

Secondary lightning protection module for photovoltaic modules



Overview

Surge protection modules of the VPU PV series have been designed for optimal protection of the inverter against surges.

Key Takeaways

A photovoltaic secondary lightning protection module (SPD) safeguards PV system components from overvoltage caused by lightning or switching surges, complementing primary lightning protection systems.

Function and Purpose

Secondary lightning protection modules, also known as surge protective devices (SPDs), are designed to protect sensitive PV system components such as inverters, combiner boxes, and monitoring equipment from transient overvoltages caused by direct or nearby lightning strikes, as well as utility switching events. Unlike primary protection, which involves air terminals and grounding to prevent direct strikes, secondary protection clamps or diverts excess voltage to ground, preventing damage to electrical and electronic components.

Key Features



Type I and II Protection: Many SPDs, such as the VARITECTOR VPU PV series, combine Type I (for direct lightning strikes) and Type II (for indirect surges) protection, making them flexible for various PV system configurations. **Voltage Compatibility:** Modules are available for PV generator voltages ranging from 600 V to 1,500 V, suitable for both residential and utility-scale installations. **Integration with MPP Trackers:** Some SPDs are designed to connect directly to 2 MPP trackers, optimizing protection for inverter inputs.

Compact Design: Modern SPDs are narrow and easy to install in string combiner boxes, minimizing space requirements.

Installation Guidelines

Placement: SPDs should be installed as close as possible to the equipment terminals using the shortest and straightest conductors to minimize voltage drop during surge events.

AC and DC

DC Protection: Both the DC side (solar modules to inverter) and AC side (inverter to grid) should be protected, along with control and communication circuits if applicable. **Separation Distance:** Type II SPDs require a minimum separation distance (typically 0.7–1 m) from the PV array; if this distance cannot be maintained, Type I protection is recommended for DC cabling.

Compliance: SPDs must comply with EN 61643-32, UL, and IEC standards to ensure global applicability and reliable performance.

Benefits

Prevents System Failures: Reduces the risk of inverter and module damage, avoiding costly repairs and downtime. **Extends System Life:** Protects PV components from repeated transient overvoltages, enhancing long-term profitability.

Supports High-

Risk Locations: Effective even in high-altitude or exposed installations where lightning risk is elevated.

Conclusion

A secondary lightning protection module is essential for PV systems, especially in exposed or high-risk areas. By combining Type I and II protection, ensuring proper placement, and complying with international standards, SPDs safeguard inverters, modules, and monitoring equipment from transient overvoltages, complementing primary lightning protection systems and ensuring reliable energy production.

Article Content

Lightning and surge protection for photovoltaic facilities

Surge protection modules of the VPU PV series have been designed for optimal protection of the inverter against surges. PV systems are at high risk of lightning strikes due to their installation in

Photovoltaic System Protection Against Lightning

The study delves into the characteristics of lightning and its interaction with PV installations, identifies vulnerabilities within the system, and discusses the principles and techniques for effective lightning

Modeling and protection of photovoltaic systems during lightning ...

The purpose of different methods for modeling the PV System during lightning occurrence, which are summarized in Table 2, is to illustrate the various numerical approaches used by

Protecting PV installations against surges | DEHN

We offer comprehensive protection concepts for surge protection, earthing and equipotential bonding, as well as for the external lightning protection of

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SPDs installed at key locations will protect major components such as inverters, arrays, equipment in combiner boxes, measurement and control equipment, instrumentation systems, and

Lightning and surge protection of solar panels

Modern, durable and easy to install components of external lightning protection. Comprehensive solution for surge protection (internal lightning protection) - selection of the SPD protecting the photovoltaic

Complete Protection of Photovoltaic (PV) systems

Saving money, these SPD's can guarantee a very high level of protection by protecting the system from dangerous overvoltage that can cause huge economic damage.

Lightning and surge protection for rooftop photovoltaic systems

According to the state of scientific and technical knowledge, the installation of PV modules does not increase the risk of a lightning strike. Therefore, the request for lightning protection measures cannot

Lightning and Surge Protection of Photovoltaic Installations

In this report, two case histories are examined. These include the photovoltaic installations at Vulcano Island (Italy) and at Kythnos Island (Greece).

Common Practices for Protection Against the Effects of Lightning on ...

Surge protection devices (zinc type varistors, spark gaps, transient voltage suppressors, electronic crowbars, etc.) are installed at both sides of connections in order to protect equipment (photovoltaic

Lightning Protection of Photovoltaic Systems: Computation of the

In this paper, the performance of a lightning protection system (LPS) on a grid-connected photovoltaic (PV) park is studied by simulating different scenarios with the use of an appropriate

Surge Protection for Photovoltaic Systems - IAEI

Photovoltaic systems" vulnerability to lightning strikes—both direct and indirect—means that they must be built with reliable and properly installed surge

Lightning and surge protection for photovoltaic facilities

Photovoltaic energy generation is one of the fastest growing renewable energy sources. Hundreds of MW of rooftop systems and utility-scale PV parks are installed every year. VARITECTOR PV surge

(PDF) Lightning protection of PV systems

Lightning protection analysis for hybrid PV-wind energy systems have suffered from lack of coverage in the study of suitability of lightning protection standards for them.

Lightning protection design of solar photovoltaic systems: Methodology ...

The proposed procedure is finally applied to investigate lightning transients in a practical PV system. The lightning failure mode of bypass diodes is identified for the first time. The results can

Lightning and Surge Protection in Photovoltaic Installations

The extra cost of this protection in this PVI (approximately 3.6% of the system cost) is of secondary importance because of the increase of safety and availability. Furthermore, in order to fulfill with this

How Can Photovoltaic Systems Be Protected from

Prioritize such modules during product selection, and pair them with a light protection + module synergy strategy based on project layout. This can

How to Protect Solar PV Systems from Lightning

Learn how to protect your solar PV system from lightning strikes with our comprehensive guide. Discover the risks and effective lightning protection strategies for different types of PV systems.

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

