NEOVOLTA

Technical Product Notes

Benefit of Installing a Type 2 Surge Protection Device (SPD) on the Grid-Side Input

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11/25/2025	TN-NV16KAC-003	Patrick Honegger

Overview:

The NeoVolta NV16KAC Hybrid Inverter includes internal Type 2 surge protection devices (SPDs) mounted on its control board to protect sensitive electronics from short or transient overvoltage events.
However, these internal SPDs do not replace the need for an external, service-entrance-rated Type 2 SPD on the AC grid input.
Installing a dedicated external SPD provides additional protection, improves system reliability, and ensures compliance with applicable electrical codes including the National Electrical Code (NEC) requirements for surge protection on new service installations and service modifications.

1. Why an External Grid-Side Type 2 SPD Is Recommended

A. Protection from large and fast grid-side surges
The internal SPDs are designed primarily for:

- Secondary protection
- Localized suppression of inverter-level surges
- Protection of low-voltage control and power electronics

They are not designed to absorb or divert the full magnitude of:

- Utility switching transients
- Inductive load switching on the premises
- Lightning-induced surges entering through the service conductors

A service-rated external Type 2 SPD:

- Has a higher surge current capacity
- Is positioned where surges first enter the premises
- Dramatically reduces energy reaching the inverter's internal circuitry

This protects not only the NV16KAC, but also other connected equipment.

B. Layered (Cascaded) Surge Protection—Industry Best Practice

A cascaded SPD configuration provides the most robust protection:

- The primary SPD at the service entrance handles high-energy surges
- The secondary SPD inside inverter cleans up smaller, residual surges

This two-stage strategy prevents excessive stress on any single device and significantly extends the life of both SPDs and inverter components.

2. NEC Requirements

The National Electrical Code (NEC) includes mandatory SPD requirements that apply to many installations:

- NEC Article 230.67:
  - Requires a Type 1 or Type 2 SPD for all new dwelling-unit service installations.
- NEC Article 242 (Overvoltage Protection):
  - Requires surge protection when modifying or replacing service equipment.
- NEC 705/710:
  - In distributed energy and hybrid system installations, surge protection must be provided at the interconnection point protect equipment from high-voltage spikes on the utility side

Because the NV16KAC's internal SPDs are located inside the inverter, they do not satisfy NEC requirements for SPDs at the service equipment.
Therefore, an external, service-entrance-located Type 2 SPD is required for NEC code compliance whenever the installation constitutes:

- A new service, or
- A service modification (such as adding energy storage or hybrid inverter equipment)

3. System Reliability Benefits

Installing a grid-side SPD:

- Reduces downtime by preventing inverter lockouts or internal board damage
- Minimizes the likelihood of nuisance tripping from voltage spikes
- Protects batteries, backup load panels, and all AC-connected devices
- Provides a clear, replaceable surge protection device outside the inverter enclosure

- Limits damage from lightning or grid anomalies that internal SPDs cannot safely absorb

4. Recommendation

For all NV16KAC installations, especially where the system is connected to the utility grid, a dedicated, service-entrance-rated Type 2 SPD should be installed on the AC grid input, feeding the inverter.
This ensures:

1. Full compliance with NEC requirements
2. Enhanced surge immunity and reduced damage risk
3. Optimal system longevity and reliability
4. Cascaded protection, an industry-standard best practice

5. Summary

Even though the NV16KAC includes internal Type 2 SPDs, these devices provide secondary, not primary, protection.
A grid-side Type 2 SPD is essential for:

- Compliance
- Safety
- Longevity
- Performance

This external device serves as the first line of defense against high-energy surges entering the home or facility, safeguarding both the inverter and all connected electrical infrastructure.

Version	Revision Date	Brief Description of Change
V1.0	12/8/2025	Document Published