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INTERNATIONAL STANDARD

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Home and building electronic systems (HBES) and building automation and control systems (BACS) – Part 3: Electrical safety requirements

IEC 63044-3:2017-01+AMD1:2021-05 CSV(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3: Electrical safety requirements

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 63044-3 edition 1.1 contains the first edition (2017-01) [documents 23/735/CDV and 23/747/RVC] and its amendment 1 (2021-05) [documents 23/912/CDV and 23/961A/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 63044-3 has been prepared by IEC technical committee 23: Electrical accessories.

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.

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 the base publication and its amendment 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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~~ network, 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~~ devices. 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~~ network.

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

For HBES/BACS ~~products~~ devices 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.

– According to the principles of IEC 60664-1, the rated 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.~~

This document specifies the electrical safety requirements for HBES/BACS.

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,~~

~~– devices for management functions,~~

~~– control devices, automation stations and application-specific controllers,~~

~~– field devices and their interfaces, and~~

~~– cabling and interconnection of devices~~

~~used within a dedicated HBES/BACS network.~~

This document covers the following requirements and compliance criteria:

- protection ~~from~~ against hazards ~~in~~ from the device;
- protection ~~from~~ against overvoltages on the network;
- protection ~~from~~ against touch current;
- protection ~~from~~ against hazards caused by different types of ~~circuit~~ network;
- protection of the communication wiring ~~from~~ against 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*

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 networks*[1]

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

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- 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~~ networks 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~~ networks 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:

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

– a public switched telephone network;

– a public data network;

– an Integrated Services Digital Network (ISDN);

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

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

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

3.1.6
mains ~~circuit~~ network
electrical ~~circuit~~ network in which the nominal voltage cannot exceed mains voltage under normal conditions

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

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

3.1.9
functional extra low voltage ~~circuit~~ network
FELV ~~circuit~~ network
electrical ~~circuit~~ network 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~~ network is not safe to touch and may be connected to protective earth.

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

– under normal conditions,

– under single-fault conditions, including earth fault in other ~~circuits~~ networks

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

Note 2 to entry: Under normal conditions and single-fault conditions in a dry location inside a building, a SELV ~~circuit~~ network 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~~ network
PELV ~~circuit~~ network
electrical ~~circuit~~ network in which the nominal voltage cannot exceed ELV

– under normal conditions,

– under single-fault conditions, except earth fault in other ~~circuits~~ networks

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

Note 2 to entry: PELV ~~circuit~~ network 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
simple separation
separation between ~~circuits~~ networks or between a ~~circuit~~ network and earth by means of basic insulation

3.1.13
protective separation
separation of one electric ~~circuit~~ network from another by means of

– double insulation, or

– basic insulation and electrically protective screening (shielding), or

– reinforced insulation

[SOURCE: IEC 60050-195:1998, 195-06-19, modified – "(electrically)" has been omitted from the term and "circuit" has been replaced with "network" in the definition.]

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]