IEC 63044-6

Edition 1.0 2021-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

**Home and building electronic systems (HBES) and building automation and control systems (BACS) –
Part 6: Requirements for planning and installation**

**Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) et systèmes de gestion technique du bâtiment (SGTB) –
Partie 6: Exigences de planification et d’installation**

IEC 63044-6:2021-06(en-fr)

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Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) et systèmes de gestion technique du bâtiment (SCTB) – Partie 6: Exigences de planification et d'installation

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 29.120.01; 29.120.99

ISBN 978-2-8322-9899-2

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 6: Requirements for planning and installation

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FDIS	Report on voting
23/972/FDIS	23/974/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 63044 series, published under the general title *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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INTRODUCTION

A HBES/BACS network is part of the home/building network, which includes cabling for information and communication technology (ICT) and broadcast communication technology (BCT) applications. ISO/IEC 14763-2 is the specific standard for ICT and BCT cabling installation and planning.

This document covers installation and planning requirements specific to a HBES/BACS network in addition to safety requirements for electrical installations included in the IEC 60364 series.

Installation and planning specific requirements include:

– infrastructures for cabling,

– coexistence with electric wiring,

– hints for sensors.

Wireless systems are also considered. Planning the cabled backbone for wireless systems is less complex compared to a full cabled network pathway, power supply cabling. Additional provisions are provided to guarantee coverage and reliability.

HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 6: Requirements for planning and installation

1 Scope

This document specifies the requirements for planning and installation of HBES/BACS and the supporting infrastructure.

Radio frequency (RF) HBES/BACS are also considered.

Safety requirements are covered by IEC 60364 (all parts).

Information and communication technology (ICT) and broadcasting and communication technology (BCT) network installations are typically interfaced with HBES/BACS.

The requirements for ICT and BCT network installations are covered by ISO/IEC 14763-2.

This document does not cover HBES/BACS implementation with:

– optical fibre,
– power lines,
– power over Ethernet (PoE).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-44, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60364-5-54, *Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors*

IEC 63044-1, *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 1: General requirements*

IEC 63044-3, *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 3: Electrical safety requirements*

IEC 63044-4, *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 4: General functional safety requirements for products intended to be integrated in HBES and BACS*

IEC 63044-5 (all parts), *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 5: EMC requirements*

IEC 61386-24, *Conduit systems for cable management – Part 24: Particular requirements – Conduit systems buried underground*

ISO/IEC 11801-1, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

ISO/IEC 14763-2, *Information technology – Implementation and operation of customer premises cabling – Part 2: Planning and installation*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63044-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
BCT cabling
broadcast and communication technologies cabling
cabling system designed to support applications using the HF band (3 MHz to 30 MHz), the VHF band (30 MHz to 300 MHz) and the UHF band (300 MHz to 3 000 MHz) for transmission of sound radio, TV and two-way data services, as well as for in-home inter-networking, as defined in ISO/IEC 11801-1

3.1.2
HBES/BACS application
single automated action performed by HBES/BACS (see definition 3.1.4)

Note 1 to entry: Applications are normally integrated to perform higher-level actions.

3.1.3
home/building network
network for digital and analogue information transport for a home or a building, providing defined access points and using one or more media in any topology

3.1.4
ICT cabling
information and communication technologies cabling
cabling system designed to support applications using information and communication technologies, as defined in ISO/IEC 11801-1

3.1.5
wired HBES/BACS
HBES/BACS with wired power and signals

3.1.6
RF HBES/BACS
HBES/BACS whose signals are exchanged by radio frequency; power can be wired or not (e.g. battery)

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

AV Audiovisual
BCT Broadcast and communication technologies
BO Broadcasting outlet
CO Control outlet
HD Home distributor
HF High frequency
HVAC Heating, ventilation, and air conditioning
ICT Information and communication technologies
IT Information technology
MATO Multi-application telecommunication outlet
RF Radio frequency
SHD Secondary home distributor
TO Telecommunications outlet
UHF Ultra high frequency
VHF Very high frequency

4 Home/building networks

The home/building networks:

– ensure the distribution of services, such as:
  - communication,
  - HBES/BACS;
– need components such as conduits, boxes, etc. as physical infrastructures for the system.

The implementation of the home/building network goes through the following steps:

– design,
– planning of physical infrastructure,
– installation.

The planning of a common physical infrastructure for HBES/BACS, ICT, and BCT and the supporting power distribution network is advantageous for the following reasons:

– cost optimization through common works,
– optimization of the pathways,
– planning of common installation spaces for interfacing units,
– simplify the planning of spaces for future updates.

Specific requirements for the planning and the installation of a communication services generic cabling infrastructure are given in ISO/IEC 14763-2. Requirements for the HBES/BACS physical infrastructure are given in this document.

HBES/BACS networks can be wired, wireless or a combination of both and require a supporting physical infrastructure. For example, wireless HBES/BACS are composed of the housing of the device, the supporting power network, the positioning of interfacing modules, etc.

5 Home/building network model and general requirements

The design of the home/building network shall consider:

– characteristics of the premises, including surface, type of home/building, physical characteristics;

– required services:

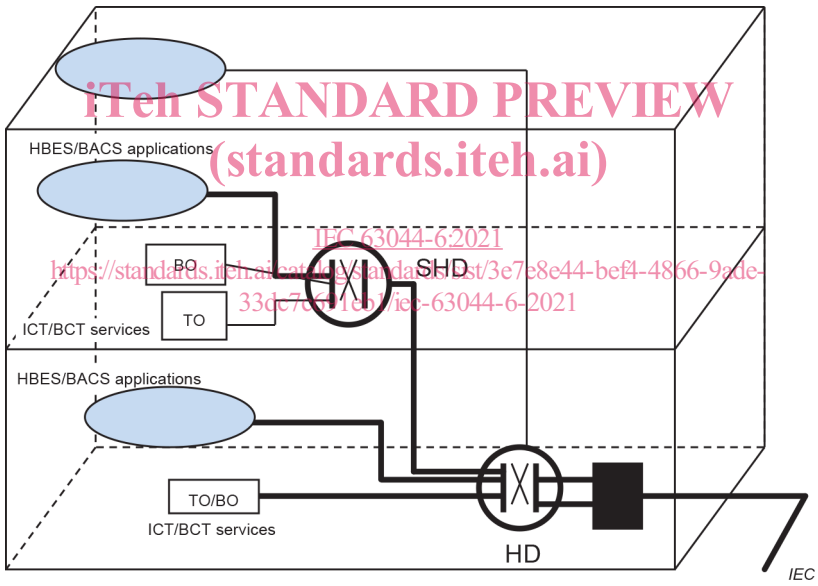
  • communication,

  • HBES/BACS (see IEC 63044-1 for the complete list of HBES services);

– possible restrictions, in the case of existing buildings (see Annex A).

Figure 1 shows that a star topology is commonly used for ICT and BCT cabling subsystems (according to ISO/IEC 11801-1). The home distributor (HD) is the unit for service delivery to outlets (TO: telecommunication outlets; BO: broadcast outlet). A secondary home distributor (SHD) may be necessary in the case of complex premises (e.g. a home on two floors).

HBES/BACS networks may have different topologies: wired (e.g. bus, tree, loop, star and/or combinations thereof), wireless or mixed wired/wireless. However, HD and SHD spaces may be conveniently shared with ICT and BCT networks.



HD: Home distributor

SHD: Secondary home distributor

TO: Telecommunication outlet

BO: Broadcast outlet

Figure 1 – General topology of home/building network showing ICT, BCT, HBES/BACS networks

Home/building applications may be distributed over the ICT network, and communication services may have interfaces with HBES/BACS.

HBES/BACS networks may have outdoor parts.

NOTE Outdoor locations are for example front doors, garages, garden lighting.

Improvements and additions to the HBES/BACS may however occur during the building life (e.g. change/addition of devices). Flexibility is therefore required for the home/building network layout.

Wireless networks often need some wiring and spaces for housing devices which need infrastructure planning as well. See Clause 6 for infrastructure planning either for wired or wireless networks.

Some installation guidelines for typical HBES/BACS applications are reported in Annex B depending on the applications and clusters of services for HBES/BACS provided in Annex E.

6 Infrastructure requirements

6.1 Infrastructure requirements for wired HBES/BACS

6.1.1 Installation spaces for wired HBES/BACS

According to the home/building network model of Clause 5, a physical infrastructure shall be planned to allow the installation of cables and housing of the equipment.

Since the HBES/BACS may be extended to the whole building and to the outdoor grounds, corresponding installation spaces shall be foreseen.

Six levels of installation spaces are identified, labelled IS1 to IS6 and selected according to the design specification.

NOTE The selection of installation spaces depends on the complexity of the installation. For example, in a single home installation only IS2, IS4, IS5 and IS6 are usually needed.

Installation spaces IS1 to IS6 are intended for fixing cabinets, enclosures and/or boxes, for example according to IEC 60670-1 and containing active and/or passive devices as well as connecting hardware.

Each installation space shall:

– contain boxes with an appropriate fixture for fixing the devices;

– allow mounting of active and passive (modular) devices, with any insulation and separation that may be required;

– facilitate access for maintenance;

– allow foreseeable extensions of the network.

Figure 2 summarises the installation spaces IS1 to IS6.

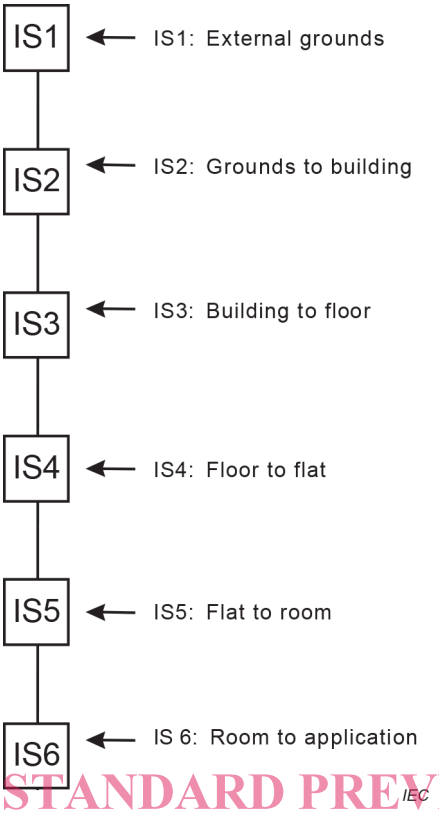


Figure 2 – Installation spaces

In 6.1.2, coexistence requirements between HBES/BACS cables and mains are specified.

If such requirements are met, the space for cable ways can be reduced accordingly.

An example of a building infrastructure is shown in Figure 3.

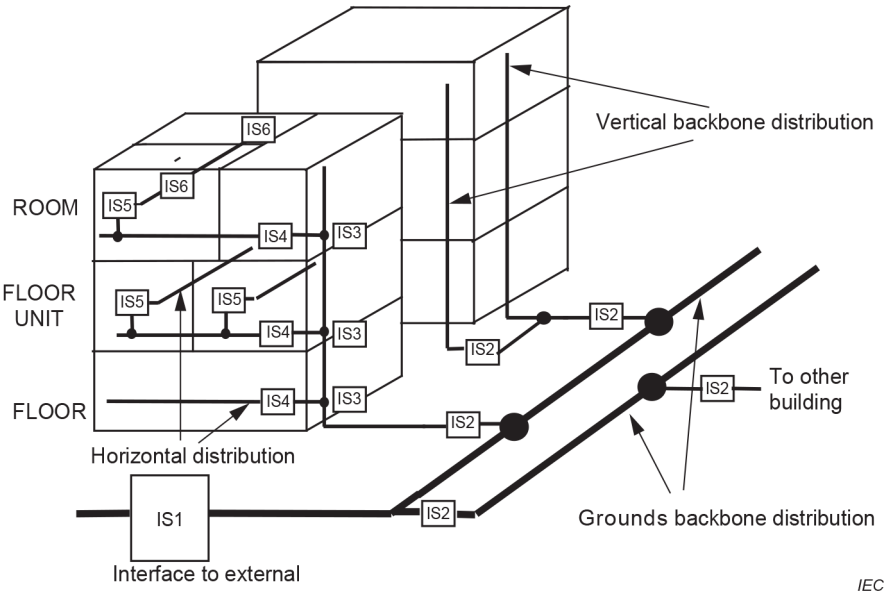


Figure 3 – Infrastructure for buildings

In Figure 3, the building in the foreground shows one single vertical backbone distribution, the building in the background shows two vertical ways of distribution connected with each other.

The gateways to external services connecting the grounds with a public network may be in an extra enclosure (IS1), which can be mandatory in certain cases, for example, IP network.

A maximum cable length between devices may be imposed for HBES/BACS functions. Infrastructure planning shall consider such aspects for distances between installation spaces.

The general infrastructure may consist of the grounds, building, floors, flats, rooms, distribution systems and shall be adapted to the needs by considering different types of buildings.

The infrastructure shall easily allow future extension/modification of the home/building network.

Figure 4 shows an example of a horizontal floor distribution infrastructure.

Horizontal floor distribution connects the floor installation space IS3 to the flat installation space IS4.

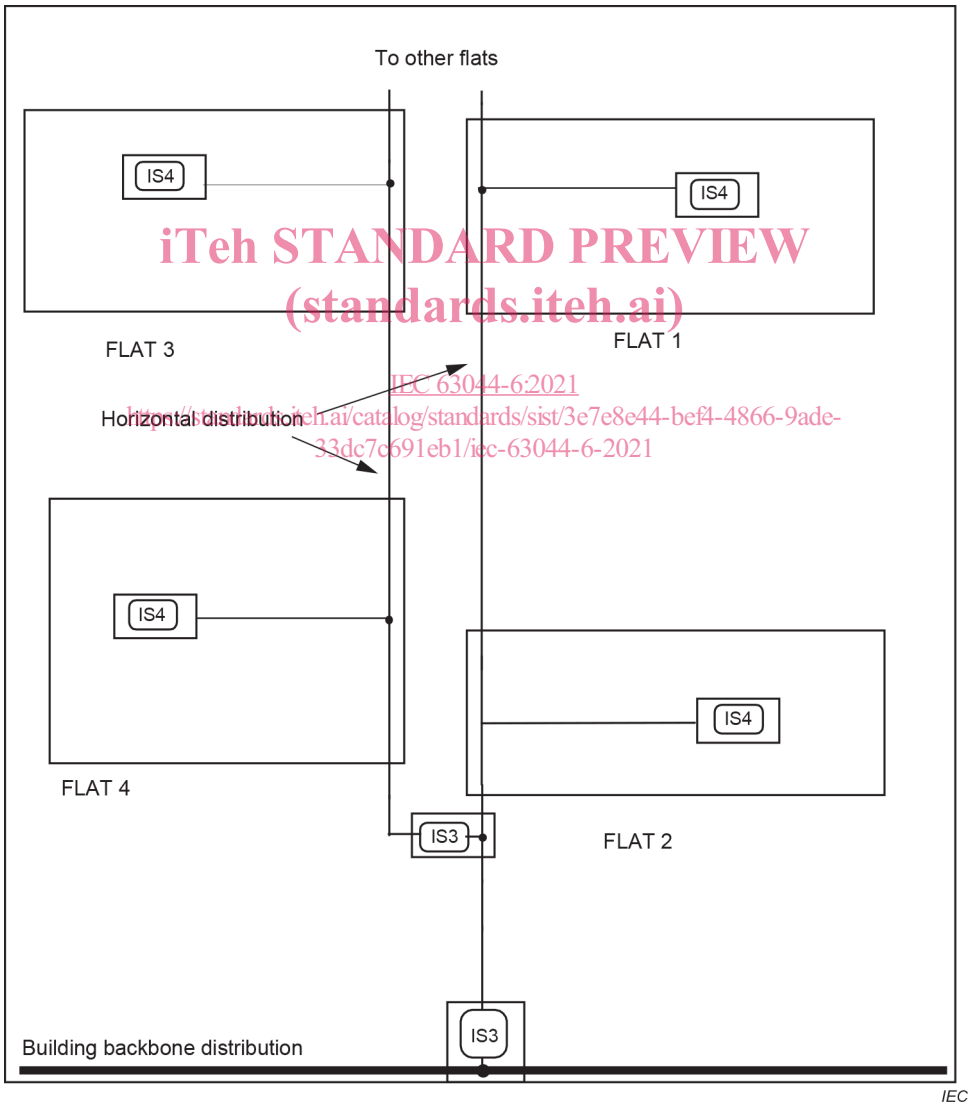


Figure 4 – Horizontal infrastructure (floor distribution)

Figure 5 and Figure 6 show examples of the topology of installation spaces inside a home.

IS4 provides the space for equipment to distribute services in the home as well as home gateway to the building network.