

INTERNATIONAL STANDARD



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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

~~LAMP CONTROLGEAR –~~
CONTROLGEAR FOR ELECTRIC LIGHT SOURCES – SAFETY –

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

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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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 61347-2-1:2000+AMD1:2005+AMD2:2013 CSV. 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 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.

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INTRODUCTION

~~This first edition of IEC 61347-2-1, published in conjunction with IEC 61347-1, represents an editorial review of IEC 60926. The formatting into separately published parts provides for ease of future amendments and revisions. Additional requirements will be added as and when a need for them is recognized.~~

~~This standard, and the parts which make up IEC 61347-2, in referring to any of the clauses of IEC 61347-1, specify the extent to which such a clause is applicable and the order in which the tests are to be performed; they also include additional requirements, as necessary. All parts which make up IEC 61347-2 are self-contained and, therefore, do not include references to each other.~~

~~Where the requirements of any of the clauses of IEC 61347-1 are referred to in this standard by the phrase "The requirements of clause n of IEC 61347-1 apply", this phrase is interpreted as meaning that all requirements of the clause in question of part 1 apply, except any which are clearly inapplicable to the specific type of lamp controlgear covered by this particular part of IEC 61347-2.~~

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.

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

~~LAMP CONTROLGEAR –~~ 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 ~~ballasts 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. ~~Preheat transformers for fluorescent lamps are covered by IEC 61347-2-8.~~

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 60068-2-75:1997/2014, *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 60188, High-pressure mercury vapour lamps~~

~~IEC 60192, Low-pressure sodium vapour lamps~~

IEC 60255-8:1990², *Electrical relays – Part 8: Thermal electrical relays*

IEC 60598 (all parts), *Luminaires*

² Withdrawn.

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

~~IEC 60662, High-pressure sodium vapour lamps~~

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

~~IEC 61167, Metal halide lamps~~

~~IEC 61195, Double-capped fluorescent lamps – Safety specifications~~

~~IEC 61199, Single-capped fluorescent lamps – Safety specifications~~

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

IEC 61347-1:2015/AMD1:2017

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

~~apparatus which provides, by itself or in combination with other components in the circuit, the appropriate electrical conditions needed to start a discharge type of lamp~~

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

~~starting device, usually for fluorescent lamps, which provides for the necessary preheating of the electrodes and may, in combination with the series impedance of the ballast, cause a surge in the voltage applied to the lamp~~

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 ~~may~~ can be either triggered, ~~for example, phase-angle synchronized,~~ 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 ~~and/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

U_p

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

3.5 ~~short-circuit power (of a voltage source)~~

~~quotient of the square of the voltage produced at the output terminals of the voltage source, in open-circuit condition, and its internal impedance as seen from 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.

~~[SOURCE: IEC 60927, 3.7, modified – The term "starting device" is added.]~~

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:

~~5.1 Starting devices for use with lamps having different electrical characteristics~~

~~Starting devices intended for use with lamps having different electrical characteristics are tested with the lamp which gives the most unfavourable conditions.~~

~~5.2 Number of specimens~~

~~The following number of specimens shall be submitted for testing:~~

- ~~— one unit for the tests of clauses 6 to 12 and 15 to 22;~~
- ~~— one unit for the tests of clause 14 (additional units or components, where necessary, may be required in consultation with the manufacturer).~~

- 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 ~~are~~ 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

~~In accordance with the requirements of 7.2 of IEC 61347-1, Starting devices shall be clearly and durably marked with the following markings:~~

- 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);
- ~~the manufacturer shall declare the~~ allowable maximum case temperature under normal conditions (A) and, for ignitors which are intended to be connected in series with discharge lamps which ~~could~~ 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, if applicable

~~In addition to the above mandatory markings,~~ 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 Provisions for 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 ~~necessary~~ 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 M Ω .
- 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.