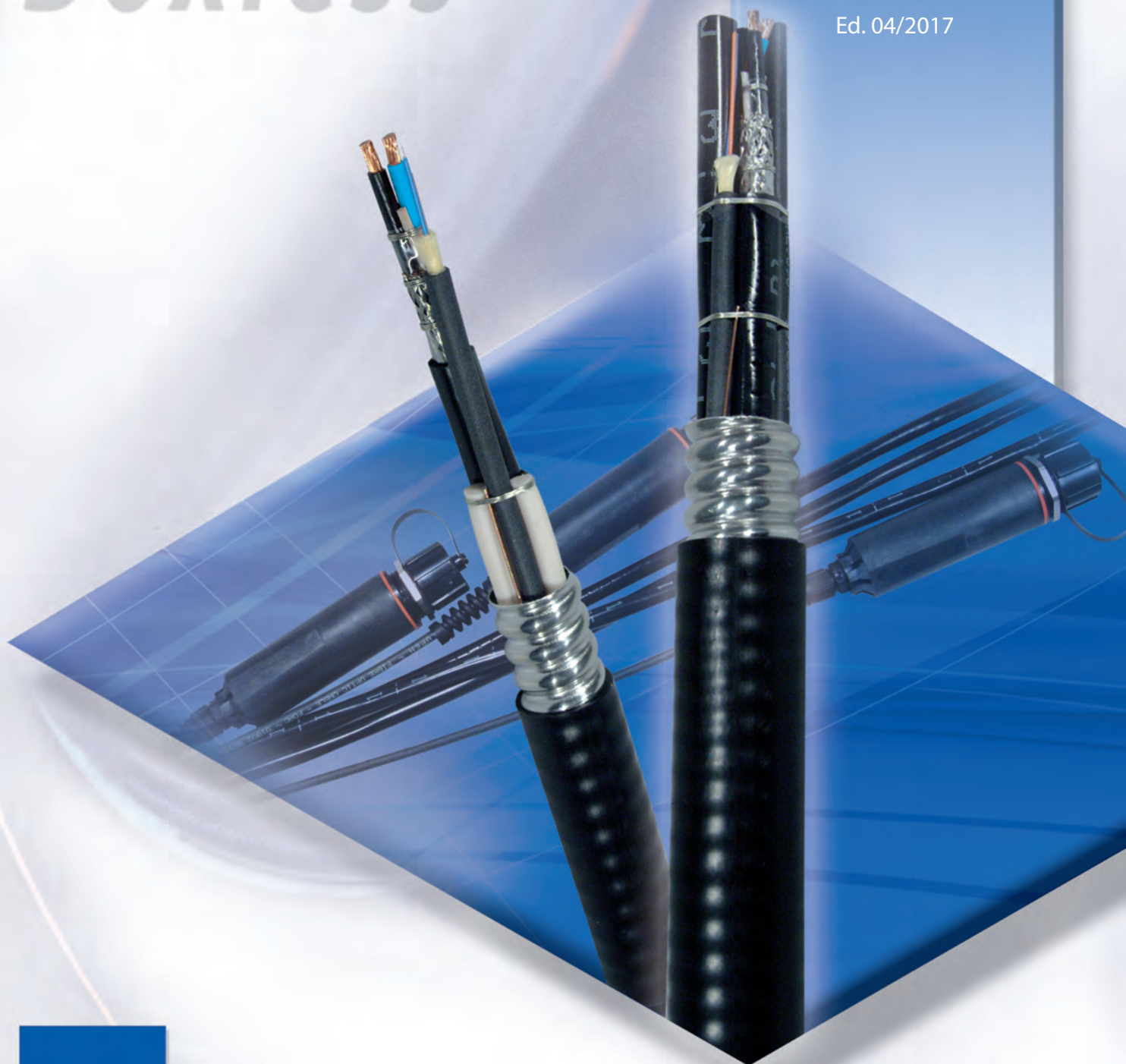


EUCAHYBRID ***Boxless***

Instructions
manual

Ed. 04/2017



Kabelwerk

EUPEN AG
cable



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Contact / Kontakt

KABELWERK EUPEN AG

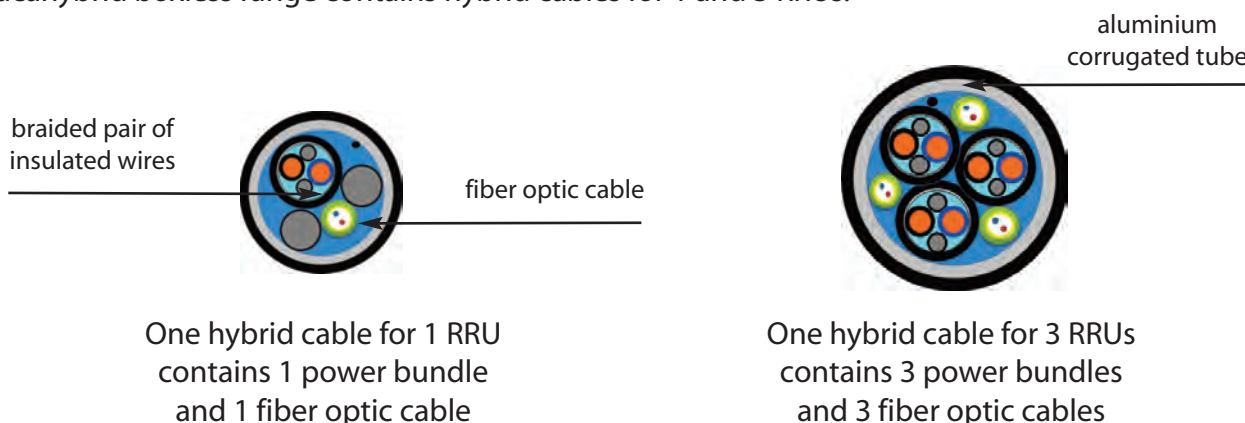
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1. Presentation of the Eucahybrid “boxless” system

Eupen’s Eucahybrid is a range of hybrid cables which combine power and fiber optic in a compact and robust aluminium corrugated tube, providing an optimized solution for Fiber To The Antenna sites. The Eucahybrid “boxless” cables are divided outdoor into separated power and fiber optic cables going towards the Remote Radio Units (RRUs), without requiring any junction box.

The Eucahybrid boxless range contains hybrid cables for 1 and 3 RRUs.

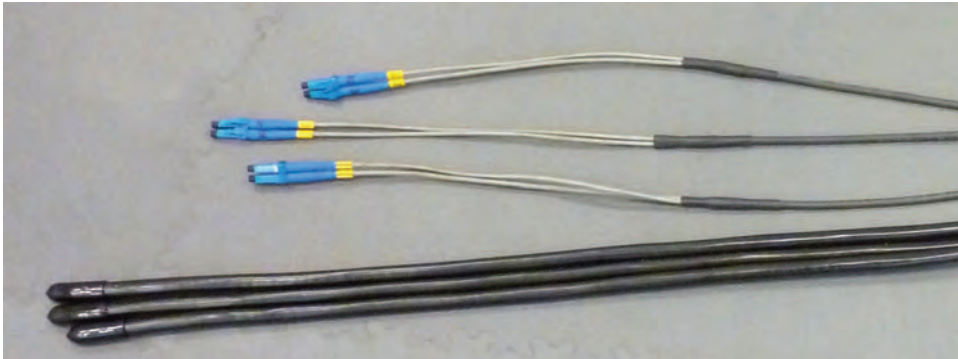


According to the distance between the Base Band Unit (BBU) and the RRUs, the allowed voltage drop and the power consumption of the RRU, the copper wires must have a minimal cross section. In order to efficiently deal with the different cases, the Eucahybrid boxless cables are available in 4mm², 6mm² and 10mm².

The corresponding cable sizes are as follows :

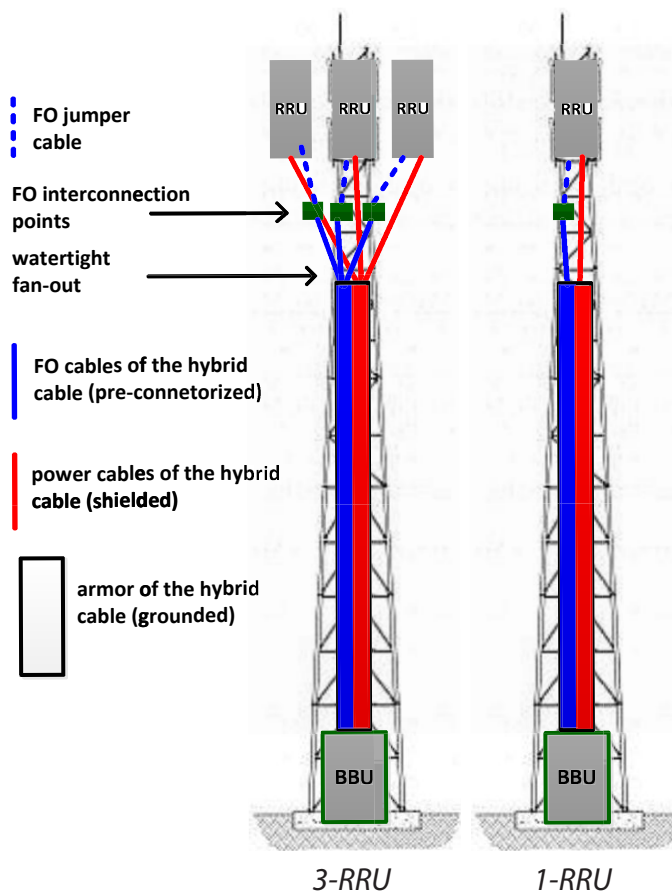
Copper wires cross-section	Cable size		Typical lengths (to be confirmed with the operator)
	1RRU	3 RRUs	
4 mm ²	5/8"	7/8"	up to 60 m
6 mm ²	5/8"	7/8"	up to 100 m
10 mm ²	5/8"	1-1/4"	up to 150 m

The **bottom side** of the Eucahybrid cable is directly plugged into the BBU and the power supply cabinet. To provide a quick and robust fiber optic connection, the bottom side of the Eucahybrid cable is equipped in the factory with furcation tubes and Duplex LC connectors.



Bottom side termination

At the **top side**, the power cable is directly plugged into the RRU, whereas the fiber optic is connected to the RRU via an optical jumper cable. The interconnection point between fiber optic cables and optical jumpers are suitable for harsh environment (*EucaConnect*).



Overview of the system

The interconnection point consists of a factory-installed *EucaConnect* adaptor (ODVA-LC). The Eucaconnect and the jumper (ODVA side) are sealed by IP67/68 dust caps, and the Eucaconnect can be fixed to a wall or a pole thanks to a dedicated fixing bracket *FBES*.



Top side of a 3-RRU cable



One EucaConnect installed on its fixing bracket



EucaConnect
(installed on the Eucahybrid cable in the factory)

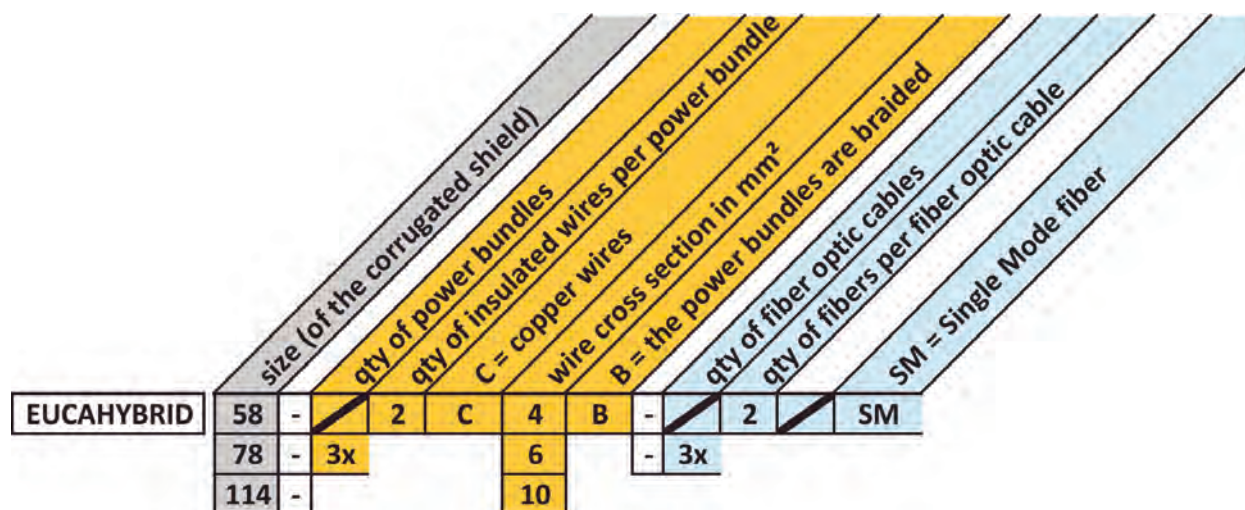


FBES
(Fixing Bracket for EucaConnect Single)



Fiber Optic Jumper
ODVA-LC-xxx-xM

Explanation of the designation codes of the Eucahybrid boxless cables :



examples :

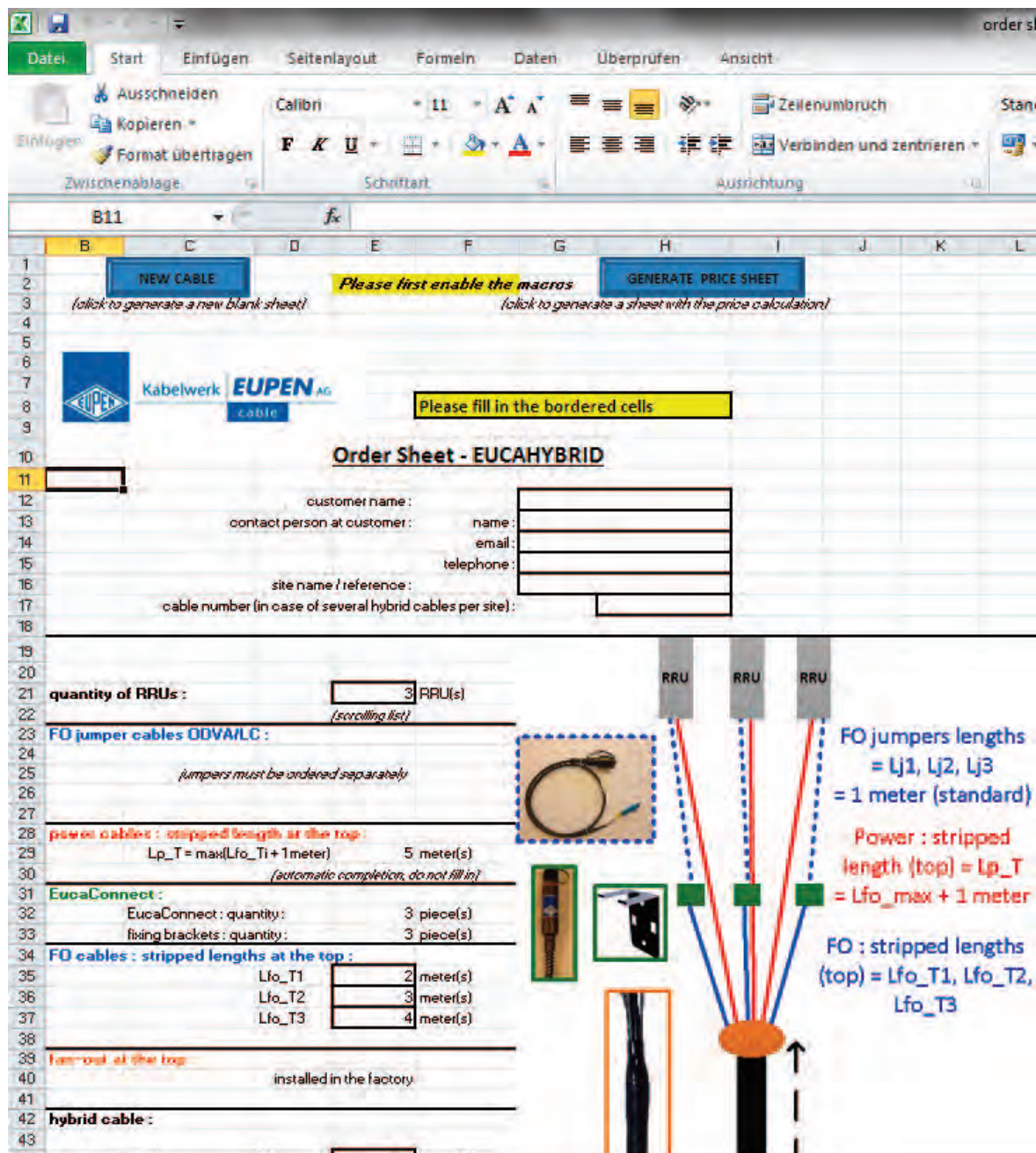
EUCAHYBRID 58-2C6B-2SM

EUCAHYBRID 78-3x2C4B-3x2SM

In chapter 10, you can find the datasheets of the cables composing the Eucahybrid boxless range.

2. Ordering process and delivery information

A special order sheet has to be filled in by the customer. This Excel sheet has been designed to help the customer to specify in an easy way all characteristics of the hybrid cable for one specific site. After completion, it generates a price sheet and a summary of the characteristics that Eupen needs to prepare the cable length. The order sheet must be attached to the customer's purchase order and sent to Eupen.



NEW CABLE (click to generate a new blank sheet) | **GENERATE PRICE SHEET** (click to generate a sheet with the price calculation)

Please first enable the macros

Please fill in the bordered cells

Order Sheet - EUCAHYBRID

customer name:

contact person at customer: name: email:

telephone:

site name / reference:

cable number (in case of several hybrid cables per site):

quantity of RRUs: RRU(s) (scrolling list)

FO jumper cables ODVA/LC:

jumpers must be ordered separately

power cables: stripped lengths at the top:

$Lp_T = \max(Lfo_Ti + 1 \text{ meter})$ 5 meter(s)

(automatic completion, do not fill in)

EucaConnect:

EucaConnect: quantity: 3 piece(s)

fixing brackets: quantity: 3 piece(s)

FO cables: stripped lengths at the top:

Lfo_T1: 2 meter(s)

Lfo_T2: 3 meter(s)

Lfo_T3: 4 meter(s)

removal at the top: installed in the factory

hybrid cable:

Diagram: Three RRUs are connected to a central point. Red lines represent power cables, and blue lines represent FO cables. The diagram shows the stripping lengths for the power cables and the FO cables.

FO jumpers lengths = Lj1, Lj2, Lj3 = 1 meter (standard)

Power: stripped length (top) = Lp_T = Lfo_max + 1 meter

FO: stripped lengths (top) = Lfo_T1, Lfo_T2, Lfo_T3

Eucahybrid boxless order sheet (empty)

Order Sheet - EUCAHYBRID

customer name :

contact person at customer :
name :
email :
telephone :

site name / reference :

cable number :

Hybrid cables	ordered quantity	total
EUCAHYBRID 78-3x2C4B-3x2 SM <input type="text"/>	40	<input type="text"/>
Preparation + packaging ----- without price for the EucaConnect		
prep. of EUCAHYBRID 78-3x2C4B-3x2 SM <input type="text"/> € <input type="text"/>	1	<input type="text"/>
EucaConnect connectors		
Eucaconnect <input type="text"/> €/pc	3	<input type="text"/>
fixing bracket <input type="text"/> €/pc	3	<input type="text"/>
Watertight fan-out kit		
fan-out kit (installation to be completed on site) <input type="text"/> €/pc	1	<input type="text"/>
Accessories		
grounding kit 7/8 : <input type="text"/> €/pc	3	<input type="text"/>
universal clamp 1x7/8 : <input type="text"/> €/pc	42	<input type="text"/>
universal clamp 2x7/8 : <input type="text"/> €/pc	0	<input type="text"/>
universal clamp 3x7/8 : <input type="text"/> €/pc	0	<input type="text"/>
hoisting grip (not pre-laced) 7/8 : <input type="text"/> €/pc	2	<input type="text"/>
TOTAL		<input type="text"/>

quantity of RRUs : 3

FO jumper cables ODVA/LC :
Lj1 0
Lj2 0
Lj3 0

power cables : top : Lp_T : 5

EucaConnect : quantity : 3

fixing brackets : quantity : 3

FO cables : top :
Lfo_T1 2
Lfo_T2 3
Lfo_T3 4
Lfo_T3 4

fan-out at the top : installed in the factory

hybrid cable :
unstripped length : 34
cross section of power cables : 4
fiber optic type : single
CODE : EUCAHYBRID 78-3x2C4B-3x2 SM

fan-out at bottom : installation to be completed on site

power cables : stripped length at the bottom :
Lp_B 1

FO cables : stripped length at the bottom :
Lfo_B 1

manufactured length = 40
manufactured length = 40

Example of a completed order sheet sent to Eupen

On every hybrid cable drum, next to the information about the delivery, the measurement report (attenuation) is attached on the side of the drum.

Site code : **02ACR C1**
Hybrid cable : **EUCAHYBRID 78-3x2C4B-3x2SM**
Total length : **35**

ATTENUATION MEASUREMENT

date : 03.10.2014
measured by : SH

measurement equipment :

power meter : JDSU OLP-35
light source : JDSU OLS-36
patchcords : SM(9/125)-2M-SC/PC-LC/PC-3.0-DP (2 m / 3mm)
wavelength : wavelength : 1310 nm & 1550 nm
nb of measures pro fiber : nb of measures pro fiber : 2 (both directions)

attenuation in dB		BOTTOM --> TOP		TOP --> BOTTOM	
identification of the connector at the bottom		att. @1310nm	att. @1550nm	att. @1310nm	att. @1550nm
fiber cable #1	Rx	-0,25	-0,11	-0,25	-0,09
	Tx	-0,29	-0,23	-0,51	-0,25
fiber cable #2	Rx	-0,19	-0,05	-0,15	-0,06
	Tx	-0,39	-0,21	-0,22	-0,07
fiber cable #3	Rx	-0,08	-0,11	-0,09	-0,02
	Tx	-0,44	-0,48	-0,12	-0,02

Example of a measurement report attached on a drum

3. Drum handling

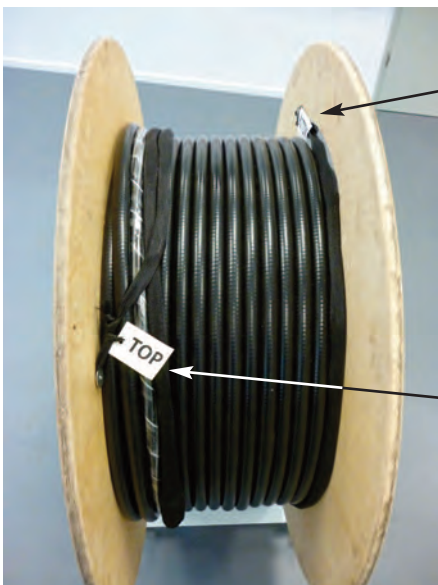
The hybrid cable on the drum is protected during the transport by a protective sheet.

If the protection is damaged when you receive the drum, don't unpack the drum and do complain to the transporter. The hybrid cable is indeed likely to be damaged and unusable.

To unpack the protective sheet, just cut the tape that closes the sheet and remove it. Then the hybrid cable is accessible.



The side to be connected to the RRU is identified by the label "TOP" and the side to be connected to the BBU is identified by the label "BOTTOM".



The end of the **BOTTOM** side (BBU side) is the inner end of the reel. It is fixed to one flange of the drum and will be untied at last.

The end of the **TOP** side (RRU side) is the outer end of the reel. It must be untied and unreeled at first.

Cordoning - off the working area

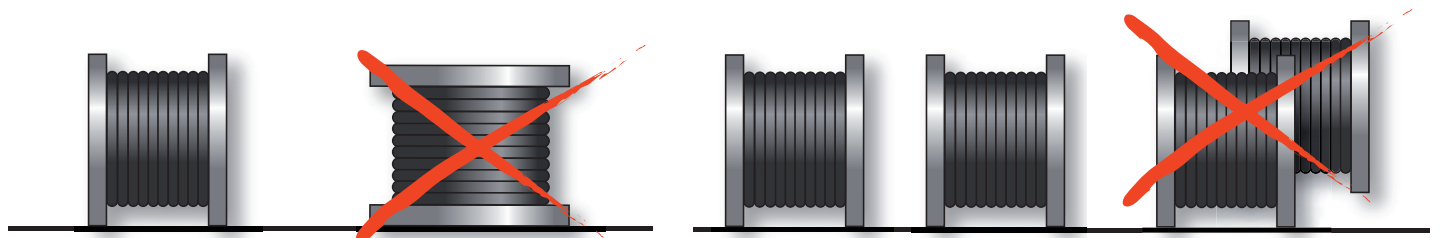
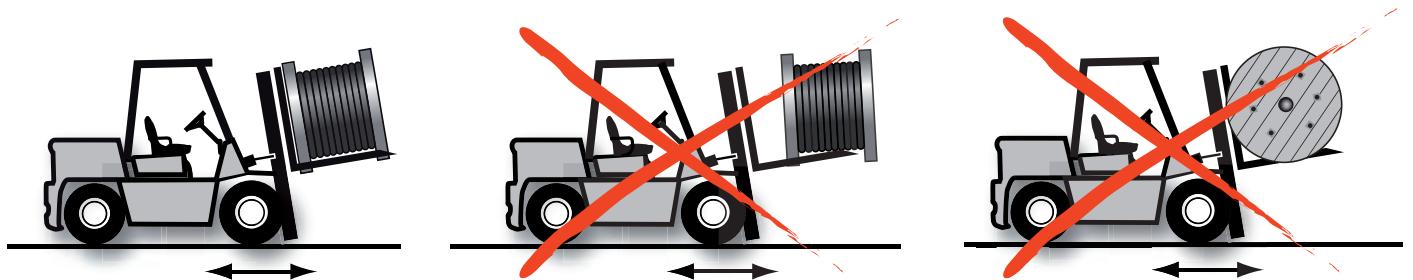
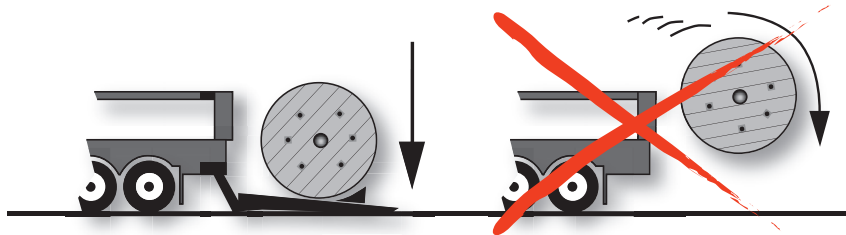
- Warning Signs
- Warning Cones
- Warning Lights
- Warning Tape

Keeping the access and emergency routes clear of

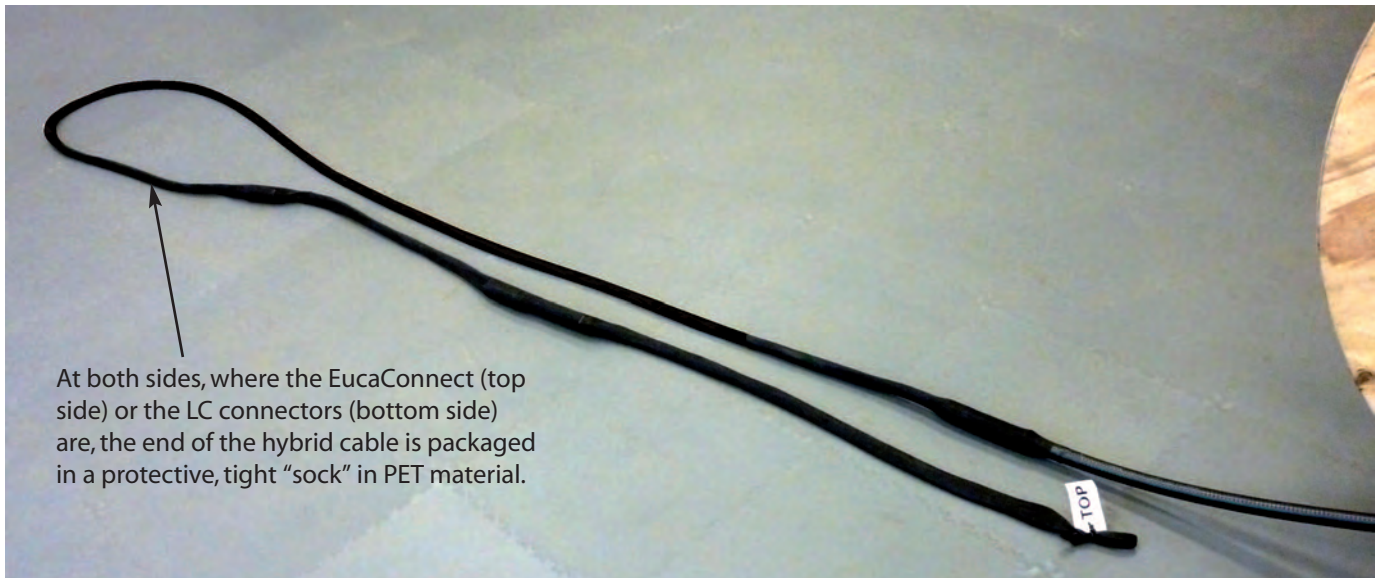
- Materials
- Tolls
- Vehicles

Fire precautions

- Easily inflammable materials should be
 - kept to a minimum
 - disposed of immediately if not necessary any longer
 - brought into the tunnel only in the amount required



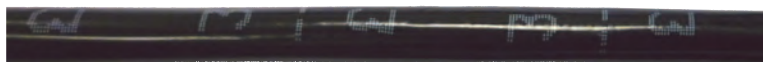
4. Unpacking the extremities of the Eucahybrid cable



Once the cable has been unreeled and installed between the BBU and the RRU, remove the protective "socks":



At the top side, if it is a Eucahybrid cable for 3 RRUs, spread the separate power and optical cables towards the 3 RRUs. Along the whole cable length, both power and fiber are printed "1", "2", "3" for an easy identification. Here for example the power cable:



The fan-out at the **top side** is already sealed with a protection suitable for harsh environment. After removing the protective sock, it can be left without additional protection.



Sealed fan-out at the top side after removing the protective sock

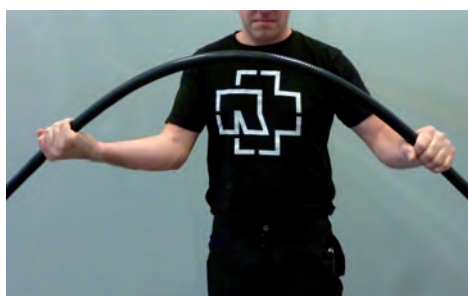
5. Manipulation of the cable

The type of single mode fiber optic used in the Eucahybrid cable is 9/125µm G657.A1. This fiber is packaged in a 900µm buffer and one fiber optic cable, consisting of 2 fibers and an aramid reinforcement, has an external diameter of 5mm and an outdoor-rated outer jacket.

Bending :

Although this fiber has superior bending performance, there are minimum bending radii that must be respected. They are different if the fiber optic cable is still packaged in the hybrid cable or not :

cable	minimum bending radius without pulling
hybrid cable 1-1/4"	360 mm
hybrid cable 7/8"	250 mm
hybrid cable 5/8"	200 mm
5 mm fibre optic cable	65 mm
900µm single fiber	30 mm



Hybrid cable



5 mm fiber optic cable



single fiber

Temperature :

The Eucahybrid cable fulfills the following requirements according to the temperature :

Recommended temperature range:

Storage	-30 °C to +70 °C
Installation	-20 °C to +60 °C
Operation	-30 °C to +70 °C

6. Installation of the Eucacconnect

These installation instructions explain how to mount correctly the EucaConnect on its fixing bracket and how to connect correctly the optical jumper.

Equipment required:



EucaConnect
(installed on the Eucahybrid
cable in the factory)



FBES
(Fixing Bracket for
EucaConnect Single)



Fiber Optic Jumper
ODVA-LC-xxx-xM

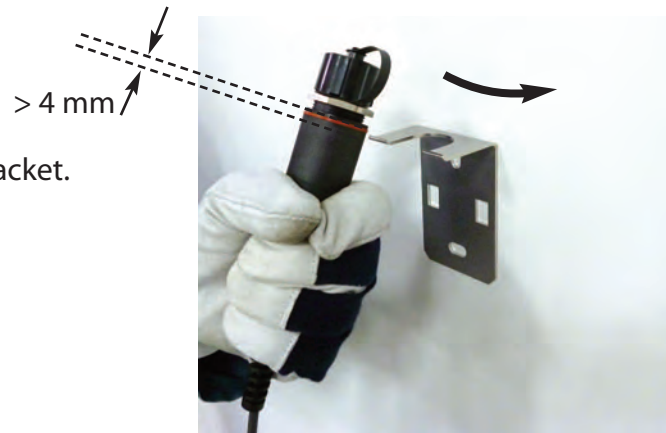


FBE-T
(Fixing Bracket
EucaConnect Tool)
(Recommended)

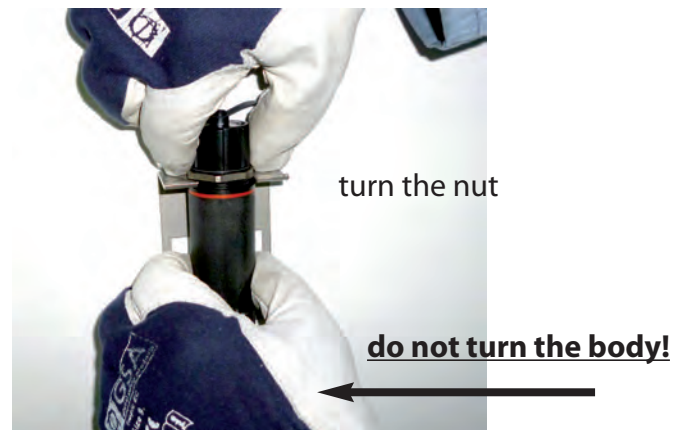


**Optical Connector
Cleaner Roll**
(Recommended)

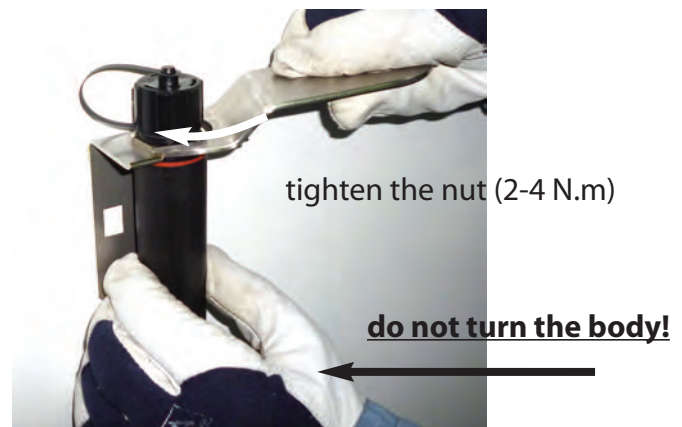
1. Place the EucaConnect on the fixing bracket.



2. Tighten the nut by hand first.
Do not turn the body of the EucaConnect!



3. Finish tightening the nut with the FBE-T tool.
It must be well tightened (2 to 4 N.m)
Do not turn the body of the EucaConnect!



4. The EucaConnect is now fixed and can stay outdoor in this condition as long as the dust cap remains fastened (**bayonet closed**).

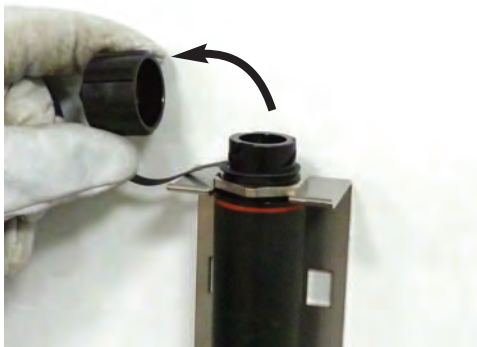


7. Connection to the RRU

a. Optical jumper connection

Connect the jumper to the EucaConnect only when the RRU is ready to be connected at the same time.

• To connect the jumper to the EucaConnect:



a) open the bayonet of the EucaConnect



b) open the bayonet of the jumper



c) clean the connectors of the jumper (ODVA side)



d) connect the jumper to the EucaConnect
The bayonet must "click".

e) connect both caps together. **The bayonet must "click".**

• The other end of the jumper must be connected to the RRU at the same time:



First, remove the protective caps.



Then, clean the connectors.

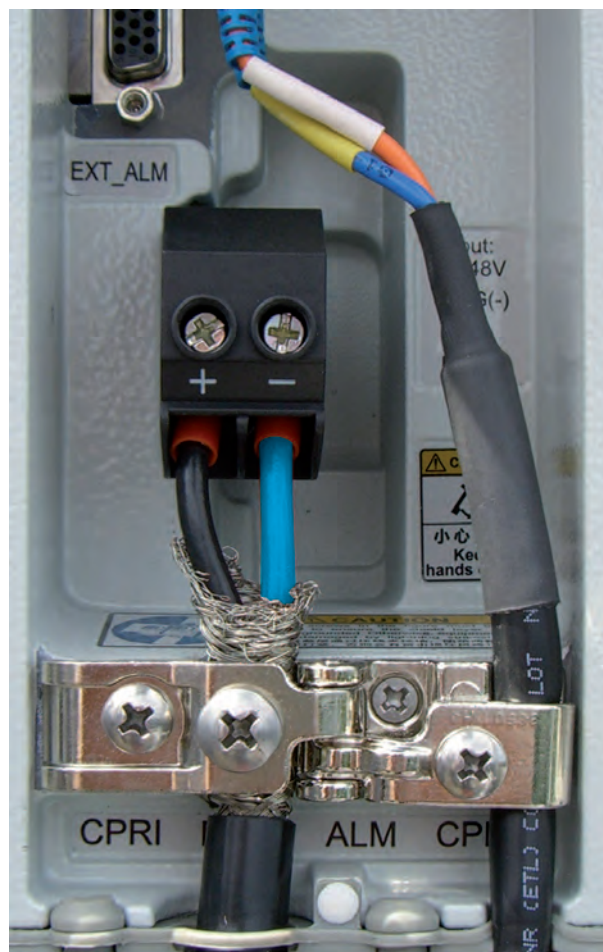
Finally, connect the LC connectors to the RRU by respecting the correct position for "Rx" and "Tx".

b. Power connection

After cutting the wires to the appropriate length, connect them to the terminals in the RRU. Respect the following convention at both top and bottom sides :

blue to $-$ (it is potential -48V)

black to $+$ (it is potential 0V)



8. Connection to the BBU

a. Overlength management

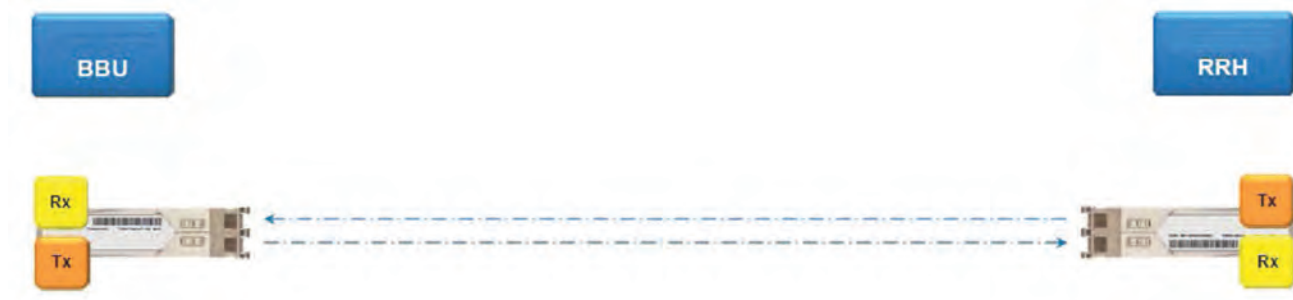
The overlength shall be stored at the **bottom side**, near the BBU.

Stripping the Eucahybrid cable allows to remove the outer jacket and the aluminium shield, to cut the power cables to length, and to store the overlength of fiber optic only.

To strip the Eucahybrid cable, follow the instructions detailed on the **next 5 pages**.

If the fan-out at the bottom side is outdoor, a watertight sealing must be installed. See **chapter 9** for more information. Completing the installation of the sealing kit on site allows to first strip the cable and only afterwards to seal the fan-out.

b. Optical connection



The fibers are labeled "Rx" and "Tx" for a 1-RRU hybrid cable, and "Rx1", "Rx2", "Rx3", "Tx1", "Tx2", "Tx3" for a 3-RRU hybrid cable. The connectors are assembled with duplex clips so that the "Tx" is always on the left. If there is a mistake, the duplex clip can always be taken off and mounted again.

Always clean the connectors (for example with an optical connector cleaner roll) before plugging them in.



Labeling of the connectors at the jumper LC side (connection to the RRU)

How to strip the Eucahybrid cable

These installation instructions explain how to remove the outer jacket and the aluminium sheet of the Eucahybrid cable on several meters. This can be done on site to manage the overlength : after stripping, the power cables can be cut to length whereas the fiber optic cables can be stored in a dedicated box or rack.

Equipment required:



EHRC-T
(EucaHybrid Rip Cord Tool)



Flat pliers



Cutting pliers



Drill machine
≥14 V, 2Ah



Cable knife



PTGC78
(optional and only for 7/8" size)

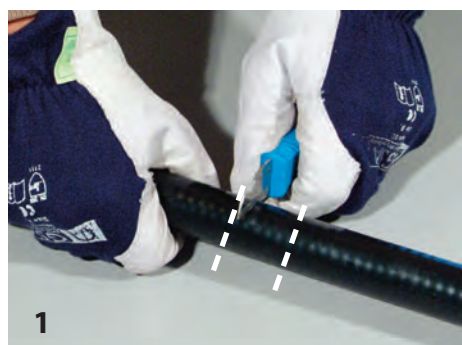


1) Remove a few centimeters of the outer jacket where you want to end the stripping.

Use a cable knife as shown on the pictures below (pic. 1-2-3).

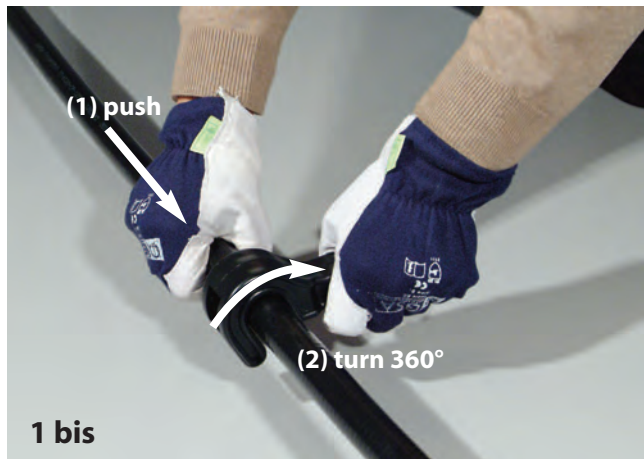
For 7/8" hybrid cables, you can use the Eupen PTGC78 tool (pic. 1bis – 3bis).

With a cable knife:



How to strip the Eucahybrid cable

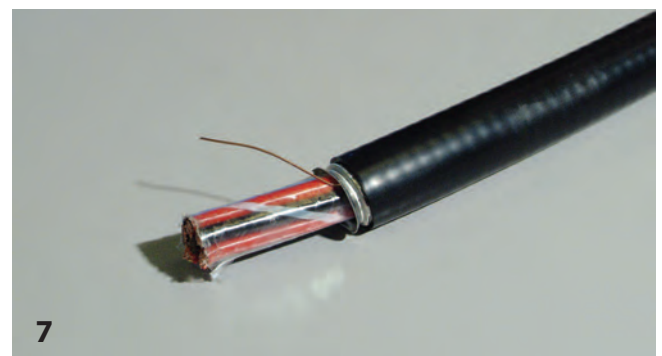
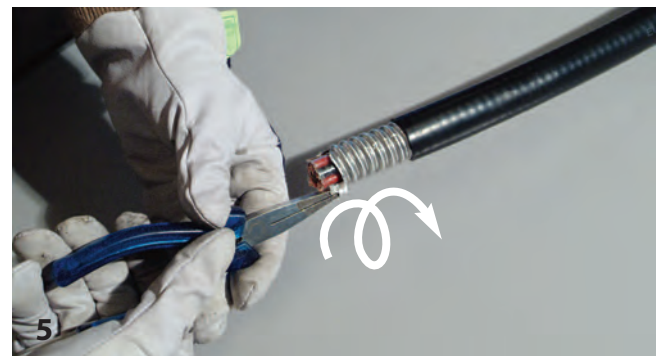
With the PTGC78 tool (for 7/8" cable) :



2) Free a few centimeters of rip cord at the end of the cable (7 - 10 cm).

First, remove the outer jacket with a cable knife (pic. 4). (Optionally, with the tool PTGC78 for 7/8" cable). Then, remove the aluminium sheet with the help of flat pliers by following the spiral shape of the aluminium (pic. 5-6).

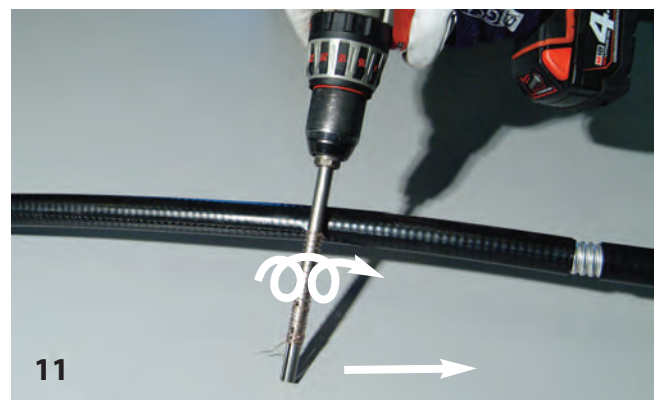
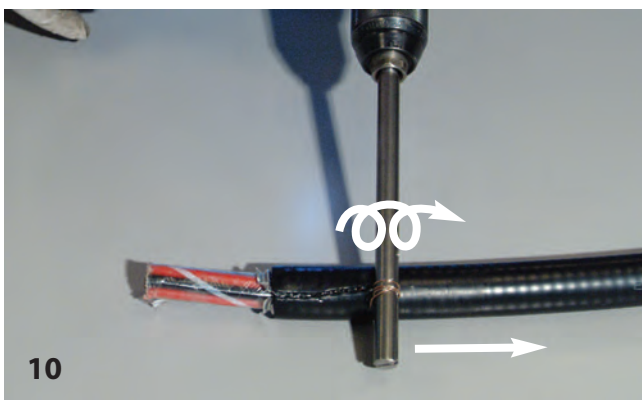
Do not try to cut the aluminium sheet directly with a knife, you could damage the inner cables !



How to strip the Eucahybrid cable

3) Use the special Eupen stripping tool for Eucahybrid EHRC-T and a drill machine ;

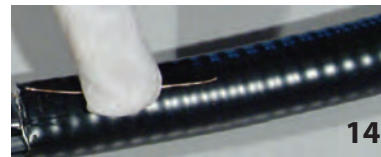
insert the rip cord into the tool (pic. 8), bend it opposite to the direction you want to strip (pic. 9) and drill slowly up to the area where you have already removed the jacket (pic. 10-11-12).



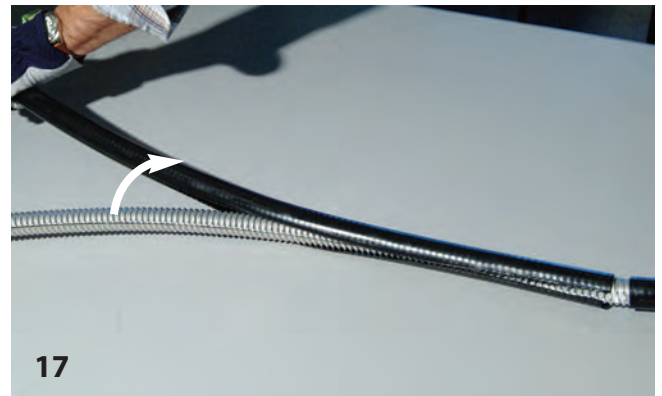
How to strip the Eucahybrid cable

At the end, cut the rip cord with the cutting pliers (pic. 13).

Let a few centimeters of rip cord (≈ 10 cm), bend it backwards (pic. 14) and tape it on the outer jacket (pic. 15)

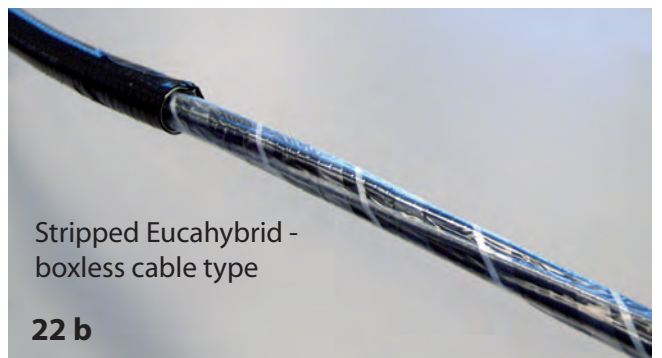
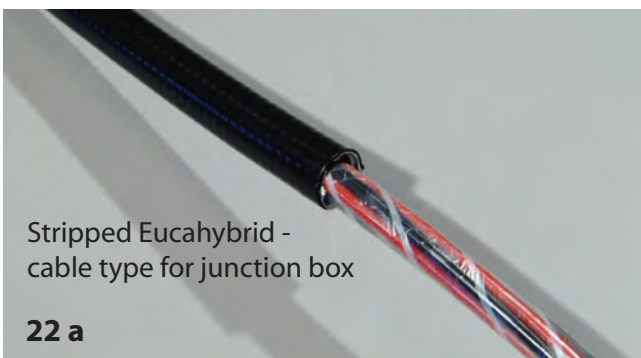
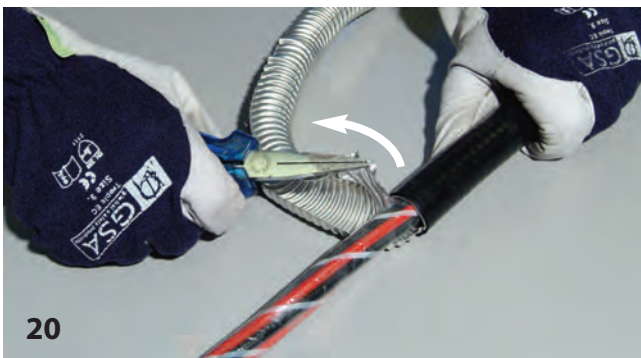
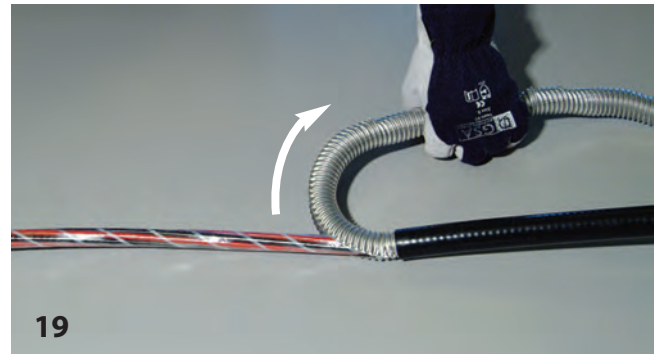


4) Remove the outer jacket manually.

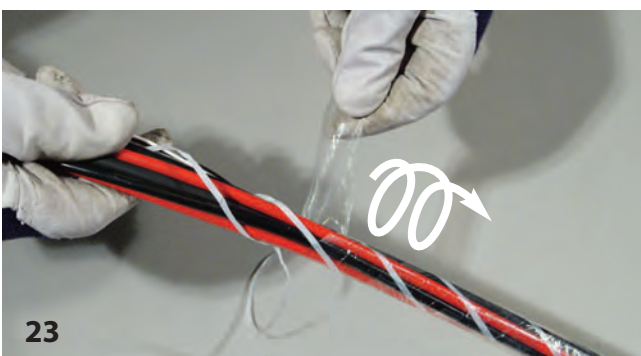


How to strip the Eucahybrid cable

5) Take the aluminium sheet out with the help of flat pliers (pic. 18-19), and cut it along the edge of the remaining outer jacket (pic.20). Remove the last sharp edges (pic.21).



6) In order to free the inner cables, remove the wrapping tapes by unwinding them around the cables (pic.23).



9. Sealing of the Eucahybrid cable

Except when agreed with the customer, the fan-out of the Eucahybrid cable at the **top side** is always sealed in the factory.

At the **bottom side**, the customer can optionally order a sealing kit, either completely installed in the factory or with the installation to be completed on site.

Eupen proposes sealing kits that are easy to install, and tested watertight according to IP67/68. They consist of mastic stripes to be placed between the inner cables and of a UV-resistant, mechanical protection to be tightened around this fan-out.



Installation of the mastic tape between the wires



Installed sealing kit with cold shrink

How to seal the Eucahybrid cable

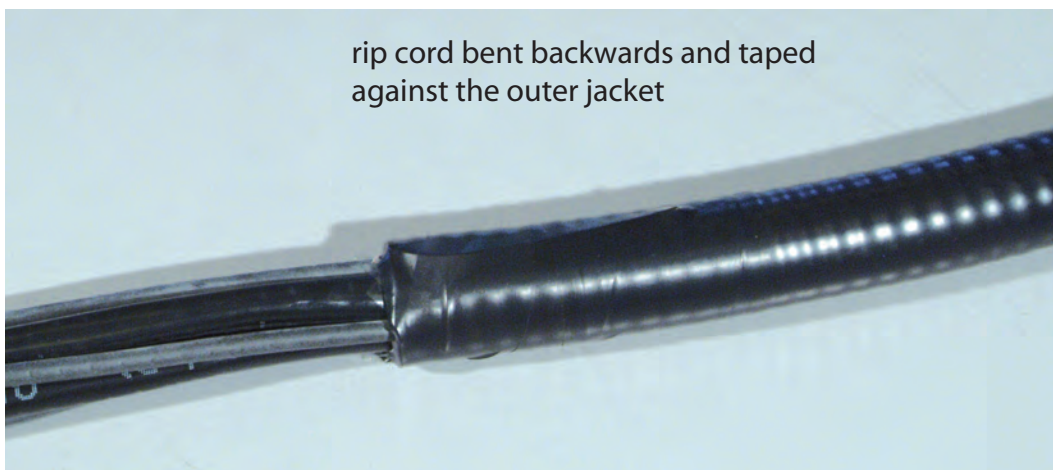
Kit EH-COLDB-E-xx with cold shrink

These instructions explain how to install a watertight sealing at the fan-out of the Eucahybrid cable, using a sealing kit EH-COLDB-E-02 (for 5/8" and 7/8" Eucahybrid cables) or a kit EH-COLDB-E-03 (for 1-1/4" Eucahybrid cable). This solution is especially to be used outside with the *boxless* Eucahybrid cables.

The sealing kit EH-COLDB-E-xx is composed of 1 cold shrink and 2 stripes of mastic tape. In addition, tape (e.g. PVC tape) is also necessary (not included in the kit).



1. The outer jacket and the aluminium sheet of the hybrid cable are already stripped off, and the remaining length of **rip cord** is bent backwards and taped against the outer jacket :



How to seal the Eucahybrid cable

Kit EH-COLDB-E-xx with cold shrink

2. About 2 cm away from the aluminium, wrap the first stripe of mastic between all the wires, following the diagram below. Choose one wire to start with, and turn around the bundle by adding one wire at each turn.



3. Then wrap the second stripe of mastic tape, from the mastic you have already installed, up to the outer jacket of the hybrid cable.



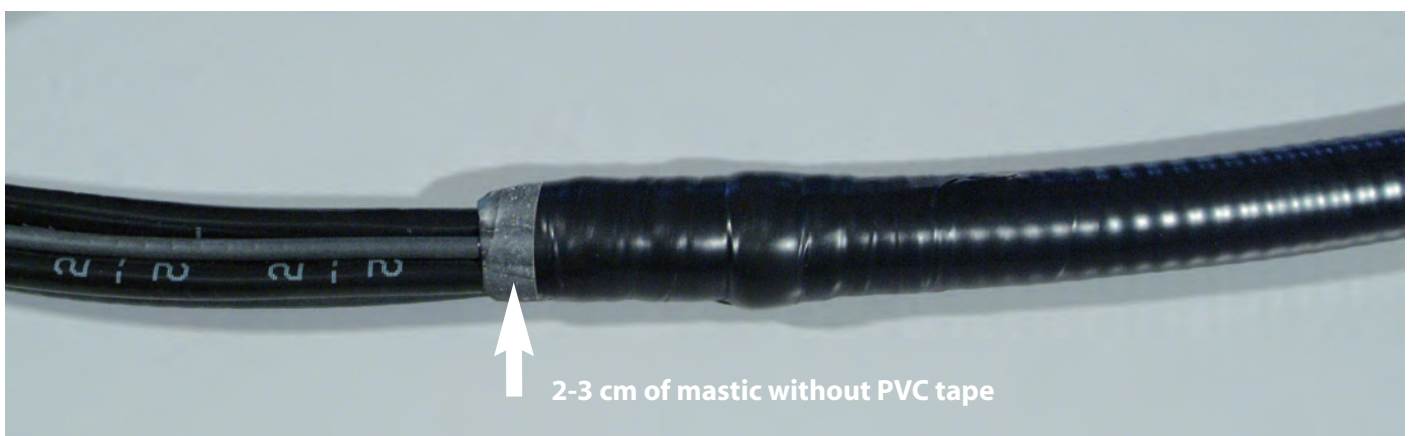
How to seal the Eucahybrid cable

Kit EH-COLDB-E-xx with cold shrink

4. Press with the fingers to compact the mastic on the whole surface.



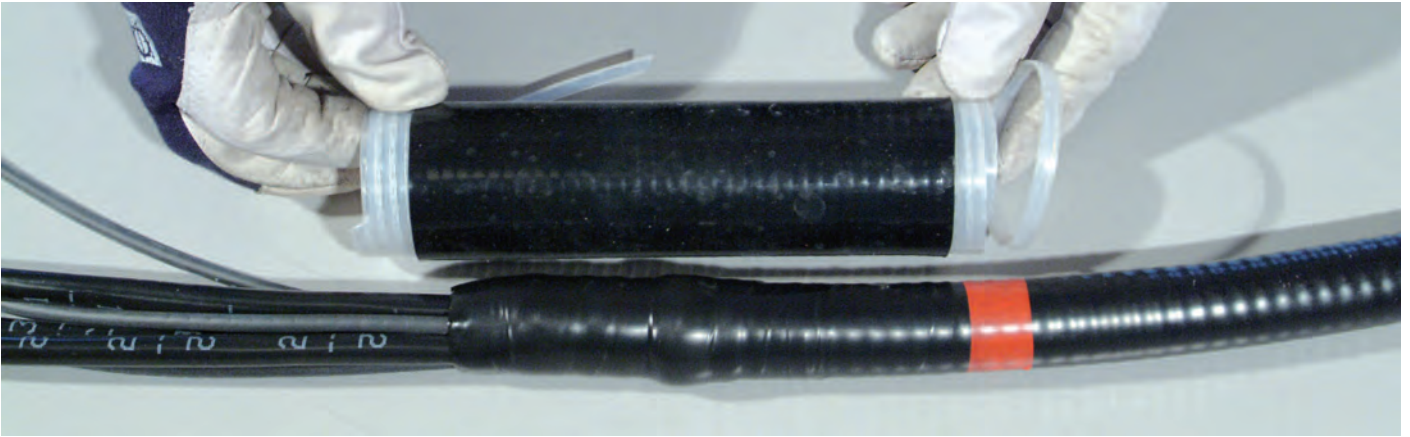
5. Wrap the PVC tape around the mastic, except on the first 2-3 cm on the open side, where the mastic should be left without PVC tape.



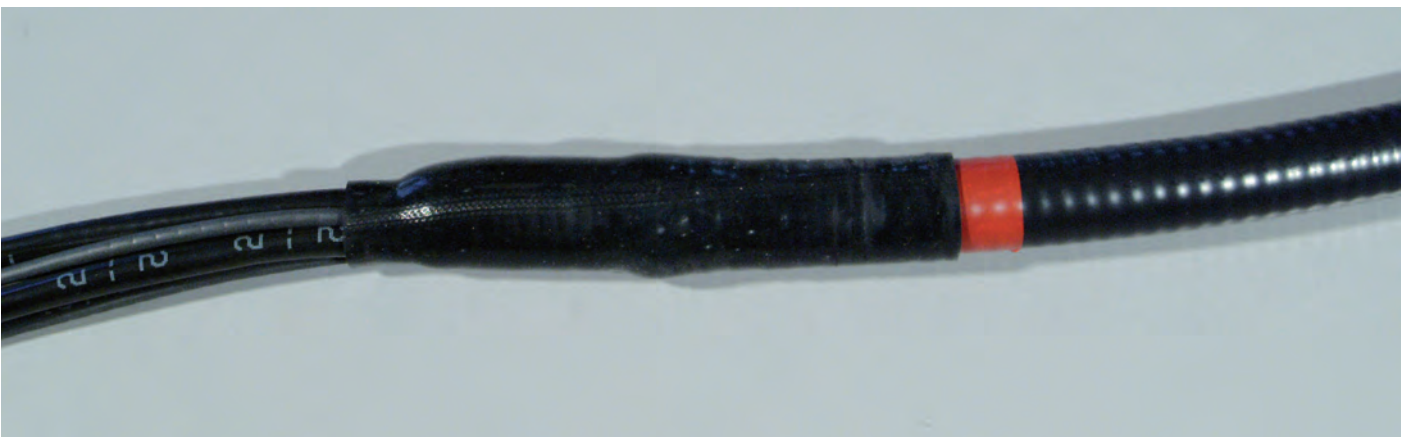
How to seal the Eucahybrid cable

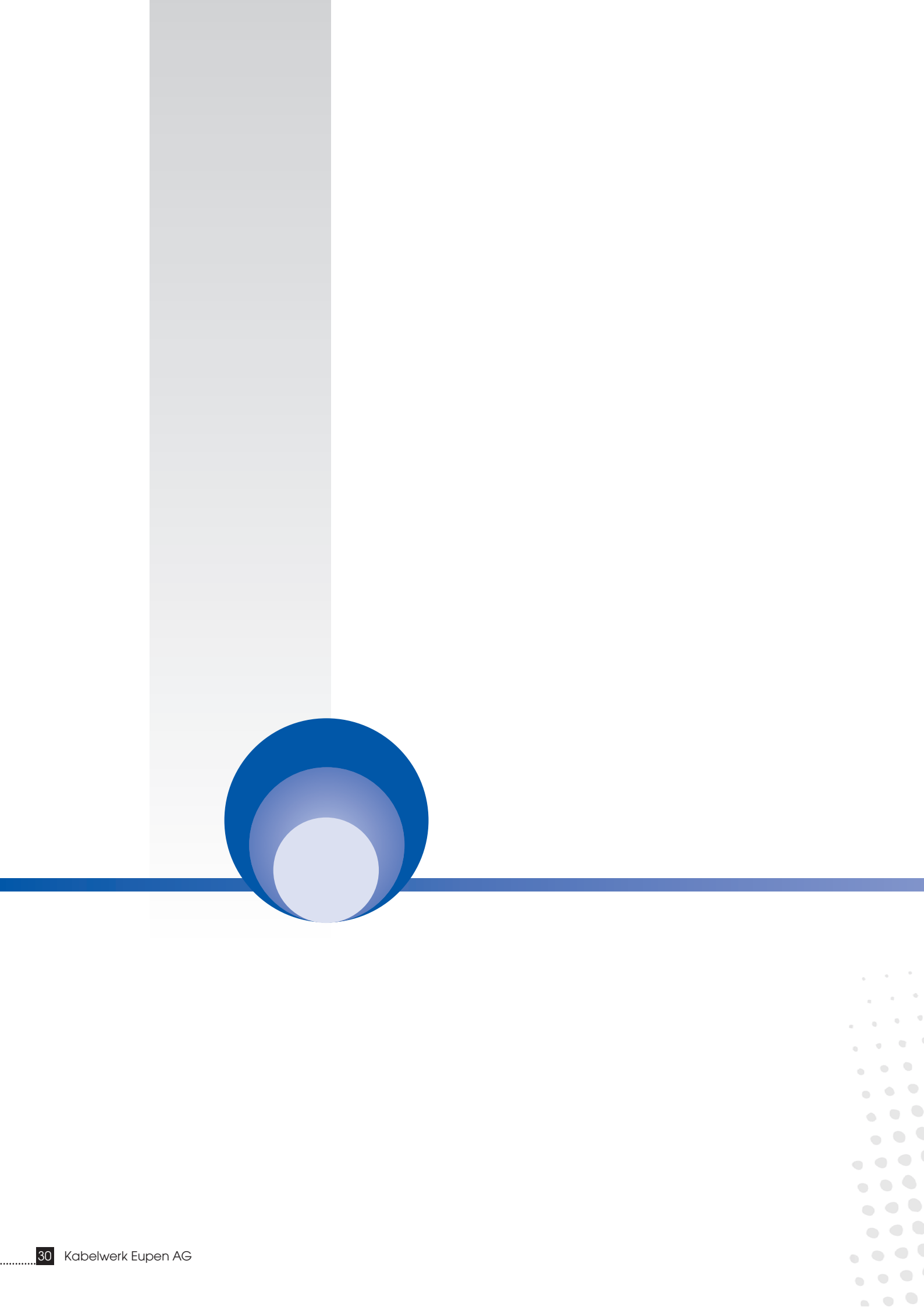
Kit EH-COLDB-E-xx with cold shrink

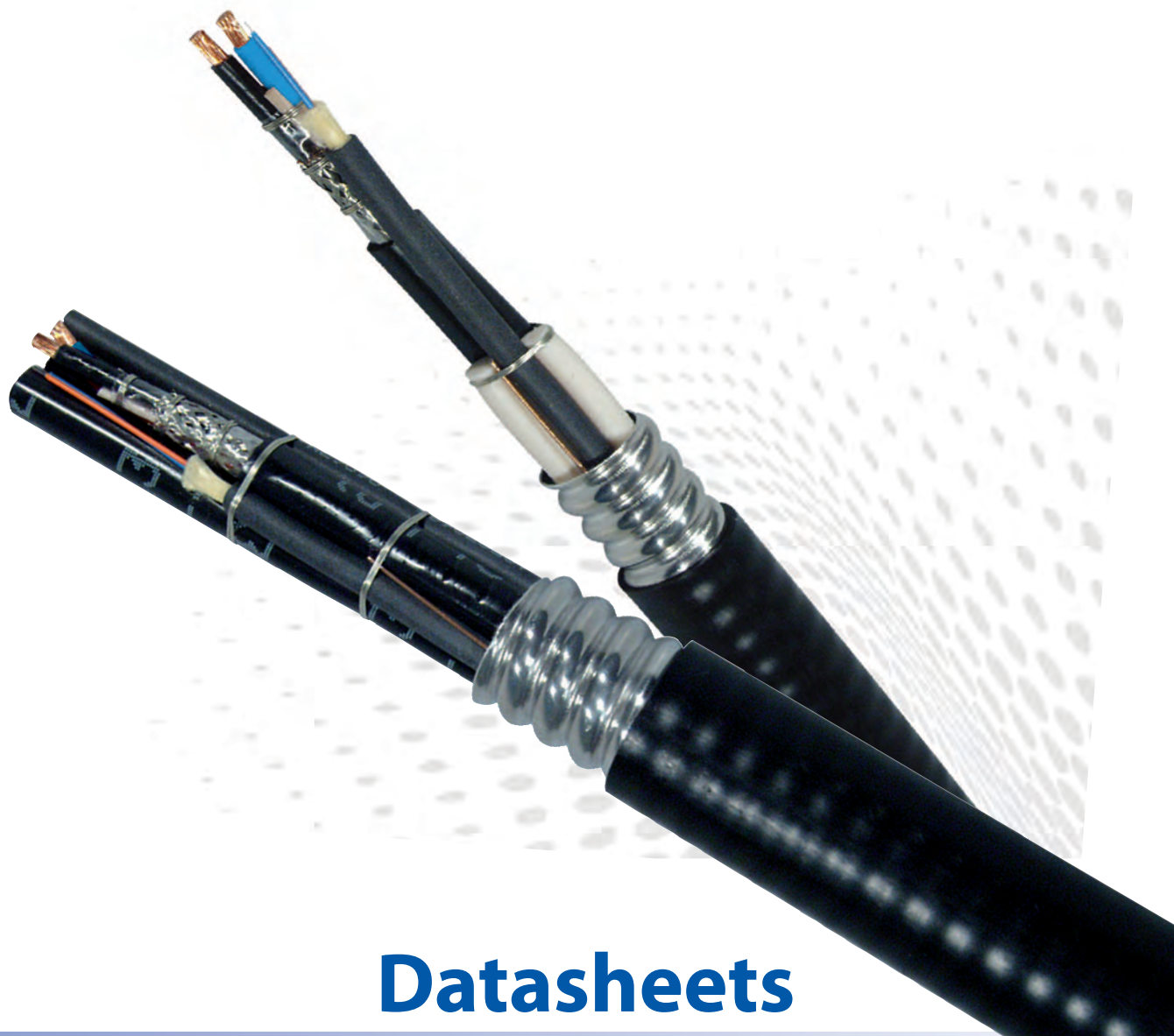
6. Make a mark on the outer jacket in order to position the cold shrink at the right place, with only up to 1 cm exceeding on the open side.



7. Pull on the stripping wire of the cold shrink. Pull from the open side, the wire beginning to shrink the closed side first.







Datasheets

EUCAHYBRID 58-2C4B-2MM5

EUCAHYBRID 58-2C4B-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 4 mm²	
• Diameter	10 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	



EUCAHYBRID 58-2C4B-2MM5

EUCAHYBRID 58-2C4B-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	414 kg/km (0,28 lb/ft)

ELECTRICAL

• Main conductors	
Resistance	4,95 Ohm/km at 20 °C
Operating DC voltage	48 V

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

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	

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

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

EUCAHYBRID 58-2C6B-2SM-HLFR

PRODUCT DESCRIPTION



5/8" hybrid fiber optic cable with 48V energy feeder in a corrugated aluminum shielding with HLFR jacket (halogen free acc. to IEC 60754, low smoke acc. to IEC 61034, flame retardant acc. to IEC 60332-1-2 and IEC 60332-3 cat.C).

TECHNICAL FEATURES

CONSTRUCTION

Copper feed lines

• Type	shielded bundel, UV rated, halogen free
• Quantity	1
• Conductor material	electrolytic copper
• Section	2 x 6 mm ²
• Diameter	11 mm

Fiber Optic cable

• Quantity	1
• Fibers quantity	2
• Fiber type	Single Mode
• Fiber size	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 HLFR
• Thickness	1,1 mm
• Diameter	21,9 mm



EUCAHYBRID 58-2C6B-2SM-HLFR

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	480 kg/km (0,33 lb/ft)

ELECTRICAL

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

OPTICAL

• Fiber type	G657A1
• Fiber wave length	1310 & 1550 nm
• Max attenuation	
	1310 nm: ≤0,40 dB/km
	1550 nm: ≤0,25 dB/km
• Core diameter	9 µm
• Cladding diameter	125 µm
• Coating diameter	250 µm
• Tight buffer fiber diameter	900 µm

EUCAHYBRID 58-2C10B-2MM5

EUCAHYBRID 58-2C10B-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 10 mm²	
• Diameter	13 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	

EUCAHYBRID 58-2C10B-2MM5

EUCAHYBRID 58-2C10B-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	531 kg/km (0,36 lb/ft)

ELECTRICAL

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

OPTICAL

MM5

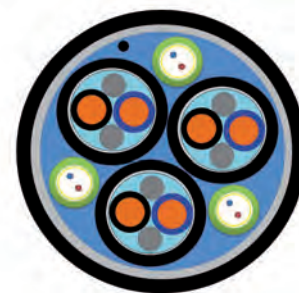
SM

• 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

EUCAHYBRID 78-3x2C4B-3x2 MM5

EUCAHYBRID 78-3x2C4B-3x2 SM

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		
• Type:	shielded bundels, UV rated	
• Quantity	3	
• Conductor material	electrolytic copper	
• Section	2 x 4 mm ²	
• Diameter	10 mm	
Fiber Optic cable element		
• Quantity	3	
• Fibers quantity per element	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	25 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	28 mm	



EUCAHYBRID 78-3x2C4B-3x2 MM5

EUCAHYBRID 78-3x2C4B-3x2 SM

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	815 kg/km (0,55 lb/ft)

ELECTRICAL

• Main conductors	
Resistance	4,95 Ohm/km at 20° C
Operating DC voltage	48 V

OPTICAL

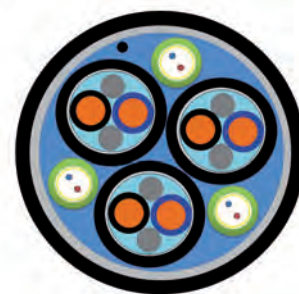
MM5

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

EUCAHYBRID 78-3x2C4B-3x2 SM-HLFR

PRODUCT DESCRIPTION



7/8" hybrid fiber optic cable with 48V energy feeder in a corrugated aluminum shielding with HLFR jacket (halogen free acc. to IEC 60754, low smoke acc. to IEC 61034, flame retardant acc. to IEC 60332-1-2 and IEC 60332-3 cat. C).

TECHNICAL FEATURES

CONSTRUCTION

Copper feed lines

• Type:	shielded bundels, UV rated, halogen free
• Quantity	3
• Conductor material	electrolytic copper
• Section	2 x 4 mm ²
• Diameter	10 mm

Fiber Optic cable element

• Quantity	3
• Fibers quantity per element	2
• Fiber type	Single Mode
• Fiber size	9/125/900 µm
• Reinforcement	Aramid fiber
• Diameter	5 mm

Ripcord

• Quantity	1
• Material	Steel Wire
• Diameter	0,8 mm

Outer shield

• Material	Corrugated aluminum tube
• Diameter	25 mm

Jacket

• Material	black HLFR
• Thickness	1,5 mm
• Diameter	28 mm



EUCAHYBRID 78-3x2C4B-3x2 SM-HLFR

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	790 kg/km (0,53 lb/ft)

ELECTRICAL

• Main conductors	
Resistance	4,95 Ohm/km at 20° C
Operating DC voltage	48 V

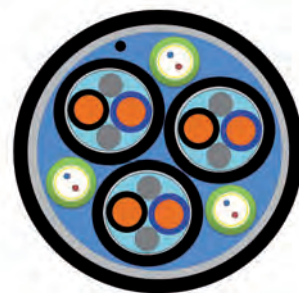
OPTICAL

• Fiber type	G657A1
• Fiber wave length	1310 & 1550 nm
• Max attenuation	
	1310 nm: ≤0,40 dB/km
	1550 nm: ≤0,25 dB/km
• Core diameter	9 µm
• Cladding diameter	125 µm
• Coating diameter	250 µm
• Tight buffer fiber diameter	900 µm

EUCAHYBRID 78-3x2C6B-3x2MM5

EUCAHYBRID 78-3x2C6B-3x2SM

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		
• Type:	shielded bundels, UV rated	
• Quantity	3	
• Conductor material	electrolytic copper	
• Section	2 x 6 mm ²	
• Diameter	11 mm	
Fiber Optic cable element		
• Quantity	3	
• Fibers quantity per element	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	25 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	28 mm	



EUCAHYBRID 78-3x2C6B-3x2MM5

EUCAHYBRID 78-3x2C6B-3x2SM

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	977 kg/km (0,66 lb/ft)

ELECTRICAL

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

OPTICAL

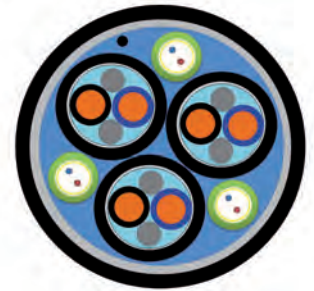
MM5

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

EUCAHYBRID 78-3x2C6B-3x2SM-HLFR

PRODUCT DESCRIPTION



7/8" hybrid fiber optic cable with 48V energy feeder in a corrugated aluminum shielding with HLFR jacket (halogen free acc. to IEC 60754, low smoke acc. to IEC 61034, flame retardant acc. to IEC 60332-1-2 and IEC 60332-3 cat. C).

TECHNICAL FEATURES

CONSTRUCTION

Copper feed lines

• Type:	shielded bundels, UV rated, halogen free
• Quantity	3
• Conductor material	electrolytic copper
• Section	2 x 6 mm ²
• Diameter	11 mm

Fiber Optic cable element

• Quantity	3
• Fibers quantity per element	2
• Fiber type	Single Mode
• Fiber size	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	25 mm

Jacket

• Material	black HLFR
• Thickness	1,5 mm
• Diameter	28 mm



EUCAHYBRID 78-3x2C6B-3x2SM-HLFR

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	970 kg/km (0,65 lb/ft)

ELECTRICAL

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

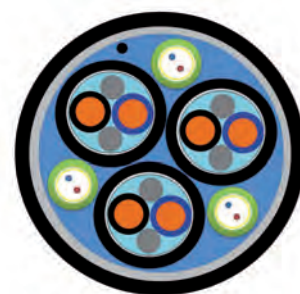
OPTICAL

• Fiber type	G657A1
• Fiber wave length	1310 & 1550 nm
• Max attenuation	
	1310 nm: ≤0,40 dB/km
	1550 nm: ≤0,25 dB/km
• Core diameter	9 µm
• Cladding diameter	125 µm
• Coating diameter	250 µm
• Tight buffer fiber diameter	900 µm

EUCAHYBRID 114-3x2C10B-3x2MM5

EUCAHYBRID 114-3x2C10B-3x2SM

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 fiber available.

TECHNICAL FEATURES

CONSTRUCTION	MM5	SM
Copper feed lines		
• Type:	shielded bundels, UV rated	
• Quantity	3	
• Conductor material	electrolytic copper	
• Section	2 x 10 mm²	
• Diameter	14,5 mm	
Fiber Optic cable element		
• Quantity	3	
• Fibers quantity per element	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	36 mm	
Jacket		
• Material	Black Polyethylene	
• Thickness	1,5 mm	
• Diameter	39 mm	



EUCAHYBRID 114-3x2C10B-3x2MM5

EUCAHYBRID 114-3x2C10B-3x2SM

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	1520 kg/km (1,02 lb/ft)

ELECTRICAL

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

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





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