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



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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 D

C 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.

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Article Content

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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

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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

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(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.

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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

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How to Protect Solar PV Systems from Lightning

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

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