IEC 62386-301

Edition 1.0 2017-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Digital addressable lighting interface – Part 301: Particular requirements – Input devices – Push buttons

Interface d'éclairage adressable numérique – Partie 301: Exigences particulières – Dispositifs d'entrée – Boutons-poussoirs

IEC 62386-301:2017-05(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 301: Particular requirements – Input devices – Push buttons

FOREWORD

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

FDIS	Report on voting
34C/1311A/FDIS	34C/1331/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 301 of IEC 62386 is intended to be used in conjunction with:

- Part 101, which contains general requirements for system components;

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- Part 103, which contains general requirements for control devices.

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- withdrawn,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.

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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 62386-301 is intended to be used in conjunction with IEC 62386-101:2014, IEC 62386-101:2014/AMD1:—, IEC 62386-103:2014 and IEC 62386-103:2014/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.

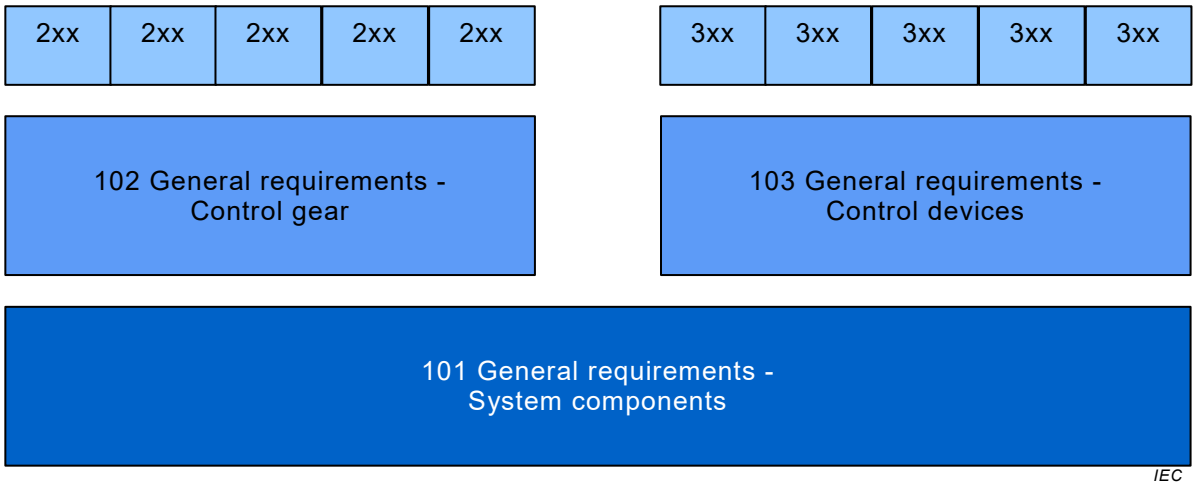

Figure 1 – IEC 62386 graphical overview

This document, and the other parts that make up the IEC 62386-300 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 devices is intended to achieve compatible co-existence and multi-master operation between electronic control gear and lighting control devices, below the level of building management systems. This document describes a method of implementing control devices.

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

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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”

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DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 301: Particular requirements – Input devices – Push buttons

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, with the addition of DC supplies.

This document is only applicable to IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:— input devices that make the lighting control system sensitive to push button operations.

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 62386-103:2014, *Digital addressable lighting interface – Part 103: General requirements – Control devices*
IEC 62386-103:2014/AMD1:—[2]

IEC 62386-333:—[3], *Digital addressable lighting interface – Part 333: Particular requirements for control devices – Manual configuration (feature type 33)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62386-101 and IEC 62386-103 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
instance
push button processing unit of an input device

---

[1] Under preparation. Stage at the time of publication: IEC ACDV 62386-101/AMD1:2017.

[2] Under preparation. Stage at the time of publication: IEC ACDV 62386-103/AMD1:2017.

[3] Under preparation. Stage at the time of publication: IEC CCDV 62386-333:2017.

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[SOURCE: IEC 62386-101:2014, 3.29, modified — "signal" replaced by "push button"]

3.2
bouncing
tendency of any two contacts in an electronic device to generate multiple signals as the contacts close or open

3.3
debouncing
any kind of hardware device or software that ensures that only a single signal will be acted upon for a single opening or closing of a contact

3.4
push button
means for the end user to interact with a lighting control system and known to be in the released state except while the end user is pressing it, in which case it is in the pressed state

3.5
strictly monotonic
either entirely increasing or decreasing without repeating values

Note 1 to entry: Function f defined on a subset of the real numbers with real values is called monotonically increasing, if for all x and y such that $x < y$ one has $f(x) < f(y)$, so f preserves the order. Likewise, a function is called monotonically decreasing if, whenever $x < y$, then $f(x) > f(y)$, so it reverses the order. For this document strictly monotonic is defined as either monotonically increasing or monotonically decreasing.

4 General

4.1 General

The requirements of IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:—, Clause 4 apply, with the restrictions, changes and additions identified below.

4.2 Version number

In 4.2 of IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:—, “103” shall be replaced by “301”, “version number” shall be replaced by “extended version number” and “*versionNumber*” shall be replaced by “*extendedVersionNumber*”.

4.3 Insulation

According to IEC 61347-1 it might be required that the input device has at least supplementary insulation. This depends on the connected components. In case internal buttons are used, the input device shall have at least supplementary insulation. In case of external connected components, it depends on the requirements imposed on these components.

NOTE IEC-62386-103:2014 and IEC 62386-103:2014/AMD1:— require system components to have at least basic insulation. Push buttons are intended to be safely operable by end users.

5 Electrical specification

The requirements of IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:—, Clause 5 apply.

6 Interface power supply

The requirements of IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:—, Clause 6 apply.

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7 Transmission protocol structure

The requirements of IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:—, Clause 7 apply.

NOTE Subclause 9.4 provides detailed event information applicable to instances.

8 Timing

The requirements of IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:—, Clause 8 apply.

9 Method of operation

9.1 General

The requirements of IEC 62386-103:2014 and IEC 62386-103:2014/AMD1:—, Clause 9 apply, with the following restrictions and additions.

9.2 Instance type

The instance type (*"instanceType"*) shall be equal to 1.

9.3 Input signal and value

The input *"resolution"* shall be equal to 1.

NOTE 1 A *"resolution"* of 1 implies that *"inputValue"* is a single byte variable with possible values limited to 0x00 and 0xFF.

NOTE 2 Since *"inputValue"* is a single byte variable, the instance will answer NO to "QUERY INPUT VALUE LATCH".

"inputValue" shall reflect the state of the push button or binary input, as shown in Table 1.

Table 1 – Meaning of *"inputValue"*

"inputValue"	Push button state
0x00	Released
0xFF	Pressed

A bouncing input signal shall be adequately debounced to ensure a single change of *"inputValue"*.

9.4 Events

9.4.1 Priority use

The default *"eventPriority"* shall be priority 3. Since the application controller needs a timeslot to respond, "*eventPriority*" should not be set to 2.

9.4.2 Bus usage

9.4.2.1 Instance level

Multiple events from an instance shall not be sent in a transaction.

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9.4.2.2 Device level

At the device level events from different instances may be sent in a transaction.

9.4.3 Encoding

Push button events shall be encoded as shown in Table 2. Details on event timing are described in 9.4.5.

Table 2 – Push button input events

Event name	Event information	Description
Button released	00 0000 0000b [a]	The button is released.
Button pressed	00 0000 0001b [a]	The button is pressed.
Short press	00 0000 0010b [a]	The button is pressed and released, without being pressed quickly again (in case double press is enabled), or the button is pressed and quickly released (in case double press is disabled).
Double press	00 0000 0101b [a]	The button is pressed and released, quickly followed by another button press.
Long press start	00 0000 1001b [a]	The button is pressed without releasing it.
Long press repeat	00 0000 1011b [a]	Following a long press start condition, the button is still pressed. The event occurs at regular intervals as long as the condition holds.
Long press stop	00 0000 1100b [a]	Following a long press start condition, the button is released.
Button free	00 0000 1110b [a]	The button has been stuck and is now released.
Button stuck	00 0000 1111b [a]	The button has been pressed for a very long time and is assumed stuck.
	00 0000 0011b	Reserved for future use.
	00 0000 0100b	
	00 0000 011xb	
	00 0000 10x0b	
	00 0000 1101b	
	1x xxxx xxxxb	
	01 xxxx xxxxb	
	00 1xxx xxxxb	
	00 01xx xxxxb	
	00 001x xxxxb	
[a] Bit 0 always contains button pressed or button released information.		

NOTE In order to save bus bandwidth, the application controller has the possibility to inhibit event notifications that it does not need, as is described in 9.4.6.

A change of "*inputValue*" shall generate a maximum of one event. The button pressed/released information is always present and can be derived from the event encoding.

9.4.4 Untimed events

The button pressed/released events are shown in Figure 2.

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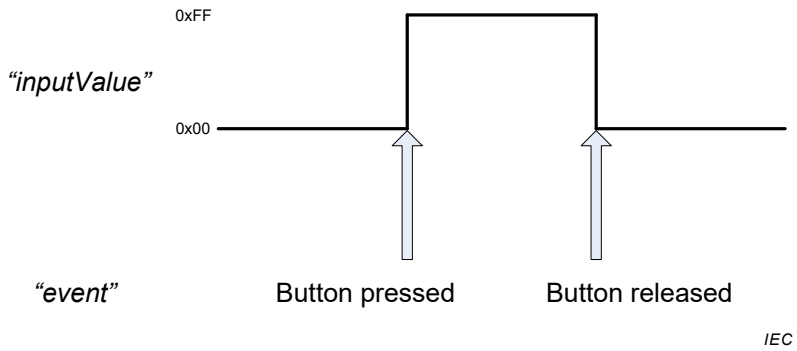

Figure 2 – Button pressed/button released events

9.4.5 Timed events

Events are subject to the following timing configurations:

- T_{short} – The time which differentiates a short press from a long press. If a button is released within T_{short}, either a short or a double press event will follow; a long press event otherwise.
- T_{double} – The time which differentiates a single (short) press from a double press. If a button is not pressed once more within T_{double}, a short press event occurs, a double press event otherwise.
- T_{repeat} – The repetition interval of long press repeat events.
- T_{stuck} – If a button is pressed or bouncing longer than T_{stuck} it is considered broken.

Given the above timing definitions, event timing shall be as indicated in Figure 3 for a short press.

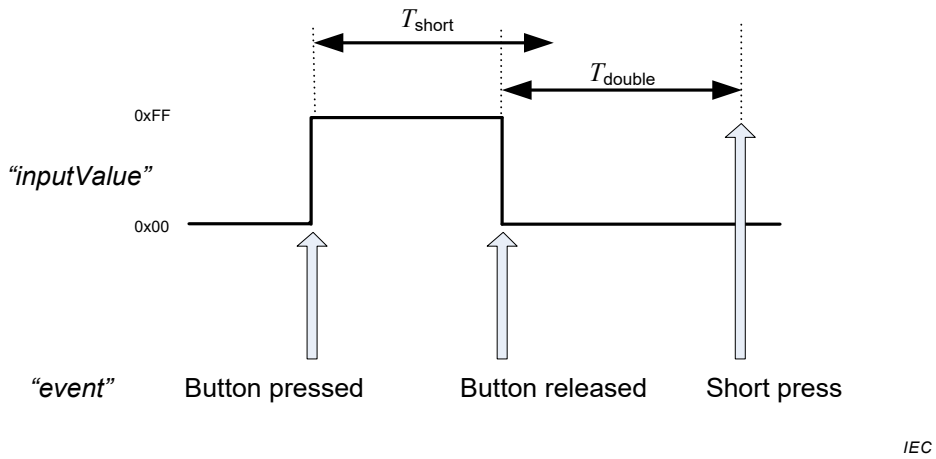

Figure 3 – Short press event

NOTE If T_{double} is set to 0 (which means event disabled) a short press event is recognized directly with Button released. See 9.5.1.

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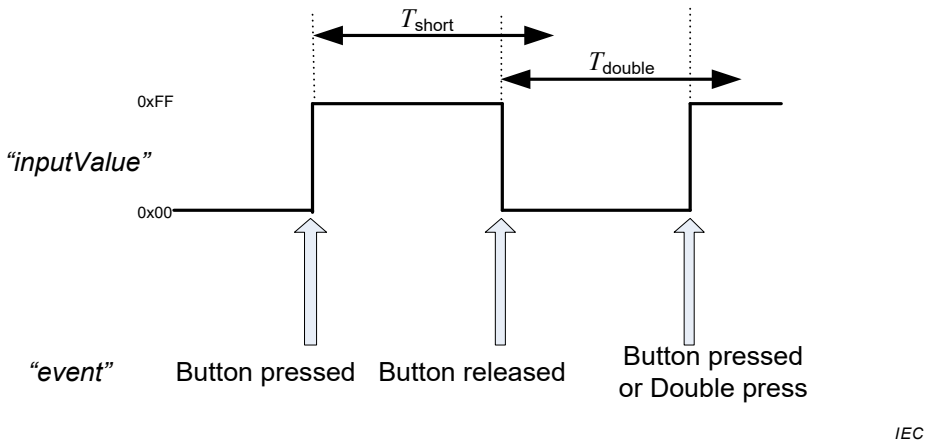

Figure 4 – Double press event

Figure 4 shows the events for a double press event. If the double press event is enabled, there is no separate button pressed event. However, the button pressed information can be retrieved from the double press event, see Table 2.

Following a double press event, no further events shall occur until the button is released (leading to a button released event) or the button is declared stuck (leading to a button stuck event).

A double press event cannot occur on the first button press after a previous double press event.

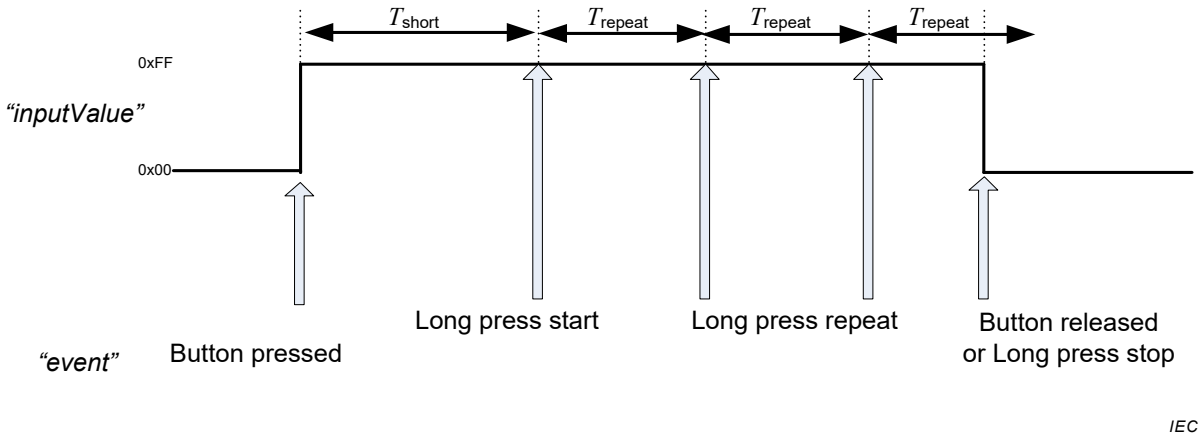

Figure 5 – Long press event

Figure 5 shows the events for a long button press. If the long press stop event is enabled, there is no separate button released event. However, the button released information can be retrieved from the long press stop event, see Table 2.

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