

## Solar-Photovoltaic Fire Detection Guide

Envisage access to “thousands of point detectors” with a single wire install

**Integrated photovoltaic (PV) systems on roof and building facades are becoming increasingly common and this trend is expected to continue to rise. Although PV installations are widely regarded as safe technologies, a notable increase in fire-hazards derived from PV installations must be taken into account when carrying out risk analysis and designing fire protection systems, whether active or passive.**

During the last decade, the installation of PV systems has been broadly adopted on a large scale throughout national and international territories. The adoption of this solution has found wide acceptance thanks to its environmental sustainability characteristics since it allows electricity to be produced in a sustainable fashion, in addition to reasonable return of investments based on Kw/h (kilowatt hours) produced.



Common causes of PV fire include the following:

- Inaccessible combustible spaces hidden in the gap between the solar panels and the combustible ceiling can propagate the spread of fire and deteriorate the effectiveness of the fire suppression/extinction efforts.
- Arc discharge events in boxes and DC wiring.
- PV module Hot spots and surfaces

- Hazards generated during panel maintenance activities or lack of maintenance thereof.
- Accumulated dirt or vegetation growth where PV modules are installed at ground level.
- Vandalism.
- Late fire detection as PV modules are usually installed in outdoor areas which aren't generally covered by the standard fire alarm detection systems.



The appropriate and rapid detection of fires in PV installations are essential to prevent the unnecessary spread of fire, which can result in increased material losses.

Organisations must therefore establish adequate due diligence when incorporating PV into projects and infrastructure.

### DETECTION METHODOLOGY

This guide describes considerations for linear fiber optic fire detection systems, although similar approaches can be employed with alternative linear heat detection (LHD) technologies (digital cable) or thermal imaging cameras.

Automatic fire detection equipment installation is required in and around converters, transformers, batteries, power-factor correction equipment and power distribution rooms and cabinets, in addition to solar panels themselves. The same sensor cable can be used to protect the entire installation.

Fiber Optic LHD solutions allow precise temperature monitoring along the entire length of the sensor cable and provide a means to detect the slightest temperature variation as a function of time (Rate of Rise) including in very low temperature environments.

Furthermore, Fiber Optic LHD also allows the assignment of a set of different alarm criteria for each configured zone of the sensor cable. The sensor cable itself withstands temperatures of up to 750°C for 2 hours (certified) while maintaining detection effectiveness and providing inference on the size and state of the fire.



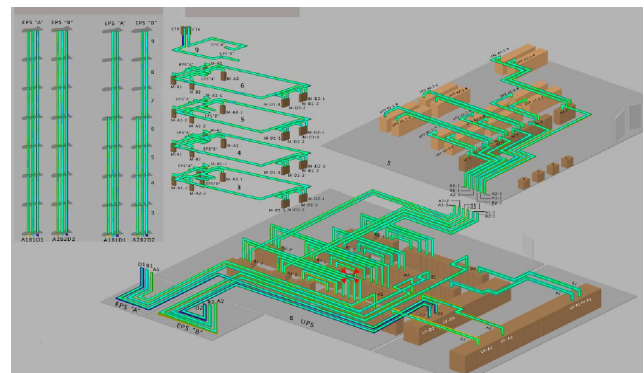
Moreover, Fiber optic LHD sensor cables are easy to install with a plethora of fixing solutions and do not require maintenance. They additionally boast of a long service life of 25 years.



In addition to the advantages described herein, Fiber Optic LHD allows for real-time monitoring through a graphical user interface (GUI) showing an accurate overview of the current thermal state of the installation, providing an indispensable tool when monitoring the effectiveness of fire suppression activities.

The system is provided with relay outputs allowing direct connection to any fire detection systems on the market and can also be easily integrated into management platforms through standard protocols (ModBus, TCP/IP, etc). It is therefore possible to act on control ancillaries such as the de-energizing of AC/DC switches, arc detection systems, batteries, etc.

Moreover, Smartvision, a package within the included GUI, displays real-time data and can be configured with easy-to-manage bespoke colour-coded zones.



Feel free to contact us by email regarding any queries related to this guide, references and for pricing.

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