

Fire detection and alarm systems for buildings —

Part 4: Specification for control and indicating equipment

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Committees responsible for this British Standard

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- British Fire Protection Systems Association Ltd.
- British Fire Services' Association
- British Telecommunications plc
- Chartered Institution of Building Services Engineers
- Chief and Assistant Chief Fire Officers' Association
- Department of Health and Social Security
- Department of the Environment [Building Research Establishment (Fire Research Station)]
- Department of the Environment (Property Services Agency)
- Department of Transport (Marine Directorate)
- Electrical Contractors' Association
- Electrical Installation Equipment Manufacturers' Association (BEAMA Ltd.)
- Fire Insurers' Research and Testing Organization (FIRTO)
- Fire Offices Committee
- Fire Protection Association
- Home Office
- Institution of Electrical Engineers
- Institution of Fire Engineers
- Ministry of Defence
- National Inspection Council for Electrical Installation Contracting
- Royal Institute of British Architects
- Society of Fire Protection Engineers
- Trades Union Congress

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Foreword

This part of BS 5839 has been prepared under the direction of the Fire Standards Committee, and is a revision of BS 3116-4:1974, which is withdrawn. This edition may be revised, amended or superseded on the publication of EN 54-2, which deals with control and indicating equipment.

A simple single zone control unit suitable for small buildings is described in Appendix G of BS 5839-1:1998.

The tests specified herein are intended to assess the resistance of the equipment to the normal range of environmental conditions which may be encountered in buildings in temperate climates. Additional requirements may have to be met if the equipment is used in a flammable atmosphere (see BS 5345 and BS 5501) or outdoors.

The purpose of this part of BS 5839 is to ensure the satisfactory performance of the control and indicating equipment (and any associated power supply unit) used in a fire alarm system, but the overall performance of the system is dependent on its proper installation, etc. Guidance on these matters is given in BS 5839-1.

The purpose of a fire alarm system is to give warning of fire at the earliest practicable moment, in order that appropriate emergency measures may be taken. It is the primary function of the control and indicating equipment to raise an effective alarm in response to the operation of a trigger device by automatically switching on alarm sounders at the protected premises, by indicating where the operated trigger device is situated and, in certain cases, by transmitting a fire alarm signal to a remote manned centre.

Automatic indication of those faults directly affecting the primary function of the equipment is required. Other faults that do not affect the primary function need not be automatically indicated but should be recognizable by routine testing. Such routine testing is of the greatest importance in ensuring the continued effectiveness of the system, is necessary for systems installed in accordance with BS 5839-1 and, therefore, a test schedule and a recommended time interval between tests is required to highlight faults which may impair the effectiveness of the equipment. Specific requirements cannot be given for these test schedules since the testing routine will vary widely with the type of equipment or system.

This part of BS 5839 does not specify the facilities that have to be provided in the control and indicating equipment for a particular installation: these are determined by the plan for the action to be taken in the event of fire that should be prepared as part of the fire precautions of any building. Reference should be made to BS 5839-1 and BS 5588.

The tests are type tests and are not intended as manufacturers' tests to maintain uniformity of quality in production, which is dealt with in BS 5750. While the tests are intended to assess the most important features of the design and construction of the equipment, they cannot remove the necessity for regular inspection and maintenance, which is essential for reliable operation.

Product certification. Users of this part of BS 5839 are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate part of BS 5750.

Enquiries as to the availability of third party certification schemes will be forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 18, an inside back cover and a back cover.

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Section 1. General

1 Scope

This part of BS 5839 specifies requirements and tests for control and indicating equipment (including any associated power supply units) for fire detection and alarm systems for buildings installed for the safety of life, the protection of property, or both, with the exception of indicating equipment at remote manned centres.

NOTE 1 The requirements of this part of BS 5839 apply to the combination of the power supply unit, the control panel and the indicating panel, whether the power supply unit is integral with, partly integral with or separate from the control and indicating equipment, and whether the control panel and the indicating panel are in the same enclosure or not.

NOTE 2 The titles of the publications referred to in this part of BS 5839 are listed on the inside back cover.

2 Definitions

For the purposes of this part of BS 5839 the definitions given in BS 5839-1 apply, together with the following.

2.1

access level

the accessibility of controls and visibility of indications, subclassified as follows:

- a) *access level 1*: no restrictions;
- b) *access level 2*: restricted to authorized operators and servicing personnel;
- c) *access level 3*: restricted to authorized servicing personnel.

2.2

decision element

the element that differentiates between the fire and non-fire states

NOTE The decision element may be in the detector or the control equipment.

2.3

final voltage

the final voltage for standby batteries is 1.85 V/cell for lead acid cells, 1.1 V/cell for vented nickel cadmium cells and 1.0 V/cell for sealed nickel cadmium cells, at the 10 h (C_{10}) discharge rate

2.4

manufacturer's data

data supplied by the manufacturer or supplier

2.5

memory

provision for storage of software

2.6

alterable memory

memory whose contents can be altered as part of the operation of the control and indicating equipment without the use of any special programming device external to the system

2.7

non-volatile memory

memory that does not require the presence of any energy source for the retention of its contents (but see the note to 2.9)

2.8

read-only memory

memory whose contents can only be programmed during manufacture or altered by a special external programming device

2.9

volatile memory

memory that requires the presence of an energy source for the retention of its contents

NOTE Some types of memory can retain their contents for a limited period without power. Unless the period for which the contents can be kept exceeds 6 months without the use of power external to the memory, for the purposes of this standard the memory is considered as volatile.

2.10

software

data required for the operation of a program-controlled system

2.11

operating system

data that controls the operations carried out within the system, and which is not dependent on the configuration of any particular installation

2.12

configuration data

data, other than the operating system (see 2.11) that controls the configuration of a particular installation

2.13

running data

data that is either generated internally by the system (such as the readings of sensors) or is entered manually to initiate test or disablement functions

2.14

extra low voltage (elv)

a voltage that does not exceed 50 V between conductors, or between any conductor and earth

2.15

safety extra low voltage (selv)

an extra low voltage (see 2.14) in a circuit that is isolated from the supply mains by means such as a safety transformer or converter with separate windings

Section 2. Requirements

3 Functional requirements

3.1 Alarm condition

3.1.1 Alarm condition responses. The transition of the decision element from a non-fire state to the fire state shall result in the following.

- a) Outputs to external circuits for the energization of fire alarm devices (usually sounders) external to the control and indicating equipment, so arranged that at least one fire alarm device can continue to operate with a single open circuit or short circuit at any point on the external wiring.

NOTE 1 This requirement could be met either by the provision of two independent outputs or by a single output to a ring circuit which includes protection against both open circuit and short circuit faults. See also 6.6.5 of BS 5839-1:1988.

NOTE 2 A fire alarm evacuation signal should be given by the continuous operation of the fire alarm devices or continuous energization of the outputs. If the control equipment is arranged to provide alarms for phased evacuation, with differentiation between "evacuation" and "alert" signals, the evacuation signal should be continuous and the alert signal should be intermittent, 1.0 ± 0.5 s on and 1.0 ± 0.5 s off.

- b) A visible indication of the fire alarm.
- c) Operation of a control sounder adjacent to or within the control and indicating equipment.

NOTE 3 If two independent outputs are provided [see item a)] the control sounder may be energized from one of these outputs.

- d) For equipment capable of multi-zone operation, a separate and continuous visible indication for each zone in which a detector or manual call point has operated.

NOTE 4 This indication may be given on the control panel or on a separate indicator panel connected to it.

NOTE 5 The indications described in items b) and d) may be combined.

- e) Operation of such other functions as specified in the manufacturer's data, for example transmission of signals to fire protection equipment.

None of the responses specified in items a) to e) shall be prevented by the simultaneous operation of two detectors, or by the operation of any further detectors up to the maximum number of detectors per circuit specified by the manufacturer, at a rate not exceeding one detector every 2 s. If the control equipment is intended for use with flame detectors, then the responses shall not be prevented by the simultaneous operation of any number of flame detectors up to the maximum number of flame detectors per circuit specified by the manufacturer.

NOTE 6 Simultaneous operation (or operation in quick succession) of detectors might simulate a short circuit. The above paragraph is intended to ensure that simultaneous operation of detectors causes a fire alarm to be given and not a fault indication.

3.1.2 Delays in alarm condition responses. Any delay in the giving of the responses listed in 3.1.1 shall be limited as follows.

- a) Where the response is to a detector, the time taken by scanning, interrogation, decision or other signal processing, either within the control equipment, or controlled by it, shall not delay the responses by more than 10 s beyond the point where operation is required by the appropriate part of BS 5445 or BS 5839.

- b) Where the response is to the operation of a manual call point, the delay shall not exceed 3 s.

- c) If the manufacturer's data allows the use of call points which allow the call to be cancelled after breaking the frangible element (for example by pushing the "button" back into the call point), any operator actions at the call point more than 1 s after the breaking of the frangible element shall not inhibit or delay the giving of the alarm responses.

- d) Any control provided to override transmission delays shall be accessible at access level 1. The operation of any such control shall also result in the energization of the fire alarm device (sounder) circuit(s).

3.1.3 Silencing of fire alarm devices (sounders) and the control sounder. Switches shall be provided to silence the alarm condition responses specified in items a) and c) of 3.1.1. The switches shall be manually operated biased switches or other devices fulfilling the same function. The alarm condition responses specified in items a) and c) of 3.1.1 shall continue until silenced by the manual operation of either the appropriate silencing switch or the reset switch (see 3.1.5); they shall not be automatically silenced. In the event of further alarms from a zone or zones not already in the fire condition, the alarm condition responses specified in items a) and c) of 3.1.1 shall restart.

NOTE 1 In practice it is recommended that the reset switch is not operated until the source of the alarm is identified. It is therefore desirable that it is not possible to reset the equipment until the alarm sounders have been silenced.

NOTE 2 The silencing switches may be combined into a single control as long as access is restricted to access level 2.

Operation of either or both of the silencing switches shall not cancel the alarm condition responses specified in items b), d) and e) of 3.1.1. While the alarm devices are silenced an audible signal shall be given at the control and indicating equipment, until the fire alarm system is reset. This audible signal, which may be the same as the fault warning, shall give a sound different and distinctive from any fire alarm sounder. If intermittent, this signal shall sound for a minimum of 0.5 s at least once every 15 s.