



# SLOVENSKI STANDARD

## SIST EN 50131-2-4:2008

01-julij-2008

Nadomešča:

SIST-TS CLC/TS 50131-2-4:2005

---

### Alarmni sistemi - Sistemi za javljanje vloma in ropa - 2-4. del: Zahteve za kombinirane pasivne infrardeče in mikrovalovne javljalnike

Alarm systems - Intrusion and hold-up systems -- Part 2-4: Requirements for combined passive infrared and microwave detectors

Alarmanlagen - Einbruch- und Überfallmeldeanlagen -- Teil 2-4: Anforderungen an Passiv-Infrarotdualmelder und Mikrowellenmelder

Systèmes d'alarme - Systèmes d'alarme contre l'intrusion et les hold-up - Partie 2-4: Exigences pour détecteurs combinés à infrarouges passifs et à hyperfréquences

Ta slovenski standard je istoveten z: **EN 50131-2-4:2008**

---

#### **ICS:**

13.310	Varstvo pred kriminalom	Protection against crime
13.320	Alarmni in opozorilni sistemi	Alarm and warning systems

**SIST EN 50131-2-4:2008**

en,fr

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 50131-2-4:2008

<https://standards.iteh.ai/catalog/standards/sist/a8f5f138-fbb2-4bc1-ab96-12dffcfid2810/sist-en-50131-2-4-2008>

EUROPEAN STANDARD

**EN 50131-2-4**

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2008

ICS 13.310

Supersedes CLC/TS 50131-2-4:2004

English version

**Alarm systems -  
Intrusion and hold-up systems -  
Part 2-4: Requirements for combined passive infrared  
and microwave detectors**

Systemes d'alarme -  
Systemes d'alarme contre l'intrusion  
et les hold-up -  
Partie 2-4: Exigences pour detecteurs  
combines à infrarouges passifs  
et à hyperfréquences

Alarmanlagen -  
Einbruch- und Überfallmeldeanlagen -  
Teil 2-4: Anforderungen  
an Passiv-Infrarotdualmelder  
und Mikrowellenmelder

**ITeH STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 50131-2-4:2008](https://standards.iteh.ai/catalog/standards/sist/a85f138-fbb2-4bc1-ab96-1792d1590c03/sist-en-50131-2-4-2008)

[https://standards.iteh.ai/catalog/standards/sist/a85f138-fbb2-4bc1-ab96-](https://standards.iteh.ai/catalog/standards/sist/a85f138-fbb2-4bc1-ab96-1792d1590c03/sist-en-50131-2-4-2008)

This European Standard was approved by CENELEC on 2007-12-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

# 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 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 50131-2-4 on 2007-12-01.

This European Standard supersedes CLC/TS 50131-2-4:2004.

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) 2008-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-12-01

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 Intrusion detectors – Microwave detectors
- Part 2–4 Intrusion detectors – Combined passive infrared / Microwave detectors
- Part 2–5 Intrusion detectors – Combined passive infrared / 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

## Contents

<b>Introduction</b> .....	<b>5</b>
<b>1 Scope</b> .....	<b>6</b>
<b>2 Normative references</b> .....	<b>6</b>
<b>3 Definitions and abbreviations</b> .....	<b>6</b>
3.1 Definitions .....	6
3.2 Abbreviations .....	7
<b>4 Functional requirements</b> .....	<b>8</b>
4.1 Indication signals or messages .....	8
4.2 Detection .....	9
4.3 Operational requirements .....	10
4.4 Immunity of the individual technologies to incorrect operation .....	10
4.5 Tamper security .....	11
4.6 Electrical requirements .....	12
4.7 Environmental classification and conditions .....	13
<b>5 Marking, identification and documentation</b> .....	<b>13</b>
5.1 Marking and/or identification .....	13
5.2 Documentation .....	13
<b>6 Testing</b> .....	<b>14</b>
6.1 General test conditions .....	14
6.2 Basic detection test .....	15
6.3 Walk testing .....	16
6.4 Switch-on delay, time interval between signals and indication of detection .....	18
6.5 Self tests .....	18
6.6 Immunity of individual technologies to incorrect operation .....	18
6.7 Tamper security .....	19
6.8 Electrical tests .....	21
6.9 Environmental classification and conditions .....	22
6.10 Marking, identification and documentation .....	24
<b>Annexes</b>	
<b>Annex A (normative) Dimensions &amp; Requirements of the standardised Test Magnets</b> .....	<b>25</b>
<b>Annex B (normative) General testing matrix</b> .....	<b>28</b>
<b>Annex C (normative) Walk test diagrams</b> .....	<b>30</b>
<b>Annex D (normative) Procedure for calculation of the average temperature difference between the standard target and the background</b> .....	<b>33</b>
<b>Annex E (informative) Basic detection target for the basic test of detection capability</b> .....	<b>34</b>
<b>Annex F (informative) Equipment for walk test velocity control</b> .....	<b>35</b>
<b>Annex G (informative) Immunity to visible and near Infrared radiation - Notes on calibration of the light source</b> .....	<b>36</b>
<b>Annex H (informative) Immunity to microwave signal interference by fluorescent lights</b> .....	<b>37</b>
<b>Annex I (informative) Example list of small tools</b> .....	<b>38</b>
<b>Annex J (informative) Test for resistance to re-orientation of adjustable mountings</b> .....	<b>39</b>

**Figures**

Figure A.1 — Test magnet - Magnet Type 1 .....	26
Figure A.2 — Test magnet - Magnet Type 2 .....	25
Figure C.1 — Detection across the boundary .....	30
Figure C.2 — Detection within the boundary.....	30
Figure C.3 — High velocity and intermittent movement .....	31
Figure C.4 — Close-in detection .....	31
Figure C.5 — Significant range reduction .....	32
Figure H.1 — Immunity to fluorescent lamp interference .....	37
Figure J.1 — Re-orientation test .....	39

**Tables**

Table 1 — Events to be processed by grade .....	8
Table 2 — Generation of signals or messages .....	8
Table 3 — General walk test velocity and attitude requirements.....	9
Table 4 — Tamper security requirements .....	12
Table 5 — Electrical requirements .....	12
Table 6 — Range of materials for masking tests .....	21
Table 7 — Operational tests .....	23
Table 8 — Endurance tests .....	23

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 50131-2-4:2008

<https://standards.iteh.ai/catalog/standards/sist/a8f5f138-fbb2-4bc1-ab96-12dfcfd2810/sist-en-50131-2-4-2008>

## Introduction

This standard deals with combined passive infrared and microwave 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 the detector is to detect the broad spectrum infrared radiation emitted by an intruder, to emit microwave radiation and analyse signals that are returned 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 European Standard is only concerned with the requirements and tests for the detector. Other types of detector are covered by other documents identified as in EN 50131-2 series.

If a combined detector can be operated in each technology individually, it shall also meet the grade-dependant requirements of the standards having relevance to those technologies.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 50131-2-4:2008](https://standards.iteh.ai/catalog/standards/sist/a8f5f138-fbb2-4bc1-ab96-12dfcfd2810/sist-en-50131-2-4-2008)

<https://standards.iteh.ai/catalog/standards/sist/a8f5f138-fbb2-4bc1-ab96-12dfcfd2810/sist-en-50131-2-4-2008>

## 1 Scope

This standard is for combined passive infrared and microwave 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 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.

This 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 systems - Part 6: Power supplies
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)
EN 60529	Degrees of protection provided by enclosures (IP code) (IEC 60529)

## 3 Definitions and abbreviations

For the purpose of this European Standard the following definitions and abbreviations apply in addition to those given in EN 50131-1.

### 3.1 Definitions

#### 3.1.1

##### **basic detection target**

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

#### 3.1.2

##### **combined passive infrared and microwave detector**

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

#### 3.1.3

##### **incorrect operation**

physical condition that causes an inappropriate signal from a detector

#### 3.1.4

##### **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



**3.1.5****microwave detector**

detector having an active microwave emitter and receiver installed in the same casing

**3.1.6****passive infrared detector**

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

**3.1.7****simulated walk test target**

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

**3.1.8****standard walk test target**

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

**3.1.9****walk test**

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

**3.1.10****walk test attitude, crawling**

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

**3.1.11****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**

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 Indication signals or messages

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
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 <sup>a</sup>	M	Op	M
Significant reduction of range <sup>a</sup>	M	Op	M
Low supply voltage	Op	Op	M
Total loss of power supply <sup>b</sup>	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			
<sup>a</sup> An independent signal or message may be provided instead.			
<sup>b</sup> 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 prioritise signals, eg 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 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
<b>Detection across the boundary</b>	Required	Required	Required	Required
Velocity	1,0 ms <sup>-1</sup>	1,0 ms <sup>-1</sup>	1,0 ms <sup>-1</sup>	1,0 ms <sup>-1</sup>
Attitude	Upright	Upright	Upright	Upright
<b>Detection within the boundary</b>	Required	Required	Required	Required
Velocity	0,3 ms <sup>-1</sup>	0,3 ms <sup>-1</sup>	0,2 ms <sup>-1</sup>	0,1 ms <sup>-1</sup>
Attitude	Upright	Upright	Upright	Upright
<b>Detection at high velocity</b>	Not required	Required	Required	Required
Velocity	N/A	2,0 ms <sup>-1</sup>	2,5 ms <sup>-1</sup>	3,0 ms <sup>-1</sup>
Attitude	N/A	Upright	Upright	Upright
<b>Close-in detection performance</b>	Required	Required	Required	Required
Distance	2,0 m	2,0 m	0,5 m	0,5 m
Velocity	0,5 ms <sup>-1</sup>	0,4 ms <sup>-1</sup>	0,3 ms <sup>-1</sup>	0,2 ms <sup>-1</sup>
Attitude	Upright	Upright	Crawling	Crawling
<b>Intermittent movement detection performance<sup>a</sup></b>	Not required	Not required	Required	Required
Velocity	N/A	N/A	1,0 ms <sup>-1</sup>	1,0 ms <sup>-1</sup>
Attitude	N/A	N/A	Upright	Upright
<b>Significant reduction of specified range<sup>b</sup></b>	Not required	Not required	Not required	Required
Velocity	N/A	N/A	N/A	1,0 ms <sup>-1</sup>
Attitude	N/A	N/A	N/A	Upright
<p><sup>a</sup> For Grade 3 and 4 detectors, the intermittent movement shall consist of the SWT walking 1 m at a velocity of 1,0 ms<sup>-1</sup> 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.</p> <p><sup>b</sup> 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 (eg 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.</p>				

### 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 specified 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 signals or messages when air is blown over the face of the detector.

### 4.4.2 Immunity to visible & 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 microwave signal interference by fluorescent lights

The microwave component of the detector shall not generate any signals or messages due to the operation of a fluorescent light 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 the inside of the detector through covers and existing holes

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 (standards.iteh.ai)

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  $1 \text{ ms}^{-1}$  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.