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Splošne zahteve za stanovanjske in stavbne elektronske sisteme (HBES) in stavbne sisteme avtomatizacije in nadzora (BACS) - 4-1. del: Sistemski pregled - 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)

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

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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 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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This draft European Standard is submitted to CENELEC members for CENELEC enquiry.
Deadline for CENELEC: 2011-07-22.

It has been drawn up by CLC/TC 205.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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CENELEC

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

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1 Foreword

2 This draft European Standard has been prepared by the Technical Committee CENELEC TC 205, Home and
3 Building Electronic Systems (HBES). It is submitted to the CENELEC enquiry.

4 This document will supersede EN 50090-2-3:2005.

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

8 - Part 1: general requirements and overview

9 - Part 2: Environmental conditions

10 - Part 3: Electrical Safety requirements

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

13 - Part 5-1: EMC requirements, conditions and test set-up

14 - Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry
15 environment

16 - Part 5-3: EMC requirements for HBES/BACS used in industry environment

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44 Introduction

45 Homes buildings and similar environments require various electronic devices for several application. These
46 devices when linked via a digital transmission network are called Home and Building Electronic System,
47 (HBES) or Building automation controll system (BACS).

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

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

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

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

56 This European Standard specifies the general functional safety requirements for HBES /BACS following the
57 principles of the basic standard for functional safety EN 61508 and Technical Report R205-012 in particular.

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

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

62 This European Standard only addresses HBES /BACS /BACS products.

63 This European Standard is addressed to committees that develops or modify HBES /BACS product/system
64 standards or, where not suitable HBES /BACS product standards addressing functional safety exist, to
65 product manufacturer.

66 HBES /BACS products in this European Standard are for non-safety related applications. Additional
67 requirements for safety related HBES /BACS will be described, according to EN 61508, in Part 4-1 of the
68 EN 50491 series (under consideration).

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69 1 Scope

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

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

77 This European Standard is used as a product family standard. It is not intended to be used as a stand-alone
78 standard.

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

80 2 Normative references

81 The following referenced documents are indispensable for the application of this document. For dated
82 references, only the edition cited applies. For undated references, the latest edition of the referenced
83 document (including any amendments) applies.

| | | |
|----|--------------------|---|
| 84 | EN 50491-3 | General requirements for Home and Building Electronic Systems (HBES) and |
| 85 | | Building Automation and Control Systems (BACS) - Part 3: Electrical safety |
| 86 | | requirements |
| 87 | EN 61508-4:2001 | Functional safety of electrical/electronic/programmable electronic safety-related |
| 88 | | systems – Part 4: Definitions and abbreviations |
| 89 | | (IEC 61508-4:1998 + corrigendum 1999) |
| 90 | EN 61508-5:2001 | Functional safety of electrical/electronic/programmable electronic safety-related |
| 91 | | systems – Part 5: Examples of methods for the determination of safety integrity |
| 92 | | levels (IEC 61508-5:1998 + corrigendum 1999) |
| 93 | EN 61709:1998 | Electronic components - Reliability - Reference conditions for failure rates and stress |
| 94 | | models for conversion (IEC 61709:1996) |
| 95 | CEN/CLC Guide 9 | Guidelines for the inclusion of safety aspects in standards (ISO/IEC Guide 51) |
| 96 | EN ISO 9000 series | Quality management systems (9000 series) |

97 3 Definitions

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

99 3.1

100 architecture

101 specific configuration of hardware and software elements in a system

102 [EN 61508-4:2001, definition 3.3.5]

103 3.2

104 authentication

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

107 3.3

108 authorisation

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

111 **3.4**112 **disturbed communication**

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

116 **3.5**117 **functional safety**

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

- 120 1) normal operation,
- 121 2) reasonably foreseeable misuse,
- 122 3) failure,
- 123 4) temporary disturbances

124 NOTE 1 Definition of EN 61508-4:2001, 3.1.9: part of the overall safety relating to the EUC (Equipment Under Control) and the EUC
 125 control system which depends on the correct functioning of the Electrical/Electronic/Programmable Electronic (E/E/PE) safety related
 126 systems, other technology safety related systems and external risk reduction facilities.

127 NOTE 2 Definition of IEC TR 61000-2-1 and IEC TS 61000-1-2 (IEC/TC 77) are taken into account.

128 **3.6**129 **Hamming distance**

130 numbers of bits in which two binary codes differ

131 **3.7**132 **harm**

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

135 [EN 61508-4:2001, definition 3.1.1]

136 **3.8**137 **hazard**

138 a potential source of harm

139 [CEN/CLC Guide 9, respectively ISO/IEC Guide 51:1990]

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

142 [EN 61508-4:2001, definition 3.1.2]

143 **3.9**144 **hazardous event**

145 situation which results in harm on normal operation or abnormal condition

146 NOTE Definition of EN 61508-4:2001, 3.1.3 and 3.1.4: circumstance in which a person is exposed to hazard(s) which results in harm

147 **3.10**148 **HBES /BACS Home and Building Electronic Systems**

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

151 NOTE HBES is used in homes and buildings plus their surroundings. Functions of the system are e.g: switching, open loop controlling,
 152 closed loop controlling, monitoring and supervising.

153 **3.11**154 **HBES /BACS product**

155 products consist of devices in the form of hardware, firmware, their associated software and configuration
 156 tools, intended to be used in an HBES /BACS

157 **3.12**158 **product**

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

160 **3.13**161 **product documentation**

162 – the manufacturer's installation and operations literature

163 – as manufacturer's catalogue, leaflet and other printed or electronic product information

164

165 **3.14**166 **safety related system**

167 designated system that both

168 – implements the required safety functions necessary to achieve or maintain a safe state for the EUC, and

169 – is intended to achieve on its own or with other E/E/PE safety related systems, other technology safety-related systems or external risk reduction facilities, the necessary safety integrity for the required safety functions.

172 NOTE 1 The term refers to those systems, designated as safety-related systems, that are intended to achieve, together with the external risk reduction facilities (see EN 61508-4:2001, definition 3.4.3), the necessary risk reduction in order to meet the required tolerable risk (see EN 61508-4:2001, definition 3.1.6). See also Annex A of EN 61508-5:2001.

175 NOTE 2 The safety-related systems are designed to prevent the EUC from going into a dangerous state by taking appropriate action on receipt of commands. 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, and have two modes of operation (EN 61508-4:2001, definition 3.5.12).

180 NOTE 3 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.

184 NOTE 4 A safety-related system may

185 a) be designed to prevent the hazardous event (i.e. if the safety-related systems perform their safety functions then no hazardous event arises),

187 b) be designed to mitigate the effects of the hazardous event, thereby reducing the risk by reducing the consequences,

188 c) be designed to achieve a combination of a) and b).

189 NOTE 5 A person can be part of a safety-related system (EN 61508-4:2001, definition 3.3.1). 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.

192 NOTE 6 The term 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).

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

197 [EN 61508-4:2001, definition 3.4.1]

198 **3.15**199 **risk**

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

201 [CEN/CLC Guide 9, respectively ISO/IEC Guide 51:1990, modified]

202 [EN 61508-4:2001, definition 3.1.5]

203 NOTE For risk classes see Annex A.

204 **3.16**205 **reasonably foreseeable misuse**

206 the use of a product, process or service under conditions or for purposes not intended by the supplier, but which may happen, induced by the product, process or service in combination with, or as result of, common human behaviour

209 [EN 61508-4:2001, definition 3.1.11]

3.17**safety function**

function to be implemented by an E/E/PE safety related system, other technology safety-related systems or external risk reduction facilities, which is intended to achieve and maintain a safe state for the EUC, in respect of a specific hazardous event (see EN 61508-4:2001, definition 3.4.1)

[EN 61508-4:2001, definition 3.5.1]

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

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.

4.2.1 HBES application environment

The HBES /BACS application environment is taken into account.