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Lighting control interface for dimming – Analogue voltage dimming interface for
electronic current sourcing controlgear

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIGHTING CONTROL INTERFACE FOR DIMMING – ANALOGUE VOLTAGE DIMMING INTERFACE FOR ELECTRONIC CURRENT SOURCING CONTROLGEAR

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

IEC 63128 edition 1.1 contains the first edition (2019-05) [documents 34/592/FDIS and 34/609/RVD] and its amendment 1 (2024-07) [documents 34/1053/CDV and 34/1137A/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 63128 has been prepared by IEC technical committee 34: Lamps and related equipment.

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

The committee has decided that the contents of this document and its amendment 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

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- revised.

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LIGHTING CONTROL INTERFACE FOR DIMMING – ANALOGUE VOLTAGE DIMMING INTERFACE FOR ELECTRONIC CURRENT SOURCING CONTROLGEAR

1 Scope

This document specifies the analogue control interface of controlgear which has the function of controlling the output of the controlgear. The output of the controlgear is controlled between minimum/off and maximum values by the voltage control device sinking the controlgear current source.

This document does not specify safety requirements for the analogue interface of controlgear. Safety requirements are given in IEC 61347 (all parts).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 controlgear

<for an electric light source> unit inserted between the electrical supply and at least one light source, which serves to supply the light source(s) with its (their) rated voltage or rated current, and can consist of one or more separate components

Note 1 to entry: The controlgear may include means for igniting, dimming, correcting the power factor and suppressing radio interference, and further control functions.

Note 2 to entry: The controlgear consists of a power supply and a control unit.

Note 3 to entry: The terms "control gear" and "controlgear" are interchangeable. In IEC standards, the term "controlgear" is commonly used.

3.2 controllable lamp controlgear

electronic controlgear whose lamp operating characteristics can be changed by means of a separate control input signal

[SOURCE: IEC 61347-1:2015, 3.2.3, modified – "ballast" has been replaced with "lamp controlgear" and "a signal via mains or extra control input" has been replaced with "a separate control input signal".]

3.3 control terminal

terminal intended to connect an item to a circuit or device capable of supplying or receiving an electronic control signal to the item

Note 1 to entry: Control inputs for other control signals (for example IEC 62386 (all parts), IEC 62756-1) are excluded.

[SOURCE: IEC 60050-845:—, 845-28-062, modified – The note has been added.]

3.4 control signal

DC voltage that is used to set the output power of the lamp controlgear

3.5 control unit of the controlgear

<for an LED light source> electronic device, being part of the controlgear, designed for controlling the electric energy to the LED light source

Note 1 to entry: The purpose of controlling the electric energy can be colour mixing, responding to depreciating luminous flux, and other features.

Note 2 to entry: In LEDsi modules, the control unit of the control gear is part of the LED module and separate from the power supply of the control gear.

[SOURCE: IEC 60050-845:—, 845-28-057]

3.8 correlated colour temperature factor CCTF

ratio of the dimmed CCT to the full power CCT

Note 1 to entry: This ratio is used in the calculation of warm dimming responses for applicable LED systems.

Note 2 to entry: CCT (correlated colour temperature) is defined in IEC 63128:2019 IEC 845-23-068.

3.6 electric light source

light source

primary light source with the means for connecting to the electric supply and usually designed to be incorporated into a luminaire

Note 1 to entry: An electric light source can be a lamp, provided with a lamp cap, or LED module designed to be connected by terminals, connectors or similar devices.

3.7 output power

<of an electronic lamp controlgear> electrical power supplied from the electronic lamp controlgear at the output terminals of the electronic lamp controlgear

3.9 warm dimming

capability of controlgear to decrease the colour temperature of its LED light sources as the power, and therefore the luminous flux output of the light sources is decreased

4 General remarks on tests

4.1 Disconnected control signal

If the control signal is not received, the lamp controlgear shall provide the rated power or maximum of the rated power range or the system failure level, if applicable and described by the manufacturer.

4.2 Type test

Tests according to this document are type tests.

The requirements and tolerances permitted by this document are based on the testing of a type test sample submitted by the manufacturer for that purpose. In principle this type test sample should consist of units having characteristics typical of the manufacturer's production and be as close to the production centre point values as possible. For guidance on sampling plans and procedures for inspection by attributes, see ISO 2859-1.

4.3 Test order and application of test

The tests shall be carried out in the order of the clauses, unless otherwise specified.

One lamp controlgear shall be submitted to all tests, unless otherwise stated.

In general, all tests are made on each type of lamp controlgear or where a power range of similar lamp controlgear is involved, for each rated power in the range or on a representative selection from the range as given by the manufacturer.

5 Marking

Controllable electronic light source controlgear in accordance with this document shall be clearly marked with the following marking (see Figure 1):

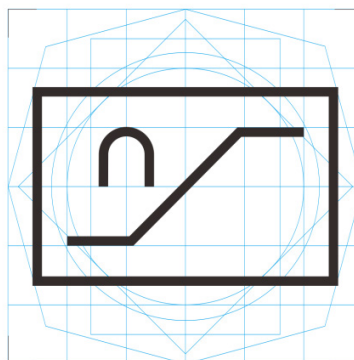


Figure 1 – Marking of controllable electronic light source controlgear

The preferred marking size should be 8 mm x 16 mm (H x L).

Markings should be readable with normal vision.

6 System description

6.1 General

The circuit diagram of the functional specification for DC voltage control is shown in Figure 2.

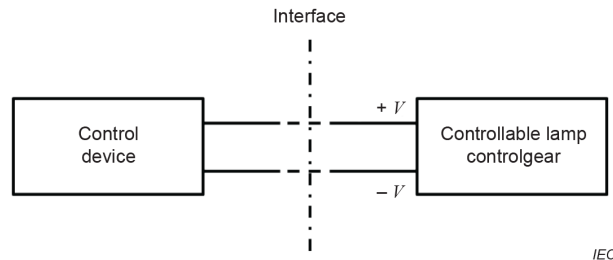


Figure 2 – Functional specification for DC voltage control

The output power of a controllable lamp controlgear is controlled by the control signal applied to the control input of the controllable lamp controlgear.

Depending on the current sink capability of the control device, and the total maximum source current for all controllable lamp controlgear, several controllable lamp controlgear can be connected to one control device (see Figure 3).

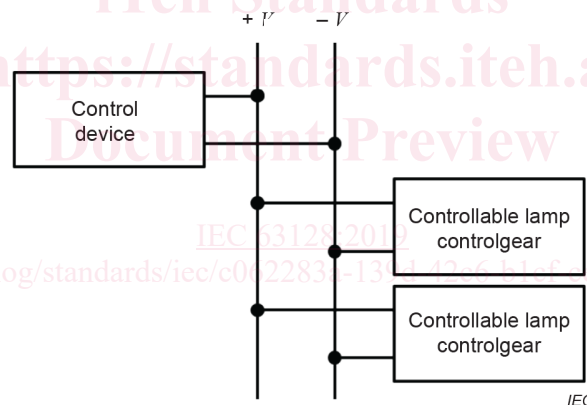


Figure 3 – Connection diagram for several controllable electronic lamp controlgear

6.2 Control signal voltage range and characteristics

The control input voltage V shall be in the range of:

$$-20 \text{ V} < V < +20 \text{ V}.$$

In this range the controlgear shall not be damaged.

The control terminals shall be protected against the application of reversed polarity. In that case, the electronic lamp controlgear shall operate with minimum output power or shall not operate.

The control signal shall have the following characteristics:

Control signal range

V = between 0 V and 1 V: minimum value of output power (minimum light output).

V = between 1 V and 10 V: output power increasing from minimum to maximum value, see 6.3.

V = between 10 V and 11 V: maximum value of output power (maximum light output)

V = between 0 V and 11 V: stable output power, where stable light output is expected.

If the control terminals of the controllable controlgear are not connected to a control device (open circuit) the controlgear shall provide the maximum output power (the light output shall be the maximum light output).

This shall be tested by measuring the output power.

6.3 Dimming curve

The dimming curve is defined using the values in Table 1.

Table 1 – Control signal related to the electronic light source controlgear output power (light level of the dimming curve)

Control signal voltage VDC at the electronic light source controlgear control terminals in V	Minimum output power in % of the maximum level	Maximum output power in % of the maximum level
≤ 1	min	min +15
5	45	65
7	70	90
10	90	100
> 10	100	100

NOTE If the electronic lamp controlgear is designed as a power source based on a current source, then the values given in the table are percentages of the rated current. If the electronic lamp controlgear is designed as a power source based on a voltage source, then the values given in the table are the percentages of the rated voltage.

In the case of electronic light source controlgear with a minimum physically possible value of output power higher than a value in the table, the table shall be applied only above this lowest possible value.

6.4 Control input current limits

Controlgear in relation to this document acts as a current source. Limits for the control input current to be sourced by the controlgear are 100 μ A minimum and 2 mA maximum, for the input voltage range of 0 V to 11 V.

The nominal value of the control input current shall be declared in the manufacturer's literature or stated on the lamp controlgear.

6.5 Switch-on

The switch-on of the controlgear is permitted at any dimming position.

This shall be tested by visual inspection.