SLOVENSKI STANDARD
SIST ENV 13321-1:2004

01-november-2004

Izmenjava podatkov v aplikacijah HVAC – Omrežje med elementi avtomatike – 1. del: BACnet, Profibus, World FIP

Data communication for HVAC application automation net - Part 1: BACnet, Profibus, World FIP

Datenkommunikation für HLK Anwendungen Automationsnetz - Teil 1: BACnet, Profibus, WorldFIB

Transmission de données pour applications CVC réseau automatismes - Partie 1: BACnet, Profibus, World FIB

Ta slovenski standard je istoveten z: ENV 13321-1:1999

ICS:

35.240.99	Wj[¦æà}ãz\^Á^zãç^ÁQYÁæå¦ˇ*ã@Á[å¦[bã@	IT applications in other fields
97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use

SIST ENV 13321-1:2004   **en**

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EUROPEAN PRESTANDARD

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ENV 13321-1

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ICS 35.240.99; 97.120

Descriptors: automation, buildings, data processing, information interchange, data transfer, open systems interconnection, protocols

English version

Data communication for HVAC application automation net - Part 1: BACnet, Profibus, World FIP

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 247 "Controls for mechanical building services", the secretariat of which is held by SNV.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This European Prestandard is part of a series of standards for system-neutral data communications in HVAC systems. This document is part 1 of the prestandard for data communications on the automation level.

The position of this European Prestandard in the whole range of standards for mechanical building services, especially in the data communication field of controls for mechanical building services included is illustrated in figure 1.

No existing European standards are superseded. At present this document exists only in English.
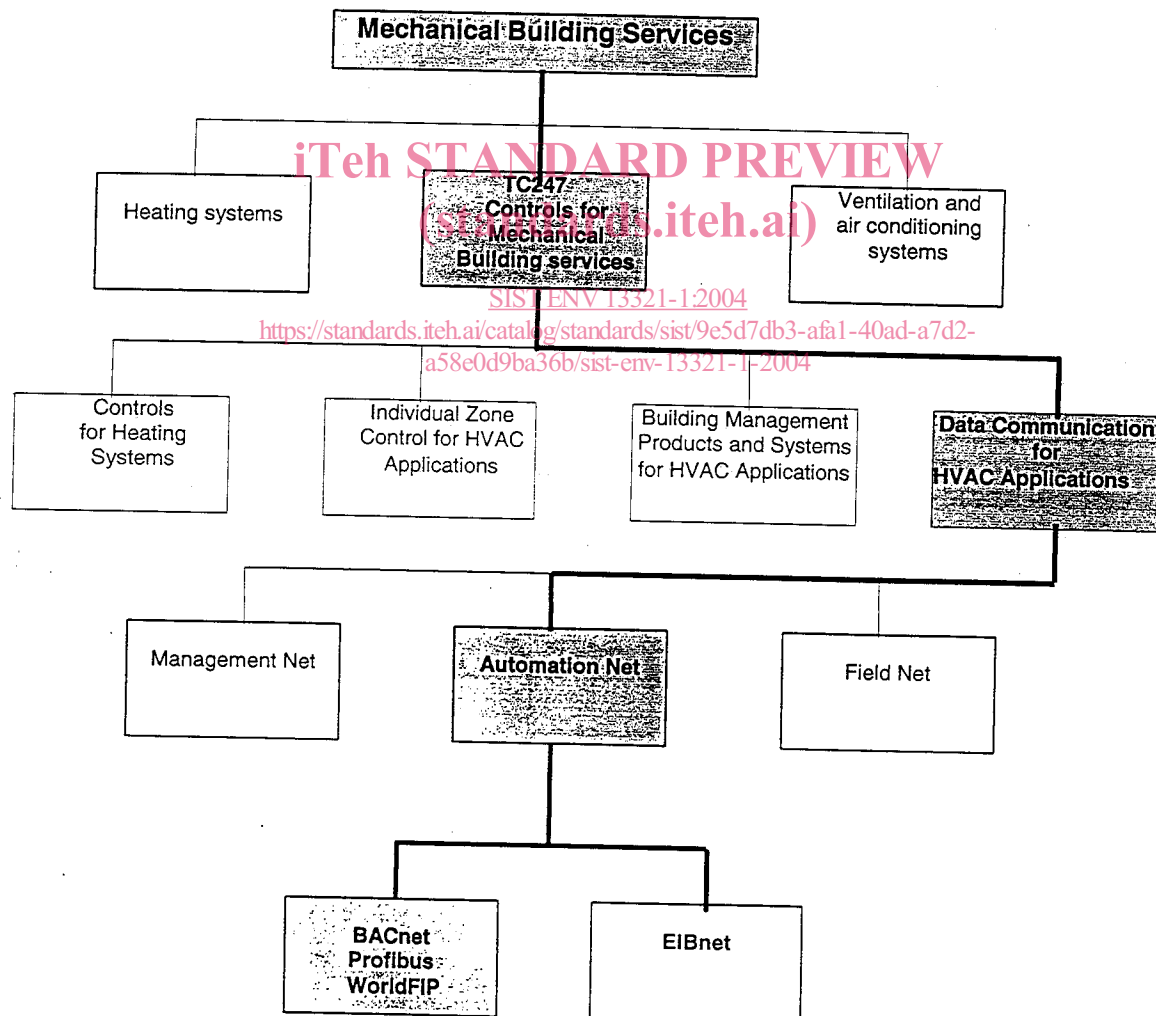
Figure 1: The shaded boxes indicate the contents and the hierarchy of this standard. The plain areas show the positioning of this standard in relationship to other relevant mechanical building services standards.

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Introduction

This ENV 13321-1 has been prepared to provide mechanisms through which various vendors of building automation systems may exchange information in a standardized way. It defines communication capabilities and not control functionality.

This European Prestandard applies to the automation level network according to the hierarchical levels defined in the EN xxx-1 "Building management products for HVAC applications, Part 1: System structure and Definitions".

This European Prestandard is to be used by all involved in design, manufacture, engineering, installation and commissioning activities.

This European Prestandard has been made in response to the essential requirements of the Constructive Products Directive

1   Scope

This document is part 1 of European Prestandards defining the system neutral data communication mechanisms for use at the automation level in heating, ventilating, air-conditioning and related building automation and building management applications.

2   Normative Reference

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This European Prestandard incorporates, by dated or undated reference, provisions from other publications. These Normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

2.1   BACnet

ENV 1805-1   Data Communication for HVAC Application Management Net Part 1:Building Automation and Control Networking (BACnet)

2.2   Profibus

EN 50170:   1995 General Purpose Field Communication System

2.3   World FIP

EN 50170:   1995 General Purpose Field Communication System

3   Definitions

BACnet   Building Automation and Control Network

Profibus   Process Field Bus

FIP   Factory Instrumentation Protocol

4   General Requirements

The used protocol shall be a protocol described in:

Chapter 5   BACnet
Chapter 6   Profibus
Chapter 7   World FIP

Conformance to this standard implies conformity to one of the protocols in chapter 5, 6 or 7.

Products complying with Chapter 5 shall be designated BACnet
Products complying with Chapter 6 shall be designated Profibus
Products complying with Chapter 7 shall be designated FIP

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5   The BACnet Standard

5.1   Overview

BACnet is a communications protocol for Building Automation and Control Networks which has been developed under the auspices of the American Society of Heating Refrigerating, and Air-Conditioning Engineers (ASHRAE). The intention of this standard is to provide building owners and operators with the ability to integrate equipment from different vendors into a coherent automation and control system.

This European Prestandard was specifically tailored for heating, ventilating, air-conditioning and refrigerating control equipment, but is also intended to provide a basis for integrating other kinds of building control systems, such as lighting, security and fire detection systems. These extensions are outside the scope of this standard, but every effort has been made to make them simple and straight-forward to incorporate. Many of the objects and services defined in this standard can be used without modification.

This European Prestandard can be divided into four key components which together provide the mechanisms by which distributed control and monitoring devices can exchange information, to perform the required building automation function. The first key component consists of the standardized objects which provide a network-visible view of the proprietary data structures and control algorithms.
The second key component is a set of common commands or services that are used between devices to carry out the functions which are required to implement distributed monitoring and control. This also includes the definitions of what kind of messages the protocol has to provide.

The third key component specifies how to encode the messages which are defined in a standard way. In other word, how the messages are presented as binary zeros and ones on the communication media.
Finally those LAN technologies are described which are used to transport the BACnet messages from one device to another. From the standpoint of the Open Systems Interconnection (OSI) Reference Model for communication processes, BACnet is a collapsed architecture, implementing layers 1, 2, 3 and 7, as shown in Figure 1. The application and network layers provide a uniform interface to one of several options at the data link and physical layers.

BACnet Layers					Equivalent OSI Layers
BACnet Application Layer					Application
BACnet Network Layer					Network
ISO 8802-2 Type 1		BACnet MS/TP	BACnet dial up	LonTalk	Data link
Ethernet	ARCnet				
		RS 485	RS 232		Physical

figure 2

Each of these fundamental aspects of the BACnet specification are described in more detail below.

5.2   Normative and informative sections

The ENV 1805-1 Data Communication for HVAC Application Management Net Part 1: Building Automation and Control Networking (BACnet), which is referred to in clause 2.1 of this European Prestandard, applies for the automation level network with the following amendment.

Informative sections

For this European Prestandard the following sections contained in ENV 1805-1 have only an informational purpose:

*   Section 8.   DATALINK/PHYSICAL LAYERS: ARCNET LAN
*   Section 9.   DATALINK/PHYSICAL LAYERS: MS/TP LAN

These sections are intended for information only.

Normative sections

All the other sections of ENV 1805-1 are normative in compliance with this European Prestandard.

5.3   BACnet Application Layer

The BACnet application layer is based on an object-oriented approach. Standardized objects provide a network-visible view of the proprietary data structures and control algorithms of a controller. The idea behind an object is that it is a collection of data elements, all of which relate to a particular function.

The individual data elements are called the properties of an object. While the internal design and configuration of building automation devices will be proprietary and therefore different for each vendor, the properties of objects provide a means of identifying and accessing information without requiring any knowledge of the details of a device's internal design. BACnet defines 18 object types as summarised in table 1. Any given building automation device may have zero, one or many objects of each object type.

The key to accessing a particular object is a property called the object identifier which uniquely identifies each object within a specific device. The object identifier is a 32-bit octet string containing the object type and a instance number.

The object types described in the standard represent most of the kinds of information found in modern DDC devices. Each device supports only those objects which are necessary to represent the internal functionality of the system. Table 2 shows, as an example, the properties that are defined for Analog Input objects.

Table 1: BACnet Standard Object Types

Analog Input	Device
Analog Output	Event Enrolment
Analog Value	File
Binary Input	Group
Binary Output	Loop
Binary Value	Multi-state Input
Calendar	Multi-state-Output
Notification Class	Program
Command	Schedule

Here is a brief description of the standard BACnet object types:

Analog, Binary Input Represents the characteristics of physical analog and binary sensor inputs

Analog, Binary Output Represents the characteristics of physical analog and binary actuator outputs