

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Lamp controlgear –
Part 2-1: Particular requirements for starting devices (other than glow starters)**

**Appareillages de lampes –
Partie 2-1: Prescriptions particulières pour les dispositifs d'amorçage (autres
que starters à lueur)**

IEC 61347-2-1:2000

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REDLINE VERSION

VERSION REDLINE



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CONTENTS

FOREWORD	3
INTRODUCTION	4
1 Scope	6
2 Normative references	6
3 Definitions	7
4 General requirements	8
5 General notes on tests	8
5.1 Starting devices for use with lamps having different electrical characteristics	8
5.2 Number of specimens	8
6 Classification	8
7 Marking	8
7.1 Mandatory markings	8
7.2 Information to be provided, if applicable	9
8 Protection against accidental contact with live parts	9
9 Terminals	9
10 Provisions for earthing	9
11 Moisture resistance and insulation	9
12 Electric strength	10
13 Thermal endurance test for windings	10
14 Fault conditions	10
15 Heating of built-in and independent starting devices	11
15.1 General	11
15.2 Normal operation	11
15.3 Abnormal operation	12
16 Pulse voltage of ignitors	15
17 Mechanical strength	15
18 Construction	16
19 Creepage distances and clearances	16
20 Screws, current-carrying parts and connections	16
21 Resistance to heat, fire and tracking	17
22 Resistance to corrosion	17
Annexes	18
Bibliography	23
Figure 1 – Starting voltage measurement for ignitors	17
Figure I.1 – Tumbling barrel	21

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LAMP CONTROLGEAR –

Part 2-1: Particular requirements for starting devices (other than glow starters)

FOREWORD

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This consolidated version of the official IEC Standard and its amendments has been prepared for user convenience.

IEC 61347-2-1 edition 1.2 contains the first edition (2000) [documents 34C/498/FDIS and 34C/512/RVD], its amendment 1 (2005) [documents 34C/697/FDIS and 34C/709/RVD] and its amendment 2 (2013) [documents 34C/1051/FDIS and 34C/1067/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions and deletions are displayed in red, with deletions being struck through. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 61347-2-1 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

This standard shall be used in conjunction with IEC 61347-1. It was established on the basis of the first edition (2000) of that standard.

This part 2 supplements or modifies the corresponding clauses in IEC 61347-1, so as to convert that publication into the IEC Standard: Particular requirements for starting devices (other than glow starters).

NOTE In this standard, the following print types are used:

- Requirements proper: in roman type.
- *Test specifications: in italic type.*
- Explanatory matter: in smaller roman type.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A to J form an integral part of this standard.

IEC 61347 consists of the following parts, under the general title *Lamp controlgear*:

- Part 1: General and safety requirements
- Part 2-1: Particular requirements for starting devices (other than glow starters)
- Part 2-2: Particular requirements for d.c. or a.c. supplied electronic step-down convertors for filament lamps
- Part 2-3: Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps
- Part 2-4: Particular requirements for d.c. electronic ballasts for general lighting
- Part 2-5: Particular requirements for d.c. supplied electronic ballasts for public transport lighting
- Part 2-6: Particular requirements for d.c. supplied electronic ballasts for aircraft lighting
- Part 2-7: Particular requirements for d.c. supplied electronic ballasts for emergency lighting
- Part 2-8: Particular requirements for ballasts for fluorescent lamps
- Part 2-9: Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)
- Part 2-10: Particular requirements for electronic invertors and convertors for high-frequency operation of cold start tubular discharge lamps (neon tubes)
- Part 2-11: Particular requirements for miscellaneous electronic circuits used with luminaires

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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.

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LAMP CONTROLGEAR –

Part 2-1: Particular requirements for starting devices (other than glow starters)

1 Scope

This part of IEC 61347 specifies particular safety requirements for starting devices (starters other than glow starters and ignitors) for fluorescent and other discharge lamps for use on a.c. 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 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.

It 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 Glow starters are dealt with in IEC 60155.

~~This standard refers only to starting devices for use with ballasts and lamps which are internationally the most in demand.~~

Performance requirements are given in IEC 60927.

2 Normative references

For the purpose of this part of IEC 61347, the normative references given in clause 2 of IEC 61347-1 which are mentioned in this standard apply, together with the following normative references.

~~IEC 60052, Recommendations for voltage measurement by means of sphere gaps (one sphere earthed)~~

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

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

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60188, *High-pressure mercury vapour lamps*

IEC 60192, *Low-pressure sodium vapour lamps*

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

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

IEC 60662, *High-pressure sodium vapour lamps*

IEC 61167, *Metal halide lamps*

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

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

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

ISO 3864, *Safety colours and safety signs*

3 Definitions

For the purpose of this part of IEC 61347, the definitions given in clause 3 of IEC 61347-1 apply, together with the following:

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

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

NOTE The starter element that releases the starting voltage pulse may be either triggered, for example, phase-angle synchronized, or non-triggered.

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 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 ~~its~~ the output terminals of the voltage source, (in open-circuit conditions), and ~~the its~~ internal impedance ~~of the source~~ (as seen from the ~~same output terminals~~)

3.6

spherical spark gap

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

3.7

maximum case temperature under abnormal conditions

maximum allowable case temperature of the starting devices and ignitors under abnormal conditions with metal halide lamps

$(t_c + X)$

NOTE The value of $(t_c + X)$ is declared by the manufacturer.

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

4 General requirements

The requirements of clause 4 of IEC 61347-1 apply.

5 General notes on tests

The requirements of clause 5 of IEC 61347-1 apply, together with the following additional requirements:

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).

6 Classification

The requirements of clause 6 of IEC 61347-1 apply, together with the following additional requirements:

Output voltage

Starting devices are classified according to output voltage categories as follows:

- up to and including 5 kV;
- greater than 5 kV, and up to and including 10 kV;
- greater than 10 kV, and up to and including 100 kV.

7 Marking

7.1 Mandatory markings

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), c) and f) of 7.1 of IEC 61347-1, together with
- 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 ISO 3864).
- the manufacturer shall declare the allowable maximum case temperature under normal condition (A) and, for ignitors which are intended to be connected in series with discharge lamps which could, according to the lamp specification cause rectification, the maximum case temperature under abnormal condition (B). The marking shall be "tc A/B" (example

tc 60/90 = maximum temperature 60 °C for the normal and maximum temperature 90 °C for the abnormal conditions).

The marking of the earthing terminal is not required for ignitors over 5 kV because these are mandatorily provided with a time limitation.

7.2 Information to be provided, if applicable

In addition to the above mandatory markings, the following information, if applicable, shall be given 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 7.1 of IEC 61347-1, together with
- 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.

8 Protection against accidental contact with live parts

The requirements of clause 10 of IEC 61347-1 apply.

9 Terminals

The requirements of clause 8 of IEC 61347-1 apply.

10 Provisions for earthing

The requirements of clause 9 of IEC 61347-1 apply.

11 Moisture resistance and insulation

The requirements of clause 11 of IEC 61347-1 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 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

The requirements of clause 12 of IEC 61347-1 apply, together with the following additional requirement:

Pulsing test

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 ~~for 1 min as given in Clause 12 of IEC 61347-1.~~

13 Thermal endurance test for windings

The requirements of clause 13 of IEC 61347-1 are not applicable and a separate test is under consideration.

14 Fault conditions

The requirements of clause 14 of IEC 61347-1 apply, together with the following additional requirements:

14.614.1 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, this requirement is met if the current in the lamp circuit does not exceed the maximum pre-heat current value as specified in IEC 60081 and IEC 60901 for a period longer than 5 min.

14.714.2 Independent starting devices shall not exceed the temperature values for abnormal operation given in 15.23.3. This requirement is regarded as complied with when, for preheated lamp electrodes, the preheating current ~~has not increased by more than 5 % above the value with~~ 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.