IEC 61347-2-1

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Controlgear for electric light sources – Safety – Part 2-1: Particular requirements – Starting devices (other than glow starters)

Appareillages de commande pour les sources de lumière électriques – Sécurité – Partie 2-1: Exigences particulières – Dispositifs d'amorçage (autres que starters à lueur)

IEC 61347-2-1:2024-05(en-fr)

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CONTROLGEAR FOR ELECTRIC LIGHT SOURCES – SAFETY –

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FOREWORD

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IEC 61347-2-1 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lighting. It is an International Standard.

This second edition cancels and replaces the first edition published in 2000, Amendment 1:2005 and Amendment 2:2013. This edition constitutes a technical revision.

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

a) update of normative references, introducing dated references where appropriate;
b) clarification of sample item numbers;
c) alignment of clause numbers with those of IEC 61347-1;
d) renumbering of Clause 15 and Clause 16.

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

Draft	Report on voting
34C/1582/CDV	34C/1590/RVC

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.

This document is intended to be used in conjunction with IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017. Where the requirements of any of the clauses of IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017 are referred to in this document by the phrase "IEC 61347-1:2015, Clause n and IEC 61347-1:2015/AMD1:2017, Clause n apply", this phrase is interpreted as meaning that all the requirements of the clause in question of IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017 apply, except any which are clearly inapplicable to the specific type of controlgear covered by this document.

NOTE In this document, the following print type is used:

– *compliance statements: in italic type*.

A list of all parts in the IEC 61347 series, published under the general title *Controlgear for electric light sources – Safety,* can be found on the IEC website.

Future documents in this series will carry the new general title as cited above. Titles of existing documents in this series will be updated at the time of the next edition.

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, or
- revised.

INTRODUCTION

The technical requirements in this document compared to IEC 61347-2-1:2000, IEC 61347-2-1:2000/AMD1:2005 and IEC 61347-2-1:2000/AMD2:2013 are essentially unchanged. Nevertheless, a new edition of this document could not be avoided, as without the introduction of dated references to IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017, the fourth edition of IEC 61347-1:—[1] would have been implicitly applicable due to the undated nature of the references to IEC 61347-1 in IEC 61347-2-1:2000, IEC 61347-2-1:2000/AMD1:2005 and IEC 61347-2-1:2000/AMD2:2013.

This document, in referring to any of the clauses of IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017, specifies the extent to which such a clause is applicable. Additional requirements are also included, as necessary.

[1] Fourth edition under preparation. Stage at the time of publication IEC FDIS 61347-1:2024.

CONTROLGEAR FOR ELECTRIC LIGHT SOURCES – SAFETY –

Part 2-1: Particular requirements – Starting devices (other than glow starters)

1 Scope

This part of IEC 61347 specifies safety requirements for starting devices (starters other than glow starters and ignitors) for fluorescent and other discharge lamps for use on AC supplies up to 1 000 V at 50 Hz or 60 Hz which produce starting pulses not greater than 100 kV and which are used in combination with lamps and controlgear covered in IEC 60081, IEC 60188, IEC 60192, IEC 60662, IEC 60901, IEC 61167, IEC 61195, IEC 61199, IEC 61347-2-8 and IEC 61347-2-9.

This document does not apply to glow starters or starting devices which are incorporated in discharge lamps or which are manually operated.

NOTE 1 Glow starters are dealt with in IEC 60155.

NOTE 2 Performance requirements are given in IEC 60927.

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 60052:2002, *Voltage measurement by means of standard air gaps*

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

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 60155:1993, *Glow-starters for fluorescent lamps*
IEC 60155:1993/AMD1:1995
IEC 60155:1993/AMD2:2006

IEC 60255-8:1990[2], *Electrical relays – Part 8: Thermal electrical relays*

IEC 60598 (all parts), *Luminaires*

IEC 60598-1:2020, *Luminaires – Part 1: General requirements and tests*

IEC 60901, *Single-capped fluorescent lamps – Performance specifications*

IEC 61347-1:2015, *Lamp controlgear – Part 1: General and safety requirements*
IEC 61347-1:2015/AMD1:2017

[2] Withdrawn.

ISO 3864 (all parts), *Graphical symbols – Safety colours and safety signs*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61347-1 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
starting device
ignitor
device designed to provide the appropriate electrical conditions to start a discharge lamp by itself or in combination with other components in the circuit

[SOURCE: IEC 60500-845:2020, 845-28-041, modified – The admitted term "ignitor" has been added.]

3.2
starter
device, usually for fluorescent lamps, which is used for the purpose of starting the discharge lamp by providing the necessary preheating of the cathode and, in combination with the series inductance of the ballast, causes a voltage surge applied to the discharge lamp

Note 1 to entry: The starter element that releases the starting voltage pulse can be either triggered or non-triggered.

[SOURCE: IEC 60500-845:2020, 845-28-042]

3.3
starting device with operating time limitation
starting device which prevents prolonged attempts to start lamps which refuse to start, for example, lamps with deactivated electrodes

Note 1 to entry: Prevention of starting attempts means that in the case of starters, the starting-current circuit is switched off or the current in the starting circuit is limited to a value equal to or smaller than the rated lamp current.

In the case of ignitors, prevention of starting attempts means that pulse generation has ceased, or voltage pulses are significantly reduced in amplitude.

3.4
peak voltage
highest value of the voltage pulses generated by an ignitor at the output terminals

3.5
spherical spark gap
two metal spheres of the same diameter arranged at a specified distance and used under specified conditions for the measurement of peak voltages in excess of 15 kV

3.6
maximum case temperature under abnormal conditions
(t_c + X)
maximum allowable case temperature of the starting devices and ignitors under abnormal conditions with metal halide lamps

Note 1 to entry: The value of (t_c + X) is declared by the manufacturer.

3.7
sample
one or more sampling items intended to provide information on the population or on the material provided by the manufacturer or responsible vendor

[SOURCE: IEC 60050-151:2001, 151-16-19, modified – "provided by the manufacturer or responsible vendor" has been added.]

3.8
sample item
one of the individual items in a population of similar items, or a portion of material forming a cohesive entity and taken from one place and at one time

[SOURCE: IEC 60050-151:2001, 151-16-18]

4 General requirements

IEC 61347-1:2015, Clause 4 applies.

5 General notes on tests

IEC 61347-1:2015, Clause 5 applies, together with the following:

– IEC 61347-1:2015, Annex H applies.
– One sample item shall be used for all tests, unless otherwise specified in the corresponding clause.

  To allow for parallel testing and reduced test times, additional sample items may be used except where the outcome of the test can be affected by preceding tests, for example the tests of Clause 11 and Clause 12.
– Specially prepared sample items may be used where required.
– Starting devices intended for use with lamps having different electrical characteristics are tested with the lamp which gives the most unfavourable conditions.

For information on requalification of products compliant with the previous edition of this document, i.e. IEC 61347-2-1:2000, IEC 61347-2-1:2000/AMD1:2005 and IEC 61347-2-1:2000/AMD2:2013, refer to Annex C.

6 Classification

IEC 61347-1:2015, Clause 6 applies.

Additionally, starting devices shall be classified as one of the following:

– output voltage up to and including 5 kV;
– output voltage greater than 5 kV, and up to and including 10 kV;
– output voltage greater than 10 kV, and up to and including 100 kV.

7 Marking

7.1 Marking and information

7.1.1 Mandatory marking

Starting devices shall be marked with the following:

– items a), b) and c) of IEC 61347-1:2015, 7.1;

– item f) of IEC 61347-1:2015, 7.1, and IEC 61347-1:2015/AMD1:2017, 7.1;

  This marking is not required for ignitors over 5 kV, because these are mandatorily provided with a time limitation;

– a marking to show the peak value of the voltage produced if the peak value exceeds 1 500 V. Connections having this voltage shall be marked; for ignitors with a pulse voltage over 5 kV, this marking shall be a flash symbol (broken arrow) (see the ISO 3864 series);

– allowable maximum case temperature under normal conditions (A) and, for ignitors which are intended to be connected in series with discharge lamps which can, according to the lamp specification cause rectification, the maximum case temperature under abnormal conditions (B). The marking shall be "t_c A/B" (example t_c 60/90 = maximum temperature 60 °C for the normal and maximum temperature 90 °C for the abnormal conditions).

7.1.2 Information to be provided

The following information, if applicable, shall be given either on the starting device, or be made available in the manufacturer's catalogue or similar:

– items d), e), h), i), j), k) and l) of IEC 61347-1:2015, 7.1 and IEC 61347-1:2015/AMD1:2017, 7.1;

– an indication of the time limitation, if this is provided by the starting device;

– the catalogue reference of the ballast which may be associated with the starting device, if the ballast design governs the magnitude of the pulse voltage;

– special conditions relating to the use of the starting device.

7.2 Durability and legibility

IEC 61347-1:2015, 7.2 applies.

8 Terminals

IEC 61347-1:2015, Clause 8 and IEC 61347-1:2015/AMD1:2017, Clause 8 apply.

9 Earthing

IEC 61347-1:2015, Clause 9 applies.

10 Protection against accidental contact with live parts

IEC 61347-1:2015, Clause 10 and IEC 61347-1:2015/AMD1:2017, Clause 10 apply.

11 Moisture resistance and insulation

IEC 61347-1:2015, Clause 11 and IEC 61347-1:2015/AMD1:2017, Clause 11 apply, together with the following:

– Electric components, enclosures and other parts which can be removed without the aid of a tool are removed and subjected, if necessary, to the humidity treatment with the main part.

– In order to achieve the specified conditions within the cabinet, it is recommended to ensure constant circulation of the air within and, in general, to use a cabinet which is thermally insulated.

– With double or reinforced insulation, the resistance shall be not less than 7 MΩ.

– Care should be taken to avoid the moisture content of the devices at the end of the moisture treatment changing appreciably before the measurement of the insulation resistance.

  To achieve this, it is recommended that the insulation resistance be measured while the devices are still kept in the humidity cabinet or in an adjacent room protected against draught and having similar conditions to those in the humidity cabinet.

12 Electric strength

IEC 61347-1:2015, Clause 12 applies, together with the following:

For starting devices which incorporate a high-voltage winding, compliance is checked by the following pulsing test. The starting device is operated at 110 % rated supply voltage without a lamp load until 50 pulses have occurred, switching the supply on and off if necessary.

NOTE High-voltage winding denotes a winding incorporated in the starting device which produces the necessary voltage to start the lamp.

During the test, there shall be

a) no visible or audible disruptive discharge (indication of failure of insulation under electrical stress);

b) no sparkover or flashover;

c) no collapse or reduction of the front or the tail of the impulse voltage waveshape when observed on an oscilloscope.

For starting devices without high-voltage winding, compliance is checked by an electric strength test as given in IEC 61347-1:2015, Clause 12.

13 Thermal endurance test for windings of ballasts

There are no requirements.

NOTE The requirements of IEC 61347-1:2015, Clause 13 are not applicable.

14 Fault conditions

IEC 61347-1:2015, Clause 14 and IEC 61347-1:2015/AMD1:2017, Clause 14 apply, together with the following:

– The current in the lamp circuit shall not be increased by a fault in the starting device to such an extent that the ballast becomes overheated, i.e. the winding temperature exceeds the t_w value at abnormal conditions. For starters having external dimensions as specified in IEC 60155:1993, IEC 60155:1993/AMD1:1995 and IEC 60155:1993/AMD2:2006, this requirement is met if the current in the lamp circuit does not exceed the maximum preheat current value as specified in IEC 60081 and IEC 60901 for a period longer than 5 min.

– Independent starting devices shall not exceed the temperature values for abnormal operations given in 16.3.3. This requirement is regarded as complied with when, for preheated lamp electrodes, the preheating current does not increase above its rated value by more than 5 % when the starting device is short-circuited. Mechanical cut-outs in starting devices shall be bridged if, with preheated lamp electrodes at 110 % of rated voltage, the current through the ballast is more than 105 % of the short-circuit value for a period longer than 5 min.

  This requirement is regarded as being complied with when the mechanical cut-out meets the relevant conditions of IEC 60255-8:1990[3].

15 Pulse voltage of ignitors

The maximum value of the pulse voltage, of either positive or negative pulses, shall not exceed 5 kV when operated at the rated voltage and with a load capacitance of 20 pF, using the circuit shown in Figure 1. However, the maximum pulse voltage specified in the relevant lamp data sheet shall be taken into account.

3 Withdrawn.