

SURGE PROTECTION DEVICES

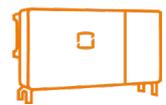
ENHANCING INVERTER SAFETY



LIGHTNING PROTECTION



SYSTEM LONGEVITY



INTEGRATED SOLUTION

WHAT ARE SPDs?

Surge Protection Devices (SPDs) are designed to protect against excessive electrical voltages and impulse currents. Surges can be caused by lightning — either through direct strikes or via capacitive or inductive coupling into electrical systems — or also by switching operations in the public grid.

Sungrow's C&I inverters come with integrated Type I+II DC and Type II AC SPDs to provide comprehensive protection for PV installations.



Improve inverter safety with Sungrow

Comprehensive Surge Protection

Sungrow's SGCX-P2 inverters are equipped with **integrated Type I+II DC SPDs**, offering maximum protection against excessive voltages and impulse currents. Unlike Type II DC SPDs, this ensures protection against both high-energy surges from direct lightning strikes and lower-energy surges caused by switching operations or indirect lightning

AC and DC Protection

SPDs are installed on both the AC and DC sides of Sungrow inverters. The DC side is equipped with Type I+II SPDs, while the AC side is equipped with Type II SPDs

Cost and Time Savings

Integrated SPDs reduce the need for external devices and complex wiring, making installation quicker and more cost-effective. The dual protection on the DC side also eliminates the need for external DC surge protection devices, saving significant installation and equipment costs. This also minimizes maintenance efforts over the system's lifespan

Compliance with Safety Standards

Sungrow's SPDs comply with all relevant safety standards, including BS EN 61643-11 and 61643-31 for the Type I+II DC SPDs

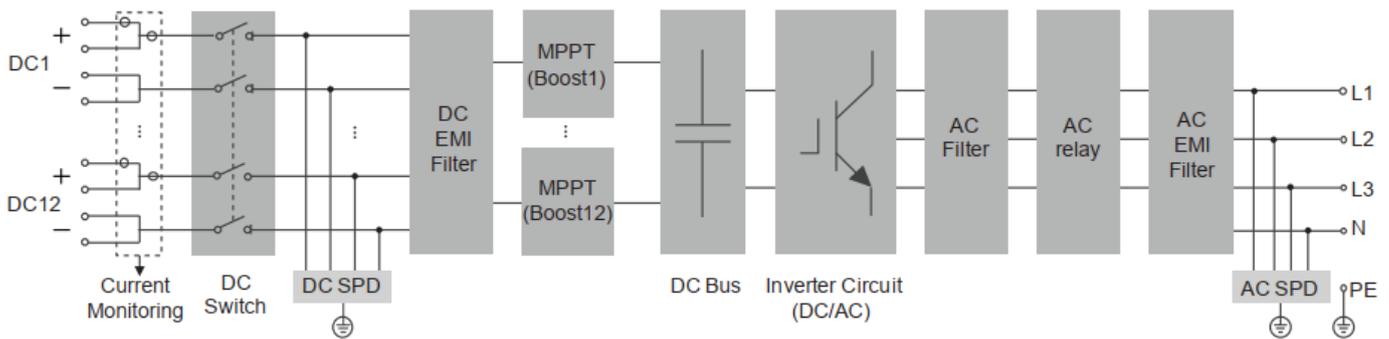


Figure 1: Sungrow's SG125CX-P2 circuit diagram including the DC SPDs Type I+II and AC SPDs Type II



The integrated Type I+II DC SPDs are available for:

SG25-50CX-P2
SG125CX-P2

FREQUENTLY ASKED QUESTIONS

- 1 What is the role of a surge protection device (SPD) in a PV system?**

SPDs protect sensitive components of a PV system from overvoltage caused by lightning strikes, electrical faults, and switching operations.
- 2 Why do Sungrow inverters use Type I+II SPDs on the DC side and Type II SPDs on the AC side?**

Sungrow integrates Type I+II SPDs on the DC side to provide comprehensive protection against both high-energy surges from direct lightning strikes and lower-energy surges from switching operations or indirect lightning. This dual protection ensures system reliability and eliminates the need for additional external DC surge protection devices, reducing installation and equipment costs.

On the AC side, Type II SPDs are used because surges are generally lower in energy and typically originate from switching operations or grid disturbances. This makes AC Type II SPDs sufficient in most scenarios, ensuring an optimal balance of safety and cost-efficiency.
- 3 What is the difference between Type I+II and Type II SPDs?**

Type I+II SPDs protect against both direct and indirect lightning strikes, while Type II SPDs only safeguard against residual surges from indirect lightning strikes or electrical switching events. Type I+II offers more comprehensive protection, making it ideal for areas prone to lightning.
- 4 Do Sungrow inverters with integrated DC Type I+II SPDs require additional external surge protection?**

In most cases, Sungrow inverters with integrated DC Type I+II SPDs provide full protection and do not require additional external surge protection on the DC side. However, local regulations and specific site conditions may mandate additional measures, so it's important to follow all applicable guidelines to ensure compliance.
- 5 How do DC Type I+II SPDs impact the overall installation cost of a PV system?**

By integrating DC SPDs Type I+II directly into the inverter, Sungrow reduces the need for external surge protection devices on the DC side in most cases, lowering BOS costs and simplifying the system design.
- 6 Are Sungrow's SPDs compliant with required standards?**

Yes, all DC Type I+II SPDs in Sungrow inverters comply with key safety standards, including BS EN 61643-11 and BS EN 61643-31, providing optimal protection for PV systems. Additionally, all AC-SPDs fulfill the relevant safety requirements and thus guarantee comprehensive system safety.
- 7 Do the SPDs require manual activation?**

No, the SPDs are ready to function immediately after installation and do not require manual activation.
- 8 What is the difference between surge protection types and overvoltage categories?**

Overvoltage categories, typically defined as categories I-IV, classify the level of voltage that equipment can withstand based on its location and connection to the utility grid. Typically, these overvoltage categories are mentioned on the nameplate of the inverter. For example, category I covers sensitive devices, while category IV applies to equipment directly connected to the utility, like transformers. However, overvoltage categories and surge protection are not the same.

Surge Protection Devices (SPDs), classified as Type I-III, protect against electrical surges. The SPD type is typically not mentioned on the nameplate for the inverter. Type I is used for direct lightning protection, Type II for general protection in electrical systems, and Type III for additional protection of sensitive equipment.