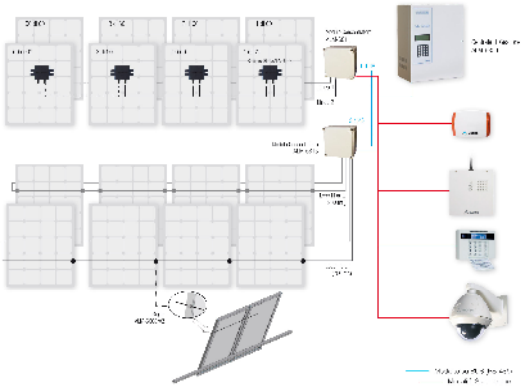
SOLAR DEFENDER

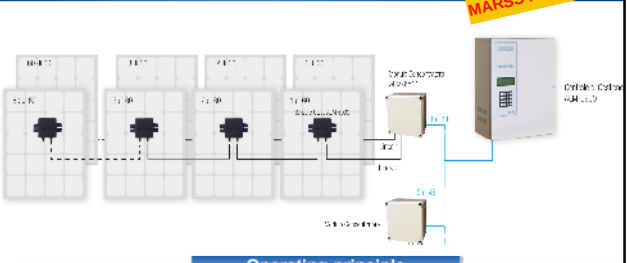
The anti-theft system for photovoltaic panels

Solar Defender: the systems



Solar Defender at Optical Sensors

MARSS PATENTED



Operating principle

Solar Defender is based on a system of addressed **optical sensors** applied **directly on the panel** to be alarmed. (The sensors are addressed by a special programming devices)
When there is any **optical change** inside the sensor, a **tear** from the installation surface or any **tamper of the cable**, there is an alarm.

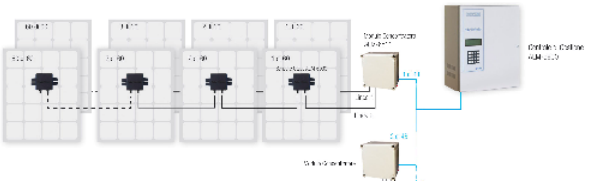
Solar Defender at Optical Sensors

Concentrator Module

- Manages up to 120 optical sensors ALM-6000 by 2 Lines.
- Double operating mode selectable by dip-switch:
  - ***Stand-alone***
  - ***On BUS***
- Addressing by dip-switch.
- Configuration by programming device ALM-6010.
- Alarm:
  - alarm detected by sensor,
  - cable tamper (cut or short).
- Alarm Relé Outputs:
  - alarm Line 1
  - alarm Line 2.
- Auxiliary Alarm Outputs:
  - absence of power on the network
  - battery fault
  - box tamper.
- Display with 7 segments.
- Line exclusion by dip-switch
- Supervised power (7 Ampere battery)

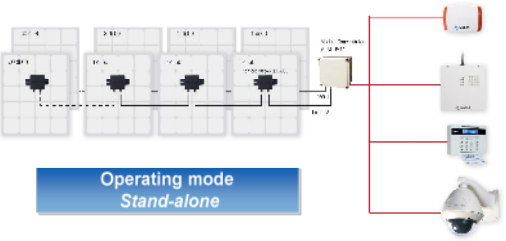
Solar Defender at Optical Sensors

Operating mode
on BUS



The sensors applied on the single photovoltaic panels communicate with the **control panel Solar Defender**: it interrogates in *"polling"* each concentrator module, **detects the status and provides all the details about the specific sensor in alarm**.

Solar Defender at Optical Sensors



Operating mode
Stand-alone

The information about alarm will be sent to the **concentrator modules** that can be **interfaced** with any alarm communication and signalization system, thanks to the signal **outputs on board**.

This operating mode is more used for plant until 200KWp; it assures the protection of the single panel, but the information are related the Line of sensors in alarm.

Solar Defender at Optical Fiber

Anti-theft System
Solar Defender at Optical Fiber
on the panels

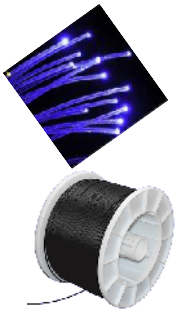
To protect the panels organized in lines

Anti-theft system
Solar Defender at Optical Fiber
on the perimeter

To protect the fence around the photovoltaic plant and not only….

Not only photovoltaic

Solar Defender at Optical Fiber



PLASTIC OPTICAL FIBER (POF)
(ALM-6008/2/10)

- It's a cable conductor of light, simply and fast to be installed.
- It's immune at electric nose and weather conditions.
- It doesn't needs special tools for installation
- It can be stay with the electric cables
- It guarantees data transmission interceptions
- It's flexible and permit radius of curvature up to 20mm
- It can repaired in 1 minute if there is any possible break
- It has a long life (more than 20 years)

Solar Defender at Optical Fiber

Concentrator Module (ALM-6813)

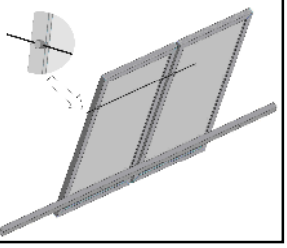
- Manage on 2 Loops, 2 lines of optical plastic fiber (Pof) (200 mt. x Loop).
- Double operating ways selectable by dip-switch:
  - ***Stand-alone***
  - ***On BUS***.
- Addressing by dip-switch.
- Alarm conditions: alarm detected by fiber interruption
- Alarm Relè Outputs: - alarm Loop 1 - alarm Loop 2.
- Auxiliary Alarm Outputs:
  - absence of power on the network
  - battery fault
  - box tamper.
- Display with 7 segments.
- Loop exclusion by dip-switch
- Supervised power (2 Ampere battery)

Solar Defender at Optical Fiber

TO THREAD THE FIBER WIHT THE SEAL SOLAR DEFENDER (ALM-6006/AZ-/BZ)

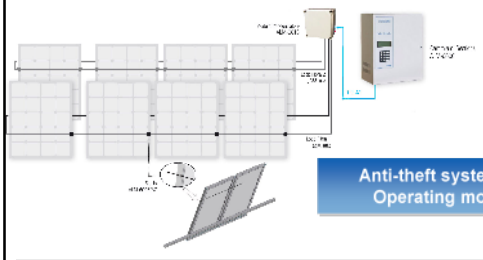
It enables:
- to reduce of about 70% the installation times;
- to install the fiber with precision;
- to guard mechanically the panel;
- to keep panel warranty;
- to make invulnerable the whole anti-theft system.

MARSS PATENTED



Solar Defender at Optical Fiber

Centralized system



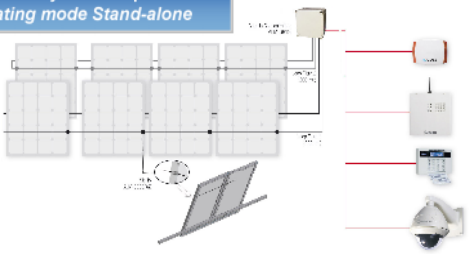
Anti-theft system for panels
Operating mode on *BUS*

The **optical fiber** is installed as a *"close ring"* between the panels, so to make impossible the theft without to interrupt itself, because the **optical transmitter** detects any changes of the light transmitted by the fiber and sends the information at the **concentrator module**.

In ***operating mode on BUS***, the control panel Solar Defender interrogates the concentrator modules in *"polling"*, detects the status and manages the alarm related the line of panel interested.

Solar Defender at Optical Fiber

Anti-theft system for panels
Operating mode Stand-alone

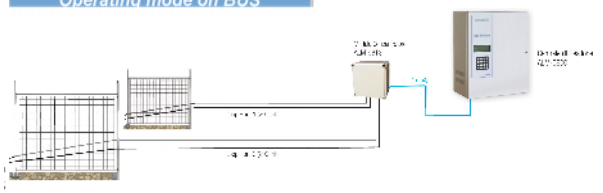


The optical fiber is installed as a "close ring" between panels. When there is any fiber interruptions, the **optical transmitter** detects the light changes an send the information to the **concentrator module**. It can be **interfaced** with any **alarm communication systems**, thanks to the outputs on board.

Solar Defender at Optical Fiber

Centralized system

Anti-theft system on the perimeter
Operating mode on BUS

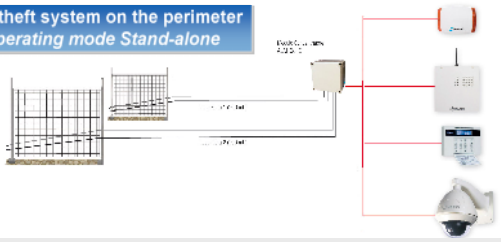


The installation is simple and fast and consists to pass the **fiber** into the meshes of the fence. When there is any fiber interruption, the **optical transmitter** detects the light change and communicates with the **concentrator module**.

When the system is set ***on Bus mode***, the control panel Solar Defender inquires "*in polling*" the single concentrator modules, detects the status and manages the events as an alarm for each **fence's section**.

Solar Defender at Optical Fiber

Anti-theft system on the perimeter
Operating mode Stand-alone



The installation is simple and fast and consists to pass the **fiber** into the meshes of the fence. When there is any fiber interruption, the **optical transmitter** detects the light change and communicates with the **concentrator module**. It can be interface with any alarm communication systems, thanks to the **outputs on board**.

The user receives the information about the **Loop of fiber** interested by the alarm.

Solar Defender

FEATURES

- **Protect the single panel** and can be installed on any type of panels and plants
- **Protect the plant's fence.**
- **Technologies that can be integrated**
- **Modular System**: it can be expanded and modified about plant needs.
- **Double operating mode**
- **Detect** the single panel and section of fence interested by the alarm.
- Immune at ***False Alarms***
- Include the exclusive function "***Cantiere Protetto***"
- **Simple** to be installed and programmed
- Protection **H.24**

Rides out limits

- Territorial
- Environmental
- Architectural
- Due to the site
- Activation Times

Some of the main installations …..

Plant	MW	Plant type	Installed system
Galatina (Le) Itay	2	On the ground	- Solar Defender at Optical Sensor - Perimeter System at POF - CCTV - Alarm system in the technical room
Foggia Italy	3	On the ground	-Solar Defender at Optical Sensor -Perimeter System at POF -CCTV -Alarm system in the technical room
Osimo (An) Italy	0,4	On the ground (on a hill)	- Solar Defender at Optical Sensor

Some of the main installations …..

Plant	MW	Plant type	Installed system
Siena Italy	0,2	On the ground	- Solar Defender at Optical Sensor
Arlena di Castro (VT) Italy	0,5	On the ground	-Solar Defender at Optical Sensor
Potenza	3	On the ground (tracker)	Solar Defender at Optical Fiber
Ugento (Le)	4	On the ground	-Solar Defender at Optical Fiber - CCTV - Beams

Some of the main installations …..

Plant	MW	Plant type	Installed system
Racale (Le)	2	On the ground	- Solar Defender at Optical Fiber - CCTV - Beams
Scorrano (Le)	1	On the ground	-Solar Defender at Optical Sensors -CCTV - Beams
Tiggiano (Le)	1	On the ground	-Solar Defender at Optical Sensors - CCTV - Beams
Alessano (Le)	2	On the ground	-Solar Defender at Optical Sensors - CCTV - Beams

La mente che si apre ad una nuova idea non torna mai alla dimensione precedente.

(A. Einstein)

Solar Defender
L'ANTIFURTO PER PANNELLI SOLARI