

<b>STN</b>	<b>Programovateľné súčasti elektronických ovládacích zariadení svetelných zdrojov. Všeobecné a bezpečnostné požiadavky.</b>	<b>STN EN 62733</b>  36 0518
------------	---	--

Programmable components in electronic lamp controlgear - General and safety requirements

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/15

Obsahuje: EN 62733:2015, IEC 62733:2015

**121985**

---

Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, 2016  
Podľa zákona č. 264/1999 Z. z. v znení neskorších predpisov sa môžu slovenské technické normy rozmnožovať a rozširovať iba so súhlasom Úradu pre normalizáciu, metrológiu a skúšobníctvo SR.

EUROPEAN STANDARD

**EN 62733**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2015

---

ICS 29.140.99

English Version

**Programmable components in electronic lamp controlgear -  
General and safety requirements  
(IEC 62733:2015)**

Composants programmables dans les appareillages  
électroniques de lampes - Exigences générales et  
exigences de sécurité  
(IEC 62733:2015)

Programmierbare Bauteile von elektronischen  
Betriebsgeräten für Lampen - Teil 1: Allgemeine und  
Sicherheitsanforderungen  
(IEC 62733:2015)

This European Standard was approved by CENELEC on 2015-06-11. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

**European foreword**

The text of document 34C/1140/FDIS, future edition 1 of IEC 62733, prepared by SC 34C, "Auxiliaries for lamps", of IEC TC 34, "Lamps and related equipment", was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62733:2015.

The following dates are fixed:

- latest date by which the document has (dop) 2016-03-11  
to be implemented at national level by  
publication of an identical national  
standard or by endorsement
- latest date by which the national (dow) 2018-06-11  
standards conflicting with the  
document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

**Endorsement notice**

The text of the International Standard IEC 62733:2015 was approved by CENELEC as a European Standard without any modification.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-13	2002	Electromagnetic compatibility (EMC) -- Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests	EN 61000-4-13	2002
+ A1 IEC 61347-1	2009 -	Lamp controlgear - Part 1: General and safety requirement	+ A1 EN 61347-1	2009 -
IEC 61347-2 IEC 61508-4	series 2010	Lamp controlgear Functional safety of electrical/electronic/programmable electronic safety-related systems -- Part 4: Definitions and abbreviations	EN 61347-2 EN 61508-4	series 2010
IEC 61508-5	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems -- Part 5: Examples of methods for the determination of safety integrity levels	EN 61508-5	2010
IEC 61508-7	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems -- Part 7: Overview of techniques and measures	EN 61508-7	2010
IEC 61547	2009	Equipment for general lighting purposes - EMC immunity requirements	EN 61547	2009



IEC 62733

Edition 1.0 2015-05

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Programmable components in electronic lamp controlgear – General and safety requirements**

**Composants programmables dans les appareillages électroniques de lampes – Exigences générales et exigences de sécurité**





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### Recherche de publications IEC - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [csc@iec.ch](mailto:csc@iec.ch).



IEC 62733

Edition 1.0 2015-05

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Programmable components in electronic lamp controlgear – General and safety requirements**

**Composants programmables dans les appareillages électroniques de lampes – Exigences générales et exigences de sécurité**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 29.140.99

ISBN 978-2-8322-2668-1

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms and definitions .....	7
4 General requirements .....	10
5 Risk assessment .....	11
5.1 General.....	11
5.2 Specification of tolerable risk .....	11
5.3 Documentation.....	11
6 Requirements for abnormal operating and fault conditions .....	12
6.1 Abnormal operating and fault conditions in the application of the electronic lamp controlgear .....	12
6.2 Fault conditions for the programmable component .....	12
7 Requirements for software.....	13
8 Requirements for EMC immunity.....	13
Annex A (normative) Software evaluation.....	15
A.1 General.....	15
A.2 Protective programmable components using software.....	15
A.3 Terms and definitions.....	15
A.4 Requirements for the architecture .....	22
A.5 Measures to avoid errors .....	30
Annex B (informative) FTA and FMEA analysis .....	34
B.1 FTA results .....	34
B.2 FMEA results .....	35
Annex C (informative) Guidance on the identification of a protective programmable component.....	37
Annex D (normative) Risk classification .....	38
D.1 General.....	38
D.2 Frequency of occurrence.....	38
D.3 Risk severity .....	38
D.4 Classification of risks .....	39
Bibliography.....	40
Figure B.1 – Example of a fault tree diagram .....	35
Table A.1 – General fault/error conditions .....	24
Table A.2 – Specific fault/error conditions .....	26
Table A.3 – Semi-formal methods .....	31
Table A.4 – Software architecture specification.....	31
Table A.5 – Module design specification .....	32
Table A.6 – Design and coding standards .....	33
Table A.7 – Software safety validation .....	33
Table D.1 – Frequency definition and categorization (from IEC 61508-5:2010 Annex C) .....	38



Table D.2 – Risk severity definitions (from IEC 61508-5:2010, Annex C) .....	38
Table D.3 – Safety risk classification .....	39

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PROGRAMMABLE COMPONENTS  
IN ELECTRONIC LAMP CONTROLGEAR –  
GENERAL AND SAFETY 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 62733 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
34C/1140/FDIS	34C/1156/RVD

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

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

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.

The committee has decided that the contents of this publication 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,
- withdrawn,
- replaced by a revised edition, or
- amended.

## INTRODUCTION

This International Standard provides safety requirements and test methods for programmable components when in electronic lamp controlgear. It provides additional safety requirements for electronic lamp controlgear containing programmable components to the requirements of IEC 61347 series.

In general, the two means of protection safety principle is used for protection against hazards such as electric shock. Consequently one single fault condition or abnormal operation of the electrical equipment will not lead to a hazardous situation.

Until recent technology, two means of protection have been realized in traditional hardware. Examples are the provision of basic insulation and supplementary insulation between hazardous live parts and accessible parts, and provision of basic insulation combined by disconnection of the mains supply by a fuse.

Nowadays however programmable components (with embedded software) may be used as a measure to provide safety under normal conditions, single fault conditions and/or abnormal operation.

Since the traditional lighting standards do not provide requirements for programmable components, this standard has been drawn up.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers conditions for electromagnetic phenomena that can be expected in practice with influence on the operation of the programmable component, for taking into account the way this can affect the safe operation of the electronic lamp controlgear.

This first edition is based upon IEC 60730-1:2010 and IEC 60335-1:2010 and adapted for electronic lamp controlgear

NOTE The terms and definitions and Tables A.1 and A.2 respectively of this standard are equivalent to terms and definitions and Table R.1 and R.2 of IEC 60335-1:2010, and equivalent terms and definitions and Table H.1 (class B and class C software) of IEC 60730-1:2010.

## PROGRAMMABLE COMPONENTS IN ELECTRONIC LAMP CONTROLGEAR – GENERAL AND SAFETY REQUIREMENTS

### 1 Scope

This International Standard provides general and safety requirements for programmable components used in products covered by IEC 61347.

The requirements of this standard are only applicable to the programmable components (including its embedded software) in the electronic lamp controlgear. For other electric/electronic circuits and their components in the electronic lamp controlgear, the requirements of IEC 61347 series apply.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*  
IEC 61000-4-13:2002/AMD 1:2009

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

IEC 61347-2 (all parts)<sup>1</sup>, *Lamp controlgear – Part 2: Particular requirements*

IEC 61547:2009, *Equipment for general lighting purposes – EMC immunity requirements*

IEC 61508-4:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 4: Definitions and abbreviations*

IEC 61508-5:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 5: Examples of methods for the determination of safety integrity levels*

IEC 61508-7:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 7: Overview of techniques and measures*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**

---

<sup>1</sup> Relevant parts of the series depend on the context.