

BS EN 62386-202:2009



BSI Standards Publication

Digital addressable lighting interface —

Part 202: Particular requirements for control gear —
Self-contained emergency lighting (device type 1)

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National foreword

This British Standard is the UK implementation of EN 62386-202:2009. It is identical to IEC 62386-202:2009.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and related equipment, to Subcommittee CPL/34/3, Auxiliaries for lamps.

A list of organizations represented on this committee can be obtained on request to its secretary.

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EN 62386-202

August 2009

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English version

**Digital addressable lighting interface -
Part 202: Particular requirements for control gear -
Self-contained emergency lighting (device type 1)
(IEC 62386-202:2009)**

Interface d'éclairage
adressable numérique -
Partie 202: Exigences particulières
pour les appareillages de commande -
Blocs autonomes d'éclairage de secours
(dispositifs de type 1)
(CEI 62386-202:2009)

Digital adressierbare Schnittstelle
für die Beleuchtung -
Teil 202: Besondere Anforderungen
an Betriebsgeräte -
Notbeleuchtung mit Einzelbatterie
(Gerätetyp 1)
(IEC 62386-202:2009)

This European Standard was approved by CENELEC on 2009-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 34C/880/FDIS, future edition 1 of IEC 62386-202, prepared by SC 34C, Auxiliaries for lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62386-202 on 2009-07-01.

This Part 202 is to be used in conjunction with EN 62386-101 and EN 62386-102, which contain general requirements for the relevant product type (control gear or control devices).

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2010-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2012-07-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62386-202:2009 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60598-1	NOTE	Harmonized as EN 60598-1:2008 (modified).
IEC 60669-2-1	NOTE	Harmonized as EN 60669-2-1:2004 (modified).
IEC 60921	NOTE	Harmonized as EN 60921:2004 (not modified).
IEC 60923	NOTE	Harmonized as EN 60923:2005 (not modified).
IEC 60925	NOTE	Harmonized as EN 60925:1991 (not modified).
IEC 60929	NOTE	Harmonized as EN 60929:2006 (not modified).
IEC 61347-1	NOTE	Harmonized as EN 61347-1:2008 (modified).
IEC 61347-2-3	NOTE	Harmonized as EN 61347-2-3:2001 (not modified).
IEC 61547	NOTE	Harmonized as EN 61547:2009 (not modified).
CISPR 15	NOTE	Harmonized as EN 55015:2006 (not modified).

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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IEC 62386-102	2009	Digital addressable lighting interface - Part 102: General requirements - Control gear	EN 62386-102	2009

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 202: Particular requirements for control gear – Self-contained emergency lighting (device type 1)

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62386-202 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

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

FDIS	Report on voting
34C/880/FDIS	34C/887/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This Part 202 is intended to be used in conjunction with IEC 62386-101 and IEC 62386-102, which contain general requirements for the relevant product type (control gear or control devices).

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

INTRODUCTION

This first edition of IEC 62386-202 is published in conjunction with IEC 62386-101 and IEC 62386-102. 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.

This International Standard, and the other parts that make up IEC 62386-200 series, in referring to any of the clauses of IEC 62386-101 or IEC 62386-102, specify 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. All parts that make up the IEC 62386-200 series are self-contained and therefore do not include references to each other.

Where the requirements of any of the clauses of IEC 62386-101 or IEC 62386-102 are referred to in this International Standard by the statement "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 this Part 202.

All numbers used in this International Standard 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'.

DIGITAL ADDRESSABLE LIGHTING INTERFACE –

Part 202: Particular requirements for control gear – Self-contained emergency lighting (device type 1)

1 Scope

This International Standard specifies a protocol and test procedures for the control by digital signals of electronic control gear for use on a.c. or d.c. supplies, associated with self-contained emergency lighting.

NOTE Tests in this standard are type tests. Requirements for testing individual control gear during production are not included.

2 Normative references

The following referenced documents are indispensable for the application 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 62386-101:2009, *Digital addressable lighting interface – Part 101: General requirements – System*

IEC 62386-102:2009, *Digital addressable lighting interface – Part 102: General requirements – Control gear*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in Clause 3 of IEC 62386-101:2009 and Clause 3 of IEC 62386-102:2009 apply, together with the following.

3.1

normal mode (for self-contained emergency control gear)

mode in which mains supply is available, with the battery charged or charging

3.2

emergency mode (for self-contained emergency control gear)

mode in which mains supply has failed and whilst the control gear is powered by the battery until deep discharge point

3.3

rest mode (for self-contained emergency control gear)

mode in which the lamp is intentionally off whilst the control gear is powered by the battery

3.4

inhibit mode (for self-contained emergency control gear)

mode in which the control gear is powered from the mains but prevented from going into emergency mode in the event of mains failure

3.5

extended emergency mode (for self-contained emergency control gear)

mode in which the control gear continues to operate the lamp in the same way as in emergency mode for the programmed prolong time after the restoration of the mains supply

3.6

function test

test to check the integrity of the circuit and the correct operation of a lamp, a changeover device and the self-contained battery

3.7

duration test

test to check if the self-contained battery supplies the system within the limits of rated duration of emergency operation

3.8

hardwired inhibit

optional additional input of the control gear which prevents the control gear from going into the emergency mode.

NOTE The hardwired inhibit input is specified by the manufacturer. The state of the switch may be “active” or “inactive”.

3.9

prolong time

time the extended emergency mode will last after restoration of the mains supply

3.10

non-maintained control gear

control gear which operates the lamp only in emergency mode or test mode and supports neither arc power control commands nor corresponding configuration commands

3.11

maintained control gear

control gear which operates the lamp always, no matter whether the mains is present or not, but which supports neither arc power control commands nor corresponding configuration commands

3.12

switched maintained non-dimmable control gear

control gear with physical minimum level equal to 254 (100 %)

NOTE If the mains is present, this type acts like a standard dimmable device with its minimum level set to 254. Therefore this type supports all arc power commands and corresponding configuration commands defined in Part 102. Because of the definition of the physical minimum level, all arc power commands will result in 'no reaction', 'lamp on' or 'lamp off' only – depending on the definition of the actual command.

3.13

switched maintained dimmable control gear

emergency control gear with a physical minimum level below 254 (100 %)

NOTE If the mains is present, this type acts like a standard dimmable device. Therefore this type supports all arc power commands and corresponding configuration commands defined in Part 102.

3.14

hardwired switch

optional additional input of the control gear to switch the lamp on and off in normal mode

NOTE The hardwired switch input is specified by the manufacturer. The state of the switch may be “on” or “off”.

3.15

integral emergency control gear

lamp control gear which forms a non-replaceable part of an emergency luminaire and which cannot be tested separately from the luminaire

3.16

deep discharge

situation in which the lamp can no longer be powered by the battery because the battery voltage has fallen to the lower battery threshold as defined by the cell manufacturer

4 General

The requirements of Clause 4 of IEC 62386-101:2009 and Clause 4 of IEC 62386-102:2009 shall apply.

5 Electrical specifications

The requirements of Clause 5 of IEC 62386-101:2009 and Clause 5 of IEC 62386-102:2009 shall apply.

6 Interface power supply

The requirements of Clause 6 of IEC 62386-101:2009 and Clause 6 of IEC 62386-102:2009 shall apply if the control gear has an integral power supply.

7 Transmission protocol structure

The requirements of Clause 7 of IEC 62386-101:2009 and Clause 7 of IEC 62386-102:2009 shall apply.

8 Timing

The requirements of Clause 8 of IEC 62386-101:2009 and Clause 8 of IEC 62386-102:2009 shall apply.

9 Method of operation

9.1 Logarithmic dimming curve, arc power levels and accuracy

The requirements of Subclause 9.1 of IEC 62386-102:2009 shall apply only if the emergency control gear supports arc power commands and the corresponding configuration commands.

9.2 Power-on

The requirements of Subclause 9.2 of IEC 62386-102:2009 shall apply if the emergency control gear supports arc power control commands and where “power-on” means the application of mains supply once the battery supply is established.

Where “power-on” means application of the mains power, the control gear shall react properly to commands no later than 0.5 s after power-on.

Where “power-on” means application of only the battery supply, the control gear shall either remain in a power-down state or go into emergency mode or rest mode. If the control gear goes into emergency mode or rest mode it shall react properly to commands no later than 5 s after power-on.

If mains power is applied to the control gear when it is completely powered off, it shall go into normal mode.

NOTE 1 The battery supply is normally permanently connected to the control gear

NOTE 2 Low power clock circuits may take several seconds to start.

NOTE 3 It follows that the power-on time of emergency control gear may not be well synchronised with the power-on time of other control gear in the same system.

NOTE 4 The application of mains power to gear running on battery power is not a power-on event, but may change the mode of operation of the control gear as described in 9.9 below.

9.3 Interface-failure

If the control gear supports arc power commands and the corresponding configuration commands, then the requirements of Subclause 9.3 of IEC 62386-102:2009 shall apply, when the control gear is in normal mode. Otherwise, an interface failure as described in Subclause 9.3 of IEC 62386-102:2009 shall have no effect on the arc power level.

NOTE Although the requirements of Subclause 9.3 of IEC 62386-102:2009 state that on restoration of the idle voltage the control gear shall not change its state, in practice there may be an approximately simultaneous change of state if the restoration of the interface idle voltage coincides with the restoration of mains power.

9.4 Min and max level

If the control gear supports arc power commands and the corresponding configuration commands, then the requirements of Subclause 9.4 IEC 62386-102:2009 shall apply when the control gear is in normal mode.

The EMERGENCY LEVEL shall not be affected by the MIN LEVEL and MAX LEVEL settings.

The MIN LEVEL and MAX LEVEL shall only affect the arc power level during normal mode; they have no relation with and shall therefore not be linked in any way to the EMERGENCY LEVEL, EMERGENCY MIN LEVEL and EMERGENCY MAX LEVEL.

NOTE 1 If commands affecting the EMERGENCY LEVEL are supported, then (because of the provisions of 11.2) programming an EMERGENCY LEVEL above the EMERGENCY MAX LEVEL or below the EMERGENCY MIN LEVEL causes the EMERGENCY LEVEL to be set to the EMERGENCY MAX LEVEL or EMERGENCY MIN LEVEL.

NOTE 2 PHYSICAL MIN LEVEL is the manufacturer-fixed minimum level for mains operation and is not necessarily related to any emergency light level.

NOTE 3 Figure 1 illustrates the relationship of the various light level definitions.

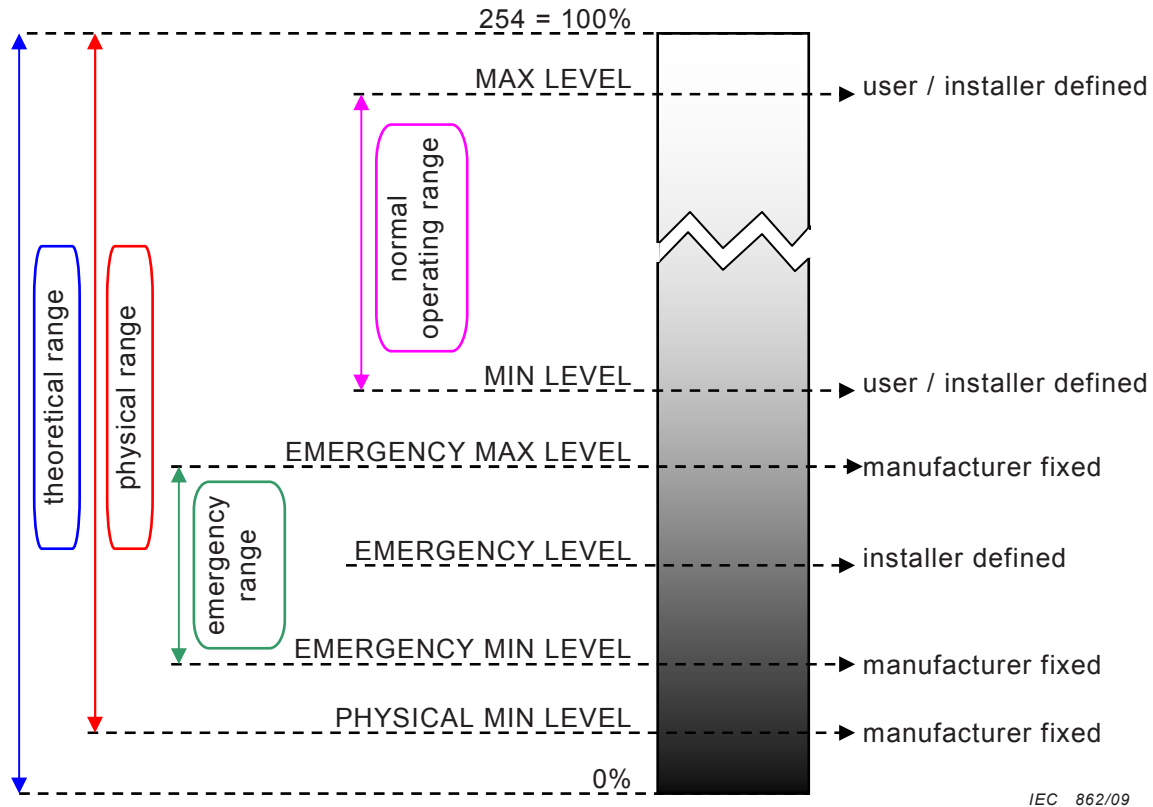


Figure 1 – Example of light level definitions

9.5 Fade time and fade rate

If the control gear supports arc power commands and the corresponding configuration commands, then the requirements of Subclause 9.5 of IEC 62386-102:2009 shall apply.

9.6 Reaction to commands during error state

If the control gear supports arc power commands and the corresponding configuration commands, then the requirements of Subclause 9.6 of IEC 62386-102:2009 shall apply when the control gear is in normal mode.

9.7 Behaviour during lamp preheating and lamp ignition time

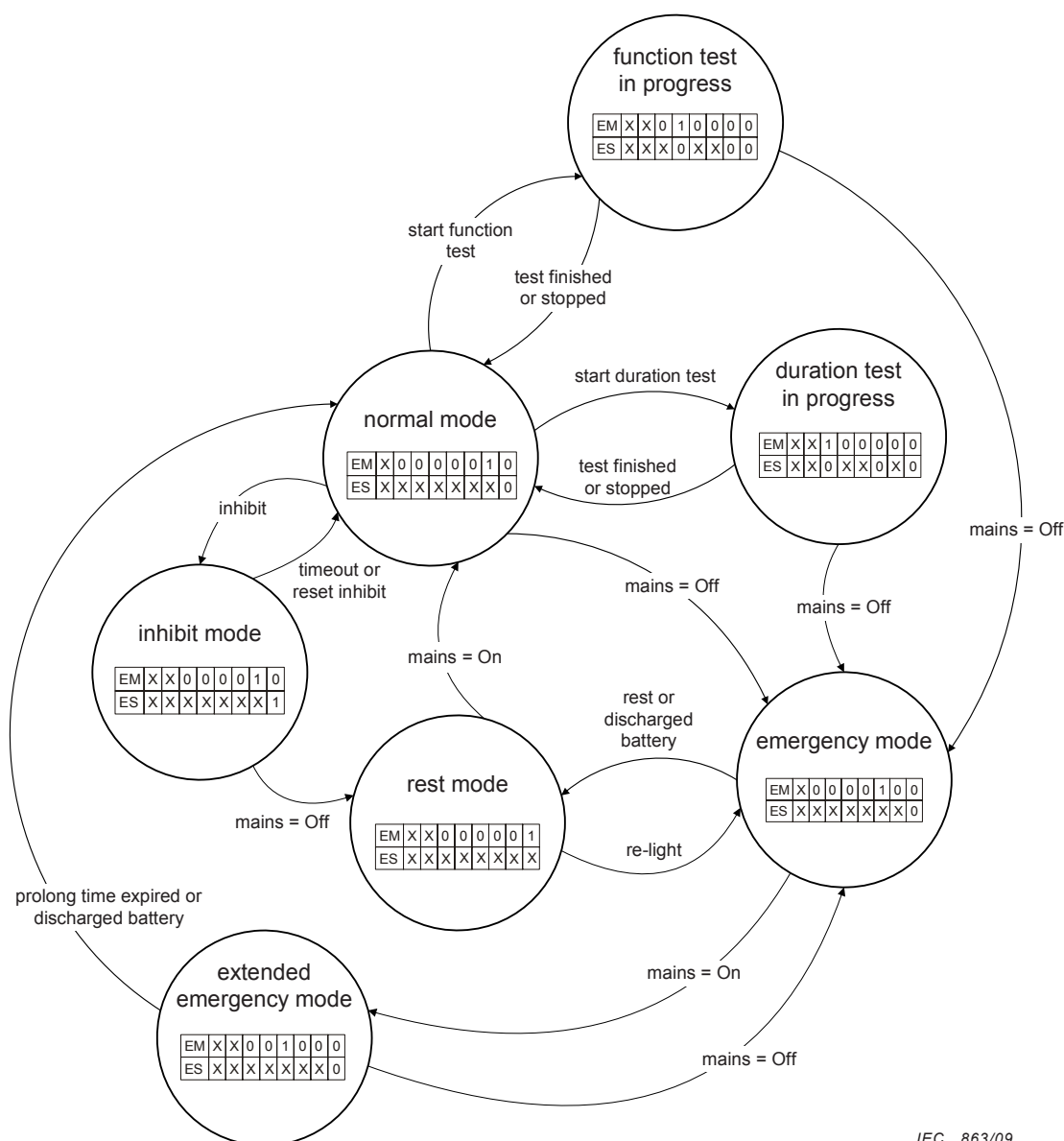
If the control gear supports arc power commands and the corresponding configuration commands, then the requirements of Subclause 9.7 of IEC 62386-102:2009 shall apply when the control gear is in normal mode.

9.8 Memory access and memory map

The requirements of Subclause 9.8 of IEC 62386-102:2009 shall apply.

9.9 Modes of operation

The state transition diagram in Figure 2 shows the different modes of operation and the conditions for mode transitions. In addition the value of the EMERGENCY MODE byte (EM) and the value of the EMERGENCY STATUS byte (ES) in the different modes are shown.



IEC 863/09

Figure 2 – Modes of operation

9.10 Function and duration test

The control gear shall be able to perform two kinds of tests, a function test and a duration test. The emergency status byte, failure status byte and duration test result byte shall give an indication of the progress and results of these tests.

Automatic testing is an optional feature, the presence of which shall be indicated in bit 3 of the FEATURES byte.

NOTE The ability to perform duration tests and function tests is not an optional feature, the commands to start and stop tests being supported by all self-contained emergency control gear. It is the automatic scheduling of such tests which is optional.

If automatic testing is supported, the gear shall be capable of starting function tests and duration tests according to a schedule defined by the functionality required for commands 234 to 237, and illustrated in annexes A.5 and A.6.

10 Declaration of variables

The requirements of Clause 10 of IEC 62386-102:2009 shall apply together with the declaration of additional variables shown in Table 1.

Table 1 – Declaration of additional variables

Variable	Default value (control gear leaves the factory)	Reset value	Range of validity	Memory ^a
'EMERGENCY LEVEL'	EMERGENCY MAX LEVEL	No change	'EMERGENCY MIN LEVEL' – 'EMERGENCY MAX LEVEL' or 'MASK'	1 byte
'EMERGENCY MIN LEVEL'	Factory burn-in	No change	1 – 'EMERGENCY MAX LEVEL' or 'MASK'	1 byte ROM
'EMERGENCY MAX LEVEL'	Factory burn-in	No change	'EMERGENCY MIN LEVEL' – 254 or 'MASK'	1 byte ROM
'PROLONG TIME'	0	No change	0 – 255	1 byte
'TEST DELAY TIME' ^d	0 ^b	0	0x0000 – 0xFFFF	2 bytes RAM
'FUNCTION TEST DELAY TIME' ^d	0	No change	0x0000 – 0xFFFF	2 bytes
'DURATION TEST DELAY TIME' ^d	0	No change	0x0000 – 0xFFFF	2 bytes
'FUNCTION TEST INTERVAL' ^d	7	No change	0 (disabled), 1 – 255	1 byte
'DURATION TEST INTERVAL' ^d	52	No change	0 (disabled), 1 – 97	1 byte
'TEST EXECUTION TIMEOUT'	7	No change	0 – 255	1 byte
'BATTERY CHARGE'	???? ???? ^b	No change	0 – 255	1 byte RAM
'DURATION TEST RESULT'	0 ^b	No change	0 – 255	1 byte RAM
'LAMP EMERGENCY TIME'	0	No change	0 – 255	1 byte
'LAMP TOTAL OPERATION TIME'	0	No change	0 – 255	1 byte
'RATED DURATION'	Factory burn-in	No change	0 – 255	1 byte ROM
'EMERGENCY MODE'	???? ???? ^b ??00 0010 ^c	No change	0 – 255	1 byte RAM
'FEATURES'	Factory burn-in	No change	0 – 255	1 byte ROM
'FAILURE STATUS'	???? ???? ^b 0000 ???? ^c	No change	0 – 255	1 byte RAM
'EMERGENCY STATUS'	?0?? ???? ^b ?0?? ?000 ^c	No change	0 – 255	1 byte RAM
'DEVICE TYPE'	1	No change	0 – 254 or 'MASK'	1 byte ROM
'EXTENDED VERSION NUMBER'	1	No change	0 – 255	1 byte ROM

? Value will be generated by the control gear in accordance with the actual situation

^a Persistent memory (storage time indefinite) if not stated otherwise.

RAM value will be sustained until neither mains supply nor battery supply is available.

^b Power on value (general case)

^c Power on value in the particular case that the control gear is able to continue in normal mode (e.g. no interruption by automatic test)

NOTE Power down means for this device type: Neither mains supply nor battery supply

^d The TEST DELAY TIME, FUNCTION TEST DELAY TIME, DURATION TEST DELAY TIME, FUNCTION TEST INTERVAL AND DURATION TEST INTERVAL, are optional variables which are supported only if bit 3 of the FEATURES byte "auto test capability" is set.

11 Definition of commands

11.1 Arc power control commands

If the control gear supports arc power commands, then the requirements of Subclause 11.1 of IEC 62386-102:2009 shall apply, except that if a hardwired switch is fitted then arc power commands shall be obeyed only if the hardwired switch is on. If the hardwired switch is fitted but switched off, no arc power commands shall be executed.

Commands affecting the Arc Power Level shall only be processed in normal mode or inhibit mode. Likewise, the control gear shall take account of the state of the hardwires switch only when in normal mode or inhibit mode.

NOTE This behaviour is similar to that of a non-emergency control gear with switched mains connected.

11.2 Configuration commands

If the control gear supports arc power commands, then the requirements of Subclause 11.2 of IEC 62386-102:2009 shall apply.

The following commands shall have no effect upon control gear which does not support arc power commands:

Command 33:	YAAA AAA1 0010 0001	"STORE ACTUAL LEVEL IN THE DTR"
Command 42:	YAAA AAA1 0010 1010	"STORE THE DTR AS MAX LEVEL"
Command 43:	YAAA AAA1 0010 1011	"STORE THE DTR AS MIN LEVEL"
Command 44:	YAAA AAA1 0010 1100	"STORE THE DTR AS SYSTEM FAILURE LEVEL"
Command 45:	YAAA AAA1 0010 1101	"STORE THE DTR AS POWER ON LEVEL"
Command 46:	YAAA AAA1 0010 1110	"STORE THE DTR AS FADE TIME"
Command 47:	YAAA AAA1 0010 1111	"STORE THE DTR AS FADE RATE"
Commands 64 – 79:	YAAA AAA1 0100 XXXX	"STORE THE DTR AS SCENE"
Commands 80 – 95:	YAAA AAA1 0101 XXXX	"REMOVE FROM SCENE"

All other commands defined in Subclause 11.2 of IEC 62386-102:2009 shall affect all control gear in the ways defined in that clause.

11.3 Query commands

The requirements of Subclause 11.3 of IEC 62386-102:2009 shall apply with the following exceptions:

11.3.1 Queries related to status information

Command 144: YAAA AAA1 1001 0000 "QUERY STATUS"

The answer shall be the following "STATUS INFORMATION" byte:

- bit 0 Status of control gear; "0" = OK
bit 1 Lamp failure; "0" = no lamp failure

NOTE The emergency control gear may not be able to detect an emergency lamp failure without performing a function test or a duration test or entering emergency mode.

- bit 2 Lamp powered by emergency control gear; "0" = Lamp not powered by emergency control gear.

NOTE The emergency control gear may not be able to provide information about the state of the lamp when in normal mode.

- bit 3 If the emergency control gear supports arc power commands, the value of this bit is as defined in Subclause 11.3.1 of IEC 62386-102:2009; otherwise this bit shall be cleared.
- bit 4 If the emergency control gear supports arc power commands, the value of this bit is as defined in Subclause 11.3.1 of IEC 62386-102:2009; otherwise this bit shall be cleared.
- bit 5 Query: "RESET STATE"? "0" = "No"
- bit 6 Query: Missing short address? "0" = "No"
- bit 7 If the emergency control gear supports arc power commands, the value of this bit is as defined in Subclause 11.3.1 of IEC 62386-102:2009; otherwise this bit shall be cleared.

Command 146: YAAA AAA1 1001 0010 "QUERY LAMP FAILURE"

Ask if there is a lamp problem at the given address. The answer shall be "Yes" or "No".

NOTE The emergency control gear may not be able to detect an emergency lamp failure without performing a function test or a duration test or entering emergency mode.

Command 147: YAAA AAA1 1001 0011 "QUERY LAMP POWER ON"

If the lamp is powered by the emergency control gear, then the answer shall be "Yes". Otherwise the answer shall be "No".

NOTE The emergency control gear may not be able to provide information about the state of the emergency lamp when in normal mode.

Command 148: YAAA AAA1 1001 0100 "QUERY LIMIT ERROR"

If the control gear supports arc power commands, then the requirements of Subclause 11.3.1 of IEC 62386-102:2009 apply. Otherwise the answer is "No".

Command 153: YAAA AAA1 1001 1001 "QUERY DEVICE TYPE"

Answer shall be 1.

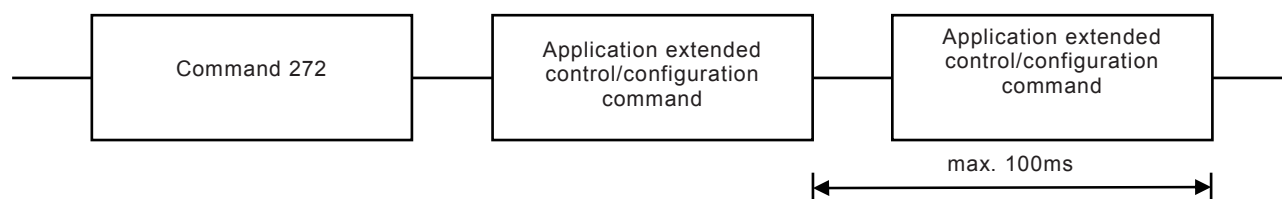
11.3.2 Queries related to arc power parameter settings

NOTE It follows from the requirements of Subclause 11.2 that if the control gear does not support arc power control commands, the replies to these queries are the default values of the corresponding variables, as listed in Clause 10 of IEC 62386-102:2009.

11.3.4 Application extended commands

Every control command (224 to 232 and 254) and configuration command (233 to 240) shall be received a second time within 100 ms (nominal) before it is executed in order to reduce the probability of incorrect reception. No other commands addressing the same control gear shall be sent between these two commands, otherwise the first such command shall be ignored and the respective control or configuration sequence shall be aborted.

Command 272 shall be received before the two instances of the application extended configuration/control command, but not between them (see Figure 3).



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Figure 3 – Application extended control or configuration command sequence example

All values of DTR shall be checked against the values mentioned in the range of validity column in Table 1, i.e. the value shall be set to the upper / lower limit if it is above / below the valid range defined in Table 1.

11.3.4.1 Application extended control commands

Command 224 YAAA AAA1 1110 0000 "REST"

If the command is received when the control gear is in emergency mode then the lamp shall be extinguished and the control gear shall go into rest mode.

Rest mode shall revert to normal mode in the event of restoration of normal supply. If re-light in rest mode is supported the control gear shall revert to emergency mode on receipt of command 226 'RE-LIGHT/RESET INHIBIT'.

No other command shall cause the lamp to be extinguished when the control gear is in emergency mode.

Command 225: YAAA AAA1 1110 0001 "INHIBIT"

If the control gear is in normal mode on receipt of this command, bit 0 of the EMERGENCY STATUS byte shall be set, the control gear shall go into inhibit mode and start a 15 min inhibit timer. If the control gear is in inhibit mode on receipt of this command, the 15 min inhibit timer shall be restarted.

If the control gear is in any other mode when the command is received, it shall be ignored.

Whilst the 15 min inhibit timer is running, the control gear shall be prevented from going into emergency mode. In the event of a mains failure during this period, the control gear shall go into rest mode.

If mains power is still available, bit 0 of the EMERGENCY STATUS byte shall be cleared and the control gear shall return to normal mode if:

- the 15 min inhibit timer period expires, or
- command 226 'RE-LIGHT/RESET INHIBIT' is received

Command 226: YAAA AAA1 1110 0010 "RE-LIGHT/RESET INHIBIT"

This command shall cancel the inhibit timer.

If re-light in rest mode is supported, this command shall also put the control gear back into emergency mode when mains is not present unless further inhibited by the hardwired inhibit.

NOTE 1 Re-light in rest mode will normally cause the lamp to be lit, and the battery will consequently be discharged.

NOTE 2 The state transitions referred to in the descriptions of commands 224, 225 and 226 are shown in Figure 2.

Command 227: YAAA AAA1 1110 0011 "START FUNCTION TEST"

The command shall request the control gear to perform a function test.

The command shall be ignored if a function test is already in progress. Otherwise the control gear shall proceed as follows.

The control gear may delay the start of a function test if the battery charge level is low or the control gear is in any mode other than normal mode, but the test shall not be delayed for any other reason.

If the control gear is not able to start the function test immediately, the function test shall be set as pending until it can be performed. The delay of the function test shall be flagged in bit 4

of the EMERGENCY STATUS byte. If a delayed function test cannot be completed within the maximum delay time defined by the TEST EXECUTION TIMEOUT byte, this shall be flagged in bit 4 of the FAILURE STATUS byte, bit 4 of the EMERGENCY STATUS byte shall remain set and the test shall remain pending.

When the function test starts, bit 4 of the EMERGENCY MODE byte shall be set and bit 1 and bit 4 of the EMERGENCY STATUS byte shall be cleared.

On completion of a function test, bit 1 of the EMERGENCY STATUS byte shall be set. If the function test is failed because of a lamp fault, then bit 3 and bit 6 of the FAILURE STATUS byte shall be set. If the function test is failed either because of a battery fault or because there was insufficient battery capacity to complete the test, then bit 2 and bit 6 of the FAILURE STATUS byte shall be set.

Bit 4 of the FAILURE STATUS byte shall be cleared if a function test is completed without the TEST EXECUTION TIMEOUT period having expired.

NOTE A function test ends upon self-timeout or if a fault condition is detected.

Command 228: YAAA AAA1 1110 0100 "START DURATION TEST"

The command shall request the control gear to perform a duration test.

The command shall be ignored if a duration test is already in progress. Otherwise the control gear shall then proceed as follows:

If there is sufficient battery charge and the control gear is in normal mode, a duration test shall be started immediately. Otherwise, the duration test shall be set as pending until it can be performed. The delay of the duration test shall be flagged in bit 5 in the EMERGENCY STATUS byte. If the start of the duration test is delayed beyond the time implied by the TEST EXECUTION TIMEOUT byte, this shall be flagged in bit 5 of the FAILURE STATUS byte, bit 5 of the EMERGENCY STATUS byte shall remain set and the test shall remain pending.

NOTE It is the responsibility of the control system to ensure that this command is issued at a time when the consequent duration test will not compromise safety.

When the duration test starts, bit 5 of the EMERGENCY MODE byte shall be set, bit 2 and bit 5 of the EMERGENCY STATUS byte shall be cleared, and the DURATION TEST RESULT byte shall be set to zero. As the test proceeds, the DURATION TEST RESULT byte shall be incremented at appropriate intervals.

On completion of the test, bit 2 of the EMERGENCY STATUS byte shall be set. If the test was successful, bit 7 of the FAILURE STATUS byte shall be cleared and the value of DURATION TEST RESULT byte shall be greater than or equal to the value of the RATED DURATION byte. If the test was not successful, bit 7 of the FAILURE STATUS byte shall be set and the DURATION TEST RESULT byte shall give an indication of the time for which the emergency control gear successfully powered the lamp from the battery supply.

Bit 5 of the FAILURE STATUS byte shall be cleared if a duration test is completed without the TEST EXECUTION TIMEOUT period having expired.

Command 229: YAAA AAA1 1110 0101 "STOP TEST"

On receipt of this command any pending tests shall be cancelled and bits 4 and 5 of the EMERGENCY STATUS byte shall be cleared. If the gear is performing either a function test or a duration test then that test shall be stopped and the gear shall return to normal mode.

If the control gear is in any mode other than function test or duration test, the mode shall not be changed.

NOTE 1 Neither a function test nor a duration test can be performed whilst mains is not present, so the specified return to normal mode will always be possible.

NOTE 2 Bits 4 and 5 of the FAILURE STATUS are not affected by this command. In other words, if a test delay has already been exceeded, the information that this has occurred is not lost.

Command 230: **YAAA AAA1 1110 0110** **"RESET FUNCTION TEST DONE FLAG"**

The "function test done and result valid" flag (bit 1 of the EMERGENCY STATUS byte) shall be cleared.

NOTE This flag indicates that a function test has been carried out completely, and that the function test result indicated in bit 6 of the FAILURE STATUS byte is valid.

Command 231: **YAAA AAA1 1110 0111** **"RESET DURATION TEST DONE FLAG"**

The "duration test done and result valid" flag (bit 2 of the EMERGENCY STATUS byte) shall be cleared.

NOTE This flag indicates that a duration test has been carried out completely, and that both the value in the DURATION TEST RESULT byte and the result indicated in bit 7 of the FAILURE STATUS byte are valid.

Command 232: **YAAA AAA1 1110 1000** **"RESET LAMP TIME"**

The LAMP EMERGENCY TIME and the LAMP TOTAL OPERATION TIME counters shall be reset.

11.3.4.2 Application extended configuration commands

Command 233: **YAAA AAA1 1110 1001** **"STORE DTR AS EMERGENCY LEVEL"**

If the EMERGENCY LEVEL is adjustable, the data held in the Data Transfer Register shall be stored as the EMERGENCY LEVEL.

Programming the EMERGENCY LEVEL shall not influence the actual arc power level in any mode.

NOTE This command should only be used during the set-up procedure and can be password or key protected by the control system.

Command 234: **YAAA AAA1 1110 1010** **"STORE TEST DELAY TIME HIGH BYTE"**

The data held in the Data Transfer Register shall be stored as the high byte of TEST DELAY TIME in "quarters of an hour". This byte represents the high byte that together with command 235 'STORE TEST DELAY TIME LOW BYTE' forms a 16-bit FUNCTION TEST DELAY TIME or DURATION TEST DELAY TIME number in "quarters of an hour".

If automatic testing is not supported the command shall be ignored.

Command 235: **YAAA AAA1 1110 1011** **"STORE TEST DELAY TIME LOW BYTE"**

The data held in the Data Transfer Register shall be stored as the low byte of TEST DELAY TIME in "quarters of an hour". This byte represents the low byte that together with command 234 'STORE TEST DELAY TIME HIGH BYTE' forms a 16-bit FUNCTION TEST DELAY TIME or DURATION TEST DELAY TIME number in "quarters of an hour".

If automatic testing is not supported the command shall be ignored.

Command 236: **YAAA AAA1 1110 1100** **"STORE FUNCTION TEST INTERVAL"**

The data held in the Data Transfer Register shall be stored as the FUNCTION TEST INTERVAL.

The FUNCTION TEST INTERVAL is defined in days (1 to 255). A function test as described under command 227 shall be initiated after the end of each interval period. A DTR value of 0 shall disable the auto-function test.

At the moment the command is received, with a DTR value larger than 0, the next function test shall be delayed by a time depending on the previously stored value of the TEST DELAY TIME HIGH BYTE and the TEST DELAY TIME LOW BYTE.

Automatically initiated tests may be further delayed so as to be carried out at a time estimated to be of low risk.

If automatic testing is not supported the command shall be ignored.

Command 237: YAAA AAA1 1110 1101 "STORE DURATION TEST INTERVAL"

The data held in the Data Transfer Register shall be stored as the DURATION TEST INTERVAL.

The DURATION TEST INTERVAL is defined in weeks (1 to 97). A duration test as described under command 228 shall be initiated after the end of each interval period. A DTR value of 0 shall disable the auto duration test.

At the moment the command is received, with a DTR value larger than 0, the next duration test shall be delayed by a time depending on the previously stored value of the TEST DELAY TIME HIGH BYTE and the TEST DELAY TIME LOW BYTE.

Automatically initiated tests may be further delayed so as to be carried out at a time estimated to be of low risk.

If automatic testing is not supported the command shall be ignored.

Command 238: YAAA AAA1 1110 1110 "STORE TEST EXECUTION TIMEOUT"

The data held in the Data Transfer Register shall be stored as the TEST EXECUTION TIMEOUT. The TEST EXECUTION TIMEOUT is defined in days (0 to 255).

The TEST EXECUTION TIMEOUT shall be valid for all function and duration tests, whether attempted in response to a command or as a result of an automatic test schedule. If the TEST EXECUTION TIMEOUT is set to 0 this shall result in a test timeout interval of 15 min.

The TEST EXECUTION TIMEOUT period shall start when a test becomes pending.

If the TEST EXECUTION TIMEOUT period expires without the test being finished, it shall be flagged as a failure in the FAILURE STATUS byte (command 252, bits 4 and 5) but the test shall remain pending.

NOTE Meaningful values for TEST EXECUTION TIMEOUT are 0 up to the test interval, or any value if automatic testing is disabled or not supported. The default value is 7 days. If a test is requested the test execution can be delayed if the control gear is not ready to test.

Command 239: YAAA AAA1 1110 1111 "STORE PROLONG TIME"

The data held in the Data Transfer Register shall be stored as the PROLONG TIME.

The PROLONG TIME is defined with a resolution of 0,5 min (0 to 255), and shall be used to determine the length of time the control gear shall remain in extended emergency mode. If the PROLONG TIME value is 0, then the control gear shall return to normal mode from emergency mode as soon as the mains is restored.

The PROLONG TIME shall be recalled when the control gear enters the extended emergency mode. Changing the PROLONG TIME whilst the control gear is in extended emergency mode shall have no immediate effect on the timing.

NOTE The behaviour is illustrated in Figure 2, but it must be understood that the time spent in extended emergency mode may be zero.

Command 240: YAAA AAA1 1111 0000 "START IDENTIFICATION"

The control gear shall start or restart a ten-second identification procedure.

NOTE 1 The details of this procedure can only be defined by the manufacturer.

NOTE 2 An appropriate procedure might be to change the arc power so as to facilitate identification of the control gear by optical means.

11.3.4.3 Application extended query commands

Command 241: YAAA AAA1 1111 0001 "QUERY BATTERY CHARGE"

The answer shall be an 8-bit value in the range 0 to 254 representing the actual battery charge level from the deep discharge point to fully charged. If the emergency control gear cannot perform this function "MASK" (255) shall be returned.

NOTE The value for battery charge level may not be valid if the control gear has not performed a successful duration test

Command 242: YAAA AAA1 1111 0010 "QUERY TEST TIMING"

The answer shall depend upon the content of the Data Transfer Register.

DTR value:

0000 0000	If automatic testing is supported, the answer shall be the time until the next function test in quarters of an hour (high byte) ; otherwise the answer shall be MASK
0000 0001	If automatic testing is supported, the answer shall be the time until the next function test in quarters of an hour (low byte) ; otherwise the answer shall be MASK.
0000 0010	If automatic testing is supported, the answer shall be the time until the next duration test in quarters of an hour (high byte) ; otherwise the answer shall be MASK.
0000 0011	If automatic testing is supported, the answer shall be the time until the next duration test in quarters of an hour (low byte) ; otherwise the answer shall be MASK.
0000 0100	If automatic testing is supported, the answer shall be the function test interval time in days ; otherwise the answer shall be 0.
0000 0101	If automatic testing is supported, the answer shall be the duration test interval time in weeks ; otherwise the answer shall be 0.
0000 0110	test execution timeout in days.
0000 0111	prolong time in multiples of 0,5 min.

All other DTR values are reserved for future needs and no answer shall be sent.

If the high byte of a 16-bit value is read the corresponding low byte shall be transferred to DTR 1.

Command 243: YAAA AAA1 1111 0011 "QUERY DURATION TEST RESULT"

The answer shall be the duration test result as an 8-bit value in 120-s (2 min) steps. A value of 255 means the maximum value (510 min, 8 h, 30 min) or longer.

Command 244: YAAA AAA1 1111 0100 "QUERY LAMP EMERGENCY TIME"

The answer shall be the accumulated lamp functioning time ('LAMP EMERGENCY TIME'), with the battery as power source, as an 8-bit value in 1-h steps. A value of 255 means the maximum value of 254 h or longer. The timer shall be incremented at the beginning of the 1 h timeslot.

NOTE 1 When the 'LAMP EMERGENCY TIME' reaches 255 h, it will stay at this value, until reset by command 232. To get the correct time over more than 254 h, a control unit should read out the value, accumulate it and reset the timer with command 232.

NOTE 2 Although the reported value is in units of 1 h, the control gear should accumulate the time internally with greater precision.

Command 245: YAAA AAA1 1111 0101 "QUERY LAMP TOTAL OPERATION TIME"

The answer shall be the accumulated lamp total functioning time ('LAMP TOTAL OPERATION TIME') as an 8-bit value in 4-h steps. A value of 255 means the maximum value of 1 016 h or longer. The timer shall be incremented at the beginning of the 4 h timeslot.

NOTE 1 When the value of 'LAMP TOTAL OPERATION TIME' reaches 255, it will stay at this value, until reset by command 232. To get the correct time over more than 1 016 h, a control unit should read out the value, accumulate it and reset the timer with command 232.

NOTE 2 If the lamp is operated in normal mode by another control gear, the self-contained emergency control gear might not be able to detect the correct total lamp operation time.

Command 246: YAAA AAA1 1111 0110 "QUERY EMERGENCY LEVEL"

The answer shall be the EMERGENCY LEVEL as an 8-bit number. If the EMERGENCY LEVEL is unknown, MASK (255) shall be returned.

Command 247: YAAA AAA1 1111 0111 "QUERY EMERGENCY MIN LEVEL"

The answer shall be the EMERGENCY MIN LEVEL as an 8-bit number. If the EMERGENCY MIN LEVEL is unknown, MASK (255) shall be returned.

Command 248: YAAA AAA1 1111 1000 "QUERY EMERGENCY MAX LEVEL"

The answer shall be the EMERGENCY MAX LEVEL as an 8-bit number. If the EMERGENCY MAX LEVEL is unknown, MASK (255) shall be returned.

Command 249: YAAA AAA1 1111 1001 "QUERY RATED DURATION"

The answer shall be an 8-bit number representing the rated duration as a multiple of 2 min.

A value of 255 means a time of 510 min or longer.

Command 250: YAAA AAA1 1111 1010 "QUERY EMERGENCY MODE"

The answer shall be the following 'EMERGENCY MODE INFORMATION' byte:

- bit 0 rest mode active; "0" = "No"
- bit 1 normal mode active; "0" = "No"
- bit 2 emergency mode active; "0" = "No"
- bit 3 extended emergency mode active; "0" = "No"
- bit 4 function test is in progress; "0" = "No"
- bit 5 duration test is in progress; "0" = "No"
- bit 6 hardwired inhibit is active; "0" = Not active / not present
- bit 7 hardwired switch is on. "0" = Off

The 'EMERGENCY MODE' information shall be available in the RAM of the control gear and shall be updated regularly by the control gear according to the actual situation.

Bits 0 to 5: Since the control gear cannot be in more than one of these modes at the same time no more than one of these bits shall be set at the same time.

Bit 6: If hardwired inhibit is active it shall have priority over the effects of commands 224 to 228.

Bit 7: Arc power control commands shall be executed only if the hardwired switch is "On"; if the switch is "Off", no arc power commands shall be executed.

NOTE This behaviour is similar to that of a non-emergency control gear with switched mains connected.

Command 251: YAAA AAA1 1111 1011 "QUERY FEATURES"

The answer shall be the following 'FEATURES' information byte describing the type of control gear:

bit 0	integral emergency control gear;	"0" = "No"
bit 1	maintained control gear;	"0" = "No"
bit 2	switched maintained control gear;	"0" = "No"
bit 3	auto test capability;	"0" = "No"
bit 4	adjustable emergency level;	"0" = "No"
bit 5	hardwired inhibit supported;	"0" = "No"
bit 6	physical selection supported;	"0" = "No"
bit 7	re-light in rest mode supported.	"0" = "No"

If bit 2 is set, then bit 1 shall be ignored.

NOTE 1 If bit 7 is clear, then rest mode can only be left in the event of restoration of normal supply.

NOTE 2 Bit 3 - If this function is not available, the associated queries will return "MASK" or 0 as described under command 242.

Command 252: YAAA AAA1 1111 1100 "QUERY FAILURE STATUS"

The answer shall be the following 'FAILURE STATUS' information byte:

bit 0	circuit failure;	"0" = "No"
bit 1	battery duration failure;	"0" = "No"
bit 2	battery failure;	"0" = "No"
bit 3	emergency lamp failure;	"0" = "No"
bit 4	function test max. delay exceeded;	"0" = "No"
bit 5	duration test max. delay exceeded;	"0" = "No"
bit 6	function test failed;	"0" = "No"
bit 7	duration test failed.	"0" = "No"

Bit 2 shall be maintained in accordance with the actual situation.

Bit 3 may be set or cleared at any time that the emergency control gear lights or attempts to light the lamp or lamps using battery power. If bit 3 is set, the answer to command 146 'QUERY LAMP FAILURE' shall be 'Yes' and bit 1 of the answer to command 144 'QUERY STATUS' shall be set.

If the control gear has more than one lamp then the "emergency lamp failure" bit of this query must be activated if one or more of the lamps fails.

If any of the bits 0 to 2 is set, bit 0 in the answer to command 144 'QUERY STATUS' shall be set.

NOTE 1 The precise meaning of bit 0 can only be defined by the manufacturer.

NOTE 2 Bit 1 can only be set or cleared in accordance with the result of a duration test.

NOTE 3 If a lamp failure is detected during battery operation, bit 3 of the FAILURE STATUS byte and bit 1 in the answer to command 144 'QUERY STATUS' will be set. Nevertheless, if during normal operation lamp failure is no longer detected, bit 1 in the answer to command 144 'QUERY STATUS' will be cleared during normal operation, whereas bit 3 of the FAILURE STATUS byte remains set.

Command 253: YAAA AAA1 1111 1101 "QUERY EMERGENCY STATUS"

The answer shall be the following 'EMERGENCY STATUS' information byte:

bit 0	inhibit mode;	"0" = "No"
bit 1	function test done and result valid;	"0" = "No"
bit 2	duration test done and result valid;	"0" = "No"
bit 3	battery fully charged;	"0" = In progress
bit 4	function test request pending;	"0" = "No"
bit 5	duration test request pending;	"0" = "No"
bit 6	identification active;	"0" = "No"
bit 7	physically selected.	"0" = "No"

If mains is present, then bit 0 indicates that the timer started by command 225 is running. If mains is not present, bit 0 indicates that the control gear is in rest mode as a result of being inhibited either by command or by hardwired inhibit.

Bit 7 – This bit shall be set when the control gear is physically selected and shall be reset automatically after reading of this status byte. Resetting this bit shall not cancel the physical selection in addressing mode (see Subclause 11.4.3 of IEC 62386-102:2009).

NOTE Physical selection can be done for example by pushbutton or by lamp removal. Bit 7 can be used to inform the control unit of any servicing on the control gear, or for identification.

Command 254 YAAA AAA1 1111 1110 "PEFORM DTR SELECTED FUNCTION"

The command shall request the control gear to perform a function dependent on the content of the Data Transfer Register.

DTR value:

0000 0000 "Restore Factory Default Settings": The control shall restore all default values of the parameters defined Table 1 in Clause 10 of this document.

All other DTR values are reserved for future needs and no function shall be performed. The control gear shall not react in any way.

NOTE This is a control command and has to be sent twice.

Command 255: YAAA AAA1 1111 1111 "QUERY EXTENDED VERSION NUMBER"

The answer shall be 1.

11.3.5 Extended special commands

Command 272: 1100 0001 0000 0001 "ENABLE DEVICE TYPE 1"

The device type for control gear for self-contained emergency lighting shall be 1.

11.4 Special commands

The requirements of Subclause 11.4 of IEC 62386-102:2009 shall apply.

11.5 Summary of the application extended command set

Table 2 shows a summary of the application extended command set.

Table 2 – Summary of the application extended command set

Command Number	Command Code	Command Name
224	YAAA AAA1 1110 0000	REST
225	YAAA AAA1 1110 0001	INHIBIT
226	YAAA AAA1 1110 0010	RE-LIGHT/RESET INHIBIT
227	YAAA AAA1 1110 0011	START FUNCTION TEST
228	YAAA AAA1 1110 0100	START DURATION TEST
229	YAAA AAA1 1110 0101	STOP TEST
230	YAAA AAA1 1110 0110	RESET FUNCTION TEST DONE FLAG
231	YAAA AAA1 1110 0111	RESET DURATION TEST DONE FLAG
232	YAAA AAA1 1110 1000	RESET LAMP TIME
233	YAAA AAA1 1110 1001	STORE DTR AS EMERGENCY LEVEL
234	YAAA AAA1 1110 1010	STORE TEST DELAY TIME HIGH BYTE
235	YAAA AAA1 1110 1011	STORE TEST DELAY TIME LOW BYTE
236	YAAA AAA1 1110 1100	STORE FUNCTION TEST INTERVAL
237	YAAA AAA1 1110 1101	STORE DURATION TEST INTERVAL
238	YAAA AAA1 1110 1110	STORE TEST EXECUTION TIMEOUT
239	YAAA AAA1 1110 1111	STORE PROLONG TIME
240	YAAA AAA1 1111 0000	START IDENTIFICATION
241	YAAA AAA1 1111 0001	QUERY BATTERY CHARGE
242	YAAA AAA1 1111 0010	QUERY TEST TIMING
243	YAAA AAA1 1111 0011	QUERY DURATION TEST RESULT
244	YAAA AAA1 1111 0100	QUERY LAMP EMERGENCY TIME
245	YAAA AAA1 1111 0101	QUERY LAMP TOTAL OPERATION TIME
246	YAAA AAA1 1111 0110	QUERY EMERGENCY LEVEL
247	YAAA AAA1 1111 0111	QUERY EMERGENCY MIN LEVEL
248	YAAA AAA1 1111 1000	QUERY EMERGENCY MAX LEVEL
249	YAAA AAA1 1111 1001	QUERY RATED DURATION
250	YAAA AAA1 1111 1010	QUERY EMERGENCY MODE
251	YAAA AAA1 1111 1011	QUERY FEATURES
252	YAAA AAA1 1111 1100	QUERY FAILURE STATUS
253	YAAA AAA1 1111 1101	QUERY EMERGENCY STATUS
254	YAAA AAA1 1111 1110	PERFORM DTR SELECTED FUNCTION
255	YAAA AAA1 1111 1111	QUERY EXTENDED VERSION NUMBER
272	1100 0001 0000 0001	ENABLE DEVICE TYPE 1

12 Test procedures

The requirements of Clause 12 of IEC 62386-102:2009 shall apply with the following exceptions:

12.0 General

Addition:

Additional abbreviations:

- FT = Function Test
- DT = Duration Test
- EM. LEV. = EMERGENCY LEVEL
- EM. Time = Emergency Time
- TOT. OP. Time = Total Operation Time
- HB = High Byte
- LB = Low Byte

An emergency control gear may be defined via the FEATURES byte as one of the types shown in Table 3.

Table 3 – Types of emergency control gear

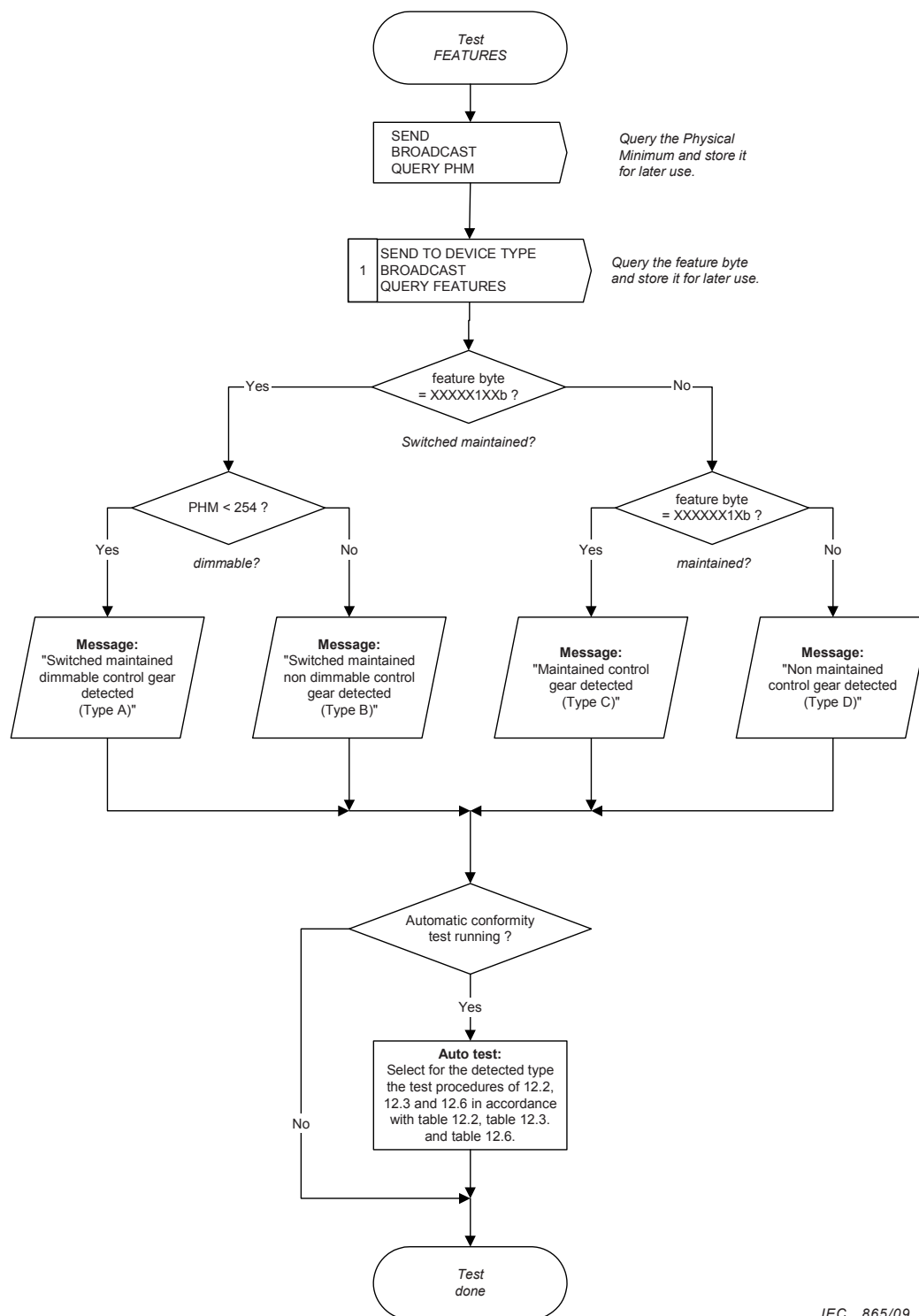
Type	Type-No. *	FEATURES byte	Physical Minimum
Non-maintained	D	xxxxx00xb	254
Maintained	C	xxxxx01xb	254
Switched maintained non-dimmable	B	xxxxx1xxb	254
Switched maintained dimmable	A	xxxxx1xxb	< 254
* The type number is used as an abbreviation for this document only			

12.1 Test sequences ‘Physical operational parameters’

Additional subclause:

12.1.6 Test sequence 'Features'

The test sequence shown in Figure 4 shall be used to determine the features of the emergency control gear. Depending on the type of emergency control gear the appropriate test sequences of Subclause 12.2 ‘Configuration commands’, Subclause 12.3 ‘Arc power control commands’ and Subclause 12.6 ‘Queries and reserved commands’ are assigned when an automatic conformity test of the DUT is performed.



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Figure 4 – Test sequence 'Features'

12.2 Test sequences 'Configuration commands'

The test sequences of Subclause 12.2 of IEC 62386-102:2009 apply with the following exceptions:

Depending on the type of emergency control gear, the test sequences listed in Table 4 shall be applied.

Table 4 – List of test sequences 'Configuration commands'

Test sequence	Type of emergency control gear			
	A	B	C	D
12.2.1.1 Test sequence 'RESET'	X	X	X	X
12.2.1.2 Test sequence 'RESET: timeout / command in-between'	X	X	X	X
12.2.1.3 Test sequence '100 ms-timeout'	X	X	X	X
12.2.1.4 Test sequence 'Commands in-between'	X	X	X	X
12.2.1.5 Test sequence 'QUERY VERSION NUMBER'	X	X	X	X
12.2.1.6 Test sequence 'STORE ACTUAL LEVEL IN THE DTR'	X	X	-	-
12.2.1.7 Test sequence 'Persistent memory'	X	X	X	X
12.2.2.1 Test sequence 'STORE THE DTR AS MAX LEVEL'	X	-	-	-
12.2.2.2 Test sequence 'STORE THE DTR AS MIN LEVEL'	X	-	-	-
12.2.2.3 Test sequence 'STORE THE DTR AS SYSTEM FAILURE LEVEL'	X	X	-	-
12.2.2.4 Test sequence 'STORE THE DTR AS POWER ON LEVEL'	X	X	-	-
12.2.2.5 Test sequence 'STORE THE DTR AS FADE TIME'	X	X	-	-
12.2.2.6 Test sequence 'STORE THE DTR AS FADE RATE'	X	X	-	-
12.2.2.7 Test sequence 'STORE THE DTR AS SCENE' / 'GO TO SCENE'	X	X	-	-
12.2.3.1 Test sequence 'REMOVE FROM SCENE'	X	X	-	-
12.2.3.2 Test sequence 'ADD TO GROUP' / 'REMOVE FROM GROUP'	X	X	X	X
12.2.3.3 Test sequence 'STORE THE DTR AS SHORT ADDRESS'	X	X	X	X
A ... switched maintained dimmable control gear (PHM < 254) B ... switched maintained non dimmable control gear (PHM = 254) C ... maintained control gear D ... non maintained control gear				

12.2.1 Test sequences 'General configuration commands'

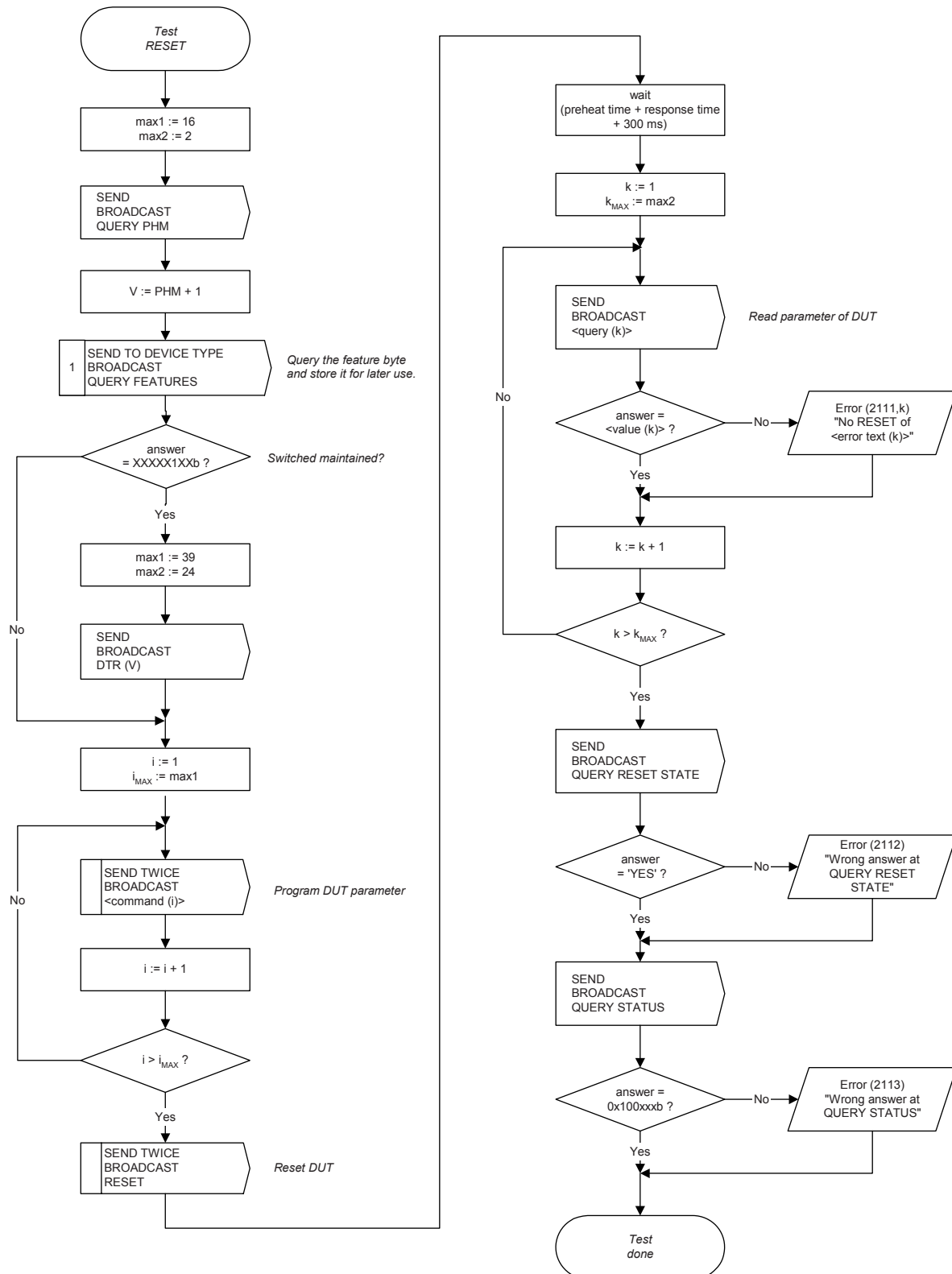
12.2.1.1 Test sequence 'RESET'

The test sequence shown in Figure 5 shall be used to check the RESET command. The parameters for the test sequence are given in Table 5.

NOTE The application extended parameters are checked in test sequence 12.7.5.1.

Table 5 – Parameters for test sequences 'RESET'

i	<command (i)>	k	<query (k)>	<value (k)>	<error text (k)>
1	ADD TO GROUP 0	1	QUERY GROUP 0-7	0x00	GROUP 0-7
2	ADD TO GROUP 1	2	QUERY GROUP 8-15	0x00	GROUP 8-15
3	ADD TO GROUP 2	3	QUERY SCENE LEVEL 0	255	SCENE 0
4	ADD TO GROUP 3	4	QUERY SCENE LEVEL 1	255	SCENE 1
5	ADD TO GROUP 4	5	QUERY SCENE LEVEL 2	255	SCENE 2
6	ADD TO GROUP 5	6	QUERY SCENE LEVEL 3	255	SCENE 3
7	ADD TO GROUP 6	7	QUERY SCENE LEVEL 4	255	SCENE 4
8	ADD TO GROUP 7	8	QUERY SCENE LEVEL 5	255	SCENE 5
9	ADD TO GROUP 8	9	QUERY SCENE LEVEL 6	255	SCENE 6
10	ADD TO GROUP 9	10	QUERY SCENE LEVEL 7	255	SCENE 7
11	ADD TO GROUP 10	11	QUERY SCENE LEVEL 8	255	SCENE 8
12	ADD TO GROUP 11	12	QUERY SCENE LEVEL 9	255	SCENE 9
13	ADD TO GROUP 12	13	QUERY SCENE LEVEL 10	255	SCENE 10
14	ADD TO GROUP 13	14	QUERY SCENE LEVEL 11	255	SCENE 11
15	ADD TO GROUP 14	15	QUERY SCENE LEVEL 12	255	SCENE 12
16	ADD TO GROUP 15	16	QUERY SCENE LEVEL 13	255	SCENE 13
17	STORE DTR AS SCENE 0	17	QUERY SCENE LEVEL 14	255	SCENE 14
18	STORE DTR AS SCENE 1	18	QUERY SCENE LEVEL 15	255	SCENE 15
19	STORE DTR AS SCENE 2	19	QUERY MAX LEVEL	254	MAX LEVEL
20	STORE DTR AS SCENE 3	20	QUERY MIN LEVEL	PHM	MIN LEVEL
21	STORE DTR AS SCENE 4	21	QUERY SYSTEM FAILURE LEVEL	254	SYSTEM FAILURE LEVEL
22	STORE DTR AS SCENE 5	22	QUERY POWER ON LEVEL	254	POWER ON LEVEL
23	STORE DTR AS SCENE 6	23	QUERY FADE TIME / FADE RATE	0x07	FADE TIME / FADE RATE
24	STORE DTR AS SCENE 7	24	QUERY ACTUAL LEVEL	254	ACTUAL LEVEL
25	STORE DTR AS SCENE 8				
26	STORE DTR AS SCENE 9				
27	STORE DTR AS SCENE 10				
28	STORE DTR AS SCENE 11				
29	STORE DTR AS SCENE 12				
30	STORE DTR AS SCENE 13				
31	STORE DTR AS SCENE 14				
32	STORE DTR AS SCENE 15				
33	STORE DTR AS MAX LEVEL				
34	STORE DTR AS MIN LEVEL				
35	STORE DTR AS SYSTEM FAILURE LEVEL				
36	STORE DTR AS POWER ON LEVEL				
37	STORE DTR AS FADE TIME				
38	STORE DTR AS FADE RATE				
39	OFF				



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Figure 5 – Test sequence 'RESET'

12.2.1.3 Test sequence '100 ms-timeout'

The test sequence shown in Figure 6 shall be used to check whether configuration commands need to be received twice within 100 ms. The parameters for the test sequence are given in Table 6.

Table 6 – Parameters for test sequences '100 ms-timeout'

i	<command (i)>	k	<query (k)>	<value (k)>	<error text (k)>
1	ADD TO GROUP 0	1	QUERY GROUP 0-7	0x00	GROUP 0-7
2	ADD TO GROUP 1	2	QUERY GROUP 8-15	0x00	GROUP 8-15
3	ADD TO GROUP 2	3	QUERY SCENE LEVEL 0	255	SCENE 0
4	ADD TO GROUP 3	4	QUERY SCENE LEVEL 1	255	SCENE 1
5	ADD TO GROUP 4	5	QUERY SCENE LEVEL 2	255	SCENE 2
6	ADD TO GROUP 5	6	QUERY SCENE LEVEL 3	255	SCENE 3
7	ADD TO GROUP 6	7	QUERY SCENE LEVEL 4	255	SCENE 4
8	ADD TO GROUP 7	8	QUERY SCENE LEVEL 5	255	SCENE 5
9	ADD TO GROUP 8	9	QUERY SCENE LEVEL 6	255	SCENE 6
10	ADD TO GROUP 9	10	QUERY SCENE LEVEL 7	255	SCENE 7
11	ADD TO GROUP 10	11	QUERY SCENE LEVEL 8	255	SCENE 8
12	ADD TO GROUP 11	12	QUERY SCENE LEVEL 9	255	SCENE 9
13	ADD TO GROUP 12	13	QUERY SCENE LEVEL 10	255	SCENE 10
14	ADD TO GROUP 13	14	QUERY SCENE LEVEL 11	255	SCENE 11
15	ADD TO GROUP 14	15	QUERY SCENE LEVEL 12	255	SCENE 12
16	ADD TO GROUP 15	16	QUERY SCENE LEVEL 13	255	SCENE 13
17	STORE DTR AS SCENE 0	17	QUERY SCENE LEVEL 14	255	SCENE 14
18	STORE DTR AS SCENE 1	18	QUERY SCENE LEVEL 15	255	SCENE 15
19	STORE DTR AS SCENE 2	19	QUERY MAX LEVEL	254	MAX LEVEL
20	STORE DTR AS SCENE 3	20	QUERY MIN LEVEL	PHM	MIN LEVEL
21	STORE DTR AS SCENE 4	21	QUERY SYSTEM FAILURE LEVEL	254	SYSTEM FAILURE LEVEL
22	STORE DTR AS SCENE 5	22	QUERY POWER ON LEVEL	254	POWER ON LEVEL
23	STORE DTR AS SCENE 6	23	QUERY FADE TIME / FADE RATE	0x07	FADE TIME / FADE RATE
24	STORE DTR AS SCENE 7				
25	STORE DTR AS SCENE 8				
26	STORE DTR AS SCENE 9				
27	STORE DTR AS SCENE 10				
28	STORE DTR AS SCENE 11				
29	STORE DTR AS SCENE 12				
30	STORE DTR AS SCENE 13				
31	STORE DTR AS SCENE 14				
32	STORE DTR AS SCENE 15				
33	STORE DTR AS MAX LEVEL				
34	STORE DTR AS MIN LEVEL				
35	STORE DTR AS SYSTEM FAILURE LEVEL				
36	STORE DTR AS POWER ON LEVEL				
37	STORE DTR AS FADE TIME				
38	STORE DTR AS FADE RATE				