

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Alarm systems – Intrusion and hold-up systems –
Part 2-2: Intrusion detectors – Passive infrared detectors**

**Systèmes d'alarme – Systèmes d'alarme contre l'intrusion et les hold-up –
Partie 2-2: Détecteurs d'intrusion – Détecteurs à infrarouges passifs**

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**Systèmes d'alarme – Systèmes d'alarme contre l'intrusion et les hold-up –
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ALARM SYSTEMS – INTRUSION AND HOLD-UP SYSTEMS –

Part 2-2: Intrusion detectors – Passive infrared detectors

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

This standard is based on EN 50131-2-2 (2004).

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

FDIS	Report on voting
79/307/FDIS	79/318/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 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

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INTRODUCTION

This part 2-2 of the IEC 62642 series of standards gives requirements for passive infrared 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
Part 2-72	Intrusion detectors – Glass break detectors – Passive
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
Part 6	Power supplies
Part 7	Application guidelines
Part 8	Security fog devices

This International Standard deals with passive infrared 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 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.

ALARM SYSTEMS – INTRUSION AND HOLD-UP SYSTEMS –

Part 2-2: Intrusion detectors – Passive infrared detectors

1 Scope

This part of the IEC 62642 is for passive infrared 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 International Standard does not include requirements for passive infrared 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 International 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.

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 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*

3 Terms, definitions and abbreviations

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

3.1 Terms and definitions

3.1.1

basic detection target

heat source designed to verify the operation of a detector

3.1.2**incorrect operation**

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

3.1.3**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

3.1.4**passive infrared detector**

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

3.1.5**simulated walk test target**

non-human heat source 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**

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

3.1.9**walk test attitude, upright**

attitude consisting of the standard walk test target standing and walking with arms by the sides of the body

NOTE 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
CIE	control and indicating equipment

4 Functional requirements**4.1 Event processing**

Detectors 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				

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

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

4.5 Tamper security

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