SLOVENSKI STANDARD
SIST EN 50491-11:2015

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Splošne zahteve za stanovanjske in stavbne elektronske sisteme (HBES) in sisteme za avtomatizacijo in krmiljenje stavb (BACS) - 11. del: Inteligentno merjenje - Aplikacijske specifikacije - Preprost zunanji prikazovalnik za uporabnika

General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 11: Smart Metering - Application Specifications - Simple External Consumer Display

Allgemeine Anforderungen an die Elektrische Systemtechnik für Heim und Gebäude (ESHG) und an Systeme der Gebäudeautomation (GA) -- Teil 11: Smart Metering - Applikationsbeschreibung - Einfache externe Verbrauchsanzeige

Exigences générales pour systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) et pour systèmes de gestion technique du bâtiment (SGTB) -- Partie 11: Comptage intelligent - Spécifications d'application - Affichage simple et externe du client

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ICS:

35.240.99	Uporabniške rešitve IT na drugih področjih	IT applications in other fields
97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use

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EUROPEAN STANDARD

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English Version

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European Committee for Electrotechnical Standardization
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Contents

Foreword

This document (EN 50491-11:2015) has been prepared by CLC/TC 205 "Home and Building Electronic Systems (HBES)".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2016-05-04
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2018-05-04

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EN 50491-11 is part of the EN 50491 series, *General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)*, which comprises the following parts:

- *Part 1: General*;
- *Part 2: Environmental conditions*;
- *Part 3: Electrical safety requirements*;
- *Part 4-1: General functional safety requirements for products intended to be integrated in Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)*;
- *Part 5-1: EMC requirements, conditions and test setup*;
- *Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry environment*;
- *Part 5-3: EMC requirements for HBES/BACS used in industry environment*;
- *Part 6-1: HBES installations — Installation and planning*;
- *Part 6-3: HBES installations — Assessment and definition of levels* [Technical Report CLC/TR 50491-6-3];
- *Part 11: Smart Metering — Application Specification — Simple External Consumer Display* (the present document);
- *Part 12: Smart grid — Application specification — Interface and framework for customer* (currently at Enquiry stage).

Introduction

In March 2009, the European Commission issued a mandate M/441 for the standardization of smart metering functionalities and communication for usage in Europe for electricity, gas, heat and water applications to ensure interoperability of technologies and applications within a harmonized European market.

As a result, a Technical Report, CEN/CLC/ETSI TR 50572, *Functional Reference Architecture for Communications in Smart Metering Systems*, was published in December 2011.

As a consequence of this work and in line with the CEN/CLC/ETSI TR 50572 functional reference architecture, CLC/TC 205, responsible for Home and Building Electronic Systems, was entrusted with the task to formulate standards for the communication from the smart metering system towards the home.

1 Scope

This European Standard specifies a data model to abstract the metering world towards a simple external consumer display. The data model, as described by means of functional blocks contained in this European Standard, lays down the format of metering data accessible by a simple external consumer display. This data interface would be typically part of the meter communication functions and be accessed by a simple external consumer display via the H1 interface of the CEN/CLC/ETSI TR 50572 between the display and the meter communication functions.

The data interface specified in this document may also be accessed by the LNAP or NNAP through the C or M interface, after which the data could be accessed by HBES devices through the H2 and H3 interface.

In other words, in this way the same data model can be used both on the H1 as well as the H2 and H3 interface.

The document specifies neither the communication mechanisms used on the data interface, nor the applied data privacy and security mechanisms nor the ergonomics of the simple external consumer displays, where national regulations may apply.

The document does also not specify the communication protocol used between the meters and the meter communication functions. However, it takes into account the existing European standards like the EN 13757 series (in particular EN 13757-3:2013 and its Annex O) and the EN 62056 series for the definition of the data model.

2 Normative References

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13757 (all parts), *Communication system for meters*

prEN 50491-12, *General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) — Part 12: Smart grid — Application specification — Interface and framework for customer*

CEN/CLC/ETSI TR 50572, *Functional Reference Architecture for Communications in Smart Metering Systems*

EN 62056 (all parts), *Electricity metering data exchange — The DLMS/COSEM suite (IEC 62056, all parts)*

ISO 4217, *Codes for the representation of currencies and funds*

ISO/IEC 8859-1, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

3.1.1
meter
instrument for measuring, memorizing and displaying data related to the consumption of a commodity

3.1.2
data point
container element, in which information is located related to a function of a product (in e.g. memory or a register)

3.2 Abbreviations

C C interface – for the term and definition, see CEN/CLC/ETSI TR 50572

Cs Company Specific

FB Functional Block

H1 H1 interface – for the term and definition, see CEN/CLC/ETSI TR 50572

H2 H2 interface – for the term and definition, see CEN/CLC/ETSI TR 50572

H3 H3 interface – for the term and definition, see CEN/CLC/ETSI TR 50572

LNAP Local Network Access Point - for the term and definition, see CEN/CLC/ETSI TR 50572

M M interface – for the term and definition, see CEN/CLC/ETSI TR 50572

NA Not Allowed / Not Applicable

MCF Meter Communication Function – for the term and definition, see CEN/CLC/ETSI TR 50572

NNAP Neighbourhood Network Access Point – for the term and definition, see CEN/CLC/ETSI TR 50572

HVAC Heating Ventilation Air Conditioning

4 General reference model

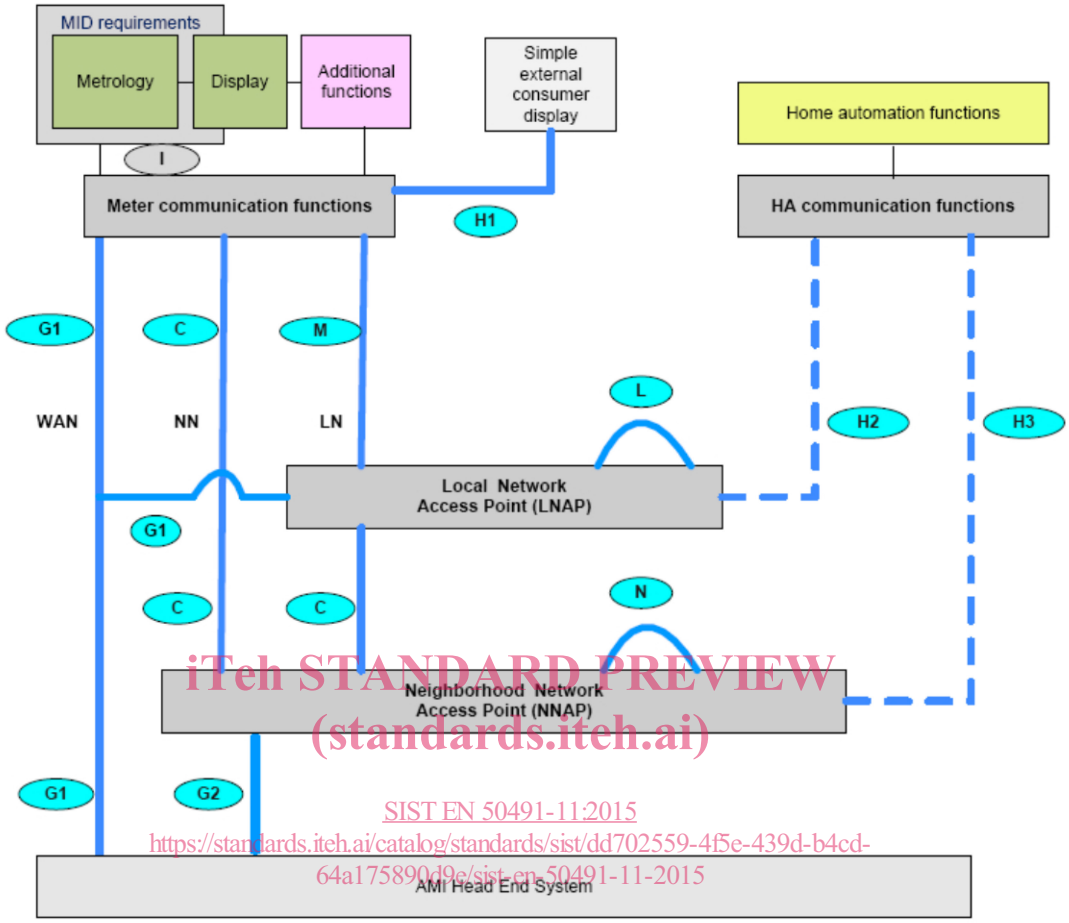

Figure 1 — Metering system topology from CEN/CLC/ETSI/TR 50572

Reference is made to the Reference architecture diagram for smart metering communications as given in CEN/CLC/ETSI/TR 50572.

In this European Standard, a functional block is specified for each typical metering function, grouping a number of in- and output data points, as depicted in Figure 1.

Figure 1 depicts logical entities and not physical devices.

NOTE 1 This standard does not define requirements for devices acting as data sources for the simple external consumer display (devices sending input on the I interface shown in Figure 1) and are covered by other European standards.

In line with the M/441 architecture, the information flow on the H1 is predominantly from the meter communication function in one or more meters to one or more simple external consumer displays (or optionally one common display), whereby the latter acts as sink of the information obtained through the H1 interface from the meter communication functions. Where necessary, the consumer display may poll data from the meter communication functions, e.g. historical values. In no case shall it be able to alter metering data through the consumer display. Hence, most functional blocks of the data interface specified in this European Standard contain data that are intended as output data to a connected display.

The data structures used on the H1 interface are part of this European Standard. All other underneath described interfaces are informative.

NOTE 2 The wired Meter communication according to EN 13757-2 / EN 13757-6 is only applicable if it is used exclusively for the H1 interface.

The functional blocks specified in this document may also be accessed by the LNAP or NNAP through the C or M interface, after which the data could be accessed bi-directionally with HBES devices through the H2 and H3 interface.

The communication on the H2 and H3 interface is part of prEN 50491-12.

For each connected metering function (Tx Meter in Figure 1), the corresponding metering communication function shall hold an entity of the corresponding functional block. The input for each connected metering function is supplied by meters complying with the EN 62056 and EN 13757 series and is not part of this standard.

The input to the LNAP and NNAP is due to be part of the IEC 62746[1)].

The measurable quantities shown in Table 1 can be represented in the data interface through the listed functional blocks (FB):

Table 1 – Measurable quantities

Physical Media	FB
Other	M_GENERICM
Oil	M_GENERICM
Electricity	M_ELECM
Gas	M_GASM b)
Heat (outlet)	M_HEATM
Steam	M_GENERICM
Warm Water (30°C to 90°C)	M_WATERM
Water	M_WATERM
Heat cost allocator	M_HCA
Cooling Load meter (outlet)	M_HEATM
Cooling Load meter (inlet)	M_HEATM
Heat (inlet)	M_HEATM
Heat and Cool	M_HEATM
Breaker	M_BREAKERM
Valve	M_VALVEM
Waste water meter	M_WATERM

1) Under development.

5 Requirements for the Data interface

5.1 General

Each metering function shall be represented by a corresponding functional block, typically part of the metering communication function and accessed by a simple user display.

Some meters may also provide metering data history values (e.g. monthly data). It is highly recommended that for each meter a limited set of history values is available, e.g. covering the previous week, previous month or previous year.

Depending on national regulations, it may be necessary that some of the data survive power down situations.

In case of one common display unit supporting multiple meter devices, during installation and teach-in procedures of metering devices, a meter device directory shall be created to assign linked meters.

The format and management of the metering device directory is company and/or protocol specific and not part of this specification. Appropriate procedures shall be provided to:

- add a new metering device, and
- replace a metering device by another device (with different identification number and e.g. different unit/resolution of the metering data), and
- delete a metering device.

The above workflow shall be supported by appropriate means (e.g. device localization via display, text information…).

Two data points ‘MeterReplacement’ and ‘MeterReplacementCounter’ are defined for each metering Functional Block to detect and manage replacement of metering devices. Further company specific mechanisms can be implemented to simplify the meter replacement workflow.

For each meter a ‘UserText’ may be configured to simplify identification and localization of the meter. This ‘UserText’ can be useful in case of:

- service, maintenance;
- binding of metering data to displays;
- billing information for the end user;
- etc.

In case of removal or deletion of a metering device from the device directory, it is highly recommended to keep the corresponding instance of the functional block alive and set all data in the Functional Block to void values (see below). It is not recommended to re-assign functional block Indices of the remaining functional blocks because data processing by the data display could be corrupted.

After commissioning or power up, metering data can be void or outdated for hours until a new message from a metering device is received by the metering communication function.

On customer move out, certain data may need to be made unavailable for the next customer.

On supplier change, certain data needs to be made unavailable for the next supplier.

The ‘OutOfService’ Status attribute in metering Data Points shall indicate void data. This status attribute may be set in the following cases:

- No metering device is connected to the metering Functional Block (ex-factory default data).
- A previously connected metering device is removed or deleted from the device directory. Handling of the metering device directory is manufacturer specific.

In case of meter replacement, all metering data in the corresponding Functional Block shall be set to void as upon removal of the previous meter until the first valid metering data message from the new device is received. This may take several hours.

NOTE This specification does not foresee specific mechanisms to supervise the presence/function of connected metering devices using life-check mechanisms etc. Because of very manufacturer specific cyclic update periods for metering messages, a life-check 'timeout' cannot be standardized. Therefore this specification does not put requirements to set metering data automatically 'OutOfService' in case of missing/outdated data from the connected metering device.

The simply user display can access metering data by:

- polling of Functional Blocks and Data Points or
- regularly by data being pushed to the display or
- notifications or messages (e.g. sent by an external actor or generated by the meter). Data structures for this type of messages are not specified in this standard.

5.2 Minimization of data transmission

Meter data comprises data that change infrequently and some that change frequently. The data transmission rate shall reflect the frequency with which the data is expected to change. In the case the data is polled, the user display shall not access a next Data Point value before the meter communication function has responded to the previous Data Point access, unless the meter communication function did not respond to the user display's request within a time that can be set manufacturer specific.

5.3 Data consistency

During polling of metering data, new metering data may be received and read-out data may be inconsistent. For data consistency checking each metering Functional Block shall provide a Data Point 'RxSequenceCounter' that shall be incremented each time new metering data is received from the corresponding metering device.

The user display reading out metering data shall check the 'RxSequenceCounter' counter before and after read out of the complete set of metering data. If the sequence counter value has changed, metering data may be inconsistent. The user display shall then retry the procedure.

5.4 Filtering of message types and data points

EN 13757-3 provides several message types declared by the C-field. For a display only a few Message types are relevant. The special Request/Respond messages used for the Gateway to request special data are not relevant for a simple external consumer display. For the presentation of the data the spontaneous meter messages with C=44h are recommended. Also C=46h or 06h could be taken into account, as they constitute special messages for installation purposes.

All other message types should be ignored. If a message is ignored the reception time stamp "RxReceptionTime" shall not be changed.

It is recommended to limit the number of supported VIF/VIFE of EN 13757-3 for a consumer display.

The following data points may be excluded from the interpretation:

- Plain text VIF 7Ch/FCh , as used for very uncommon units;
- Manufacturer specific VIFs 7Fh/FFh;
- Extension Table FDh.

The manufacturer shall consider to also limit the number of supported units from the extension table FBh.