

YOUNCTA

SWR 1.3.x/1.4.x

Installation and Test Manual for
Y-Packet

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Edition 2

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Table of content

- 1 Foreword 9
 - 1.1 Customer documentation organization 9
 - 1.2 Service and technical support 10
 - 1.3 Regulatory issues..... 11
 - 1.3.1 Intended Use..... 11
 - 1.3.2 Adaptive modulation rules 12
 - 1.3.3 Use of Unlicensed Bands (only with ETSI configuration) 12
 - 1.3.4 Declaration and Marking 12
 - 1.4 Purpose of the document 13
 - 1.5 Handbook structure 13
- 2 Unpacking, Warehousing, Repacking 14
 - 2.1 General..... 14
 - 2.2 Preliminary Checks 14
 - 2.3 Unpacking 15
 - 2.4 Warehousing 15
 - 2.5 Repacking 16
- 3 Pre-installation checking 17
 - 3.1 Basic equipment elements check..... 17
 - 3.1.1 Outdoor Units 17
 - 3.1.2 Indoor Units 18
 - 3.1.3 Pole/Wall Mounting Installation Hardware 19
 - 3.1.4 Installation and maintenance Tools..... 21
- 4 Outdoor Unit Installation 22
 - 4.1 General..... 22
 - 4.1.1 ODU signal cable assembly for threaded connector 29
 - 4.1.2 IDU signal cable assembly..... 32
 - 4.1.3 Typical installation layout and grounding criteria 33
 - 4.1.3.1 Fixing the IDU/ODU cables..... 38
 - 4.1.3.2 Grounding on the ODU 38
 - 4.1.3.3 Grounding on the IDU 38
 - 4.2 Installation of ODU 1+0 integrated to antenna..... 39
 - 4.2.1 Required Part List..... 39
 - 4.2.1.1 Antenna pre-pointing..... 40
 - 4.3 ODU 1+0 Installation with non-integrated antenna 41
 - 4.3.1 Required Part List..... 41
 - 4.3.1.1 Installing ODU Supporting Frame on the pole/wall 42
 - 4.3.1.2 ODU installation 43

ED	02		ZZZAY00001AA IM E	3/78
----	----	--	-------------------	------

- 4.3.1.3 Flex twist waveguide installation 44
- 4.4 1+1 ODU configuration Installation with integrated antenna 45
 - 4.4.1 Required Parts Listing 45
- 5 LINE UP AND COMMISSIONING 46
 - 5.1 General Information’s 46
 - 5.2 Line Up (Station A) 47
 - 5.2.1 Hardware Presetting 47
 - 5.2.2 Software Presetting 47
 - 5.2.3 Line up preliminary operations 47
 - 5.2.4 Starting the Y-Terminal 48
 - 5.2.5 Line up basic configuration 50
 - 5.3 Link Line up 51
 - 5.3.1 Station B Line up and antenna alignment (station A and B) 51
 - 5.3.2 Preliminary Link checks after line up 52
 - 5.4 Commissioning and acceptance test 53
 - 5.4.1 PTx and PRx measurements 53
 - 5.4.2 Modulation level control 53
 - 5.4.3 Automatic Transmitter Power Control (ATPC) 54
 - 5.4.4 Switch Protection Hot/Standby Test (1+1 configuration) 54
 - 5.4.5 Hop stability test with Ethernet traffic 55
 - 5.5 Final Configuration Set-up 56
- 6 SAFETY/EMC/ESD RULES AND EQUIPMENT LABELLING 58
 - 6.1 First Aid for Electric Shocks 58
 - 6.2 Artificial Respiration 58
 - 6.3 Treatment of Burns 60
 - 6.4 Safety Rules 60
 - 6.4.1 General Rules 60
 - 6.4.2 Warning for electrical safety 61
 - 6.4.3 Microwave radiations 62
 - 6.4.4 Dangerous material 62
 - 6.4.5 Risk of explosion 63
 - 6.4.6 Heat radiating mechanical parts 63
 - 6.5 EMC norms 63
 - 6.6 ESDS Precautions 64
 - 6.7 Equipment labels 65
 - 6.7.1 ODU labels 65
- 7 APPENDIXES 67
 - 7.1 Appendix 1 – Antenna alignment procedure 67
 - 7.1.1 Fine antenna alignment (integrated antenna) 67

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ED	02		ZZZAY00001AA IM E	4/78
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7.1.2 Fine antenna alignment (not integrated antenna) 68

7.2 Appendix 2 – Connectors Data Sheet 69

7.3 Appendix 3 – Cable specifications 74

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ED	02		ZZZAY00001AA IM E	5/78
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TERMS, ACRONYMS AND ABBREVIATIONS

Acronym or term	Explanation
AGC	Automatic Gain Control
AIS	Alarm Indication Signal
ALL	Urgent Alarm
APS	Application Software
ATPC	Automatic Transmit Power Control
BATT	Battery
BER	Bit Error Rate
BIP	Bit Interleaved Parity
CCDP	Co-Channel Dual Polarization
CK	Clock
CoS	Class of Service (802.1p)
CPM	Continuous Phase Modulation
CRC	Cyclic Redundancy Check
CT	Craft Terminal
DSCP	Differentiated Services Code Point
DTMF	Dual Tone Multi Frequency
EMC	Electromagnetic Compatibility
EOW	Engineering Order Wire
ES	Errored Seconds
ESDS	Electro Static Discharges Sensitive
ETH	Ethernet
ETSI	European Telecommunication Standard Institute
FE	Fast Ethernet
F&C_GUIDE	Feature&Configuration_Guide
FER	Frame Error Ratio
FTP	File Transfer Protocol
GND	Ground
GUI	Graphical User Interface
HSB	Hot Stand-By
HW	Hardware
I/F	Interface
IDU	In-Door Unit
IEEE	Inst. Electrical & Electronic Engineer.
IN	Input

ED	02		ZZZAY00001AA IM E	6/78
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IP	Internet Protocol
ITMN	Installation and Test Manual
ITU	International Telecommunication Union
IVL	Independent VLAN Learning
Jumbo Frame	Ethernet frame longer than 1522 bytes
LAN	Local Area Network
LED	Light Emission Diode
LOF	Loss Of Frame
LOG	Event and Command Logger
LOS	Loss Of Signal
MAC	Media Access Control
MIB	Management Information Base
ODU	Out Door Unit
OMN	Operator Manual
OS	Operation System (network management)
OUT	Output
PC	Media Access Control
PHY	Physical Ethernet Interface Function
PoE	Power over Ethernet
PRx	Receive Power
PTx	Transmit Power
QoS	Quality of Service
RADIUS	Remote Authentication Dial In User Service
RCC	Remote Control Channel
RCT	Remote Craft Terminal
RDI	Far End Remote Failure
RF	Radio Frequency
RoHS	Restriction Of Hazardous Substances
RSSI	Receive Signal Strength Indicator
RTPC	Remote Transmit Power Control
RX	Receiver/Received
SLAAC	Stateless Address Auto-configuration
SNMP	Simple Network Management Protocol
SSM	Synchronization Status Messages
SWR	Software Version Release
SW	Software
TMN	Telecommunication Management Network
TX	Transmitter/Transmitted

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ED	02		ZZZAY00001AA IM E	7/78
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VAC	Voltage Alternating Current
VCO	Voltage Controlled Oscillator
VDC	Voltage Direct Current
VLAN	Virtual LAN
WARN	Warning Indication or Non-Urgent Alarm
XPIC	Cross Polarization Interference Cancellation
Y-Terminal	Local Craft Terminal

1 Foreword

1.1 Customer documentation organization

The Customer Documentation for Y-Packet SWR 1.3.x. High Capacity Ethernet over Radio System is subdivided into the following documents:

- ZZZAY00002AA FCE [Feature&Configuration_Guide](#)

The [Feature&Configuration_Guide](#) gives an overview of the application, composition, performance, features, interfaces, functions and maintenance of the Y-Packet product.

It also contains the most important technical data.

The [Feature&Configuration_Guide](#) does not contain instructions for installing.

- ZZZAY00001AA IME [Installation and Test Manual \(ITMN\)](#)

The [Installation and Test Manual ITMN](#) contains instructions about mounting, connecting and commissioning the Y-Packet product, connecting and commissioning the Y-Terminal operating terminals.

ED	02		ZZZAY00001AA IM E	9/78
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1.2 Service and technical support

For customer service and technical support, contact the Technical Help Desks listed below.

CONTACT	DETAIL
Techsupport@youncta.com	E-mail address for first contact; will process the request and forward to department of competence
https://youncta.zendesk.com	Knowledge base of product and portal for technical assistance

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ED	02		ZZZAY00001AA IM E	10/78
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1.3 Regulatory issues

1.3.1 Intended Use

The **Y-Packet** (C and F versions) is classified under the R&TTE Directive 99/5/EC as a class 2.8 radio (microwave fixed link) product.

Band (GHz)	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Iceland	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Norway	Poland	Portugal	Romania	Slovak Republic	Slovenia	Spain	Sweden	Switzerland	United Kingdom
6L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6U	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
07	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
08	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
18	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
26	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
28	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
38	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 1-1; Equipment & Country Availability Matrix

YOUNCTA S.R.L. intends to market this product where an 'v' is shown.

NOTE: It should be noted that a license to operate this equipment is likely to be necessary, and the appropriate regulatory administration should be contacted.

1.3.2 Adaptive modulation rules

In case of a configuration with **adaptive modulation** enabled is recommended to keep the functionality **ATPC** enabled to always allow the maximum system gain.

1.3.3 Use of Unlicensed Bands (only with ETSI configuration)

Special regulations apply to the use of **Y-Packet 17 GHz** (C and F versions) and **Y-Packet 24 GHz** (C and F versions) in the unlicensed frequency bands 17,1 – 17,3 GHz and 24,00 – 24,25 GHz in EU countries: specifically they must conform to the applicable regulations for the Equivalent Isotropic Radiated Power (EIRP) and therefore the Max allowed Transmit Power is equal to EIRP limit - antenna gain + cable loss.

Limits of EIRP and applicable regulations are shown on ERC/REC 70-03:

- 100mw (+ 20dBm) for frequency band 17,10 – 17,30 GHz and 24,00 – 24,25 GHz

Operators should note that regulations are subject to change.

In order to be compliant with such regulations YOUNCTA strongly suggests to use antennas with diameter equal or less than **0.3m** (1ft).

In case of 24 GHz the max antenna diameter recommended is **0.2m**.

Y-Packet 17 GHz equipment may be used in the following EU states and EFTA countries: AUT, BEL, BUL, CZE, DNK, EST, FIN, GRC, ISL, IRL, I, LVA, LIE, LTU, LUX, MLT, HOL, NOR, POL, POR, ROU, SUI, S, (HNG, planned).

Y-Packet 24 GHz equipment may be used in the following EU states and EFTA countries: AUT, BEL, BUL, CZE, CYP, DNK, EST, FIN, D, GRC, HNG, ISL, IRL, I, LVA, LIE, LTU, LUX, MLT, HOL, NOR, POL, POR, ROU, SVK, SVN, E, SUI, S, (F, G, limited implementation). (REC7003e Annexes 1 : date 7 Feb 2014)

1.3.4 Declaration and Marking

Hereby, YOUNCTA S.r.l , declares that this Y-Packet system is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at www.YOUNCTA.com

Equipment marking (CE-Marking, NB-Identification Number, Alert-sign).

All the equipment except the Y-Packet 17 GHz are marked as follow:



Y-Packet 17 GHz is marked as follow:



ED	02		ZZZAY00001AA IM E	12/78
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1.4 Purpose of the document

The document aims at providing information needed to install equipment of Y-Packet series and to activate it. The manual has to be used by the customer together with the other manuals (Feature&Configuration_Guide).

Handbook contents are:

- Mechanical installation of PoE and ODU elements
- Mechanical installation and pre-positioning of antenna
- Deployment of IDU – ODU cable
- Line up instructions

The handbook doesn't include any technical information for which you can refer to the [Feature&Configuration_Guide](#).

1.5 Handbook structure

The handbook is structured in four basic parts:

- Handbook guide part providing information about the document and identified by chapter **1**
- Installation part providing information for a proper installation of all the parts composing the system in a radio station and described in chapters **2-3-4**
- Line up and commissioning part dedicated to information needed to start the system to operate and to carry out acceptance tests referred in chapter **5**
- Recommendation and reference rules summarized in chapter **6**
- Appendix with antenna alignment descriptions and cables/connectors details in chapter **7**

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2 Unpacking, Warehousing, Repacking

2.1 General

This chapter supplies all information on packing, warehousing and repacking of the supporting frame, shelf, sub rack and cards, i.e. all purchased parts.

Quality standards prescribe several types of packing to protect the equipment against mechanical and climatic stress. The type of packaging chosen for Y-Packet series is built by Carton boxes for any kind of transport way (road, rail, airplane and ship) to Europe or outside Europe.

The packaging is in Carton boxes: typically is for station (ODU, IDU, and kits).

International symbols are printed on the sides of packing:



Identifies this side up during transport



Fragile



Keep dry

Furthermore the following information are grouped on packing labels:

- trade mark and sender
- part number
- description
- serial number
- operating frequency range (TX)
- customer order reference

2.2 Preliminary Checks

Upon receipt, check packing has not been damaged during transportation.

If it has, contact the company's representative or the shipping agency and inform them of the damage.

Make sure the final destination is that printed on the packing.

After unpacking check the equipment so as to be sure it has not been damaged during packing, transport and unpacking. In particular perform a visual inspection of the equipment being complete.

ED	02		ZZZAY00001AA IM E	14/78
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2.3 Unpacking

It is recommended to unpack the material only when it is actually installed and used.

Anticipating unpacking may be necessary should the packing show damage.

Anyway, whenever possible, materials should remain in their plastic protection bags.

Unpack in sequence of use, thereby ascertaining that the material is in excellent state.

Carefully manage packing so that it may be used again for repacking if necessary.

Remove the equipment from packing, thereby avoiding operations that might damage the material or be harmful to the personnel involved.

To unpack proceed as follows:

- ensure that the packing has been properly positioned, refer to the symbol
- open the case
- remove the shockproof material
- remove the goods from the case
- remove protecting plastic bags including those containing accessories
- ensure that goods are not damaged and that they correspond to those indicated on the packing list enclosed in the envelope.

In case of discrepancy, contact the agency's representative.

Note: When unpacking handle the packing material with care; it might be reused for packing again if equipment must be reshipped.

2.4 Warehousing

Some considerations have to be made when warehousing the packed equipment:

- duration
- temperature
- environment

Duration should not exceed 12 months. Temperature should range from -20 to +55°C.

Considering that Y-Packet is shipped using cardboard boxes package it should be warehoused inside ventilated buildings and not too cold or humid.

The packing is provided with shipping details required to identify the packed material.

Should the packing be damaged due to previous shocks it is recommended to unpack before warehousing the material.

ED	02		ZZZAY00001AA IM E	15/78
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2.5 Repacking

Before proceeding to repacking, it is recommended to carefully clean the equipment, protect the external connectors and perform packing in a dry, ventilated and clean place.

Usually, packing is suitable both for transportation and for warehousing the material.

Generally, packing takes place in the following steps:

- Place the material in a plastic protection bag with appropriate closure.
- Use of appropriate material such as stir flex chips, polyurethane etc. to protect the material against shocks and shifting inside packing during transportation.
- Provide the packing sides with any shipping details and indications necessary to identify the material.

Should it be necessary to send back the material to the Company, repacking may also be performed by the customer, thereby reusing the packing material.

ED	02		ZZZAY00001AA IM E	16/78
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3 Pre-installation checking

3.1 Basic equipment elements check

3.1.1 Outdoor Units



Figure 3.1-1: ODU standard view



Figure 3.1-2: ODU with optical interface view

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ED	02		ZZZAY00001AA IM E	17/78
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3.1.2 Indoor Units



Figure 3.1-3: EU power supply cable 220V



Figure 3.1-4: PoE AC/DC View



Figure 3.1-5: PoE DC/DC View

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3.1.3 Pole/Wall Mounting Installation Hardware



Figure 3.1-6: Integrated antenna1+0 mounting

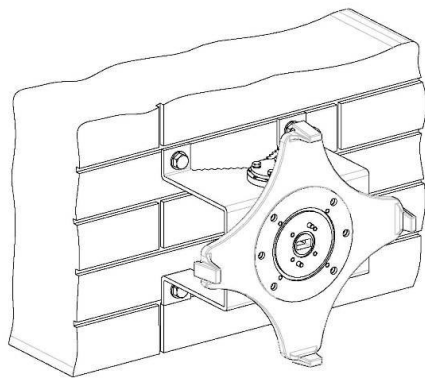


Figure 3.1-7: ODU Supporting Frame 1+0 wall mounting (Not integrated antenna)

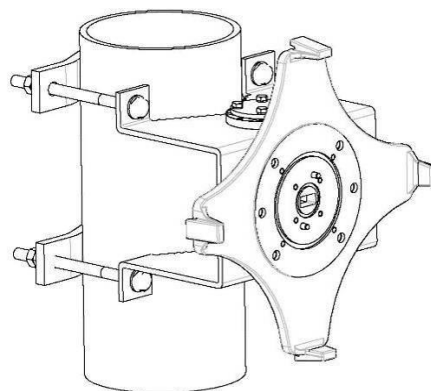


Figure 3.1-8: ODU Supporting Frame 1+0 pole mounting (Not integrated antenna)

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ED	02		ZZZAY00001AA IM E	19/78
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Figure 3.1-8: Integrated antenna1+1 / XPIC mounting

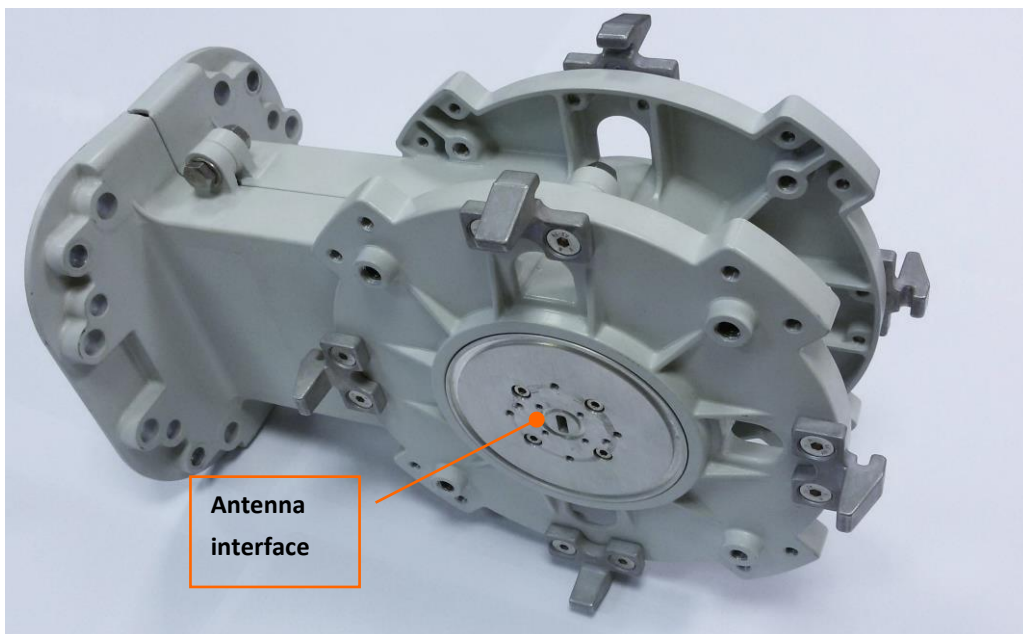


Figure 3.1-9: ODU Supporting frame 1+1 with RF coupler view (compatible with 1+0 integrated antenna support)

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ED	02		ZZAY00001AA IM E	20/78
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3.1.4 Installation and maintenance Tools

The following table lists the tools required for IDU and ODU installation and maintenance activities.

Description	Details	Q.ty
Electrician's scissors		1
Electronics cutter		1
Short flat nose pliers		1
Universal knife		1
Screwdrivers set	3 cutting e 2 cross (Ph 1 e 2)	5
Douple open ended spanners set	5x5,5; 6x7; 8x9; 10x11; 12x13; 14x15; 16x17; 18x19; 20x22; 21x23; 24x26, 27x32	12
Allen head wrenches set	3; 4; 5; 6; 8; 10	6
Combination pliers		1
Inox tweezers for electronics		1
Crimping pliers for RJ45 modular terminals		1
Electrician's insulation tape		1
Antistatic elastic bracelet with spiral cord for grounding connection		1
Cable ethernet Cat.5e conn. RJ45 Terminal connection)	(for Y-	1

Table 3.1-1: List of Installation and maintenance Tools

4 Outdoor Unit Installation

4.1 General

ODU unit is designed for assembly either with an integrated antenna connected directly to the outdoor equipment, or with non-integrated antennas and can be mounted with right hand (RH) offset or left hand (LH) offset respect to the pole.

In all cases the antenna connector mainly allows the installer to realize fast, safe and robust mechanical / electrical connection between the ODU and the antenna (integrated or non-integrated versions).

In the bottom Fig 4.1-1 the pictures of ODU cabinet is shown pointing out the access interfaces:

- ODU Signal Interface
- Receive Signal Strength Indicator
- ODU-to-ODU channel

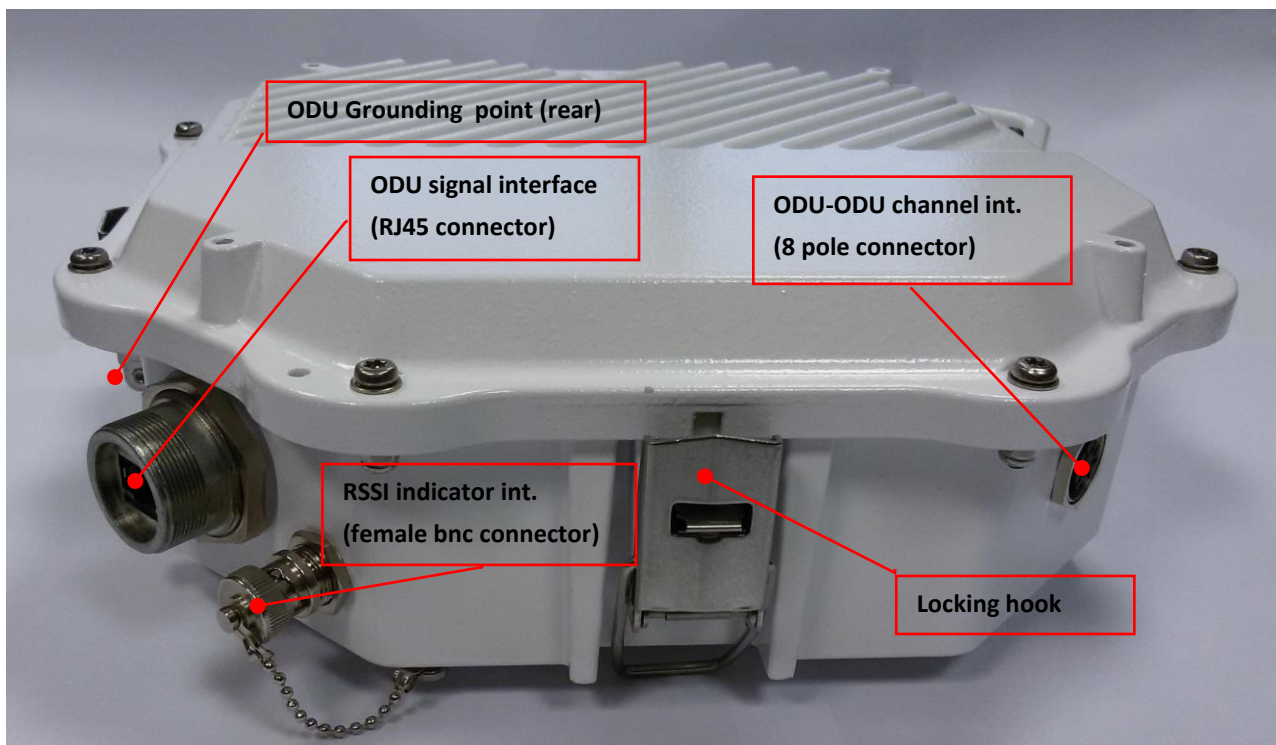


Figure 4.1-1: ODU view (simple cover)

The following additional interfaces (in a dedicated cover) are available with Y-Packet Optical Version:

- FO GE 1000Base SX Signal Interface
- Power Copper Supply interface

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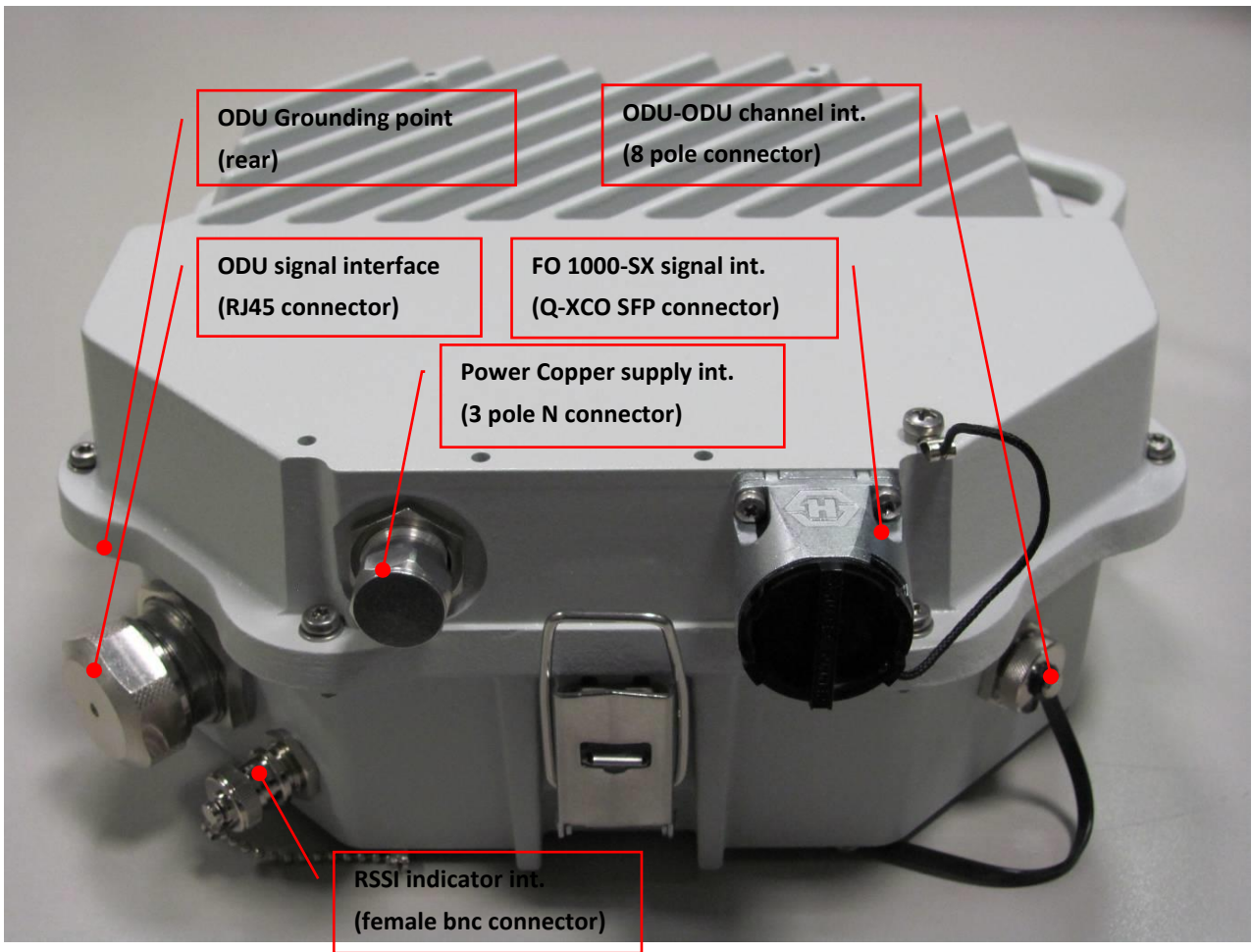


Figure 4.1-2: ODU with optical interface view (dedicated cover)

The reference documents to the homologated cables to use, kit Connectors and dedicated kit connection cables are visible in the Appendix 2 and Appendix 3 of this document.

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Connectors description:

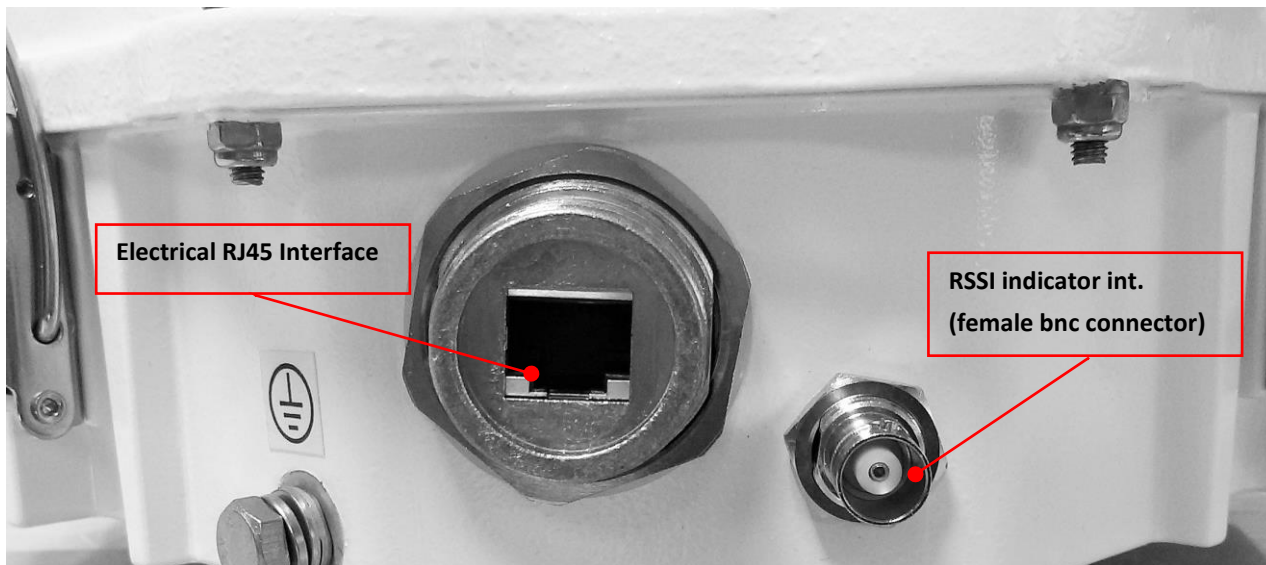


Figure 4.1-3: ODU electrical RJ45 interface and RSSI interface view

- **ODU GE interface (Ethernet Cable)**

The user data traffic is composed of an Ethernet Frames stream according to IEEE 802.3..

The physical interface is a RJ45 connector (ETH). The pin assignment is reported in Table 4-1.

PIN	Signal	Description
1	ETH_A-	ETH_A, ETH_B, ETH_C and ETH_D are the four bidirectional Data signals according to 1000BaseT standard. Power feed according to different Alternatives of 802.3at
2	ETH_A+	
3	ETH_B-	
4	ETH_C-	
5	ETH_C+	
6	ETH_B+	
7	ETH_D-	
8	ETH_D+	

Table 4-1: User/Network Interface 1000Base-T: pin assignment

- **Power Interface from Battery**

The PoE Injector is the input for the power to supply the whole system. Alternatively the system can be powered by a PoE integrated in the User Equipment. The PoE injector has a power input from a -48Vdc source (battery) or alternatively from mains. The PoE Injector is a commercial device and connectors can be different according to the type used.

The nominal primary input voltage has to be **- 48 Vdc** (range -40.5 V to -57.6 V) and with grounded positive conductor. The power supply characteristics has to comply with ETSI EN 300 132-2 v2.1.2.

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- **RSSI Interface**

RSSI (Received Signal Strength Indicator) interface allows the installer of the ODU to get information about the received RF signal level. A standard (portable) voltmeter can be used as measuring instrument. (Main technical characteristics in Table 4-2).

Parameter	Value	Notes
Connector type	female BNC, 50Ω, waterproof	Waterproof cap must be available
Waterproof level	IP 65	
Output voltage range	0.5 V ÷ 4.0 V	
Output impedance	> 10kΩ	
Nominal sensitivity	0.5V / 10dB	
Slope	positive	
Reference points	+4.0 V @ P _{RX} = -20dBm +0.5 V @ P _{RX} = -90dBm	Over the temperature/humidity range of the ODU climatogram and over the whole frequency range.

Table 4-2: RSSI interface characteristics

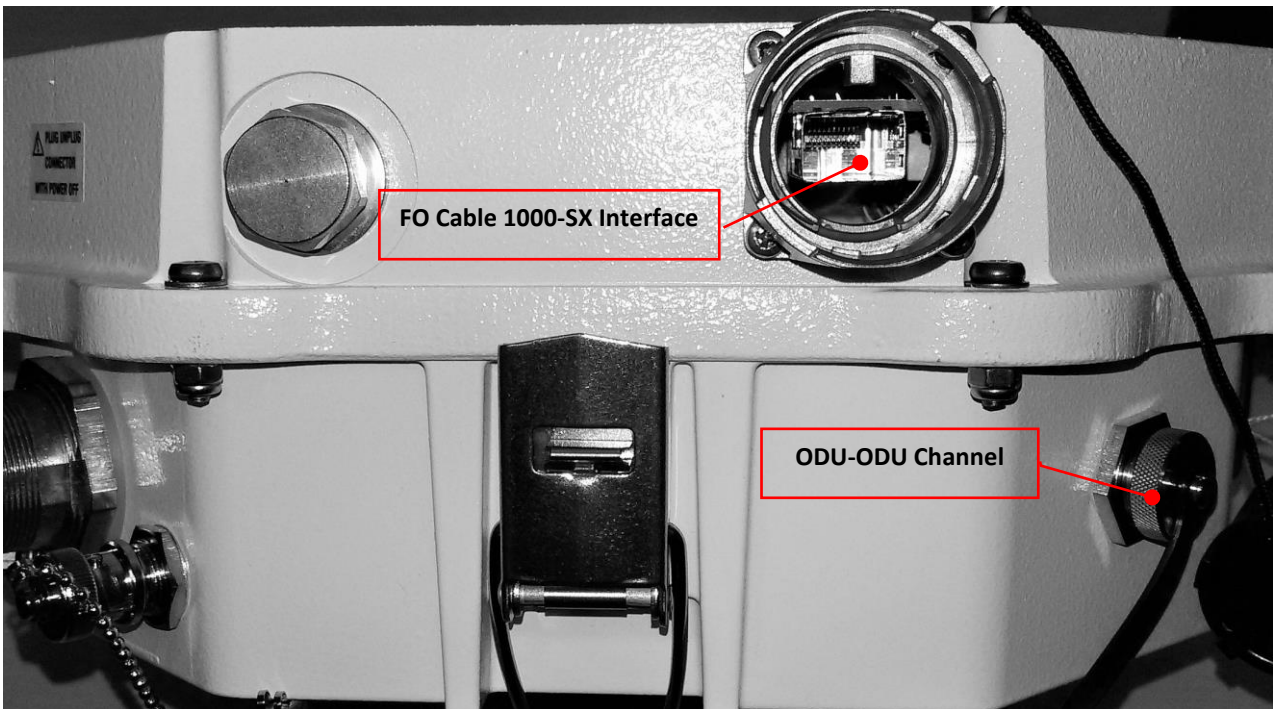


Figure 4.1-4: FO cable interface and ODU-ODU Channel interface view

- **FO Cable Interface**

This interface (available only on O-ODU) supports the connection with an SFP module and the FO Cable used with O-ODU to connect the Customer’s equipment.

A standard 20 pin SMT SFP connector and cage (compatible with SFP MSA Compliant Modules) is used to plug-in the SFP module on the Optical daughter board.

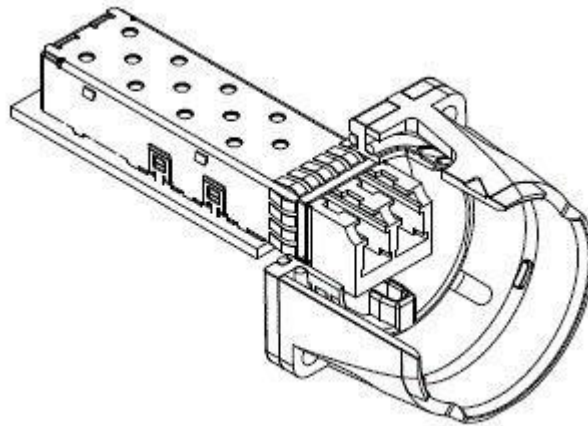


Figure 4-1: FO Cable interface to the O-ODU

- **FO Cable**

It is required for O-ODU to connect the ODU to the Customer’s equipment with an optical GE interface according to 1000Base-SX standards.

In the ODU the cable is terminated with a SFP module (to be provided separately) which is inserted in a standard MSA SFP connector on the Optical Daughter board. (see Fig. 4-1). The technical characteristics of the connector are detailed in Appendix 3.



Figure 4-2: FO Cable

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- **ODU/ODU Channel interface**

This interface supports the signals between the two ODU in 1+1 or 2+0 configurations. Two bidirectional signals are transmitted using 4 balanced pairs of a cat.6S cable for outdoor applications (see Table 4.3) implementing :

- a channel to transfer I/Q samples (I/Q)
- a channel to transfer control and traffic data (Data)

The Cable is cross connecting Tx on Side ODU1 to Rx on Side ODU2 and viceversa.

Side ODU1	Side ODU2	Description
Pin 1/4	Pin 8/6	I/Q samples ODU1 to ODU2
Pin 2/5	Pin 7/3	I/Q samples ODU2 to ODU1
Pin 7/3	Pin 2/5	Data ODU1 to ODU2
Pin 8/6	Pin 1/4	Data ODU2 to ODU1

Table 4-3: ODU-to-ODU Interface (RJ45 waterproof connector)

- **ODU-to-ODU Cable**

It is required to connect the two ODU of 1+1 or 2+0 configurations, carrying the following signals:

1. I/Q samples from one ODU to the other in order to perform Cross channel Interference Cancellation (XPIC) or Signal Combination (SD configuration).
2. Data Ethernet traffic to perform signal protection in 1+1 or XPIC configurations. In the same signal a control channel is implemented between the controllers of the ODU to exchange control and monitoring information.

The cable is a standard Ethernet twisted multipair cable, S-FTP 26 AWG Cat.7 for outdoor application (temperature range -33° C to +55° C). It operates at 1.6 Gbit/s and can operate with a max length of 1 m without performance degradation.

The cable is cross with external waterproof connectors (C91Amphenol – 8 pin) at both sides and the shield is connected to earth/ground to prevent overvoltage

Table 4-2 shows how each pair is used and the pin assignment on the ODU external connector.



Figure 4-3: ODU-to-ODU Cable

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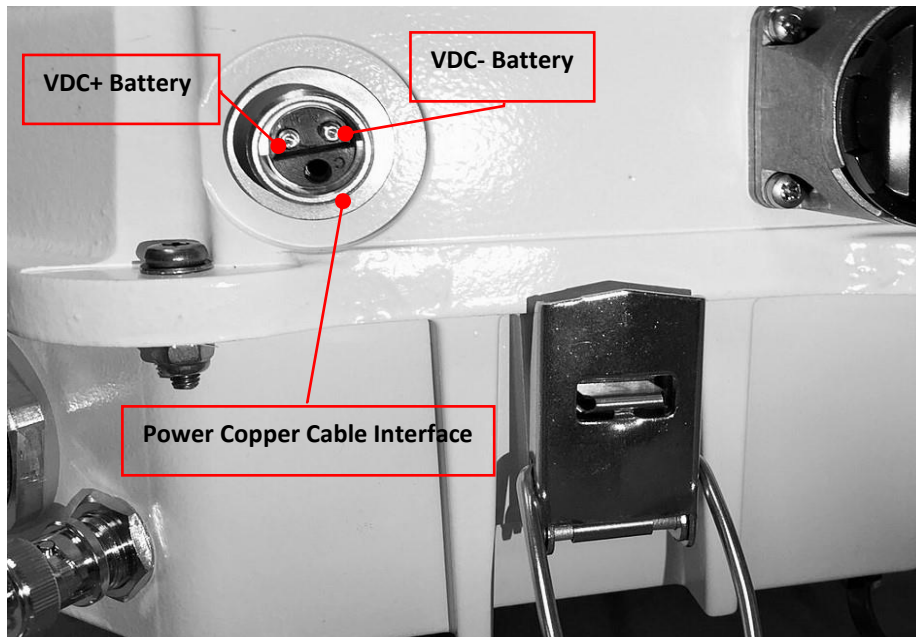


Figure 4.1-5: Power Copper Cable Interface

- **Power Copper Cable Interface**

This interface (available only on O-ODU) supports the connection with Power Cable, which directly feeds the ODU from a battery source. The nominal primary input voltage has to be **- 48 VDC** (range -40.5 V to -57.6 V). The power supply characteristics has to comply with ETSI EN 300 132-2 v2.1.2. The DC voltage at the input power interface of the O-ODU has to be in the range -36 V to -58V: the maximum current at min voltage is 1.2 A. A 3-wire standard connector is used (VDC+, VDC-)(Ground PIN not used).

- **Power Copper Cable**

This cable is required in case of O-ODU to feed the ODU if the PoE power interface on the Ethernet Cable is not available. In the indoor station the cable is directly connected to a -48 VDC battery. The cable is a shielded 2-wire copper cable. Min. AWG 13 wires must be used to support a maximum length of 300 m for the cable. The connector on the ODU is a waterproof connector. See Appendix 3 for details on the ODU interface.



Figure 4-4 : Power Copper Cable

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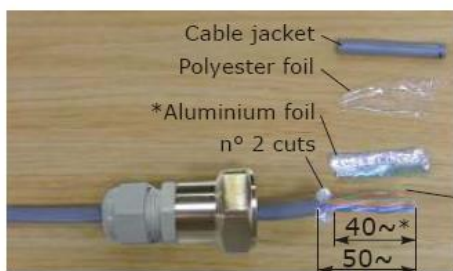
4.1.1 ODU signal cable assembly for threaded connector

In the following pages is showed the procedure to follow for the assembly of the ODU signal interface connection cable with threaded connector.



Material and tools necessary for the assembly:
cutting nippers, cutter, scissors, IDC tool for RJ-45, flat-nose pliers, paper adhesive tape.
Spanners: HEX 32mm and HEX 24mm.

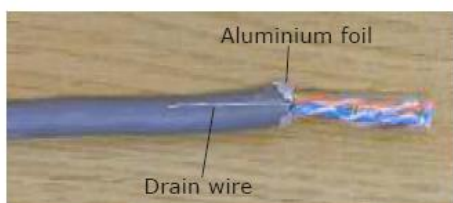
1 Connector (p/n 350.038.211) with RJ-45 male.



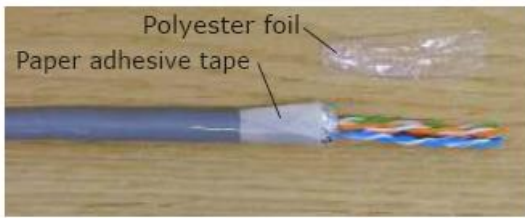
Slide the connector onto the cable as indicated.
Remove 50mm of cable jacket.
Remove the polyester foil and 40mm of aluminium foil.
Cut sideways (n° 2 cuts) the remaining aluminium foil.



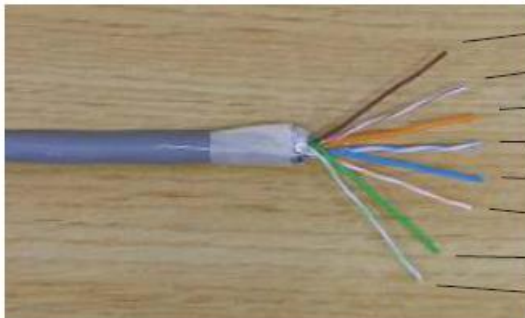
Flatten the cable with flat-nose pliers for ~5mm length.



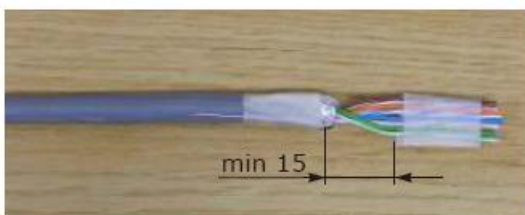
Fold back the two edge of aluminium foil and drain wire.



Block them all with paper adhesive tape as indicated. Remove the second polyester foil.



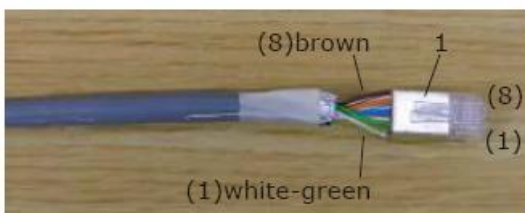
Free the twisted pairs and straighten the wires. Position the wires with the indicated colour sequence.



Keep the strands in a linear position and apply the paper adhesive tape at 15mm min. as shown.



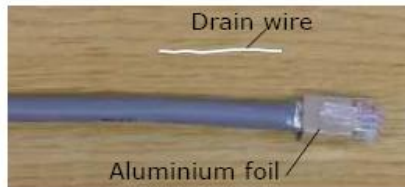
Cut the strands at a distance of 15mm perpendicular to the cable axis as indicated.



Check the correct sequence of the colours (1 to 8). Insert the cable into the RJ-45 connector pos. **1** until it reaches the bottom of the connector.

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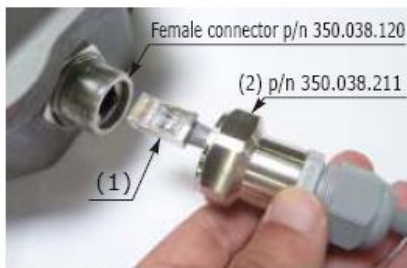


Position the sub-assembly into the IDC tool and crimp it. Remove excess of aluminium foil, cut the drain wire and remove the paper adhesive tape.

ELECTRICAL TEST TO CHECK THE CORRECT ASSEMBLY.

Insert the RJ-45 assembled connector into the RJ-45 female connector and check the continuity of the connections (included the ground contact) with opposite side of the cable.

In case of failure, cut the cable, just before the RJ-45 male connector and repeat the complete procedure.



Insert the RJ-45 connector pos. **1** into the female connector until complete mating (click sound effect).



Screw by hand the hexagonal of female connector body and tighten with spanner HEX 32 mm.



Screw by hand the clamp nut pos. **2a** in order to block initially the cable movement. Tighten the clamp nut until it stops with spanner HEX 24 mm.

CAUTION

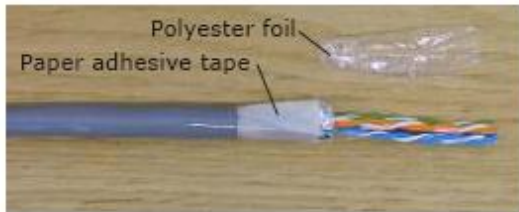
If you have to unmate the connector pos. **2**, the clamp nut must be loosened before unscrewing the connector.

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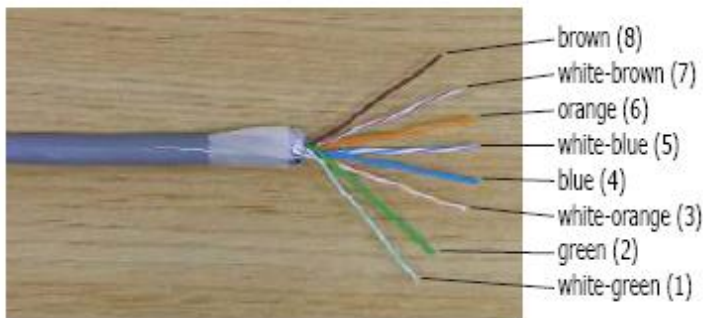
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4.1.2 IDU signal cable assembly

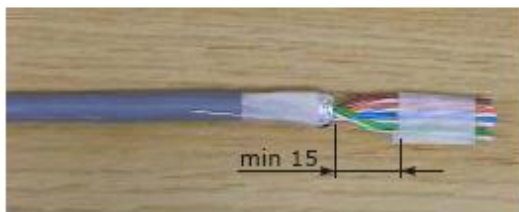
For assembly indoor connector follow this procedure:



Block them all with paper adhesive tape as indicated. Remove the second polyester foil.



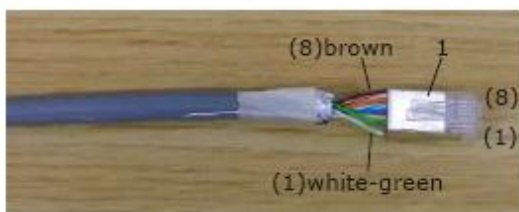
Free the twisted pairs and straighten the wires. Position the wires with the indicated colour sequence.



Keep the strands in a linear position and apply the paper adhesive tape at 15mm min. as shown.



Cut the strands at a distance of 15mm perpendicular to the cable axis as indicated.



Check the correct sequence of the colours (1 to 8). Insert the cable into the RJ-45 connector pos. **1** until it reaches the bottom of the connector.



Position the sub-assembly into the IDC tool and crimp it. Remove excess of aluminium foil, cut the drain wire and remove the paper adhesive tape. Areas which must be totally free of burrs or braid residues

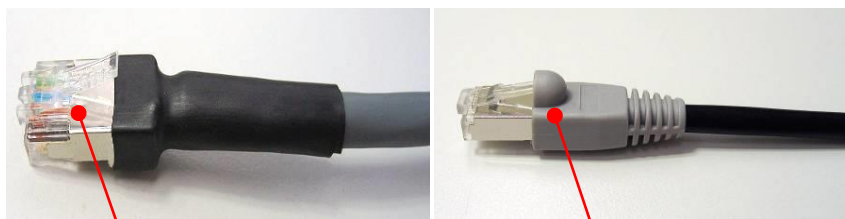


FIG. A

ELECTRICAL TEST TO CHECK THE CORRECT ASSEMBLY.

Insert the RJ-45 assembled connector into the RJ-45 female connector and check the continuity of the connections (included the ground contact) with opposite side of the cable.

In case of failure cut the cable, just before the RJ-45 male connector and repeat the complete procedure.



RJ45 plug for IDU connection with protection thermo-tube

RJ45 plug for IDU connection with protection boot

4.1.3 Typical installation layout and grounding criteria

Figure 4.1-6, 4.1-7 show the typical installation layouts and grounding for 1+0 system and Fig.4.1-8 for 1+1 systems, with not-integrated antenna.

Grounding connections affect separately three separated parts:

- the IDU units
- the ODU units
- the IDU – ODU cable

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As general criteria:

- implement grounding using insulated cable, while wiring should be kept as short as possible
- avoid long parallel paths between IDU/ODU cable and other electrical cables
- respect minimum bending radius of IDU/ODU cable suggested by the supplier
- make a drip groove where the cable enters the buildings to prevent water infiltration

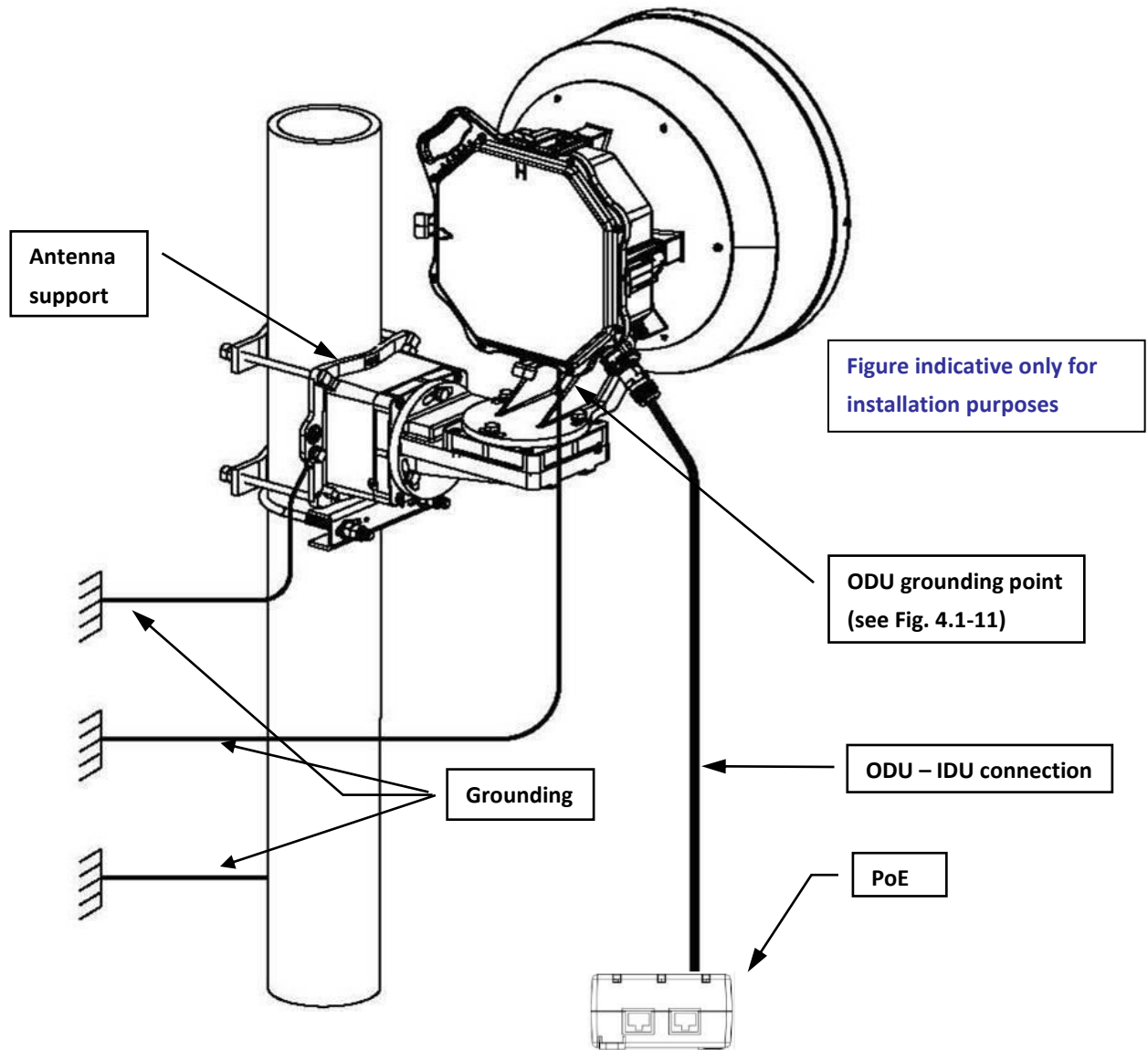


Figure 4.1-6 : Typical 1+0 ODU (simple cover) installation with integrated antenna

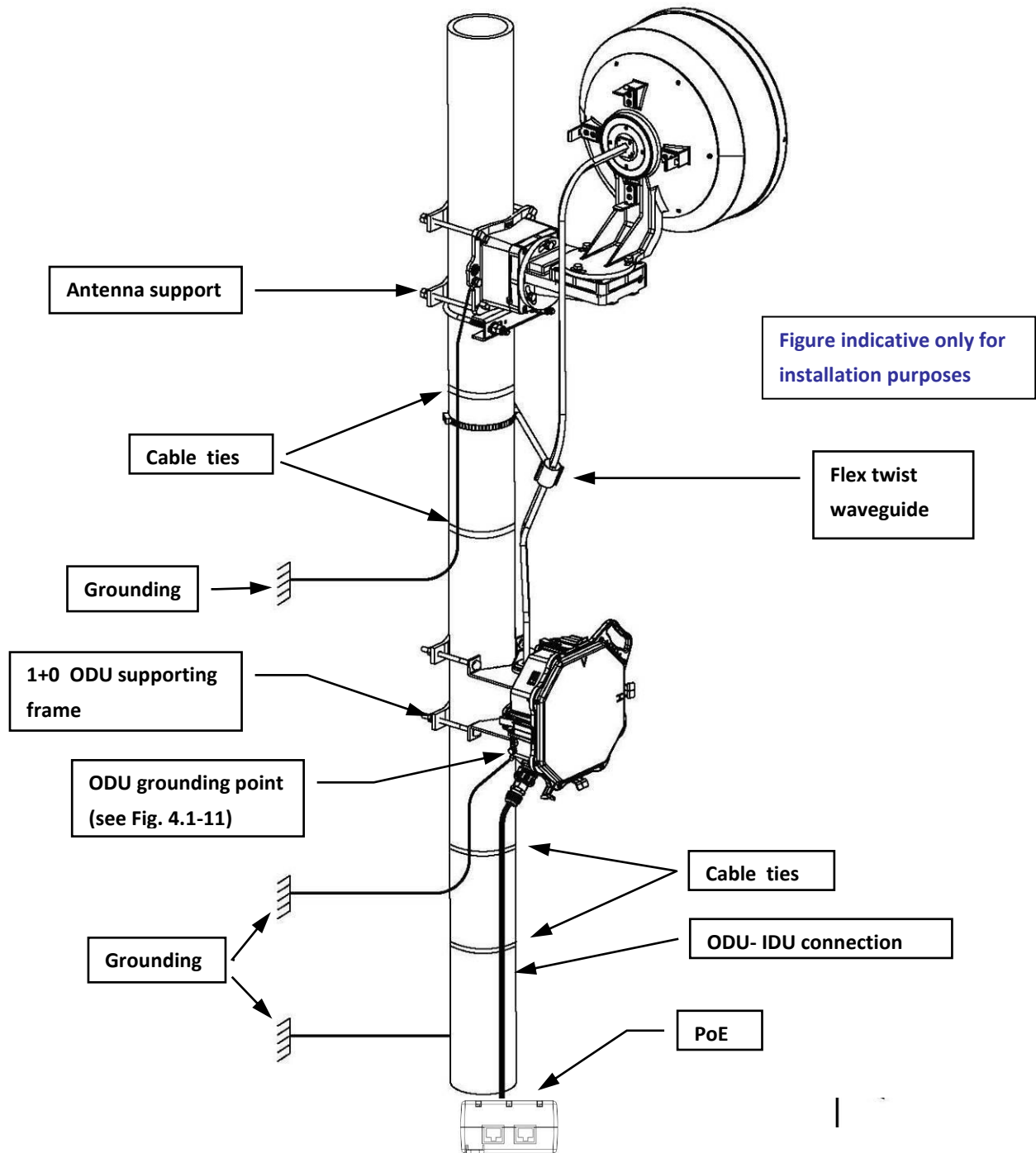


Figure 4.1-7 : Typical 1+0 ODU (simple cover) installation with not integrated antenna

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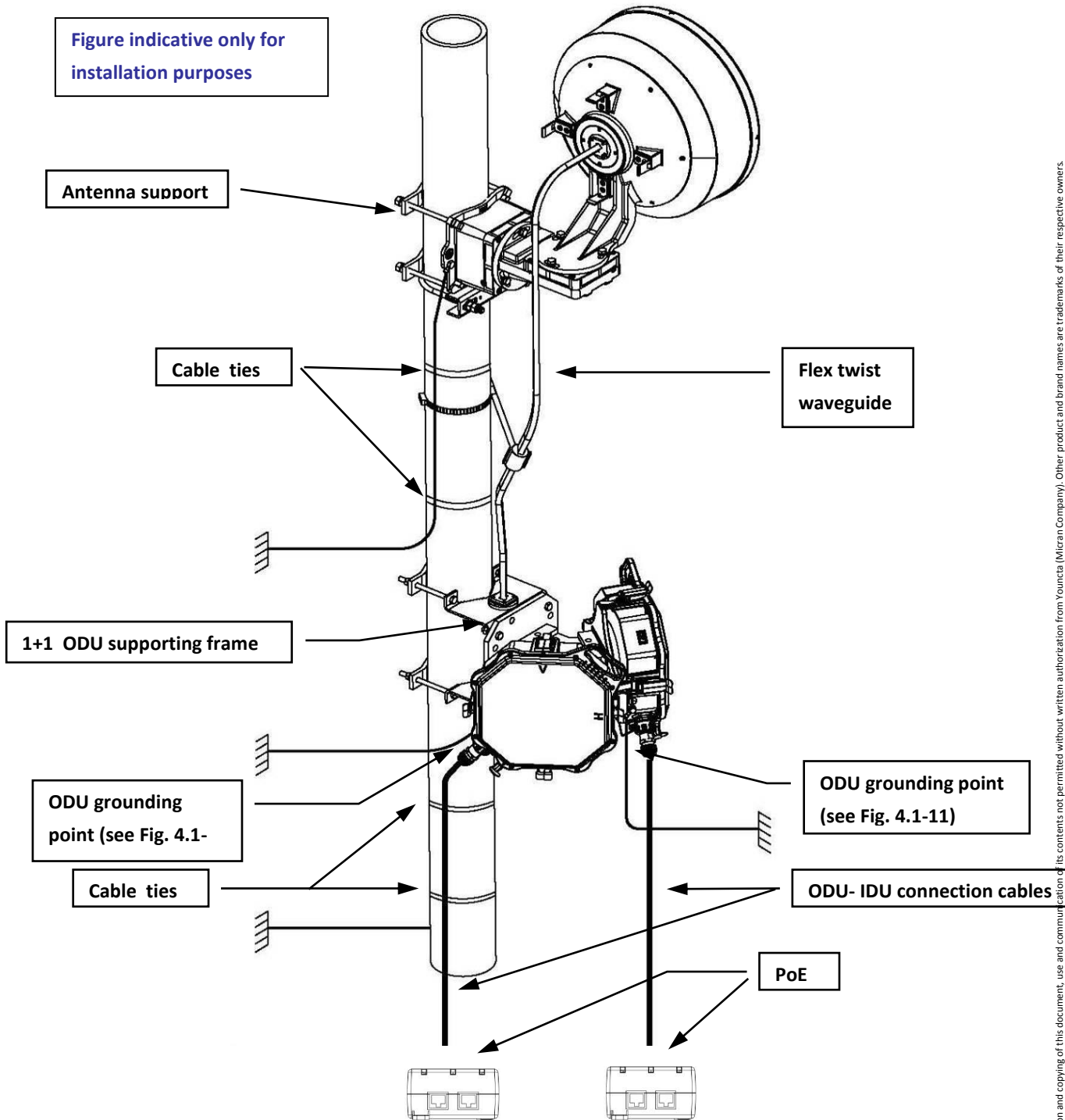


Figure 4.1-8 : Typical 1+1 ODU (simple cover) installation with not integrated antenna

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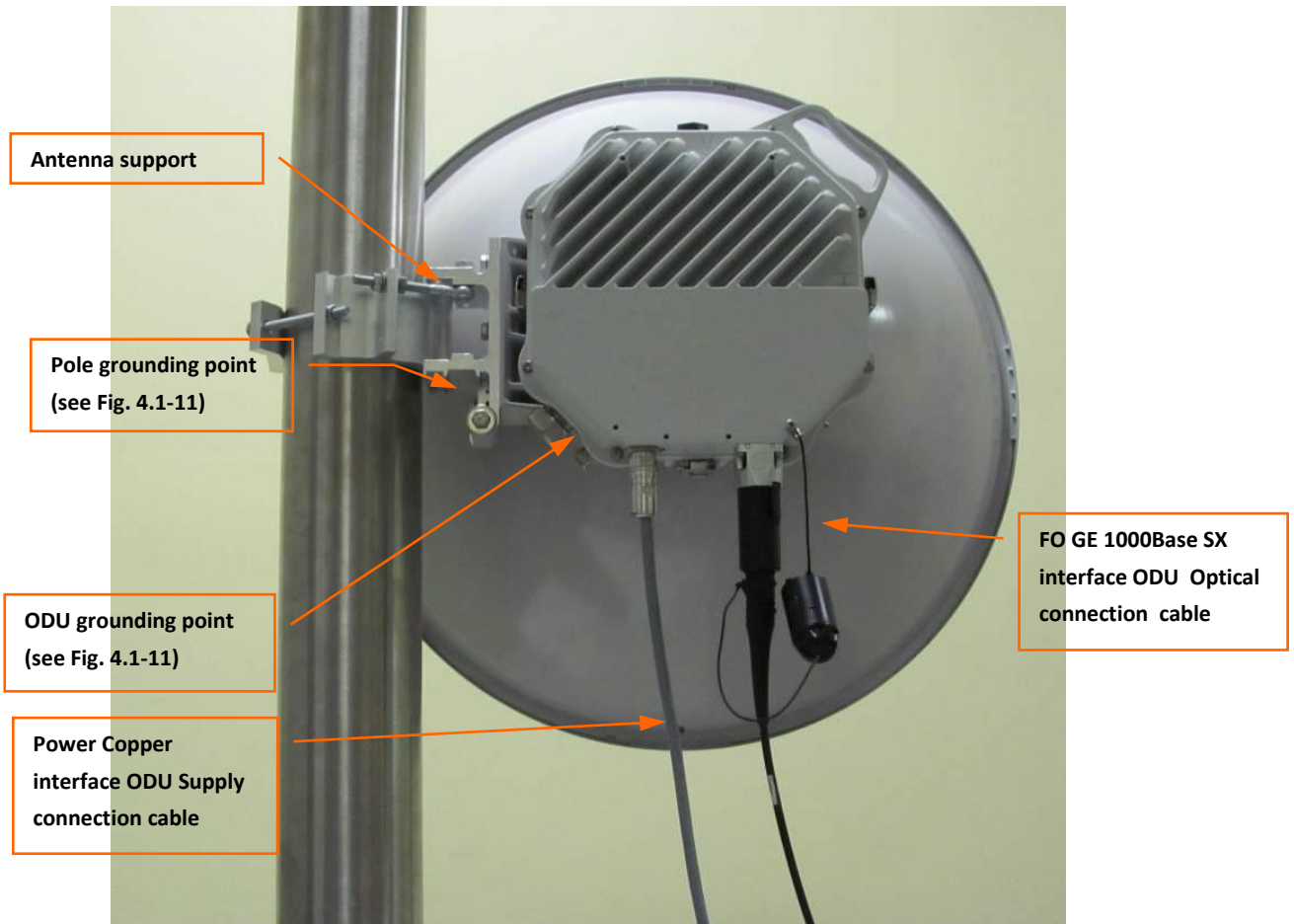


Figure 4.1-9 : Typical 1+0 OPT-ODU (dedicated cover) installation with integrated antenna



Figure 4.1-10 : Detail of ODU/ODU cable

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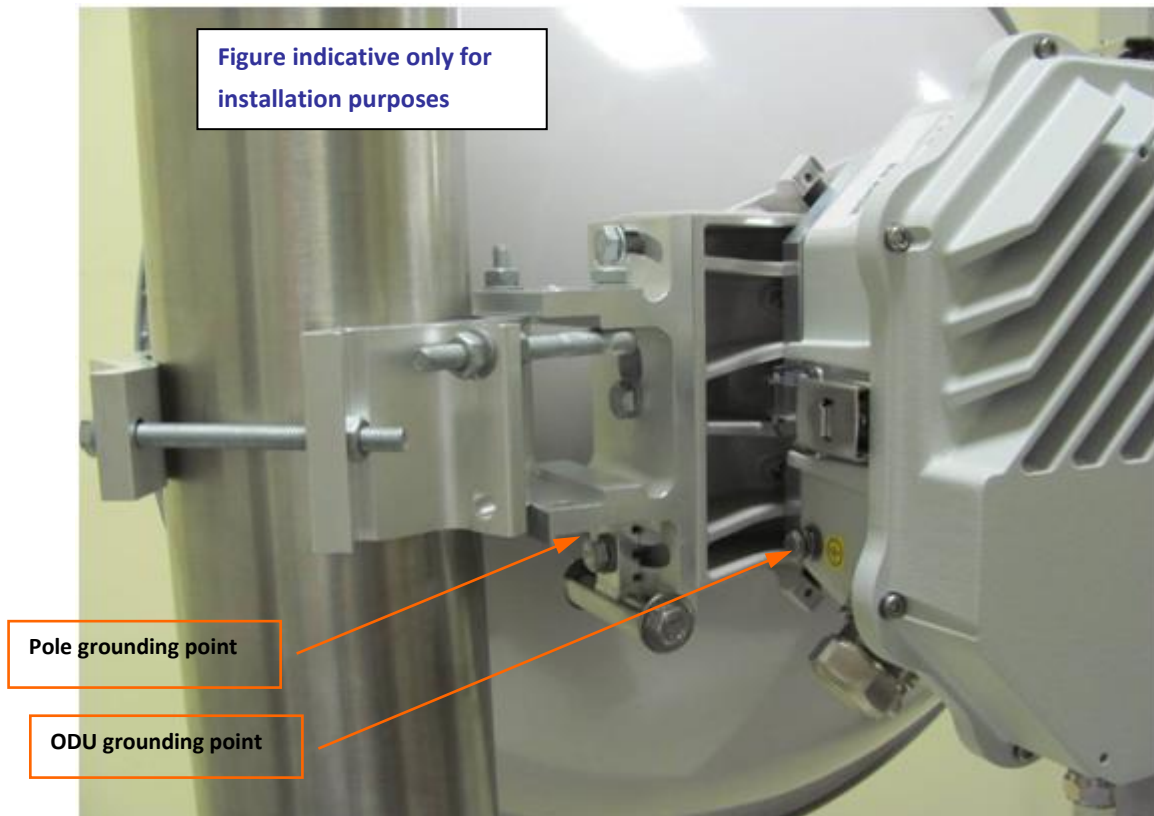


Figure 4.1-11 : Detail of ODU and Pole grounding points

4.1.3.1 Fixing the IDU/ODU cables

The various cables have to be fixed to the supporting pipe or pole by appropriate Cable ties.

4.1.3.2 Grounding on the ODU

The ODU grounding must be implemented connecting the ODU grounding point (see Figure 4.1-11) to the Pole grounding point (see Figure 4.1-11) with 'GROUNDING KIT for ODU'.

4.1.3.3 Grounding on the IDU

In case of rack installation the rack must be grounded by means of a connection to the protection ground terminal of the site using the top and/or bottom side grounding points.

For safety reasons this must happen before carrying out any other electrical connection.

The rack is grounded using a green/yellow insulated cable with a minimum cross sectional area of 16mm² terminated into the cable terminal.

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4.2 Installation of ODU 1+0 integrated to antenna

4.2.1 Required Part List

- Antenna
- Antenna support (pole mounting) and instructions (supplied by manufacturer)
- Antenna mounting hardware
- Outdoor Unit (ODU)



Figure 4.2-1 : ODU 1+0 integrated to antenna

NOTE: The devices can have different flange interface consistent with working frequencies and configurations, for this reason the pictures in this chapter are indicative only for the installation purposes . For the antenna installation follow the instructions in the antenna packaging.

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4.2.1.1 Antenna pre-pointing

The pole mounting allows two types of movements one on the horizontal plane (azimuth) and the other on the vertical plane (zenith).

During installation phase a pre-pointing action is performed, leaving final pointing to the commissioning phase.

- Horizontal pre-pointing (azimuth)

With reference to the figure operate on horizontal position coarse alignment B to place the antenna in horizontal plane according to the wished direction using a compass as standard instrument.

- Vertical pre-pointing (zenith)

With reference to the figure operate on vertical position coarse alignment A and on vertical fine alignment A1 to move the antenna in vertical plane according to the wished direction using again a compass as standard instrument.

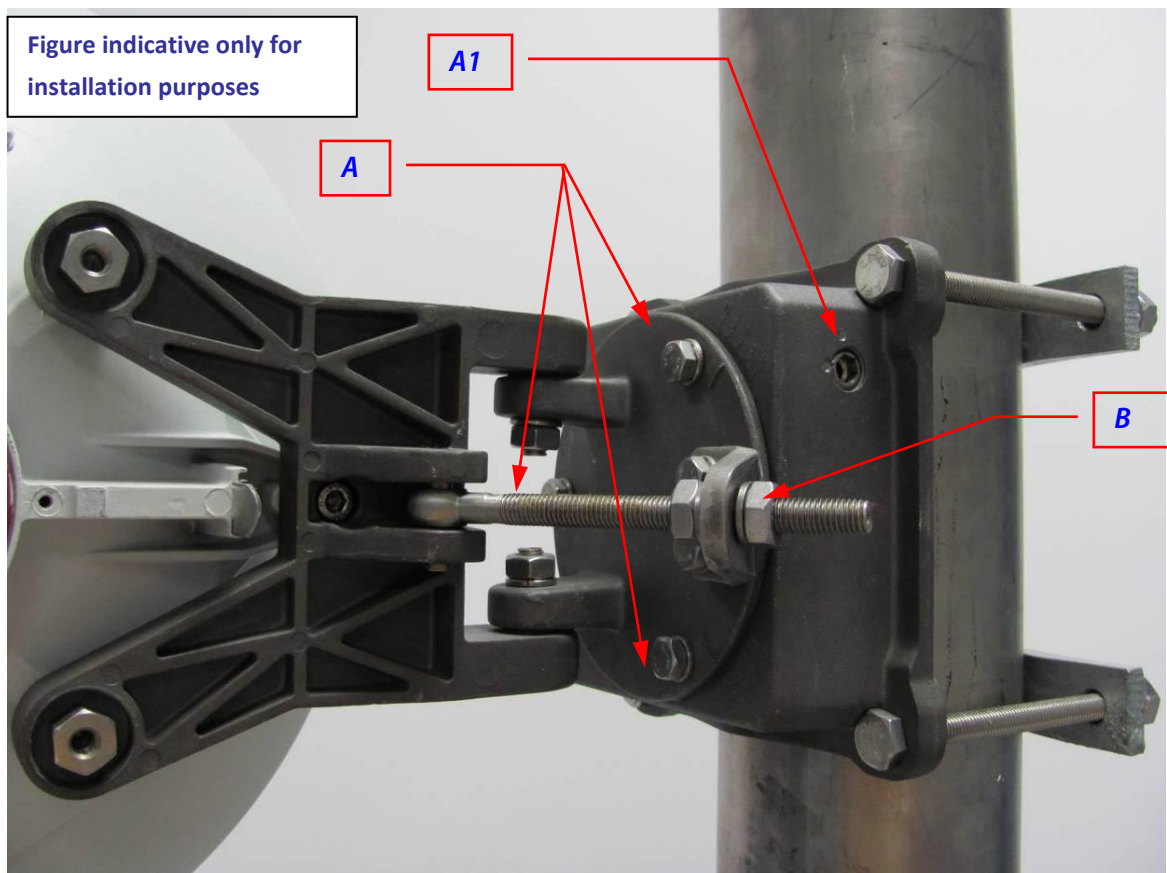


Figure 4.2-2 : Antenna horizontal and vertical alignment

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4.3 ODU 1+0 Installation with non-integrated antenna

4.3.1 Required Part List

- Antenna
- Antenna Support (pole mounting)
- Antenna Mounting Hardware and instructions (supplied by manufacturer)
- ODU Supporting Frame 1+0 (Pole/Wall mounting)
- Outdoor Unit
- Flexible waveguide, gaskets, and fasteners or standard waveguide and flanges

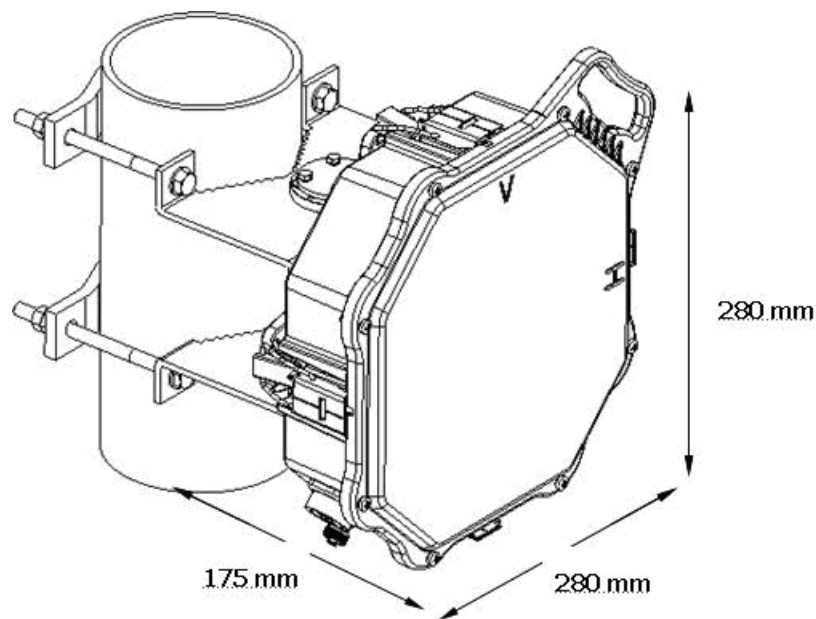


Figure 4.3-1 : Pole mounting assembly for ODU not integrated to antenna

NOTE: The devices can have different flange interface consistent with working frequencies and configurations, for this reason the pictures in this chapter are indicative only for the installation purposes . For the antenna installation follow the instructions in the antenna packaging.

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4.3.1.1 Installing ODU Supporting Frame on the pole/wall

- Position the bolts (1) and pole clamps (2) (see Fig.4.3-2) on the pole and fit the washers, nuts and lock nuts
- Orient the ODU Supporting Frame for the most comfortable connection with the external antenna and then tighten the nuts and secure the supporting frame to the pole.

The ODU Supporting Frame can be fixed to any pole or mast with a diameter between 75 and 115mm, but the diameter of **115 mm is the recommended one**; in case a smaller diameter pole care is required to guarantee the mechanical rigidity of the assembly.

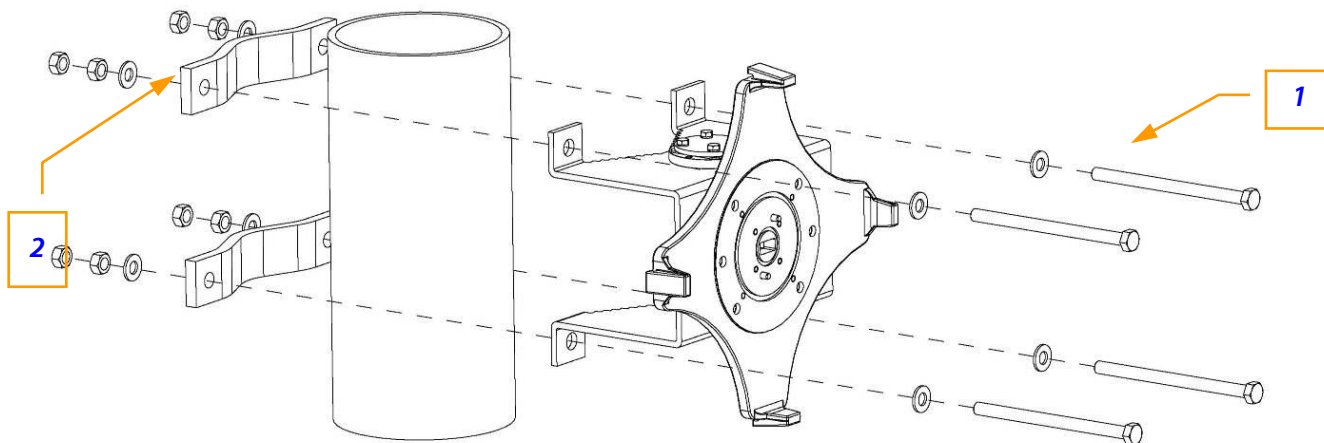


Figure 4.3-2 : Pole mounting installation for ODU not integrated to antenna

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4.3.1.2 ODU installation

Whatever is the mounting type either pole mounting (with Right offset or Left offset) or wall mounting carry out the following steps:

- Keep ODU unit by its handle and open the four locking hooks (1)
- Rotate the ODU to match either the vertical or horizontal polarization chosen on the antenna feed (vertical corresponds to V in the top part of ODU cover, while horizontal corresponds to H in top part of ODU cover)
- Insert the hooks on the dedicated brackets (2) of the ODU supporting frames
- Close the four hooks (1) securing the ODU unit to the relevant brackets.

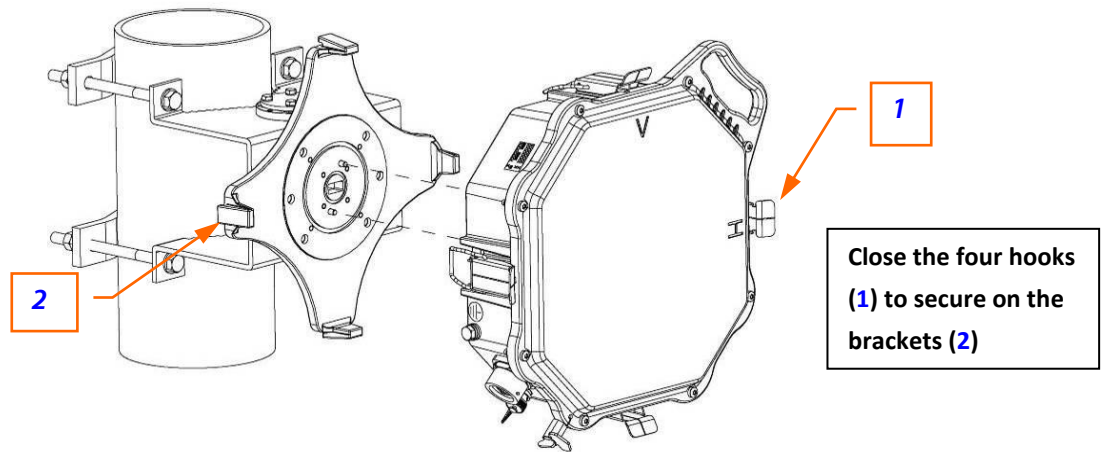
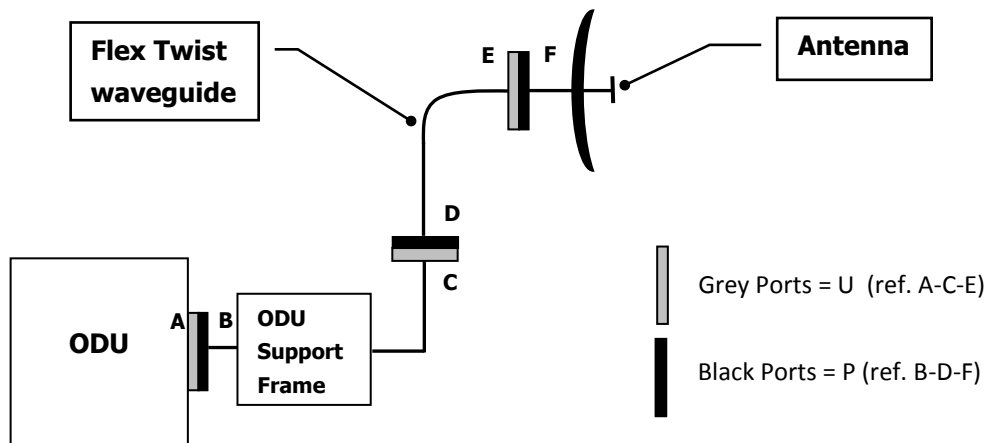


Figure 4.3-3 : ODU installation on pole and wall mounting in case of not integrated antenna

4.3.1.3 Flex twist waveguide installation

In the installation with not integrated antenna the connection between the ODU and antenna is accomplished with a “Flex twist” waveguide that at one end has a smooth square flange (to be mounted on the antenna) and at the other end a grooved square range designed to accommodate an O-ring seal (mounted at the ODU end).

In the following figure and table 4.3-1 is reported the summary per frequency bands of the flanges used and the wave guide types.



Frequency	OUTPUT FLANGES (Ports ref. A-C-E)	INPUT FLANGES (Ports ref. B-D-F)	WAVE GUIDE
6L/6U GHz	UDR70	PDR70	WR137
7/8 GHz	UDR84	PDR84	WR112
10/11 GHz	UBR100	PBR100	WR90
13 GHz	UBR120	PBR120	WR75
15 GHz	UBR140	PBR140	WR62
17/18/23/24/26 GHz	UBR220	PBR220	WR42
28/32/38 GHz	UBR320	PBR320	WR28

Table 4.3-1: Standard waveguide and flanges

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4.4 1+1 ODU configuration Installation with integrated antenna

4.4.1 Required Parts Listing

- Antenna
- Antenna support (pole mounting)
- Antenna Mounting Hardware and instructions (supplied by manufacturer)
- ODU Supporting Frame 1+1
- Outdoor Units (ODU)



Figure 4.4-1 : ODU 1+1 integrated to antenna

NOTE: The devices can have different flange interface consistent with working frequencies and configurations, for this reason the pictures in this chapter are indicative only for the installation purposes . For the antenna installation follow the instructions in the antenna packaging.

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5 LINE UP AND COMMISSIONING

5.1 General Information's

Y-Packet system is a short haul radio link suitable to provide inter-site connectivity, typically built by two terminals either protected/unprotected.

To make a link operating two basic activities have to be carried out:

- **LINE UP** when hardware checks, power up, presetting and configuration, rough and fine antenna alignment, preliminary tests are performed
- **COMMISSIONING** when the acceptance tests are performed

With reference to the below Figure 5.1-1 a link is composed by two stations A and B where Y-Packet terminals are located; the two stations are connected to a transmission network.

Line up and commissioning activity are supposed to start from station A.

Note: in this procedure it is assumed that a new link is installed and the equipment parts are coming directly from the factory and therefore not preloaded with any configuration data.

Note: the link line up and commissioning refers to a standard 1+0 system (PoE version).

For 1+1/2+0 stations the same operations have to be performed independently on both links.

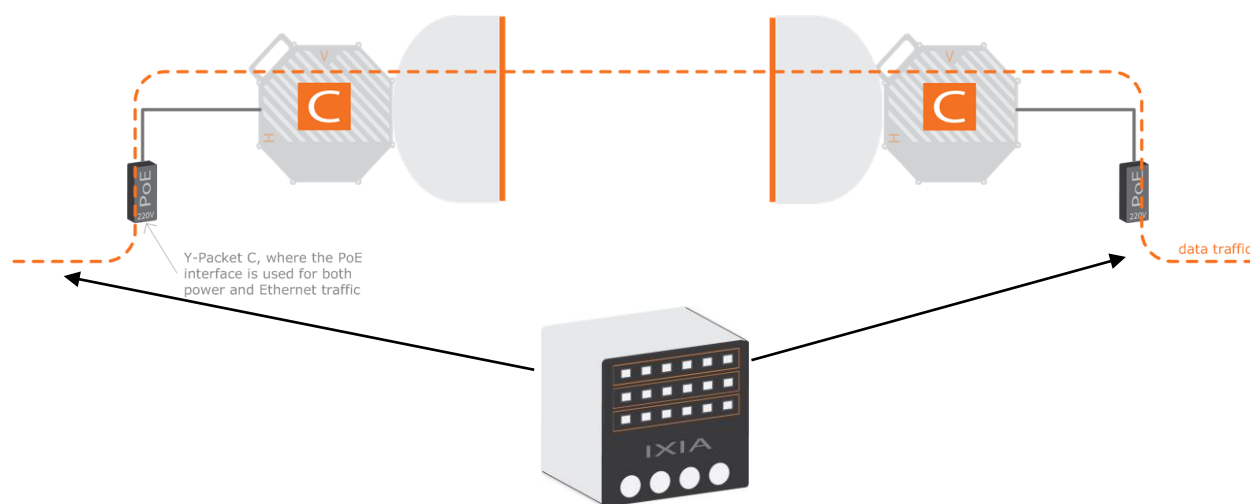


Figure 5.1-1 : Typical radio link 1+0 with station A/B connected to transmission network

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5.2 Line Up (Station A)

The following general remarks have to be taken into account:

- Switch off power supply before disconnecting earth connection
- Consider that IDU/ODU cable connector on PoE carries DC battery voltage to power the ODU, consequently no tool or instrument can be directly connected to this connector
- Don't connect IDU /ODU cable while PoE is powered

5.2.1 Hardware Presetting

Each terminal is preset in factory and no hardware presetting is necessary in field.

5.2.2 Software Presetting

Y-Packet System is shipped with NE software already downloaded in factory, but system configuration has to be accomplished in field through Y-Terminal that can use a standard WEB browser to exploit local management features provided by the embedded NE software.

5.2.3 Line up preliminary operations

A few preliminary operations and conditions must be verified before starting system line up as in the following:

- The antenna in station A has to be roughly pointed towards station B according the procedure described in the installation section.
- Check that the hardware configuration corresponds to the expected one
- PoE has to be inserted in the support frame as from station lay-out
- PoE and ODU must be properly grounded (including also antenna in case of not integrated antenna configuration)
- Check presence of the correct battery voltage (-48 Vdc) in case of the PoE DC/DC power input with the right polarity
- The IDU-ODU cable has to be connected to the ODU outside and to the PoE connector inside

After this check the system can be powered up switching on the external circuit breakers and then turning on the power on PoE. The system is now ready to be configured by Y-Terminal.

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5.2.4 Starting the Y-Terminal

Connect a laptop PC or notebook as shown in Figure 5.2-1 using the Y-Terminal interface:

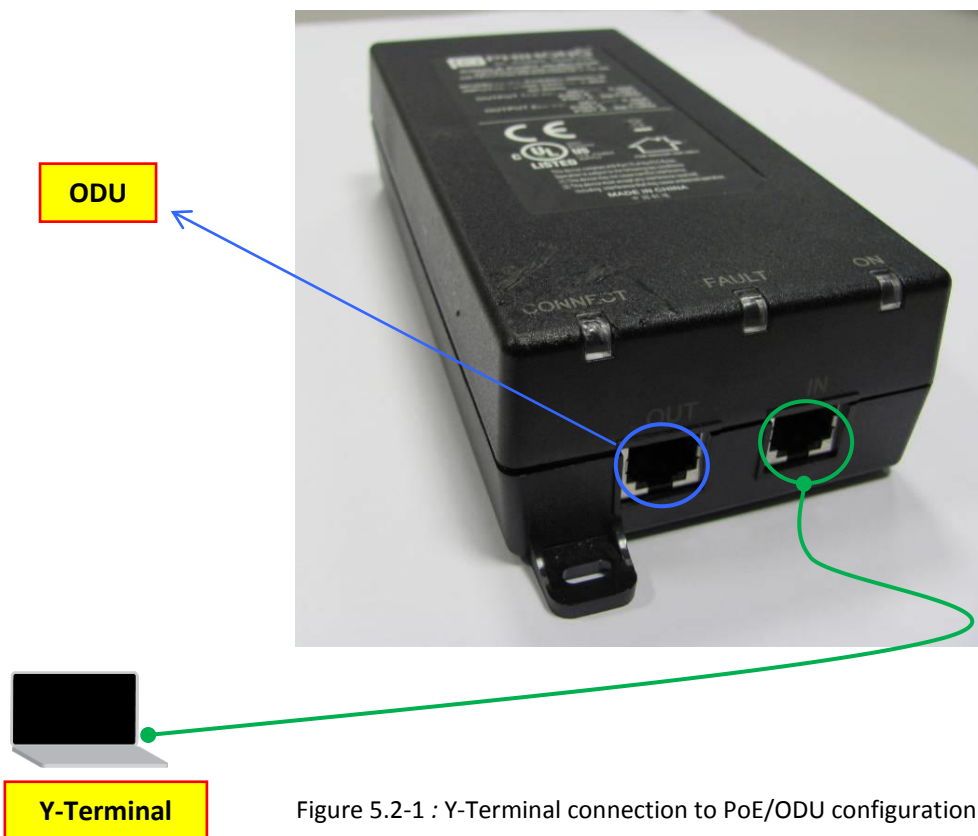


Figure 5.2-1 : Y-Terminal connection to PoE/ODU configuration

Before opening any session as Y-Terminal, the LAN port of the PC used to Y-Terminal has to be assigned an IP Address belonging to the same Subnet defined for the equipment.

At the factory all equipment are preloaded with the following IP addressing:

IP Address (ODU LB)	192.168.0.50
IP Address (ODU HB)	192.168.0.51
Subnet Mask	255.255.255.0
Gateway	192.168.0.1

Note: The user can set up the required IP configuration on the LAN port of the PC by means of the following procedure:

1. Open “Network and Internet” in the Control Panel of the PC
2. Open “Network and Sharing Center”

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3. Select "Change Adapter Settings"
4. Select the network where the system is connected and with the right button of the mouse open the window
5. Click on "Properties"
6. In the window General select "Internet Protocol" and open "Properties"
7. Enter an IP address (192.168.0.x) consistent with the Subnet of the equipment (255.255.255.0)
8. Close (OK) the transaction

Therefore to open a session as Y-Terminal when the equipment from the factory is initially used, the main window of the Y-Terminal web interface can be get writing the System IP address in the "Address" field:

1. Open the Internet Browser
2. Enter the IP Address **192.168.0.50** for **ODU LB** or **192.168.0.51** for **ODU HB** to access the Local Terminal of the link

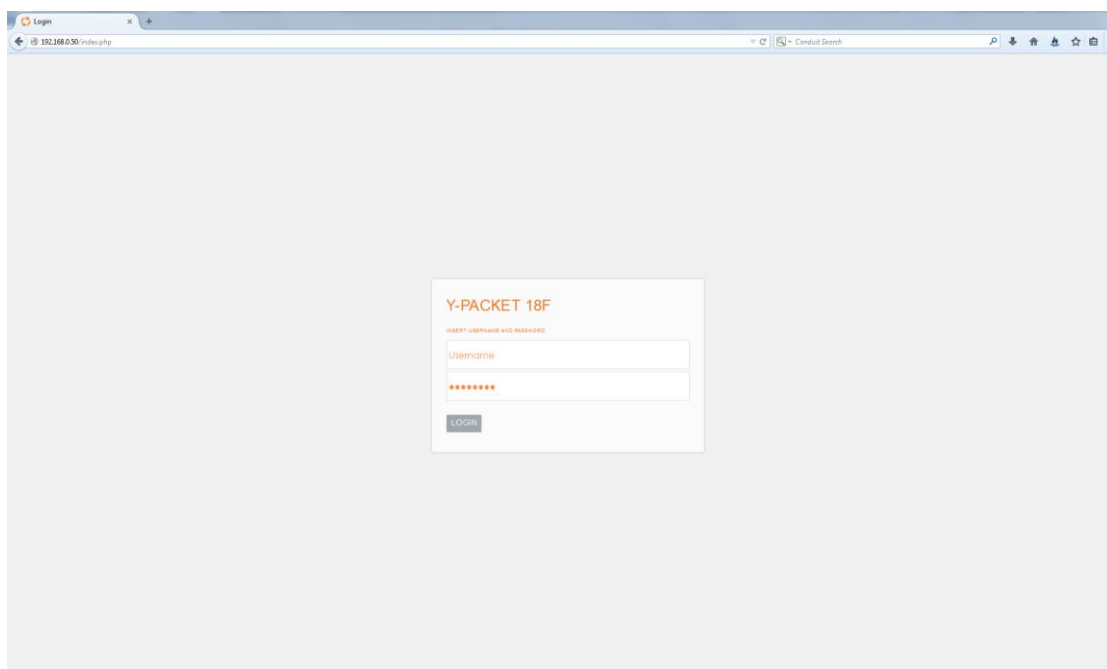


Figure 5.2-2 : Y-Terminal login window

Enter credentials Factory:

USERNAME: **admin**

PASSWORD: **port_adm**

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5.2.5 Line up basic configuration

Once connection is established the basic parameters of the radio terminal can be configured for line up purposes.

The configuration starts from the main window here reported for convenience (Figure 5.2-3) and using the pop-up windows described in the Feature and Configuration Guide.

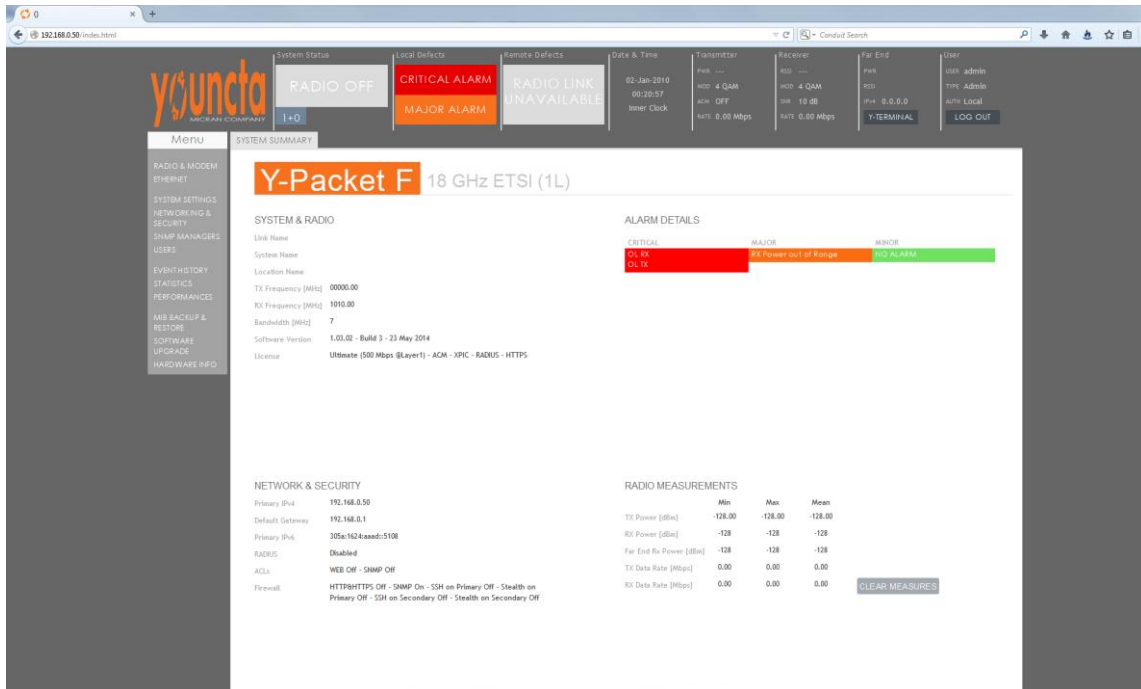


Figure 5.2-3 : Y-Terminal system summary window (main window)

5.3 Link Line up

5.3.1 Station B Line up and antenna alignment (station A and B)

With respect to the link situation depicted in Figure 5.1-1 after having completed station A line up, it's necessary to proceed with station B line up which has to be executed locally.

During this phase it is assumed that two installation engineers are present in the two stations coordinating each other.

The procedure to line up station B is identical to that one applied to station A and described above.

Once also station B is fully configured and working, if preliminary antenna pointing in station A has been properly carried out, station B should receive a minimum level of radio signal from station A.

In order to maximize the received level in station B it's necessary to pass to the fine tuning of the antenna pointing according to the procedure described in APPENDIX 1.

Antenna alignment procedure implies received power level monitoring that can be performed either using Y-Terminal Main window of Figure 5.2-3 (RX pwr) or measuring with a standard voltmeter the voltage present on the RSSI interface of ODU. The Rx power measured must be in according with the value indicated in the link calculation report.

After the antenna alignment is completed in Station B, the antenna fine alignment procedure must be executed also in station A to achieve the best received power level in both stations A and B.

As a final check during the line-up it is recommended to verify that no radio interference is present, impairing the operation in one of the receivers. For this purpose the Tx of the other station must be squelched and a Rx power measurement carried out with the help of Y-Terminal: Using RSSI or Y-Terminal Main window of Figure 5.2-3, the operator has to monitor for a few minutes the RX signal field (no signal/ -128 dBm display should be observed - no interference condition).

It's possible use a functionality **Radio Sweeper** to check radio interference when unlicensed bands are used .

After this check the system has to be returned to the normal transmission condition in RTPC mode.

Note: After all above steps are passed the link is operational and the User interfaces can be configured and connected. With the link operational it is possible to perform the monitoring and control of the link by only one station (either A or B) using the capability of Y-Terminal to be connected to both local and remote terminals.

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5.3.2 Preliminary Link checks after line up

The following checks have to be executed in both stations after the completions of the line up:

- LED ON (Power ON and Connection) on PoE.
- In the Y-Terminal Main window of Figure 5.2-3, the same LED status as above has to be reported by the status indicators. LO LED is green.
- Using Y-Terminal verify that ATPC is disabled (RTPC operating mode) and check in the Y-Terminal Main window of Figure 5.2-3 that the value reported in the TX signal field corresponds to the value set in the RF set up.
- Repeat above step on Protection channel in 1+1 configuration.

Note: It is possible at any time to verify the correct operation of the link using the Performances feature.

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5.4 Commissioning and acceptance test

Once the system is installed and lined up and the antennas are aligned, it's ready to be tested for proper operation. The minimum set of functional tests required for commissioning is here described and the results of the check should be recorded in a **Test Result Sheet** (TRS).

The measurements of chap. 5.4.1 and 5.4.2 have to be executed for both Station A and B.

The stability test can be in general executed loading the system with an Ethernet Traffic and measuring the performances in both directions (see chap. 7.4.3).

5.4.1 PTx and PRx measurements

Purpose :

verify in both stations A and B the transmitted power (PTX) in RTPC mode and verify in these conditions the transmitted power PTx and the received power PRx.

Procedure :

- With reference to the Radio interface management set the Modulation level value in manual mode and Channel Spacing required
- With reference to the Radio interface management check the Administrative status field for the value UP (previously configured) enabling the transmission manual mode and verify the TX Power Level field to the value previously loaded
- Check that transmitted power level monitored in the TX signal field of the Y-Terminal Main window of Figure 5.2-3 corresponds to the Tx Power Level loaded in the previous step
- In these conditions verify the received power level monitored in the RX signal field of the Y-Terminal Main window of Figure 5.2-3 and verify that the Rx level is consistent with the value expected from the hop calculations.

5.4.2 Modulation level control

Purpose :

to ensure equipment supports different Modulation levels TX & RX used in AMC
(Adaptive Modulation Control)

Procedure :

- With reference to the Radio interface management enabling the Modulation manual mode .

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- Check the different Modulation level used in AMC mode (QAM 1024/512/256/128/64/32/16/4) in accordance with the SW license enable and the Channel Spacing required.

IMPORTANT NOTE : the modulation mode and level setting must be done in remote station before and local after.

5.4.3 Automatic Transmitter Power Control (ATPC)

Purpose :

check the ATPC functionalities

Procedure :

- Using the Radio Interface management window set in Administrative status field ATPC enable mode.
- Set the range and Target ATPC values consistent with the planned operation conditions and verify that the actual transmitted power level monitored in the TX signal field of the Y-Terminal Main window of Figure 5.2-3 is in the range defined by ATPC Min Power Lev and ATPC Max Power Lev
- In these conditions verify the received power level monitored in the RX signal field of the Y-Terminal Main window of Figure 5.2-3 is around the expected operational value.

5.4.4 Switch Protection Hot/Standby Test (1+1 configuration)

Purpose :

check the Switch protection functionality in 1+1 configuration

Procedure :

- Using the Radio Interface management window set 1+1 HSB Main in Protection field ODU STA (main Channel) and 1+1 Protection in second ODU STA (Stby Channel)

Repeat the procedure described above in STB

- Set **not Revertive** in Protection and check the protection functionality, switching ON/OFF the power supply PoE Main in STA/B

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5.4.5 Hop stability test with Ethernet traffic

Purpose : to verify hop stability with ATPC and AMC working (final configuration). The stability test can be normally performed loading the system in both directions with Ethernet frames by means of two pattern generators connected in the two stations to the ETH User Ports of either PoE (see Fig. 5.4.1)

Procedure:

- In both stations:
 - Configure the Ethernet User port as enabled with no flow control in both stations (Ethernet Interface window)
 - Enable Statistics and Performance Monitoring Counters by the relevant Y-Terminal windows (after clearing all previous records)
 - Clear current Log and enable logging of new events (Logs window)
 - Connect a data analyzers to the ETH User port. The data analyzer should be programmed to load the system with a 90% load versus the system capacity (defined by the radio channel) with a random frame length.
 - Start the monitoring on the data analyzer.
- Perform at least a two hours stability test and verify that, in normal propagation conditions, the data analyzers displays no lost ETH frames or other abnormal
- In both stations read Counters and Logs and verify that no abnormal condition is recorded
- Disconnect the data analyzers from the ETH User Ports

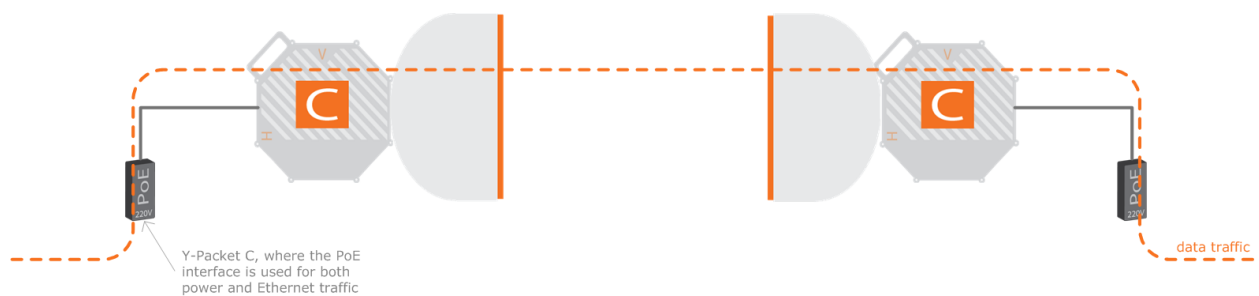


Figure 5.4-1 : Test bench 1+0 Configuration for hop stability test

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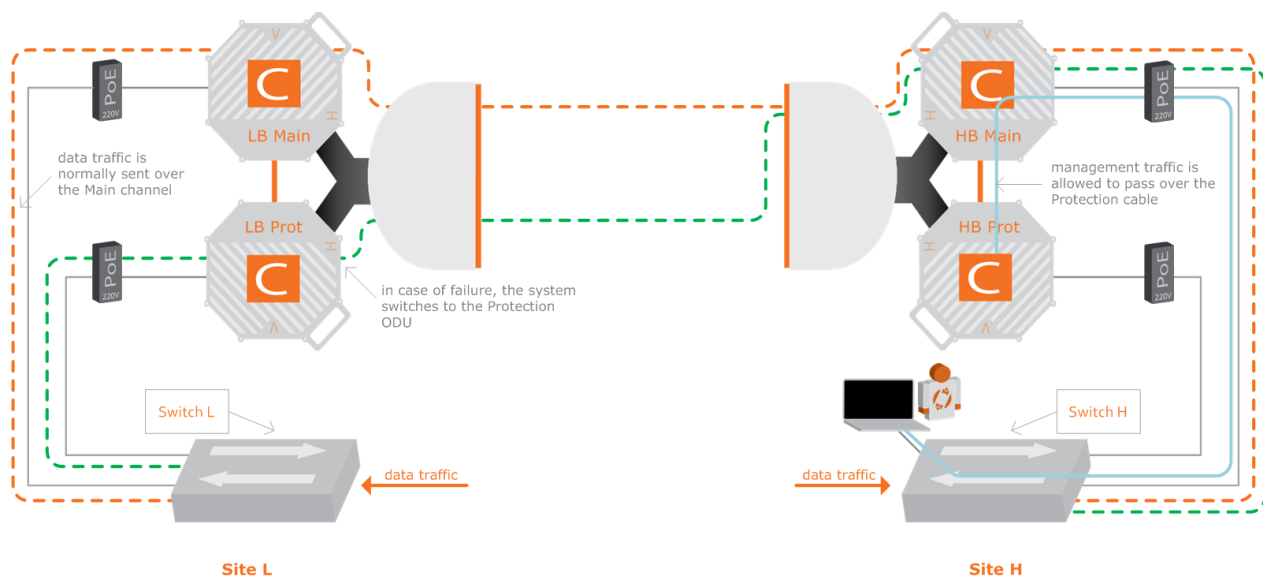


Figure 5.4-2: Test bench 1+1 Configuration for hop stability test

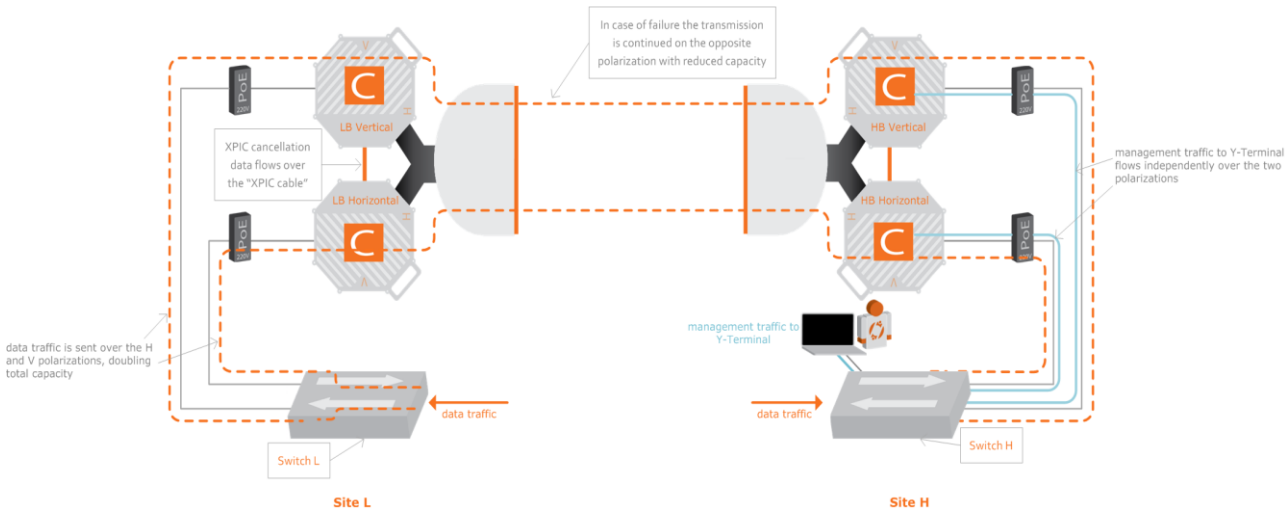


Figure 5.4-3: Test bench XPIC Configuration for hop stability test

5.5 Final Configuration Set-up

After the above tests have been executed with positive results, the link is ready to be put in service. Here are recalled the main actions to be performed to complete the link configuration:

- In both stations connect the cable(s) carrying the data traffic signals to the Network (user) equipment according to the station layout (this signals normally go through the station DDF)

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- In both stations configure via CT (local or remote) the radio terminal according to the normal working configuration previously defined with the customer, modifying when required the status of the parameters set during line-up and commissioning. Specifically there are to be checked or modified:
 1. **Admin status** : ATPC or manual setting (RF set-up)
 2. **Modulation mode** : Manual or Automatic
 3. **Revertive mode** : Revertive or Not Revertive
 4. **Management Interface** : Specifically VLAN identifier for management traffic and enable of OS supervision
 5. **System Time** : Specifically Time zone and Daylight saving
 6. **Statistics and Performance Monitoring counters** : (not mandatory) after clearing all history
 7. **Event History** : Enable and clear

Finally check that no equipment alarm is raised

- Enable and configure the traffic interfaces (ETH User Interface) according to traffic configuration defined by the customer
- After traffic configuration and connection set-up verify that the Interface alarms possibly raised are consistent with the interface operating conditions

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6 SAFETY/EMC/ESD RULES AND EQUIPMENT LABELLING

6.1 First Aid for Electric Shocks

Do not touch the patient with bare hands until the circuit has been opened. Open the circuit by switching the line switches off. If that is not possible, protect yourself with dry material and free the patient from the conductor.

6.2 Artificial Respiration

It is important to start mouth to mouth resuscitation at once and seek doctor help immediately. The mouth to mouth method to apply is described here below.

Mouth to mouth resuscitation method

1. Lay the patient supine with his arms parallel with the body. If the patient is laying on a inclined plane, make sure that his stomach is slightly lower than his chest.

Open the patient's mouth and check that there are no extraneous bodies in his mouth (dentures, chewing-gum, etc.).

2. Kneel beside the patient level with his head. Put a hand under the patient's head and one under his neck (Fig. 6.2-1)

Lift the patient's head and let it recline backwards as far as possible.



Figure 6.2-1 : Artificial respiration procedure (1/4)

3. Shift the hand from the patient's neck to his chin: place your thumb between his chin and his mouth, the index along his jawbone, and keep the other fingers closed together (Fig. 6.2-2).

While performing these operations take a good supply of oxygen by taking deep breaths with your mouth open.

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Figure 6.2-2 : Artificial respiration procedure (2/4)

4. With your thumb between patient's chin and mouth keep his lips together and blow into his nasal cavities (Fig. 6.2-3).



Figure 6.2-3 : Artificial respiration procedure (3/4)

5. While performing these operations, observe if the patient's chest rises (Fig. 6.2-4). If not, it is possible that his nose is blocked: in that case, open the patient's mouth as much as possible by pressing on his chin with your hand, place your lips around his mouth and blow into his oral cavity.

Observe if patient's chest heaves. This second method can be used instead of the first even when the patient's nose is not obstructed, provided his nose is kept closed by pressing the nostrils together by using the hand you were holding his head with.

The patient's head must be kept sloping backwards as much as possible.



Figure 6.2-4 : Artificial respiration procedure (4/4)

6. Start with ten rapid expirations, hence continue at a rate of twelve/fifteen expirations per minute. Go on like this until the patient has regained consciousness, or until a doctor has ascertained his death.

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6.3 Treatment of Burns

This treatment should be used after the patient has regained consciousness. It can also be employed while the artificial respiration is being applied (in this case, there should be at least two persons present).

Important:

- Do not attempt to remove his clothing from the burnt parts.
- Apply dry gauze on the burns.
- Do not apply ointments or other oily substances.

6.4 Safety Rules

6.4.1 General Rules

Before carrying out any installation, turn-on, tests & operation and maintenance operations carefully read the related Handbooks.

When equipment is operating nobody is allowed to have access inside on the equipment parts which are protected with Cover Plate Shields removable with tools.

In case of absolute need to have access inside, on the equipment parts when it is operating this is allowed exclusively to properly trained personnel.

For the eventual cleaning of the external parts of the equipment, absolutely do not use any inflammable substance or substances which in some way may alter the markings, inscriptions etc.

It is recommended to use a slightly wet cleaning cloth.

Whenever the safety protection features have been impaired, REMOVE POWER.

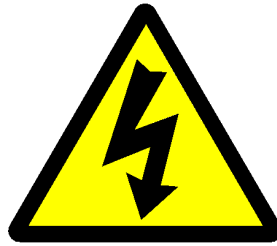
To cut off power proceed to switch off the power supply units as well as cut off power station upstream (rack or station distribution frame).

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6.4.2 Warning for electrical safety

All product parts are to be designed in compliance with EN 60950-1:2001-12 “information technology equipment-Safety”. The equipment must be installed, started up, managed and repaired only by properly trained personnel.

The following plate defines the points on the inner units of the system that can have voltages exceeding the SELV and/or TNV levels described into EN60950 (>120 Vdc).



Here below a few basic general recommendation for electrical safety:

- Before supplying the equipment, it is necessary to complete the wiring of the connections to the protection ground, the insertion of all the units and/or modules provided for the requested configuration and also the connection of all the necessary connectors.
- The connection to the protection ground must not be removed or damaged.
- The equipment supplying system must be provided with a sectioning device upstream the connector.
- Before disconnecting the connectors, check that the supply has been removed by means of the sectioning device installed upstream.
- Personal injury can be caused by dc voltages lower than –48V and as a consequence avoid touching powered terminals with any exposed part of your body
- Short circuiting, low impedance, dc circuits can cause arcing with risks of burns and/or eye damage. Therefore remove rings ,watches and any other metal parts before working with primary circuits. Be careful in avoiding power input terminals short circuits.

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6.4.3 Microwave radiations

Microwave radiations can endanger your health.

Consequently the following rules should be applied by the Customer:

- The site must be compliant with ICNIRP guidelines or local regulation if more restrictive
- Non authorized person should not enter the compliance boundaries, if any, for general public.
- Compliance RF boundaries, if any , relevant to EMF exposure have to be marked
- **Workers should be allowed to switch off the power transmitters if they have to operate inside compliance boundaries (close to the antenna)**
- Assure good cable connections
- Install the antenna as high as possible from floor with public access and from other existing equipment emitting RF power

No dangerous level of microwave radiations exists outside the antenna feeder. Nevertheless, body should not be exposed to the radiation in front of the antenna (< 0.5 m) for a long time (> 6 minutes).

Finally remind that someone standing in front of the antenna can cause traffic interruption.

The EMF emission warning sign represented below should be applied:

- On the mast (front side) at the bottom of the antenna visible by someone moving in front of the antenna (roof top installation)
- On the antenna in the rear side



EMF EMISSION WARNING SIGN

6.4.4 Dangerous material

For the elimination at the end of life, this equipment is inside the 160214 class (other electronic material out of order) of the EUROPEAN CATALOGUE OF WASTES defined with CEE/CEEA/CECA decision NR. 2001/118/CE of 16-01-2001.

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Inside this product, some materials can be present that must not be exposed to flames or to high temperatures. Such conditions can cause toxic fumes that must not absolutely be inhaled.

Some metallic elements, necessary for the EMC shielding, contain beryllium. Then it is necessary to pay high attention during the use of such elements to avoid their breakage or abrasion.

ROHS DIRECTIVE

The RoHS (Restriction of Hazardous Substances) Directive (2011/65/UE) was implemented on 30 March, 2014. Y-Packet meets the requirements of this directive.

6.4.5 Risk of explosion

In the equipments there are no parts with risk of explosions.

6.4.6 Heat radiating mechanical parts

In the equipments there are no parts with dangerous external temperature.

6.5 EMC norms

EMC norms and recommendations are referred to the different types of activities i.e. installation, turn-on and operation, maintenance.

- All connections (towards the external source of the equipment) made with shielded cables use only cables and connectors suggested in this Feature&Configuration_Guide or in the installation handbook (or similar documents).
- Shielded cables must be suitably terminated
- Install filters outside the equipment
- Connect the equipment to ground utilizing a conductor with proper diameter and impedance
- Mount shields (if utilized) after having cleaned them
- Be careful to clean contact surfaces of shielded units or dummy covers before to mount them either at first installation or at faulty unit replacement
- Screw fasten the units to the support frame

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- Check that the equipment is working with all shield properly mounted (dummy covers, ESD connector protections etc.)

6.6 ESDS Precautions

The ESDS (Electro Static Discharge Sensitive) electronic devices can be partially or permanently damaged by the static electricity that is commonly present in the operating environment.

The main ESDS devices are:

- CMOS components.
- Large Scale Integration components in MOS technology.
- SAW (Surface Acoustic Wave) components.
- Operational amplifiers with MOS/FET inputs.
- MOS/FET components and arrays.
- Microwave semiconductors and microcircuits at frequencies > 1 GHz.

Modules containing ESDS devices are identified by following adhesive labels:



In order avoid any damage while handling the modules, the user should wear an **antistatic elastic bracelet**, grounded by means a **spiral cord**. Those modules that are mounted on the equipment (faulty or spare parts) shall be stores in their original antistatic package marked by the labels above shown.

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6.7 Equipment labels

Labels with the purpose of supporting equipment parts management, are affixed on ODU.

In this paragraph is provided the description of labels content and their positioning.

6.7.1 ODU labels

In the following Fig. 6.7-1 label standard. The position of label on the ODU in Fig. 6.7-3 and Table 6.7-1 for its contents.

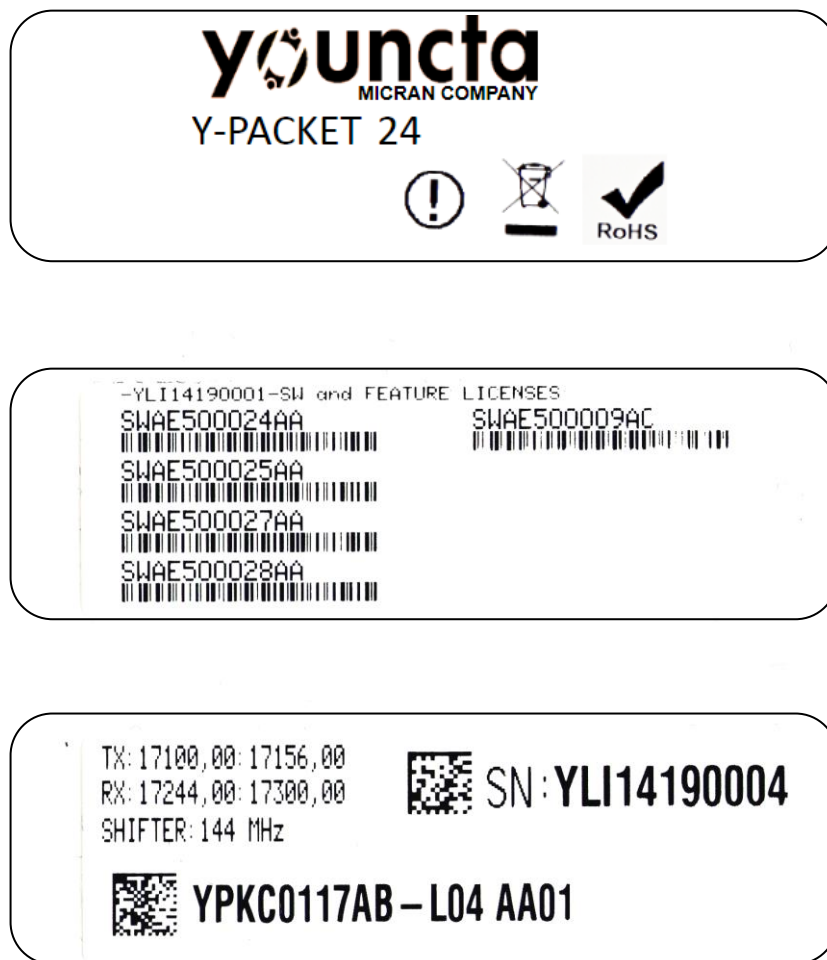


Figure 6.7-1 : ODU label picture standard

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Field	Field name	L x H Char	Text Length
A	Feature Licenses + (Feature Licenses Bar Code 128)	1 x 1,5	8 Codes Max
TX: 17100,00: 17156,00	Trasmission Frequency Band	1x1,5	30 char Max
RX: 17244,00: 17300,00	Receiver Frequency Band	1x1,5	30 char Max
SHIFTER: 144 MHz	Shifter	1x1,5	12 char Max
SN:YLI14190001	Serial number	2x3	14 char Max
B	Serial Number (data matrix code)	5x5	Security = 200 Module: 8 for 600 dpi printer ; Module: 4 for 300 dpi printer
YPKC0177AB-L04 AA01	Youncta P/N + Revision	2x3	19 char Max
C	Part Number +Revision (data matrix code)	5x5	Security = 200 Module: 8 for 600 dpi printer ; Module: 4 for 300 dpi printer

YOUNCTA serial Number YLI14190001 is composed to:

Y=YOUNCTA

14=YY

0001= identification number

LI= Supplier YOUNCTA

19=WW

Label PN PMAK500002AA

quantity 2

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7 APPENDIXES

7.1 Appendix 1 – Antenna alignment procedure

Y-Packet system can be equipped either with integrated antenna or with not integrated antenna of different diameters and operating in different frequency bands.

In the case of not integrated antenna, installation and alignment of the antenna is driven by manufacturer instructions, while for integrated antenna the pole mounting has provisions for alignment in both the azimuth (horizontal) and elevation (vertical) planes. In both integrated and not integrated antenna cases antenna alignment is performed in two steps: a **coarse alignment** and a **fine alignment**.

The coarse alignment is based on visual indication when remote antenna is in sight or can exploit the help of a compass if the remote antenna is not visible (see also antenna pre-pointing par. 4.2.2.5).

The fine alignment instead is based on **Received Signal Strength Indicator** (RSSI) voltage and is performed with both near-end and far-end terminals operating.

7.1.1 Fine antenna alignment (integrated antenna)

Fine antenna alignment is needed to ensure the optimum system performance aligning the main lobe of the local antenna with the main lobe of the opposite antenna in the link.

The fine pointing exploits the RSSI voltage accessible on the dedicated ODU connector orienting the antenna to achieve the relative minimum or null of RSSI voltage. During antenna alignment three distinct nulls are probable: the two side lobes nulls and the center lobe null. The center lobe null will typically be lower than the other lobes. The antenna should be aligned to the center lobe.

Procedure:

1. At near end ODU remove the protective cap from the RSSI interface
2. Connect the RSSI interface to the voltmeter using the supplied cable contained in the maintenance tool bag and set the voltmeter for DC measurement.
3. Verify that the power switch of IDU is ON, both in the near-end and in the far-end terminals
4. For **vertical alignment** with reference to Figure 4.2.2 tune coarse alignment screws A and fine alignment A1 while monitoring the PRx level on the voltmeter; when the maximum of PRX (voltage null) is achieved, note the voltage value and tight the locking screws A.

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5. For **horizontal alignment** with reference to Figure 4.2.2 tune coarse alignment screws B and fine alignment B1 while monitoring the PRx level on the voltmeter; when the maximum of PRX (voltage null) is achieved, note the voltage value and tight the locking screws B. This should be the main lobe of the antenna.
6. Repeat the steps above as necessary for optimization, checking that after tightening the screws the nulls have not changed.
7. Finally disconnect the voltmeter with the relative cable from RSSI interface and re-install the RSSI protective cap.

7.1.2 Fine antenna alignment (not integrated antenna)

In case of not integrated antenna fine alignment has to be achieved following manufacturer instructions about antenna movements as reported in the antenna installation manual, but exploiting the RSSI feature to maximize PRX and align main lobes, by using a standard voltmeter as described in par 7.1.1 for integrated antenna.

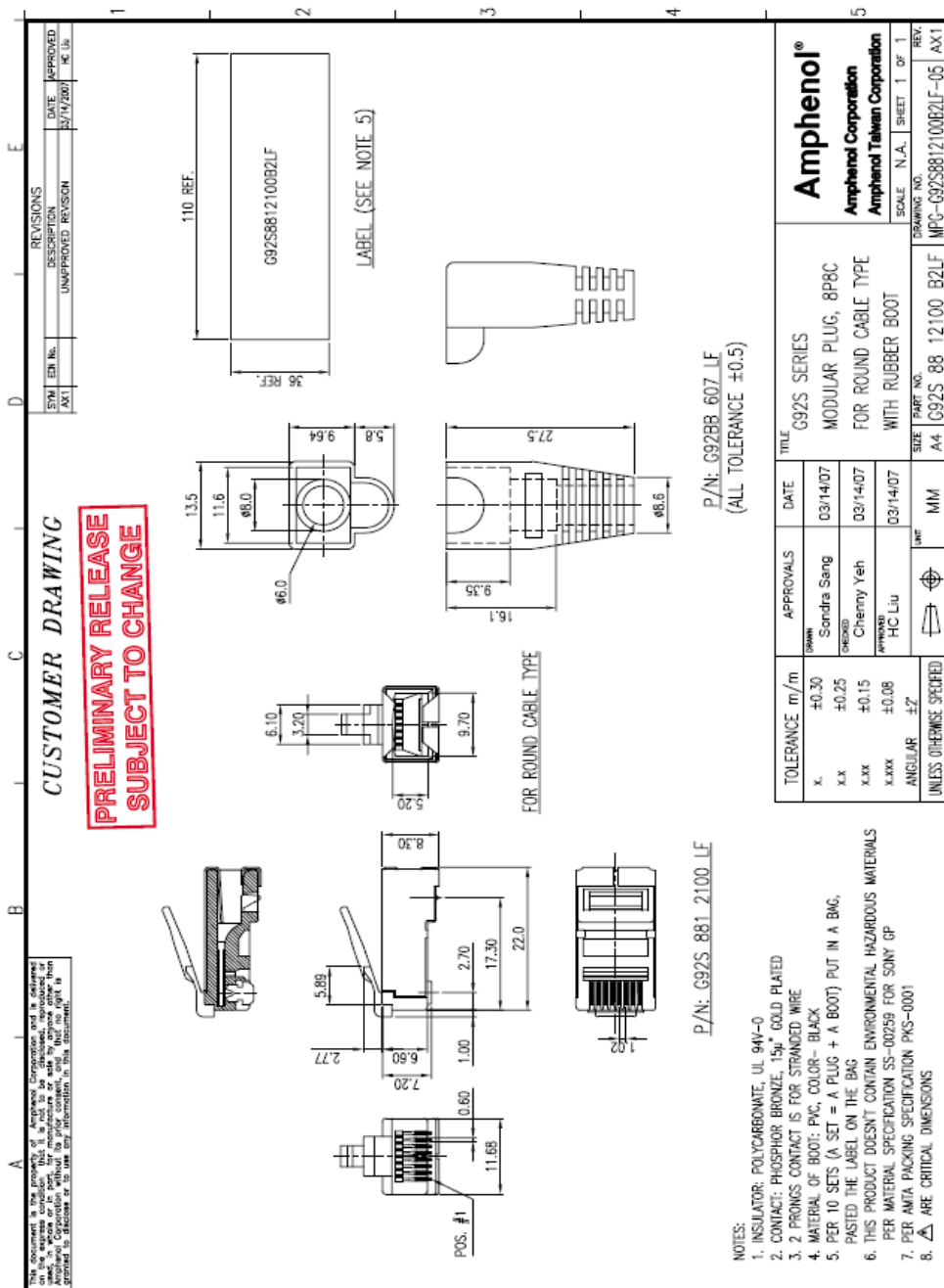
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7.2 Appendix 2 – Connectors Data Sheet

In this section is showed the connector documents.

IDU-ODU CONNECTORS KIT M. THREADED

Plug modular connector



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Connector M-RJ45 flying (Threaded)

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LE CARATTERISTICHE ELENcate POSSONO ESSERE SOGGETTE A MODIFICHE SENZA ALCUN OBBLIGO DI PREAVVISO E DISTRIBUZIONE.

COMPEL®

**CONNETTORI
ETHERNET
CONNECTORS**

Connettore maschio volante.
 Attacco al cavo : con serracavo anti-svitamento
 Sistema di accoppiamento : a vite.
 Interfaccia connessione : RJ-45
 Grado di protezione : IP68
 (0.1 bar, 24h a 20 °C sec. norma CEI EN60529)

Materiali e finiture:
 Corpo e ghiera : ottone nichelato
 Serracavo : PA (Poliammide) colore grigio (RAL 7001)
 Guarnizione : gomma siliconica

Corrosione (nebbia salina) : MIL-STD-202,
 metodo 101, condizione A
 Temperatura di utilizzo : -30 °C / +70 °C

[1] FTP CAT. 5e-T1A/EIA-568-A-5,
 24AWG filo solido, Øisolante 0.74±0.99

(*) RJ45 maschio schermato fornito sciolto
 con il connettore.

*Free plug connector.
 Cable attachment : cable clamp with unlocking device.
 Coupling interface : thread
 Connection interface : RJ-45
 Protection degree : IP68
 (0.1 bar, 24h at 20 °C acc. to spec. CEI EN60529)*

*Materials and finishing:
 Body and nut : brass-nickel plated
 Cable clamp : PA (Polyamide) grey colour (RAL 7001)
 Gasket : silicone rubber*

*Corrosion (salt spray) : acc. to spec. MIL-STD-202,
 method 101, condition A
 Operating temperature : -30 °C to +70 °C*

[1] FTP CAT. 5e-T1A/EIA-568-A-5,
 24AWG solid wire, Øinsulator 0.74±0.99

(*) Shielded RJ-45 plug loose supplied with the
 connector.

(**) Cavi utilizzabili : da Ø6.5 a Ø8 mm.
Usable cables :

RoHS COMPLIANT

Istruzioni di assemblaggio : 901.009.021
Assembly instructions

Part. nr.	Cavo / Cable	Ønom.
350.038.211	[1]	7.2

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Connector for Cable 48Vdc

To be used to feed the Optical ODU (with external power) when does not used the PoE inj.

Technical Data Sheet - DRAFT		Rosenberger
Multi-Power	EMI shielded Straight plug, screw on	70S1S31-001N1

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All dimensions are in mm; tolerances according to ISO 2768 m-H

Inserts		
	Order no.	AWG
Female 	70K1R01-010/20B	10
Male 	70S1R01-014/20B	14

Rosenberger Hochfrequenztechnik GmbH & Co. KG P.O.Box 1260 D-84526 Tittmoning Germany www.rosenberger.de	Tel. : +49 8684 18-0 Fax : +49 8684 18-499 Email : info@rosenberger.de	Page 1 / 3
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Technical Data Sheet - DRAFT		Rosenberger																																																
Multi-Power	EMI shielded Straight plug, screw on	70S1S31-001N1																																																
<p>Documents</p> <p>Assembly instruction MA_70A1</p> <p>Material and plating</p> <table border="0"> <tr> <td>Connector parts</td> <td>Material</td> <td>Plating</td> </tr> <tr> <td>Body</td> <td>Brass</td> <td>White bronze(e.g. Optalloy®)</td> </tr> <tr> <td>Coupling nut</td> <td>Brass</td> <td>White bronze(e.g. Optalloy®)</td> </tr> <tr> <td>Dielectric</td> <td>PA, POM</td> <td></td> </tr> <tr> <td>Gasket</td> <td>Silicone</td> <td></td> </tr> <tr> <td>Insert</td> <td>CuBe or equiv.</td> <td>Silver, 3-6 µm</td> </tr> </table> <p>Electrical data</p> <p>Contact current acc. to chart*</p> <p>Contact resistance ≤ 3 mΩ</p> <p>RF-leakage ≥ 128 dB @ DC to 1 GHz</p> <p>Working voltage 48V DC</p> <div style="text-align: center;"> <p>Derating chart acc. to DIN EN 60512-5-2</p> <p>DUT 70S1R01-010/20B and 70K1R01-010/20B max. contact temperature: 100°C</p> <p>— 2 contacts current loaded — 4 contacts current loaded</p> <table border="1"> <caption>Approximate data from Derating Chart</caption> <thead> <tr> <th>Ambient temperature [°C]</th> <th>2 contacts current loaded [A]</th> <th>4 contacts current loaded [A]</th> </tr> </thead> <tbody> <tr><td>20</td><td>24</td><td>23</td></tr> <tr><td>30</td><td>22</td><td>20</td></tr> <tr><td>40</td><td>20</td><td>17</td></tr> <tr><td>50</td><td>18</td><td>14</td></tr> <tr><td>60</td><td>16</td><td>11</td></tr> <tr><td>70</td><td>14</td><td>8</td></tr> <tr><td>80</td><td>11</td><td>5</td></tr> <tr><td>90</td><td>7</td><td>2</td></tr> <tr><td>100</td><td>0</td><td>0</td></tr> </tbody> </table> </div> <p>* depends on used cable, connector dielectric material and customer application.</p>			Connector parts	Material	Plating	Body	Brass	White bronze(e.g. Optalloy®)	Coupling nut	Brass	White bronze(e.g. Optalloy®)	Dielectric	PA, POM		Gasket	Silicone		Insert	CuBe or equiv.	Silver, 3-6 µm	Ambient temperature [°C]	2 contacts current loaded [A]	4 contacts current loaded [A]	20	24	23	30	22	20	40	20	17	50	18	14	60	16	11	70	14	8	80	11	5	90	7	2	100	0	0
Connector parts	Material	Plating																																																
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60	16	11																																																
70	14	8																																																
80	11	5																																																
90	7	2																																																
100	0	0																																																
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		Page 2 / 3																																																

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Technical Data Sheet - DRAFT				Rosenberger			
Multi-Power		EMI shielded Straight plug, screw on		70S1S31-001N1			
Mechanical data							
Mating cycles		≥ 100					
Coupling test torque		≤ 1.7 Nm					
Recommended torque		0.7 Nm to 1.1 Nm					
Coupling nut retention		≥ 450 N					
Environmental data							
Temperature range		-55°C to +100°C					
Thermal shock		MIL-STD-202, Method 107, Condition B					
Corrosion resistance		MIL-STD-202, Method 101, Condition B					
Vibration		MIL-STD-202, Method 204, Condition B					
Shock		MIL-STD-202, Method 213, Condition I					
Moisture resistance		MIL-STD-202, Method 106					
Degree of protection (mated pair)		IEC 60529, IP68					
2011/65/EU (RoHS2)		compliant					
Tooling							
Crimping tool		tbd					
Cable							
		L45551-J12-B6					
Packing							
Standard		1 pce in bag					
Weight		57g/pce					
<p>While the information has been carefully compiled to the best of our knowledge, nothing is intended as representation or warranty on our part and no statement herein shall be construed as recommendation to infringe existing patents. In the effort to improve our products, we reserve the right to make changes judged to be necessary.</p>							
Draft	Date	Approved	Date	Rev.	Engineering change number	Name	Date
E. Truc-Vallet	21/12/12	T. Höher	21/12/12	100	12-v470	Tobias Stadler	21/12/12
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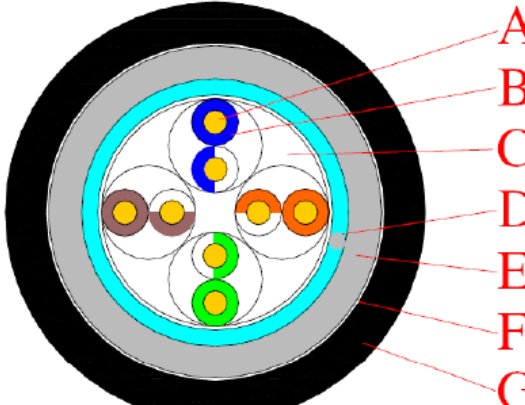
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7.3 Appendix 3 – Cable specifications

In this section is showed the cable documents.

Homologated cable IDU-ODU

<h1 style="margin: 0;">Metallurgica Bresciana s.p.a</h1>										
<i>Technical Dept.</i>	TECHNICAL DATA SHEET			Specification n° 574.F6.600						
<p><u>SPECIAL CABLE</u> <u>4x2x24 AWG FTP CAT. 5E WITH 2 JACKET PVC/PE</u></p> <div style="text-align: center;">  </div> <p><u>CONSTRUCTION:</u></p> <ul style="list-style-type: none"> - A) Conductor: solid annealed bare wire nominal diameter: 0,53 mm - B) Insulation: polyethylene nominal diameter: 1,07 mm ± 0,05 mm - Pair: 2 cores shall twisted together in pair - Pair's identification: <table style="margin-left: 20px; border: none;"> <tr> <td>1) white/blue + blue</td> <td>3) white/green + green</td> </tr> <tr> <td>2) white/orange + orange</td> <td>4) white/brown + brown</td> </tr> </table> - C) stranding: the 4 pairs shall stranded together and wrapped with a polyester tape 							1) white/blue + blue	3) white/green + green	2) white/orange + orange	4) white/brown + brown
1) white/blue + blue	3) white/green + green									
2) white/orange + orange	4) white/brown + brown									
						CABLE CODE				
						600MCO430				
						Replace n.				
0	EMISSION	22/05/06	<i>Sed</i>	<i>A. Rossi</i>	<i>D. Rossi</i>	Of				
Rev.	Description	Date	Drawn up	Controlled	Seen	Sheet 1 of 2				

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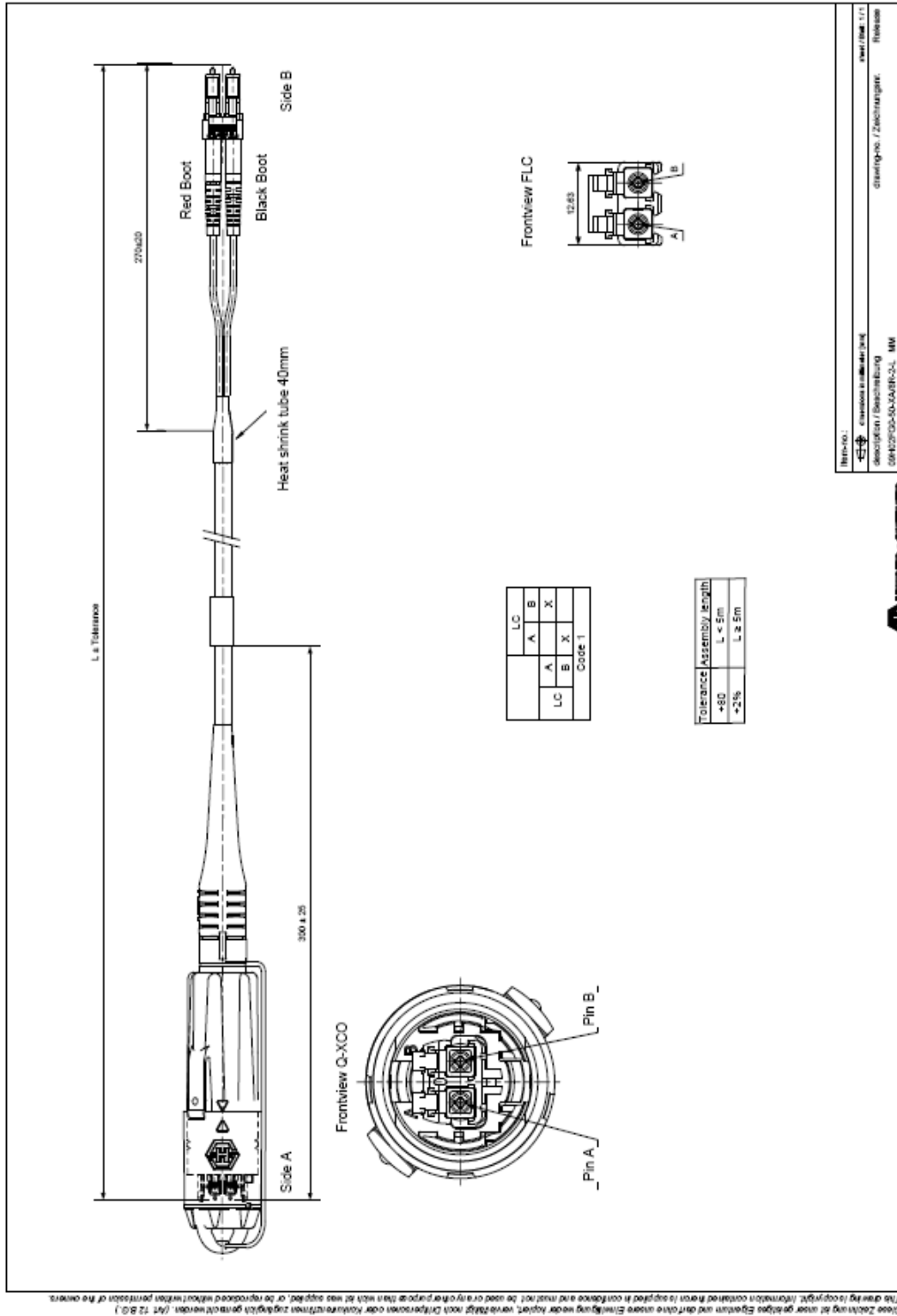
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<i>Metallurgica Bresciana s.p.a</i>						
<i>Technical Dept.</i>	TECHNICAL DATA SHEET				Specification n° 574.F6.600	
- D) Overall shield: - Ripcord: - E) Inner jacket: - F) Wrapping: - G) Outer jacket: - Approximate cable weight: - Temperature range:	aluminium/polyester tape (aluminium inside) + tinned copper drain wire of 0,41 mm nominal diameter yes PVC flame retardant colour: grey (RAL 7032) nominal thickness: 0,50 mm ± 0,10 mm nominal diameter: 5,76 mm polyester tape solid PE colour: black nominal thickness: 0,70 mm ± 0,10 mm nominal diameter: 7,30 mm 70 Kg/Km -20°C +80°C (static) -5°C + 80°C (installation)					
						CABLE CODE
						600MCO430
						Replace n.
0	EMISSION	22/05/06	<i>Set</i>	<i>ASand</i>	<i>BLOM</i>	Of
Rev.	Description	Date	Drawn up	Controlled	Seen	Sheet 2 of 2

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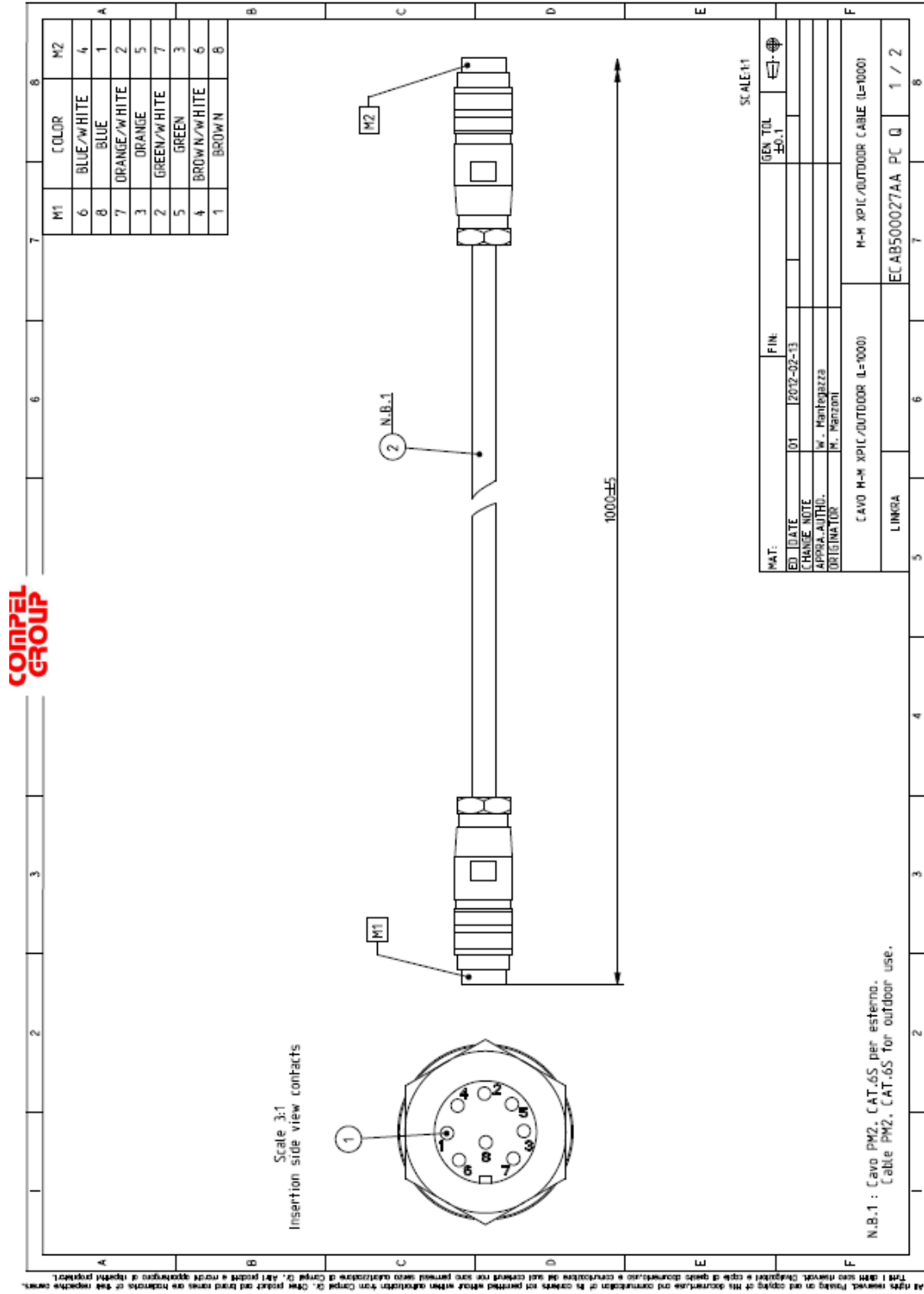
Optical Cables Q-XCO/FLC



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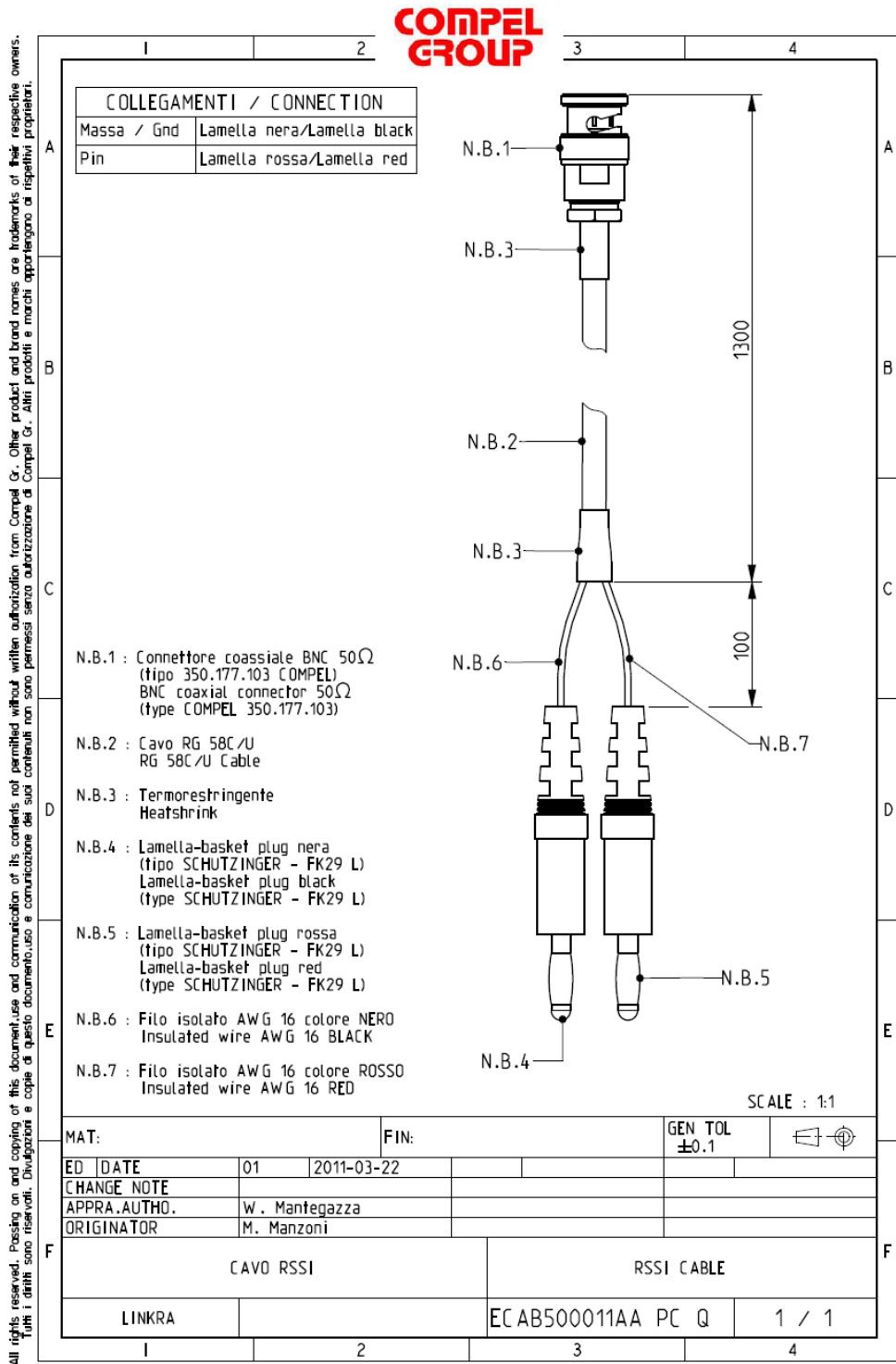
Cables for XPIC, HSB and SD config. (Conn. 8 P MALE CIRCULAR)

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RSSI Cable



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