IEC 62386-220

Edition 1.0 2019-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Digital addressable lighting interface – Part 220: Particular requirements for control gear – Centrally supplied emergency operation (device type 19)

Interface d'éclairage adressable numérique – Partie 220: Exigences particulières pour les appareillages de commande – Fonctionnement de secours alimenté par source centrale (dispositifs de type 19)

IEC 62386-220:2019-01(en-fr)

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IEC 62386-220:2019
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Interface d'éclairage adressable numérique – Partie 220: Exigences particulières pour les appareillages de commande – Fonctionnement de secours alimenté par source centrale (dispositifs de type 19)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 29.140.50; 29.140.99

ISBN 78-2-8322-6459-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 220: Particular requirements for control gear – Centrally supplied emergency operation (device type 19)

FOREWORD

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International Standard IEC 62386-220 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
34/577/FDIS	34/591/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 220 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- withdrawn,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 62386-220 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/AMD1:2018 and with the various parts that make up the IEC 62386-2xx series for control gear. 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 recognised.

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

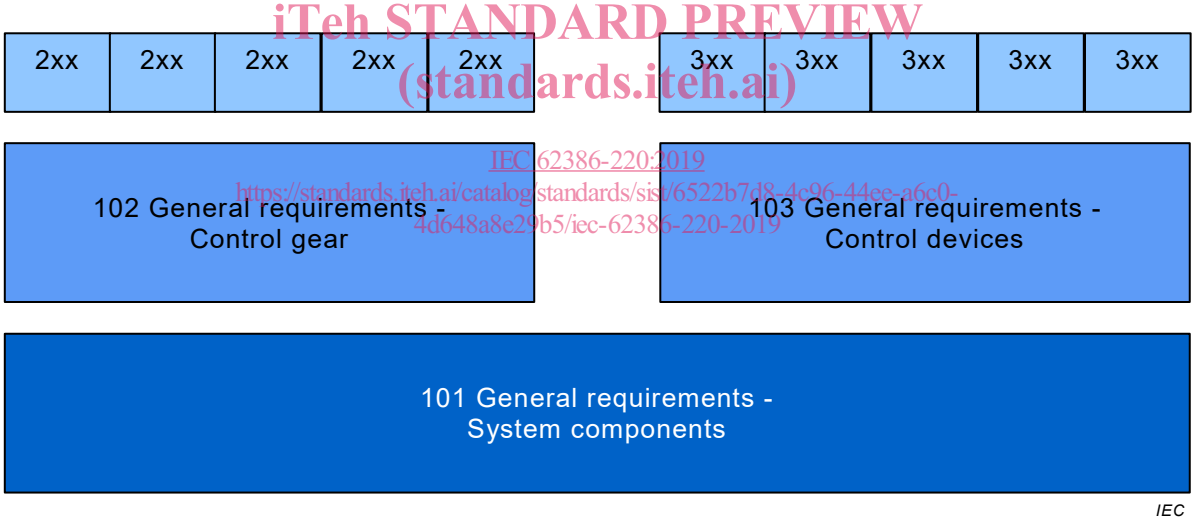

Figure 1 – IEC 62386 graphical overview

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 220: Particular requirements for control gear – Centrally supplied emergency operation (device type 19)

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 applicable to control gear supporting centrally supplied emergency operation as described in EN 50171.

This document does not apply to self-contained emergency lighting control gear. These types of control gear are specified in IEC 62386-202.

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 devices*
IEC 62386-102:2014/AMD1:2018

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
emergency level
configurable arc power level for emergency operation

3.2
emergency condition
defined change of state of the supply type or bus power to provoke the emergency operation of control gear

Note 1 to entry: This purely focuses on control gear interfaces. It is not to be confused with the emergency condition signalling occurrence of an emergency event to a central emergency power system.

Note 2 to entry: Change of state is typically controlled by the central power supply system.

3.3
emergency mode
emergency operation, due to the emergency condition being detected

3.4
emergency physical maximum level
emergency level corresponding to the maximum physical light output the control gear can operate at when in emergency mode

Note 1 to entry: The light level in normal mode is not affected by this physical maximum level.

3.5
emergency condition detection time
time starting with the external emergency condition being present and ending with the control gear having detected the emergency condition

3.6
emergency switch and ignition time
time starting with control gear having detected the emergency condition and ending with lamp(s) emitting light

3.7
emergency system failure
ESF
type of emergency condition in which bus power is down

Note 1 to entry: The emergency system failure replaces the system failure where applicable.

Note 2 to entry: This note only applies to the French language.

3.8
emergency transition time
control gear emergency condition detection time plus emergency switch and ignition time

3.9
normal mode
standard operation of a control gear without a detected emergency condition

3.10
supply type
AC supply or DC supply

Note 1 to entry: Supply type for normal and emergency mode may or may not be different.

Note 2 to entry: DC supply is typically realized as continuous DC voltage or pulsed DC voltage (e.g. rectified AC).

4 General

4.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 4 apply, with the restrictions, changes and additions identified below.

4.2 Version number

In IEC 62386-102:2014, 4.2, “102” shall be replaced by “220”, “version number” shall be replaced by “extended version number” and the current version number shall be replaced by "*extendedVersionNumber*".

4.3 External power supply of bus units

A control gear according to this document shall not be bus powered.

4.4 Power interruption at bus units

4.4.1 General

The requirements of IEC 62386-101:2014 and IEC 62386-101:2014/AMD1:2018, 4.11 apply, with the following changes and additions.

4.4.2 Power interruptions of external power supply

For control gear with *“deviceType”* = 19, interruptions of external power supply shall be defined as the period of time beginning with failure of normal supply and ending with fully re-established normal supply. This definition applies regardless whether there has been any emergency supply detected in the meantime. Figure 2 shows an example of an external power interruption.

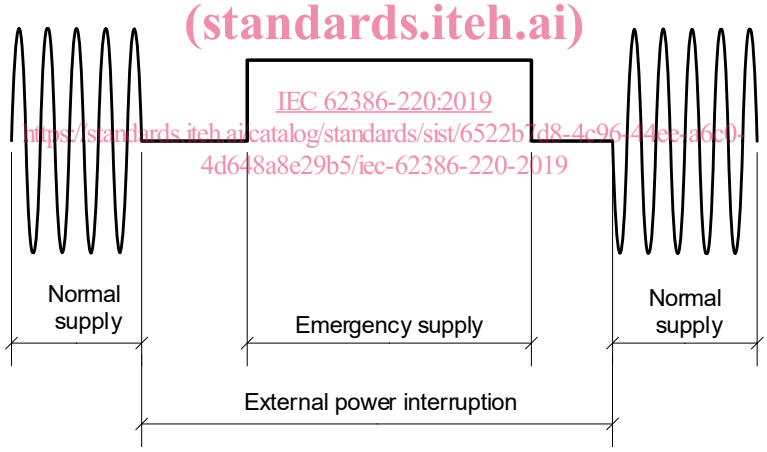

Figure 2 – Example of an external power interruption

5 Electrical specification

5.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 5 apply, with the following additions.

5.2 Marking of the supply interface

If the detection of DC supply is polarity sensitive, the external power supply terminals shall be marked with "+" and "–" to indicate the polarity. If colour coding is used, the colours representing the "+" and "–" shall be given on the label.

6 Interface power supply

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 6, apply.

7 Transmission protocol structure

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 7, apply.

8 Timing

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 8, apply.

9 Method of operation

9.1 General

The requirements of IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, Clause 9 apply, with the following restrictions, changes and additions.

9.2 Purpose of control gear in central emergency system

Control gear according to this document are only one component within a centralized emergency power system, and therefore do only partly contribute to the overall central emergency system functionality. Consequently this document focuses solely on functionality realized within the control gear. See Annex A for more information.

NOTE This "part contribution" differs fundamentally from self-contained emergency control gear, where the whole emergency lighting functionality is realized within the control gear.

9.3 Emergency operation light output and emergency level

"emergencyLevel" shall comply with the dimming curve given in IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, 9.3 whereas *"actualLevel"* shall be replaced by *"emergencyLevel"*. The light output at any percentage when *"emergencyMode"* is TRUE shall be the same as at the corresponding percentage in normal mode.

NOTE The default dimming curve is given in IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, 9.3.

9.4 Detection of supply type

The control gear shall provide means for detecting AC and DC supply.

9.5 Emergency condition

Whether to operate in emergency mode or normal mode shall be derived from:

- supply type, or
- bus power down.

The *"emergencyCondition"* variable determines which condition is used to set or clear the emergency mode. See Table 1.

If "*emergencyCondition*" is SUPPLY, the mode shall be determined by the supply type. If the supply type is DC, *"emergencyMode"* shall be set to TRUE, otherwise, "*emergencyMode"* shall be set to FALSE. Changes in bus power shall be handled according to 9.6.

If "*emergencyCondition*" is BUS, the mode shall be determined by bus power down. If bus power down is detected, *"emergencyMode"* shall be set to TRUE, otherwise "*emergencyMode"* shall be set to FALSE. The supply type has no impact on "*emergencyMode"*.

NOTE *emergencyCondition*" being BUS is typically used in the case where the supply type does not change when changing from normal to an emergency situation.

Table 1 – Emergency condition and emergency mode

"emergencyCondition"	**Supply type**	**Bus power**	**Resulting *"emergencyMode"***
SUPPLY	DC supply	Don't care	TRUE
	AC supply	Don't care	FALSE
BUS	Don't care	Bus power down	TRUE
		System failure	
	Don't care	Normal	FALSE

9.6 System failure versus emergency system failure

The response to interruptions of bus power shall differ depending on the selected emergency source. In case of bus power interruptions, behaviour according to Table 2 shall apply:

Table 2 – Response on interruptions of bus power

"emergencyCondition"	***"emergencyMode"***	**Bus power**	**Resulting response**
SUPPLY	FALSE	Short interruption of bus power	response according to IEC 62386-101:2014, 4.11.4
		Bus power down	Bus power down response (according to IEC 62386-101:2014 and IEC 62386-101:2014/AMD1:2018, 4.11)
		System failure	System failure response (according to IEC 62386-101:2014 and IEC 62386-101:2014/AMD1:2018, 4.11 and IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, 9.12)
	TRUE	Don't care	No reaction. See 9.7.2
BUS	Not applicable	Short interruption of bus power	Response according to IEC 62386-101:2014, 4.11.4
		Bus power down	Response as described in 9.5
		System failure	

9.7 Emergency mode

9.7.1 Activating emergency mode

If *"emergencyMode"* is changed from FALSE to TRUE, the light output shall be calculated according to *"emergencyLevel"* and shall be adjusted as quickly as possible, at least complying with 9.7.2.

9.7.2 Light output transition time in emergency mode

The function of light output over time starting when the emergency condition occurs until the physical maximum emergency light output has been reached shall be documented in the product manual. The description shall at least contain the emergency transition time and the light output over time function (e.g. as a graph) starting at the end of the emergency transition time ending with the point in time when at least 90 % of the physical maximum emergency light output is reached. The information provided shall comprise the worst case timing and the test shall verify that the actual timing is faster or equal to the data given.

NOTE 1 Worst case timing is typically applicable in the case where *"emergencyLevel"* equals *"emergencyPhMaxLevel"* and the rated emergency supply voltage is the lowest.

NOTE 2 Requirements on light output over time differ depending on application and various national regulations. For example, some applications require 50 % of the requested light output after 5 s, 100 % of the requested light output after 60 s according to given emergency standards (See bibliography).

9.7.3 Response during emergency mode

As long as *"emergencyMode"* is TRUE the following holds:

- The light output shall only depend on *"emergencyLevel"*. As this document is an emergency standard this applies even if other parts of the IEC 62386 series require a different light output.
- The control gear shall refuse execution of all instructions, all special commands and all application extended instructions except the following (see IEC 62386-102:2014 and IEC 62386-102:2014/AMD1:2018, 9.7):
  - "DTR0(*data*)", "DTR1(*data*)", "DTR2(*data*)"
  - "READ MEMORY LOCATION (*DTR1, DTR0*)"
  - "ENABLE DEVICE TYPE (*data*)"

NOTE 1 The above requirements imply that, as long as *"emergencyMode"* is TRUE, only queries are processed. This also applies for all parts of the IEC 62386-2xx series.

NOTE 2 *"emergencyCondition"* being BUS, implies that no communication is possible on the bus as long as *"emergencyMode"* is TRUE.

- Updating of control gear internal variables shall continue where applicable.

NOTE 3 Control gear status information is an example of variables to be updated.

9.7.4 Leaving emergency mode

If *"emergencyMode"* is changed from TRUE to FALSE the response according to Table 3 shall apply.