Home and Building Electronic Systems (HBES) -- Part 4-3: Media independent layers - Communication over IP

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EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 50090-4-3:2007 sisaldab Euroopa standardi EN 50090-4-3:2007 ingliskeelset teksti. Käesolev dokument on jõustatud 22.11.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 50090-4-3:2007 consists of the English text of the European standard EN 50090-4-3:2007. This document is endorsed on 22.11.2007 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This European Standard defines the mandatory and optional requirements for the medium independent communication over IP for HBES products and systems, a multi-application bus system where the functions are decentralised, distributed and linked through a common communication process. This European Standard is used as a product family standard. It is not intended to be used as a standalone standard. Other parts from the EN 50090 series may apply.	**Scope:** This European Standard defines the mandatory and optional requirements for the medium independent communication over IP for HBES products and systems, a multi-application bus system where the functions are decentralised, distributed and linked through a common communication process. This European Standard is used as a product family standard. It is not intended to be used as a standalone standard. Other parts from the EN 50090 series may apply.

ICS 35.240.99, 97.120

Võtmesõnad:

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50090-4-3

October 2007

ICS 35.240.99; 97.120

English version

Home and Building Electronic Systems (HBES) – Part 4-3: Media independent layers – Communication over IP

(EN 13321-2:2006)

Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) – Partie 4-3: Couches indépendantes des medias – Communication sur IP
(EN 13321-2:2006)

Elektrische Systemtechnik für Heim und Gebäude (ESHG) – Teil 4-3: Medienunabhängige Schicht – Kommunikation über IP
(EN 13321-2:2006)

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

The CENELEC Technical Committee TC 205, Home and Building Electronic Systems (HBES), in collaboration with CEN TC 247, Building Automation, Controls and Building Management, – and with participation of its cooperating partner KNX – has prepared this document to reference the European Standard EN 13321-2, prepared by CEN TC 247, also as a CENELEC TC 205 standard and to extend its area of application to Home and Building Electronic Systems (HBES).

The document was approved by CENELEC as EN 50090-4-3 on 2007-04-11.

CENELEC takes no position concerning the evidence, validity and scope of patent rights.

KNX Association as Cooperating Partner to CENELEC confirms that to the extent that the standard contains patents and like rights, the KNX Association's members are willing to negotiate licenses thereof with applicants throughout the world on fair, reasonable and non-discriminatory terms and conditions.

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Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights other than those identified above. CENELEC shall not be held responsible for identifying any or all such patent rights.

EN 50090-4-3 is part of the EN 50090 series of European Standards, which 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

Introduction

The permanent objective of CENELEC TC 205 is to prepare standards for all aspects of Home and Building Electronic Systems (HBES) in relation to the Information Society. Such HBES standards shall ensure integration of a wide spectrum of control applications and the control and management aspects of other applications in and around homes and buildings, including the gateways to different transmission media and public networks. As a widespread medium for communication, IP (being over Ethernet or any other communication media, is an important element of this integration. It was therefore considered of utmost importance to integrate the standard for communication over IP developed under the umbrella of CEN TC 247 into this standard series in order to complete the possible communication means in the field of Home and Building Electronic Systems (HBES).

This standard is intended for use by all involved in design, manufacture, engineering, installation and commissioning activities.

Moreover and in line with the EU's co-regulatory view of European standardisation this standard supports the eEurope objectives and helps to comply with important EU Directives such as the Construction Products' Directive and the Energy Performance of Buildings' Directive.

1 Scope

This European Standard defines the mandatory and optional requirements for the medium independent communication over IP for HBES products and systems, a multi-application bus system where the functions are decentralised, distributed and linked through a common communication process.

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

Other parts from the EN 50090 series may apply.

2 Requirements

HBES products and systems using the HBES Open Communication System according to this standard series shall use the requirements stated in EN 13321-2.

When using EN 13321-2, read any reference to

"EN 13321-1, Open data communication in building automation, controls and building management – Home and building electronic system – Part 1: Product and system requirement"

as

"EN 50090 Home and Building Electronic Systems (HBES), series".

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13321-2

October 2006

ICS 35.240.99; 97.120

Supersedes ENV 13321-2:2000

English Version

Open data communication in building automation, controls and building management - Home and building electronic systems - Part 2: KNXnet/IP Communication

Réseau ouvert de communication de données pour l'automatisation, la régulation et la gestion technique du bâtiment - Systèmes électroniques pour les foyers domestiques et les bâtiments - Partie 2 : Communication KNX/IP

Offene Datenkommunikation für die Gebäudeautomation und Gebäudemanagement - Elektrische Systemtechnik für Heim und Gebäude - Teil 2: KNXnet/IP Kommunikation

This European Standard was approved by CEN on 28 August 2006.

CEN 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 CEN 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 CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

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COMITÉ EUROPÉEN DE NORMALISATION
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Ref. No. EN 13321-2:2006: E

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Foreword

This document (EN 13321-2:2006) has been prepared by Technical Committee CEN/TC 247 “Building Automation, Control and Building Management”, the secretariat of which is held by SNV.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2007, and conflicting national standards shall be withdrawn at the latest by April 2007.

This document supersedes ENV 13321-2:2000 Data communication for HVAC application - Automation net - Part 2: EIBnet.

This document also supersedes parts BatiBUS, EHS and EIB of ENV 13154-1:1998.

Whereas ENV 13321-2:2000 described the transmission of EIB packets over Ethernet including the frame encoding this document describes the transmission of HBES packets using the Internet Protocol. Details of the HBES packet frames are covered in EN 13321-1, [9] Open Data Communication in Building Automation, Controls and Building Management — Home and Building Electronic Systems — Part 1: Product and System Requirements, removing the need to explicitly describe the HBES frames in this document.

This document is part 2 of the EN 13321 series of European Standards under the general title Open data communication in building automation, controls and building management - Home and building electronic systems, which will comprise the following parts:

Part 1: Product and system requirements

Part 2: KNXnet/IP communication

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This standard is intended for design of new buildings and retrofit of existing buildings for an acceptable indoor environment, practical energy conservation and efficiency.

This standard defines the integration of KNX protocol implementations within the Internet Protocol (IP) named KNXnet/IP or EIBnet/IP for continuity with ENV 13221-2:2000 (EIBnet) as defined by CEN/TC 247. EIBnet was introduced as an expansion of EIB into the information technology realm and was incorporated as a building controls technology in CEN/TC 247. EIBnet/IP is the logical successor to EIBnet. As EIB has become a part of KNX, this standard is called KNXnet/IP.

This specification defines a standard protocol, which is implemented within KNX devices, the EIB Tool Software Next Generation (ETS NG) and other implementations to support KNX data exchange over IP networks. In fact, KNXnet/IP provides a general framework, which accommodates several specialized “Service Protocols” in a modular and extendible fashion.

- The KNXnet/IP specification consists of these clauses:
  - — Clause 1, Overview
  - — Clause 2, Core Specification
  - — Clause 3, Device Management
  - — Clause 4, Tunnelling
  - — Clause 5, Routing

Additional clauses may be added to the KNXnet/IP specification in the future at which time Clause 1 “Overview” as well as Annex A shall be updated.

KNXnet/IP supports different software implementations on top of the protocol. Specifically these software implementations can be Building Management, Facility Management, Energy Management, or simply Data Base and SCADA (Supervision, Control and Data Acquisition) packages.

Most of these packages need to be configured for the specific user application. In order to simplify this process and cut cost for engineering, KNXnet/IP provides simple engineering interfaces, namely a description “language” for the underlying KNX system. This may be done off-line, e.g. generated as an ETS export file, or on-line by a mechanism that self-describes the underlying KNX system (reading data from the system itself).

In conjunction with the EIB/KNX-to-BACnet mapping described in EN ISO 16484-5 [11] EIB/KNX installations can very easily be integrated into BACnet system environments.

- KNXnet/IP supports
  - — On-the-fly change-over between Operational modes (configuration, operation);
  - — Event driven mechanisms;
  - — Connections with a delay time greater than $t_{EIB\_transfer\_timeout}$ (e.g. network connection via satellite).

Clause 1, Overview

Clause 1 “Overview” provides a general overview of KNXnet/IP and covers security considerations.

Clause 2, Core specification

Clause 2 “Core Specification” defines a standard protocol, which is implemented within KNXnet/IP devices and the EIB Tool Software Next Generation (ETS NG) to support KNX data exchange over IP networks.

This specific implementation of the protocol over the Internet Protocol (IP) is called KNXnet/IP.

This specification addresses:

— Definition of data packets sent over the IP host protocol network for KNXnet/IP communication

— Discovery and self-description of KNXnet/IP servers

— Configuring and establishing a communication channel between a KNXnet/IP client and a KNXnet/IP server

Clause 3, Device Management

Clause 3 “Device Management” defines services for remote configuration and remote management of KNXnet/IP servers.

Clause 4, Tunneling

Clause 4 “Tunnelling” defines services supporting all ETS functions for download, test, and analysis of KNX devices on KNX networks connected via KNXnet/IP servers. This includes changes of single KNX device object properties.

Tunnelling assumes that a data transmission round-trip between ETS or any other KNXnet/IP Tunnelling client and KNXnet/IP servers takes less than $t_{KNX\_transfer\_timeouts}$.

It describes direct communication between ETS and target BCU with single telegrams exchanged between both (like iETS). This mode also allows for change of properties in devices.

Clause 5, Routing

Clause 5 “Routing” defines services, which route KNX telegrams between KNXnet/IP servers through the IP network.

1 Scope

This specification defines the integration of KNX protocol implementations on top of Internet Protocol (IP) networks, called KNXnet/IP. It describes a standard protocol for KNX devices connected to an IP network, called KNXnet/IP devices. The IP network acts as a fast (compared to KNX transmission speed) backbone in KNX installations.

- Widespread deployment of data networks using the Internet Protocol (IP) presents an opportunity to expand building control communication beyond the local KNX control bus providing:

— Remote configuration

— Remote operation (including control and annunciation)

— Fast interface from LAN to KNX and vice versa

— WAN connection between KNX systems (where an installed KNX system is at least one line)

- A KNXnet/IP system contains at least these elements:

  — one EIB line with up to 64 (255) EIB devices
  OR
  one KNX segment (KNX-TP1, KNX-TP0, KNX-RF, KNX-PL110, KNX-PL132),

  — a KNX-to-IP network connection device
  (called KNXnet/IP server),

and typically additional

  — software for remote functions residing on e.g. a workstation
  (may be iETS, data base application, BACnet Building Management System, browser, ...).

Figure 1 shows a typical scenario where a KNXnet/IP client (e.g. running ETS) accesses multiple KNX installed systems or KNX subnetworks via an IP network. The KNXnet/IP client may access one or more KNXnet/IP servers at a time. For subnetwork routing server-to-server communication is possible.

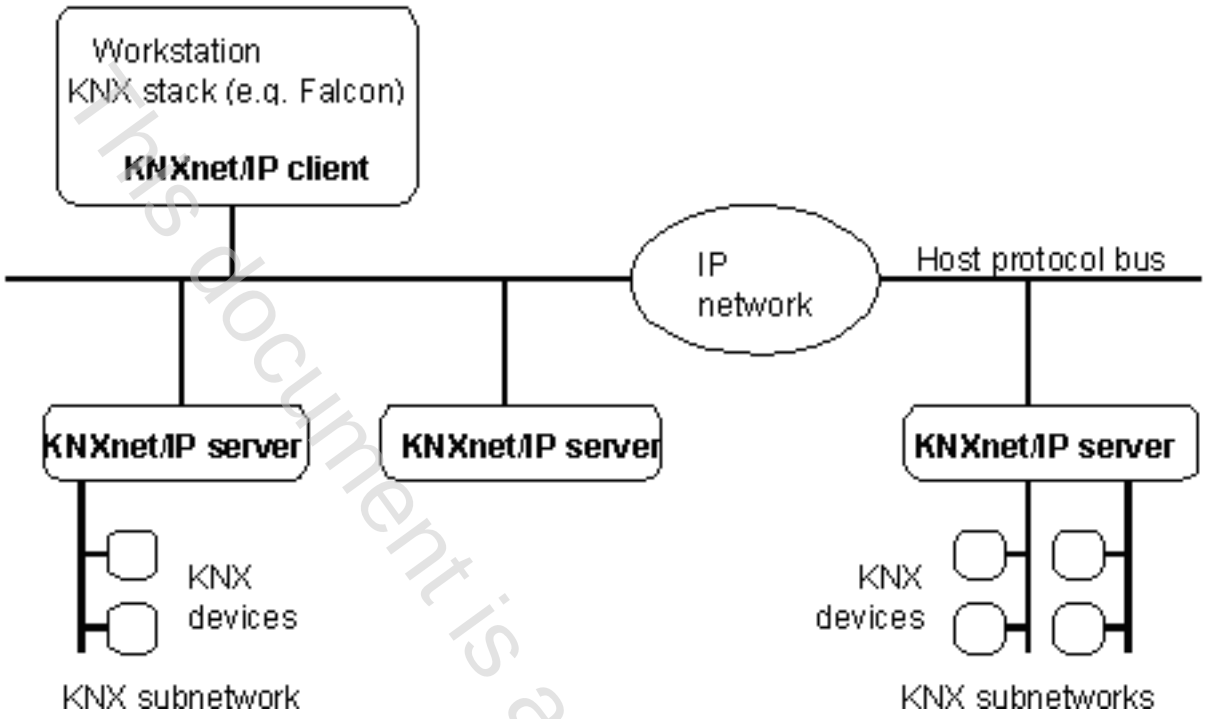

Figure 1 – Device types and configuration examples

2 Normative references

Not applicable.

3 Terms and definitions

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

3.1
subnet

portion of a network that shares a common address component known as the "subnet address". Different network protocols specify the subnet address in different ways

3.2
Engineering Tool Software (ETS)

software used to configure KNX devices

3.3
Host Protocol Address Information (HPAI)

represents the Host Protocol Address Information structure. This structure holds the IP host protocol address information and is used to address a KNXnet/IP endpoint on another KNXnet/IP device