IEC 62386-221

Edition 1.0 2018-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Digital addressable lighting interface – Part 221: Particular requirements for control gear – Demand response (device type 20)

Interface d'éclairage adressable numérique – Partie 221: Exigences particulières pour les appareillages de commande – Réaction à la demande (dispositifs de type 20)

IEC 62386-221:2018-06(en-fr)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.140.50; 29.140.99

ISBN 978-2-8322-5792-0

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DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 221: Particular requirements for control gear – Demand response (device type 20)

FOREWORD

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International Standard IEC 62386-221 has been prepared by IEC technical committee 34: Lamps and related equipment.

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

CDV	Report on voting
34/409/CDV	34/488A/RVC

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 221 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 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- withdrawn,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 document using a colour printer.

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 62386-221 is intended to be used in conjunction with IEC 62386-101:2014, IEC 62386-101:2014/AMD1:2018, IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:—. The division of IEC 62386 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.

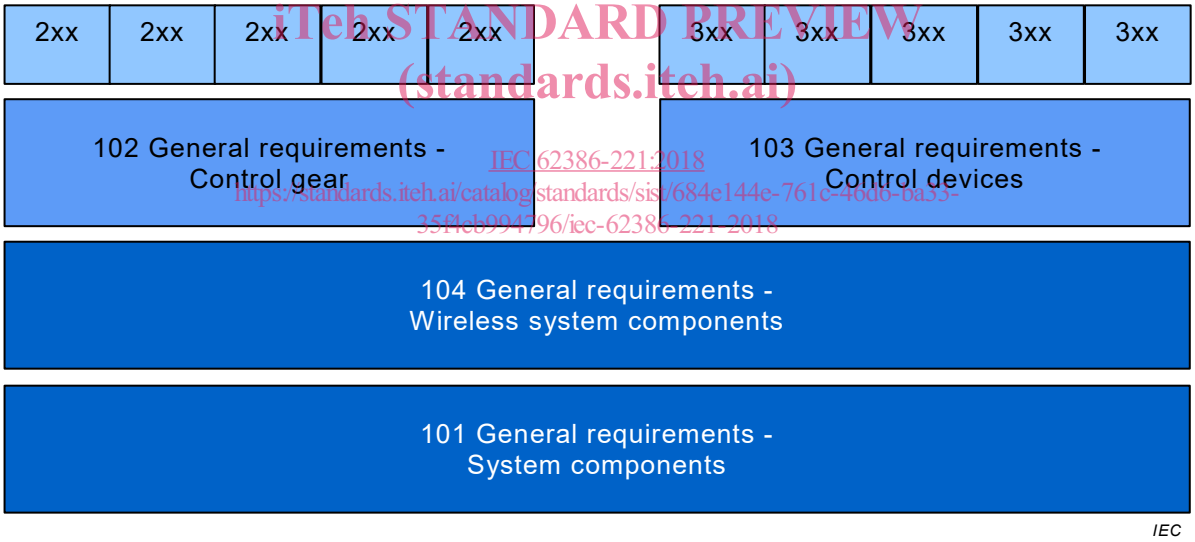

Figure 1 – IEC 62386 graphical overview

This document, and the other parts that make up the IEC 62386-2xx series, in referring to any of the clauses of IEC 62386-1XX or IEC 62386-2XX, specifies the extent to which such a clause is applicable and the order in which the tests are to be performed. The parts also include additional requirements, as necessary.

Where the requirements of any of the clauses of IEC 62386-101 or IEC 62386-102 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 101 or Part 102 apply, except any which are inapplicable to the specific type of lamp control gear covered by Part 221.

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 221: Particular requirements for control gear – Demand response (device type 20)

1 Scope

This part of IEC 62386 specifies the methodology of demand response which focuses on the curtailment of electric loads during peak demand times thus avoiding the requirement to find new sources of generation capacity. By using load shedding, the lighting system responds to the demands of the energy supply.

This document is applicable to control gear supporting the demand response functionality.

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/AMD1:2018

IEC 62386-102:2014, *Digital addressable lighting interface – Part 102: General requirements – Control gear*
IEC 62386-102:2014/AMD1:—[1]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62386-101 and 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
load shedding
temporary reduction of light output with the intention of reducing mains power consumption

3.2
normal light output
expected light output representing the variable *"actualLevel"* as determined by the currently selected dimming curve

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[1] Under preparation. Stage at the time of publication: IEC CFDIS 62386-102/AMD1:2018.

3.3
load shedding light output
resultant light output determined by the normal light output after the application of the load shedding reduction factor

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 “221”, “version number” shall be replaced by “extended version number” and the current version number shall be replaced by "2.0".

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 restrictions, changes and additions.

9.2 Load shedding

The application of the load shedding functionality is intended to achieve a rapid reduction in the current lighting system electrical power load of a building, in response to an abnormal condition in the mains electrical generation and distribution system.

As load shedding functionality is only a temporary state of the lighting system, its application shall be without any impact on IEC 62386-102 control gear variables and functionalities, unless explicitly stated otherwise. Enabling load shedding shall only affect the generated light output of the control gear, whereas other photometric properties shall remain unchanged.

The application controller might separately need to adjust the daylight set point during daylight harvesting operations to prevent an inadvertent increase in light level and energy consumed when a change to a load shedding condition has occurred.

NOTE 1 Examples of IEC 62386-102 control gear variables are *"actualLevel"*, and *"targetLevel"*.

NOTE 2 Examples of photometric properties are luminous colour, colour rendering index Ra.

9.3 Load shedding conditions

A control gear which conforms to this document shall support four load shedding conditions with associated reduction factors as shown in Table 1.

Table 1 – Load shedding conditions and reduction factors

"loadSheddingCondition"	**Load shedding reduction factors**
0	*"actualFactor"* = 0 (no reduction)
1	*"actualFactor"* = *"reductionFactor1"*
2	*"actualFactor"* = *"reductionFactor2"*
3	*"actualFactor"* = *"reductionFactor3"*

An application controller may select the load shedding condition by means of the instruction "SET LOAD SHEDDING CONDITION (DTR0)". The current load shedding condition can be queried by means of the query "QUERY LOAD SHEDDING CONDITION".

9.4 Reduction factors

9.4.1 General

The reduction factors can be set by means of instructions "SET REDUCTION FACTOR 1 (DTR0)", "SET REDUCTION FACTOR 2 (DTR0)", and "SET REDUCTION FACTOR 3 (DTR0)".

The reduction factor of *"loadSheddingCondtion"*: 0 is fixed to zero and cannot be changed.

The reduction factors can be queried by means of queries QUERY REDUCTION FACTOR 1, QUERY REDUCTION FACTOR 2 and QUERY REDUCTION FACTOR 3.

"SET LOAD SHEDDING CONDITION (DTR0)" shall cause *"actualFactor"* to be set to the corresponding load shedding reduction factor from Table 1.

To determine either the currently set reduction factor of a single gear or if there is currently any load shedding functionality enabled, QUERY ACTUAL FACTOR can be used.

9.4.2 Use of reduction factors

The control gear shall operate the lamp(s) with a reduced arc power calculated according to the following formula:

$$load\ shedding\ light\ output = \left(1 - \frac{"actualFactor"}{100}\right) \times normal\ light\ output$$

If the *"actualFactor"* is less than 100 and will result in a reduction of the arc power below the *"minLevel"*, the control gear shall operate the lamp at a reduced arc power that corresponds to the *"PHM"* of the control gear.