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Alarmni sistemi - Sistemi za javljanje vloma in ropa - 2-5. del: Zahteve za kombinirane pasivne infrardeče in ultrazvočne javljalnike

Alarm systems - Intrusion and hold-up systems -- Part 2-5: Requirements for combined passive infrared and ultrasonic detectors

Alarmanlagen - Einbruch- und Überfallmeldeanlagen -- Teil 2-5: Anforderungen an kombinierte Passsiv-Infrarot- und Ultraschallmelder

Systèmes d'alarme - Systèmes d'alarme contre l'intrusion et les hold-up -- Partie 2-5: Exigences pour détecteurs combinés à infrarouges passifs et ultrasoniques

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This European Standard was approved by CENELEC on 2008-05-01. 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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CENELEC

European Committee for Electrotechnical Standardization
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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 79, Alarm systems.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50131-2-5 on 2008-05-01.

This European Standard supersedes CLC/TS 50131-2-5:2004.

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)	2009-05-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2011-05-01

EN 50131 will consist of the following parts, under the general title *Alarm systems – Intrusion and hold-up systems*:

Part 1	System requirements
Part 2-2	Intrusion detectors – Passive infrared detectors
Part 2-3	Requirements for microwave detectors
Part 2-4	Requirements for combined passive infrared and microwave detectors
Part 2-5	Requirements for combined passive infrared and ultrasonic detectors
Part 2-6	Intrusion detectors – Opening contacts (magnetic)
Part 2-7-1	Intrusion detectors – Glass break detectors – Acoustic
Part 2-7-2	Intrusion detectors – Glass break detectors – Passive
Part 2-7-3	Intrusion detectors – Glass break detectors – Active
Part 3	Control and indicating equipment
Part 4	Warning devices
Part 5-3	Requirements for interconnections equipment using radio frequency techniques
Part 6	Power supplies
Part 7	Application guidelines
Part 8	Security fog devices

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Introduction

This European Standard is for combined passive infrared and ultrasonic detectors (to be referred to as the detector) used as part of intrusion alarm systems installed in buildings. It includes four security grades and four environmental classes.

The purpose of a detector is to detect the broad spectrum infrared radiation emitted by an intruder and, at the same time, to emit ultrasonic radiation over the area being protected, and analyse signals that are returned, 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 European Standard is only concerned with the requirements and tests for the detector. Other types of detector are covered by other documents identified as EN 50131-2 series.

1 Scope

This European Standard is for combined passive infrared and ultrasonic detectors installed in buildings and provides for security grades 1 to 4 (see EN 50131-1), specific or non-specific wired or wire-free detectors, and uses environmental classes I to IV (see EN 50130-5). This standard does not include requirements for combined passive infra red and ultrasonic detectors intended for use outdoors.

A detector shall fulfil all the requirements of the specified grade.

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

The European Standard does not apply to system interconnections.

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 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 60068 series	Environmental testing (IEC 60068 series)
EN 60068-1	Environmental testing – Part 1: General and guidance (IEC 60068-1)
EN 60068-2-52	Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution) (IEC 60068-2-52)

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply in addition to those given in EN 50131-1.

3.1.1
basic detection target
heat source and/or ultrasonic reflector designed to verify the operation of a detector

3.1.2
combined passive infrared and ultrasonic detector
detector of the broad-spectrum infrared radiation emitted by a human being, with an active ultrasonic emitter and receiver installed in the same housing

3.1.3
incorrect operation
physical condition that causes an inappropriate signal or message from a detector

3.1.4
masking
interference with the detector input capability by the introduction of a physical barrier such as metal, plastics, paper or sprayed paints or lacquers in close proximity to the detector

3.1.5
simulated walk test target
non-human or synthetic heat source or ultrasonic reflector designed to simulate the standard walk test target

3.1.6
standard walk test target
human being of standard weight and height clothed in close fitting clothing appropriate to the simulation of an intruder

3.1.7
walk test
operational test during which a detector is stimulated by the standard walk test target in a controlled environment

3.1.8
walk test attitude, crawling
crawling attitude shall consist of the standard walk test target moving with hands and knees in contact with the floor

3.1.9
walk test attitude, upright
upright attitude shall consist of the standard walk test target standing and walking with arms held at the sides of the body. The standard walk test target begins and ends a traverse with feet together

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply in addition to those given in EN 50131-1.

HDPE High Density PolyEthylene

PIR Passive InfraRed

EMC ElectroMagnetic Compatibility

SWT Standard Walk-test Target

BDT Basic Detection Target

FOV Field Of View

4 Functional requirements

4.1 Event processing

Detectors shall process the events shown in Table 1. Detectors shall generate signals or messages as shown in Table 2.

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

Key
M = Mandatory
Op = Optional

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

Key
M = Mandatory
NP = Not Permitted
Op = Optional

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 prioritise 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.

NOTE 3 It is accepted that a bus system may send out dedicated signals or messaged and does not necessarily have to follow the mapping of Table 2 provided that all of the required events are signalled.

[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.

4.2 Detection

4.2.1 Detection performance

The detector shall generate an intrusion signal or message when the standard or simulated walk-test target moves at velocities and attitudes specified in Table 3. For detection across the boundary the walk-test distance shall be 1,5 m either side of the boundary. For detection within the boundary the walk-test distance shall be 3,0 m.

Table 3 – General walk test velocity and attitude requirements

Test	Grade 1	Grade 2	Grade 3	Grade 4
Detection across the boundary	Required	Required	Required	Required
Velocity	1,0 ms^{-1}	1,0 ms^{-1}	1,0 ms^{-1}	1,0 ms^{-1}
Attitude	Upright	Upright	Upright	Upright
Detection within the boundary	Required	Required	Required	Required
Velocity	0,3 ms^{-1}	0,3 ms^{-1}	0,2 ms^{-1}	0,1 ms^{-1}
Attitude	Upright	Upright	Upright	Upright
Detection at high velocity	Not required	Required	Required	Required
Velocity	N/A	2,0 ms^{-1}	2,5 ms^{-1}	3,0 ms^{-1}
Attitude	N/A	Upright	Upright	Upright
Close-in detection performance	Required	Required	Required	Required
Distance	2,0 m	2,0 m	0,5 m	0,5 m
Velocity	0,5 ms^{-1}	0,4 ms^{-1}	0,3 ms^{-1}	0,2 ms^{-1}
Attitude	Upright	Upright	Crawling	Crawling
Intermittent movement detection performance [a]	Not required	Not required	Required	Required
Velocity	N/A	N/A	1,0 ms^{-1}	1,0 ms^{-1}
Attitude	N/A	N/A	Upright	Upright
Significant reduction of specified range [b]	Not required	Not required	Not required	Required
Velocity	N/A	N/A	N/A	1,0 ms^{-1}
Attitude	N/A	N/A	N/A	Upright

[a] For grades 3 and 4 detectors, the intermittent movement shall consist of the SWT walking 1 m at a velocity of 1,0 ms^{-1} then pausing for 5 s before continuing. The sequence shall be maintained until the SWT has traversed through the entire detection area. This constitutes one walk test. The test shall be repeated in each of the directions shown in Figure C.3.

[b] The means to detect a significant reduction in range may be met either by detectors having the appropriate function (4.2.3) or by suitable system design. Two or more devices (e.g. a detector in conjunction with a camera, active transmitter or additional detector), may cooperate and interconnect with the system to provide means to detect a significant reduction of range.

4.2.2 Indication of detection

An indicator shall be provided at the detector to indicate when an intrusion signal or message has been generated. At grades 1 and 2 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 3 and 4 this indicator shall be capable of being enabled and disabled remotely at Access Level 2.

4.2.3 Significant reduction of range

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

Range reduction along the principal axis of detection of more than 50 % shall generate a signal or message within 180 s, according to the requirements of Table 2 and Table 3.

If additional equipment is required to detect significant reduction of range, reference shall be made to this equipment and its operation in the manufacturer's documentation.

4.3 Operational requirements

4.3.1 Time interval between intrusion signals or messages

Detectors 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.

Detectors 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 detector 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

4.3.3.1 Local self test

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

4.3.3.2 Remote self test

A detector 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 of the individual technologies to incorrect operation

The detector 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.

4.4.1 Immunity to air flow

The PIR component of the detector shall not generate any signal or message when air is blown over the face of the detector.

4.4.2 Immunity to visible and near infrared radiation

The PIR component of the detector shall not generate any signal or message when a car headlamp is swept across the front window or lens through two panes of glass.

4.4.3 Immunity to ultrasonic signal interference by extraneous sound sources

The ultrasonic component of the combined detector shall not generate an intrusion signal or message due to the operation of a sound source mounted nearby.

4.5 Tamper security

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

4.5.1 Resistance to and detection of unauthorised access to components and means of adjustment

All components, means of adjustment and access to mounting screws, which, when interfered with, could adversely affect the operation of the detector, shall be located within the detector 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 or message or causing visible damage.

4.5.2 Detection of removal from the mounting surface

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

4.5.3 Resistance to, or detection of, re-orientation

When the torque given in Table 4 is applied to the detector it shall not rotate more than 5°. Alternatively, when the torque given in Table 4 is applied, a tamper signal or message shall be generated before the detector has rotated by 5°.

4.5.4 Immunity 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 A.

4.5.5 Detection of masking

Means shall be provided to detect inhibition of the operation of the detector by masking according to the requirements of Table 4.

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 at 1 ms^{-1} at a distance equal to or greater than 1 m.

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.