SLOVENSKI STANDARD
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Komunikacijski sistemi za merilnike in daljinsko odčitavanje - 3. del: Poseben aplikacijski sloj

Communication systems for and remote reading of meters - Part 3: Dedicated application layer

Kommunikationssysteme für Zähler und deren Fernablesung - Teil 3: Spezielle Anwendungsschicht

Systèmes de communication et de télérelevé de compteurs - Partie 3: Couche d'application spéciale

Ta slovenski standard je istoveten z: **prEN 13757-3**

ICS:

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

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English Version

Communication systems for and remote reading of meters - Part 3: Dedicated application layer

Systèmes de communication et de télérelevé de compteurs - Partie 3: Couche d'application spéciale

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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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 13757-3:2011) has been prepared by Technical Committee CEN/TC 294 “Communication systems for meters and remote reading of meters”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13757-3:2004.

EN 13757, *Communication systems for meters and remote reading of meters* consists of the following parts:

— *Part 1: Data exchange*

— *Part 2: Physical and link layer*

— *Part 3: Dedicated application layer*

— *Part 4: Wireless meter readout*

— *Part 5: Wireless relaying*

— *Part 6: Local bus*

Amendments

It should be noted that the following significant technical changes compared to the previous edition have been incorporated in this European Standard:

a) Extension of existing frames formats for different data protocols to support various wireless transmission schemes (harmonisation with EN13757-4).

b) Adding an annex with a Smart Metering profile based on the requirements of the “Smart Mater Coordination Group” of the ESO´s.

c) Adding an Annex to have a unique translation of M-Bus-data points to OBIS-Codes.

d) Update of the encryption methods to the state of the art.

e) Enhancement of data points for Electricity meter.

f) Adding some annexes to show explanations and examples.

Introduction

This document belongs to a series of parts of EN 13757, which covers communication systems for meters and remote reading of meters. EN 13757-1 contains generic descriptions and a communication protocol. EN 13757-2 contains a physical and a link layer for twisted pair base band (M-Bus). EN 13757-4 describes wireless communication (often named wireless M-Bus or wM-Bus). EN 13757-5 describes wireless relaying for the mode R2 of EN 13757-4. EN 13757-6 describes a twisted pair local bus.

This dedicated application layer (M-Bus-Protocol) can be used with various physical layers and with link layers and network layers which support the transmission of variable length binary transparent telegrams. Frequently the physical and link layers of EN 13757-2 (Twisted pair baseband) and EN 13757-4 (wireless) or the alternatives described in EN 13757-1 are used. This dedicated application layer has been optimized for minimum battery consumption of meters especially for the case of wireless communication to ensure long battery lifetimes of the meters. Secondly it is optimized for minimum telegram length to minimize the wireless channel occupancy and hence the collision rate. It is thirdly optimized for minimum requirements towards the meter processor regarding requirements of RAM size, code length and computational power.

An overview of communication systems for meters is given in EN 13757-1, which also contains further definitions.

This standard concentrates on the meter communication. The meter communicates with one (or occasionally several) fixed or mobile communication partners which again might be part of a private or public network. These further communication systems might use the same or other application layer protocols, security, privacy, authentication, and management methods.

NOTE Another annex describes how part of this standard and of EN 13757-2 and -4 can be used to implement smart meter functionalities. Similar functionalities could also be implemented using other physical and link layers.

To facilitate common communication systems for CEN-meters (e. g. Gas, Heat, Water meters and heat cost allocators) and for electricity meters in this standards occasionally electricity meters are mentioned. All these references are for information only and are not standard requirements. The definition of communication standards for electricity meters (possibly by a reference to CEN standards) remains solely in the responsibility of CENELEC.

1 Scope

This document applies to communication systems for meters and remote reading of meters.

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 13757-2:2004, *Communication systems for meters and remote reading of meters — Part 2: Physical and link layer*

EN 13757-4:2005, *Communication systems for meters and remote reading of meters — Part 4: Wireless communication*

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

ANSI X3.92:1981

INCITS/ISO 8372-1987, *Information Processing — Modes of Operation for a 64-bit Block Cipher Algorithm (formerly ANSI/ISO 8372-1987)*))

FIPS197, *Advanced Encryption Standard*[1)]

NOTE Further information and examples are available in the download area of http://www.m-bus.com.

3 Terms and definitions

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

3.1 Definitions

3.1.1
nominal transmission interval
transmission interval between all synchronous or periodical messages (new, old or no data content) for wireless meters, differs from the individual transmission interval by the scatter

3.1.2
individual transmission interval
exact time between two subsequent synchronous or periodically transmissions, changes with each transmission, its average equals to the nominal transmission interval

3.1.3
scatter
deviation of the individual transmission interval and the nominal transmission interval, either based on a dedicated mathematical function (for synchronous transmissions) or a random function (non-synchronous periodical transmission), avoids consecutive collisions of two or more meter with the same nominal transmission interval

1) Published by: NIST, National Institute of Standards and Technology http://www.nist.gov

3.1.4
average update interval
duration a meter shall send newer consumption and power/flow values, equal to the nominal transmission interval in case that the meter sends new data with each synchronous respectively periodical transmission or a multiple of the nominal transmission interval in case that the meter also repeats old consumption values or sends dummy messages in between

3.2 List of abbreviations

DES	Data Encryption Standard
AES	Advanced Encryption Standard
CBC	Cipher Block Chaining
DRH	Data Record Header
DIB	Data Information Block
DIF	Data Information Field
DIFE	Data Information Field Extensions
VIB	Value Information Block
VIF	Value Information Field
VIFE	Value Information Field Extensions
RSP_UD	Respond User Data
SND_UD	Send User Data to slave
SND-IR	Send Installation Request
CNF-IR	Confirm Installation Request
REQ-UD	Request User Data (Class 1 or 2)
ACK	Acknowledge
MDH	Manufacturer Specific Data Block
CI	Control Information Field
E	Extension bit
MSBit	Most significant bit
LSBit	Least significant bit
MSB	Most significant byte
LSB	Least significant byte

3.3 Hexadecimal and binary numbers

Hexadecimal numbers are designated by a following "h"

Binary numbers are designated by a following “b”

Decimal numbers have no suffix!

4 General principles: CI-field

4.1 Overview

All higher protocol layer telegrams have a variable length. The length information is part of the link layer. It shall be known to the application layer in order to properly terminate its decoding of each telegram. Each telegram starts with a one byte CI (control information) field, which distinguishes between various telegram types and application functions and header length. It is also used to distinguish between true application layer communication and management commands for lower layers. The meaning of the remaining bytes of the telegram depends also on the value of the CI-field.

Table 1 — CI-Field codes used by the master or the slave

CI-field	Direction	Header length	Higher layer protocol
00h-4Fh	Reserved for DLMS-based applications		DLMS (See part 1)
50h	Application select to device	None	M-Bus
51h	Data send to device	None	M-Bus (not for wireless)
52h	Selection of device	None	M-Bus
54h-58h	Reserved for DLMS-based applications		DLMS (see EN 13757-1)
59h	Reserved		
5Ah	CMD to device	Short (4 Byte)	M-Bus
5Bh	CMD to device	Long (12 Byte)	M-Bus
5Ch	Synchronize action		
5Dh-5Fh	Reserved		
60h	CMD to device	Long (14 Byte)	OBIS-type value descriptors COSEM (IEC 62056-53)
61h	CMD to device	Short (6 Byte)	OBIS-type value descriptors COSEM (IEC 62056-53)
62h-63h	Reserved		
64h	CMD to device	Long (14 Byte)	Reserved for OBIS-type value descriptors
65h	CMD to device	Short (6 Byte)	Reserved for OBIS-type value descriptors
66h-68h	Reserved		
69h	Response from device (M-Bus-Format frame)	None	see Annex K
6Ah	Response from device (M-Bus-Format frame)	Short (6 Byte)	see Annex K

Table 1 *(continued)*

CI-field	Direction	Header length	Higher layer protocol
6Bh	Response from device (M-Bus-Format frame)	Long (14 Byte)	see Annex K
6Ch	Time Sync to device	Long (14 Byte)	Generic
6Dh	Time Sync to device	Long (14 Byte)	Generic
6Eh	Error from device	Short (4 Byte)	Generic
6Fh	Error from device	Long (12 Byte)	Generic
70h	Error from device	None	Generic
71h	Alarm from device	None	Generic
72h	Response from device	Long (12 Byte)	M-Bus
73h	Response from device (M-Bus-Compact frame)	Long (14 Byte)	see Annex K
74h	Alarm from device	Short (4 Byte)	Generic
75h	Alarm from device	Long (12 Byte)	Generic
76h-77h	Reserved		
78h	Response from device	None	M-Bus
79h	Response from device (M-Bus-Compact frame)	None	see Annex K
7Ah	Response from device	Short (4 Byte)	M-Bus
7Bh	Response from device (M-Bus-Compact frame)	Short (6 Byte)	see Annex K
7Ch	Response from device	Long (14 Byte)	OBIS-type value descriptors COSEM (IEC 62056-53)
7Dh	Response from device	Short (6 Byte)	OBIS-type value descriptors COSEM (IEC 62056-53)
7Eh	Response from device	Long (14 Byte)	Reserved for OBIS-type value descriptors
7Fh	Response from device	Short (6 Byte)	Reserved for OBIS-type value descriptors
80h	Transport layer to device	Long (12 Byte)	(see EN 13757-4)
81h	Network layer data		(see EN 13757-5)
82h	Reserved for a future CENELEC/TC 205 network/application Layer		
83h	Network management data		(see EN 13757-5)
84h	Transport layer to device (M-Bus-Compact frame expected)	Long (12 Byte)	see Annex K
85h	Transport layer to device (M-Bus-Format frame expected)	Long (12 Byte)	see Annex K