
Oznake in inštalacije s svetlobnimi sijalkami, ki delujejo od neobremenjene izhodne napetosti v območju od več kot 1 kV do manj od 10 kV - 2. del: Zahteve za zaščitne naprave pred zemeljskim uhajanjem in odprtim tokokrogom

(istoveten EN 50107-2:2005)

Signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1 kV but not exceeding 10 kV - Part 2: Requirements for earth-leakage and open circuit protective devices

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**Signs and luminous-discharge-tube installations operating
from a no-load rated output voltage exceeding 1 kV
but not exceeding 10 kV
Part 2: Requirements for earth-leakage
and open-circuit protective devices**

Installation d'enseignes et de tubes
lumineux à décharge fonctionnant
à une tension de sortie à vide assignée
supérieure à 1 kV mais ne dépassant
pas 10 kV

Partie 2: Prescriptions pour les dispositifs
de protection contre les défauts
d'isolement et contre l'ouverture des
circuits secondaires

Leuchtröhrengeräte und
Leuchtröhrenanlagen
mit einer Leerlaufspannung über 1 kV,
aber nicht über 10 kV

Teil 2: Anforderungen an
Erdschlussschutz- und
Leerlaufschutzeinrichtungen

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This European Standard was prepared by CENELEC BTTF 60-2, Electrical discharge lamp installations.

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The following dates were fixed:

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1 Scope

This European Standard specifies requirements for earth-leakage and open-circuit protective devices designed to protect circuits for neon tubes operating from transformers conforming to EN 61050 at voltages exceeding 1 000 V but not exceeding 10 000 V.

NOTE 1 Requirements for the installation of earth-leakage and open-circuit protective devices are given in EN 50107-1.

NOTE 2 Requirements for earth-leakage and open-circuit protective devices used with inverters and converters are specified in EN 61347-2-10.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 50107-1:2002, *Signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1 kV but not exceeding 10 kV - Part 1: General requirements*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code)* (IEC 60529:1989)

EN 60598-1:2000, *Luminaires - Part 1: General requirements and tests* (IEC 60598-1:1999, mod.)

EN 61050:1992, *Transformers for tubular discharge lamps having a no-load output voltage exceeding 1 kV (generally called neon-transformers) - General and safety requirements* (IEC 61050:1991 + corrigendum March 1992, mod.)

EN 61347-1:2001, *Lamp controlgear - Part 1: General and safety requirements* (IEC 61347-1:2000)

3 Definitions

For the purposes of this European Standard, the definitions given in EN 50107-1 and EN 61347-1 apply, together with the following.

NOTE Where the terms "voltage" and "current" are used, they refer to r.m.s. values unless otherwise stated.

3.1

type A device

earth-leakage or open-circuit protective device generally designed to be built into the enclosure of a transformer and not intended to be mounted outside a transformer without special precautions

NOTE A type A device normally protects only the transformer in which it is mounted.

3.2

type B device

earth-leakage or open-circuit protective device consisting of one or more separate elements so designed that it can be mounted outside a transformer and housed in an enclosure that provides all necessary protection according to its markings

NOTE 1 The enclosure may consist of the sign in which the device is mounted; the sign having a protection according to its markings.

NOTE 2 The device may protect more than one transformer.

3.3

type C device

earth-leakage or open-circuit protective device that forms a non-replaceable part of a transformer and which normally cannot be tested separately from the transformer

3.4

earth-leakage current

fault current flowing from a point in the output circuit to earth

3.5

open-circuit condition

disconnection or lamp fault in the output circuit that causes the secondary load current of the transformer feeding the lamp circuit to fall below the respective shut-down current limit

3.6

shut-down current limit

secondary load current of a transformer at which an open-circuit protective device operates

NOTE Although the shut-down current limit is specified in terms of the current flowing in the output circuit, the manufacturer of the device may measure this by other than direct means. Such means might include, e.g. measuring the current reflected into the primary winding of the transformer or measuring a change in circuit power factor.

3.7

sensor

device that detects an earth-leakage current or, in the case of an open-circuit protective device, detects when the secondary load current has fallen below the shut-down current limit, and either causes a protective switch to operate or otherwise causes the output voltage of a transformer to be removed

3.8

protective switch

part of an earth-leakage or open-circuit protective device that disconnects the mains supply from a transformer

3.9

response time

time from the start of the fault condition until the protective device removes the output voltage

3.10

secondary load current

current flowing in the output circuit of transformer supplying one or more tubes

4 General requirements

EN 61347-1:2001, Clause 4, shall apply, with the words "earth-leakage protective device" or "open-circuit protective device" (as appropriate) substituted for "lamp controlgear".

5 Tests

5.1 With the exception of EN 61347-1:2001, Subclause 5.4 (see 5.2), EN 61347-1:2001, Clause 5, shall apply, with the words "earth-leakage protective device" or "open-circuit protective device" (as appropriate) substituted for "lamp controlgear".

5.2 The requirements of EN 61347-1:2001, Subclause 5.4, shall be replaced by the following:

- a) a total of ten devices shall be selected at random for the tests;
- b) type A devices shall be tested with a representative sample of the associated transformer in which the device is normally mounted;
- c) type B devices shall be tested with transformers having characteristics at either end of the range specified in accordance with 7.3 h);
- d) type C devices shall be tested complete with their associated transformers;
- e) three devices, taken at random from the batch of ten, shall be tested in accordance with the relevant tests specified in this European Standard. The results shall be assessed as follows:
 - 1) if all three samples pass all the tests, the batch shall be deemed to conform to this European Standard;
 - 2) if two or more samples fail any of the tests, the batch shall be deemed not to conform to this European Standard;
 - 3) if one sample fails any of the tests, the tests shall be repeated on a second batch of three devices;
 - 4) if all three devices from this second batch pass all the tests, the batch shall be deemed to conform to this European Standard;
 - 5) if any device from this second batch fails any of the tests, the entire batch shall be deemed not to conform to this European Standard.

6 Classification

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EN 61347-1:2001, Clause 6 shall apply, with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear”.

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7 Marking

7.1 Items of marking

The following items shall be marked, either:

- a) on the device itself, in the case of type A or type B devices; or
- b) on the label attached to the transformer in which the device is housed, and in the case of type C devices with:
 - 1) the number of this European Standard, i.e. EN 50107-2;
 - 2) the items specified in EN 61347-1:2001, Subclause 7.1 a), b), f), and l), with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear”.

7.2 Durability of marking

The durability of the marking shall conform to the requirements of EN 61347-1:2001, Subclause 7.2.

7.3 Additional information

In addition to the items specified in 7.1, the following information, if applicable, shall be given in the manufacturer's instructions to be provided with both earth-leakage and open-circuit protective devices:

- a) the items specified in EN 61347-1:2001, Subclause 7.1 h), i) and k), with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear”;

- b) the information necessary for the test specified in EN 50107-1:2002, Clause 18, to be carried out;
- c) the information necessary for the safe installation of the device in accordance with the requirements of EN 50107-1;
- d) the information necessary for the device to be disabled manually for maintenance purposes;
- e) for type A or type C protective devices, the maximum ambient temperature at which the transformer may operate to ensure that the earth-leakage device or open-circuit protective device (as appropriate) operates safely;
- f) for type B protective devices, the maximum ambient temperature at which the device may operate to ensure that the earth-leakage or open-circuit protection (as appropriate) operates safely;
- g) where the sensors of a number of transformers are connected to a single protective device that is connected in the mains supply to their input circuits, the number of sensors that may be connected to one protective device;
- h) for type B earth-leakage protective devices or open-circuit protective devices (as appropriate), information on the types and range of transformers for which the device is suitable;
- i) a warning against using the device in a circuit with a dimmer, unless special arrangements are made to ensure that the open-circuit or earth-leakage protective device operates correctly when the circuit is dimmed;
- j) for open-circuit protective devices only, information on the shut-down current limit.

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8 Terminals

EN 61347-1:2001, Clause 8, shall apply. [SIST EN 50107-2:2007](#)

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9 Provision for protective earthing

EN 61347-1:2001, Clause 9, shall apply, with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear”.

10 Protection against accidental contact with live parts

EN 61347-1:2001, Clause 10, shall apply, with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear”.

11 Moisture resistance and insulation of type B devices

For type B protective devices, intended for mounting outdoors, EN 61347-1:2001, Clause 11, shall apply, with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear”.

Any enclosure shall provide a degree of protection corresponding to at least IP23 in EN 60529:1991, Tables I and III. Conformance shall be checked by means of the tests specified in EN 60598-1:2000, Clause 9.

12 Electric strength

For parts of an earth-leakage or open-circuit protective device operating at low voltage, EN 61347-1:2001, Clause 12, shall apply, with the words "earth-leakage protective device" or "open-circuit protective device" (as appropriate) substituted for "lamp controlgear".

If a type A or type B earth-leakage or open-circuit protective device has components that are connected in the output circuit of a transformer and are operated at a voltage exceeding 1 kV to earth under normal conditions, those components shall be tested by means of the following induced voltage test:

- a) a type A or type B device shall be connected to a transformer having the highest no-load output voltage rating specified for the device;
- b) the transformer shall be operated with no load and subjected to the induced voltage test specified in EN 61050:1992, Subclause 15.4.

No flashover or breakdown of the device shall occur during the test.

This test is not applied to components of open-circuit or earth-leakage protective devices that operate at or are subjected to low voltage (less than 1 kV).

13 Thermal endurance of devices

13.1 General

The thermal endurance of earth-leakage or open-circuit protective devices shall be tested in accordance with 13.2 or 13.3, as appropriate.

13.2 Tests for type B devices

Type B devices shall be tested in accordance with the following:

- a) the tests shall be carried out using a transformer, selected from one end of the range specified in accordance with 7.3 h). They shall then be repeated using a transformer selected from the other end of the range specified in accordance with 7.3 h);
- b) the device and the selected transformer shall be operated with resistive load such that the r.m.s value of the secondary load current is equivalent to that of the rated lamp load;
- c) the device, but not the associated transformer, shall be operated for a period of 6 h in a chamber, the temperature of which shall be maintained at +65 °C;
- d) at the conclusion of the operating period, the device shall be tested in accordance with Annex A or Annex C (as appropriate). The ambient temperature around the device shall be maintained at +65 °C during this test;
- e) the tests in b), c) and d) shall be repeated with the ambient temperature in the chamber maintained at -25 °C.

13.3 Tests for type A or type C devices

Type A or type C devices shall be tested in accordance with the following:

- a) the device and its associated transformer shall be operated with resistive load such that the r.m.s value of the secondary load current is equivalent to that of the rated load current;
- b) the combined unit shall be operated for a period of 6 h in a chamber, the temperature of which shall be maintained at the maximum rated ambient temperature of the transformer according to the markings;

- c) at the conclusion of the operating period, the device shall be tested in accordance with Annex A or Annex C (as appropriate). The ambient temperature shall be maintained at the maximum rated value during this test;
- d) the tests in a), b) and c) shall be repeated with the ambient temperature in the chamber maintained at $-25\text{ }^{\circ}\text{C}$.

14 Fault conditions

EN 61347-1, Clause 14, shall apply with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear” and with the following addition to EN 61347-1:2001, Subclause 14.1, first sentence or:

“the creepage distances and clearances specified in EN 50107-1:2002, Subclause 7.9, as appropriate”.

15 Construction

EN 61347-1:2001, Clause 15, shall apply, with the following addition to EN 61347-1:2001, Subclause 15.2:

“Printed circuits are permitted for connections to input and output terminals provided they are adequately protected.”

16 Creepage distances and clearances

EN 61347-1:2001, Clause 16, shall apply for terminals and other parts operating at low voltage.

EN 50107-1:2002, Subclause 7.9 shall apply for terminals and other parts operating at voltages in excess of low voltage.

17 Screws, current-carrying parts and connections

EN 61347-1:2001, Clause 17 shall apply, with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “lamp controlgear”.

18 Resistance to heat, fire and tracking

EN 61050:1992, Subclause 21.1, shall apply, with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “independent transformer”.

19 Resistance to corrosion

EN 61050:1992, Clause 22, shall apply, with the words “earth-leakage protective device” or “open-circuit protective device” (as appropriate) substituted for “independent transformer”.

20 Performance

20.1 Performance requirements for earth-leakage protective devices

20.1.1 When measured in accordance with Annex A, the performance of the earth-leakage device shall conform to the requirements specified in 20.1.2 to 20.1.5.