



SLOVENSKI STANDARD
SIST-TP CLC/TR 50090-9-2:2008
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**Stanovanjski in stavbni elektronski sistemi (HBES) - 9-2. del: Inštalacijske zahteve
- Pregledovanje in preskušanje inštalacij HBES**

Home and Building Electronic Systems (HBES) - Part 9-2: Installation requirements -
Inspection and testing of HBES installation

Elektrische Systemtechnik für Heim und Gebäude (ESHG) - Teil 9-2:
Installationsanforderungen - Prüfung der ESHG-Installation

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ICS:

97.120 Avtomatske krmilne naprave Automatic controls for
za dom household use

SIST-TP CLC/TR 50090-9-2:2008 en

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English version

**Home and Building Electronic Systems (HBES) -
Part 9-2: Installation requirements -
Inspection and testing of HBES installation**

This Technical Report was approved by CENELEC on 2007-04-27.

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CENELEC

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

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Foreword

This Technical Report was prepared by the Technical Committee CENELEC TC 205, Home and Building Electronic Systems (HBES).

The text of the draft was circulated for vote as prTS in accordance with the Internal Regulations, Part 2, Subclause 11.4.3.3 and was approved by CENELEC as CLC/TR 50090-9-2 on 2007-04-27.

The 50090 series comprises the following parts:

- Part 1: Standardization structure
- Part 2: System overview
- Part 3: Aspects of application
- Part 4: Media independent layers
- Part 5: Media and media dependent layers
- Part 6: Interfaces
- Part 7: System management
- Part 8: Conformity assessment of products
- Part 9: Installation requirements

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Introduction

This Technical Specification defines the mandatory and optional requirements for inspecting, testing and commissioning Home and Building Electronic System (HBES). It has been developed in order to help ensure that the client or system owner has confidence that the HBES has been designed and installed

- in a competent manner, meeting with the manufacturers' installation instructions, relative standards and statutory requirements;
- with the intention of providing both reliability and resilience.

Although these requirements are normative, they are intended to be applied in a competent manner and can be readily adapted to the complexity of the HBES installation.

These requirements are provided for inspecting and testing of both professionally installed system and systems that have not been installed by professional operatives.

The aim of this document is also to ensure that the installation of the HBES will not affect the integrity of HBES products and that the client's perception of such systems is not diminished. It can also be used as a basis for a contractual agreement for completion of an installation and placing it into service.

1 Scope

This document provides the specific requirements for inspectors and commissioning engineers (as defined in the document), on checking and approving HBES installations in order to ensure its quality and safe operation.

The requirements apply to the HBES itself and its relations and interfaces with other systems and functions of buildings both inside and outside.

Although this document contains recommendations for testing HBES and their interfaces, it is not intended to cover the mechanical aspects of the installation such as pressure testing pneumatic or hydraulic lines and systems, or checking for compliance with the pressure vessel directive, etc. These aspects are covered in other standards. Likewise, when the HBES interfaces with machinery or boilers, etc., such equipment should be tested in accordance with the relevant standard and manufacturer's instructions.

These requirements are intended to assist in the inspection, testing and commissioning of HBES systems.

They are also intended as an aide to integration with the regulations for any other system that the HBES may need to interface with.

These requirements are intended for applications in any building, or part of a building, for which the designer considers the HBES suitable. They may also apply to any addition or modification to a HBES within a building, which will affect the overall integrity of the HBES and give guidance that ongoing inspection and maintenance will be necessary to ensure the continued safe and efficient operation of an installed HBES.

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 50110 | Operation of electrical installations |
| EN 50173 | Information technology - Generic cabling systems |
| EN 50346 | Information technology - Cabling installation - Testing of installed cabling |
| HD 384/HD 60364 series | Electrical installations of buildings (IEC 60364 series, modified) |
| EN 61010 | Safety requirements for electrical equipment for measurement, control and laboratory use (IEC 61010) |

3 Definitions

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

3.1

active

electrical energy present on the HBES or its interfaces

3.2

client or system designer

person who is either the end user of a HBES or an agent acting on behalf of an end user and who is fully conversant with the end user's requirements

3.3

commissioning

placing a HBES into service and ensuring that it meets the client or system designer's requirements as detailed in the relevant specifications. Ensuring that both the HBES and its interfaces are adjusted to operate to their optimum performance. Ensuring that all on-line tests are completed

3.4

commissioning engineer

as for inspector, but with additional experience in commissioning HBES and plant

3.5

handover documentation

documentation in support of the HBES having been inspected, tested, and verified by a competent person

3.6

hardware

all the electrical and electronic equipment, together with the physical media (cable connector, taps, etc.) associated with HBES

3.7

inspection

checking a HBES installation in order to ensure that the components of the HBES and the HBES itself have all been installed in a safe, good workmanship manner and comply with local, national and other requirements and specifications applicable to the project (see also 5.3)

3.8

inspector

competent person who is capable of inspecting all aspects of HBES in accordance with this document, together with the ability to verify that it meets the client's requirements and relevant standards. This person can be the same installer who has installed the HBES installation. In some countries there may exist national regulations, which specify the definition of an inspector

3.9

interconnection

both physical and/or wireless connection of equipment

3.10

passive

no electrical energy present on the HBES

3.11

pre-commissioning

checking that all system inputs, outputs, alarms, communicators and sequences are wired correctly and produce the expected actions. Also checking sequences, set points, cause and effects and other software parameters are correct

3.12**resilience**

ability of a system to recover after a fault has occurred

3.13**safety system**

system that contains control elements allied to ensuring no hazard or danger exists during normal operation of the system or when an abnormal occurrence takes place within the system

3.14**software**

the programme(s) needed for the correct operation of any given HBES or other programmable electronic device

3.15**testing**

checking the installed cables (and sometimes the installed connectors) to ensure that they have not been damaged by the installation process by means of specialist test equipment

4 General requirements**4.1 Competency of inspectors and commissioning engineers**

Only competent companies or individuals shall be used for this work. This may or may not be the installer of the HBES.

A competent individual or company is one who has experience of the HBES being inspected/tested/commissioned, or has sufficient knowledge and expertise to enable themselves to make a professional judgement and familiarise themselves with any system before carrying out any work upon it. Relevant sections of EN 50110 may be used as the guide in this matter. There may be some variance on this depending upon national or local requirements.

<https://standards.itih.ai/catalog/standards/sist/03ca8ad8-0ee3-4c1a-930f-632bd9e4d3/sist-tr-50090-9-2-2007>

4.2 Use of standard based products and non-standard based products

If the HBES is not covered by a standard, the inspector and/or commissioning engineer shall gain knowledge of the product to ensure that no hazard or non-compliance with relevant regulations exists. If necessary, liaison shall be sought with the HBES designer and/or the manufacturer of the equipment to ensure that the intended safe operation and functionality is correct.

4.3 Reports

The provision of a report shall form an integral part of any inspection, testing and commissioning procedure. This shall include all documents required for the testing and certification of the installation.

4.4 Alternative cabling solutions

The inspector shall ensure that any cabling solution that has been chosen is compliant with the relevant parts of EN 50090 or any other standard to which it has been designed.

5 Purpose of inspection**5.1 General**

The purpose of inspection is to ensure that the HBES is electrically and functionally safe and also to ensure that it meets the client's or designer's performance requirements and complies with all of the relevant codes and statutory requirements.

This section deals with the initial inspection upon installation or installation stage completion and with the subsequent periodic inspection of the HBES to ensure its continued safe and satisfactory operation.

Because this document covers both home and large building HBES, many of the aspects required for inspection and testing large systems will not be relevant or applicable to home systems.

Where an addition or modification is carried out on the HBES, the effect of the addition or modification on the existing HBES needs to be assessed and a decision made as to the extent of the inspection of the new and existing installation.

The client shall provide all of the information necessary to inspect and test the HBES within the building. The inspector shall ensure he has sufficient information from the client before he proceeds. This shall include the designer's specification, manufacturer's instructions and data sheets, system schematics, a list of standards that are applicable to the HBES, and a list of the main functions, input/output/address list of the HBES with the worst case scenario and risk analysis of what has to be tested.

The inspector shall ensure that all the EMC requirements for the installation have been met.

5.2 Initial inspection

This is the first inspection carried out upon completion of the HBES. On small installations it will almost certainly be done at the end of the installation. However, on larger installations, it is more likely to be done in stages.

The inspector shall verify that the HBES meets the client's specification, the HBES is installed correctly, and also ensure the intended operation of HBES is both safe and operates as intended by the client or system designer.

5.3 Periodic inspection

The purpose of periodic inspection is to ensure so far as is reasonably practicable, that the installation is operating safely, efficiently and continues to meet the client's requirements.

Periodic inspection is necessary because all installations deteriorate due to a number of factors such as wear, tear, damage, corrosion, excessive loading, ageing and environmental influences.

The method by which it is done will depend upon a number of factors including manufacturers' recommendations, statutory regulations, best practice, size and type of installation.

For larger installations under effective supervision in normal use, periodic inspection may be replaced by an adequate schedule of continuous monitoring and maintenance of the installation and its constituent equipment by skilled persons. A record must be kept of all inspections and tests carried out on the HBES installation.

When an installation is maintained under a planned preventative maintenance programme and supervised by a qualified engineer with results being recorded over a long period of time, then a formal periodic inspection may not be required. The results may be recorded on paper or computer and clearly detail what maintenance has been done and by whom. The results of any tests should also be recorded and available for scrutiny if required.

5.4 Path to inspecting a HBES

The inspection of the HBES shall follow the event path listed below:

1. Before commencing, the inspector shall obtain from the client/system designer the following contract documentation:
 - the client's or system designer's specification;
 - the hardware schedule and the installation specification;
 - the operational specification for the system;
 - the input/output/address schedule for the HBES control unit;
 - the cause and effect diagram;
 - layout drawings;
 - cable and connection schedules;
 - annunciator and alarm schedule.

In the case of a domestic installation, this may simply consist of a letter confirming the order and specifying a particular system and which options are required.

2. Where the HBES allows, the inspector shall then verify that the HBES meets with the client's specification.

All documents relating to the HBES shall have a unique reference number allocated to each of them.

The inspector shall verify that the HBES within and/or outwith the building meets with the following requirements:

- the HBES meets with the client's specification;
- the HBES has been installed in accordance with relevant drawings, codes of practice and statutory requirements;
- the HBES covers statutory safety aspects and complies with CLC/TR 50090-9-2 "Home and Building Electronic Systems (HBES) - Part 9-2: Installation requirements - Inspection and testing of HBES installation";
- the HBES is adequately protected against any detrimental influences that might exist.

It is important to note that a major difference between home and building inspections is the extent to which an exhaustive inspection of schedules, plans and documents is required. Therefore, the items listed in Annex C may either be minimal in content or not be applied at all to a small domestic HBES.

5.5 Visual inspection

The following visual checks shall be made on the HBES:

- (a) the adequacy of the power supply and interconnecting cables for a given application is in accordance with the installation specification;
- (b) the correct cables and glands have been satisfactorily installed;
- (c) compliance with relevant standards and statutory requirements for the installation;
- (d) the adequacy of cable supports, separation and cabling integrity;
- (e) the suitability of equipment for its location;
- (f) ensure both the cabling and equipment are readily identifiable in accordance with the associated system drawings and schedules;
- (g) check number, type, location, and hardware configuration of devices;
- (h) verify that the HBES has been installed in such a way so as not to compromise the system manufacturer's reliability figures (e.g. failure rates) or the client's reliability requirements (e.g. lifetime figure).

6 Testing and commissioning

6.1 General

Prior to any testing or commissioning taking place a commissioning plan must be produced. Normally this shall be done by the client or system designer and included with the contract documents, but, in small systems it may all be all done by the one person. The complexity of the plan will again depend upon the size and sophistication of the HBES and it will clearly state the duties of each person involved in the process, the method of test reporting and the order of checks and phasing of the commissioning. In addition to the aforementioned requirements the commissioning plan shall state what arrangements shall be made to test and/or commission parts of the system which have natural obstacles to their commissioning such as the heating system in the height of summer, etc.

The Inspector shall ensure that the electrical installation or the parts of the electrical installation, which comprise part of the HBES, has been inspected and tested prior to the inspection of the HBES.

Before the commissioning phase can begin, the commissioning engineer must ensure that it is safe to do so and that all necessary non HBES elements are in place, i.e. where appropriate fire doors, walls, fire fighting apparatus, clear emergency escape routes, emergency lighting, fire alarms, etc. This will also include clear unimpeded access to all areas and all associated permits drawn and issued where necessary. For home systems only a small part of the clause applies.

Testing shall take place upon completion of visual inspection and is designed to ensure that the installed cabling, components and equipment are in satisfactory condition and are safe to use once the system is commissioned. On larger systems the testing will usually be done in sections rather than as a composite stage. Hence, testing will need to be applied in a manner that takes into consideration both the HBES size and complexity. The inspector or inspectors on a larger project shall assess the requirements for each HBES accordingly.

Once testing is completed and any critical faults are fixed, the inspector (or inspectors) shall sign the test sheets confirming their satisfaction with the installation to proceed to the commissioning phase.

6.2 Passive testing and inspecting

Passive testing and inspecting of the HBES is done prior to applying electrical energy to the system and is only done after completion of a satisfactory visual inspection in accordance with Clause 6 of this document.

6.2.1 Guidelines for testing HBES cables

Due to the variety of cables permitted in the EN 50090, this section is included for guidance for the person or persons undertaking cable testing. Where a HBES or part of the HBES has been installed to a particular standard then the cable test method specified by that standard should be utilised i.e. HD 384/HD 60364 or for an EN 50173 based system EN 50346 shall be applied, etc.

This standard recognises that at this time there are many HBES and HBES system cables, which fall out with any particular standard and gives the current best practice which should be used when manufacturers recommendations for cable testing are not available. It also gives some advice for wireless connections i.e. radio and I.R.

| | | |
|--|---|--|
| Power cables | - | <p>https://standards.iteh.ai/catalog/standards/sist/03ca8ad8-0ee3-4c1a-930f-f2ab4aee6dc3/sist-tr-clc-tr-50090-9-2-2008</p> <p>Installation test.</p> <p>Continuity test of conductors, screens and armour.</p> <p>Short circuit test between conductors, screens and armour.</p> |
| Bus cables | - | <p>Continuity test of conductors and screens.</p> <p>Short circuit test between conductors and screen.</p> <p>Performance test as defined by system/cable manufacturer.</p> |
| Twisted pair/ Multiple twisted pair | - | <p>Continuity test of conductors and screens.</p> <p>Short circuit test between conductors and screen.</p> <p>Performance test and other tests as defined by the system/cable manufacturer or by solution type employed i.e. for a system employing an EN 50173 type solution should have their cables test in accordance with EN 50346, etc.</p> |
| Co-axial cables | - | <p>Continuity test of conductor and screen.</p> <p>Short circuit test between conductor and screen.</p> |
| Radio system | - | <p>Check for sources of possible interference and if a radio frequency interference survey has been done (usually only if requested by client).</p> |
| I.R. | - | <p>Check for sources of possible interference and if an I.R. interference survey has been done (usually only if requested by client).</p> |