



**SLOVENSKI STANDARD**  
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**SIST EN 50090-2-2:1998/A2:2007**

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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  
(standards.iteh.ai)

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

**Ta slovenski standard je istoveten z: EN 50491-3:2009**

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**ICS:**

97.120      Avtomatske krmilne naprave      Automatic controls for  
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 50491-3**

July 2009

ICS 97.120

Supersedes EN 50090-2-2:1996 + A1:2002 + A2:2007 (partially)

English version

**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

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This European Standard was approved by CENELEC on 2009-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**

## 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 (standards.iteh.ai)

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.