

SLOVENSKI STANDARD

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SIST EN 50090-2-3:2005

Splošne zahteve za stanovanjske in stavbne elektronske sisteme (HBES) in stavbne sisteme avtomatizacije in nadzora (BACS) - 4-1. del: Zahteve splošne funkcionalne varnosti za proizvode, ki so namenjeni za vgradnjo v HBES in BACS

General requirements for Home and Building Electronic Systems, HBES and Building Automation and Control Systems (BACS) - Part 4-1: General functional safety requirements for products intended to be integrated in Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)

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Allgemeine Anforderungen an die Elektrische Systemtechnik für Heim und Gebäude (ESHG) und an Systeme der Gebäudeautomation (GA) - Teil 4-1: Anforderungen an die funktionale Sicherheit für Produkte, die für den Einbau in ESHG / GA vorgesehen sind

Exigences générales relatives aux systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) et aux Systèmes de Gestion Technique du Bâtiment (SGTB) - Partie 4-1: Exigences générales de sécurité fonctionnelle pour les produits destinés à être intégrés dans les systèmes HBES/SGTB

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**General requirements for Home and Building Electronic Systems (HBES)
and Building Automation and Control Systems (BACS) -
Part 4-1: General functional safety requirements for products intended to
be integrated in Building Electronic Systems (HBES) and Building
Automation and Control Systems (BACS)**

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CENELEC

European Committee for Electrotechnical Standardization
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Foreword

This document (EN 50491-4-1:2012) has been prepared by CLC/TC 205, "Home and Building Electronic Systems (HBES)".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-02-20
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2015-02-20

This document supersedes EN 50090-2-3:2005.

EN 50491-4-1:2012 includes the following significant technical changes with respect to EN 50090-2-3:2005:

- 3 Definitions
- 5.6 Software and communication

EN 50491-4-1 is part of the EN 50491 series, which comprises the following parts under the generic title *General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)*:

- Part 1: General requirements
- Part 2: Environmental conditions [SIST EN 50491-4-1:2012](https://standards.iteh.ai/catalog/standards/sist/2debbd6b-e3df-434d-ad91-74aaffac6bc7/sist-en-50491-4-1-2012)
- Part 3: Electrical safety requirements
- Part 4-1: General functional safety requirements for products intended to be integrated in Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)
- Part 5-1: EMC requirements, conditions and test set-up
- Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry environment
- Part 5-3: EMC requirements for HBES/BACS used in industry environment
- Part 6-1: HBES installations — Installation and planning
- Part 6-3: HBES installations — Assessment and definition of levels [Technical Report]

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC)

Introduction

Homes buildings and similar environments require various electronic devices for several application. These devices when linked via a digital transmission network are called Home and Building Electronic System (HBES) or Building Automation and Control System (BACS).

Examples of HBES/BACS applications are the management, of lighting, heating, energy water, fire alarms, blinds, different forms of security, etc.

A HBES/BACS network may be based on different communication media as power line, twisted pair, coax cable, radio frequency or infrared and may be connected to external networks like telephone, broad band, television, power supply networks and alarm networks.

Several standards of this series serve to implement public interest matters, primarily as reflected in European Commission Directives.

HBES/BACS products integrated in a HBES/BACS should be safe for the use in intended applications.

This European Standard specifies the general functional safety requirements for HBES/BACS following the principles of the basic standard for functional safety EN 61508.

This European Standard identifies functional safety issues related to products and their installation. The requirements are based on a risk analysis in accordance with EN 61508.

The intention of this European Standard is to allocate, as far as possible, all safety requirements for HBES/BACS products in there life cycle.

This European Standard only addresses HBES/BACS products.

This European Standard is addressed to committees that develop or modify HBES /BACS product/system standards or, where no suitable HBES/BACS product standards addressing functional safety exist, to product manufacturers.

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HBES/BACS products in this European Standard are for non-safety related applications. Additional requirements for safety related HBES/BACS according to EN 61508 will be defined in part 4-2 of the EN 50491 series.

1 Scope

This European Standard sets the requirements for functional safety for HBES/BACS products and systems, a multi-application bus system where the functions are decentralised, distributed and linked through a common communication process. The requirements may also apply to the distributed functions of any equipment connected in a home or building control system if no specific functional safety standard exists for this equipment or system.

The functional safety requirements of this European Standard apply together with the relevant product standard for the device if any.

This European Standard is part of the EN 50491 series of standards.

This European Standard does not provide functional safety requirements for safety-related systems.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50491-2	<i>General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) — Part 2: Environmental conditions</i>
EN 50491-3	<i>General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) — Part 3: Electrical safety requirements</i>
EN 50491-5 (all parts)	<i>General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)</i>
EN 61508 (all parts)	<i>Functional safety of electrical/electronic/programmable electronic safety-related systems</i>
EN 61709:1998	<i>Electronic components — Reliability — Reference conditions for failure rates and stress models for conversion (IEC 61709:1996)</i>
EN ISO 9000	<i>Quality management systems — Fundamentals and vocabulary (ISO 9000)</i>

3 Terms and definitions

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

3.1 architecture

specific configuration of hardware and software elements in a system

[SOURCE: EN 61508-4:2010, definition 3.3.4]

3.2 authentication

means for certifying that the entity sending a message is what or who it purports to be and confirmation that the message is identical to that which was sent

3.3 authorisation

mechanism to ensure that the entity or person accessing information, functions or services has the authority to do so

3.4**disturbed communication**

communication in which for any reason a message being communicated is incomplete, truncated, contains errors or has the correct format but delivers information which is outside the range of expected parameters for such a message

3.5**functional safety**

freedom from unacceptable risk of harm due to the operation of an HBES/BACS, including that resulting from:

- 1) normal operation,
- 2) reasonably foreseeable misuse,
- 3) failure,
- 4) temporary disturbances

Note 1 to entry: functional safety: part of the overall safety relating to the EUC and the EUC control system that depends on the correct functioning of the E/E/PE safety-related systems and other risk reduction measures [SOURCE: EN 61508-4:2010, definition 3.1.12]

Note 2 to entry: Definition of IEC/TR 61000-2-1 and IEC/TS 61000-1-2 (IEC/TC 77) are taken into account.

3.6**Hamming distance**

numbers of bits in which two binary codes differ

3.7**harm**

physical injury or damage to the health of people either directly or indirectly as a result of damage to property or to the environment

Note 1 to entry: harm: physical injury or damage to the health of people or damage to property or the environment [SOURCE: EN 61508-4:2010, 3.1.1]

3.8**hazard**

potential source of harm

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[SOURCE: ISO/IEC Guide 51:1999, definition 3.5]

[SOURCE: EN 61508-4:2010, definition 3.1.2]

Note 1 to entry: The term includes danger to persons arising within a short time scale (for example, fire and explosion) and also those that have a long-term effect on a person's health (for example, release of a toxic substance).

3.9**hazardous event**

situation which results in harm on normal operation or abnormal condition

Note 1 to entry: Whether or not a hazardous event results in harm depends on whether people, property or the environment are exposed to the consequence of the hazardous event and, in the case of harm to people, whether any such exposed people can escape the consequences of the event after it has occurred.

Note 2 to entry: Adapted from EN 61508-4:2010, definition 3.1.4.

3.10**HBES/BACS Home and Building Electronic Systems**

multi-application bus system where the functions are decentrally distributed and linked through a common communication process

Note 1 to entry: HBES is used in homes and buildings plus their surroundings. Functions of the system are e.g: switching, open loop controlling, closed loop controlling, monitoring and supervising.

3.11**HBES/BACS product**

product consisting of devices in the form of hardware, firmware, their associated software and configuration tools, intended to be used in an HBES/BACS

3.12**product**

device in the form of hardware, firmware, their associated software and configuration tools

3.13**product documentation**

manufacturer's installation and operations literature as manufacturer's catalogue, leaflet and other printed or electronic product information

3.14**safety related system**

designated system that both

- implements the required safety functions necessary to achieve or maintain a safe state for the EUC, and
- is intended to achieve, on its own or with other E/E/PE safety-related systems and other technology risk reduction measures, the necessary safety integrity for the required safety functions

Note 1 to entry: The term refers to those systems, designated as safety-related systems, that are intended to achieve, together with the other risk reduction measures, the necessary risk reduction in order to meet the required tolerable risk.

Note 2 to entry: Safety-related systems are designed to prevent the EUC from going into a dangerous state by taking appropriate action on detection of a condition which may lead to a hazardous event. The failure of a safety-related system would be included in the events leading to the determined hazard or hazards. Although there may be other systems having safety functions, it is the safety-related systems that have been designated to achieve, in their own right, the required tolerable risk. Safety-related systems can broadly be divided into safety-related control systems and safety-related protection systems.

Note 3 to entry: Safety-related systems may be an integral part of the EUC control system or may interface with the EUC by sensors and/or actuators. That is, the required safety integrity level may be achieved by implementing the safety functions in the EUC control system (and possibly by additional separate and independent systems as well) or the safety functions may be implemented by separate and independent systems dedicated to safety.

Note 4 to entry: A safety-related system may:

- a) be designed to prevent the hazardous event (i.e. if the safety-related systems perform their safety functions then no harmful event arises);
- b) be designed to mitigate the effects of the harmful event, thereby reducing the risk by reducing the consequences;
- c) be designed to achieve a combination of a) and b).

Note 5 to entry: A person can be part of a safety-related system. For example, a person could receive information from a programmable electronic device and perform a safety action based on this information, or perform a safety action through a programmable electronic device.

Note 6 to entry: A safety-related system includes all the hardware, software and supporting services (for example, power supplies) necessary to carry out the specified safety function (sensors, other input devices, final elements (actuators) and other output devices are therefore included in the safety-related system).

Note 7 to entry: A safety-related system may be based on a wide range of technologies including electrical, electronic, programmable electronic, hydraulic and pneumatic.

3.15**risk**

combination of the probability of occurrence of a harm and the severity of that harm

Note 1 to entry: For more discussion on this concept see Annex A of EN 61508-5:2010.

[SOURCE: EN 61508-4:2010, definition 3.1.6]

3.16**reasonably foreseeable misuse**

use of a product, process or service in a way not intended by the supplier, but which may result from readily predictable human behaviour

[SOURCE: EN 61508-4:2010, definition 3.1.14, ISO/IEC Guide 51:1999, definition 3.14]

3.17**safety function**

function to be implemented by an E/E/PE safety-related system or other risk reduction measures, that is intended to achieve or maintain a safe state for the EUC, in respect of a specific hazardous event

EXAMPLE Examples of safety functions include:

- functions that are required to be carried out as positive actions to avoid hazardous situations (for example switching off a motor); and
- functions that prevent actions being taken (for example preventing a motor starting).

[SOURCE: EN 61508-4:2010, definition 3.5.1]

3.18

EUC

Equipment Under Control

[SOURCE: EN 61508-4:2010, Table 1]

4 General requirements

4.1 General

Functional safety of a system relies upon both the performance of the network, and upon the performance of the connected HBES /BACS products:

- 1) failure of either the network or any other part of HBES /BACS system shall not cause the system, the products, or the controlled equipment to become unsafe;
- 2) whilst in operation, individual HBES /BACS products shall not rely solely upon the system for their safe operation;
- 3) while in operation, the systems interaction of any product(s) with any other product(s) shall not result in unsafe operation of the system.

4.2 Method of establishment for the requirements

4.2.1 General

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For specification of the functional safety requirements the life-cycle used in EN 61508 was followed:

- 1) concept phase of products;
- 2) application environment;
- 3) identification of hazards and hazard events;
- 4) hazard and risk analysis, risk reduction measures;
- 5) realisation of risk reduction measures;
- 6) validation;
- 7) maintenance;
- 8) installation and commissioning;
- 9) decommissioning.

The Product Technical Committees and/or developers shall take the requirements of this European Standard into account in the product safety requirements, but it is not necessary to go into the EN 61508 process itself.

4.2.2 HBES/BACS application environment

The HBES/BACS application environment is taken into account.

4.2.3 Sources of hazards

The following sources of hazards have been considered:

- 1) material and construction;
- 2) reliability;
- 3) normal operation;
- 4) unintentional interaction with other products;
- 5) interaction with other HBES/BACS products;
- 6) abnormal conditions;
- 7) foreseeable misuse, including the download of unauthorised and malicious code;

NOTE This includes unintentional software modifications.

- 8) life time;
- 9) environment.

4.2.4 Hazardous events

The following hazardous events have been taken into account for the analysis (the bus and mains (230 V/400 V) have been considered):

- 1) power failure;
- 2) short circuit of bus line;
- 3) overvoltage on the bus line;
- 4) overvoltage on the mains;
- 5) insulation damage (temperature, surge, mechanical);
- 6) wrong connection;
- 7) over temperature;
- 8) fire;
- 9) mechanical shock, vibration;
- 10) corrosion;
- 11) electromagnetic disturbance;
- 12) disturbed communication;
- 13) pollution;
- 14) end of life time of a component/products;
- 15) reasonably foreseeable misuse;
- 16) software failure;
- 17) overload;
- 18) loss of reliability;
- 19) breakdown of material (mechanically);
- 20) inappropriate design/construction;
- 21) switching of damaged equipment and subsystems;
- 22) remote control;
- 23) command from two sources to one product (e.g. actuator);
- 24) system failures.

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