INTERNATIONAL STANDARD

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Fire detection and alarm systems —

Part 4: **Power supply equipment**

Systèmes de détection et d'alarme d'incendie —

Partie 4: Équipement d'alimentation électrique

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7240-4 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

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ISO 7240 consists of the following parts, under the general title *Fire detection and alarm systems*:

- Part 1: General and definitions
- Part 2: Control and indicating equipment https://standards.iteh.ai/catalog/standards/sist/b8d66f7b-7dd5-45b1-811d-
- Part 4: Power supply equipment
- Part 5: Point-type heat detectors
- Part 7: Point-type smoke detectors using scattered light transmitted light or ionization
- Part 11: Manual call points
- Part 14: Guidelines for drafting codes of practice for design, installation and use of fire detection and fire alarm systems in and around buildings
- Part 15: Point-type multisensor (light and heat) fire detectors

Part 6, *Point-type fire detectors for detection of carbon monoxide* and Part 9, *Fire sensitivity tests* are under preparation.

Introduction

This part of ISO 7240 is drafted on the basis of mandatory functions, which are to be provided on all equipment, and optional (each with its own requirements). It is intended that the options be used for specific applications, as recommended in application guidelines.

Each optional function is included as a separate entity, with its own set of associated requirements, in order to permit equipment with many different combinations of functions to comply with this part of ISO 7240.

Other functions associated with fire detection and alarm can also be provided, even if not specified in this part of ISO 7240.

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Fire detection and alarm systems —

Part 4 Power supply equipment

Scope 1

This part of ISO 7240 specifies requirements, test methods and performance criteria for power supply equipment (p.s.e.) for use in fire detection and alarm systems installed in buildings.

It is not necessarily applicable to power supply equipment with special characteristics, developed for particular applications, which could require further tests.

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.

ISO 7240-1:1988, Fire detection and alarm systems — Part 1: General and definitions

ISO 7240-2:—¹⁾, Fire detection and alarm systems — Part 2: Control and indicating equipment

IEC 60068-1, Environmental testing — Part 1: General and guidance

IEC 60068-2-1, Environmental testing — Part 2: Tests. Tests A: cold

IEC 60068-2-3, Environmental testing — Part 2: Tests. Test Ca: damp heat, steady state

IEC 60068-2-6, Environmental testing — Part 2: Tests. Test Fc: vibration (sinusoidal)

IEC 60068-2-47, Environmental testing — Part 2: Test methods — Mounting of components, equipment and other articles for vibration, impact and similar dynamic tests

IEC 60068-2-75, Environmental testing — Part 2: Tests — Test Eh: Hammer tests

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

IEC 60721-3-3, Classification of environmental conditions — Part 3: Classification of groups of environmental parameters and their severities — Section 3: Stationary use and weather protected locations

IEC 60950-1, Information technology equipment — Safety — Part 1: General requirements

EN 50130-4, Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

To be published.

3 Terms, definitions and symbols

For the purposes of this part of ISO 7240, the terms and definitions given in ISO 7240-1 and the following terms, definitions and symbols apply. See also Figure 1 of ISO 7240-1:1988.

Terms and definitions 3.1

3.1.1

float voltage

voltage that when applied to the battery will maintain the battery in a fully charged state

NOTE The float voltage is specified by the battery manufacturer.

3.1.2

final voltage

lowest recommended voltage to which a battery should be discharged

NOTE The final voltage is specified by the battery manufacturer.

3.1.3

integrated p.s.e.

equipment for which it is not possible for the manufacturer to specify its output voltage range(s) or power supply input voltage range(s) and, if in the case of a defective p.s.e., where the repair by replacement of the p.s.e. involves replacement of a part or the whole of the other equipment

Symbols 3.2

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3.2.1

Ia, max

^{*I*a, max rated maximum output current that can be supplied continuously https://standards.iteh.al/catalog/standards/sist/b8d66f7b-7dd5-45b1-811d-} 1424d5200cc8/iso-7240-4-2003

3.2.2

Ib, max

rated maximum output current that can be supplied for a short duration in which battery charging is not required

3.2.3

Imin

(integrated p.s.e.) minimum output current specified by the manufacturer

3.2.4

 V_{n}

nominal voltage of the public electricity supply

General requirements 4

4.1 Compliance

In order to comply with this part of ISO 7240, the p.s.e. (Item L in Figure 1 of ISO 7240-1:1988) shall meet the requirements of Clauses 4, 5, 6, 7 and 8, shall be tested in accordance with Clause 9 and shall meet the requirements of the tests.

4.2 Power sources

4.2.1 There shall be at least two power sources for the power supply of a fire detection and alarm system: the main power source and the standby power source.

4.2.2 The main power source shall be designed to operate from the public electricity supply or equivalent system.

4.2.3 Where a battery is used, the p.s.e. shall include charging equipment to charge the battery and maintain it in a fully charged state.

4.2.4 Each power source, on its own, shall be capable of meeting the p.s.e. manufacturer's output specification or, in the case of an integrated p.s.e., shall be capable of operating the equipment in which it is integrated within its specifications.

4.2.5 When the main power source is available, it shall be the exclusive source of power to the fire detection and alarm system, except for currents associated with battery monitoring.

4.2.6 If the main power source fails, then the p.s.e. shall be automatically switched over to a standby power source. When the main power source is restored, the p.s.e. shall be automatically switched back to the main power source.

4.2.7 If the p.s.e. is integrated within other equipment of the fire detection and fire alarm system, then the switching from one power source to the other shall not cause any change in status or indications, other than those relating to the power supply.

4.2.8 If the p.s.e. is separated from other equipment of the fire detection and alarm system and the switching from one power source to the other causes an interruption in supply of power, then the duration of the interruption shall be specified in the manufacturer's data.

4.2.9 Failure of one of the power sources shall not cause the failure of any other power source or the failure of the supply of power to the system.

NOTE The compatibility of the separated p.s.e. with the other equipment, for example the c.i.e. (control and indicating equipment — Item B in Figure 1 of ISO 7240-1:1988), is intended to be dealt with in a future part 13, system requirements.

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5 Functions

5.1 Power supply from main power source

When operated from the main power source, the following applies.

- a) The p.s.e. shall be capable of operating in accordance with its specification given in the manufacturer's data, irrespective of the condition of the standby power source. This includes any charge condition of the standby power source, or open circuit or short circuit of the connection to the standby power source.
- b) The p.s.e. shall be capable of continuously supplying *I*_{a, max} and simultaneously charging a battery discharged to its final voltage.
- c) It may allow battery charging to be limited or interrupted when delivering a current greater than *I*_{a, max} (see note to Table 1).

5.2 Power supply from standby power source

5.2.1 When operated from the standby power source, the p.s.e. shall be capable of operating in accordance with the specification given in the manufacturer's data, irrespective of the condition of the main power source.

It is intended that the standby and alarm periods required in any specific application should comply with a future part 14, application guidelines.

5.2.2 When the standby power source consists of a battery it shall

- be rechargeable,
- be suitable to be maintained in a fully charged state,
- be constructed for stationary use,
- be marked with its type designation and code or number identifying the production period, and
- have a safety mechanism to prevent explosion.

5.2.3 If the battery is mounted in a cabinet which houses other fire detection and alarm system equipment, then it shall be of the sealed type and shall be mounted in accordance with the manufacturer's data.

5.2.4 When operating from a battery standby power source and where the battery is subject to damage from over-discharge, the p.s.e. shall have a facility to switch off the p.s.e. output or outputs if the output voltage or voltages, or the voltage of the battery, falls below a value specified by the battery manufacturer.

5.3 Charger

5.3.1 The charger shall be designed and rated so that

- the battery can be charged automatically,
- a battery discharged to its final voltage can be recharged to at least 80 % of its rated capacity within 24 h and to its rated capacity within another 48 h and ards.iteh.ai)
- the charging characteristics are within the battery manufacturer's specification over the ambient temperature range of the battery. https://standards.iteh.ai/catalog/standards/sist/b8d66f7b-7dd5-45b1-811d-

5.3.2 Except for currents associated with battery monitoring, the battery shall not discharge through the charger when the charging voltage is below the battery voltage.

5.4 Faults

The p.s.e. shall be capable of recognizing and signalling the following faults within 100 s of their occurrence:

- a) a reduction in the main power source voltage to a level less than the minimum required to maintain the output voltage within the specification;
- b) loss of the standby power source;
- c) reduction of the battery voltage to less than 0,9 of the final voltage when the primary power source is unavailable;
- d) reduction of the charger output to a level of less than 0,9 of the float voltage, except under the conditions specified in 5.1 c).

5.4.1 If the p.s.e. is separately housed from the c.i.e, then at least a fault output common to the above-mentioned faults shall be provided.

5.4.2 If the p.s.e. is housed within the cabinet of the c.i.e., then the above-mentioned faults shall be indicated in accordance with Clause 9 of ISO 7240-2: $-^{2}$, either on the c.i.e. or on the p.s.e. itself.

²⁾ To be published.

5.5 Battery function check — Optional

The p.s.e. shall include a facility to check the function of the battery.

6 Materials, design and manufacture

6.1 Manufacturer's declaration

The manufacturer shall declare the following in writing:

- a) that the design has been carried out in accordance with a quality management system which incorporates a set of rules for the design of all elements of the p.s.e.;
- b) that the components of the p.s.e. have been selected for the intended purpose and are expected to operate within their specification when the environmental conditions outside the cabinet of the p.s.e. comply with Class 3K5 of IEC 60721-3-3.

6.2 Mechanical design

6.2.1 The cabinet of the p.s.e. shall be consistent with the method of installation recommended in the documentation. It shall meet at least classification IP 30 of IEC 60529.

6.2.2 The p.s.e. may be housed either in a separate cabinet or in cabinets associated with other fire detection and alarm system equipment ANDARD PREVIEW

6.2.3 If the p.s.e. is housed in the power sources shall be accessible only at Access Level 3 of ISO 7240-2.

6.2.4 If the p.s.e. is not housed in the c.i.e., then manual controls, fuses, calibration elements etc. for disconnection and adjustment of the power sources shall be accessible only by the use of a tool or key.

6.2.5 All manual controls, fuses, calibration elements and cable terminals shall be clearly labelled (e.g. to indicate their function, rating or reference to appropriate drawings).

6.2.6 If mandatory indicators required by ISO 7240-2 are repeated on a separately housed p.s.e., then the indicators shall be in accordance with ISO 7240-2.

6.3 Electrical design

6.3.1 All outputs shall have appropriate power limitations in order to ensure that in case of external short circuits no danger exists because of heat production.

6.3.2 The p.s.e. shall have safety characteristics in accordance with IEC 60950-1 for protection against direct and indirect contact, for the separation of the extra low voltage d.c. circuits from the low voltage a.c. circuits and for earthing of metal parts.

6.4 Power supply interface

Where the p.s.e. is designed to be used with c.i.e. contained in a remote separate cabinet, then an interface shall be provided for at least two transmission paths to the c.i.e., such that a short circuit or interruption in one path does not prevent the supply of power.