



Edition 1.0 2010-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Alarm systems – Intrusion and hold-up systems – VIEW Part 2-4: Intrusion detectors – Combined passive infrared / Microwave detectors

Systèmes d'alarme – Systèmes d'alarme contre l'intrusion et les hold-up – Partie 2-4: Détecteurs d'intrusion – Détecteurs combinés à infrarouges passifs et à hyperfréquences 800249cbba93/iec-62642-2-4-2010





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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE CODE PRIX



ICS 13.320

ISBN 978-2-88912-303-2

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ALARM SYSTEMS – INTRUSION AND HOLD-UP SYSTEMS –

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

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International Standard IEC 62642-2-4 has been prepared by IEC technical committee 79: Alarm and electronic security systems.

This standard is based on EN 50131-2-4 (2008).

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

FDIS	Report on voting
79/323/FDIS	79/329/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.

A list of all parts of the IEC 62642 series can be found, under the general title *Alarm systems* – *Intrusion and hold-up systems*, on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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- withdrawn,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
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INTRODUCTION

This part 2-4 of the IEC 62642 series of standards gives requirements for passive infrared and microwave detectors used in intrusion and hold-up alarm systems. The other parts of this series of standards are as follows:

- 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 2-71 Intrusion detectors - Glass break detectors - Acoustic
- Intrusion detectors Glass break detectors Passive Part 2-72
- Part 2-73 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
- Power supplies TANDARD PREVIEW Application guidelines Part 6
- Part 7
- Security fog devices/systems ds.iteh.ai) Part 8

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 2-2-4-2010

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 International Standard is only concerned with the requirements and tests for the detector. Other types of detector are covered by other documents identified as in IEC 62642-2 series.

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

ALARM SYSTEMS – INTRUSION AND HOLD-UP SYSTEMS –

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

1 Scope

This part of the IEC 62642 is for combined passive infrared and microwave detectors installed in buildings and provides for security Grades 1 to 4 (see IEC 62642-1), specific or non-specific wired or wire-free detectors, and uses environmental classes I to IV (see IEC 62599-1).

This standard does not include requirements for detectors intended for use outdoors.

A detector fulfils 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 International Standard does not apply to system interconnections.

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2 Normative references

IEC 62642-2-4:2010

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 60068-1:1988, Environmental testing – Part 1: General and guidance

IEC 60068-2-52, Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)

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

IEC 62599-1, Alarm systems – Part 1: Environmental test methods

IEC 62599-2, Alarm systems – Part 2: Electromagnetic compatibility – Immunity requirements for components of fire and security alarm systems

IEC 62642-1, Alarm systems – Intrusion and hold-up systems – Part 1: System requirements

IEC 62642-6, Alarm systems – Intrusion and hold-up systems – Part 6: Power supplies

3 Terms, definitions and abbreviations

For the purposes of this document, the terms, definitions and abbreviations given in IEC 62642-1, as well as the following apply.

3.1 Terms and 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

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microwave detector

detector having an active microwave emitter and receiver installed in the same casing https://standards.iteh.ai/catalog/standards/sist/08c77d62-7ad1-483f-9654-

800249cbba93/iec-62642-2-4-2010

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

attitude that consists of the standard walk test target moving with hands and knees in contact with the floor

3.1.11

walk test attitude, upright

attitude that consists 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.

<u>(standards.</u>	iteh.ai)Grade			
Event	1	2	3	4
Intrusion detection IEC 62642-2-4	:2010 int/08077	M d62 7ad	M	M
Tamper detection 800249cbba93/iec-626	42 ⁻² ^p -4-2	2010 ^M	M	M
Masking detection	Ор	Ор	М	М
Significant reduction of range	Ор	Ор	Ор	М
Low supply voltage	Ор	Ор	М	М
Total loss of power supply	Ор	М	М	М
Local self test	Ор	Ор	М	М
Remote self test	Ор	Ор	Ор	М
M = mandatory Op = optional				

Table 1 - Events to be processed by grade

Event	Signals or Messages			
Event	Intrusion	Tamper	Fault	
No event	NP	NP	NP	
Intrusion	М	NP	NP	
Tamper	NP	М	NP	
Masking ^a	М	Ор	М	
Significant reduction of range ^a	М	Ор	М	
Low supply voltage	Ор	Ор	М	
Total loss of power supply $^{\flat}$	М	Ор	Ор	
Local self test pass	NP	NP	NP	
Local self test fail	NP	NP	М	
Remote self test pass	М	NP	NP	
Remote self test fail	NP	NP	М	
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 h STANDARD PREVIEW				
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 <u>may be ambiguous</u> . To overcome this ambiguity it is suggested that detectors should not signal intrusion and if ault at the same time except to indicate masking. This implies that the detector should prioritise signals, eg 1 Intrusion, 2 Fault, 3 Masking.				
areas shown in this table.				

Table 2 – Generation of signals or messages

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.

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		1,0 ms ⁻¹	1,0 ms ⁻¹
Attitude	N/A	N/A	Upright	Upright
Significant reduction of specified range 21	Not required	Notrequired	Not required	Required
Velocity	N/A	N/A	N/A	1,0 ms ⁻¹
Attitude	EC 62642-2-4:20	U N/A	N/A	Upright

Table 3 – General walk test velocity and attitude requirements

For Grade 3 and 4 detectors, the intermittent intermitten

^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 (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.

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.

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4.3.3.2 Remotenselfstesturds.iteh.ai/catalog/standards/sist/08c77d62-7ad1-483f-9654-

800249cbba93/iec-62642-2-4-2010

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 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 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

IEC 62642-2-4:2010

Means shall be provided to detect inhibition of the operation of the detector by masking according to the requirements of Table 4ba93/icc-62642-2-4-2010

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.