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INTERNATIONAL STANDARD

colour inside

Lightning protection system components (LPSC) – Part 6: Requirements for lightning strike counters (LSCs)

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INTERNATIONAL
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LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 6: Requirements for lightning strike counters (LSCs)

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62561-6:2018. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62561-6 has been prepared by IEC technical committee 81: Lightning protection. It is an International Standard.

This third edition cancels and replaces the second edition published in 2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) a new classification according to the internal circuit of LSCs has been added;
b) the tests flowchart in Annex C has been updated to reflect this new classification;
c) the applicability of previous tests has been added (Annex D).

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

FDIS	Report on voting
81/723/FDIS	81/726/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/standardsdev/publications.

A list of all parts in the IEC 62561 series, published under the general title *Lightning protection system components (LPSC)*, 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,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This part of IEC 62561 deals with the requirements and tests for lightning protection system components (LPSC) ~~that may be~~ used to determine the number of impulses or nominal currents on specific conductors associated with a lightning protection system (LPS) designed and implemented according to the IEC 62305 series.

LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 6: Requirements for lightning strike counters (LSCs)

1 Scope

This part of IEC 62561 specifies the requirements and tests for devices intended to count the number of lightning strikes based on the current flowing in a conductor. This conductor ~~may~~ can be part of a lightning protection system (LPS) or connected to an SPD installation or other conductors, which are not intended to conduct a significant portion of lightning currents.

~~LSCs may also be suitable for use in hazardous atmospheres and there are therefore extra requirements necessary for the components to be installed in such conditions.~~

Extra requirements for the components can be necessary for LSCs intended for use in hazardous atmospheres.

NOTE In CENELEC member countries, testing requirements of components for explosive atmospheres are specified in CLC/TS 50703-2.

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 60068-2-52:~~1996~~2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 60068-2-75:~~1997~~2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

ISO 4892-2:2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

ISO 4892-3:2016, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

ISO 4892-4:2013, *Plastics – Methods of exposure to laboratory light sources – Part 4: Open-flame, carbon-arc lamps*

ISO 22479:2019, *Corrosion of metals and alloys – Sulphur dioxide test in a humid atmosphere (fixed gas method)*

ISO 6957:1988, *Copper alloys – Ammonia test for stress corrosion resistance*

~~ISO 6988:1985, *Metallic and other non-organic coatings – Sulphur dioxide test with general condensation of moisture*~~

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

3.1
LSC
lightning strike counter
device intended to count the number of lightning strikes based on current flowing in a conductor

3.2
lightning strike counter Type I
LSC Type I
LSC classified by its design to count impulse discharge currents

3.3
lightning surge counter Type II
LSC Type II
LSC classified by its design to count nominal discharge currents

3.4
impulse discharge current
I_{imp}
crest value of an impulse current 10/350 through the LSC with specified charge transfer Q and specified energy W/R in the specified time

3.5
minimum impulse discharge current counted
$I_{imp\ min}$
minimum ~~peak~~ crest value of the impulse counting discharge current that the LSC will count

3.6
maximum impulse discharge current counted
$I_{imp\ max}$
maximum ~~peak~~ crest value of the impulse counting discharge current that the LSC will count and withstand

3.7
nominal discharge current ~~counted~~
I_n
crest value of a surge current 8/20 through the LSC ~~having a current wave shape of 8/20~~

3.8
minimum discharge current counted
$I_{n\ min}$
minimum ~~peak~~ crest value of the surge current that the LSC will count

3.9
maximum discharge current counted
$I_{n\ max}$
maximum ~~peak~~ crest value of the surge current that the LSC will count and withstand

3.10
IP code
degree of protection of enclosure
numerical classification according to IEC 60529, preceded by the symbol IP, applied to the enclosure of electrical apparatus to provide:

– protection of persons against contact with, or approach to, live parts and against contact with moving parts (other than smooth rotating shafts and the like) inside the enclosure,

– protection of the electrical apparatus against ingress of solid foreign objects, and

– protection of the electrical apparatus against harmful ingress of water where indicated by the classification

[SOURCE: IEC 60050-426:~~2008~~2020, 426-04-02, modified – In the term, "code" has been added, in the definition, "according to IEC 60529" has been added, "equipment" has been replaced with "electrical apparatus" and the Notes to entry have been deleted.]

3.11
point of strike
point where a lightning flash strikes the earth, or protruding structure

EXAMPLE: Structure, LPS, line, tree.

Note 1 to entry: A lightning flash ~~may~~ can have more than one point of strike.

3.12
strike
all strokes from a single lightning flash that attach to a point of strike on a structure

3.13
impulse current
transient current created by direct lightning strike into the LPS

3.14
surge
transient created by lightning electromagnetic pulse (LEMP) that appears either as an overvoltage or as an overcurrent, or both

4 Classification

~~LSCs are classified by type:~~

~~• lightning strike counter (Type I) as defined in 3.2;~~

~~• lightning surge counter (Type II) as defined in 3.3.~~

~~LSCs are also classified by location:~~

~~• indoor LSCs are intended for use in enclosures and/or inside buildings or shelters;~~

~~• outdoor LSCs are intended for use without enclosures and outside of buildings or shelters.~~

~~The IP codes defined in IEC 60529 are particularly relevant to the intended location of an LSC but may not be applicable to an LSC integral with an SPD.~~

4.1 Type of LSC

LSCs are classified according to the discharge current count:

a) Type I to count impulse discharge current count as defined in 3.2;
a) Type II to count nominal discharge current count as defined in 3.3.

4.2 LSC Internal circuit

LSCs are classified according to their internal circuit:

a) LSCs without electronic circuit;
b) LSCs with electronic circuit.

4.3 LSC installation location

LSCs are classified according to their installation location:

a) indoor LSCs are intended for use in enclosures or inside buildings or shelters;
b) outdoor LSCs are intended for use without enclosures and outside of buildings or shelters;
c) LSCs intended for use in special environments as specified by the manufacturer.

The degree of protection of enclosure (IP code) defined in IEC 60529 is particularly relevant to the intended location of an LSC but it is possible that they will not be applicable to an LSC integral with an SPD.

NOTE LSCs installed in outdoor enclosures or shelters are suitable for indoor use.

5 Requirements

5.1 General

~~The LSC shall be designed in such a way that in normal use its performance is reliable and without danger to persons and the surrounding.~~

LSCs shall be designed in such a manner that when they are installed in accordance with manufacturer's instructions, their performance shall be reliable, stable and safe to persons and surrounding equipment.

NOTE The choice of a material depends on its ability to match the particular application's requirements.

5.2 Documentation

The manufacturer or supplier of the LSC shall provide adequate information in their literature to ensure that the installer can select and install the counter in a suitable and safe manner.

The ranges for operating temperature, humidity, altitude, IP code and the classifications according to Clause 4 shall be declared by the manufacturer.

The following information shall also be provided (as applicable):

$$I_{\text{imp min}};\ I_{\text{imp max}};\ I_{\text{imp}};\ I_{\text{n}};\ I_{\text{n min}};\ I_{\text{n max}}.$$

where

$I_{\text{imp min}}$ is the minimum impulse discharge current counted;

$I_{\text{imp max}}$ is the maximum impulse discharge current counted;

I_{imp} is the impulse discharge current;

I_n is the nominal discharge current;

$I_{n\ min}$ is the minimum discharge current counted;

$I_{n\ max}$ is the maximum discharge current counted.

Compliance is checked by inspection in accordance with 6.2.

5.3 Marking

5.3.1 Content of marking

All products complying with this document shall be marked at least with the following:

a) the name of the manufacturer or his trademark;

b) the reference of the type or the serial number;

c) the classification;

d) $I_{imp\ min}$; $I_{imp\ max}$; ~~I_{imp}; I_n;~~ $I_{n\ min}$; $I_{n\ max}$;

e) the degree of protection (IP code);

f) conformity to this document.

If the device is small and sufficient space is not available for all the markings to appear, the indications cited in a) and b) above shall at least be reproduced on the apparatus and still be visible after installation. The indications cited in c), d), e) and f) can be given on the packaging ~~and/~~or in the installation data sheet (documentation)~~ and/~~, or in the catalogue of the manufacturer.

Compliance is checked in accordance with 6.3.1 a).

NOTE 1 Marking can be applied, for example, by moulding, pressing, engraving, printing adhesive labels~~, or water slide transfers~~.

NOTE 2 Marking can be applied with water slide transfers for only components installed indoors.

5.3.2 Durability and legibility

The marking shall be durable and legible.

Compliance is checked by test in accordance with 6.3.1 b).

5.4 Design

The lightning strike counter shall be designed to carry out its function of counting the number of lightning strikes causing a current to flow in a conductor.

These devices shall detect and record lightning strikes regardless of the polarity of the current.

LSCs intended to be used outdoors shall be able to withstand environmental conditions including temperature, dust and humidity. The minimum degree of protection is IP 43 obtained by itself or in combination with a box in accordance with IEC 60529.

This test is necessary for LSCs designed to be installed outdoors or in specific environments.

Non-metallic LSC housings for outdoor application shall withstand ultraviolet (UV) effects.

Compliance is checked in accordance with 6.4, 6.5, 6.6.

The manufacturer shall provide information regarding the range of environmental operating conditions, such as temperature, altitude and humidity which the strike counter is designed to operate within.

LSCs shall be capable of counting and withstanding specified currents without unacceptable changes in their characteristics.

Compliance is checked in accordance with 6.7, 6.8.2, 6.8.3, 6.8.4 and 6.8.5.

The size of the characters in the display, if any, shall allow a normal reading, i.e. by normal or corrected vision without magnification, of the number of lightning strikes recorded, when the LSC is installed in accordance with the instructions of the manufacturer.

Compliance is checked by visual inspection.

The fixing system of the LSC should not apply an unacceptable stress or damage to the conductor.

The materials of the LSC shall be compatible with that of the lightning conductor, so that corrosion due to galvanic coupling may be avoided.

Compliance is checked by visual inspection.

~~Their material shall be compatible with that of the conductor (galvanic coupling).~~

6 Tests

6.1 General test conditions

6.1.1 General

The tests in accordance with this document are type tests, performed in a sequence according to Annex C. Unless otherwise specified, tests are carried out with the specimens assembled and installed as in normal use according to the manufacturer's or supplier's instructions.

All tests are carried out on new specimens.

Unless otherwise specified, three specimens are subjected to the tests and the requirements are satisfied if all the tests are met. If only one of the specimens does not satisfy a test due to an assembly or a manufacturing fault, that test and any preceding one which ~~may~~ could have influenced the results of the test shall be repeated and also the tests which follow shall be carried out in the required sequence on another full set of specimens, all of which shall comply with the requirements.

NOTE 1 One set of three specimens can be used for more than one test, subject to agreement by the manufacturer.

NOTE 2 The applicant can also submit an additional set of specimens which can be used should one specimen fail. The testing laboratory will then, without further request, test the additional set of specimens and will reject the set only if a further failure occurs. If the additional set of specimens is not submitted at the same time, the failure of one specimen will entail rejection.

~~The LSC submitted for testing shall be identified by means of the following elements:~~

~~– marks and indications specified in 4.3;~~