IEC 62386-217

Edition 1.0 2018-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Digital addressable lighting interface – Part 217: Particular requirements for control gear – Thermal gear protection (device type 16)

Interface d'éclairage adressable numérique – Partie 217: Exigences particulières pour les appareillages de commande – Protection thermique de l'appareillage (dispositifs de type 16)

IEC 62386-217:2018-03(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 217: Particular requirements for control gear – Thermal gear protection (device type 16)

FOREWORD

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International Standard IEC 62386-217 has been prepared by IEC technical committee 34: Lamps and related equipment.

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

FDIS	Report on voting
34/481/FDIS	34/505/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 Part 217 of IEC 62386 is intended to be used in conjunction with:

- Part 101, which contains general requirements for system components;
- Part 102, which contains general requirements for control gear.

A list of all parts in the IEC 62386 series, published under the general title: *Digital addressable lighting interface*, can be found on the IEC website.

The committee has decided that the contents of this document 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 document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

IEC 62386 contains several parts, referred to as series. The 1xx series includes the basic specifications. Part 101 contains general requirements for system components, Part 102 extends this information with general requirements for control gear and Part 103 extends it further with general requirements for control devices.

The 2xx parts extend the general requirements for control gear with lamp specific extensions (mainly for backward compatibility with Edition 1 of IEC 62386) and with control gear specific features.

The 3xx parts extend the general requirements for control devices with input device specific extensions describing the instance types as well as some common features that can be combined with multiple instance types.

This first edition of IEC 62386-217 is intended to be used in conjunction with IEC 62386-101:2014, IEC 62386-101:2014/AMD1:—, IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—. The division 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.

The setup of the standards is graphically represented in Figure 1 below.

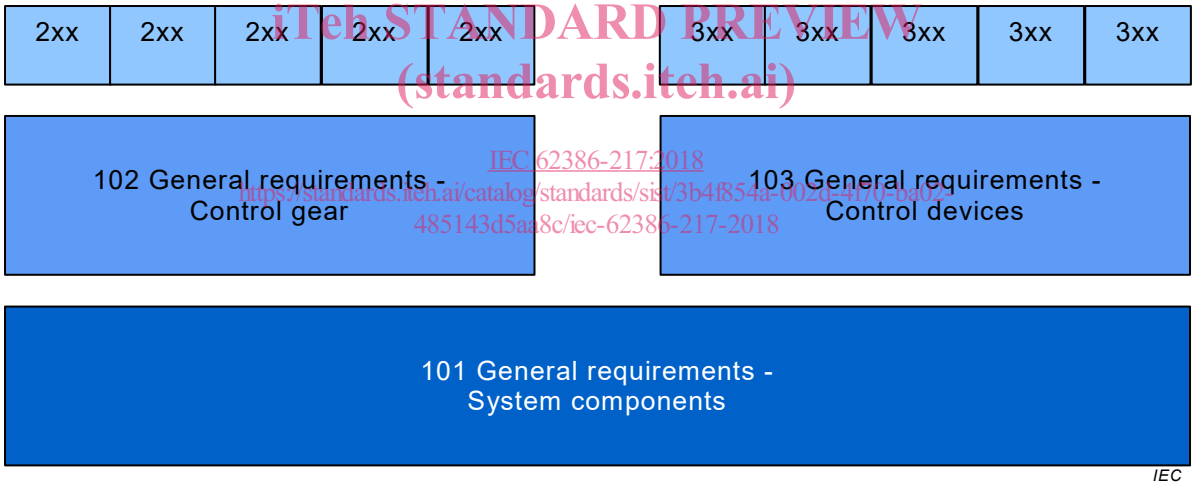

Figure 1 – IEC 62386 graphical overview

This document, and the other parts that make up the IEC 62386-200 series, in referring to any of the clauses of IEC 62386-1XX, specifies the extent to which such a clause is applicable; the parts also include additional requirements, as necessary.

Where the requirements of any of the clauses of IEC 62386-1XX are referred to in this document by the sentence “The requirements of IEC 62386-1XX, Clause “n” apply”, this sentence is to be interpreted as meaning that all requirements of the clause in question of Part 1XX apply, except any which are clearly inapplicable.

The standardization of the control interface for control gear is intended to achieve compatible co-existence between electronic control gear and lighting control devices, below the level of building management systems. This document describes a method of implementing control gear.

All numbers used in this document are decimal numbers unless otherwise noted. Hexadecimal numbers are given in the format 0xVV, where VV is the value. Binary numbers are given in the format XXXXXXXXb or in the format XXXX XXXX, where X is 0 or 1; “x” in binary numbers means “don't care”.

The following typographic expressions are used:

Variables: “*variableName*” or “*variableName[3:0]*”, giving only bits 3 to 0 of “*variableName*”.

Range of values: [lowest, highest]

Command: “COMMAND NAME”

DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 217: Particular requirements for control gear – Thermal gear protection (device type 16)

1 Scope

This part of IEC 62386 specifies a bus system for control by digital signals of electronic lighting equipment which is in line with the requirements of IEC 61347 (all parts), with the addition of DC supplies.

This document is only applicable to IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:— control gear that implements thermal gear protection.

NOTE Requirements for testing individual products during production are not included.

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 62386-101:2014, *Digital addressable lighting interface – Part 101: General requirements – System components*
IEC 62386-101:2014/AMD1:—[1]

IEC 62386-102:2014, *Digital addressable lighting interface – Part 102: General requirements – Control gear*
IEC 62386-102:2014/AMD1:—[2]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62386-102 and the following 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
thermal gear overload
condition in which the control gear temperature exceeds the upper limit T_{ovl} of the normal operating range and with the consequence that the light output is reduced

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1 Under preparation. Stage at the time of publication: IEC CCDV 62386-101/AMD1:2018.

2 Under preparation. Stage at the time of publication: IEC CCDV 62386-102/AMD1:2018.

3.2
thermal gear shutdown
thermal gear overload condition in which the control gear temperature exceeds the maximum permissible temperature T_{shut} and with the consequence that the lamp is switched off

4 General

4.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—, Clause 4 apply, with the restrictions, changes and additions identified below.

4.2 Version number

In 4.2 of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—, “102” shall be replaced by “217”, “version number” shall be replaced by “extended version number” and “*versionNumber*” shall be replaced by “*extendedVersionNumber*”.

5 Electrical specification

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—, Clause 5 apply.

6 Interface power supply

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—, Clause 6 apply.

7 Transmission protocol structure

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—, Clause 7 apply.

8 Timing

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—, Clause 8 apply.

9 Method of operation

9.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—, Clause 9 apply with the following additions.

9.2 Thermal gear behaviour

Depending on the control gear temperature, various states can be identified within a control gear:

- Normal: the control gear temperature is in the defined temperature ranges.
- Overload: the control gear temperature exceeds the defined overload temperature threshold (T_{ovl}).
- Shutdown: the control gear temperature exceeds the defined shutdown temperature threshold (T_{shut}).

All possible state transitions are illustrated in Figure 2.

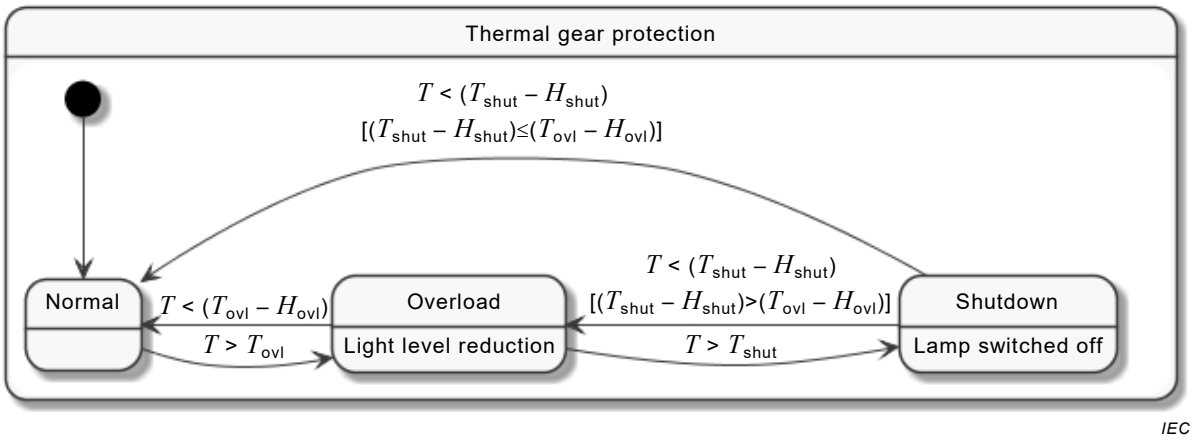

Figure 2 – Thermal gear protection state diagram

To avoid unwanted frequent switching for each temperature threshold a hysteresis is defined as follows:

- H_{ovl}: hysteresis defined for T_{ovl};
- H_{shut}: hysteresis defined for T_{shut}.

The temperature thresholds T_{ovl} and T_{shut} and their corresponding hysteresis H_{ovl} and H_{shut} are manufacturer specific and shall be stated in the manual/documentation.

The relation between the temperature thresholds in Kelvin and their corresponding hysteresis is as follows:

- $T_{ovl} \leq T_{shut}$;
- $H_{ovl} < T_{ovl}$;
- $H_{shut} < T_{shut}$.

Starting from a normal state, if the control gear temperature rises above T_{ovl}, the control gear shall enter the overload state. If the control gear temperature increases even more, rising above T_{shut}, the control gear shall enter the shutdown state. When the control gear temperature drops below $(T_{shut} - H_{shut})$, but above T_{ovl}, the control gear shall return to the overload state. When the control gear temperature drops below $(T_{ovl} - H_{ovl})$, the control gear shall return to the normal state. Figure 3 illustrates this case.

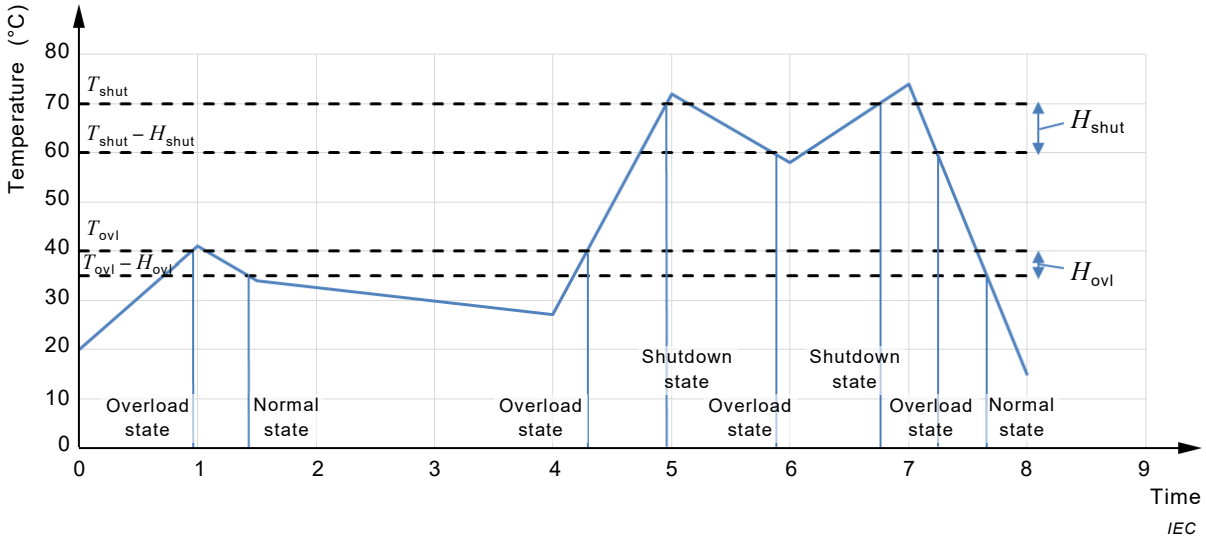

Figure 3 – Example of temperature change over time

The fact that a thermal gear protection is implemented and its actual status can be queried does not relieve the user from the obligation to comply with safety relevant information for installation given by the manufacturer. A note to this effect shall be included in the manual/documentation.

9.3 Thermal gear overload

When the control gear temperature rises above T_{ovl} the control gear shall enter the overload state.

When entering the overload state the control gear shall:

- set "*controlGearFailure*" to TRUE;
- set "*thermalGearOverload*" to TRUE;
- when entering from normal state: increment *"overloadCounter"* by 1, unless it equals 255;
- change the normal relationship between "*actualLevel*" and light output in order to decrease the control gear temperature.

While in the overload state, there shall be light in case "*actualLevel*" is not zero, except in case of total lamp failure.

When the control gear temperature drops below (T_{ovl} – H_{ovl}) the control gear shall return to the normal state. On return to the normal state the control gear shall:

- set "*controlGearFailure*" to FALSE, unless other control gear failures prevent this;
- set "*thermalGearOverload*" to FALSE;
- re-establish the normal relationship between *"actualLevel"* and light output.

"*thermalGearOverload*" can be queried using "QUERY THERMAL GEAR OVERLOAD".

9.4 Thermal gear shutdown

When the control gear temperature rises above T_{shut} the control gear shall enter the shutdown state.

When entering the shutdown state, the control gear shall additionally to the overload state: