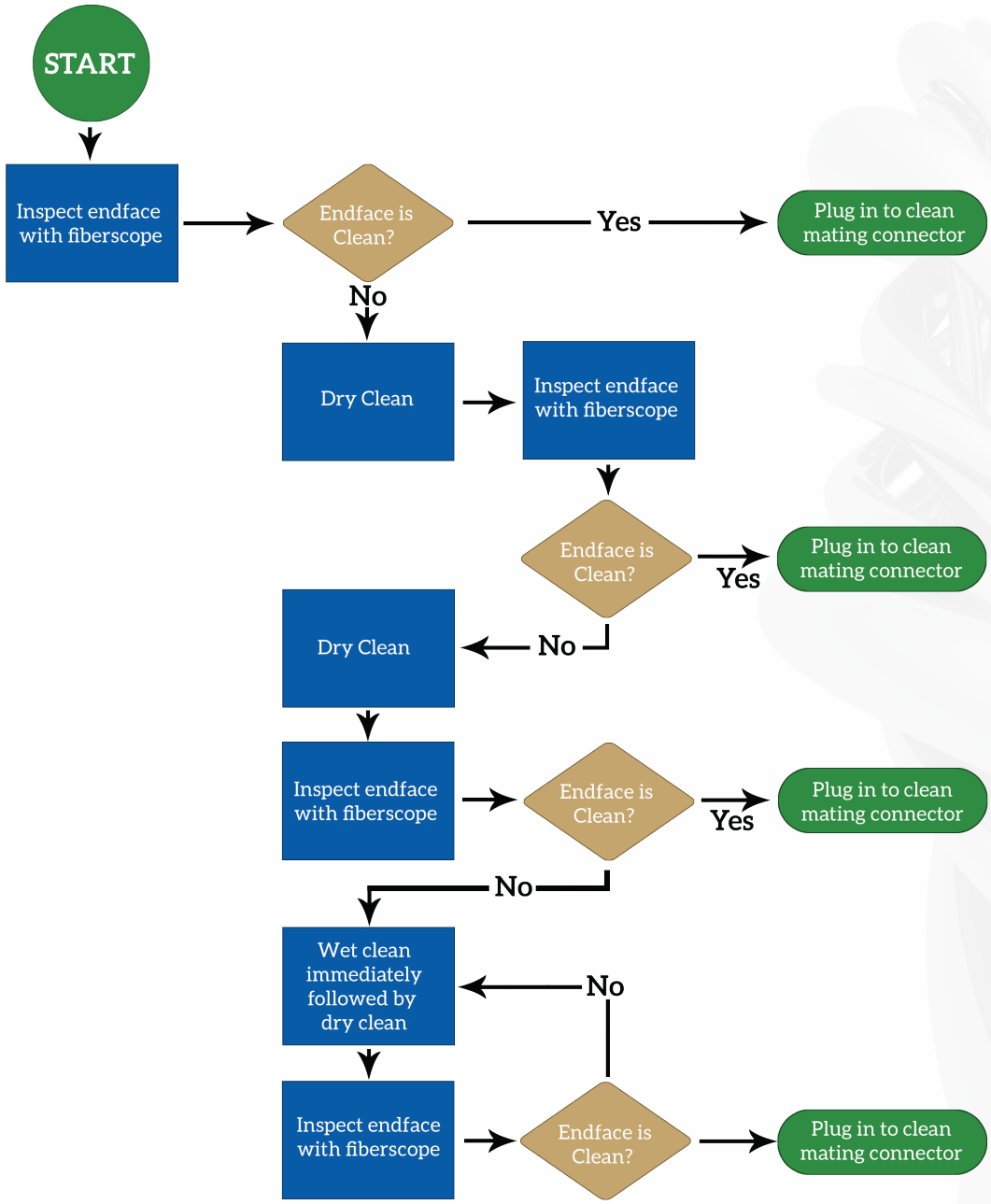
The fiber optic connector consists of a fiber optic plug and its adapter. The end of the fiber optic cable is held in the core of the ferrule in the plug. Light signals are transmitted through the core of the fiber. Even minor smudges or dirt on the end face of the fiber completely invisible to the naked eye can disrupt light transmission and lead to failure of the component or of the entire system.

Therefore, it is of the utmost importance to clean all fiber optic connectors before use.

- Use a fiber inspection scope to inspect the connector to make sure it is clean and to check for scratches, pits, or other problems that may affect performance.
- To avoid contamination or damage to the connector ends during inspection and installation, only remove dust caps on fiber pairs and adaptors that are ready to be plugged in immediately.
- Always keep a dust cap on a fiber optic connector when it is not in use.
- **Do not touch** the end face of the ferrule on the connector.
- **Do not use** compressed air to clean a fiber optic connector.
- There are many fiber connector cleaning options available to installers including:
  - **Dry Cleaners:** Cartridge type cleaners, click type cleaners, swabs, lint free wipes.
  - **Wet Cleaners:** Alcohol wipes, Electro Wash Pens, liquid alcohol.



Recommended Cleaning Process



Cable Plant Installation

Accessories

Hoisting Cable Plant

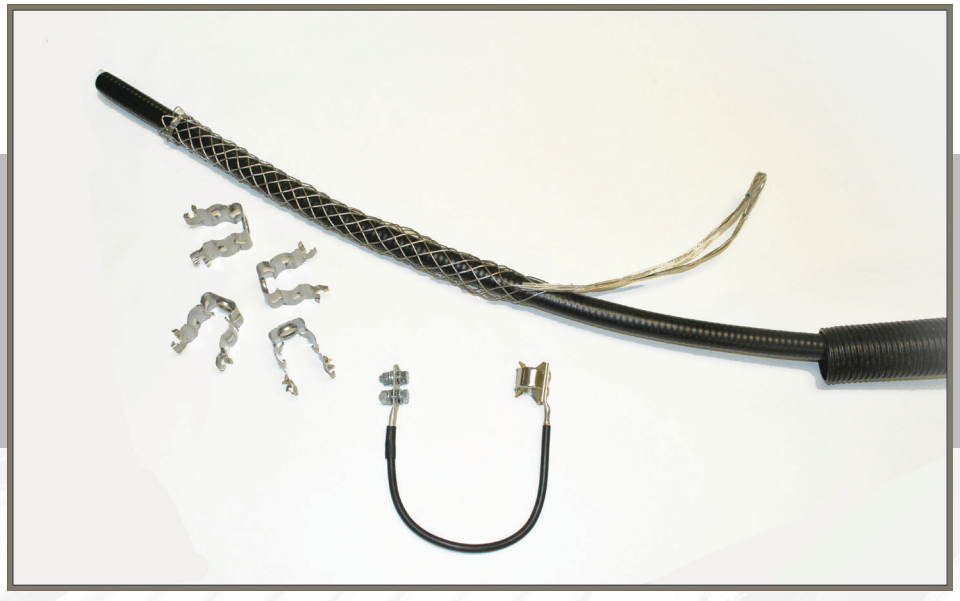
EUCAHYBRID cables will be hoisted like coaxial cables. Determine correct head spacing. Use common coaxial cable Lace-up type hoisting grips that are correct to the cable plant diameter. **Add one grip per every 200ft of cable.** Note that the cable compression sock on either end of cable plant has an "eye".
This is not weight bearing and should not be used to hoist or pull cable plant.

Mounting Cable Plant Accessories

EUCAHYBRID cables have been designed to match common coaxial cable sizes and will use common coaxial cable accessories: snap hangers, coax blocks, entry port cushions, etc.

Grounding Cable Plant

EUCAHYBRID will be grounded to structure in the same manner as coaxial cables. Due to the outer armor being aluminum, **tinned grounding kits must be used.**

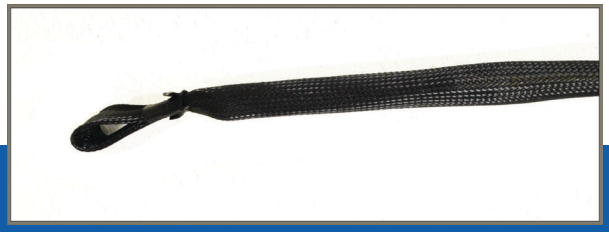


Cable Plant Installation

Protective Packaging

The EUCA Hybrid cable plants prepared ends (DC conductors and terminated fiber pairs) are protected by a poly tube (plastic bag), cable compression sock, inserted into a conduit (2 ½"), and attached to the shipping reel using cable ties. The conduit is used to protect the cable plant ends during shipment and can also be used as protection during installation.

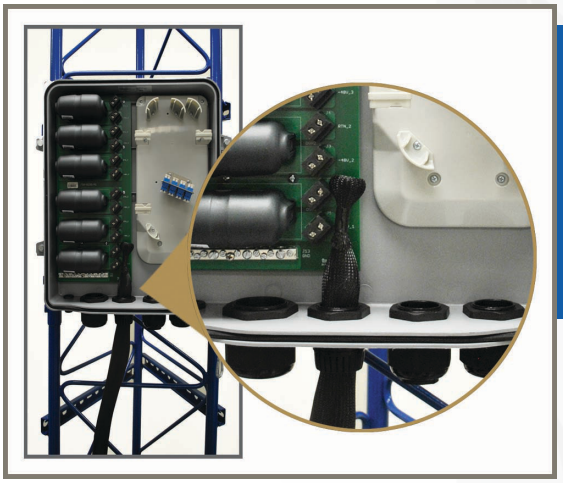
Do not remove cable compression sock or poly tube from cable plant ends until cable plant is hoisted and supported.



Hybrid In

When routing EUCAHYBRID cable plant into junction box, remove "hybrid- in" port compression nut.

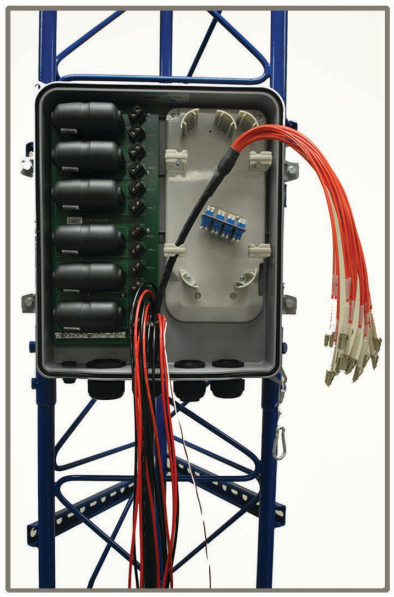
- Place compression nut onto the cable plant. Be sure threads are facing towards the cable plant end being routed into junction box.
- Insert cable plant end into "hybrid-in" port until desired length is reached.
- Tighten the "hybrid-in" compression nut. Hand tight only, it is not necessary to use a wrench to compress the port cushion.



Cable Plant Installation

Hybrid In

- Remove cable plant compression sock.
- Remove poly tubing to expose DC conductors and fiber pairs.



Fiber Color Codes per EIA/TIA 598 standards

Fiber Color Codes				Singlemode		Multimode
1	Blue			1		1
2	Orange			2		2
3	Green			3		3
4	Brown			4		4
5	Slate			5		5
6	White			6		6
7	Red			7		7
8	Black			8		8
9	Yellow			9		9
10	Violet			10		10
11	Rose			11		11
12	Aqua			12		12

Cable Plant Installation

Fiber In

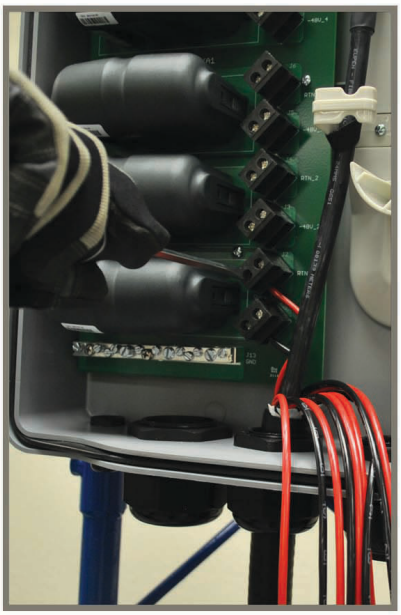
- Clean each fiber connection prior to installation.

- Route, inspect and install the EUCAHYBRID cable plant fiber pairs. Start by loosely routing fiber pairs around the cable trayguides and plug the connectors into the junction box adaptor plate starting on the back row and feed in-order left to right. Remember to avoid contamination or damage to the connector ends during inspection & installation, only remove dust caps on fiber pairs and adaptors that are ready to be plugged in immediately.

Cable Plant Installation

DC In

- Prepare and install EUCAHYBRID cable plant DC power conductors and dry alarm contacts (if applicable) into correct junction box circuits. The EUCAHYBRID cable plant DC power conductors are labeled numerically for ease of installation.

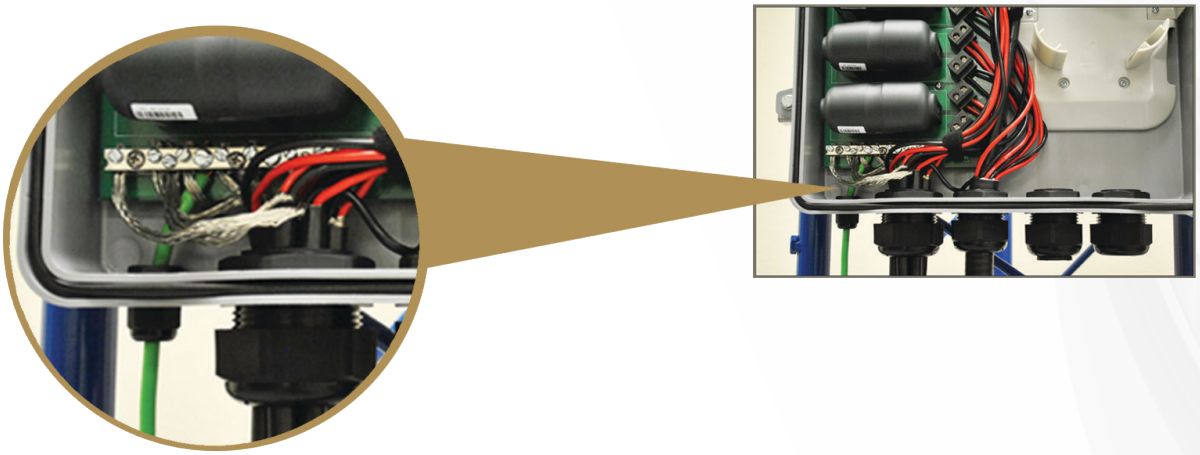


- Install Ground lead as shown (Bottom left of junction box)

DC Jumper Out Installation

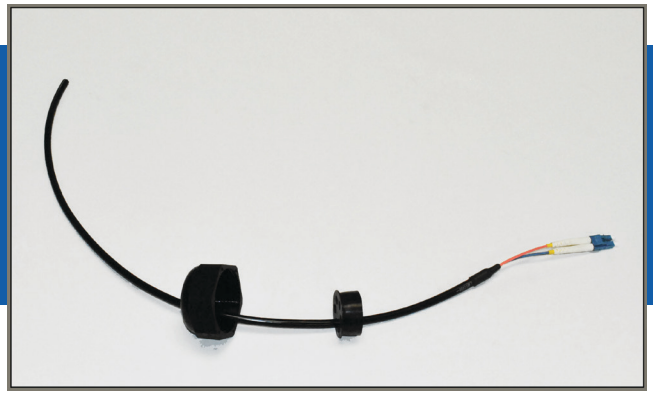
- When installing DC jumpers into junction box remove DC jumper (OUT) port compression nut and place compression nut onto the DC jumpers. Be sure threads are facing towards cable ends being routed into junction box. Feed enough length of DC jumper cables through the DC jumper (OUT) gland to strip and connect to the power connections.

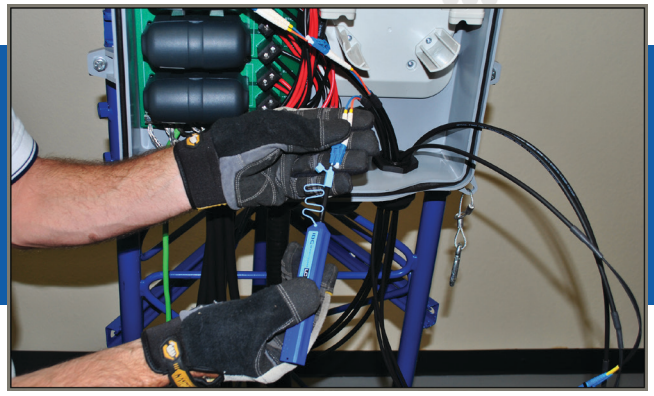
- Separate DC Jumper Cable shielding from jacketed conductors and attach to internal ground as shown. (bottom left of junction box)



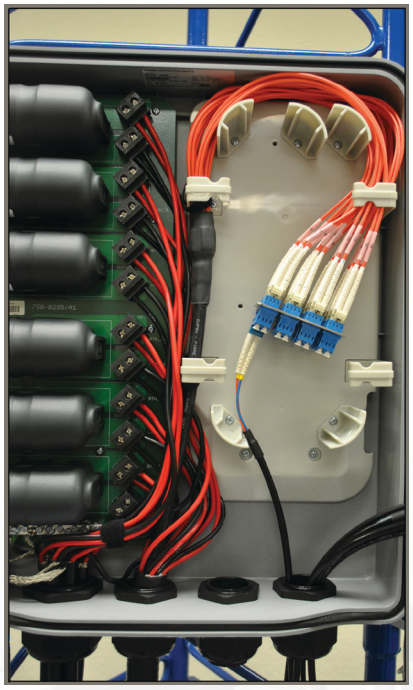
Fiber Jumper Out Installation

- When installing fiber jumpers into the junction box remove Fiber jumper (OUT) port compression nut and place compression nut onto the fiber jumpers. Be sure the compression nuts threads are facing towards the cable ends being routed into the junction box. Feed enough length of fiber jumpers through the fiber jumper (OUT) gland.





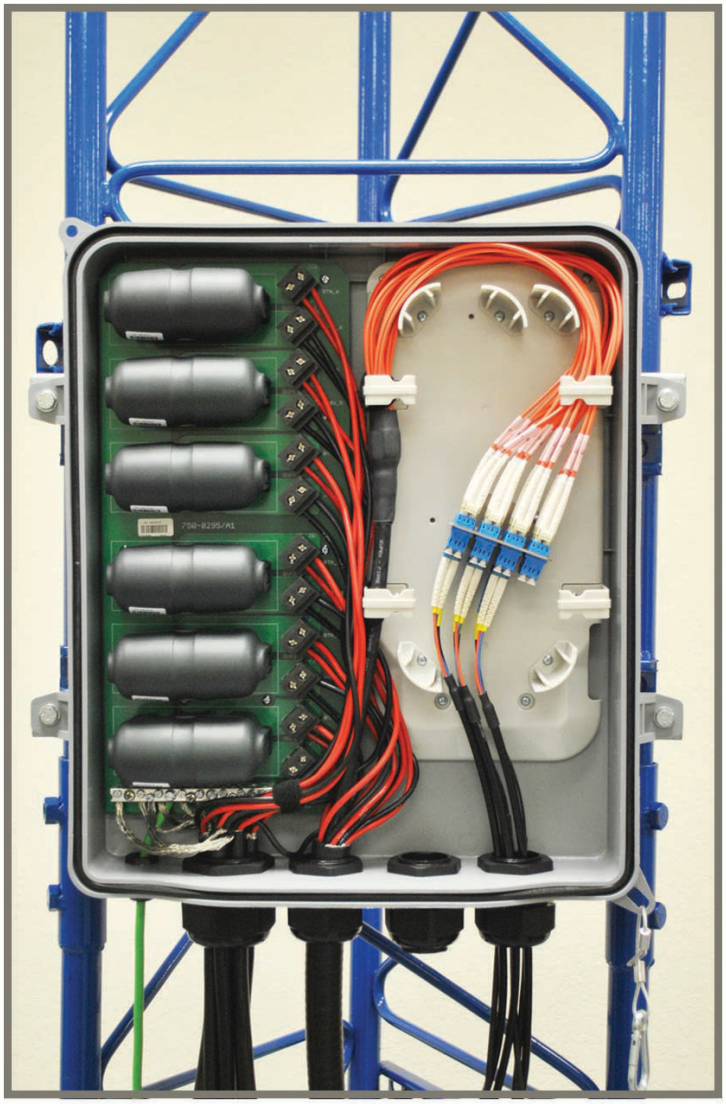
- Clean each fiber connection prior to installation.
- Route, inspect and install the fiber jumpers (OUT). Start by loosely routing fiber pairs around the cable tray guides and plug the connectors into the junction box adaptor plate starting on the back row and feeding order left to right. Remember, to avoid contamination or damage to the connector ends, only remove dust caps on fiber pairs and adaptors that are ready to be plugged in immediately.



Completed Box Installation

Completed Junction Box Installation with Cable Plant, DC Jumpers and Fiber Jumpers

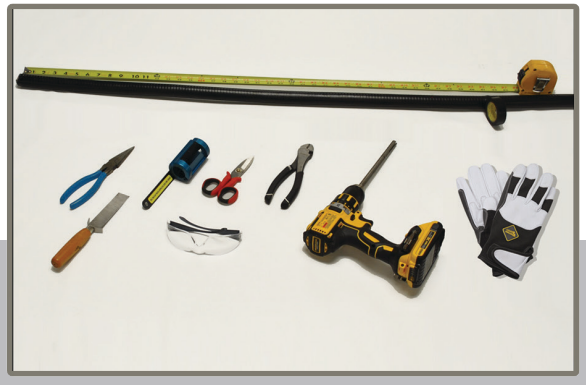
- Hybrid Cable Plant (IN)
- Fiber Jumpers (OUT)
- DC Jumpers (OUT)
- Junction Box Ground (OUT)

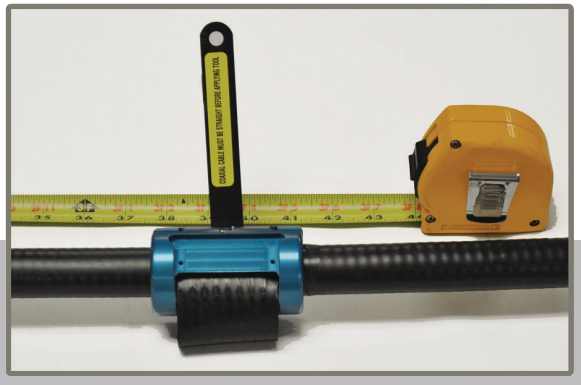


Adjusting EUCAHYBRID Cable Plant Armor Length

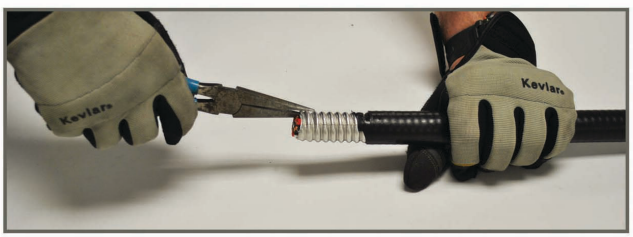
The outer armor length can be adjusted in the field by installers for better cable plant management.

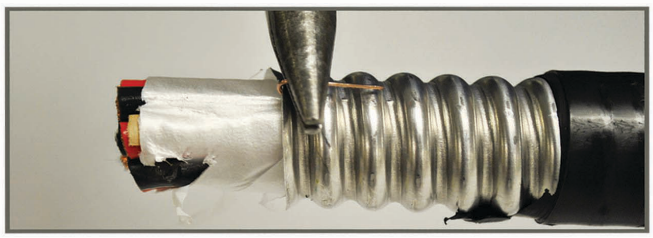
- Practice Safety - This process involves tools and exposure to sharp materials.
- Using the GKT, start by removing approximately 2” to 4” of the outer PE jacket to expose the corrugated aluminum armor closest to the cable plant end.
- Use the GKT and a tape measure, mark the desired length of armor to be removed. Remove a 2”to 4” section of PE jacket to expose aluminum armor.

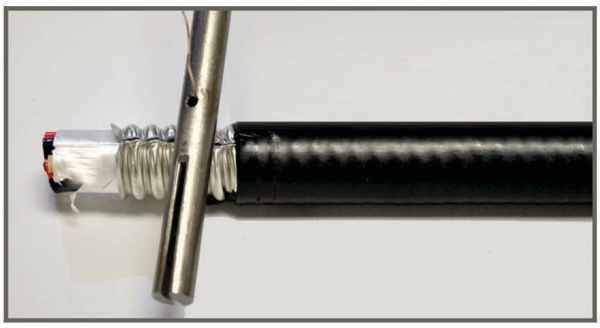


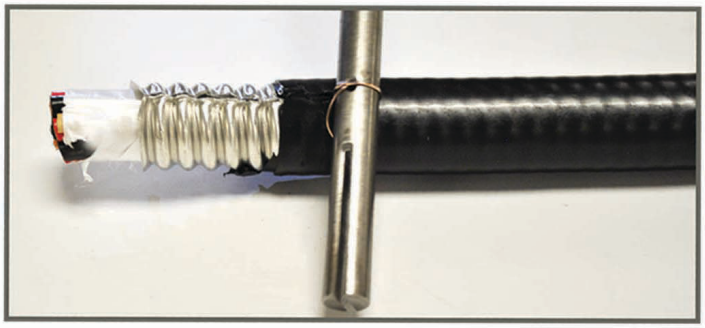


- Using needle nose pliers, peel the corrugated aluminum armor back to expose the rip cord approximately 2” to 4”.
- Using the rip cord tool on a drill, thread rip cord through the hole in the tool and cross rip cord in the end of the tool to hold it secure while splitting the armor and PE jacket.

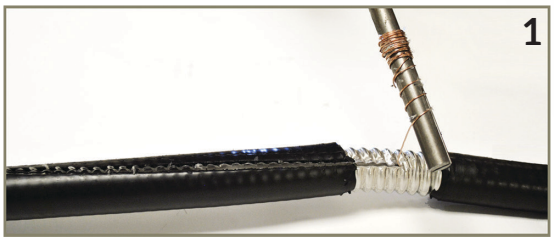


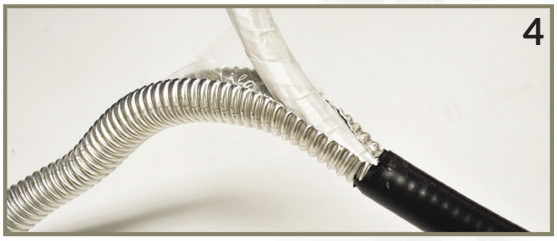


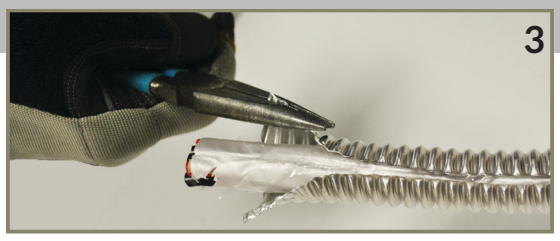


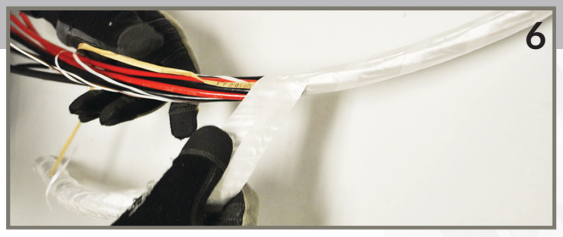


- Using a drill, slowly walk the rip cord tool down the cable while turning it clockwise at a low RPM until desired length is reached.









- Remove PE jacket, aluminum armor and friction tapes. (recommended use of scissors) Trim cable plant DC power conductors to desired length. Route, support, inspect & install excess fiber pairs following proper fiber handling procedures.

Testing and Test Equipment

The most important test of an installed fiber optic cable plant is insertion loss performed with a light source and power meter (LSPM) or optical loss test set (OLTS). This is required to ensure the cable plant is within the loss budget before acceptance of the installation.

Testing fiber optic components and cable plants requires making several measurements with the most common tests listed below. Some tests involve installer inspection and judgment, such as visual inspection or tracing, while some use sophisticated instruments that provide direct measurements.
Optical power, required for measuring source power, receiver power and, when used with a test source, loss or attenuation, is the most important parameter and is required for almost every fiber optic test.

- Visual Tracing
- Visual Fault Location
- Visual Connector Inspection by Microscope
- Optical Time Domain Reflectometer - (OTDR)
- Light Source and Power Meter - (LSPM)
- Optical Loss Test Set - (OLTS)

Eupen strongly recommends that all installers be trained for working with Fiber Optics and Testing Equipment. All required testing parameters are customer specific and will vary market to market.

Technical Data Sheets

TECHNICAL DATA SHEET

REV: 03/2015 01/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 58-2C6B-2MM5*
- *EUCAHYBRID 58-2C6B-2SM*

PRODUCT DESCRIPTION

5/8" hybrid fiber optic cable with 48V energy feeder in a corrugated aluminum shielding with UV resistant PE jacket.
Multi mode and single mode fiber available.

TECHNICAL FEATURES

CONSTRUCTION	MM5	SM
Copper feed lines		
• Type:	shielded bundel, UV rated	
• Quantity	1	
• Conductor material	electrolytic copper	
• Section	2 x 6 mm²	
• Diameter	11 mm	
Fiber Optic cable		
• Quantity	1	
• Fibers quantity	2	
• Fiber type	Multi Mode	Single Mode
• Fiber size	50/125/900 µm	9/125/900 µm
• Reinforcement	Aramide fiber	
• Diameter	5 mm	
Ripcord		
• Quantity	1	
• Material	Steel Wire	
• Diameter	0,8 mm	
Outer shield		
• Material	Corrugated aluminum tube	
• Diameter	19,7 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,1 mm	
• Diameter	21,9 mm	

TECHNICAL DATA SHEET

REV: 03/2015 02/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 58-2C6B-2MM5*
- *EUCAHYBRID 58-2C6B-2SM*

MECHANICAL

• Minimum bending radius	200 mm
• Maximum pulling strength	70 daN
• Recommended temperature range	
Storage	-30 °C - +70 °C
Installation	-20 °C - +60 °C
Operation	-30 °C - +70 °C
• Maximum Hanger spacing	1,0 m
• Approx. weight	456 kg/km (0,31 lb/ft)

ELECTRICAL

• Main conductors	
Resistance	3,30 Ohm/km at 20 °C
Operating DC voltage	48 V
Maximum DC current	32 A at 20 °C

OPTICAL	MM5	SM
• Fiber type	OM3	G657A1
• Fiber wave length	850 & 1300 nm	1310 & 1550 nm
• Max attenuation		
	850 nm: ≤3,0 dB/km	1310 nm: ≤0,40 dB/km
	1300 nm: ≤1,0 dB/km	1550 nm: ≤0,25 dB/km
• Core diameter	50 µm	9 µm
• Cladding diameter	125 µm	125 µm
• Coating diameter	250 µm	250 µm
• Tight buffer fiber diameter	900 µm	900 µm

TECHNICAL DATA SHEET

REV: 03/2015 01/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 78-6AWG6-18MM5-CP*
- *EUCAHYBRID 78-6AWG6-18SM-CP*

PRODUCT DESCRIPTION

7/8" hybrid fiber optic cable with 48V energy feeder in a corrugated aluminum shielding with UV resistant PE jacket.
Multi mode and single mode fiber available.

TECHNICAL FEATURES

CONSTRUCTION	MM5	SM
Copper feed lines		
• Quantity	6	
• Conductor material	electrolytic copper	
• Section	13,3 mm²	
Dry contact		
• Quantity	2 (one pair)	
• Conductor material	electrolytic copper	
• Copper diameter	0,8 mm	
• Outer diameter (each wire)	1,6 mm	
Fiber Optic cable		
• Quantity	1	
• Fibers quantity	24	
• Fiber type	Multi Mode	Single Mode
• Fiber size	50/125/900 µm	9/125/900 µm
• Reinforcement	Aramide fiber	
Outer shield		
• Material	Corrugated aluminum tube	
• Diameter	25 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	28 mm	

TECHNICAL DATA SHEET

REV: 03/2015 02/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 78-6AWG6-18MM5-CP*
- *EUCAHYBRID 78-6AWG6-18SM-CP*

MECHANICAL

• Minimum bending radius	250 mm
• Maximum pulling strength	100 daN
• Recommended temperature range	
Storage	-30 °C - +70 °C
Installation	-20 °C - +60 °C
Operation	-30 °C - +70 °C
• Maximum Hanger spacing	1,0 m
• Approx. weight	1250 kg/km (0,84 lb/ft)

ELECTRICAL

• Main conductors	
Resistance	1,34 Ohm/km at 20 °C
Operating DC voltage	48 V
Maximum DC current	50 A at 20 °C
• Dry contact	
Resistance	21,43 Ohm/km
Maximum DC voltage	600 V DC
Maximum DC current	6 A at 20 °C

OPTICAL	MM5	SM
• Fiber type	OM3	G657A1
• Fiber wave length	850 & 1300 nm	1310 & 1550 nm
• Max attenuation		
	850 nm: ≤3,0 dB/km	1310 nm: ≤0,40 dB/km
	1300 nm: ≤1,0 dB/km	1550 nm: ≤0,25 dB/km
• Core diameter	50 µm	9 µm
• Cladding diameter	125 µm	125 µm
• Coating diameter	250 µm	250 µm
• Tight buffer fiber diameter	900 µm	900 µm

TECHNICAL DATA SHEET

REV: 03/2015 01/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 78-6C10-24MM5-CP*
- *EUCAHYBRID 78-6C10-24SM5-CP*

PRODUCT DESCRIPTION

7/8" hybrid fiber optic cable with 48V energy feeder in a corrugated aluminum shielding with UV resistant PE jacket.
Multi mode and single mode fiber available.

TECHNICAL FEATURES

CONSTRUCTION	MM5	SM
Copper feed lines		
• Quantity	6	
• Conductor material	electrolytic copper	
• Section	10 mm²	
Dry contact		
• Quantity	2 (one pair)	
• Conductor material	electrolytic copper	
• Copper diameter	0,8 mm	
• Outer diameter (each wire)	1,6 mm	
Fiber Optic cable		
• Quantity	1	
• Fibers quantity	24	
• Fiber type	Multi Mode	Single Mode
• Fiber size	50/125/900 µm	9/125/900 µm
• Reinforcement	Aramide fiber	
Outer shield		
• Material	Corrugated aluminum tube	
• Diameter	25 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	28 mm	

TECHNICAL DATA SHEET

REV: 03/2015 02/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 78-6C10-24MM5-CP*
- *EUCAHYBRID 78-6C10-24SM5-CP*

MECHANICAL

• Minimum bending radius	250 mm
• Maximum pulling strength	100 daN
• Recommended temperature range	
Storage	-30 °C - +70 °C
Installation	-20 °C - +60 °C
Operation	-30 °C - +70 °C
• Maximum Hanger spacing	1,0 m
• Approx. weight	1035 kg/km (0,70 lb/ft)

ELECTRICAL

• Main conductors	
Resistance	1,91 Ohm/km at 20 °C
Operating DC voltage	48 V
Maximum DC current	45 A at 20 °C
• Dry contact	
Resistance	21,43 Ohm/km
Maximum DC voltage	600 V DC
Maximum DC current	6 A at 20 °C

OPTICAL	MM5	SM
• Fiber type	OM3	G657A1
• Fiber wave length	850 & 1300 nm	1310 & 1550 nm
• Max attenuation		
	850 nm: ≤3,0 dB/km	1310 nm: ≤0,40 dB/km
	1300 nm: ≤1,0 dB/km	1550 nm: ≤0,25 dB/km
• Core diameter	50 µm	9 µm
• Cladding diameter	125 µm	125 µm
• Coating diameter	250 µm	250 µm
• Tight buffer fiber diameter	900 µm	900 µm

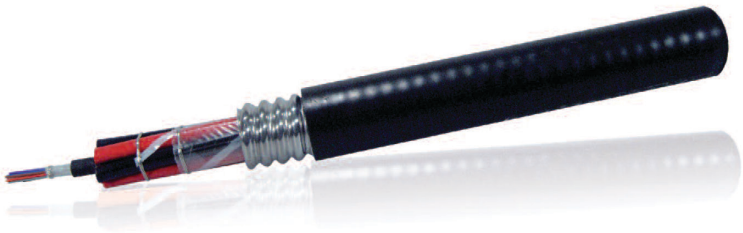
TECHNICAL DATA SHEET

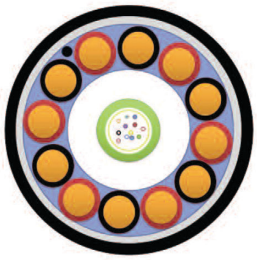
REV: 03/2015 01/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 78-12C6-24MM5*
- *EUCAHYBRID 78-12C6-24SM*

PRODUCT DESCRIPTION





7/8" Hybrid cable with fiber optic cable and 48V energy feeders in a corrugated aluminum shielding with UV resistant PE jacket. Multi mode and single mode fiber available.

TECHNICAL FEATURES

CONSTRUCTION	MM5	SM
Copper feed lines		
• Quantity	12	
• Conductor material	electrolytic copper	
• Section	6 mm^2	
Fiber Optic cable		
• Quantity	1	
• Fibers quantity	24	
• Fiber type	Multi Mode	Single Mode
• Fiber size	50/125/900 µm	9/125/900 µm
• Reinforcement	Aramide fiber	
Ripcord		
• Quantity	1	
• Material	Steel Wire	
• Diameter	0,8 mm	
Outer shield		
• Material	Corrugated aluminum tube	
• Diameter	25 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	28 mm	

TECHNICAL DATA SHEET

REV: 03/2015 02/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 78-12C6-24MM5*
- *EUCAHYBRID 78-12C6-24SM*

MECHANICAL	
• Minimum bending radius	250 mm
• Maximum pulling strength	100 daN
• Recommended temperature range	
Storage	-30 °C - +70 °C
Installation	-20 °C - +60 °C
Operation	-30 °C - +70 °C
• Maximum Hanger spacing	1,0 m
• Approx. weight	1080 kg/km (0,73 lb/ft)

ELECTRICAL	
• Main conductors	
Resistance	3,3 Ohm/km at 20 °C
Operating DC voltage	48 V
Maximum DC current	32 A at 20 °C

OPTICAL	MM5	SM
• Fiber type	OM3	G657A1
• Fiber wave length	850 & 1300 nm	1310 & 1550 nm
• Max attenuation		
	850 nm: ≤3,0 dB/km	1310 nm: ≤0,40 dB/km
	1300 nm: ≤1,0 dB/km	1550 nm: ≤0,25 dB/km
• Core diameter	50 µm	9 µm
• Cladding diameter	125 µm	125 µm
• Coating diameter	250 µm	250 µm
• Tight buffer fiber diameter	900 µm	900 µm

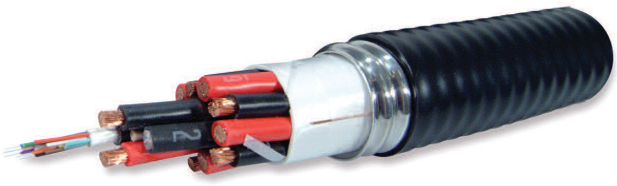
TECHNICAL DATA SHEET

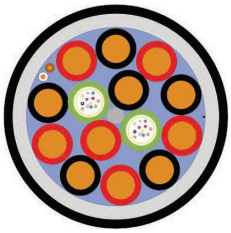
REV: 03/2015 01/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 114-12AWG6-2x12MM5-CP*
- *EUCAHYBRID 114-12AWG6-2x12SM-CP*

PRODUCT DESCRIPTION





1-1/4" hybrid fiber optic cable with 48V energy feeder in a corrugated aluminum shielding with UV resistant PE jacket.
Multi mode and single mode fibre available.

TECHNICAL FEATURES

CONSTRUCTION	MM5	SM
Copper feed lines		
• Quantity	12	
• Conductor material	electrolytic copper	
• Section	13,3 mm²	
Dry contact		
• Quantity	2 (one pair)	
• Conductor material	electrolytic copper	
• Copper diameter	0,8 mm	
• Outer diameter (each wire)	1,6 mm	
Fiber Optic cable		
• Quantity	2	
• Fibers quantity	12	
• Fiber type	Multi Mode	Single Mode
• Fiber size	50/125/900 µm	9/125/900 µm
• Reinforcement	Aramide fiber	
Ripcord		
• Quantity	1	
• Material	Steel Wire	
• Diameter	0,8 mm	
Outer shield		
• Material	Corrugated aluminum tube	
• Diameter	36 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	39 mm	

TECHNICAL DATA SHEET

REV: 03/2015 02/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 114-12AWG6-2x12MM5-CP*
- *EUCAHYBRID 114-12AWG6-2x12SM-CP*

MECHANICAL

• Minimum bending radius	360 mm
• Maximum pulling strength	150 daN
• Recommended temperature range	
Storage	-30 °C - +70 °C
Installation	-20 °C - +60 °C
Operation	-30 °C - +70 °C
• Maximum Hanger spacing	1,0 m
• Approx. weight	2300 kg/km

ELECTRICAL

• Main conductors	
Resistance	1,34 Ohm/km at 20° C
Operating DC voltage	48 V
Maximum DC current	50 A at 20 °C
• Dry contact	
Resistance	21,43 Ohm/km
Maximum DC voltage	600 V DC
Maximum DC current	6 A at 20 °C

OPTICAL	MM5	SM
• Fiber type	OM3	G657A1
• Fiber wave length	850 & 1300 nm	1310 & 1550 nm
• Max attenuation		
	850 nm: ≤3,0 dB/km	1310 nm: ≤0,40 dB/km
	1300 nm: ≤1,0 dB/km	1550 nm: ≤0,25 dB/km
• Core diameter	50 µm	9 µm
• Cladding diameter	125 µm	125 µm
• Coating diameter	250 µm	250 µm
• Tight buffer fiber diameter	900 µm	900 µm

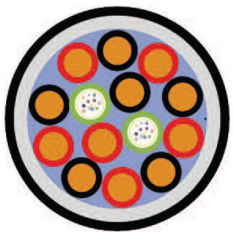
TECHNICAL DATA SHEET

REV: 03/2015 01/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 1114-12C10-2x12MM5*
- *EUCAHYBRID 114-12C10-2x12SM*

PRODUCT DESCRIPTION



1-1/4" Hybrid cable with fiber optic cable and 48V energy feeders in a corrugated aluminum shielding with UV resistant PE jacket. Multi mode and single mode fiber available.

TECHNICAL FEATURES

CONSTRUCTION	MM5	SM
Copper feed lines		
• Quantity	12 (6 pairs)	
• Conductor material	electrolytic copper	
• Section	10 mm²	
Fiber Optic cable element		
• Quantity	2	
• Fibers quantity per element	12	
• Fiber type	Multi Mode	Single Mode
• Fiber size	50/125/900 µm	9/125/900 µm
• Reinforcement	Aramide fiber	
Ripcord		
• Quantity	1	
• Material	Steel Wire	
• Diameter	0,8 mm	
Outer shield		
• Material	Corrugated aluminum tube	
• Diameter	36 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	39 mm	

TECHNICAL DATA SHEET

REV: 03/2015 01/02

Hybrid Cables for RHH applications

- *EUCAHYBRID 1114-12C10-2x12MM5*
- *EUCAHYBRID 114-12C10-2x12SM*

MECHANICAL

• Minimum bending radius	360 mm
• Maximum pulling strength	150 daN
• Recommended temperature range	
Storage	-30 °C - +70 °C
Installation	-20 °C - +60 °C
Operation	-30 °C - +70 °C
• Maximum Hanger spacing	1,0 m
• Approx. weight	1870 kg/km (1,26 lb/ft)

ELECTRICAL

• Main conductors	
Resistance	1,91 Ohm/km at 20 °C
Operating DC voltage	48 V
Maximum DC current	45 A at 20 °C

OPTICAL	MM5	SM
• Fiber type	OM3	G657A1
• Fiber wave length	850 & 1300 nm	1310 & 1550 nm
• Max attenuation		
	850 nm: ≤3,0 dB/km	1310 nm: ≤0,40 dB/km
	1300 nm: ≤1,0 dB/km	1550 nm: ≤0,25 dB/km
• Core diameter	50 µm	9 µm
• Cladding diameter	125 µm	125 µm
• Coating diameter	250 µm	250 µm
• Tight buffer fiber diameter	900 µm	900 µm

Notes

Notes

EUPEN CABLE USA, INC

Fully Stocked and Conveniently Located Warehouses

Tampa Bay, Florida - North American Headquarters

Bethlehem, PA

Dallas, TX

Contact Eupen for all your cable needs

Cables | Connectors | Tools | Jumpers | Site Accessories

Eupen Cable USA, Inc.

www.eupen.us

customerservice@eupen.us

Ph: 800-419-5100

5181 110th Ave N, Unit D, Clearwater, FL 33760