

INTERNATIONAL STANDARD

**Radio-frequency connectors -
Part 1-3: Electrical test methods - Surge withstand - Surge protective devices
built in a coaxial connector - Performance requirements and testing methods**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Surge protective devices built in a coaxial connector -
Performance requirements and testing methods**

FOREWORD

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IEC 61169-1-3 has been prepared by subcommittee 46F: RF and microwave passive components, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
46F/738/FDIS	46F/741/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61169 series, published under the general title *Radio-frequency connectors*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
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Sample Document

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1 Scope

This part of IEC 61169 is applicable to built-in devices (hereinafter referred to as "SPD" – surge protective device) or surge protection of telecommunications and signalling networks against indirect and direct effects of lightning or other transient over voltages.

An SPD is intended to protect the electrical apparatus from transient over voltages and to divert surge currents.

The SPD built in the coaxial connector can be a gas discharge tube type, a $\frac{1}{4}$ wavelength short stub type, a flash-off gap type, and a hybrid type thereof.

The purpose of these built-in SPD is to protect modern electronic equipment connected to telecommunications and signalling networks with nominal system voltages up to 1 000 V (RMS) AC and 1 500 V DC.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61083-1, *Instruments and software used for measurements in high-voltage and high-current tests - Part 1: Requirements for instruments for impulse tests*

IEC 61169-1:2013, *Radio frequency connectors - Part 1: Generic specification - General requirements and measuring methods*

IEC 61169-1-2, *Radio-frequency connectors - Part 1-2: Electrical test methods - Insertion loss*

IEC 61643-311:2013, *Components for low-voltage surge protective devices - Part 311: Performance requirements and test circuits for gas discharge tubes (GDT)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61169-1:2013 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1 surge protective device SPD

device that restricts the voltage of a designated port to protect it if surge-induced overvoltage exceeds a predetermined level

Note 1 to entry: Secondary functions can be incorporated, such as a current-limiting function, to restrict a terminal current.

Note 2 to entry: Typically, the protective circuit has at least one non-linear voltage-limiting surge protective component.

Note 3 to entry: An SPD is a complete assembly, having terminals to connect to the circuit conductors.

3.2 voltage switching type SPD

SPD that has a high shunt impedance and has a sudden and large reduction in impedance in response to a voltage surge exceeding its threshold level

Note 1 to entry: Examples of components used in voltage switching type SPDs: air gaps, gas discharge tubes (GDT) and thyristor surge suppressors (TSS).

Note 2 to entry: An example of a voltage switching type SPD is a coaxial adapter that uses a gas discharge tube (GDT). The key characteristics of this type of adapter are shown in Figure 1.

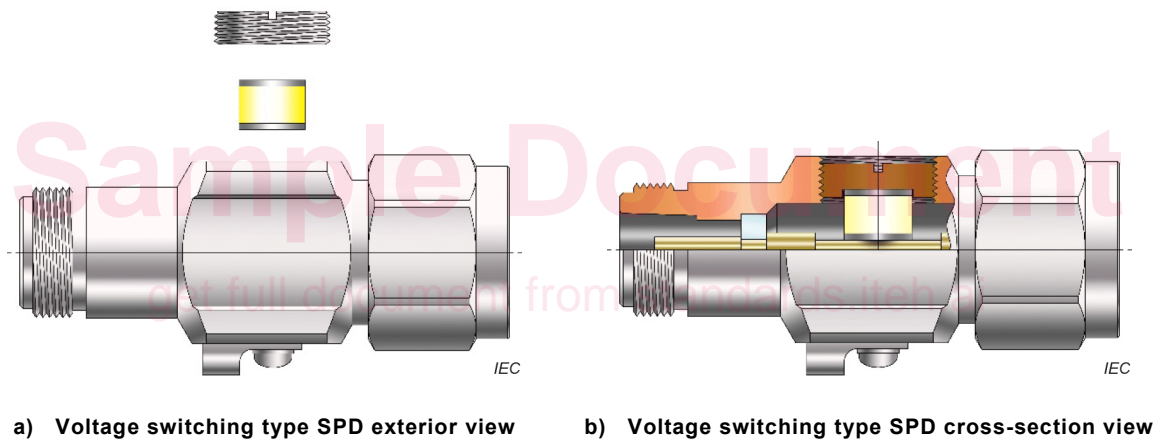


Figure 1 – Coaxial adapter for surge protection device with gas discharge tube

3.3**¼ wavelength short stub**

specialized coaxial component that leverages a short stub design at a specific length to offer surge protection for electronic devices

Note 1 to entry: A ¼ wavelength short stub serves to shield connected equipment from voltage surges, ensuring the safe and reliable operation of the electronics.

Note 2 to entry: A ¼ wavelength short stub surge withstanding adapter is a type of coaxial adapter designed to protect electronic equipment from surges and transient voltage spikes. The key characteristics of this type of adapter are shown in Figure 2.

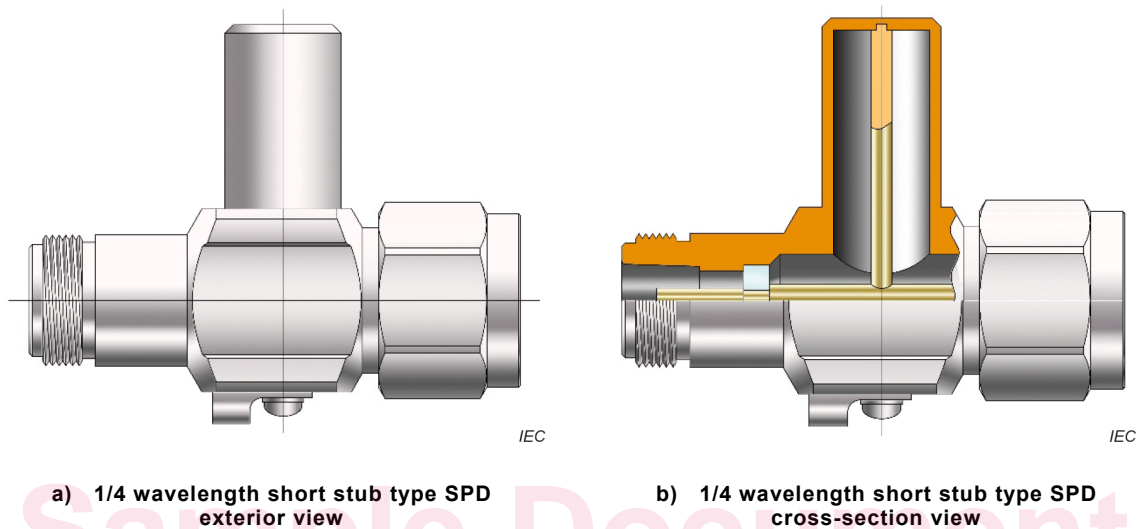


Figure 2 – Coaxial adapter for surge protection device with ¼ wavelength short stub

3.4**¼ wavelength**

length of the short stub within the adapter, which is precisely one-quarter of the wavelength of the operating frequency

Note 1 to entry: The ¼ length is critical for creating specific impedance matching and surge protection properties.

3.5**short stub design**

specific design where the short stub is a short section of transmission line within the adapter used for impedance matching and filtering

Note 1 to entry: The short stub helps to reflect or absorb unwanted signals, including surges, to protect the connected equipment.

3.6**surge withstanding capability**

capability of the adapter to withstand and mitigate high-voltage surges or transient signals that can occur in the coaxial line

Note 1 to entry: The ¼ wavelength short stub design aids in redirecting or suppressing these surges to safeguard the connected devices.