BS EN 50491-3:2009

BSI Standards Publication

General requirements for Home and Building Electronic Systems (HBES)and Building Automation and Control Systems (BACS)

Part 3: Electrical safety requirements

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National foreword

This British Standard is the UK implementation of EN 50491-3:2009. Together with BS EN 50491-5-1:2010, BS EN 50491-5-2:2010 and BS EN 50491-5-3:2010, it partially supersedes BS EN 50090-2-2:1996+A2:2007.

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This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

Exigences générales relatives aux systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) et aux Systèmes de Gestion Technique du Bâtiment (SGTB) - Partie 3: Exigences de sécurité électrique

Allgemeine Anforderungen an die Elektrische Systemtechnik für Heim und Gebäude (ESHG) und an Systeme der Gebäudeautomation (GA) - Teil 3: Anforderungen an die elektrische Sicherheit

CENELEC

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Foreword

This European Standard was prepared by a joint working group of Technical Committee CENELEC TC 205, Home and Building Electronic Systems (HBES), and Technical Committee CEN TC 247, Building Automation, Controls and Building Management.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50491-3 on 2009-03-01.

This European Standard partially supersedes EN 50090-2-2:1996 + corrigendum March 1997 + A1:2002 + A2:2007.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2010-03-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2012-03-01

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Introduction

This European Standard shall be used for products connected to a home and building automation and control system (HBES/BACS).

The expression HBES/BACS covers any combination of HBES and/or BACS products including their separate connected/detachable devices linked together via one or more networks.

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

Introductory note

The joint working group CLC/TC 205 – CEN/TC 247 has decided to include this introductory note for a better understanding of the document.

The background for this European Standard is based on the philosophy that a device considered electrically safe according to an appropriate product safety standard harmonised under the LVD Directive also should remain safe when connected to a network. This European Standard specifies in addition to the specific product standard the electrical safety requirements necessary when a HBES/BACS device connected to a network shall remain safe under normal and single fault condition of the HBES/BACS network and in the same time under normal and single fault condition of one or more HBES/BACS devices connected to the HBES/BACS network. This includes protection from over voltages on the network, protection from hazards caused by connection of different type of circuits, 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 a telecommunication network with interfaces classified according to IEC/TR 62102 or a dedicated network classified as a Mains, ELV, FELV, SELV or PELV circuit.

For HBES/BACS products connected to a telecommunication network the requirements in EN 41003 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 2). These specifications of the electrical separations follow the principle in the basic safety publications EN 60664-1 and EN 61140 together with the installation requirements of HD 60364-4-41. The following compromises are used:

Impulse overvoltages considerations:

According to the principles of EN 60664-1 the rated impulse voltage for the separation shall be the highest of either the impulse voltage on the network or the rated impulse voltage of the device circuit to be connected to the network.

The overvoltages categories considered by EN 60664-1 refer to overvoltages derived directly from the mains through the power supply

The overvoltages coming from other sources (eg. capacitive couplings) are not specified in EN 60664-1. EN 60664-1 recommends that technical committees specify overvoltage categories or rated impulse voltages as appropriate.

For the purpose of this standard, the following impulse voltages have been specified:

- For networks galvanic electrical separated 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 telecommunication networks, particular requirements apply (see 5.3.2.1).

1 Scope

This European Standard provides the electrical safety requirements for all devices connected to HBES/BACS.

This European Standard 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,

– cabling and interconnection of devices.

This European Standard 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 type of circuits;

– protection of the communication wiring from overheating caused by excessive current.

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.

EN 41003	Particular safety requirements for equipment to be connected to telecommunication networks and/or a cable distribution system
EN 60664-1:2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests (IEC 60664-1:2007)
EN 60950-1:2006	Information technology equipment - Safety - Part 1: General requirements (IEC 60950-1:2005, mod)
EN 60990	Methods of measurement of touch current and protective conductor current (IEC 60990)
EN 61140:2002	Protection against electric shock - Common aspects for installation and equipment (IEC 61140:2001)
EN 61180-1	High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements (IEC 61180-1)
EN 61180-2	High-voltage test techniques for low-voltage equipment - Part 2: Test equipment (IEC 61180-2)
CLC/TR 62102	Electrical safety - Classification of interfaces for equipment to be connected to information and communications technology networks (IEC/TR 62102)
HD 60364-4-41:2007	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock (IEC 60364-4-41:2005, mod.)

HD 384.5.523 S2:2001	Electrical installations of buildings - Part 5: Selection and erection of electrical equipment - Section 523: Current-carrying capacities in wiring systems (IEC 60364-5-523:1999, mod.)
IEC 60050-195	International Electrotechnical Vocabulary - Part 195: Earthing and protection against electric shock
IEC 60050-826	International Electrotechnical Vocabulary - Part 826: Electrical installations
IEC 62151:2000	Safety of equipment electrically connected to a telecommunication network

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
Home and Building Automation and Control (HBES/BACS) products
HBES/BACS products are devices intended to be used for control, monitoring, operation or management of building services and/or home electronic systems which can interact via a communication network

3.1.2
HBES/BACS network
any interconnection between HBES/BACS products used for communication An HBES/BACS network can carry digital data as well as analogue signals

3.1.3
HBES/BACS system
the expression HBES/BACS covers any combination of HBES/BACS products (including their separate connected/detachable devices) linked together via one or more HBES/BACS networks. Other names used such as “home control network“, “home control systems“, “home and building electronic systems“, “building systems“, “building automation system“ etc. describes types of HBES/BACS system

3.1.4
telecommunication network
metallically terminated transmission medium intended for communication between equipments that may be located in separate buildings, excluding

– the mains systems for supply, transmission and distribution of electrical power, if used as a telecommunication transmission medium,

– cable distribution systems,

– SELV circuits connecting units of information technology equipment

NOTE 1 The term TELECOMMUNICATION NETWORK is defined in terms of its functionality, not its electrical characteristics. A telecommunication network is not itself defined as being either a SELV circuit or a TNV circuit. Only the circuits in the equipment are so classified.

NOTE 2 A TELECOMMUNICATION 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 Examples of TELECOMMUNICATION NETWORKS are
- 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.

[EN 60950-1]

3.1.5
electric shock
physiological effect resulting from an electric current through a human or animal body

[IEV 195-01-04]

3.1.6
basic protection
protection against electric shock under fault-free conditions

[IEV 195-06-01]

3.1.7
fault protection
protection against electric shock under single-fault conditions

[IEV 195-06-02]

3.1.8
mains
nominal voltage up to 230/400 V a.c. for a three-phase system or 230 V a.c. for a single-phase system, or voltage up to 400 V d.c.

3.1.9
mains circuit
electrical circuit in which the nominal voltage cannot exceed mains voltage under normal conditions

3.1.10
Extra Low Voltage (ELV)
nominal voltage in the electrical installation of buildings according to the voltage band I specified in IEC 60449

NOTE Voltage band I according to IEC 60449 is a voltage below or equal to 50 V a.c. or 120 V d.c.

3.1.11
Extra Low Voltage (ELV) circuit
electrical circuit in which the nominal voltage cannot exceed ELV under normal conditions

NOTE An ELV circuit is not safe to touch.

3.1.12
Functional Extra Low Voltage (FELV) circuit
electrical circuit in which the nominal voltage cannot exceed ELV under normal conditions

NOTE 1 FELV has simple separation from LV.

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

3.1.13
Safety Extra Low Voltage (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 SELV has simple separation from PELV, other SELV systems and earth and protective separation from all other circuits.

NOTE 2 Under normal conditions and single fault conditions in dry location inside a building a SELV circuit with a voltage not higher than 25 V a.c. or 60 V d.c. is safe to touch.

3.1.14
Protective Extra Low Voltage (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 PELV has protective separation from all circuits other than PELV, SELV or earth.

NOTE 2 PELV circuit is safe to touch within the same equipotential bonding area inside a building under the following conditions: Under normal and single fault condition in dry locations and with no large contact area with a voltage not higher than 25 V a.c. or 60 V d.c., otherwise not higher than 12 V a.c. or 30 V d.c.

3.1.15
simple separation
separation between circuits or between a circuit and earth by means of basic insulation

3.1.16
protective separation
separation of one electric circuit from another by means of

– double insulation, or

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

– reinforced insulation

[IEV 195-06-19]

3.1.17
basic insulation
insulation of hazardous-live parts which provides basic protection

[IEV 826-12-14]

3.1.18
double insulation
insulation comprising both basic insulation and supplementary insulation

[IEV 195-06-08]

3.1.19
supplementary insulation
independent insulation applied in addition to basic insulation for fault protection

[IEV 826-12-15]

3.1.20
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

[IEV 195-06-18]

3.1.21
reinforced insulation
insulation of hazardous-live-parts which provides a degree of protection against electric shock equivalent to double insulation

[IEV 826-12-17]

3.2 Abbreviations

Void.

4 Classification of HBES/BACS network interfaces

HBES/BACS networks can be based on the following networks.

4.1 Telecommunication network

The classification of interfaces for devices to be connected to information and communication technology networks given in IEC/TR 62102 applies.

4.2 Dedicated network

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

5.1 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 5.2, the electrical safety requirements in 5.3 and the installation requirements in 5.4.

5.2 Classification requirements of installation areas

5.2.1 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 EN 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 EN 60664-1.

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

5.2.2 Pollution degree

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

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

5.3 Electrical safety requirements

5.3.1 Protection from hazards in the device

Devices of a 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 5.2.1 and 5.2.2.

Table 1 – List of product standards for electrical safety (informative)

Management devices	**Relevant standard**	**Title**
Data processing devices (Server stations)	EN 60950-1	Information technology equipment - Safety - Part 1: General requirements
Peripherals (Storage and archiving devices, visual display units, printers)	EN 60950-1	Information technology equipment - Safety - Part 1: General requirements
Interfaces (Data Interface Unit DIU, interfaces to Dedicated Special Systems DSS)	EN 60950-1	Information technology equipment - Safety - Part 1: General requirements
Alarm indication and annunciation devices (Acoustic annunciation devices, optical indication device)	EN 62080 EN 62094-1 EN 60598 series	 Indicator light units for household and similar fixed-electrical installations - Part 1: General requirements Luminaires
Control devices		
Controllers and automation stations	EN 60730-2-11	Automatic electrical controls for household and similar use - Part 2-11: Particular requirements for energy regulators
Application Specific Controllers (ASC)	EN 60730-2-11	Automatic electrical controls for household and similar use - Part 2-11: Particular requirements for energy regulators
Field devices		
Coupling modules	EN 60730-2-11	Automatic electrical controls for household and similar use - Part 2-11: Particular requirements for energy regulators
Local override / indication devices	EN 60730-2-11	Automatic electrical controls for household and similar use - Part 2-11: Particular requirements for energy regulators
Sensors	EN 60730-1	Automatic electrical controls for household and similar use - Part 1: General requirements
Actuators	EN 60730-2-14	Automatic electrical controls for household and similar use - Part 2-14: Particular requirements for electric actuators
Room devices	EN 60730-1	Automatic electrical controls for household and similar use - Part 1: General requirements
Uninterruptible Power Systems (UPS)	EN 62040 series	Uninterruptible power systems (UPS)
Electronic switches and associated electronic extension units for household and similar fixed electrical installations	EN 60669-2-1 EN 50428	Switches for household and similar fixed electrical installations - Part 2-1: Particular requirements - Electronic switches Switches for household and similar fixed electrical installations - Collateral standard - Switches and related accessories for use in home and building electronic systems (HBES)
Power transformers, power supply units and similar devices	EN 61558 series	Safety of power transformers, power supplies, reactors and similar products
Adjustable speed electrical power drive systems	EN 61800 series	Adjustable speed electrical power drive systems
Audio/video equipment	EN 60065	Audio, video and similar electronic apparatus - Safety requirements
NOTE For more detailed description of the BACS devices, see EN ISO 16484-2.		

For other products the appropriate product safety standard applies.

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

5.3.2 Protection from overvoltage on the network and from hazards caused by different type of circuits

5.3.2.1 HBES/BACS products connected to a telecommunication network

NOTE Products complying with EN 60950-1 or EN 60065 fulfil the requirements.

For HBES/BACS products connected to a telecommunication network, as defined in 3.1.4, the appropriate requirements in EN 41003 apply in addition to the product standard.

Compliance is checked by the requirements and tests according to EN 41003.

5.3.2.2 Products connected to a dedicated HBES/BACS network

For products connected to a dedicated HBES/BACS network, as classified in 4.2, the protection against electric shock in accordance with 5.3.1 apply. Table 2 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 2 may 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.

Table 2 - Requirements for connection of devices to a dedicated HBES/BACS network

	HBES/BACS Network circuit (overvoltage category III)				
	Mains	**ELV**	**FELV**	**SELV**	**PELV**
Voltage range V a.c. [a]	≤ 230	≤ 50	≤ 50	≤ 50	≤ 50
Voltage range V d.c. [a]	≤ 400	≤ 120	≤ 120	≤ 120	≤ 120
Device circuits (overvoltage category III or II) other than the HBES/BACS network circuit	**Requirement for the electrical separation between the HBES/BACS network circuit and other device circuits [b]**				
Mains ≤ 230 V a.c./400 V d.c.	None	Functional [d] A 230 V B - C 4 kV D 2,5 kV	Simple A 230 V B 1,5 kV C 4 kV D 2,5 kV	Protective A 230 V B 3,0 kV C 6 kV D 4 kV	Protective A 230 V B 3,0 kV C 6 kV D 4 kV
ELV ≤ 50 V a.c./120 V d.c.	Functional [d] A 230 V B - C 4 kV D 2,5 kV	None	Simple A 230 V B 1,5 kV C 4 kV D 2,5 kV	Protective A 230 V B 3,0 kV C 6 kV D 4 kV	Protective A 230 V B 3,0 kV C 6 kV D 4 kV
FELV ≤ 50 V a.c./120 V d.c.	Simple A 230 V B 1,5 kV C 4 kV D 2,5 kV	Simple A 230 V B 1,5 kV C 4 kV D 2,5 kV	Functional [c d] A 50 V B - C 2,5 kV D 1,5 kV	Simple [f] A 230 V B - C 4 kV D 2,5 kV	Simple [f] A 230 V B - C 4 kV D 2,5 kV
SELV ≤ 50 V a.c./120 V d.c.	Protective A 230 V B 3,0 kV C 6 kV D 4 kV	Protective A 230 V B 3,0 kV C 6 kV D 4 kV	Simple [f] A 230 V C 4 kV D 2,5 kV	Simple [c] A 50 V B - C 2,5 kV [e] D 1,5 kV	Simple A 50 V B - C 2,5 kV [e] D 1,5 kV
PELV ≤ 50 V a.c./120 V d.c. earthing	Protective A 230 V B 3,0 kV C 6 kV D 4 kV	Protective A 230 V B 3,0 kV C 6 kV D 4 kV	Simple [f] A 230 V B - C 4 kV D 2,5 kV	Simple A 50 V B - C 2,5 kV [e] D 1,5 kV	Simple [c] A 50 V B - C 2,5 kV [e] D 1,5 kV

[a] Values according to EN 60664-1. Voltages are nominal.

[b] Requirements for the insulation:

A = Rated insulation a.c. voltage (r.m.s.) for the electrical separation;

B = Test a.c. voltage (r.m.s.) for the electrical separation due to temporary overvoltage;

C = Rated impulse voltage for the electrical separation for devices classified as overvoltage category III;

D = Rated impulse voltage for the electrical separation for devices classified as overvoltage category II.

Impulse tests for C and D according to EN 61180-1 and EN 61180-2 (1,2 µs / 50 µs impedance 42 ohms).

[c] SELV device circuit and a SELV network circuit of same rated voltage and overvoltage category can be considered as the same circuit and therefore no separation is needed.

PELV device circuit and a PELV network circuit of same rated voltage and overvoltage category can be considered as the same circuit and therefore no separation is needed.

FELV device circuit and a FELV network circuit of same rated voltage and overvoltage category can be considered as the same circuit and therefore no separation is needed.

[d] Functional means functional separation for the highest present voltage.

[e] When the HBES/BACS is installed wholly within an equipotential earthing system, then the values C and D can be reduced to 800 V and 500 V respectively.

[f] This separation covers also the required protective separation between FELV and SELV or PELV circuits.

Compliance with the required electrical separation between the device circuit and the HBES/BACS network circuit shall be tested in accordance with the test requirements in the specific product standard with the appropriate test levels specified in the Table 2 under the following conditions:

– *if the electrical separation (simple and protective separation) has a creepage distance then the voltage specified by the letter A shall be used for dimension of the creepage distance. However this creepage distance shall not be less than the clearance for the electrical separation;*

– *if the electrical separation (simple and protective separation) has a clearance and/or a solid insulation then the voltage specified by the letters B and either C or D shall be used for dimension of the clearance and /or the solid insulation;*

– *if the product standard has no test requirements for the impulse voltage test the requirement specified Table 2 shall be used;*

– *the test voltage related to the rated impulse voltage, when used for testing the clearances, shall be corrected according to corresponding test altitudes according to EN 60664-1.*

– *As an alternative to the impulse voltage test of EN 60664-1 (6.1.2.2.1), the dielectric test with a.c. voltage (6.1.2.2.2.2) or the dielectric test with d.c. voltage (6.1.2.2.2.3) may be used.*

5.3.3 Protection from touch current

NOTE Products complying with EN 60950-1 or EN 60065 fulfil the requirements.

If the nominal voltage exceeds 25 V a.c. or 60 V d.c. or if the equipment is immersed, basic protection shall be provided for SELV and PELV circuits by insulation or barriers or enclosures.

Basic protection is generally unnecessary in normal dry conditions for:

– SELV circuits where the nominal voltage does not exceed 25 V a.c. or 60 V d.c.;

– PELV circuits where the nominal voltage does not exceed 25 V a.c. or 60 V d.c. and exposed-conductive-parts and/or the live parts are connected by a protective conductor to the main earthing terminal.

In all other cases, basic protection is not required if the nominal voltage of the SELV or PELV system does not exceed 12 V a.c. or 30 V d.c.

Compliance is checked by measurement of the voltage and, if relevant, by testing the basic protection according to the product standard.

If no product standard exist, the test voltage for basic protection shall be 500 V.

5.3.3.1 HBES/BACS products connected to a telecommunication network

For HBES/BACS products connected to a telecommunication network, as classified in 4.1, the appropriate requirements in EN 41003 apply in addition to the product standard.

5.3.3.2 Limitation of the touch current from the device to the dedicated HBES/BACS network

The touch current from devices supplied from the mains supply to the HBES/BACS network shall be limited to 0,25 mA r.m.s. according to IEC 62151, 5.4.

Compliance is checked by measurement according to the test circuits in Figures 5 and 6 in IEC 62151 (based on EN 60990).

This test does not apply to devices where the circuit to be connected to the HBES/BACS network is connected to the protective or functional earthing terminal in the device. In this case the touch current from the device to the network is considered to be zero.

5.3.3.3 Summation of touch current

A device that provides a HBES/BACS network connection for connection of multiple items of other HBES/BACS equipment, shall not create a hazard due to summation of touch current.

NOTE The background for these requirements is explained in EN 60950-1 (informative Annex W).

In these requirements, abbreviations have the following meanings:

– I_1 is the touch current received from other equipment via a network at a port of the device;

– $\sum I_1$ is the summation of touch currents received from other equipment at all such network ports of the device;

– I_2 is the touch current due to the a.c. mains supply of the device.

It shall be assumed that each HBES/BACS network port receives 0,25 mA (I_1) from the other devices, unless the actual current from the other equipment is known to be lower. The following requirements, 5.3.3.3.1 or 5.3.3.3.2 as applicable, shall be met:

5.3.3.3.1 Devices with earthed network ports

For a device in which each network port is connected to the main protective earthing terminal of the device, the following items 1) and 2) shall be considered:

1) if $\sum I_1$ (not including I_2) exceeds 3,5 mA

   – the equipment shall have provision for a permanent connection to protective earth in addition to the protective earthing conductor in the power supply cord if any, and

   – the installation instructions shall specify the provision of a permanent connection to protective earth with a cross-sectional area of not less than 2,5 mm², if mechanically protected, or otherwise 4,0 mm², and

   – a label, or a label with similar wording, shall be affixed adjacent to the permanent earth connection;

WARNING
HIGH TOUCH CURRENT
EARTH CONNECTION ESSENTIAL
BEFORE MAKING NETWORK
CONNECTIONS

2) $\sum I_1$ plus I_2 shall comply with the limits, if any, in the relevant product safety standard.

Compliance with item 1) is checked by inspection and if necessary by the following test.

If the equipment has provision for a permanent protective earth connection in accordance with item 1) above, it is not necessary to make any measurements, except that I_2 shall comply with the relevant requirements of the product safety standard.

Touch current tests, if necessary, are made using the relevant measuring instrument described in EN 60990 or any other instrument giving the same results. A capacitive coupled a.c. source of the same line frequency and phase as the a.c. mains supply is applied to each communication port such that 0,25 mA, or the actual current from other devices if known to be lower, is available to flow into that communication port. The current flowing in the earthing conductor is then measured.

5.3.3.3.2 Devices whose network ports have no reference to protective earth

If the network ports on the device do not have a common connection, each communication port shall comply with the requirements for touch current in EN 41003.

If all communication ports or any groups of such ports have a common connection including a network segment, the total touch current from each common connection shall not exceed 3,5 mA.

Compliance is checked by inspection and if necessary by the tests of EN 41003 or, if there are common connection points, by the following test:

A capacitive coupled a.c. source of the same frequency and phase as the a.c. mains supply is applied to each communication port such that 0,25 mA, or the actual current from the other if known to be lower, is available to flow into that communication port. Common connection points are tested whether or not the points are accessible.

5.3.4 Protection of the communication wiring from overheating

In addition to the control function, the network may provide a power supply function. To make sure, that the communication cable is protected from overheating, the power supply shall have a short circuit and/or overload current limitation. The current-carrying capacity for the communication wires shall be at least equal to the total current limitation for the connected power supplies

The temperature limits and current-carrying capacities for the communication wires specified in HD 384.5.523 shall not be exceeded.

Compliance is checked by inspection and measurement.

5.4 Installation

Installation of a home and building automation and control system shall comply with HD 60364-4-41.

NOTE Additional national requirements may apply.

Annex A
(normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard / Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause	Special national condition
5	**Finland, Norway and Sweden** Class I equipment which is intended for connection to the building installation wiring via a non-industrial plug or a non-industrial appliance coupler, or both and in addition is intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet.

Bibliography

EN 50428	Switches for household and similar fixed electrical installations - Collateral standard - Switches and related accessories for use in home and building electronic systems (HBES)
EN 60065	Audio, video and similar electronic apparatus - Safety requirements (IEC 60065)
EN 60598 series	Luminaires (IEC 60598 series, mod.)
EN 60669-2-1	Switches for household and similar fixed electrical installations - Part 2-1: Particular requirements - Electronic switches (IEC 60669-2-1, mod.)
EN 60730-1	Automatic electrical controls for household and similar use - Part 1: General requirements (IEC 60730-1, mod.)
EN 60730-2-11	Automatic electrical controls for household and similar use - Part 2-11: Particular requirements for energy regulators (IEC 60730-2-11)
EN 60730-2-14	Automatic electrical controls for household and similar use - Part 2-14: Particular requirements for electric actuators (IEC 60730-2-14, mod.)
EN 61558 series	Safety of power transformers, power supplies, reactors and similar products (IEC 61558 series)
EN 61800 series	Adjustable speed electrical power drive systems (IEC 61800 series)
EN 62040 series	Uninterruptible power systems (UPS) (IEC 62040 series)
EN 62080 [1)]	Sound signalling devices for household and similar purposes (IEC 62080)
EN 62094-1	Indicator light units for household and similar fixed-electrical installations - Part 1: General requirements (IEC 62094-1)
EN ISO 16484-2	Building automation and control systems (BACS) - Part 2: Hardware (ISO 16484-2)
HD 193	Voltage bands for electrical installations of buildings (IEC 60449)
HD 384.7.702	Electrical installations of buildings - Part 7: Requirements for special installations or locations - Section 702: Swimming pools and other basins (IEC 60364-7-702, mod.)
HD 60364-7-701	Low-voltage electrical installations - Part 7-701: Requirements for special installations or locations - Locations containing a bath or shower (IEC 60364-7-701, mod.)
HD 60364-7-715	Electrical installations of buildings - Part 7-715: Requirements for special installations or locations - Extra-low-voltage lighting installations (IEC 60364-7-715, mod.)
IEC/TR 61201:1992 [2)]	Extra-low voltage (ELV) - Limit values

1) At draft stage.

2) IEC/TR 61201 is superseded by IEC/TS 61201:2007 "*Use of conventional touch voltage limits - Application guide*"

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