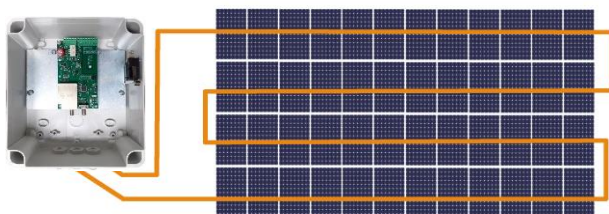


LITESUN PLUS EASY

ANTI-THEFT SECURITY SYSTEM OVER PLASTIC OPTICAL FIBER FOR THE PROTECTION OF SOLAR PANELS

(detection of bend and cut of fiber)



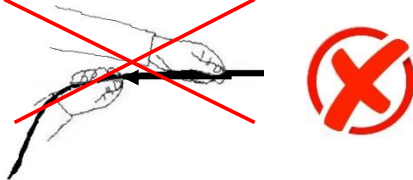
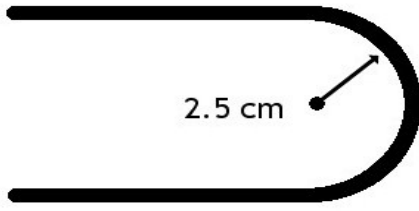
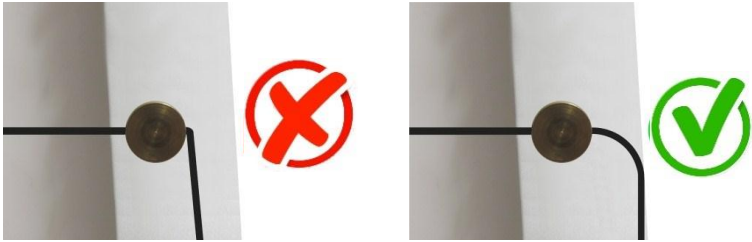
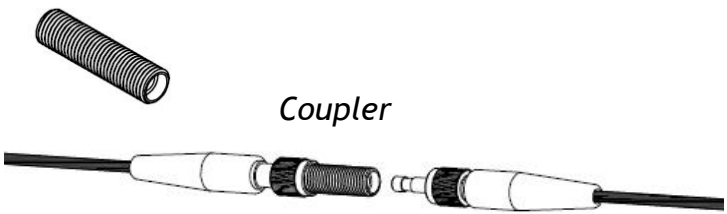
INSTALLATION MANUAL



LiteSUN Plus EASY
analyser
LSUN300P11ES

General 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 	
Do not pull hard on the cable LiteWIRE 	
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 SCHRINK TUBING! <i>N.B. Every reparation reduces the maximum operating distance by - 0.2dB (about 20m)</i> 	 Coupler

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



- Do not insert the fiber directly in the holes of the panel frames: use the recommended special bolts/drilled pins.
- Do not drill the solar panels (it could invalidate the warranty)

*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.

LiteSUN Plus EASY - How it works

This system works like a chain: the fiber plastic is attached to the solar panels to link them together and is connected to the analyser *LiteSUN Plus EASY*, which can detect both the cut and the bend of the fiber.

The plastic fiber cable LiteWIRE makes a loop all through the panels and gets back to the analysing board.

When an attempt of theft results in deformation or interruption of the fiber, the optical analyser *LiteSUN Plus EASY* detects the variation of the light signal and triggers an alarm.

After that, if the fiber has remained intact, the system resets automatically, adapting to the (new) position.

ZERO FALSE ALARMS: the plastic fiber must be bent or cut in order for the analyser to trigger an alarm. For this reason, all the stresses due to weather conditions (like wind, rain or snow), leaves or birds do not trigger any false alarms.

In addition, plastic fiber is an electrical insulator and it is not influenced by any electro-magnetic noise.

This anti-theft system is composed of 3 elements:

- **“*LiteSUN Plus EASY*” analyser, which sends a light signal and analyses the flow of light received, generating an alarm both when the cable is cut and when the cable is bent or stretched out.**
- **Plastic fiber cable “*LiteWIRE*” (with anti-UV filters for installation in the direct sunlight) which transmits the light signal**
- **Elements which secure the fiber to the solar panels (drilled bolts, drilled pins, fast bolts or adhesive tape.)**

It is important to make sure that the cable *LiteWIRE* is installed correctly.

The instructions contained in this manual will enable you to install the plastic fiber cable correctly.

*If your plant has more than one analyser, **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.*

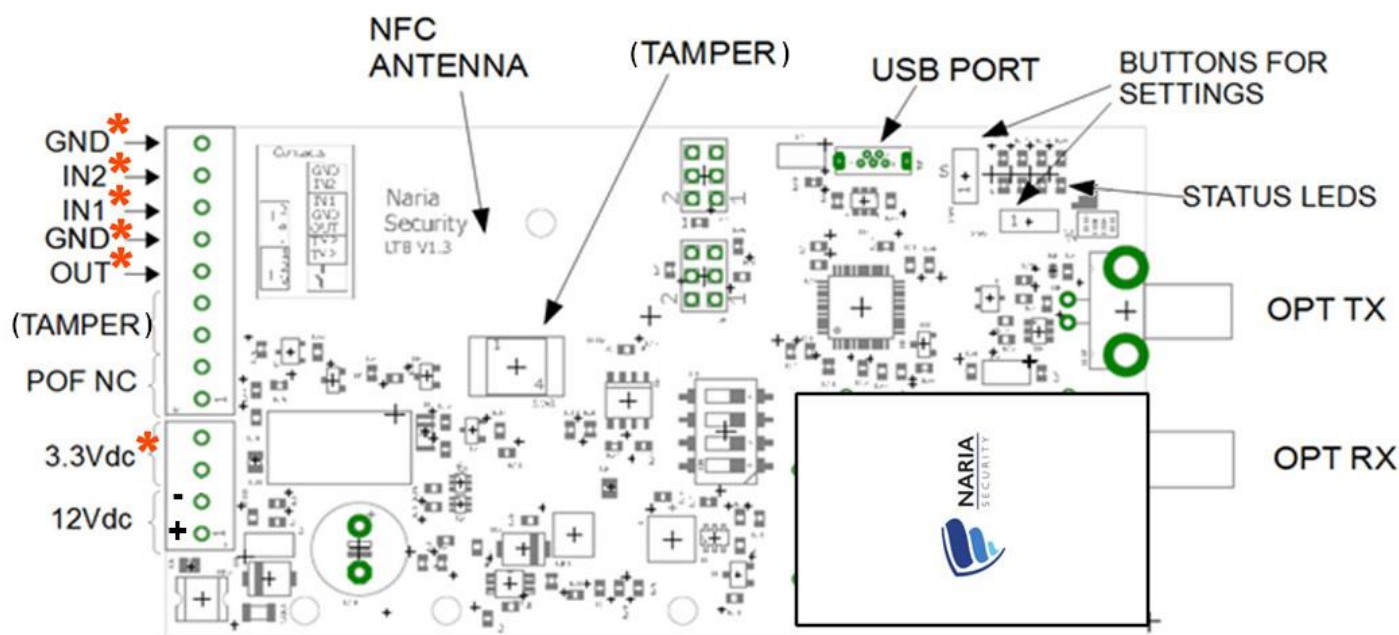
The conditions mentioned in this manual are suitable for most photovoltaic plants. However, there may be variables which are not take into account in this manual.

If the detection of attempt of theft in the trial installation is not satisfactory, please contact *Naria Security* per further tips and suggestions on how to make the *LiteSUN Plus EASY* system suitable for your photovoltaic plant.

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Reference figures



*These connectors are for future functions

The board is normally in an IP55 casing with mechanical opening sensor, so the button (TAMPER) on the board is not used.

LiteSUN Plus EASY - 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

LiteSUN Plus EASY

Protection rating of casing	IP55; IK07; glow wire temperature:750°C
Operating range	0-150m (max 15dB) <i>This distance can be reached if the installation is carried out correctly (attenuation of the fiber lower than 0.1dBm 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, reducing, even considerably, the maximum operating range, even preventing the system from working correctly</i>
Optical power budget	15dB
Alarm relay output	2A/220 Vdc NC
Power (DC)	12VDC
Operating temperature	-20° +70° C
Humidity	from 5 to 90%
Consumption at 12VDC	70mA
Anti-tampering sensor	mechanical
Weight and dimensions in IP55 casing	670g 210x160x85mm
Optical connector	FSMA connectors
Immunity to EMI/RFI	EMC 2014/30/UE

Power supply must be no more than 15 watt

LiteWIRE Simplex - Plastic optical fiber

Plastic fiber	SI-POF (980/1000)
Numerical aperture (NA)	0,46+-0,025
Max. attenuation	100dB/km @525nm / 150dB/km @650nm
Bandwidth	30MHz at 100m
Diameter of bare/jacketed plastic fiber	1mm/2,2mm ± 0,1mm
Min. bending radius	20mm at 25° C <i>During installation at low temperatures, the fiber tends to be more rigid and less elastic, so more care is required</i>
Jacket	Anti UV with meter marking
Weight	6kg/km
Max pulling force	65N at 25° C
Operating temperature	-40° C +85° C <i>During installation at low temperatures, the fiber tends to be more rigid and less elastic, so more care is required</i>
Immunity to EMI/RFI	Total
Reaction to fire	ECA

Attenuation of plastic fiber cable 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, tensioning bolts, 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
<i>Attenuation = loss of optical power = 10dB</i>		

LiteSUN Plus EASY analyser works correctly if optical power is between 0 and -10dBm. In a standard installation, please consider the following elements:

13dB = attenuation of 1310m of fiber

2dB = attenuation due to a possible future junction on the cable after attempts of theft (every junction attenuates around 2 dB)

These distances can be reached if the installation is carried out correctly (attenuation of the fiber lower than 0.1dBm 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, reducing, even considerably, the maximum operating range, even preventing the system from working correctly.

How to install *LiteSUN Plus EASY*

1 - Fix the fast bolt to the panel

Fast bolt

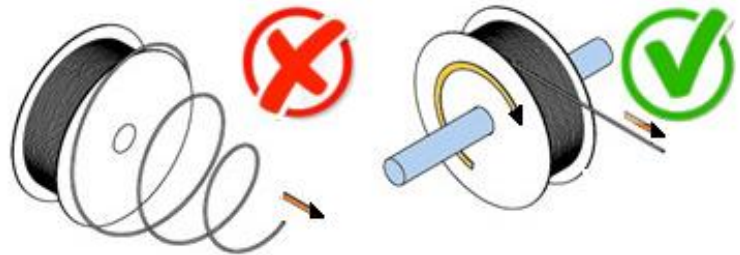
Recommended with LiteSUN Plus EASY because:

- it halves installation time (in comparison to drilled bolts for ground mounted panels).
- in case of maintenance to the panel the fiber can be easily removed and re-positioned: no need to unthread and thread it into the bolts



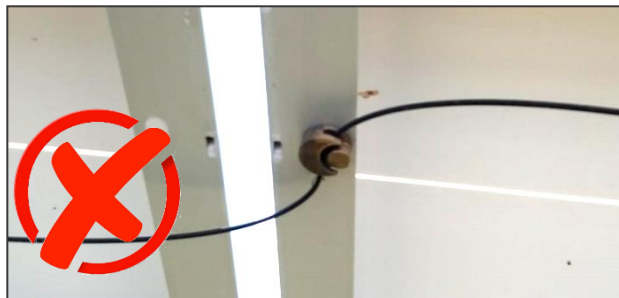
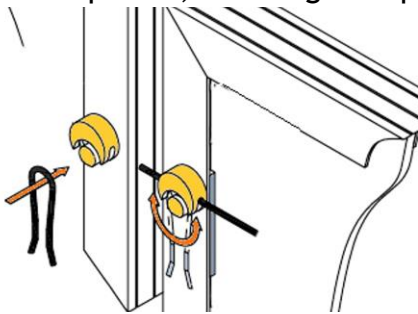
2 - Un-spool the cable

Use a cable de-reeler to prevent the cable from twirling.



3 - Pass the fiber through the bolts or the pins

In order to make the installation easier and quicker with the fast bolts, un-spool the cable and lay the cable in front of the panels to be protected. Then, hook the fiber to the fast bolts on the panels, as straight as possible and avoiding useless curves.



4 - Protect the fiber exposed to possible weather damages

Especially on roofs, where the fiber might be dragged by snow, branches, leaves or exposed to birds, we recommend protecting it with an appropriate support.



In the case shown above, the cable in plastic fiber risks triggering unwanted alarms due to birds or weather conditions. The cable can be run under the structure of the panels and fastened with cable ties (not overtightened! The cable must be able to flow).



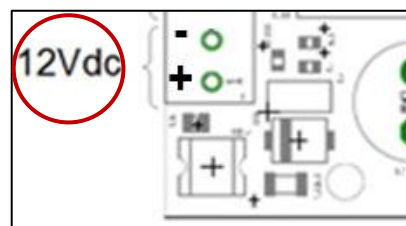
5 - Insert the LiteWIRE cables through the cable glands of the water tight box and crimp the connectors on the fiber.

See “Termination of LiteWIRE cable”

6 - Connect the fiber to the board and power.

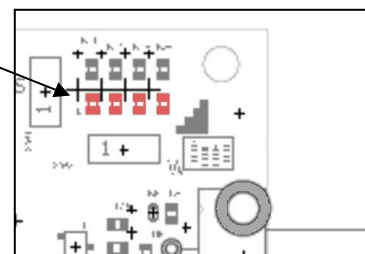
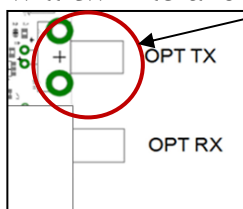
Connect the board to power.

To avoid damaging the board, make sure it is not powered before touching and handling it.



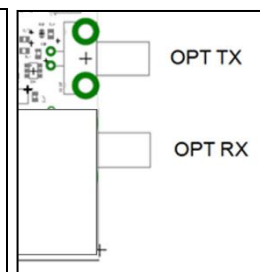
Power: 12Vdc Consumption: 70mA

When you connect the board to power, the status LEDs will twinkle and the LED on the transmission port will glow.



TIP:

First insert one end of the fiber into the TX port: you will see vivid green light coming out of the other end. If not, there will probably be an installation mistake: make sure that the fiber cable is installed correctly, no overtightened cable ties, nothing pressing the fiber, no sharp bends...
Then connect the other end to the RX port: the analyser sets up automatically in 30 seconds and is fully operative: all status LEDs are off.



From this moment on, the transmission port (TX) emits a codified light signal which runs through the plastic optical fiber and arrives at the receiving port (RX). The analyser 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.

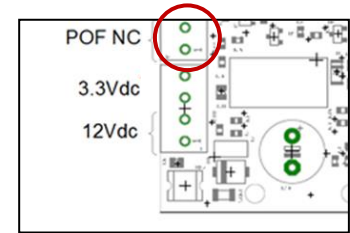
7 - Set sensitivity level after real tests

This device has 4 sensitivity settings you can select according to your application using Button “A” (see “Status LEDs”)

8 - Connect the alarm zone

Connect the alarm zone NC (2A 220VDC) to the alarm panel or to a GSM dialler. It is recommended to add balancing resistors in series, following the instructions of the alarm panel it connects to.

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.*

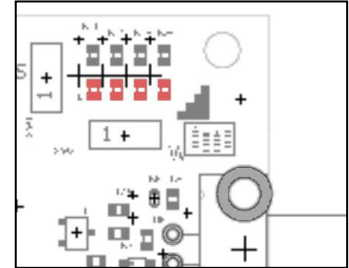


Status LEDs

The analyser is in alarm status whenever the fiber is cut, bent or stretched out.

When there is an alarm, the status LEDs twinkle and the alarm lasts 40 seconds (i.e. alarm contact remains open for 40 seconds). If the fiber cable is cut, LEDs will go on twinkling until the cable is repaired and the loop closed.

The status LEDs also twinkle when the fiber loop is not closed. When the board is normally operative, the status LEDs are off.



Buttons for settings

The board parameters are already set: the system is “**plug & play**” and pre-set values are suitable for most cases.

Button “A” controls sensitivity.

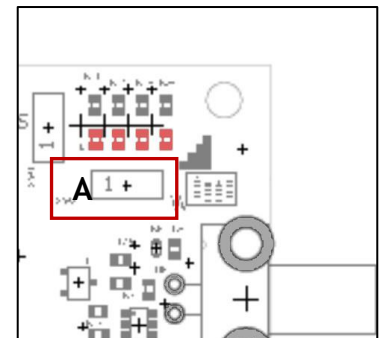
Press once to see current sensitivity: a steady LED glows as listed below.

x000= low sensitivity

0x00= medium low sensitivity

00x0= medium high sensitivity (default, used in most cases)

000x= high sensitivity



Press twice to change sensitivity

Button B controls time window.

Press once to see current time window. a LED twinkles as listed below.

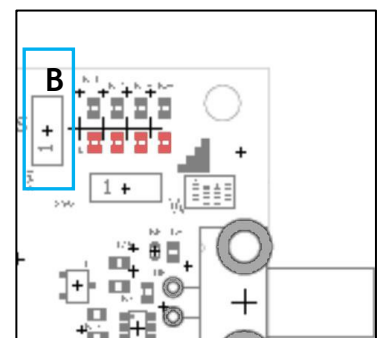
x000= long

0x00= medium-long (default)

00x0= medium-short

000x= short

Press twice to change time window*.



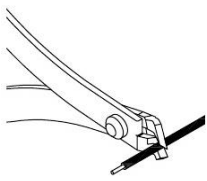
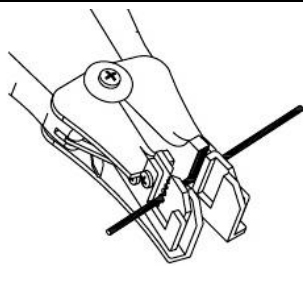
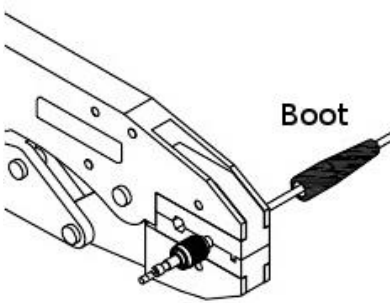
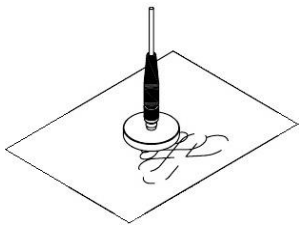
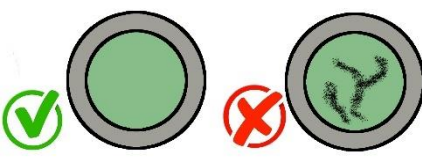
****Before changing any default settings for time window, please contact Naria Security!***

Termination of LiteWIRE (for cable reparations)

FIRST insert the LiteWIRE cables through the cable glands of the water tight box, **THEN** crimp the connectors. All the tools are contained in the "LiteWIRE termination kit".



SCAN ME

	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.
 Boot Connettore	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.
 1mm	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 sandpaper using the metal polishing disc. ATTENTION! You should make some "8"-shapes with the connector on the sandpaper. Wide the connector with a finger
	6 - Visual check Put the other end of the fiber on a light source (e.g. 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)
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Declaration of conformity



DICHIARAZIONE DI CONFORMITA'

Declaration of conformity

No.: 008/2021

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.LSUN300P11ES LiteSUN Plus EASY analizzatore 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

A handwritten signature in dark ink, appearing to read 'R. M. Merco'.

(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



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.*



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