

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Digital addressable lighting interface –
Part 253: Particular requirements – Diagnostics and maintenance (device
type 52)**

**Interface d'éclairage adressable numérique –
Partie 253: Exigences particulières – Diagnostic et maintenance (type de
dispositif 52)**



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DIGITAL ADDRESSABLE LIGHTING INTERFACE –**Part 253: Particular requirements –
Diagnostics and maintenance (device type 52)**

FOREWORD

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

Draft	Report on voting
34/1021/FDIS	34/1042/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This Part 253 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 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- withdrawn,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 IEC 62386 series specifies a bus system for control by digital signals of electronic lighting equipment. The IEC 62386-1xx 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. Part 104 and Part 105 can be applied to control gear or control devices. Part 104 gives requirements for wireless and alternative wired system components. Part 105 describes firmware transfer. Part 150 gives requirements for an auxiliary power supply which can be stand-alone, or built into control gear or control devices.

The IEC 62386-2xx series extends 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 IEC 62386-3xx series extends 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 62386-253 is intended to be used in conjunction with IEC 62386-101:2022 and IEC 62386-102:2022. 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.

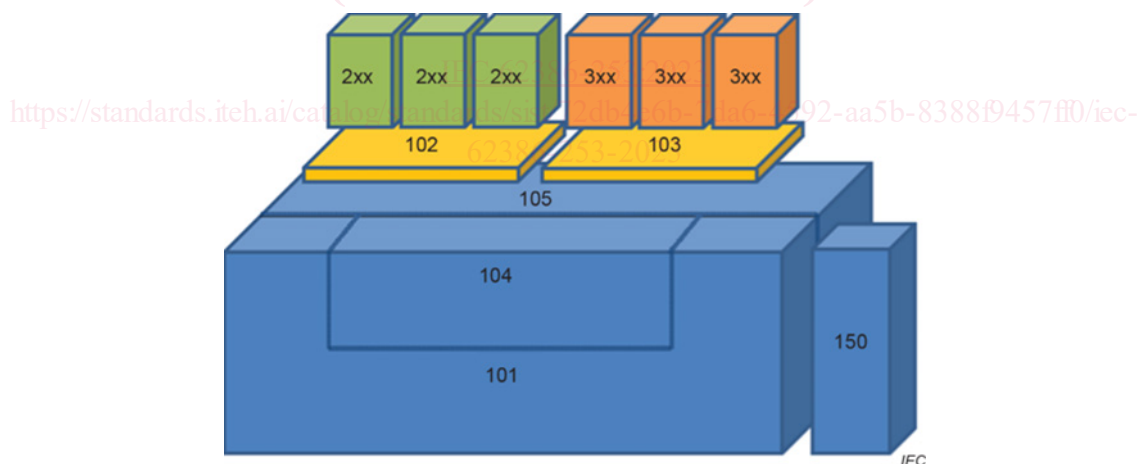


Figure 1 – IEC 62386 graphical overview

When this part of IEC 62386 refers to any of the clauses of the IEC 62386-1xx series, the extent to which such a clause is applicable is specified. The other parts also include additional requirements, as necessary.

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".

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DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 253: Particular requirements – Diagnostics and maintenance (device type 52)

1 Scope

This part of IEC 62386 specifies the information related to diagnostics and maintenance information accessible through memory banks. This document builds on the digital addressable lighting interface as specified in the IEC 62386 series, by adding specific requirements for data exchange. The information given for light sources in this document is specific to LED light sources.

This document is only applicable to control gear complying with IEC 62386-102.

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 62386-101:2022, *Digital addressable lighting interface – Part 101: General requirements – System components*

[IEC 62386-253:2023](#)

IEC 62386-102:2022, *Digital addressable lighting interface – Part 102: General requirements – Control gear*

[62386-253-2023](#)

IEC 62722-2-1:2023, *Luminaire performance – Part 2-1: Particular requirements – LED luminaires*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62386-102 apply.

ISO and IEC maintain terminology 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>

4 General

4.1 General

The requirements of IEC 62386-102:2022, Clause 4 apply, with the restrictions, changes and additions identified below.

4.2 Version number

In IEC 62386-102:2022, 4.2, "102" shall be replaced by "253", "version number" shall be replaced by "extended version number" and "*versionNumber*" shall be replaced by "*extendedVersionNumber*".

4.3 Restricting device type support

It is recommended that a control gear supporting device type 52 according to this document, should not support device type 16 (see IEC 62386-217) or device type 21 (see IEC 62386-222).

NOTE This document includes thermal gear information, similar to that given in IEC 62386-217, and thermal lamp information, similar to that given in IEC 62386-222. This document also contains additional information not contained in IEC 62386-217 or IEC 62386-222.

5 Electrical specification

The requirements of IEC 62386-102:2022, Clause 5 apply.

6 Bus power supply

The requirements of IEC 62386-102:2022, Clause 6 apply.

7 Transmission protocol structure

The requirements of IEC 62386-102:2022, Clause 7 apply.

8 Timing

[IEC 62386-253:2023](https://standards.iteh.ai/catalog/standards/sist/72db4e6b-7da6-4592-aa5b-8388f9457ff0/iec-62386-253-2023)

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The requirements of IEC 62386-102:2022, Clause 8 apply.

9 Method of operation

9.1 General

The requirements of IEC 62386-102:2022, Clause 9 apply with the following additions.

9.2 Memory banks

9.2.1 General

The requirements of IEC 62386-102:2022, 9.10 apply with the following additions and changes.

9.2.2 Accuracy of measurements

The accuracy of measurements for the values in the memory banks is determined by the manufacturer and is not specified in this document.

9.2.3 Rounding of measurement values

Measurement values shall be rounded to the nearest integer, with values ending in 0,5 rounded up.

9.2.4 Refresh rate of memory bank values

The minimum refresh rate of all memory bank values shall be one refresh cycle in 30 s. The minimum refresh rate shall be valid if the control gear is powered regardless of the status of "lampOn".

9.2.5 No overflow of counters

Counters shall not overflow. Their maximum value shall be MASK – 2, representing the given value or more.

9.2.6 Failure condition flags and failure condition counters related to control gear

Table 1 shows the failure condition flags and failure condition counters that are related to control gear failure conditions. These flags and counters are stored in memory bank 205 (Table 3).

Table 1 – Failure condition flags and failure condition counters related to control gear

Index of failure condition flag	Name of failure condition flag	Name of related failure condition counter
0	ControlGearOverallFailureCondition	ControlGearOverallFailureConditionCounter
1	ControlGearExternalSupplyUnderVoltage	ControlGearExternalSupplyUnderVoltageCounter
2	ControlGearExternalSupplyOverVoltage	ControlGearExternalSupplyOverVoltageCounter
3	ControlGearOutputPowerLimitation	ControlGearOutputPowerLimitationCounter
4	ControlGearThermalDerating	ControlGearThermalDeratingCounter
5	ControlGearThermalShutdown	ControlGearThermalShutdownCounter

Each failure condition counter shall increment each time a 0 (FALSE) to 1 (TRUE) transition of the corresponding failure condition flag occurs.

Read Protection shall always be activated or de-activated for the bundle of related failure condition flag and failure condition counter.

9.2.7 Behaviour of "controlGearFailure"

The behaviour of "controlGearFailure" shall be as specified in IEC 62386-102 with the following extensions:

"controlGearFailure" shall also be set to TRUE if any of the failure condition flags shown in Table 1 with index > 0 is TRUE.

9.2.8 Failure condition flags and failure condition counters related to light source

Table 2 shows the failure condition flags and failure condition counters that are related to light source failure conditions. These flags and counters are stored in memory bank 206 (Table 4).

Table 2 – Failure condition flags and failure condition counters related to light source

Index of failure condition flag	Name of failure condition flag	Name of related failure condition counter
0	LightSourceOverallFailureCondition	LightSourceOverallFailureConditionCounter

1	LightSourceOpenCircuit	LightSourceOpenCircuitCounter
2	LightSourceShortCircuit	LightSourceShortCircuitCounter
3	LightSourceThermalDerating	LightSourceThermalDeratingCounter
4	LightSourceThermalShutdown	LightSourceThermalShutdownCounter

Each failure condition counter shall increment each time a 0 (FALSE) to 1 (TRUE) transition of the corresponding failure condition flag occurs.

Read Protection shall always be activated or de-activated for the bundle of related failure condition flag and failure condition counter.

9.2.9 Behaviour of "*lampFailure*"

The behaviour of "*lampFailure*" shall be as specified in IEC 62386-102 with the following extensions:

"*lampFailure*" shall also be set to TRUE if any of the failure condition flags shown in Table 2 with index > 0 is TRUE.

9.2.10 Hold-off time for failure condition flags

To avoid a high frequency fluctuation of failure condition flags, the set and reset mechanism for the flag shall include a hold-off time of at least 1 s starting from every change of the flag. During the hold-off time the state of the flag shall be stable.

EXAMPLE If ControlGearThermalShutdown was set to 1 by high temperature it can stay at this level even 20 min after the temperature is reduced to the normal range due to the implemented hold-off time. Such long hold-off times can be mentioned in the data sheet.

NOTE The hold-off time can be realized by using a hysteretic behaviour of the flag.

9.2.11 Memory bank 205, control gear diagnostics and maintenance

Memory bank 205 provides diagnostics and maintenance information related to the control gear, as shown in Table 3.

Table 3 – Memory bank 205, control gear diagnostics and maintenance

Address	Description	Default value (factory)	Reset value ^a	Memory type	Multi-output requirement ^f
0x00	Address of last accessible memory location	0x1C	No change	ROM	Ind ^g
0x01	Indicator byte	Manufacturer- specific	Manufacturer- specific	Manufacturer- specific	Ind ^g
0x02	Lock byte Lockable bytes in the memory bank shall be read-only while the lock byte has a value different from 0x55. IEC 62386-253:2023 Latching of the complete memory bank can be achieved by writing a value of 0xAA to this location. See IEC 62386-102:2022, 9.10.5.5. http://standards.itec.int	0xFF	0xFF ^b	RAM-RW	Ind ^g
0x03	Version of the memory bank	0x01	No change	ROM	Ind ^g
0x04	ControlGearOperatingTime (MSB)	0x00	No change	NVM-RO	Ind ^g
0x05	ControlGearOperatingTime	0x00	No change	NVM-RO	Ind ^g
0x06	ControlGearOperatingTime	0x00	No change	NVM-RO	Ind ^g
0x07	ControlGearOperatingTime (LSB) Range of validity: [0,0xFF FF FF FE] Scaling factor and unit: 1 s Counts the control gear operating time in seconds if the control gear is powered, regardless of the status of "LampOn" bit.	0x00	No change	NVM-RO	Ind ^g
0x08	ControlGearStartCounter (MSB)	0x00	No change	NVM-RO	Ind ^g
0x09	ControlGearStartCounter	0x00	No change	NVM-RO	Ind ^g
0x0A	ControlGearStartCounter (LSB) Range of validity: [0,0xFF FF FE] Counts the number of control gear starts that are induced by a power cycle of the external supply. A power cycle shall be counted if the power on time is at least 600 ms.	0x00	No change	NVM-RO	Ind ^g
0x0B	ControlGearExternalSupplyVoltage (MSB)	c	No change	RAM-RO	Ind ^g

Address	Description	Default value (factory)	Reset value ^a	Memory type	Multi-output requirement ^f
0x0C	ControlGearExternalSupplyVoltage (LSB) Range of validity: [0,0xFF FD], TMASK, MASK Scaling factor and unit: 0,1 V RMS RMS value of external supply voltage	c	No change	RAM-RO (protectable) ^d	Ind ^g
0x0D	ControlGearExternalSupplyVoltageFrequency Range of validity: [0,0xFFD], TMASK, MASK Scaling factor and unit: 1 Hz Frequency of external supply voltage. Indication as follows: 0 in case of 0 Hz (pure DC or rectified AC voltage). NOTE 1 Examples for frequency indication are: 17 in case of 16,7 Hz; 50 in case of 50 Hz; 60 in case of 60 Hz.	c	No change	RAM-RO (protectable) ^d	Ind ^g
0x0E	ControlGearPowerFactor Range of validity: [0,100], TMASK, MASK Scaling factor and unit: 0,01 NOTE 2 ControlGearPowerFactor = 100 means: the control gear has a power factor of 1,00.	c	No change	RAM-RO (protectable) ^d	Ind ^g
0x0F	ControlGearOverallFailureCondition Range of validity: [0,1], TMASK Failure condition flag indication as follows: ControlGearOverallFailureCondition reflects the status of "ControlGearFailure".	c	No change	RAM-RO	Ind ^g
0x10	ControlGearOverallFailureConditionCounterRange of validity: [0,0xFE]	0x00	0x00 ^e	NVM-RO	Ind ^g