SLOVENSKI STANDARD
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Alarmni sistemi - Sistemi za javljanje vloma in ropa - 2-11. del: Javljalniki vloma - ALDDR

Alarm systems - Intrusion and hold-up systems - Part 2-11: Intrusion detectors - ALDDR

Alarmanlagen - Einbruch- und Überfallmeldeanlagen - Teil 2-11: Einbruchmelder - ALDDR

Systèmes d'alarme - Systèmes d'alarme contre l'intrusion et les hold-up - Partie 2-11: Détecteurs à faisceaux laser - ALDDR

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Alarm systems - Intrusion and hold-up systems - Part 2-11: Intrusion detectors - ALDDR

Systèmes d'alarme - Systèmes d'alarme contre l'intrusion et les hold-up - Partie 2-11: Détecteurs à faisceaux laser - ALDDR

Alarmanlagen - Einbruch- und Überfallmeldeanlagen - Teil 2-11: Einbruchmelder - ALDDR

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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European Foreword

This document (CLC/TS 50131-2-11:2017) has been prepared by the CLC/TC 79 “Alarm systems”.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Introduction

This Technical Specification deals with Active Laser Detector Responsive to Diffuse Reflection (to be referred to as ALDDR) installed inside buildings, used as part of intrusion alarm systems. It includes four security grades and four environmental classes.

The purpose of an ALDDR is to detect an intruder inside a predefined area and to provide the necessary range of signals or messages to be used by the rest of the intrusion alarm system.

The number and scope of these signals or messages will be more comprehensive for systems that are specified at the higher grades.

This Technical Specification is only concerned with the requirements and tests for the ALDDR. Other types of detectors are covered by other documents identified as in EN 50131-2 series.

1 Scope

This Technical Specification is for ALDDR inside buildings and provides four security grades 1 to 4 (see EN 50131-1), specific or non-specific wire or wire-free ALDDR, and uses environmental classes I to IV (see EN 50130-5).

An ALDDR fulfils all the requirements of the specified grade.

The ALDDR detects an intruder inside a predefined area.

This standard covers ALDDR using both pulsed and continuous wave laser operation technologies according to LIDAR principle (Light Detection And Ranging). Other technologies i.e. doppler based laser operation or use of additional retro-reflective objects or video based technologies are not covered by this standard.

Functions additional to the mandatory functions specified in this standard may be included in the ALDDR, providing they do not adversely influence the correct operation of the mandatory functions.

This Technical Specification does not apply to system interconnections.

This Technical Specification does not deal with requirements for compliance with regulatory directives, such as EMC-directive, low-voltage directive, etc., except that it specifies the equipment operating conditions for EMC- susceptibility testing as required by EN 50130-4.

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.

EN 50130-4, *Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems*

EN 50130-5, *Alarm systems - Part 5: Environmental test methods*

EN 50131-1, *Alarm systems - Intrusion and hold-up systems - Part 1: System requirements*

EN 50131-6, *Alarm systems - Intrusion and hold-up systems - Part 6: Power supplies*

EN 60529, *Degrees of protection provided by enclosures (IP Code)(IEC 60529)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this Technical Specification, the terms and definitions given in EN 50131-1 and the following apply.

3.1.1
Active Laser Detector Responsive to Diffuse Reflection (ALDDR)
this type of detector consists of a device with one or more detection planes whose sensing function is performed by opto-electronic emitting and receiving elements. The detector senses the diffuse reflection of optical radiation by an object in detection zone(s) specified in two dimensions generated within the device. One dimension is the distance to the device and the other dimension is the size. Both the emitting and receiving elements are contained in one device

3.1.2
incorrect operation
physical condition that causes an inappropriate signal or message from an ALDDR

3.1.3
basic detection test target
defined object to be detected inside a pre-defined area

3.1.4
detection test
operational test during which an ALDDR is interrupted by the detection test targets in a controlled environment

3.1.5
detection test upright walking
test with a basic detection test target, which simulates a person going through in an upright position

3.1.6
detection test diving through
test with a basic detection test target simulating a person diving through

3.1.7
detection test reach through
test with a detection test target simulating a person's hand reaching through

3.1.8
ALDDR response probability
probability (e.g. x/y*100 %) for response of the ALDDR on interruptions, where x is the number of monitored responses and y is the total number of interruptions (stimulus) during the test

3.1.9
adaption
manual or automatic re-learning of the ALDDR to allow for added, moved or removed objects in the field of view as a reference point to determine the alarm condition

3.2 Abbreviations

For the purposes of this Technical Specification, the abbreviations given in EN 50131-1 and the following apply.

ALDDR	Active Laser Detector Responsive to Diffuse Reflection
EMC	Electro Magnetic Compatibility
BDT	Basic Detection Target
SA	Supervised Area
I&HAS	Intrusion and Hold Up Alarm System
SWT	Standard Walking Target

4 Functional requirements

4.1 Event processing

ALDDR shall process the events shown in Table 1.

Table 1 — Events to be processed by grade

Event	Grade			
	1	2	3	4
Intrusion detection	M	M	M	M
Tamper detection	OP	M	M	M
Masking Detection	OP	OP	M	M
Significant reduction of range	OP	OP	OP	M
Low supply voltage	OP	OP	M	M
Total loss of power supply	OP	M	M	M
Local self-test	OP	OP	M	M
Remote self-test	OP	OP	OP	M
M = mandatory OP = optional				

ALDDR shall generate signals or messages as shown in Table 2.

Table 2 — Generation of Signals or Messages

Event	Signals or Messages		
	Intrusion	Tamper	Fault
No event	NP	NP	NP
Intrusion	M	NP	NP
Tamper	NP	M	NP
Masking [a]	M	OP	M
Significant reduction of range [a]	M	OP	M
Low supply voltage	OP	OP	M
Total loss of power supply [b]	M	OP	OP
Local self-test pass	NP	NP	NP
Local self-test fail	NP	NP	M
Remote self-test pass	M	NP	NP
Remote self-test fail	NP	NP	M
M = mandatory NP = not permitted OP = optional			

[a] An independent signal or message may be provided instead.

[b] Alternatively total loss of power supply shall be determined by loss of communication with the detector.

NOTE 1 This permits two methods of signalling a masking or reduction of range event: either by the intrusion signal and fault signal, or by a dedicated masking or reduction of range signal or message. Use of the intrusion signal and fault signal is preferable, as this requires fewer connections between CIE and detector. If multiple events overlap there will be some signal combinations that may be ambiguous. To overcome this ambiguity it is suggested that detectors should not signal 'intrusion' and 'fault' at the same time except to indicate masking. This implies that the detector should prioritize signals, e.g. 1 Intrusion, 2 Fault, 3 Masking.

NOTE 2 When, in Table 1, an event may optionally generate signals or messages, they shall be as shown in this table.

4.2 Detection

4.2.1 Detection performance

The ALDDR shall detect an intruder or an object inside a pre-defined area which is present for the duration time as described in Table 3.

Table 3 — Interruption time limits

Test	Grade 1	Grade 2	Grade 3	Grade 4
interruption time [a]	200 ms	150 ms	100 ms	25 ms
Response probability	90 %	90 %	100 %	100 %
[a] To avoid false alarms ≤ 10ms interruption time should not cause an alarm signal.				

For the walk test the performance criteria of Table 7 shall be met.

4.2.2 Target object diameters

The manufacturer should claim the type of surveillance. Depending on the type of surveillance a signal shall be generated, if the area surveyed by the ALDDR has been penetrated as follows:

– dive-through surveillance; penetration of a circular area with a diameter = 300 mm;

– reach-through surveillance; penetration of a circular area with a diameter = 40 mm.

After definition of the type of surveillance the manufacturer claim the maximum distance for each surveillance type.

4.2.3 Detection of mirror

The ALDDR shall generate an intrusion signal or message if a mirror is placed within the detection plane.

4.2.4 Indication of detection

A visual or acoustical indicator shall be provided on the ALDDR to indicate during walk test to show that an intrusion signal or message has been generated. This indicator shall only be enabled during walk test.

At grade 1 this indicator shall be capable of being enabled and disabled either remotely at Access Level 2 and/or locally after removal of a cover which provides tamper detection as described in Tables 1 and 4. At grades 2, 3 and 4 this indicator shall be capable of being enabled and disabled remotely at Access Level 2.

4.2.5 Significant reduction of range

Grade 4 detectors shall detect significant reduction of range, for example, to deliberate or accidental introduction of objects or obstructions into the coverage area.

Range reduction of more than 50 % and duration longer than 1 s shall generate a signal or message within 180 s, according to the requirements of Table 1 and Table 2.

4.2.6 Masking

Means shall be provided to detect inhibition of the operation of the detector by masking according to the requirements of Table 1.

In any I&HAS, any masked detectors should prevent setting of the system.

The maximum response time for the masking detection device shall be 180 s. Masking shall be signalled according to the requirements of Table 2. The signals or messages shall remain for at least as long as the masking condition is present. A masking signal or message shall not be reset while the

masking condition is still present. Alternatively, the masking signal or message shall be generated again within 180 s of being reset if the masking condition is still present.

NOTE From a system design point of view it would be preferable for masked detectors to automatically reset after the masking condition is removed.

No masking signal or message shall be generated by normal human movement according to Figure G.4.

For detectors where detection of masking may be remotely disabled the detection of masking shall operate when the I&HAS is unset; it is not required to operate when the I&HAS is set.

4.3 Operational requirements

4.3.1 Time interval between intrusion signals or messages

ALDDR using wired interconnections shall be able to provide an intrusion signal or message not more than 15 s after the end of the preceding intrusion signal or message.

ALDDR using wire-free interconnections shall be able to provide an intrusion signal or message after the end of the preceding intrusion signal or message within the following times:

Grade 1 300 s

Grade 2 180 s

Grade 3 30 s

Grade 4 15 s

4.3.2 Switch on delay

The ALDDR shall meet all functional requirements within 180 s of the power supply reaching its nominal voltage as specified by the manufacturer.

4.3.3 Self-tests

The ALDDR shall automatically test itself at least once every 24 h according to the requirements of Tables 1 and 2. If normal operation of the ALDDR is inhibited during a local self-test, the ALDDR inhibition time shall be limited to a maximum of 30 s in any period of 2 h.

An ALDDR shall process remote self-tests and generate signals or messages in accordance with Tables 1 and 2 within 10 s of the remote self-test signal being received, and shall return to normal operation within 30 s of the remote test signal being received.

4.4 Immunity to incorrect operation

4.4.1 General

The ALDDR shall be considered to have sufficient immunity to incorrect operation if the following requirements have been met. No intrusion signal or message shall be generated during the tests.

4.4.2 Immunity to ambient visible and near infrared radiation

The ALDDR shall not generate any signal or message when a car headlamp is swept across the front window or lens through a glass-pane.

4.4.3 Immunity to ALDDR´s of the same type

The ALDDR shall not generate any signal or message when a device of the same type (ALDDR) is in the field of view of the ALDDR.

4.4.4 Immunity to small fast moving objects

The ALDDR shall not generate any signal or message if small fast objects pass through the detection plane(s).

4.5 Tamper security

4.5.1 General

Tamper security requirements for each grade of ALDDR are shown in Table 4.

Table 4 — Tamper security requirements

Requirement	Grade 1	Grade 2	Grade 3	Grade 4
Resistance to access to the inside of the ALDDR	Required	Required	Required	Required
Detection of access to the inside of the ALDDR	Not Required	Required	Required	Required
Removal from the mounting surface for wired ALDDR	Not required	Not Required	Required	Required
Removal from the mounting surface for wire-free ALDDR	Not required	Required	Required	Required
Resistance to, or detection of, re-orientation - for ALDDR mounted on accessible brackets outside the tamper supervised housing only	Not required	Required	Required	Required
Applied torque		2 Nm	5 Nm	10 Nm
Magnetic field immunity	Not required	Required	Required	Required
Magnet Type defined in Annex C		Type 1	Type 2	Type 2
Resistance to laser radiation from external sources	Not required	Required	Required	Required

4.5.2 Resistance to and detection of unauthorized access to components and means of adjustment

All components, means of adjustment, which, when interfered with, could adversely affect the operation of the ALDDR, shall be located within the ALDDR housing. Such access shall require the use of an appropriate tool and depending on the grade as specified in Table 4 shall generate a tamper signal or message before access can be gained.

It shall not be possible to gain such access without generating a tamper signal, message or causing visible damage.

4.5.3 Detection of removal from the mounting surface

A tamper signal or message shall be generated if the ALDDR is removed from its mounting surface, in accordance with Table 4.

4.5.4 Resistance to magnetic field interference

It shall not be possible to inhibit any signals or messages with a magnet of grade dependence according to Table 4. The magnet types shall be as described in Annex C.

4.5.5 Resistance to laser radiation from external sources

There shall be a fault signal or message if laser radiation of a device is recognized by the ALDDR which inhibits the operation of the ALDDR.