SLOVENSKI STANDARD
oSIST prEN 13757-1:2020

01-julij-2020

Komunikacijski sistemi za merilnike - 1. del: Izmenjava podatkov

Communication systems for meters - Part 1: Data exchange

Kommunikationssysteme für Zähler - Teil 1: Datenaustausch

Systèmes de communication pour compteurs - Partie 1 : Échange de données

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Ta slovenski standard je istoveten z: **prEN 13757-1**

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ICS:

33.200	Daljinsko krmiljenje, daljinske meritve (telemetrija)	Telecontrol. Telemetering
35.100.70	Uporabniški sloj	Application layer

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2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 13757-1

June 2020

ICS 33.200; 35.100.70; 35.240.99; 91.140.50

Will supersede EN 13757-1:2014

English Version

Communication systems for meters - Part 1: Data exchange

Systèmes de communication pour compteurs - Partie 1 : Échange de données

Kommunikationssysteme für Zähler - Teil 1: Datenaustausch

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 294.

If this draft becomes a European Standard, 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.

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European foreword

This document (prEN 13757-1:2020) has been prepared by Technical Committee CEN/TC 294 “Communication systems for meters”, the secretariat of which is held by DIN.

This document will supersede EN 13757-1:2014.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

EN 13757 comprises the following parts:

— *Part 1: Data exchange [the present document];*

— *Part 2: Wired M-Bus communication;*

— *Part 3: Application protocols;*

— *Part 4: Wireless M-Bus communication;*

— *Part 5: Wireless M-Bus relaying;*

— *Part 6: Local Bus;*

— *Part 7: Transport and security services.*

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The OBIS and COSEM Clause 6 to Clause 11 of this document are prepared in liaison with the DLMS User Association based in Zug, Switzerland, and more information about DLMS/COSEM can be obtained from www.dlms.com.

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Introduction

This document is referred to in the CEN/CLC/ETSI TR 50572:2011, *Functional Reference Architecture for Communications in Smart Metering Systems*, as a standard for communications between elements in the Smart Metering Architecture. The M/441 Mandate, which led to the CEN/CLC/ETSI TR 50572, is driving significant development of standards in smart metering.

This document has been amended to reflect significant updates in Security practices, and updates to the OBIS model to reflect the state of the art. COSEM Classes have been removed from this document, as they are published in the EN 62056-6-2 standard and there is a risk of contradiction.

For an overview of activities, see M/490, the mandate for standardization for smart grid, available from https://ec.europa.eu/energy/sites/ener/files/documents/2011_03_01_mandate_m490_en.pdf, and more generally https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force.

This document describes the data exchange and communications for meters and remote reading of meters in a generic way. It is Part 1 of EN 13757.

The main use of EN 13757-1 is to provide an overview of the protocols at the different levels and to provide a specification for the DLMS/COSEM application Layer for meters.

Additional parts to the series of standard EN 13757 are:

— Part 2: Wired M-Bus communication;

— Part 3: Application protocols;

— Part 4: Wireless M-Bus communication;

— Part 5: Wireless M-Bus relaying;

— Part 6: Local Bus;

— Part 7: Transport and security services.

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The world of metering is going through a period of rapid change, and it is anticipated that this and other parts of the standard will require amending in a short period of time.

NOTE 1 This document makes repeated reference to EN 62056 standards. While the list of references is helpful, an essential companion to this document is the EN 62056-6-2 standard.

NOTE 2 Some of the ISO/IEC documents listed under Clause 2 could be available only from ISO or IEC directly. If the document you require is not available from your national standards organization, ISO or IEC can be contacted to establish the status of the document and it is availability. ISO can be contacted via www.iso.org.

NOTE 3 Clause 3 contains the terms and definitions special to remote reading of meters. Annex B is used to explain terms related to the object oriented model used in COSEM, detailed in EN 62056-6-2 and OBIS, detailed in EN 62056-6-1.

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1 Scope

This document specifies data exchange and communications for meters in a generic way.

This document establishes a protocol specification for the Application Layer for meters and establishes several protocols for meter communications which can be applied depending on the application being fulfilled.

This document also specifies the overall structure of the OBject Identification System (OBIS) and the mapping of all commonly used data items in metering equipment to their identification codes."

NOTE Electricity meters are not covered by this document, as the standardization of remote readout of electricity meters is a task for CENELEC/IEC.

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.

EN 13757-1, *Communication systems for meters - Part 1: Data exchange*

EN 13757-2:2018, *Communication systems for meters - Part 2: Wired M-Bus communication*

EN 13757-3:2018, *Communication systems for meters - Part 3: Application protocols*

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EN 13757-4:2019, *Communication systems for meters - Part 4: Wireless M-Bus communication*

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EN 13757-5:2015, *Communication systems for meters - Part 5: Wireless M-Bus relaying*

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EN 13757-6, *Communication systems for meters - Part 6: Local Bus*

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EN 13757-7:2018, *Communication systems for meters - Part 7: Transport and security services*

EN 60870-5-2, *Telecontrol equipment and systems - Part 5: Transmission protocols - Section 2: Link transmission procedures (IEC 60870-5-2)*

EN 62056-3-1, *Electricity metering data exchange - The DLMS/COSEM suite - Part 3-1: Use of local area networks on twisted pair with carrier signalling (IEC 62056-3-1)*

EN 62056-4-7, *Electricity metering data exchange - The DLMS/COSEM suite - Part 4-7: DLMS/COSEM transport layer for IP networks (IEC 62056-4-7)*

EN 62056-5-3, *Electricity metering data exchange - The DLMS/COSEM suite - Part 5-3: DLMS/COSEM application layer (IEC 62056-5-3)*

EN 62056-6-1:2017, *Electricity metering data exchange - The DLMS/COSEM suite - Part 6-1: Object Identification System (OBIS) (IEC 62056-6-1:2017)*

EN 62056-6-2:2013,[1]), Electricity metering data exchange —The DLMS/COSEM suite — Part 6-2: COSEM interface classes (IEC 62056-6-2:2013)

EN 62056-9-7, *Electricity metering data exchange - The DLMS/COSEM suite - Part 9-7: Communication profile for TCP-UDP/IP networks (IEC 62056-9-7)*

1) The EN 62056 series of standards are in the process of revision/renumbering.

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EN 62056-21:2002, *Electricity metering - Data exchange for meter reading, tariff and load control - Part 21: Direct local data exchange (IEC 62056-21:2002)*

EN 62056-42, *Electricity metering - Data exchange for meter reading, tariff and load control - Part 42: Physical layer services and procedures for connection-oriented asynchronous data exchange (IEC 62056-42)*

EN 62056-46:2002, *Electricity metering - Data exchange for meter reading, tariff and load control - Part 46: Data link layer using HDLC protocol (IEC 62056-46:2002)*

EN 62056-47, *Electricity metering - Data exchange for meter reading, tariff and load control - Part 47: COSEM transport layers for IPv4 networks (IEC 62056-47)*

ITU-T V.250, *Serial asynchronous automatic dialling and control*

3 Terms and definitions

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

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3.1
authorized party
utility, energy retailer, network operator, meter operator or data collection company authorized to access the information stored in the meter that is accessible to them according to the application association they can use

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3.2
base conditions
fixed conditions used to express the volume of gas independently of the measurement conditions

EXAMPLE: temperature of 273,15 K and absolute pressure of 1,013 25 bar or temperature of 288,15 K and absolute pressure of 1,013 25 bar

3.3
billing period
period over which a consumer bill is calculated

Note 1 to entry: See also B.7.

3.4
calendar
mechanism to program changes to active registers for Time-of-Use Tariffs

Note 1 to entry: See Activity Calendar B.3.

3.5
concentrator
intelligent station in a hierarchical communications network where incoming data (generated by multiple meters) is processed as appropriate and then repackaged, relayed, retransmitted, discarded, responded to, consolidated, prioritized and/or increased to multiple messages

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3.6
disturbance
influence quantity having a value within the limits specified, but outside the specified rated operating conditions of the measurement instrument

3.7
gas-volume conversion device
device that computes, integrates and indicates the volume increments measured by a gas meter as if it were operating at base conditions, using as inputs the volume at measurement conditions as measured by the gas meter, and other characteristics such as gas temperature and gas pressure

Note 1 to entry: The conversion device can also include the error curve of the gas meter and associated measuring transformers.

Note 2 to entry: The deviation from the ideal gas law can be compensated by the compressibility factor.

3.8
hand held terminal
portable device for reading and programming metering equipment at the customer's premises or at the access point

3.9
index
<gas and water metering> current reading of the total volume (mass) passed through the meter

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3.10
index difference
<gas and water metering> difference between the index at the end of a measurement or billing period and the index at the start of the same measurement or billing period

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Note 1 to entry: Index difference over a certain measurement or billing period is also known as consumption. For consumption, thresholds may be defined.

3.11
IPsec
end-to-end security scheme operating in the Internet Layer

Note 1 to entry: It works on IPv4 and IPv6 Networks.

Note 2 to entry: It is described in IETF RFC 4301.

3.12
measurement conditions
conditions of the gas whose volume is measured, at the point of measurement

EXAMPLE: the temperature and the pressure of the gas

3.13
scaler
exponent (to the base of 10) of the multiplication factor

Note 1 to entry: If the value is not numerical, then the scaler will be set to 0.

Note 2 to entry: See also B.49

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3.14
specified measuring range
set of values of measurements (the pressure for the pressure transducer or temperature for the temperature transducer) for which the error of the conversion device is intended to lie within the limits specified in the standard

Note 1 to entry: The upper and lower limits of the specified measuring range are called maximum value and minimum value respectively.

3.15
specified field of measurement of a conversion device
set of values at measurement conditions for which the error of the conversion device is within specified limits

Note 1 to entry: A conversion device has a measuring range for every quantity that it processes.

Note 2 to entry: The specified field of measurement applies to the characteristic quantities of the gas that are used to determine the conversion factor.

3.16
unit
enumeration defining the physical unit

Note to entry: See also B.69

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4 General description and security

4.1 Basic vocabulary

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All communications involve two sets of equipment represented by the terms **Caller** system and **Called** system. The **Caller** is the system that decides to initiate a communication with a remote system known as the **Called** party; these denominations remain valid throughout the duration of the communication.

A communication is broken down into a certain number of transactions. Each transaction is represented by a transmission from the **Transmitter** to the **Receiver**. During the sequence of transactions, the **Caller** and **Called** systems take turns to act as **Transmitter** and **Receiver**.

The terms **Client** and **Server** have the same meanings as in the DLMS model EN 61334-4-41. The **Server** is the system (meter) that acts as a receiver for service requests. The **Client** is the system (usually a data collecting system) that uses the Server for a specific purpose by means of one or more service requests.

The situation involving a **Caller Client** and a **Called Server** is undoubtedly the most frequent case, but a communication based on a **Caller Server** and a **Called Client** is also possible, in particular to report the occurrence of an urgent alarm and may offer savings in terms of data volumes in mass metering applications.

While the terms **Caller** and **Called** may imply a session, sessionless communications using, for example UDP over IP, are also a valid approach to communications for smart meters depending on the type of network.

4.2 Layered protocols

4.2.1 General

The purpose of this subclause is to explain, in a summarized way, the layered approaches and to explain the development since the initial issue of this document.

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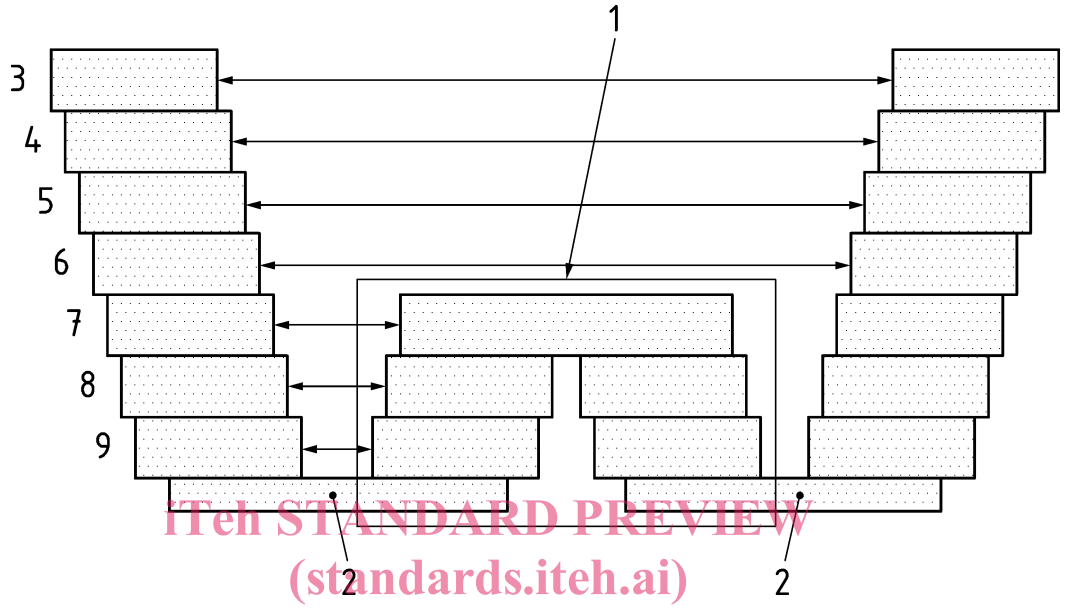
In order to perform automatic reading of meters, this document assumes a protocol stack approach. A protocol stack is divided into layers in order to reduce the complexity of the communicating system. Each layer provides services to the layer above on the basis of the layer below.

4.2.2 7 Layer Protocol

The architecture of data communication in this document is modelled using the ISO – OSI 7-layer reference model ISO/IEC 7498-1. The model is shown in Figure 1.



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Key

1	relay entity	6	transport
2	physical media	7	network
3	application	8	data link
4	presentation	9	physical
5	session		

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Figure 1 — The OSI 7-layer model

All layers have a corresponding layer at the other end of the communications link. The three upper layers are application related. The three lower layers are communications related. The Transport Layer creates the link between them. There may be multiple instances of the three lower layers if a relay is inserted between the communicating partners.

It shall be kept in mind that this is a model and not an implementation guide, i.e. not all implementations follow this model. An example of this is the Internet series of standards. They follow the model for the four lower layers, but do not specify the application related part as independent layers. Layers not necessary and thus not implemented in a specific protocol may be handled as null layers.

4.2.3 IP Protocol

IPv4 and IPv6 are widely used protocols for transport of all kinds of data, including metering data. Its principal advantages are that it can be used to carry a wide variety of applications over a wide range of communications media.