# LiteFENCE Lite
# with SV Lite Sensor

***SECURITY DEVICE FOR PERIMETER PROTECTION***

***INSTALLATION MANUAL***


**LiteFENCE Lite**
*analyser*
LFEN300F011L


**SV Lite sensor**
*vibration sensor*
**VBRS025S000L**

***V. 003***

# LiteFENCE Lite - How it works

**Luceat anti-climb protection system is composed of 3 elements:**

- **The analyser "LiteFENCE Lite", which emits/receives the light signal and analyses the flow of light**
- **The plastic fiber cable "LiteWIRE" (with anti-UV filters), which transmits light**
- **An opto-mechanic element, "SV Lite Sensor", which transforms the vibration/oscillation/flexion of the fence into a variation of the light signal**

It is important to make sure that the cable LiteWIRE is installed correctly, i.e.:

- it is fastened to the fence without introducing attenuation on the light signal;
- it is installed correctly to the fence by means of opto-mechanic accessories to detect attempts of climbing-over without false alarms.

The instructions contained in this manual will enable you to satisfy the above mentioned conditions.

It is necessary to read this manual *before* installing LiteFENCE Lite in order to achieve the best results from the very first installation.

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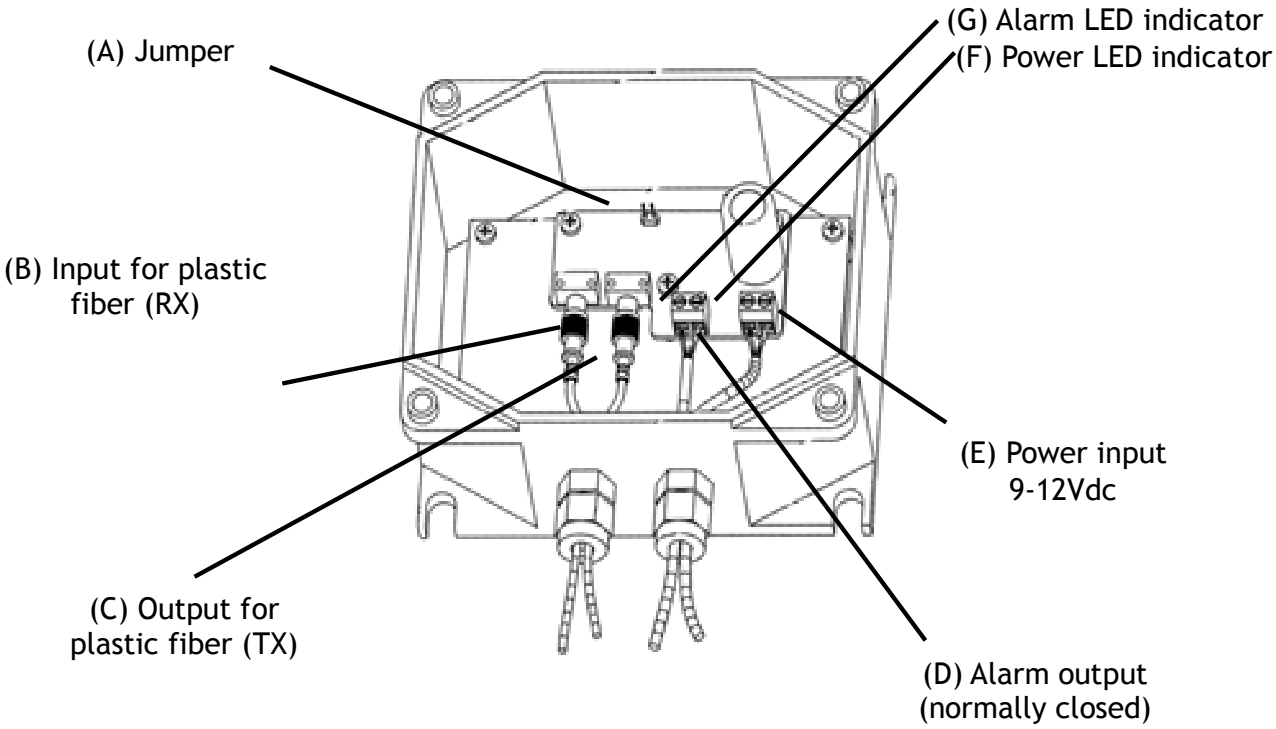
# Reference figures

## LiteFENCE Lite




## SV Lite Sensor


This sensor is pre-cabled (2 x 20m patch-cords)

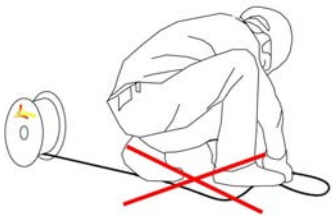
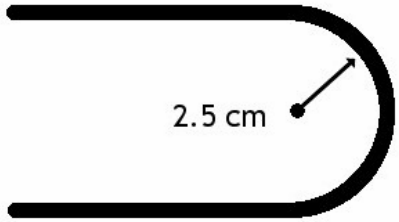
**ATTENTION!**

**Handle SV Lite Sensor with care**

*(it contains precision machinery)*

# General precautions

**Plastic fiber is very resistant and does not break, but bends and angles may reduce, also significantly, the maximum distance of the system**

| | |
|---|---|
| **Do not tread or walk on the LiteWIRE cable** |  |
| **Do not pull hard on the cable LiteWIRE** |  |
| **Minimum bending radius is 2.5 cm** |  |
| **Do not make narrow angles** |  |
| **Do not over-tighten cable ties** | |

# Attenuation of plastic fiber LiteWIRE

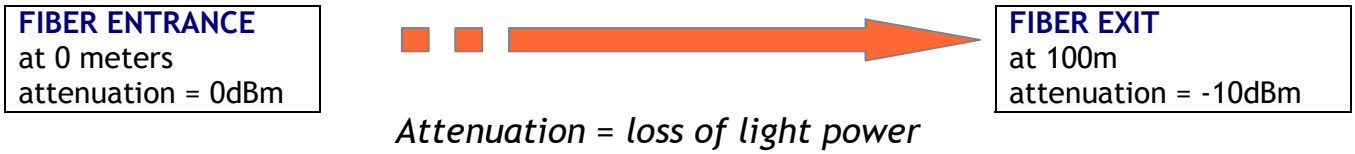
Plastic optical fiber is made of a polymeric material realized in such a way that it can lead the light inside and guarantee the transmission of the light signal. This signal looses power along the fiber: this loss is called ***attenuation***.

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

Additional factors due to the installation (e.g. over-tightened cable ties, bolts, etc.) can increase attenuation.

The power of the light is measured in dBm.

***Example:***




*Attenuation = loss of light power*

*Maximum sensitivity of Luceat systems is -30dBm.*

*The installation guidelines in this manual take into account all common sources of attenuation (10dB x 3 SV Lite sensors, incl. splices)*

*Sharp curves, over-tightened cable ties and mechanical stresses during cable installation may decrease, also significantly, the maximum distance of the system.*

## How the system works

Climbing over a modular fence, especially in its final stage, results in quite a strong mechanical strain: the fence begins to oscillate and this oscillation can be detected also several meters away from the point the fence is climbed over.

Every SV Lite sensor detects oscillations  up to 20m per side and protects up to 40m of straight fence.

***The metallic part of the fence must be at least 145m high.***
***In case of curves/angles along the fence can decrease, also significantly, the oscillation, so the use of more sensors will be required.***

In the SV Lite sensor, the light signal passes through two fibers facing each other and is constrained to move only on one axis, the same as that in which the fence sways. In the event of climbing over, swaying causes the misalignment of the fibers, the light beam completely stops and the LiteFENCE Lite analyser, which analyses the light signal, recognizes this variation triggering the alarm.

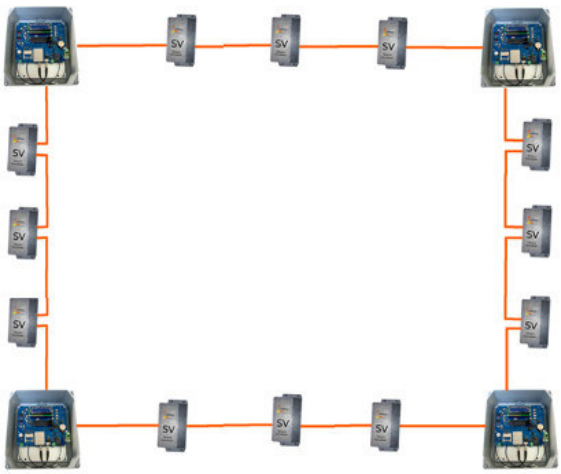
Simple vibrations resulting from weather conditions or moving vehicles fail to create a swing capable of completely stopping the light beam. Therefore the system has an excellent resistance to false alarms and does not require adjusting, new learning phases or software.

Small sensitivity adjustments can be done by moving the sensor to an upper or lower position on the fence.

**The position of the SV Lite sensor** on the fence influence the **overall sensitivity of the system:**

- SV Lite sensor in the **lower part: lower sensitivity**
- SV Lite sensor in the **upper part: higher sensitivity,** *but also higher probability of unwanted alarms.*

## Where to place sensors and analysers along the perimeter



All LiteFENCE Lite analysers and SV Lite sensors are connected as shown in the figure.

The plastic fiber is “woven” along the fence with an enter and exit process to  prevent an entry attempt via the dismounting of a panel.

Every SV Lite sensor is pre-cabled with 2 patch-cords (20m each), and has an attenuation of about 10 dBm.

Between two LiteFENCE Lite analysers, max. 3 SV Lite sensors can be placed.

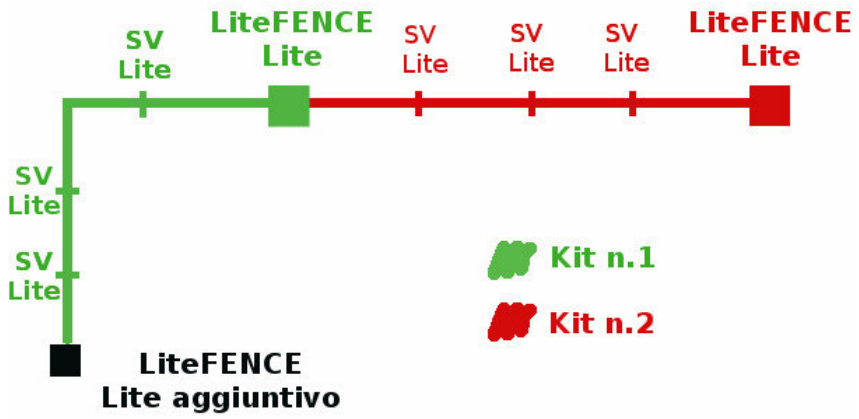
In general, for the protection of modular fencing, the following components are required:

- 1 SV Lite sensor every 40m of straight fencing (pre-cabled with 20+20m each sensor)
- 1 LiteFENCE analyser every 3 SV Lite sensors
- 2 FSMA metal connectors every analyser LiteFENCE Lite or coupler
- 1 coupler every 2 SV Lite sensors
- 1 cable tie every 1.5m of fiber

To simplify the design of fence protection, a special ***Kit FENCE Lite100m*** has been created: it contains all the material required to protect a fence of 100m (max. 120m straight).

The kits have been put together for closed loop perimeters. In case of open loop perimeters (i.e. “L” shape or “C” shape), an additional LiteFENCE Lite analysers is required.

In the example below, 2 Kit FENCE Lite kits and an additional LiteFENCE Lite have been used.

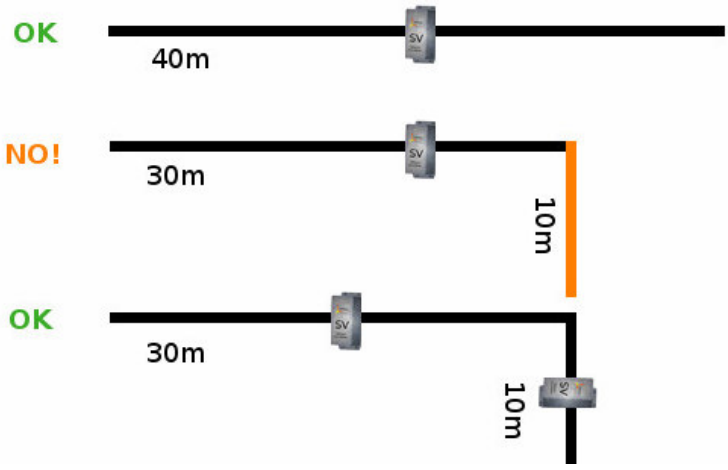



***In case of curves/angles along the fence can decrease, also significantly, the oscillation, so the use of additional sensors will be required.***

Please note that the sensitive part of the system is the sensor, whereas the fiber only transmits the signals to the LiteFENCE Lite analyser.

It is very important, that the SV Lite sensor is placed in the most suitable position to detect the oscillation.

***Angles reduce or completely interrupt the transmission of oscillations resulting from climbing over.***




40m straight protected with 1 sensor

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40m *not* straight, e.g. 30m+10m

✘ **NO!** With 1 sensor, 10m are not protectednon protetti

☞ Add 1 sensor!

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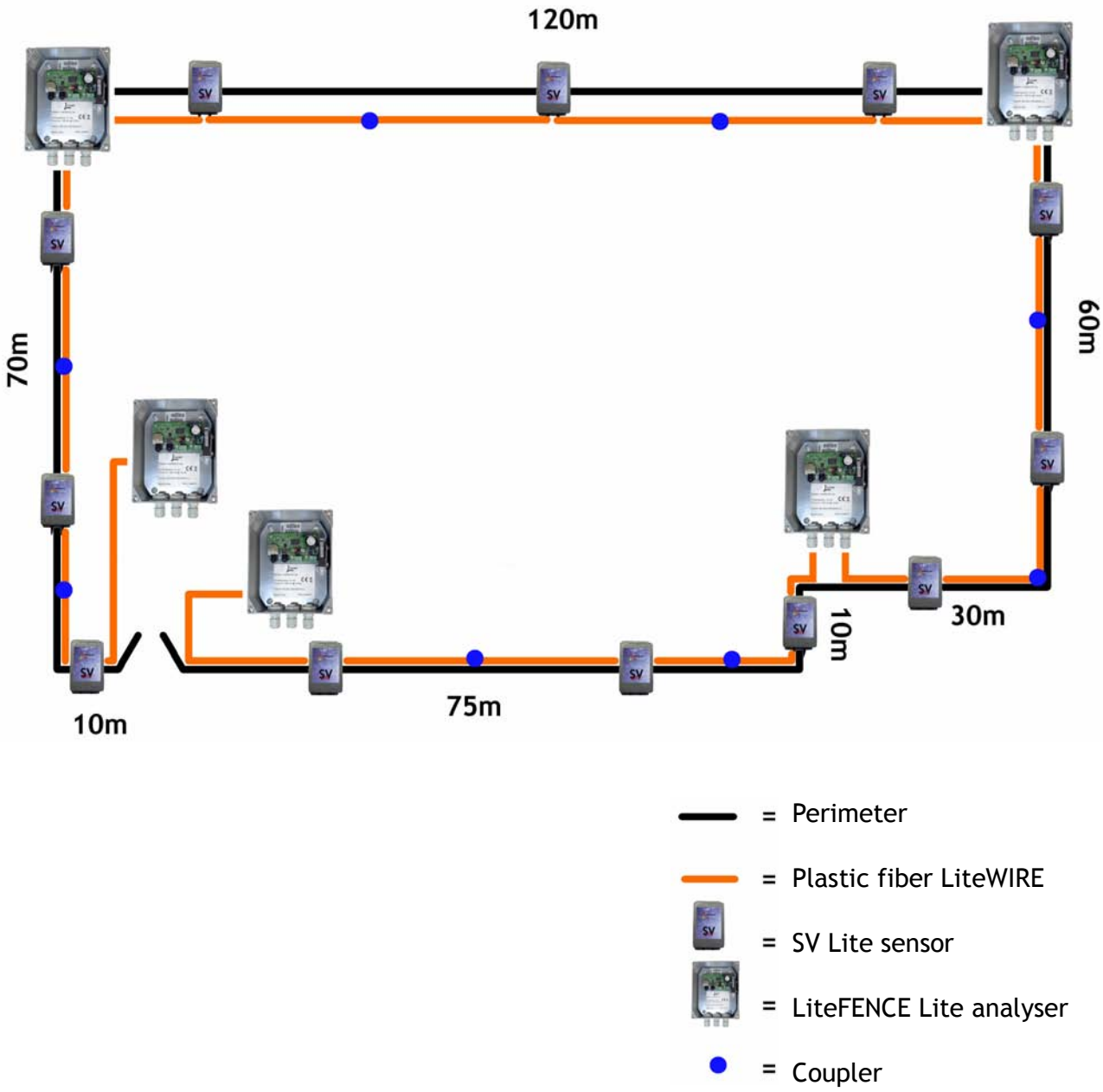
40m *not* straight, e.g. 30m+10m

✓ OK with 2 sensors

# Example of a protected fence




Open loop perimeter

Length: 375m

4 x Kit FENCE SV Lite + 1 additional LiteFENCE Lite analyser have been used, as the perimeter is not a closed loop.

In the section 10m+30m, 2 sensors (not 1) have been used, as they are non-straight 40m. For the same reason, in the section 70m+10m, 3 sensors (not 2) have been used.

# How to install the system

## PRELIMINARY NECESSARY CONDITIONS

***- the metallic part of the fence must have a min. height of 145 cm.***

***- all the panels of the fence must be firmly anchored to the posts and to the structure; they must not move. Only if the fence is firmly anchored, it will transmit the oscillations that can be detected in case of climbing over.***

*Tighten the screws*

*The fence must not move in the slots*

The installation of the system must be carried out following the ***steps in the same sequence*** as indicated below.

### 1 – Decide where to place the SV Lite sensors

Every sensor can detect oscillations up to 20m each side.

90° angles in the fence reduce or completely interrupt the transmission of oscillations resulting from climbing over, so additional sensors will be required.

Example
Side of 10m straight = 1 SV Lite sensor
Side of 35m straight = 1 SV Lite sensor
Side of 40m straight = 1 SV Lite sensor
Side of 45m straight = 2 SV Lite sensors
Side of 100m straight = 3 SV Lite sensors

### 2 – Fasten all the SV Lite sensors to the fence, using the brackets supplied

Fasten all the SV sensors to the fence using the brackets supplied.

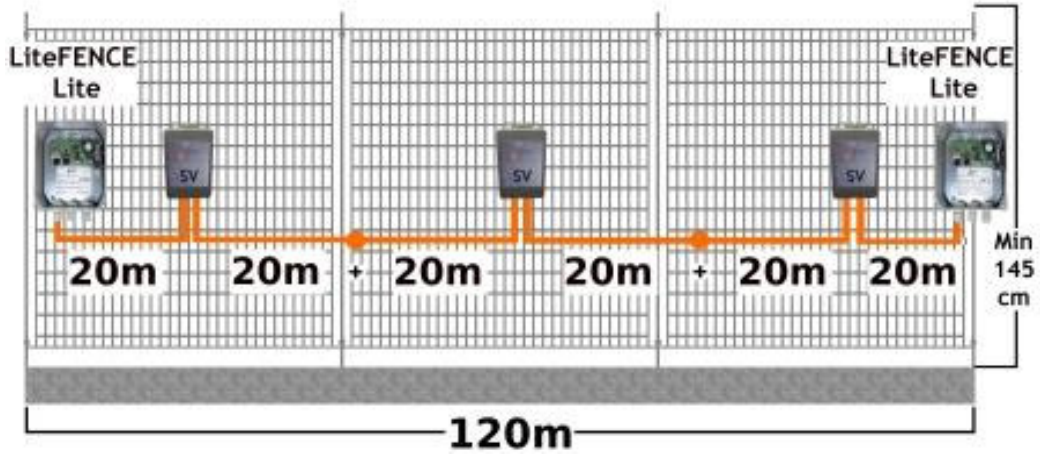
We recommend using self-tapping screws (not provided) or removing the thread by gluing or welding, to prevent the sensor being removed from the fence. Self-tapping screws can also be installed parts anchoring of the fence.

*ATTENTION: final securing only after the installation has been finished and tested.*

To guarantee a false alarm free installation, we recommend:

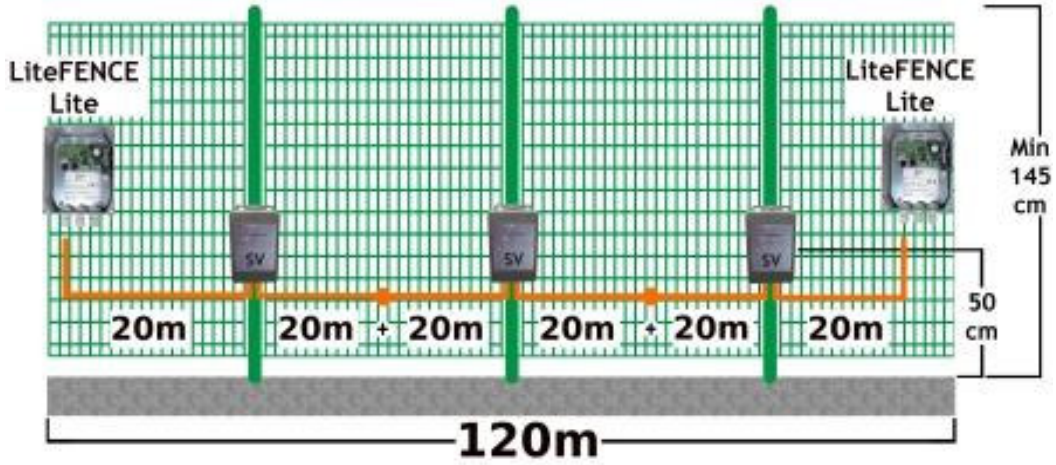
- on ***grilled fences*** *(type Orsogril/Keller)*:

Place the SV Lite sensor directly ***on the grilled module***, half way between the posts and halft height of the fence.




- on ***weld mesh fences*** *(type Betafence)*:

Place the SV Lite sensor ***on the post***, in the ***lower part***




3 – Unspool the two pre-cabled spools of the SV Lite sensors


4 – Weave (enter/exit) the fiber through the mesh

In this way you prevent an entry attempt via dismounting of a panel

For the moment, **do ***NOT*** fasten the fiber with cable ties** (as this step will be made further on)

## 5 – Place LiteFENCE Lite analyser and power it at 9-12 Vdc.

Tension must be min. 9V. Consumption at 12Vdc is 110mA.

Every sensor (with 2 x 20m patch-cords) has an attenuation of 10dBm (equal to about 100m fiber), so max. 3 sensors can be used in a link.

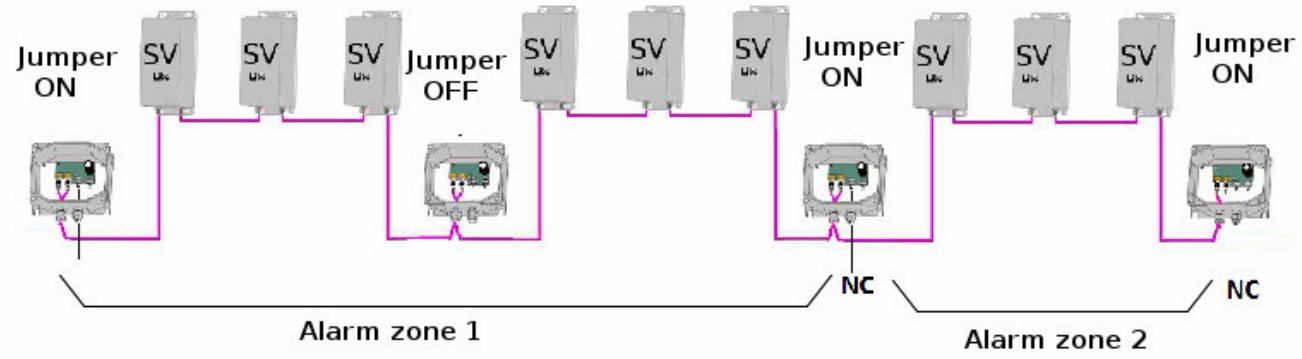
## 6 – Set the number of alarm zones and the mode of alarm propagation.

The jumper (A) is usually inserted: in this mode, the alarm is not propagated along the fiber, so you can have independent alarm zones also in case of cascade connection

(No. analysers= No. alarm contacts)

If the jumper (A) is taken away, the alarm is propagated along the fiber, so in case of cascade connection this results in a single alarm zone

(No. analysers= 1 single alarm zone)



7 – Remove excess fiber

If in the installation 20m patch-cords are too long, do not leave the fiber on the fence, because it could be unrolled to create a breach in the fence via dismounting a panel. Leave only enough fiber (about 1m) to adjust the system sensitivity by re-placing the sensor in higher or lower position.

8 – Join all the SV Lite sensors to each other with a coupler.

Put an FSMA connector on the ends of the patch-cords (see "*How to connectorize LiteWIRE*") and screw them to the coupler.

9 – Connect the patch cord to the LiteFENCE Lite analyser: put the fiber through the cable glands, crimp the FSMA connectors and screw them to the optical ports (B) and (C)

see "*How to connectorize LiteWIRE*"

10 – Power the LiteFENCE Lite analysers and check that they work properly

Make sure that the fiber transmits the light to all LiteFENCE Lite analysers and that the alarm LED (G) is green (relay is closed).

11 – Fasten the fiber to the fence using cable ties – *do not over-tighten them!*

The cable ties only keep the fiber attached to the fence, so that it doesn't move in the wind and is of no hindrance during e.g. gardening work.
One cable-tie every 2m is enough.
Using more cable ties doesn't increase security, it just risk causing more, useless attenuation.

12 – Check that the system works properly

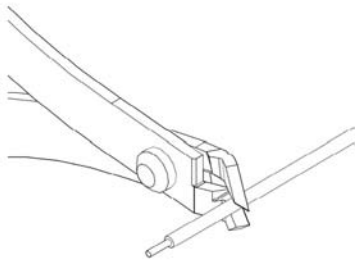
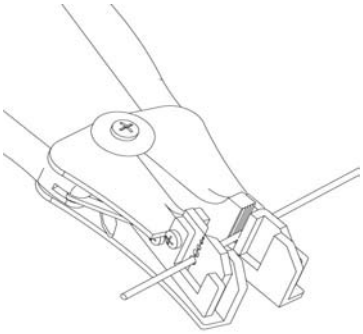
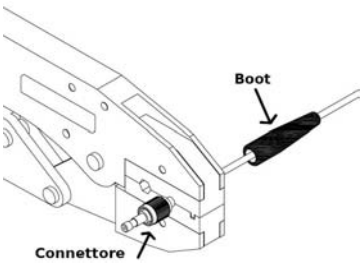
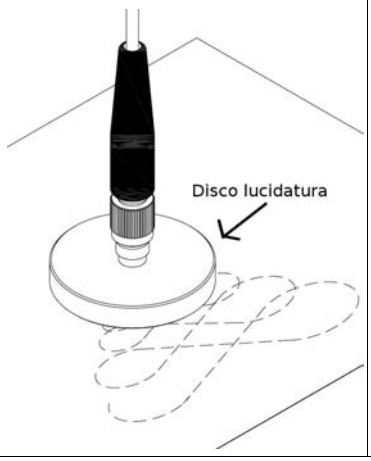
We recommend testing the system after installation by climbing <u>*completely*</u> over the fence, not just by shaking it or crawling up.

*The way a fence sways following a climb over depends not only on the type of fence, but also on the way it was anchored.*

To *increase sensitivity*, move the sensor *upwards*.
To *decrease sensitivity*, move the sensor *downwards*.

# Intestazione del cavo LiteWIRE

***FIRST*** put the cables into the cable gands of the casing, ***THEN*** crimp the connectors
*All the tools required are contained in the **LiteWIRE connectorization kit**.*

| | |
|---|---|
|  | **1 – Cut the fiber**<br>with a cutter – Do not use scissors. |
|  | **2 – Remove the jacket**<br>Remove about 1 cm of jacket.<br>The jacket of the optical cable has a diameter of 2.2mm.<br>The fiber has a diameter of 1 mm.<br><br>**ATTENTION!**<br>*Use a standard cable stripper with a hole of 1.0 mm or more, so you will not damage the fiber.* |
|  | **3 – Crimp the connector**<br>Insert the protection boot.<br>Insert the FSMA connector onto the cable till the jacket stops against the connector; the fiber should come 2mm out of the connector.<br>Crimp the FSMA connectors on the cable jacket.<br>Remove excess fiber.<br><br>**ATTENTION!**<br>*The connector must be crimped on the cable jacket and must not be crimped directly on the fiber.*<br>*The crimp tool for FSMA connectors must have a hexagonal crimping diameter of 3mm.*<br>*In case you use a Luceat crimp tool, use the 0.122” hole.* |
|  | **4 – Fiber polishing**<br>Level the fiber by polishing the connector on sand paper using the metal polishing disc.<br><br>**ATTENTION!**<br>*You should make some "8"-shapes with the connector on the sand paper..* |

## LiteFENCE Lite – analyser

| | |
|---|---|
| Certification | EMC2004/108/CE - FCC verification level part 15 |
| Protection rating | IP55 |
| Power budget ottico | 30dB |
| Operating range | 0-250m (max 30dB) |
| Power | - +9/12 vdc ± 10% |
| Operating temperature | -20°+60°C |
| Humidity | from 5 to 90% |
| Consumption at 12VDC | 110mA |
| Max. power | <1.5W |
| Optical output connector | FSMA |
| Alarm contact | 1A/24vdc |
| Dimensions (in IP55 casing) | 115 x 160 x 60 mm (cable glands incl.) |
| Weight | 520 g |

## SV Lite sensor

| | |
|---|---|
| Power | Completely passive |
| Attenuation<br>(incl. 2x20m patch-cord) | 10 dB (equal to about 100m of fiber*) |
| Protection rating | IP 68 in metal casing |
| Dimensions | 60x80x150mm |
| EMI/RFI immunity | Total |

*This distance is reachable with a correct installation with fiber attenuation <0.1 dB/m at 525nm.
(Sharp curves, cable ties or mechanical stress while placing the fiber can reduce the distance)

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## Accessories

*SMAC001M022M*
**FSMA metal connectors**, 1 pack= 10 pcs

*SMAA001M022M*
**Coupler** for FSMA splices.
Each splice requires no. 2 FSMA connectors

*SMAK001M022M*
**LiteWIRE connectorization kit**

Tool-case containing: cutter, crimping tool, automatic cable stripper, no.5 FSMA connectors, no.5 HFBR connectors, polishing discs for FSMA and HFBR, 5um sand paper

## Technical support

For any further information an technical support , please feel free to contact us :


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**DICHIARAZIONE DI CONFORMITA'**

***Declaration of conformity***
No.: 023/2013

**Luceat S.r.l.**

**Via A. Canossi, 18 25030 Torbole Casaglia (BS) - IT**

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

**320.SIS.LFEN300F011L LiteFENCE Lite**

**320.SIS.LFEN300F011T LiteFENCE Trasmettitore**

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

**Electromagnetic Compatibility:** **EMC 2004/108/CE**

**EMC 2006/95/CE 2013** ***(for the switching power supply)***

***Reduction of Hazardous Substances:*** ***ROHS II 2011/65/CE***

e che sono state applicate tutte le norme indicate sul retro.
*and is in conformity with the standards listed on the back.*

Data: 7 Maggio 2013

*(firma)*

## DICHIARAZIONE DI CONFORMITA'

***Declaration of conformity***

No.: 002/2013

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

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

**EN50130-4:2011** Alarm systems Part 4: Electromagnetic compatibility – Product family standard: Immunity requirements for components of fire, intruder and social alarm system

**EN61000-6-3:2007 and EN61000-6-3:2007/A1:2011** Electromagnetic compatibility (EMC) Part 6-3: Generic standards – Emission standard for residential, commercial and light industrial environments

**APPLIED STANDARDS AND TEST METHODS**

| **Standards** | **Test type** | **Limits according to:** | **Test method according to:** |
|---|---|---|---|
| | Persistent conducted emissions 150kHz-30MHz | EN 61000-6-3:2007 | EN-55022:2010+/AC:2011 |
| | Radiated emissions 30MHz-1GHz | EN 61000-6-3:2007 | EN-55022:2010+/AC:2011 |
| | Voltage variations and Dips immunity | EN 50130-4:2011 | EN 61000-4-11:2004 |
| | Electrostatic discharge immunity | EN 50130-4:2011 | EN 61000-4-2:2009 |
| | Radiated electromagnetic field immunity up to 1GHz | EN 50130-4:2011 | EN 61000-4-3:2006 |
| | Radiated electromagnetic field immunity above 1GHz | | |
| | Electrical fast transient (burst) immunity | EN 50130-4:2011 | EN 61000-4-4:2004 |
| | High energy transient (surge) immunity | EN 50130-4:2011 | EN 61000-4-5:2006 |
| | Conducted radio-frequency immunity | EN 50130-4:2011 | EN 61000-4-6:2007+/EC2007 |

# Notes

# Notes

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