



**SLOVENSKI STANDARD**  
**SIST-TS CLC/TS 50131-2-5:2004**  
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**Alarm systems - Intrusion systems - Part 2-5: Requirements for combined passive infrared and ultrasonic detectors**

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

Alarmanlagen - Einbruchmeldeanlagen -- Teil 2-5: Anforderungen an kombinierte Passiv-Infrarot und Ultraschallmelder

Systèmes d'alarme - Systèmes d'alarme intrusion -- Partie 2-5: Exigences pour détecteurs combinés infrarouges passifs et ultrasoniques

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13.310	Varstvo pred kriminalom	Protection against crime
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**Alarm systems - Intrusion systems  
Part 2-5: Requirements for combined passive infrared  
and ultrasonic detectors**

Systemes d'alarme –  
Systemes de detection d'intrusion  
Partie 2-5 : Exigences pour detecteurs  
combinés infrarouges passifs et  
ultrasoniques

Alarmanlagen –  
Einbruchmeldeanlagen  
Teil 2-5 : Anforderungen an Dualmelder  
Passiv-infrarot und Ultraschall-melder

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**CENELEC**

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

### Foreword

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

The text of the draft was submitted to the formal vote and was approved by CENELEC as CLC/TS 50131-2-5 on 2003-11-22. Standstill is maintained.

The following date was fixed:

- latest date by which the existence of the CLC/TS  
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### Introduction

This Technical Specification is a specification for combined passive infrared and ultrasonic detectors (to be referred to here as the combined detector) used as part of intrusion detection systems installed in buildings. It includes four security grades and the first three environmental classes.

The purpose of a combined 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. An intrusion signal or message is only generated when both technologies register a positive indication of the presence of an intruder, thus reducing incorrect operation. The combined detector shall provide the necessary range of signals or messages to be used by the rest of the intrusion detection system.

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

This specification is only concerned with the requirements and tests for the combined detector. Other types of detector are covered by other documents identified as drafts in the EN 50131-2 series.

The requirement in EN 50131-1 that detectors in grade 3 and 4 systems shall include a means to detect a significant reduction in range may be met either by detectors having the appropriate function (see 4.2.3) or by suitable system design.

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## 1 Scope

This Technical Specification provides for security grades 1 - 4 (see EN 50131-1), specific or non-specific wired or wire-free combined passive infrared and ultrasonic detectors, and is covered by environmental classes 1 – 3 (see EN 50130-5).

A function designated in the specification as not required for a particular grade may be provided by the manufacturer. If provided, it will be tested, and shall meet all relevant requirements of any higher grade. If it passes, the manufacturer may claim it as an extra feature, which does not alter the overall grading of the detector.

The specification 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 50130-4:1995 + A1:1996 + A2:2003	Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder and social alarm systems
EN 50130-5:1998	Alarm systems - Part 5: Environmental test methods
EN 50131-1:1997	Alarm systems - Intrusion systems - Part 1: General requirements
EN 50131-6:1997	Alarm systems - Intrusion systems - Part 6: sower Supplies
EN 60068-1:1994	Environmental testing - Part 1: General and guidance (IEC 60068-1:1988 + corr. October 1988 + A2:1992)
EN 60068-2-52:1996	Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution) (IEC 60068-2-52:1996)

## 3 Definitions and abbreviations

For the purpose of this document, the following definitions and abbreviations apply in addition to those given in EN 50131-1:

### 3.1

#### **alert/set mode**

state of operation in which a detector will generate an intrusion signal in response to stimulation by a human being or a standard target

### 3.2

#### **basic detection target**

heat source and/or ultrasonic reflector designed to verify the operation of a detector

### 3.3

#### **ceiling mount detector**

detector capable of sensing human movement from a mounting position on the ceiling

### 3.4

#### **combined passive infrared and ultrasonic detector**

detector of the broad-spectrum infrared emitted by a human being, with an active ultrasonic emitter and detector installed in the same casing

**3.5****curtain detector**

detector capable of sensing human movement through a continuous layer of detection zones

**3.6****local memory**

storage medium situated on board the detector, and having the capability to record signals or messages generated by the detector

**3.7****long range detector**

detector capable of sensing human movement in an extended field of view with horizontal angular coverage less than 10 degrees

**3.8****masking**

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

**3.9****ultrasonic detector**

detector having an active ultrasonic emitter and detector installed in the same casing

**3.10****passive infrared detector**

detector of the broad-spectrum infrared radiation emitted by a human being

**3.11****simulated walk test target**

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

**3.12****incorrect operation**

physical condition that causes an inappropriate signal from a detector

**3.13****standard walk test target**

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

**3.14****standby/unset mode**

state of operation in which a detector is not required to generate an intrusion signal or message in response to stimulation by a human being or a standard target

NOTE For environmental reasons, the ultrasonic emitter may be switched off.

**3.15****test mode**

state of operation in which a detector will activate an intrusion indicator in response to stimulation by a human being or a standard walk test target

**3.16****volumetric detector**

detector capable of sensing human movement in a volume such as a room with a field of view with horizontal angular coverage greater than 45°



**3.17****walk test**

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

**3.18****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

**3.19****walk test attitude, crawling**

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

**3.20****wire free detector**

detector connected to the control and indicating equipment by non-physical means such as radio frequency signals

**3.21 Abbreviations**

**HDPE** - high density polyethylene

**PIR** - passive infrared

**EMC** - electromagnetic compatibility

**SWT** - standard walk test target

**BDT** - basic detection target

**FOV** - field of view

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**4 Functional requirements****4.1 Indication signals or messages**

All combined detectors shall have an alert/set mode. Grades 3 and 4 shall also have an unset mode. If a combined detector has only one mode of operation, then it shall always be in the alert/set mode. Tamper detection shall be active in all modes.

Each possible mode of operation is determined by the status of the intrusion detection system with which the combined detector communicates. The combined detector signals or messages in these modes of operation shall function in accordance with Table 1. All signals or messages apply to all modes of operation unless stated otherwise.

Where a memory display is provided on board the combined detector, it shall not function in the alert /set mode.

Table 1 - Indication signals or messages

Event	Grades	Intrusion signal or message	Tamper signal or message	Fault signal or message
Intrusion	1 – 4	Required <sup>a</sup>	Not permitted	Not permitted
No stimulus	1 – 4	Not permitted	Not permitted	Not permitted
Masking	1 – 2	Not required	Not required	Not required
	3 – 4	Required <sup>b</sup>	Not required	Required <sup>b</sup>
Tamper	1 – 4	Not required	Required	Not required
Low supply voltage (external)	1 – 2	Not required	Not required	Not required
	3 – 4	Not required	Not required	Required
Total loss of external power supply	1	Not required	Not required	Not required
	2 – 4	Required	Not required	Not required
Local self test pass	1 – 4	Not permitted	Not permitted	Not permitted
Local self test fail	1 – 2	Not permitted	Not permitted	Not required
	3 – 4	Not permitted	Not permitted	Required
Remote self test pass	1 – 2	Not required	Not permitted	Not permitted
	3 – 4	Required	Not permitted	Not permitted
Remote self test fail	1 – 2	Not permitted	Not permitted	Not required
	3 – 4	Not permitted	Not permitted	Required

<sup>a</sup> Not required in unset / standby mode - required in test mode.

<sup>b</sup> An independent masking signal or message may be provided instead.

<sup>c</sup> Not required for bus systems.

NOTE For internal power supplies, see EN 50131-6.

## 4.2 Detection

### 4.2.1 Detection performance

The combined detector shall generate an intrusion signal or message when the SWT or simulated walk test target moves within the boundary for a distance of 3 m or across the manufacturers claimed boundary of detection. An intrusion signal or message shall only be generated when both technologies register a positive indication of the presence of an intruder.

The variety of velocities and attitudes are as specified in Table 2.

Table 2 - General walk test velocity and attitude requirements

Test	Grade 1	Grade 2	Grade 3	Grade 4
<b>Detection at the boundary</b>	Required	Required	Required	Required
Velocity (m/s)	1,0	1,0	1,0	1,0
Attitude	Upright	Upright	Upright	Upright
<b>Detection within the boundary</b>	Required	Required	Required	Required
Velocity (m/s)	0,3	0,3	0,2	0,1
Attitude	Upright	Upright	Upright	Upright
<b>Detection at high velocity</b>	Not required	Required	Required	Required
Velocity (m/s)	#	2,0	2,5	3,0
Attitude	#	Upright	Upright	Upright
<b>Close-in detection performance</b>				
Distance (m)	2,0	2,0	0,5	0,5
Velocity (m/s)	0,5	0,4	0,3	0,2
Attitude	Upright	Upright	Crawling	Crawling
<b>Intermittent movement detection performance<sup>a</sup></b>	Not required	Not required	Required	Required
Velocity (m/s)	#	#	1,0	1,0
Attitude	#	#	Upright	Upright
<b>Effect of control adjustments<sup>b</sup></b>	Not required	Required	Required	Required
Velocity (m/s)	#	0,3	0,2	0,1
Attitude	#	Upright	Upright	Crawling
<b>Significant reduction of specified range</b>	Not required	Not required	Not required <sup>c</sup>	Not required <sup>c</sup>
Velocity (m/s)	#	#	1,0	1,0
Attitude	#	#	Upright	Upright
<p><sup>a</sup> The intermittent movement shall consist of the SWT moving a distance of 1 m by taking two 0,5 m steps (at 1,0 m/s), pausing for 5 s then continuing for a further 1 s.</p> <p><sup>b</sup> If means for continuous adjustment of detection sensitivity is provided, the effect of any setting shall be indicated with a tolerance of less than 25 % of the maximum reading.</p> <p><sup>c</sup> The means to detect a significant reduction in range may be met either by detectors having the appropriate function (see 4.2.3) or by suitable system design.</p> <p># To test features that are not required in a particular grade, parameters from a higher grade shall be specified.</p>				

#### 4.2.2 Indication of detection

An indicator shall be provided at the combined detector to indicate when detection causes an intrusion signal or message. This indicator shall only have this function, shall not function in the event of power failure, and be capable of being enabled/disabled. This operation shall only be performed locally after removal of the cover or remotely at the control and indicating equipment.

### 4.2.3 Significant reduction of specified range

If the facility to detect reduction in specified range is provided, then range reduction along the principal axis of detection of more than 50 % shall generate an alarm or fault signal or message within a maximum period of 180 s, according to the requirements given in Table 2. The requirements of 4.3.5 (self test) and 4.5.5 (resistance to masking) can provide range reduction detection.

If additional equipment is required to detect significant reduction in range, reference shall be made to the manufacturers documentation.

## 4.3 Operational requirements

### 4.3.1 Time interval between intrusion signals or messages

Wired combined detectors 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. Wire free combined detectors shall perform the same function in a time as follows:

Grade 1: 300 s

Grade 2: 300 s

Grade 3: 30 s

Grade 4: 15 s (see EN 50131-1 for amendment)

### 4.3.2 Switch on delay

The combined detector shall meet all functional requirements within 180 s of the power supply reaching its nominal voltage.

### 4.3.3 Fault condition signals (standards.iteh.ai)

When a combined detector suffers a fault, a fault signal or message shall be generated in accordance with the manufacturer's specification, and the provisions of Table 1.

### 4.3.4 Power supply faults

Combined detectors of all grades shall signal complete power failure according to the provisions of Table 1.

Additionally, combined detectors of grades 3 and 4 shall signal when the supply voltage moves below the manufacturers specified range according to the provisions of Table 1.

### 4.3.5 Self tests

Grade 3 and grade 4 combined detectors shall monitor the function of the sensor and associated on-board signal processing circuitry. A self-test shall be performed under the control of the combined detector.

When a remote self-test is initiated a signal or message shall be generated between 1 and 5 s later, and shall be signalled within 5 s of that initiation. The test duration shall not exceed 10 s. After the test is completed, the combined detector shall resume it's previous state within 5 s. Fault indication requirements appear in Table 1

Where normal operation of the combined detector is inhibited during a local test of function monitoring the inhibition time shall be limited to a maximum of 15 s in a period of 1 h.

## 4.4 Immunity of the individual technologies to incorrect operation

The combined 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.