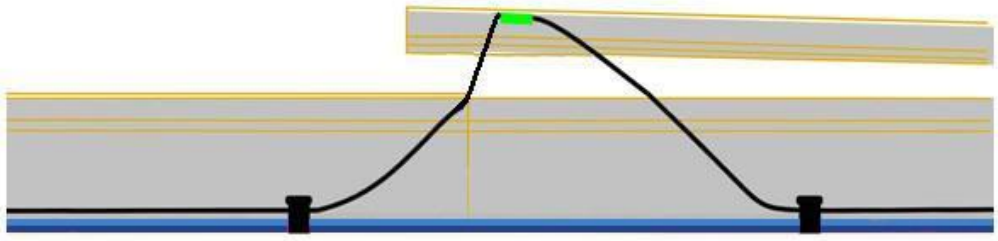
NARIA SECURITY

LITECOPPER

ANTI-THEFT DEVICE FOR THE PROTECTION OF COPPER CABLES , ALSO DETECTING THE OPENING OF CABLE TRAYS



INSTALLATION MANUAL

LiteCOPPER

Analyser (Tx+Rx)

LCOP300C011S

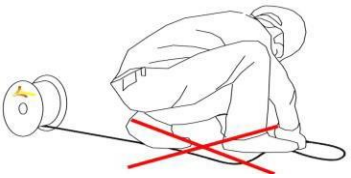
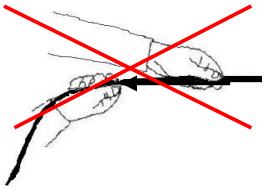
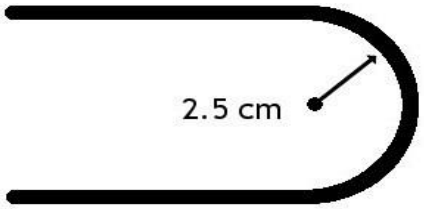
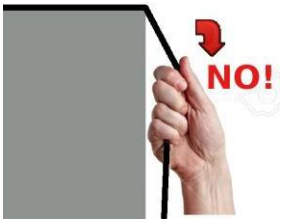
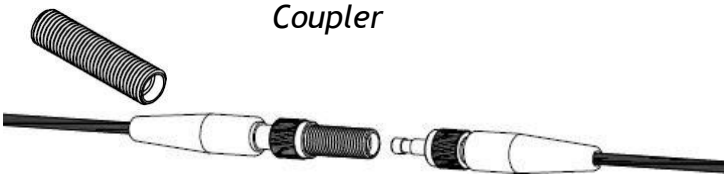
LiteCOPPER TX

Transmitter

LFEN300F011T

Genaral precautions

Plastic fiber is very resistant and does not break easily, but bends and passages on edges may reduce, also significantly, the maximum operating range of the system.

Do not tread or walk on the cable LiteWIRE	 NO !
Do not pull hard on the cable LiteWIRE	 NO !
Minimum bending radius of 2.5 cm	
Do not make narrow angles and do not run the cable in holes with sharp edges	
Do not pull the fiber on edges because it risks straining and damaging inside	
Do not over-tighten cable ties: the fiber must pass without friction	
Repair the cable mechanically, using a coupler. **DO NOT USE HEAT SHRINK TUBING!** *N.B. Every reparation reduces the maximum operating distance by - 0.2dB (about 20m)*	*Coupler* 

These conditions are increased if the fiber is laid at low temperatures.

*This manual must be read **before** installation: very often, the problems occurring during installation are due to installation mistake which can be avoided by reading this manual carefully.*

Note 1: This equipment design typically applies to commercial or industrial equipment expected to be installed in locations where only adults are normally present

This equipment is not suitable for use in locations where children are likely to be present

The device cannot be used where children are present without adult supervision. The appliance is intended for use by expert and duly trained personnel only.

LiteCOPPER – How it works

When an attempt of theft of copper cables causes flections on the fiber or interrupts it, the optical analyzer LiteCOPPER detects the variations of the lights signal and triggers an alarm. *After that, if the fiber has remained intact, the system resets automatically, adapting to the (new) position*.

This anti-theft system is composed of 3 elements:

- **"LiteCOPPER": an optical analyser that sends a light signal and analyses the flow of light it receives.**
- **"LiteWIRE": the cable in plastic optical fiber which transmits the light signal.**
- **An opto-mechanic item (i.e. fast-bolt). Once it has been attached to the cable tray, this bolt transforms the opening of the manhole (and the consequent flexion of the cable) into a light variation, so that the analyser LiteCOPPER can trigger an alarm as soon as the tray is opened**

LiteCOPPER analyser detects the flexions of the fiber as soon as the cable tray is opened or the cable is moved, allowing prompt intervention.

*If your plant has more than one analysers, **FIRST** install one analyser with its link of fiber, and check that the system works properly and as expected, before installing the system on the plant. **ONLY AFTER THAT** install all the fiber and the analysers on the plant. **The conditions mentioned in this manual are suitable for cables running in cable trays. However, there may be variables which are not take into account in this manual.***

If the detection of intrusion in the trial installation is not satisfactory, please contact *Naria Security* per further tips and suggestions on how to make the LiteCOPPER system suitable for your installation.

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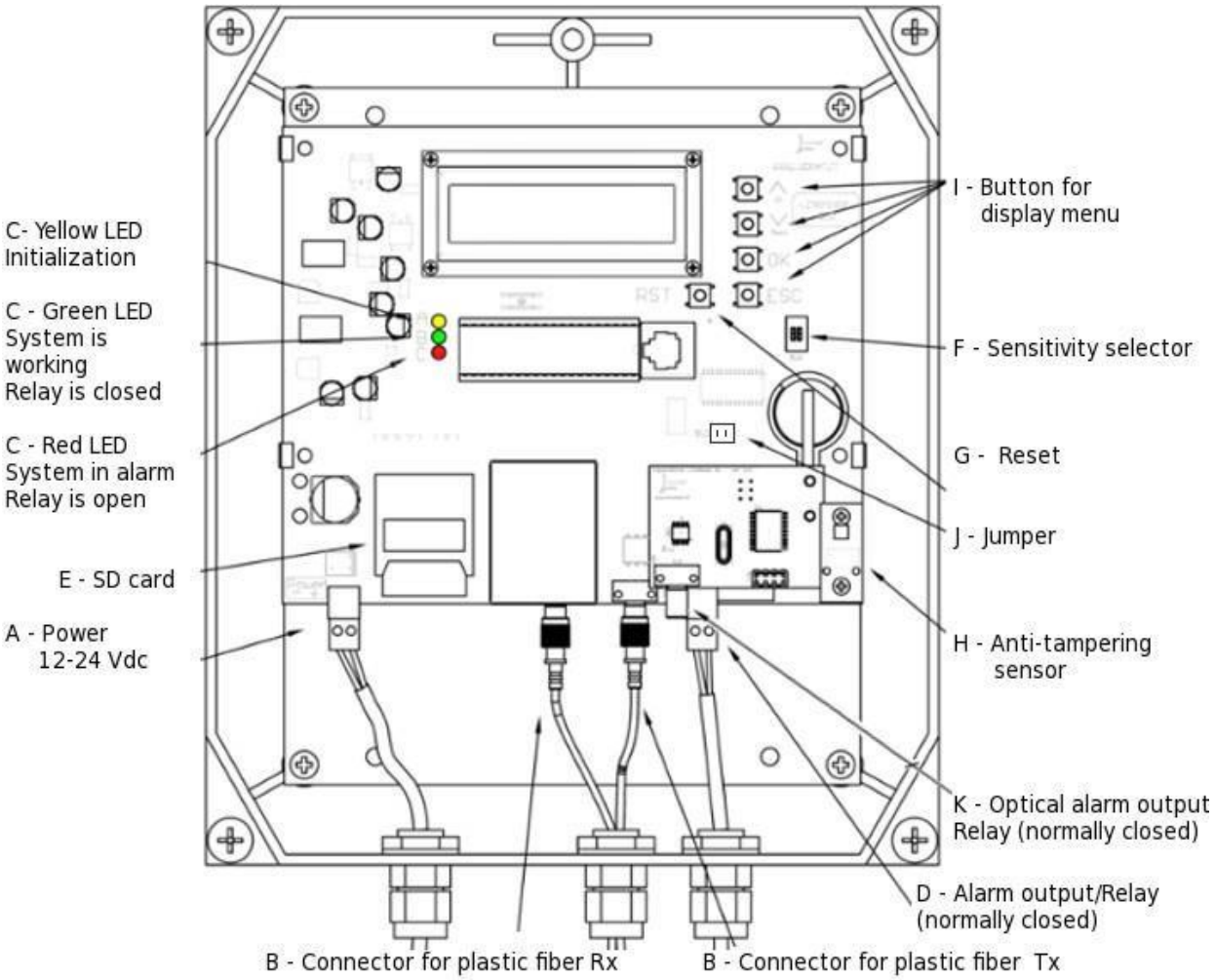
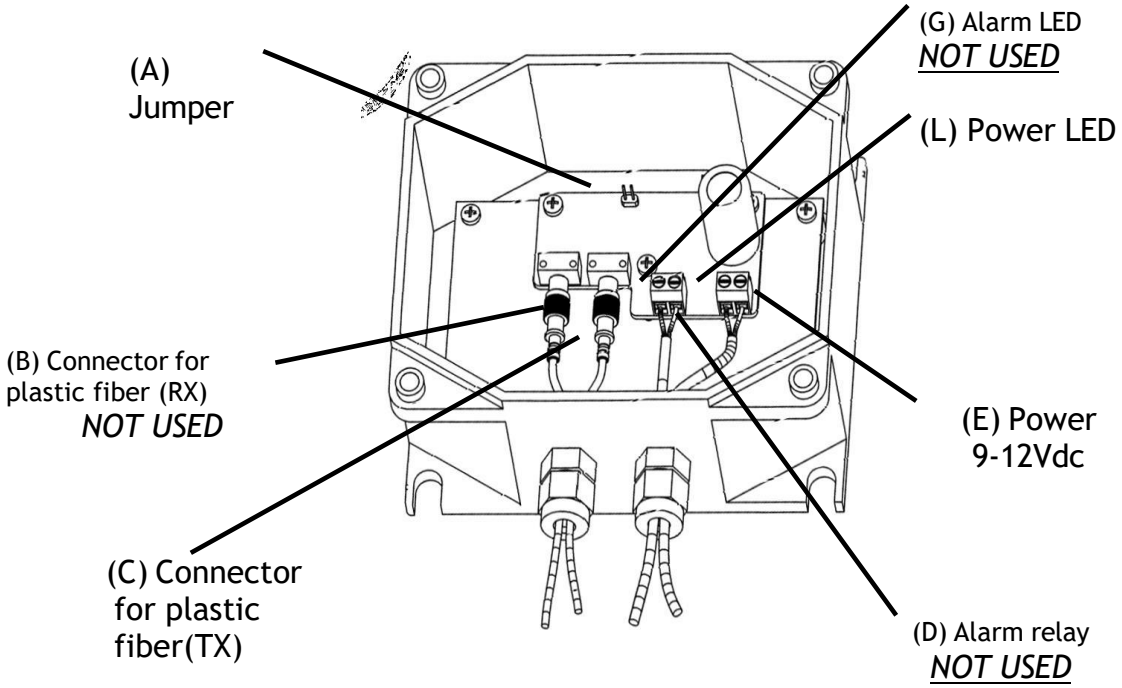
LiteCOPPER – Reference figures

LiteCOPPER analyser

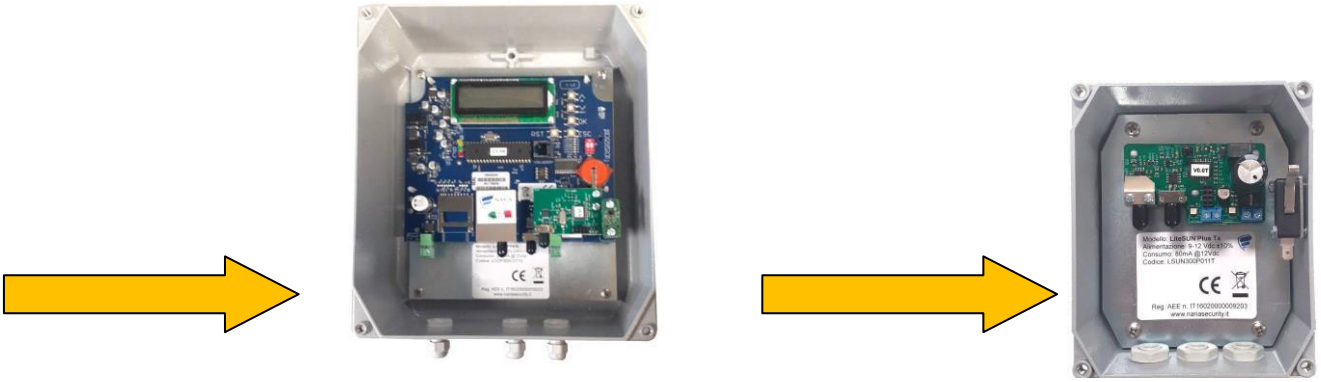


LiteCOPPER Trasmitter



Equipment markings

The identification plate of the product is placed inside the protective case, as the installation could be exposed to the elements. To locate the CE tag, remove the housing cover.



Technical specifications

LiteCOPPER - ANALYSER

Protection rating	IP55
Operating range	0-300m* (max 30dB) *Equivalent distance considering correct installation (attenuation of fiber lower than 0.1dBm/m at 525nm).Bends, passages on edges, misplaced or over-tightenedcable ties and mechanical stresses on the fiber can increase the attenuation of the optical signal.*
Optical power budget	30dB
Power Meter	Built-in
Alarm output	5A/240 Vdc NC or optical output
Power (DC)	12V-24V±10%
Operating temperature	-20°+70°C
Humidity	da 5 a 90%
Consumption at 12VDC	250mA
Max. power	3W
Weight and dimensions in IP55 casing	1900g ; 220 x 255 x 90 mm
Optical connector	F-SMA
Immunity to EMI/RFI	EMC 2014/30/UE; FCC Class B: verification level part 15

LiteCOPPER TX - Transmitter

Protection rating	IP55
Operating range	0-300m* (max 30dB) *Equivalent distance considering correct installation (attenuation of fiber lower than 0.1dBm/m at 525nm).Bends, passages on edges, misplaced or over-tightened cable ties and mechanical stresses on the fiber can increase the attenuation of the optical signal.*
Power (DC)	9-12V±10%
Operating temperature	-20°+70°C
Humidity	from 5 to 90%
Consumption at 12VDC	80mA
Weight and dimensions in IP55 casing	520g ; 115 x 160 x 60 mm
Optical connector	F-SMA
Immunity to EMI/RFI	EMC 2014/30/UE; FCC Class B: verification level part 15

LiteWIRE Simplex - Plastic optical fiber

Plastic optical fiber	SI-POF (980/1000)
Bandwidth	30 MHz 100m
Numerical aperture (NA)	0.46±0.025
Max. attenuation @525nm/@650nm	100dB/km 150 dB/km
Jacket ***(with metrical marking)***	**Anti UV** with ***meter marking***
Diameter of bare/jacketed plastic fiber/armoured cable	1mm/2.2mm ± 0.1mm
Weight (kg/km)	6
Max pulling force(N)	500max @25°C
Bending radius (mm)	25min (@25°C)
Operating temperature (°C)	-40/+85 *At low temperatures, the fiber tends to be more rigid and less flexible when it is laid*
Immunity to EMI/RFI	**Total**
Reaction to fire	**ECA**

Attenuation of plastic fiber LiteWIRE

Plastic optical fiber is a polymeric material which transmits light inside and it also permits the transmission of a light signal. While this signal propagates along the fiber, it gradually loses power: this is called ***attenuation***.

Every meter of plastic fiber introduces an attenuation (= loss of optical power): the more fiber is installed, the more attenuation is introduced, the lower will the optical power be at the end of the fiber.

Some factors related to the installation of the fiber (e.g. over-tightened cable ties, etc.) increase its attenuation.

The power of the light signal is measured in dBm.

Example:

FIBER start
at 0 meters
power = 0dBm

FIBER end
at 100m
power = -10dBm

Attenuation = loss of optical power = 10dB

LiteCOPPER analyser works correctly if optical power is between 0 and -30dBm. In a standard installation, the following elements are considered:

25dB = attenuation of 250m of fiber

The use of fast bolts should result in no attenuation increase on the fiber. The presence of cable ties which keep the fiber attached to the copper cables to be protected, however, might increase attenuation slightly.

***It is possible to build an optical power meter in LiteCOPPER**: in this way, the installer will be able to monitor attenuation constantly, in every step of installation, and will be able to solve any installation mistakes promptly.*

Bends, passages on edges, misplaced or over-tightened cable ties and mechanical stresses on the fiber can increase the attenuation of the optical signal, reducing, even considerably, the maximum operating range, even preventing the system from working correctly.

Connection schemes

All LiteCOPPER analysers have a normally closed (NC) alarm output

The NC contact has either a standard electrical output or an optical output for plastic fiber.

In case the optical ouptus is used, the plastic fiber cable LiteWIRE must be connected to a receiver for optical NC contact (cod. LCUT300S001S), which converts it back into electrical.

LiteCOPPER analysers can be connected in line, keeping their alarm zones either separate or grouped.

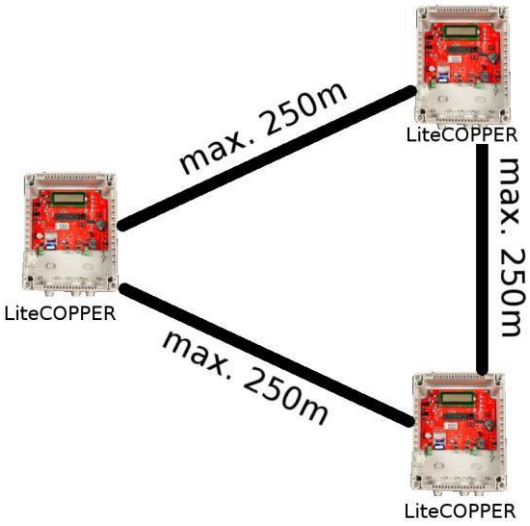
Normally, the ***jumper*** (J) is on: in this way, every alarm zone is separate and alarm s not propagated (Number of LiteCOPPER analyzer – Number of alarm zones).

If the ***jumper*** is off, the alarm is propagated over to the next device, creating one single alarm zone (Number of LiteCOPPER – 1 single alarm zone). In this case the first device must have the jumper on, the following devices must have the jumper off.

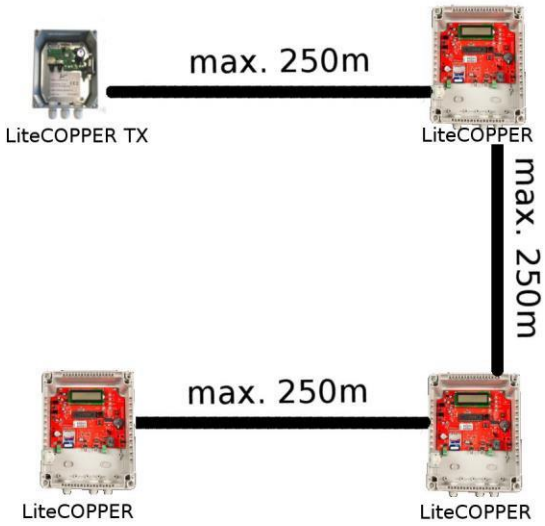
After setting the jumpers on/off, press RESET

After setting the jumpers on/off, press RESET.

Loop connection
In this case, only LiteCOPPER analysers are used.



Point to point connection
In this case, LiteCOPPER TX is used to launch the signal.



LiteCOPPER – Installation in cable trays

1 - Pass the LiteWIRE cable through the cable trays WITHOUT CABLE TIES

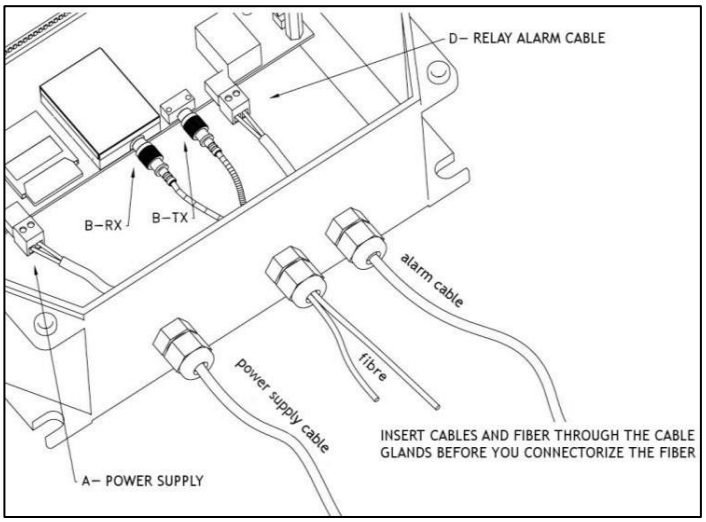
2 - Connect LiteWIRE to LiteCOPPER and power it

FIRST insert the LiteWIRE cables through the cable glands of the water tight box, THEN crimp the connectors (see *Termination of LiteWIRE*) and connect them to the device (B).

Connect power supply (e.g. from the battery of the alarm panel).

The yellow led glows for some seconds and the green led glows.

From this moment on, the transmission port (TX) emits codified light signals which pass through the plastic optical fiber and arrives at the receiving port (Rx). The device will continually control the power of the signal received.



When the device detects a difference in power, due to cable cut or bends on the fiber, an alarm will go off and the red LED is lit (see "LED indicators").

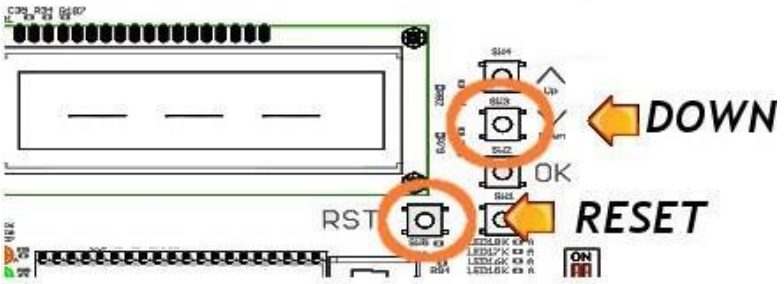
3 - Set LiteCOPPER to POWER METER mode

To prevent increase of attenuation of the fiber during installation of the cable in the tensioning bolts and when the cable ties are tightened, it is VERY IMPORTANT to keep the optical power received by LiteCOPPER constantly monitored.

- Keep the DOWN button pressed while you switch on the system, until a dashed line appears on the display

OR

- if the analyser is already powered, reset it before setting it to *Power Meter* mode.



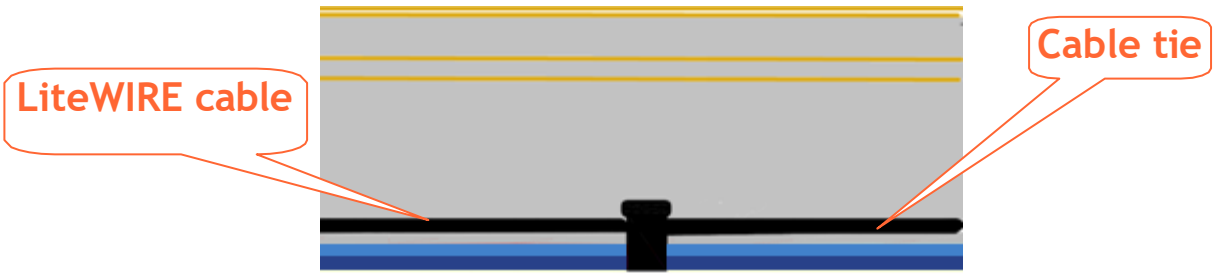
While you keep the DOWN button pressed, press the Reset button, and then release Reset first and DOWN afterwards. After a few seconds a dashed line will appear.

4. Check that the attenuation is corresponds with the fiber installed

Before securing the fiber to the fast bolts and before tightening the cable ties, make sure that the attenuation rate of the fiber matches with the length of the fiber installed (see "Attenuation of the plastic fiber LiteWIRE")

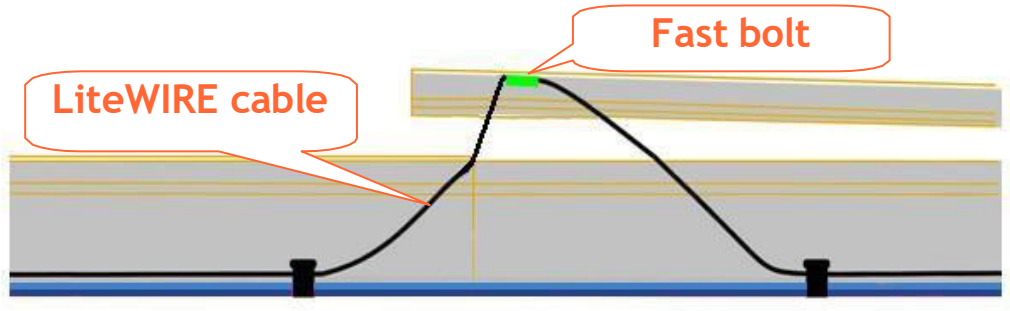
*EXAMPLE: If 170m of LiteWIRE have been installed, without securing them to the fast bolts on the lids, the **Power Meter** will indicate -17dBm ± 2dB, because every meter of fiber attenuates 0.1dB. If the value were higher, e.g. -19dBm, check that the fiber has been installed correctly*

5. Secure the copper cable to the fiber cable using cable ties

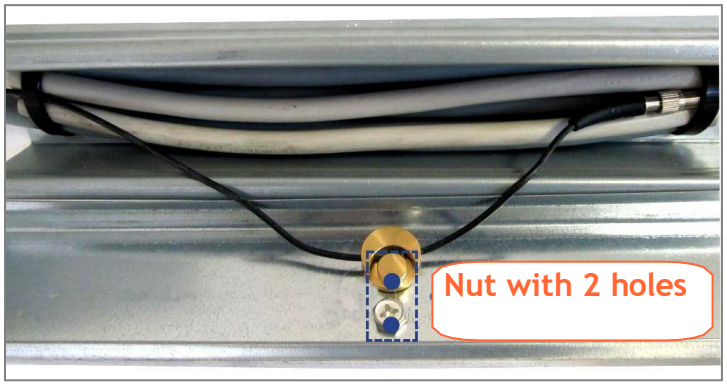


Leave enough excess fiber in order to be able to open the cable tray, but not too much, so the opening of the tray will be detected

6. While monitoring the attenuation of the fiber with LiteCOPPER, secure the fiber cable LiteWIRE to the lid of the cable tray using the fast bolt (use 1 every about 10m)

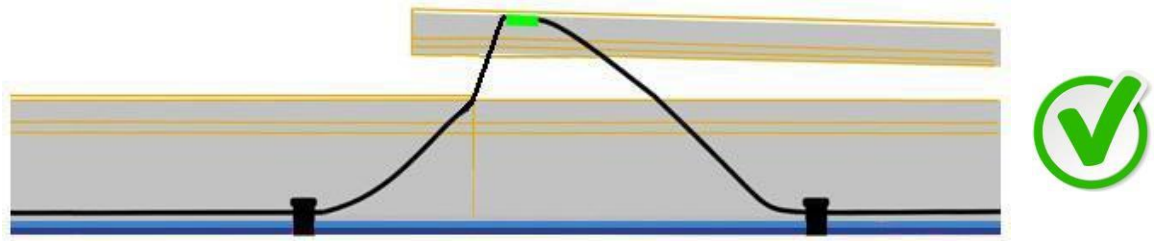


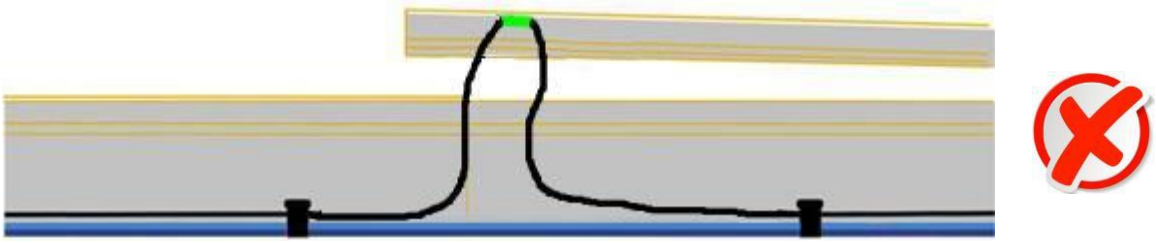
The fast bolt is attached using a special nut with 2 holes: use 1 hole for the bolt and 1 hole for the screw (screwed from inside) to prevent screwing.



7 - Test the opening of the lid

The LiteWIRE cable inside the tray should not be too loose.





Make sure that the alarm goes off as soon as the lid is lifted for just a few centimetres.

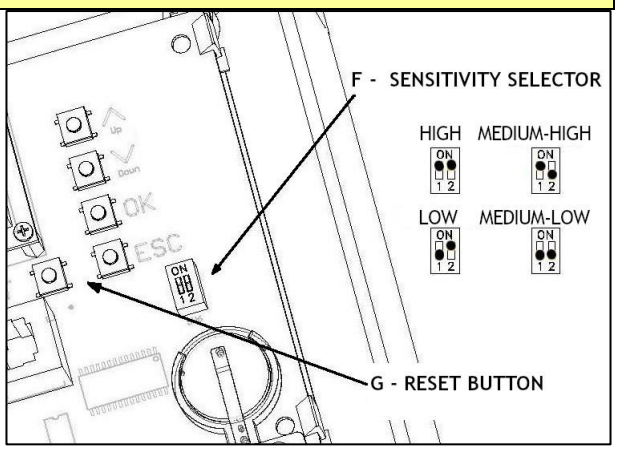
In case the alarm goes off only when the lid is wide open, tie the cable LiteWIRE to the copper cables in order to reduce excess fiber.

8 - Set sensitivity level after real tests

This device has 4 sensitivity settings you can select according to your application using the selector (F).

S1 = High sensitivity
S2 = Medium-high sensitivity (recommended) S3 = Medium-low sensitivity
S4 = Low sensitivity

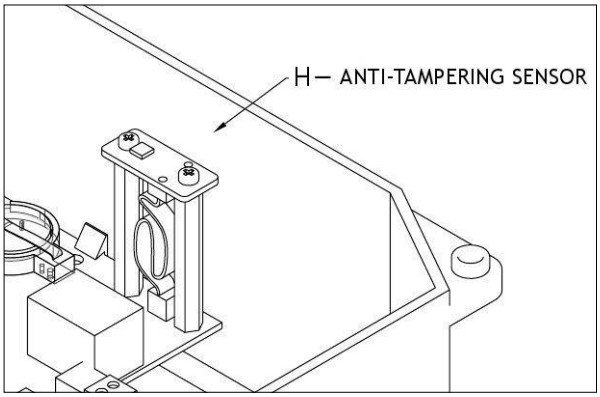
Usually, S1 or S2 are selected.



RESET after every change of sensitivity

9 – Connect the alarm zone

Connect the alarm zone (D) to the alarm panel (from 5A to 240VAC). It is recommended to add balancing resistors in series. **The relay of the anti- tampering sensor is connected in series to the alarm output.**



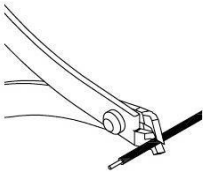
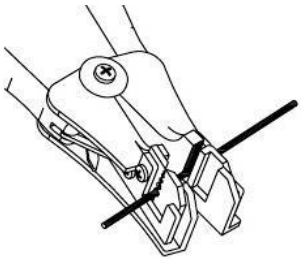
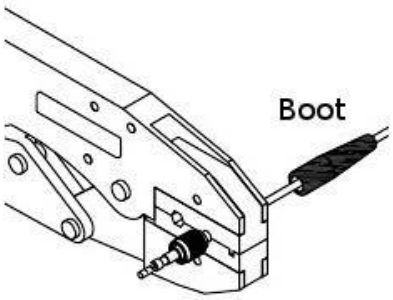
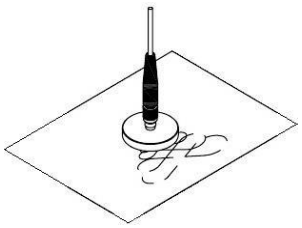
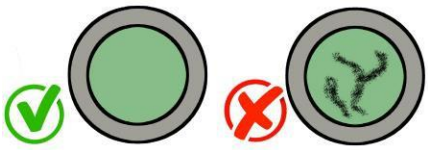
Normally, the ***jumper*** (J) is on: in this way, every alarm zone is separate and alarm s not propagated (Number of LiteCOPPER analyzers – Number of alarm zones).
If the ***jumper*** is off, the alarm is propagated over to the next device, creating one single alarm zone (Number of LiteCOPPER – 1 single alarm zone). In this case the first device must have the jumper on, the following devices must have the jumper off.

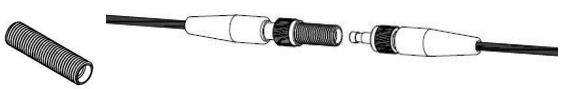
After setting the jumpers on/off, press RESET.
*The **circuit is normally closed**, so the relay is closed when there are no alarms. In case of disconnection, cable break, no power or cable bending, the circuit opens.*

10 - Remove film from the battery and set date/time

How to terminate and repair LiteWIRE

FIRST insert the LiteWIRE cables through the cable glands of the water tight box, THEN crimp the connectors

	**1- Cut the fiber** with a cutter.
	**2- Remove the jacket** Remove about 1 cm of jacket. The jacket of the optical cable has a diameter of 2.2mm. The fiber has a diameter of 1 mm. **ATTENTION!** *Use a standard cable stripper with a hole of 1.0 mm or more, so you will not damage the fiber.*
 **Connector**	**3 - Crimp the connector** Insert the protection boot. Insert the FSMA connector onto the cable till the jacket stops against the connector; the fiber should come 2mm out of the connector. Crimp the FSMA connectors on the cable jacket. **ATTENTION** *The connector must be crimped on the cable jacket and must not be crimped directly on the fiber. The crimp tool for FSMA connectors must have a hexagonal crimping diameter of 3mm. Use the 1.22" hexagonal hole.*
	**4 - Cut excess fiber.** It is NECESSARY to leave 1mm or 2mm of excess fiber out of the connector: this prevents micro-fractures on the fiber, which would increase fiber attenuation
	**5 - Fiber polishing** Level the fiber by polishing the connector on sand paper using the metal polishing disc. **ATTENTION!** *You should make some "8"-shapes with the connector on the sand paper.* Wipe the connector with a finger
	**6 - Visual check** Put the other end of the fiber on a light source (eg. LED of the transmitter), watch the light coming out of the connector and make sure that there are no cracks on the surface of the fiber. If there are cracks, remove the connector and put a new one on.

 *Coupler*	**DO NOT USE HEAT SHRINK TUBING!** *Every reparation reduces the maximum operating distance by 2dB (about 20m)*

Data analysis

LiteCOPPER continually logs the attenuation rates over the cable (one log every second) as well as alarms, recording them to an SD memory card (E). It is important that DATE and TIME are set correctly on the device.

After one month of operation, you can send the SD memory card in the device to Naria Security: we will give you free support about the most appropriate level of sensitivity that should be selected on the device.

WARNING: the files reporting the logs can only be read by a special software of Naria Security. **Do not try to open the SD memory card, as all data could be cancelled.**

Disconnect power before removing the SD card, otherwise the card could be damaged.

LED Indicators

ORANGE: initialization of device; wait until the device starts working and the LED turns green. If the signal received is too low, the yellow LED will remain on.

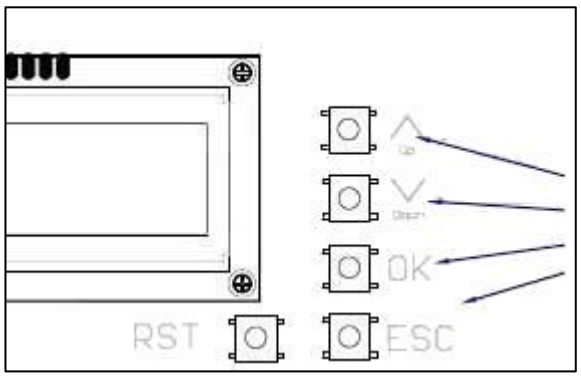
GREEN: system working, closed relay

ORANGE+GREEN: the device is working but the maximum attenuation rate has been reached, with the following alert on the display "ATTENTION LOW SIGNAL"
>>>check that the fiber/bolts/clips/sensors/cable ties are installed correctly and do not increase attenuation; in case, set a lower sensitivity level with the dip switches (F).

ORANGE+RED: the anti-tampering sensor is triggering the alarm OR the light signal has been totally interrupted (e.g. fiber cut) >>>wait till the green LED glows or check that the light comes out of the fiber

User's interface

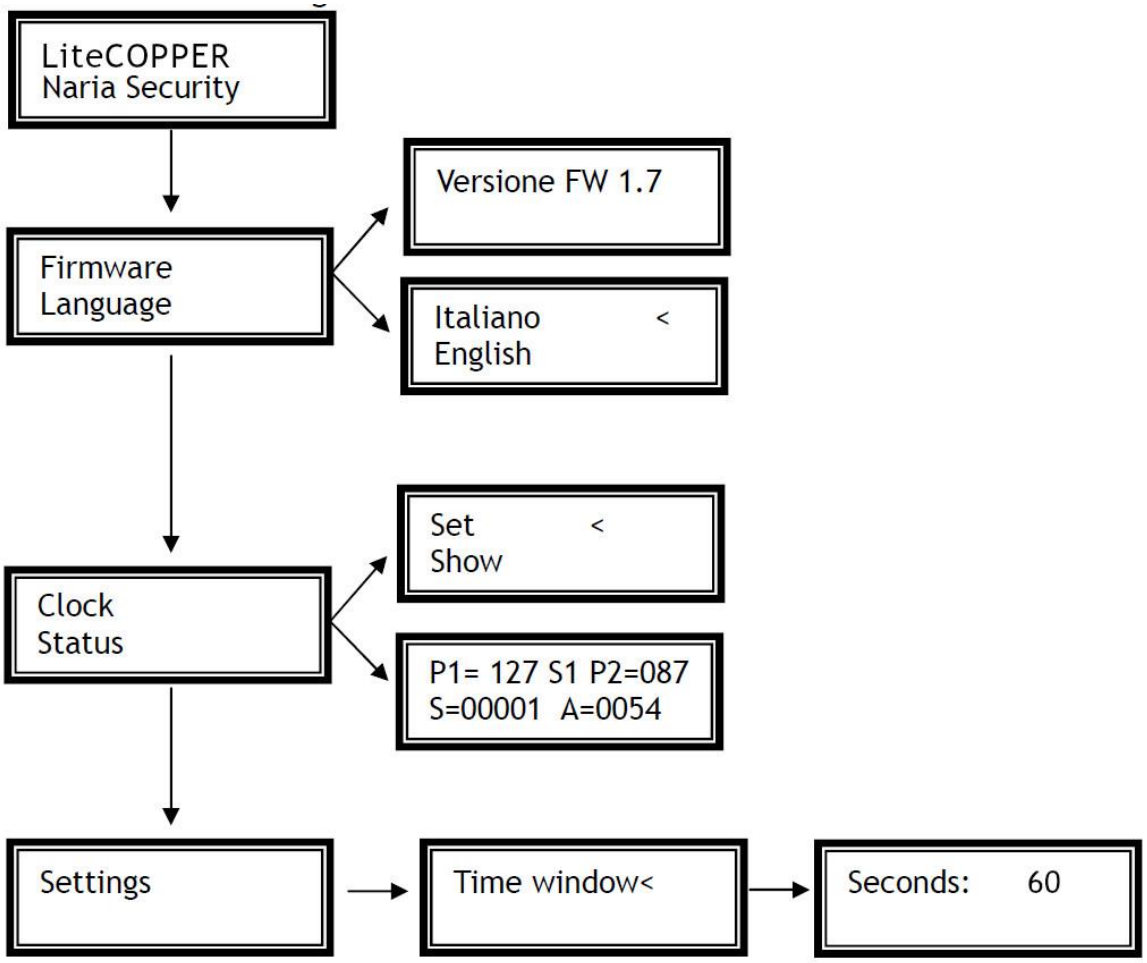
LiteCOPPER features a text interface which you can access using the button on the right of the display.



- **Up** - menu scroll upwards
- **Down** - menu scroll downwards
- **OK** - option selection
- **ESC** - menu exit
- **RST** - Reset

Sub-menus:

- ***Firmware***: shows current firmware version
- ***Language***: shows the language
- ***Clock***: shows date/time, which can also be set
- ***Settings:*** You can select the *Time window* for you can set the analysis time window of the light signal attenuation. The variation of this parameter detects attenuation variations in different intervals. Rates range from 1s (default: lowest sensitivity) to 60s (highest sensitivity).
- ***Status***: reports statistical data on how the device is working



In “Status” menu you can see the following parameters

• **P1 and P2** :

Statistical data on how the device is working – it cannot be modified

•**S1: Sensitivity** set with

selector (F) S1 = High

sensitivity
S2 = Medium-high
sensitivity S3 =
Medium-low sensitivity
S4 = Low sensitivity

• **S : Status**

S=00001 Fiber not connected (no light signal received)
S=00002 Fiber connected (light signal received): attenuation

analysis/initialization S=00003 Device is active

• **A: Number of alarms** reported by the analyser
This counter can be re-set by keeping button UP pressed while switching on or while resetting the device.

After the installation, we recommend RESET the alarm log (press **“RST”** + **“/\”**)

DICHIARAZIONE DI CONFORMITA'

Declaration of conformity

No.: 004/2021

Naria Security S.r.l.

Con sede legale in Via Cefalonia, 70 - 25124 Brescia

e sede operativa in Via A. Canossi, 18 - 25030 Torbole Casaglia (BS) Italy

dichiara qui di seguito che il prodotto
declares under its responsibility that the product

320.SIS.LCOP300C011S LiteCOPPER

scheda per controllo sistema anti intrusione

risulta in conformità a quanto previsto dalla seguente direttiva comunitaria
complies with the following EEC-directives

Electromagnetic Compatibility: ***EMC 2014/30/UE***

Reduction of Hazardous Substances: ***2015/863/UE, ROHS III***

e che sono state applicate tutte le norme indicate di seguito.
and is in conformity with the standards listed below.

Data: 10 marzo 2021

(firma)

Norme, o parti di esse, utilizzate per la presente dichiarazione di conformità:

Regulations, or part of them, used for this declaration of conformity

EN50130-4 Alarm systems Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder and social alarm system

EN61000-6-3: Electromagnetic compatibility (EMC) Part 6-3: Generic standards - Emission standard for residential, commercial and light industrial environments

DICHIARAZIONE DI CONFORMITA'

Declaration of conformity

No.: 003/2021

Naria Security S.r.l.

Con sede legale in Via Cefalonia, 70 - 25124 Brescia

e sede operativa in Via A. Canossi, 18 - 25030 Torbole Casaglia (BS) Italy

dichiara qui di seguito che il prodotto
declares under its responsibility that the product

320.SIS.LFEN300F011L LiteFENCE Lite
320.SIS.LFEN300F011T LiteFENCE Trasmettitore/LiteCOPPER Trasmettitore

scheda per controllo sistema anti intrusione

risulta in conformità a quanto previsto dalla seguente direttiva comunitaria
complies with the following EEC-directives

Electromagnetic Compatibility: ***EMC 2014/30/UE***

Reduction of Hazardous Substances: ***2015/863/UE, ROHS III***

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Read this manual carefully before installing the devices and follow all the instructions and suggestions.

Keep the manual in a safe place after reading

so that you can refer to them later.

Subject to technical modifications with corresponding follow-up certifications.
Do not throw the package away before checking that the devices work correctly.

Naria Security srl
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