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Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 3: Electrical safety requirements

Systèmes Electroniques pour les Foyers Domestiques et les Bâtiments (HBES) et Systèmes de Gestion Technique du Bâtiment (SGTB) – Partie 3: Exigences de sécurité électrique





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IEC Central Office	Tel.: +41 22 919 02 11
3, rue de Varembé	Fax: +41 22 919 03 00
CH-1211 Geneva 20	info@iec.ch
Switzerland	www.iec.ch

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Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) (standards.iteh.ai) Part 3: Electrical safety requirements

IEC 63044-3:2017

Systèmes Electroniques pour les Foyers Domestiques et les Bâtiments (HBES) et Systèmes de Gestion Technique du Bâtiment (SGTB) – Partie 3: Exigences de sécurité électrique

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 3: Electrical safety requirements

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A list of all parts in the IEC 63044 series, published under the general title *Home and Building Electronic Systems (HBES) and Building Automation Control Systems (BACS)*, can be found on the IEC website.

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

CDV	Report on voting
23/735/CDV	23/747/RVC

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.

In this publication, the following print types are used:

- Requirements proper: in roman type.
- Test specifications: in italic type.

This document shall be used in conjunction with relevant product safety standards.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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
- amended.

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>IEC 63044-3:2017</u> https://standards.iteh.ai/catalog/standards/sist/6e29eea8-1cdc-4419-b758bdd3e6887797/iec-63044-3-2017

INTRODUCTION

The IEC 63044 series deals with developing and testing Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS).

This document deals with electrical safety requirements for HBES/BACS.

This document is based on the philosophy that a device considered electrically safe according to an appropriate product safety standard should also remain safe when connected to a network. This document specifies in addition to the specific product standard the electrical safety requirements necessary in order for an HBES/BACS device connected to a network to remain safe under normal and single-fault conditions of the HBES/BACS network and at the same time under normal and single-fault conditions of one or more HBES/BACS devices connected to the HBES/BACS network. This includes protection from overvoltages on the network, protection from hazards caused by connection of different types of circuit, the limitation of the touch current to a network and protection of the communication wiring from overheating.

The HBES/BACS network is any interconnection between HBES/BACS products. The HBES/BACS networks can be either an ICT network with interfaces classified according to IEC 62949 or a dedicated network classified as a mains, ELV, FELV, SELV or PELV circuit.

For HBES/BACS products connected to an ICT network, the requirements in IEC 62949 apply.

For HBES/BACS products connected to a dedicated HBES/BACS network, the requirements for the electrical separation between the device and the network circuit are specified (see Table 1). These specifications of the electrical separations follow the principle in the basic safety publications IEC 60664-1 and IEC 61140, together with the installation requirements of IEC 60364. The following compromises are used.3.2017

https://standards.iteh.ai/catalog/standards/sist/6e29eea8-1cdc-4419-b758-

- According to the principles of lec 6066471, the trated impulse voltage for the separation shall be the higher of the impulse voltage on the network and the rated impulse voltage of the device circuit to be connected to the network.
- The overvoltage categories considered by IEC 60664-1 refer to overvoltages derived directly from the mains through the power supply.
- The overvoltages coming from other sources (e.g. capacitive couplings) are not specified in IEC 60664-1. IEC 60664-1 recommends that technical committees specify overvoltage categories or rated impulse voltages as appropriate.

For the purposes of this document, the following impulse voltages have been specified.

- For networks with galvanic electrical separation from mains (FELV, SELV or PELV circuit), the impulse overvoltage coming from the network side of the separation has been limited to 2,5 kV for fixed installed networks and 1,5 kV for detachable networks.
- For ICT networks, particular requirements apply (see 6.3.2.1).

HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 3: Electrical safety requirements

1 Scope

This part of IEC 63044 provides the electrical safety requirements related to the HBES/BACS network in addition to the product safety standards for HBES/BACS devices.

It also applies to devices used within an HBES/BACS network for which no specific HBES/BACS product safety standard exists.

In addition, it defines safety requirements for the interface of equipment intended to be connected to an HBES/BACS network. It does not apply to interfaces to other networks.

NOTE An example of other networks is a dedicated ICT network covered by IEC 62949.

This document is applicable to

- operator stations and other human-system interface devices, F.W.
- devices for management functions.
- control devices, automation stations and application-specific controllers,
- field devices and their interfaces, and C 63044-3:2017
- cabling and interconnection of devices/standards/sist/6e29eea8-1cdc-4419-b758-
- bdd3e6887797/iec-63044-3-2017

used within a dedicated HBES/BACS network.

This document covers the following requirements and compliance criteria:

- protection from hazards in the device;
- protection from overvoltages on the network;
- protection from touch current;
- protection from hazards caused by different types of circuit;
- protection of the communication wiring from overheating caused by excessive current.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60038:2009, IEC standard voltages

IEC 60364 (all parts), Low-voltage electrical installations

IEC 60364-5-52, Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems

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IEC 60664-1, Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests

IEC 60664-1:2007, Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests

IEC 61180, High-voltage test techniques for low-voltage equipment -Definitions, test and procedure requirements, test equipment

IEC 62151:2000, Safety of equipment electrically connected to a telecommunication network

IEC 62949, Particular safety requirements for equipment to be connected to information and communication networks¹

IEC 63044-1, Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 1: General requirements

Terms, definitions and abbreviated terms 3

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63044-1 and the following apply. iTeh STANDARD PREVIEW

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/ •
- 19-b758-ISO Online browsing platform: available at http://www.iso.org/obp •

3.1.1

ICT network

information and communication technology network

metallically terminated transmission medium consisting of two conductors intended for communication between equipment that may be located in separate buildings, excluding:

- the mains system for supply, transmission and distribution of electrical power, if used as a communication transmission medium;
- dedicated HBES/BACS networks:
- external circuits using ES1 connecting units of audio/video, information and communication technology equipment

Note 1 to entry: This may include twisted pairs, and may include circuits which are subjected to transients as indicated in Table 14, ID1 of IEC 62368-1:2014 (assumed to be 1,5 kV).

Note 2 to entry: An ICT network may be:

- publicly or privately owned;
- subject to transient overvoltages due to atmospheric discharges and faults in power distribution systems;
- subject to longitudinal (common mode) voltages induced from nearby power lines or electric traction lines.

Note 3 to entry: Examples of ICT networks are:

- a public switched telephone network;
- a public data network;
- an Integrated Services Digital Network (ISDN);

¹ Under preparation. Stage at the time of publication: IEC/FDIS 62949:2016.

- a private network with electrical interface characteristics similar to the above.

Note 4 to entry: For information about circuit voltages and signals which may be present, see Annex B of IEC 60950-1:2005.

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3.1.2

electric shock

physiological effect resulting from an electric current through a human or animal body

[SOURCE: IEC 60050-195:1998, 195-01-04]

3.1.3

basic protection

protection against electric shock under fault-free conditions

[SOURCE: IEC 60050-195:1998, 195-06-01]

3.1.4

fault protection

protection against electric shock under single-fault conditions

[SOURCE: IEC 60050-195:1998, 195-06-02]

3.1.5

mains power supply system with nominal voltage according Table 1 of IEC 60038:2009 (standards.iteh.ai)

3.1.6

mains circuit electrical circuit in which the nominal voltage cannot exceed mains, voltage under normal conditions bdd3e6887797/iec-63044-3-2017

3.1.7

extra low voltage

ELV

nominal voltage in the electrical installation of buildings according to the voltage band I specified in IEC 61140

Note 1 to entry: Voltage band I according to IEC 61140 is a voltage below or equal to 50 V AC or 120 V DC.

3.1.8 extra low voltage circuit ELV circuit

electrical circuit in which the nominal voltage cannot exceed ELV under normal conditions

Note 1 to entry: An ELV circuit is not safe to touch.

3.1.9 functional extra low voltage circuit FELV circuit

electrical circuit in which the nominal voltage cannot exceed ELV under normal conditions

Note 1 to entry: FELV has simple separation from mains.

Note 2 to entry: A FELV circuit is not safe to touch and may be connected to protective earth.

3.1.10 safety extra low voltage circuit SELV circuit electrical circuit in which the nominal voltage cannot exceed ELV

- under normal conditions,
- under single-fault conditions, including earth fault in other circuits _

Note 1 to entry: SELV has simple separation from PELV and other SELV systems, and earth and protective separation from all other circuits.

Note 2 to entry: Under normal conditions and single-fault conditions in a dry location inside a building, a SELV circuit with a voltage not higher than 25 V AC or 60 V DC is safe to touch.

3.1.11 protective extra low voltage circuit **PELV** circuit

electrical circuit in which the nominal voltage cannot exceed ELV

- under normal conditions,
- under single-fault conditions, except earth fault in other circuits

Note 1 to entry: PELV has protective separation from all circuits other than PELV, SELV or earth.

Note 2 to entry: PELV circuit is safe to touch within the same equipotential bonding area inside a building under the following conditions: under normal and single-fault conditions in dry locations and with no large contact area with a voltage not higher than 25 V AC or 60 V DC; otherwise not higher than 12 V AC or 30 V DC.

3.1.12

3.1.13

simple separation

separation between circuits or between a circuit and earth by means of basic insulation

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protective separation

separation of one electric circuit from another by means of ai)

- double insulation, or
- IEC 63044-3:2017
- basic insulation and electrically protective screening (shielding), or ^{b758-}
- reinforced insulation

[SOURCE: IEC 60050-195:1998, 195-06-19]

3.1.14

basic insulation

insulation of hazardous-live parts which provides basic protection

[SOURCE: IEC 60050-826:2004, 826-12-14]

3.1.15

double insulation

insulation comprising both basic insulation and supplementary insulation

[SORCE: IEC 60050-195:1998, 195-06-08]

3.1.16

supplementary insulation

independent insulation applied in addition to basic insulation for fault protection

[SOURCE: IEC 60050-826:2004, 826-12-15]

3.1.17

electrically protective screening

separation of electric circuits or conductors from hazardous-live parts by an electrically protective screen (shield) connected to the protective-equipotential-bonding system and intended to provide protection against electric shock

[SOURCE: IEC 60050-195:1998, 195-06-18]

3.1.18

reinforced insulation

insulation of hazardous-live-parts which provides a degree of protection against electric shock equivalent to double insulation

[SOURCE: IEC 60050-826:2004, 826-12-17]

3.2 Abbreviated terms

For the purposes of this document, the abbreviated terms given in IEC 63044-1 and the following apply.

ELV Extra Low Voltage

SELV Safety Extra Low Voltage

PELV Protective Extra Low Voltage

4 Classification of HBES/BACS network interfaces

4.1 General

HBES/BACS networks can be based on the following networks. iTeh STANDARD PREVIEW

4.2 ICT network

(standards.iteh.ai)

The classification of interfaces for devices to be connected to information and communication technology networks given in IEC 62949 applies. 32017

https://standards.iteh.ai/catalog/standards/sist/6e29eea8-1cdc-4419-b758-4.3 Dedicated network bdd3e6887797/iec-63044-3-2017

The classification of interfaces for devices to be connected to a dedicated network is LV, ELV, FELV, SELV or PELV circuit.

5 Safety requirements and compliance criteria

This document shall be used together with the appropriate safety standard for the device to be part of the HBES/BACS. See Table 1.

6 Requirements

6.1 General

The entire HBES/BACS, media and devices as well as their installation, shall ensure safe operation by protection against mechanical, chemical, environmental and other hazards and protection against electric shock, burns and fire during normal use as well as under specified abnormal conditions.

The entire HBES/BACS, media and devices as well as their installation, shall ensure safe operation and protection against electric shock, burns and fire during normal use as well as under single-fault conditions.

Compliance is checked by the classification requirements of installation areas in 6.2, the electrical safety requirements in 6.3 and the installation requirements in 6.4.

6.2 Classification requirements of installation areas

6.2.1 Overvoltage category

Devices to be installed as a part of the fixed installation of an HBES/BACS system shall be classified as overvoltage category III according to IEC 60664-1.

Devices that are not part of the fixed installation but to be supplied from the fixed installation of an HBES/BACS shall be classified at least as overvoltage category II according to IEC 60664-1.

Compliance is checked by inspection of the product descriptions and/or installation instructions.

6.2.2 Pollution degree

All devices of an HBES/BACS system shall be classified at least for pollution degree 2 according to IEC 60664-1.

Compliance is checked by inspection of the product descriptions and/or installation instructions.

6.3 Electrical safety requirements

6.3.1 Protection from hazards in the device D PREVIEW

Devices of an HBES/BACS shall comply with the electrical safety requirements in the appropriate product standard in consideration of the required overvoltage category and pollution degree specified in 6.2.1 and 6.2.2.

An informative non-exhaustive list of product standards for electrical safety is provided in Annex A.

Compliance is checked by the requirements in the relevant product standard.

6.3.2 Protection from overvoltage on the network and from hazards caused by different types of circuit

6.3.2.1 HBES/BACS products connected to an ICT network

For HBES/BACS products connected to an ICT network, as defined in 3.1.4, the appropriate requirements in IEC 62949 apply in addition to the product standard.

Compliance is checked by the requirements and tests according to IEC 62949.

6.3.2.2 Products connected to a dedicated HBES/BACS network

For products connected to a dedicated HBES/BACS network, as classified in 4.3, the protection against electric shock in accordance with 6.3.1 applies. Table 1 specifies the required electrical separation between the device circuit and the HBES/BACS network circuit and applies in addition to the product standard.

NOTE Table 1 can also be used as guidance for the separation between different circuits within a device in case the relevant product standard does not specify these requirements.

The relevant information about the safety classification (overvoltage category and type of circuit) of the ports and any restrictions applicable (e.g. the network topology) shall be stated in the manufacturer's documentation.