SLOVENSKI STANDARD
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Open Data Communication in Building Automation, Controls and Building Management Implementation Guideline - Control Network Protocol - Part 5: Implementation Guideline

Offene Datenkommunikation für die Gebäudeautomation und Gebäudemanagement - Gebäude Netzwerke Protokoll - Teil 5: Implementierungsrichtlinie

Réseau ouvert de communication de données pour l'automation, la régulation et la gestion technique du bâtiment - Protocole de contrôle de réseau - Partie 5 : Guide de mise en oeuvre

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Open Data Communication in Building Automation, Controls and Building Management Implementation Guideline - Control Network Protocol - Part 5: Implementation

Réseau ouvert de communication de données pour l'automatisation, la régulation et la gestion technique du bâtiment - Protocole de réseau pour le bâtiment - Partie 5 : Implémentation

Firmenneutrale Datenkommunikation für die Gebäudeautomation und Gebäudemanagement - Gebäude Netzwerk Protokoll - Teil 5: Implementierung

This European Standard was approved by CEN on 1 September 2007.

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Contents

Page

Foreword

This document (EN 14908-5:2009) has been prepared by Technical Committee CEN/TC 247 “Building automation and controls 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of an identical text or by endorsement, at the latest by October 2009, and conflicting national standards shall be withdrawn at the latest by October 2009.

This standard is part of a series of standards for open data transmission in building automation, control and in building management systems. The content of this standard covers the data communications used for management, automation/control and field functions.

The EN 14908-5 is part of a series of European Standards under the title, *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol (CNP)*, which comprises the following parts:

Part 1: *Protocol Stack*

Part 2: *Twisted Pair Communication*

Part 3: *Power Line Channel Specification*

Part 4: *IP Communication*

Part 5*: Implementation*

Part 6*: Application elements*

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Introduction

This document specifies the Layered Implementation Guidelines (LIG) for the Control Network Protocol (CNP) Specification: EN 14908-1:2005. The CNP specification model is based on the ISO Open Systems Interconnection Reference Model. There are also important extensions to the 7-layer OSI Reference Model. Figure 1 shows the scope of this specification in reference to the CNP and companion specifications for handling various data-transport media at the lower ISO protocol layers. A dashed line is used to show that the scope of this document is not treated as redundant, compared with other specifications covering their respective layers but as a complement to those specifications in implementing them in an interoperable fashion.

In this document, the guidelines for implementing a device based on CNP are specified to increase the ability for devices to interoperate regardless of the installer or manufacturer of the devices. Anything outside this boundary is covered in other parts of the standard. Similar specifications exist for CNP data-transport media.

This standard has been prepared to provide mechanisms through which various vendors of building automation, control, and of building-management systems, may exchange information in a standardised way. It defines communication and internal-documentation requirements.

This standard is contributing to the general European policy for energy savings particularly in the field of the "Energy Performance of Building Directive" and the Construction Products Directive (ER No. 6 "Energy Economy and Heat Retention").

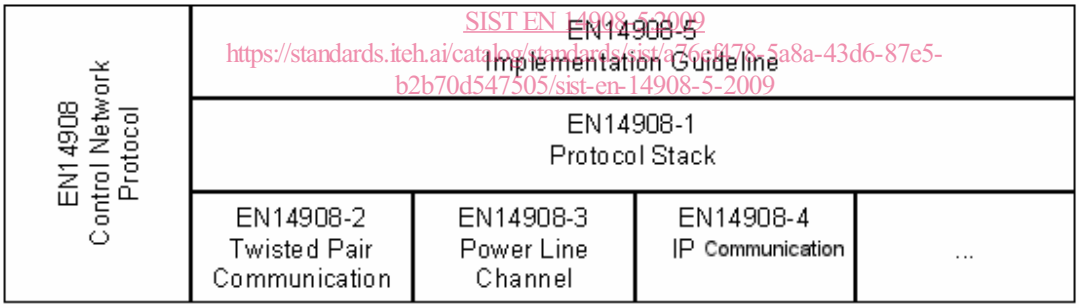

Figure 1 — Scope of this specification

1 Scope

This specification provides mechanisms through which various vendors of networked control systems in commercial building automation, control, and building management may exchange information in a standardised way.

This specification contains all the information necessary to facilitate the exchange of data and control information in an interoperable fashion using EN 14908-1 and its associated data-transport media specifications.

This specification establishes a minimal set of rules for compliance. It does not rule-out extended services to be provided, given that the rules are adhered-to within the system. It is the intention of the standard to permit extended services to coexist and defines the bounds in which those services function, including the format for internal device-documentation of those services. Services outside purvey of this specification so long as they are adherents of the system are permitted but will not necessarily be interoperable with any other devices and shall not be essential for the functioning of the device.

Certain aspects of this standard are defined in other documents. These documents are referenced where relevant. In the case where a referenced standard conflicts with this document, this document will prevail.

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 14908-1:2005 *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 1: Protocol Stack*

prEN 14908-6*, Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol — Part 6: Application elements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14908-1:2005 and the following apply.

3.1
application set
function block or function blocks to which a configuration property applies

EXAMPLE A network variable, a series or compilation of network variables, a functional block, a series or compilation of functional blocks, or the entire device.

3.2
base type
fundamental type that can be used as the basis of a network-variable type or configuration-property type

NOTE The available base types are defined in 5.1.2.2.

3.3
changeable-type network variable
network variable whose type can be changed during installation

NOTE See 4.7.3.3.

3.4
configuration property
CP
data value used to configure the application program in a device

NOTE Configuration properties are used to set parameters such as maximum, minimum, default, and override values. CPs are implemented using configuration network variables or as data items within configuration files. Configuration-property data are kept in a device's non-volatile memory.

3.5
configuration-property member
part of a functional profile

NOTE See 3.22.

3.6
configuration-property member number
part of a functional profile

NOTE See 3.23.

3.7
configuration-property type index
16-bit number that uniquely identifies a configuration-property type within the scope defined by the scope number and program-ID template of the resource file that contains the configuration-property type definition

3.8
device
logical and physical entity of the network containing an application that is designed to communicate with other logical and physical entities

3.9
device channel ID
number that optionally specifies the channel to which a device is attached

3.10
device class
two-byte field identifying the primary function of a device and part of the SPID of the device

3.11
device interface
network-visible interface to a device consisting of the unique node ID, program ID, channel ID, location field, device self-documentation string, device configuration properties, and functional blocks

3.12
device-location field
string or number that optionally specifies the location of a device

3.13
device self-documentation string
DSDS
string that specifies the structure of the contents of the self-documentation strings, the functional blocks, and optionally describes the function of a device

3.14
device subclass
two-byte field specifying the usage in the first byte and the channel type in the second byte and is part of the SPID of a device

NOTE See the usage and channel-type definitions.

3.15
dynamic functional block
functional block that is added to a device by a network tool after the device is installed

3.16
dynamic network variable
network variable that is added to a device by a network tool after the device is installed

3.17
format
<program ID> four-bit value defining the structure of the program ID as being a Standard Program Identifier (SPID) and device self-documentation string (DSDS) in the device

<resource file> string that provides formatting instructions for a network-variable or configuration-property type

3.18
functional block
portion of a device's application that performs a task by receiving configuration and operational data inputs, processing the data, and sending operational data outputs

NOTE A functional block may receive inputs from the network, from hardware attached to the device, and/or from other functional blocks on a device. A functional block may send outputs to the network, to hardware attached to the device, and/or to other functional blocks on the device. A functional block is an implementation of a functional profile. A "standard" functional block is one based on a standard functional profile template (SFPT).

3.19
functional-block index
sequentially assigned number identifying a functional-block implementation on a device

3.20
functional profile FP
template that describes common units of functional behaviour, also known as profiles, or FPs; which can be represented with a machine-readable functional-profile template (FPT)

NOTE Each functional profile consists of a profile description and a specified set of network variables and configuration properties designed to perform a single function on a device. The network variables and configuration properties specified by the functional profile are called the functional-profile members. A functional profile specifies whether the implementation of each functional-profile member is mandatory or optional. A profile is uniquely identified by a program-ID template, scope, and functional-profile number.

3.21
functional-profile key
functional-profile number

NOTE See 3.24.

3.22
functional-profile member
network-variable or configuration-property member of a functional profile

NOTE Each functional-profile member is identified as mandatory or optional by the functional profile. Each member also includes a text description of the member for the functional profile.

3.23
functional-profile member number
two-byte number that uniquely identifies a network-variable or configuration-property member of a functional profile

NOTE This member number is used to associate a network variable or configuration property on a device with the corresponding network-variable or configuration-property member of the functional profile. Member numbers shall be in the range of 1 to 4 095, and need not be continuous. Member numbers shall be unique, with the exception that network-variable and configuration-property members may use the same number. (Therefore, network-variable members' numbers shall be unique, and configuration-property members' numbers shall be unique, but they need not be unique between network-variable members and configuration-property members.) There may be a maximum of 255 mandatory members and 255 optional members of each type (scope 0 NV, inheriting NV, scope 0 CP, and inheriting CP).

3.24
functional-profile number
two-byte number that uniquely identifies a functional profile within the scope defined by the scope number and program-ID template of the resource file that contains the functional-profile definition

NOTE Also called the functional-profile key, or the FPT key.

3.25
functional-profile selector
an ASCII vertical bar ("|") or an ASCII number sign ("#") to denote the association of a network variable or configuration property with a scope-0 profile or a profile of a higher-numbered scope, respectively, where a higher-numbered scope would denote the NV or CP was added to enhance a scope-0 profile or that it applies to a non-standard profile

NOTE If the functional profile selector is a vertical bar, the member number identifies a member of a scope-0 profile. If the functional profile selector is a number sign, the member number identifies a member of the inheriting profile. The number-sign functional profile selector is always used for members of user functional profiles, including profiles that do not use inheritance. The vertical-bar functional profile selector is always used for members of standard functional profiles. Two different functional profile members may have the same member number as long as they use different functional profile selectors.

EXAMPLE The “|1” member of a functional profile is not the same as the “#1” member of the same profile. This prevents conflicts if new members are added to a standard functional profile that has already been used as the basis for inheriting profiles.

3.26
functional-profile template
functional profile in human- and machine-readable form

NOTE See 3.20.

3.27
global index
functional-block index

NOTE See 3.19.

3.28
inheriting profile
functional profile that inherits members from a scope-0 profile

3.29
interoperability
conditions that ensure multiple devices from the same or different manufacturers can be integrated into a single network without requiring custom device or tool development

3.30
CNP device
hardware and software that runs an application and communicates with other devices using the EN 14908-1 protocol

NOTE It may optionally interface with input/output hardware. A CNP device includes at least one processor and a CNP transceiver also called a CNP node, or simply a node.

3.31
CNP network
collection of intelligent devices that communicate with each other using the EN 14908-1 protocol over one or more communications channels

3.32
manufacturer ID
MID
20-bit number that uniquely identifies the device manufacturer of a device and is part of the device’s SPID

3.33
network-interface selection
form of network-variable selection that occurs on the network interface

3.34
network variable
NV
data item that a particular device application program expects to get from other devices on a network (an input network variable) or expects to make available to other devices on a network (an output network variable)

NOTE Network variable data are typically stored in a device's volatile memory.

EXAMPLE Examples are a temperature, switch value, and actuator-position setting.

3.35
network-variable declaration
establishment of an instance of a network variable type within the code of an application

3.36
network-variable index
sequentially assigned number identifying a network variable implementation on a device

NOTE For Neuron C applications, the index is assigned by the Neuron C compiler in the order of declaration. The first network variable on a device has an index of 0, the second has an index of 1, etc.

3.37
network-variable member
functional-profile member that is a network variable

NOTE See 3.22.

3.38
network-variable member number
number of a functional-profile member that is a network variable

NOTE See 3.23.

3.39
network-variable programmatic name
name assigned to a network-variable implementation by the device application developer

NOTE The programmatic name is limited to 16 characters, including any optional prefixes. The programmatic name is not significant for interoperability, but conventions are suggested in 4.7.3.4 to make programmatic names easier to use for integrators.

3.40
network-variable selection
process of associating a network-variable selector with a network variable on a device

3.41
network-variable type
specification of the length, units, valid range, and resolution of the data contained within a network variable

NOTE A network variable type may be a simple, one, two, or four-byte scalar type; or a more complex structure or union of up to 31 bytes.

3.42
network-variable type index
16-bit number that uniquely identifies a network-variable type within the scope defined by the scope number and program-ID template of the resource file that contains the network-variable type definition

3.43
unique node ID
unique 48-bit identifier within the read-only data structure of a device as defined by the EN 14908-1 protocol

NOTE It is also called the unique_node_ID.

3.44
node
<common> device

<precise> physical and logical presence on a CNP network with a unique node ID and network address

NOTE The unique node ID relates to the identification of a single instance of an implemented EN 14908-1 protocol stack. A device is also a network presence with an application processor and one or more nodes. A device with multiple unique node IDs would consist of multiple nodes. Some infrastructure devices, such as routers, also consist of more than one unique node ID and thus consist of multiple nodes.

3.45
passive configuration tool
PCT
network tool that can be used on a device to assist in the successful commissioning of the device without disrupting the operation of other network tools

NOTE It may be a plug-in, standalone software, hardware attachment, or other tool. A passive configuration tool has attributes and capabilities as defined in clause 6.3.

3.46
primary functional block
functional block on a device that implements the most important function for the device

3.47
primary functional profile
functional profile that defines the primary functional block on a device

3.48
proprietary data
data and message definitions in the device interface that are known only to the manufacturer and the manufacturer's agents

3.49
self-documentation string
SD string
text string associated with a device, network variable, or configuration property that is stored within a device and within the device interface (XIF) file for a device