



IEC 62384

Edition 2.0 2020-05
REDLINE VERSION

INTERNATIONAL STANDARD



DC or AC supplied electronic controlgear for LED modules – Performance requirements

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.140.99; 31.080.99

ISBN 978-2-8322-8361-5

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 General notes on tests	6
5 Classification	7
5.1 Classification according to the load	7
5.2 Classification according to the output voltage	7
5.3 Classification according to the output current	7
6 Marking	7
6.1 Mandatory marking	7
6.2 Optional marking	8
7 Output voltage and current	8
7.1 Starting and connecting requirements	8
7.2 Voltage and current during operation	8
7.3 Capacitive load requirement	8
7.4 Voltage surges during switching and operation	8
8 Total circuit power	9
9 Circuit power factor	9
10 Supply current	9
11 Impedance at audio frequencies	9
11 Operational tests for abnormal conditions	10
12 Endurance	10
Annex A (normative) Tests	11
A.1 General requirements	11
A.1.1 General	11
A.1.2 Ambient temperature	11
A.1.3 Supply voltage and frequency	11
A.1.4 Magnetic effects	11
A.1.5 Instrument characteristics	11
A.2 Measurement of capacitive load current	12
Annex B (informative) Guidance on quoting product life and failure rate	15
Bibliography	16
Figure A.1 – Test circuit for the current when connecting a load	11
Figure A.2 – Measurement of impedance at audio frequencies	11
Figure A.1 – Test circuit for measurement of capacitive load current	14

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DC OR AC SUPPLIED ELECTRONIC CONTROLGEAR FOR
LED MODULES – PERFORMANCE REQUIREMENTS**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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

International Standard IEC 62384 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

This second edition cancels and replaces the first edition published in 2006 and Amendment 1:2009. This edition constitutes a technical revision.

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

- a) scope extension (direct current from 250 V to 1 000 V);
- b) new specifications for measuring the power factor for controlgear with settable/non-constant output (for instance, to allow for constant light output);
- c) deletion of audio frequency requirements;
- d) selection of current test circuit by module capacitance (instead of selecting by having or not having logic circuitry) plus test circuit setup changes.

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

FDIS	Report on voting
34C/1488/FDIS	34C/1489/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This document is to be read in conjunction with IEC 61347-2-13.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://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 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.

DC OR AC SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES – PERFORMANCE REQUIREMENTS

1 Scope

This document specifies performance requirements for electronic controlgear for use on ~~d.c. supplies up to 250 V and a.c.~~ DC or AC supplies up to 1 000 V (alternating current at 50 Hz or 60 Hz) and with an output frequency which can deviate from the supply frequency, associated with LED modules according to IEC 62031. Controlgear for LED modules specified in this document are designed to provide constant voltage or current. Deviations from the pure voltage and current types do not exclude the gear from this document.

NOTE 1 The tests in this document are type tests. Requirements for testing individual controlgear during production are not included.

NOTE 2 Requirements for controlgear which incorporate means for varying the output power are under consideration.

NOTE 3 It ~~may~~ can be expected that controlgear complying with this document will ensure satisfactory operation between 92 % and 106 % of the rated supply voltage, taking into account the specifications of the LED module manufacturer.

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

IEC 61347-2-13, *Lamp controlgear – Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules*

~~IEC 62031, LED modules for general lighting – Safety requirements⁴~~

INTERNATIONAL STANDARD

NORME INTERNATIONALE



DC or AC supplied electronic controlgear for LED modules – Performance requirements

Appareillages électroniques alimentés en courant continu ou alternatif pour modules de LED – Exigences de performances

CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 General notes on tests	6
5 Classification	7
5.1 Classification according to the load	7
5.2 Classification according to the output voltage	7
5.3 Classification according to the output current	7
6 Marking	7
6.1 Mandatory marking	7
6.2 Optional marking	7
7 Output voltage and current	8
7.1 Starting and connecting requirements	8
7.2 Voltage and current during operation	8
7.3 Capacitive load requirement	8
8 Total circuit power	8
9 Circuit power factor	9
10 Supply current	9
11 Operational tests for abnormal conditions	9
12 Endurance	10
Annex A (normative) Tests	11
A.1 General requirements	11
A.1.1 General	11
A.1.2 Ambient temperature	11
A.1.3 Supply voltage and frequency	11
A.1.4 Magnetic effects	11
A.1.5 Instrument characteristics	11
A.2 Measurement of capacitive load current	12
Annex B (informative) Guidance on quoting product life and failure rate	13
Bibliography	14
Figure A.1 – Test circuit for measurement of capacitive load current	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DC OR AC SUPPLIED ELECTRONIC CONTROLGEAR FOR
LED MODULES – PERFORMANCE REQUIREMENTS**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62384 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

This second edition cancels and replaces the first edition published in 2006 and Amendment 1:2009. This edition constitutes a technical revision.

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

- a) scope extension (direct current from 250 V to 1 000 V);
- b) new specifications for measuring the power factor for controlgear with settable/non-constant output (for instance, to allow for constant light output);
- c) deletion of audio frequency requirements;
- d) selection of current test circuit by module capacitance (instead of selecting by having or not having logic circuitry) plus test circuit setup changes.

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

FDIS	Report on voting
34C/1488/FDIS	34C/1489/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This document is to be read in conjunction with IEC 61347-2-13.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://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 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.

DC OR AC SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES – PERFORMANCE REQUIREMENTS

1 Scope

This document specifies performance requirements for electronic controlgear for use on DC or AC supplies up to 1 000 V (alternating current at 50 Hz or 60 Hz) and with an output frequency which can deviate from the supply frequency, associated with LED modules according to IEC 62031. Controlgear for LED modules specified in this document are designed to provide constant voltage or current. Deviations from the pure voltage and current types do not exclude the gear from this document.

NOTE 1 The tests in this document are type tests. Requirements for testing individual controlgear during production are not included.

NOTE 2 Requirements for controlgear which incorporate means for varying the output power are under consideration.

NOTE 3 It can be expected that controlgear complying with this document will ensure satisfactory operation between 92 % and 106 % of the rated supply voltage, taking into account the specifications of the LED module manufacturer.

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

IEC 61347-2-13, *Lamp controlgear – Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules*

SOMMAIRE

AVANT-PROPOS	17
1 Domaine d'application	19
2 Références normatives	19
3 Termes et définitions	19
4 Remarques générales sur les essais	20
5 Classification	21
5.1 Classification en fonction de la charge	21
5.2 Classification en fonction de la tension de sortie	21
5.3 Classification en fonction du courant de sortie	21
6 Marquage	21
6.1 Marquage obligatoire	21
6.2 Marquage facultatif	22
7 Tension et courant de sortie	22
7.1 Exigences au démarrage et à la connexion	22
7.2 Tension et courant en fonctionnement	22
7.3 Exigences pour charges capacitives	22
8 Puissance totale du circuit	23
9 Facteur de puissance du circuit	23
10 Courant d'alimentation	23
11 Essais de fonctionnement dans les conditions anormales	24
12 Endurance	24
Annexe A (normative) Essais	25
A.1 Exigences générales	25
A.1.1 Généralités	25
A.1.2 Température ambiante	25
A.1.3 Tension et fréquence d'alimentation	25
A.1.4 Effets magnétiques	25
A.1.5 Caractéristiques des appareils de mesure	25
A.2 Mesurage du courant d'une charge capacitive	26
Annexe B (informative) Recommandations pour quantifier la durée de vie et le taux de défaillance	27
Bibliographie	28
Figure A.1 – Circuit d'essai pour le mesurage du courant d'une charge capacitive	26

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

APPAREILLAGES ÉLECTRONIQUES ALIMENTÉS EN COURANT CONTINU OU ALTERNATIF POUR MODULES DE LED – EXIGENCES DE PERFORMANCES

AVANT-PROPOS

- 1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent à appliquer de façon transparente, dans toute la mesure possible, les publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 62384 a été établie par le sous-comité 34C: Appareils auxiliaires pour lampes, du comité d'études 34 de l'IEC: Lampes et équipements associés.

Cette deuxième édition annule et remplace la première édition parue en 2006 et son Amendement 1:2009. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) extension du domaine d'application (courant continu de 250 V à 1 000 V);
- b) nouvelles spécifications pour le mesurage du facteur de puissance des appareillages avec sortie réglable/non constante (par exemple, pour permettre un flux lumineux constant);
- c) suppression des exigences en matière de fréquence audio;

- d) choix du circuit d'essai actuel en fonction de la capacité du module (en lieu et place d'un choix en fonction de la présence ou de l'absence de circuits logiques) et modification de la configuration du circuit d'essai.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
34C/1488/FDIS	34C/1489/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Ce document doit être lu conjointement avec l'IEC 61347-2-13.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

APPAREILLAGES ÉLECTRONIQUES ALIMENTÉS EN COURANT CONTINU OU ALTERNATIF POUR MODULES DE LED – EXIGENCES DE PERFORMANCES

1 Domaine d'application

Le présent document spécifie les exigences de performances relatives aux appareillages électroniques pour utilisation sur des alimentations en courant continu ou courant alternatif jusqu'à 1 000 V (courant alternatif à 50 Hz ou 60 Hz) et avec une fréquence de sortie qui peut différer de la fréquence d'alimentation, associés à des modules de LED conformes à l'IEC 62031. Les appareillages pour modules de LED spécifiés dans le présent document sont conçus pour délivrer une tension ou un courant constant. Le présent document couvre aussi les appareillages qui ne sont pas des générateurs purs de courant ou de tension.

NOTE 1 Les essais spécifiés dans le présent document sont des essais de type. Les exigences pour les essais individuels des appareillages pendant la production ne sont pas incluses.

NOTE 2 Les exigences pour les appareillages qui incluent des dispositifs pour la variation de la puissance de sortie sont à l'étude.

NOTE 3 Il est probable que les appareillages conformes au présent document assurent un fonctionnement satisfaisant entre 92 % et 106 % de la tension d'alimentation assignée, en prenant en compte les spécifications du fabricant du module de LED.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 61347-1, *Appareillages de lampes – Partie 1: Exigences générales et exigences de sécurité*

IEC 61347-2-13, *Appareillages de lampes – Partie 2-13: Exigences particulières pour les appareillages électroniques alimentés en courant continu ou alternatif pour les modules de DEL*