SLOVENSKI STANDARD
SIST EN 60929:2011/A1:2016

01-maj-2016

Izmenično in/ali enosmerno napajane elektronske predstikalne naprave za cevaste fluorescenčne svetilke - Tehnične zahteve - Dopolnilo A1

AC and/or DC-supplied electronic control gear for tubular fluorescent lamps - Performance requirements

Ta slovenski standard je istoveten z: EN 60929:2011/A1:2016

ICS:

29.140.30	Fluorescenčne sijalke. Sijalke	Fluorescent lamps. Discharge lamps

SIST EN 60929:2011/A1:2016 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60929:2011/A1

March 2016

ICS 29.140.30

English Version

AC and/or DC-supplied electronic control gear for tubular fluorescent lamps - Performance requirements (IEC 60929:2011/A1:2015)

Appareillages électroniques alimentés en courant alternatif et/ou continu pour lampes tubulaires à fluorescence - Exigences de performances (IEC 60929:2011/A1:2015)

Wechsel- und/oder gleichstromversorgte elektronische Betriebsgeräte für röhrenförmige Leuchtstofflampen - Anforderungen an die Arbeitsweise (IEC 60929:2011/A1:2015)

This amendment A1 modifies the European Standard EN 60929:2011; it was approved by CENELEC on 2015-11-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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/1114/CDV, future IEC 60929:2011/A1, 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 60929:2011/A1:2016.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2016-09-11
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2019-03-11

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 60929:2011/A1:2015 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

Publication	Year	Title	EN/HD	Year
In Annex ZA of EN 60929:2011 add the following new reference:				
IEC/TR 62750	2012	Unified fluorescent lamp dimming standard - calculations	-	-

IEC 60929

Edition 4.0 2015-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

AMENDMENT 1
AMENDEMENT 1

AC and/or DC-supplied electronic control gear for tubular fluorescent lamps – Performance requirements

Appareillages électroniques alimentés en courant alternatif et/ou continu pour lampes tubulaires à fluorescence – Exigences de performances

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.140.30

ISBN 978-2-8322-2925-5

FOREWORD

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

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

CDV	Report on voting
34C/1114/CDV	34C/1157/RVC

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website 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

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.

CONTENTS

Replace the titles of 8.3.1 and 8.4 as follows:

Add the titles of the new Annexes F and G, the new figures and the new tables as follows:

1 Scope

Add after NOTE 2 the following NOTE 3:

NOTE 3 Requirements for the digital addressable lighting interface of electronic control gear are given in IEC 62386.

2 Normative references

Add the following new reference at the end of the list:

IEC TR 62750:2012, *Unified fluorescent lamp dimming standard calculations*

8.3 Requirements for dimming

Replace the entire subclause with the following new subclause:

8.3 Requirements for dimming

8.3.1 Heating of the lamp cathodes

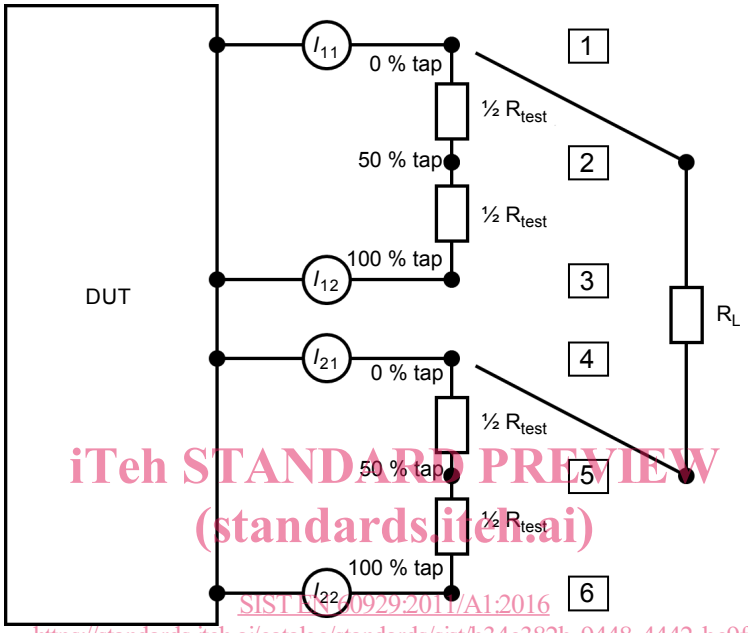
8.3.1.1 General

Fluorescent lamps operated in dimming mode (to reduce luminous flux by reducing discharge current) need their cathodes adequately heated by the electronic control gear. It has been found that measuring the currents through the two lead-in wires to the cathode and calculating the sum of the squares (SoS) of these two currents as a function of the discharge current can estimate the cathode heating. Alternatively, it has also been found that it is possible to estimate cathode heating by measuring the voltage applied across the cathode (CV) while dimming. The heating requirements are described in IEC TR 62750:2012.

The control gear is tested at lamp discharge currents (dim levels) of I_{Dmin}, I_{D30} and I_{D60}. The measurements are conducted with substitution resistors for the cathodes (R_{test}) and for the discharge, the latter dependent on the dim level (R_L, having nominal values of R_{L10Max} and R_{L10Min} as well as R_{L30} and R_{L60}). The lamp substitution resistor values shall be taken from the IEC lamp data sheets. Take care that the substitution resistors are capable of carrying the current, voltage and power occurring in the circuit.

All positions that on control gear that would be connected to a lamp shall instead be connected to substitution resistors. Wherever in this procedure a reference is made to “lamp”, it is intended to mean a set of substitution resistors that represent a lamp.

The hot spot location may vary on the lamp cathode during operation. This effect is simulated in the test by connecting the cathode substitution resistors in different circuit configurations. For this purpose, taps in the middle and at the ends of the cathode substitution resistor networks are equipped with switches (0 – 50 – 100 method), which allow all possible combinations of connection to be realized. The fundamental test set-up is shown in Figure 3.



Key

DUT control gear device under test

R_L lamp substitution resistor

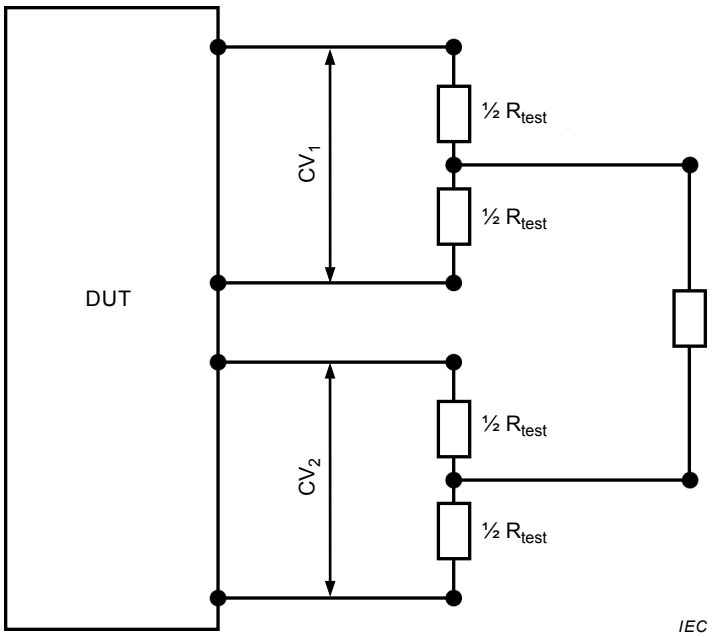
I_{nn} measured current

1…6 switch positions

Figure 3 – Fundamental test set-up for the SoS-test

In cases where the discharge current is much smaller than the auxiliary heating current, i.e. for the upper and lower heating limits at very low discharge current values (= 10 % of the test current), the cathode lead wire currents are found to be nearly equal.

Thus, for the CV-test, only the centre tap position is required for testing. The CV-test setup shown in Figure 4 is a simplified version of the SoS-test circuit.



Key

DUT	control gear device under test
R_L	lamp substitution resistor
CV_1 and CV_2	measured cathode voltages

Figure 4 – Fundamental test set-up for the CV-test

8.3.1.2 Basic test conditions

Due to the lamps being operated at high frequency, the test set-up with substitution resistors should be comparable to the set-up of the real luminaire. Relevant examples are given in Annex F.

Check the suitability of the lamp and cathode substitution resistor set-up at high frequencies for the frequency range used by the control gear.

Maintain the maximum contact resistances, parasitic inductances and coupling capacitances of the cathode circuits in test with the lamp dummy inserted (see Table 2).

Table 2 – Maximum permitted parasitic inductances, capacitances and contact resistances of a test circuit set-up according to Figures 3 and 4

Parameter	Maximum value
L (for each heating circuit)	2 µH
R (contact resistances for each heating circuit)	100 nΩ
C_1 (from heating circuit to heating circuit)	20 pF
C_2 (heating circuit to earth)	150 pF

The values of *L*, *R*, C_1, and C_2 are measured at the lamp wires next to the electronic control gear's lamp terminals. For this purpose, instead of a lamp, the cathode substitution resistors R_{test} are inserted in the test set-up.

Output circuits of electronic control gears, designed for multi-lamp operation, are each tested separately. The output circuits not involved in the test shall be connected to the substitution

resistors with equal value to the output circuit which is under test. The variations of the cathode terminal switch take place only with the output circuit under test. For the other circuit(s), the switch is connected to the middle position (positions 2 and 5 in Figure 3).

Lamp substitution circuits, supplied from multi-lamp electronic control gears (i.e. gears which operate more than one lamp simultaneously), shall each be wired separately when connected with the DUT (device under test). This means that each electrode substitution resistor is equipped with 2 cables, leading to the terminal of the electronic control gear and having an immediate connection according to the electrical circuit design. Each pair of one electrode substitution resistor's cables shall be installed together.

For wiring of the test set-up, H05V-U cables (or equivalent) shall be used. When designing the wiring layout, the values of the parasitic losses shall be in the same order for all lamp circuits. This can be achieved only if the wiring of the lamp circuits is comparable in distances, lengths, etc. and each pair of lamp circuits is located symmetrical to the axis of the device.

Check the suitability of the instruments, i.e. the tolerance at the range of expected frequency and amplitude.

For the r.m.s. current measurement, the measurement period shall be an integer multiple of the mains half wave period.

If the electronic control gear allows operation of different lamps with varying operating parameters, then safeguard with suitable means so that during operation at the lamp dummy the correct choice of parameters for that lamp(s) has been made.

Compliance with the cathode heating conditions shall be tested with each alternative lamp type.

To ensure that control gear reaches the operating state (to "start" the substitution resistors), the procedure may be modified and/or a special prepared control gear may be used, provided the cathode heating would be the same as a production control gear.

8.3.1.3 General test sequence

Table 3 gives an overview of the values for the different dimming levels which shall be measured and controlled. If an electronic control gear is designed for more than one lamp, then the same measurements and tests shall be conducted as for Lamp 1. Table 3 includes also the switching position for the simulation of the arc spot and the correlation to the test method (CV or SoS).