SLOVENSKI STANDARD
SIST EN 13757-2:2018+A1:2024

01-maj-2024

Komunikacijski sistemi za števce - 2. del: Žične komunikacije po M-vodilu (vključno z dopolnilom A1)

Communication systems for meters - Part 2: Wired M-Bus communication

Kommunikationssysteme für Zähler - Teil 2: Drahtgebundene M-Bus-Kommunikation

Systèmes de communication pour compteurs - Partie 2 : Communication M-Bus filaire

Ta slovenski standard je istoveten z: **EN 13757-2:2018+A1:2023**

ICS:

33.200	Daljinsko krmiljenje, daljinske meritve (telemetrija)	Telecontrol. Telemetering
35.100.10	Fizični sloj	Physical layer

SIST EN 13757-2:2018+A1:2024 **en,fr,de**

EUROPEAN STANDARD

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EN 13757-2:2018+A1

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English Version

Communication systems for meters - Part 2: Wired M-Bus communication

Systèmes de communication pour compteurs - Partie 2 : Communication M-Bus filaire

Kommunikationssysteme für Zähler - Teil 2: Drahtgebundene M-Bus-Kommunikation

This European Standard was approved by CEN on 8 February 2018 and includes Amendment approved by CEN on 22 October 2023.

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Contents

Page

European foreword

This document (EN 13757-2:2018+A1:2023) has been prepared by Technical Committee CEN/TC 294 “Communication systems for meters”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

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

This document supersedes ▌A1⟩ EN 13757-2:2018 ⟨A1▌.

This document includes Amendment 1 approved by CEN on 22 October 2023.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ▌A1⟩ ⟨A1▌.

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

The following significant technical changes have been incorporated in the new edition of this document:

a) more precise definition of collision state under 4.3.3.8;

b) modification of application under 5.7.3.4 from “required” to “optional”;

c) additional explanations for usage of REQ-SKE under 5.7.3.4;

d) addition of new datagram SND-UD2 under 5.7.3.4;

e) alignment of Annex D with revised definition of collision state under 4.3.3.8 and

f) editorial alignments with other parts of this standard, e.g. replacement of $E5 with ACK.

EN 13757 is currently composed with the following parts:

— *Communication systems for meters — Part 1: Data exchange*;

— *Communication systems for meters — Part 2: Wired M-Bus communication*;

— *Communication systems for meters — Part 3: Application protocols*;

— *Communication systems for meters and remote reading of meters — Part 4: Wireless meter readout (Radio meter reading for operation in SRD bands)*;

— *Communication systems for meters — Part 5: Wireless M-Bus relaying*;

— *Communication systems for meters — Part 7: Transport and security services*;

— *CEN/TR 17167*, *Communication systems for meters — Accompanying TR to* EN 13757-2,-3 *and -7, Examples and supplementary information*.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This European Standard belongs to the EN 13757 series, which covers communication systems for meters. EN 13757-1 contains generic descriptions and a communication protocol. EN 13757-3 contains detailed description of the application protocols especially the M-Bus Protocol. EN 13757-4 describes wireless communication (often called wireless M-Bus or wM-Bus). EN 13757-5 describes the wireless network used for repeating, relaying and routing for the different modes of EN 13757-4. EN 13757-6 describes a twisted pair local bus for short distance (Lo-Bus). EN 13757-7 describes transport mechanism and security methods for data. The Technical Report CEN/TR 17167 contains informative annexes from EN 13757-2, EN 13757-3 and EN 13757-7.

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

The Physical and Link Layer parameters for baseband communication over twisted pairs have first been specified in EN 1434-3:1997 (“M-Bus”) for heat meters. This standard is a compatible and interworking update of a part of EN 1434-3:2015 and includes also other measured media (e.g. water, gas, thermal energy, heat cost allocators), the master side of the communication and newer technical developments. It should be noted that EN 1434-3: 2015 covers also other communication techniques.

It can be used with various application layers especially the application layer of EN 13757-3.

1 Scope

This document is applicable to the physical and link layer parameters of baseband communication over twisted pair (M-Bus) for meter communication systems. It is especially applicable to thermal energy meters, heat cost allocators, water meters and gas meters.

NOTE It is usable also for other meters (like electricity meters) and for sensors and actuators. For generic descriptions concerning communication systems for meters and remote reading of meters see EN 13757–1.

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 13757-1:2014, *Communication systems for meters - Part 1: Data exchange*

EN 60870-5, *(all parts), Telecontrol equipment and systems (IEC 60870-5 series)*

EN 60870-5-1, *Telecontrol equipment and systems - Part 5: Transmission protocols - Section 1: Transmission frame formats*

EN 60870-5-2:1993, *Telecontrol equipment and systems - Part 5: Transmission protocols - Section 2: Link transmission procedures*

EN 61000-4-4, *Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test*

EN 61000-4-5, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

3 Terms, definitions [A1] and abbreviations [A1]

3.1 [A1] Terms and definitions [A1]

For the purposes of this document, the terms and definitions given in EN 13757-1:2014 and the following apply.

[A1] 3.1.1
communication type
frame type as defined in EN 60870-5-2:1993 and identified by the function code

Note 1 to entry: Other parts of EN 13757 also use the term message type as an equivalent. [A1]

3.1.2
unit load
one unit load (1 U_L) is the maximum mark state current of 1,5 mA

[A1] 3.1.3
ACK
acknowledge frame coded with E5h according to EN 60870-5-2:1993, 3.2 “Format FT 1.2”

3.1.4
NACK
negative acknowledge frame coded with A2h according to EN 60870-5-2:1993, 3.2 “Format FT 1.2” ⟨A1

3.2 A1⟩ Abbreviations ⟨A1

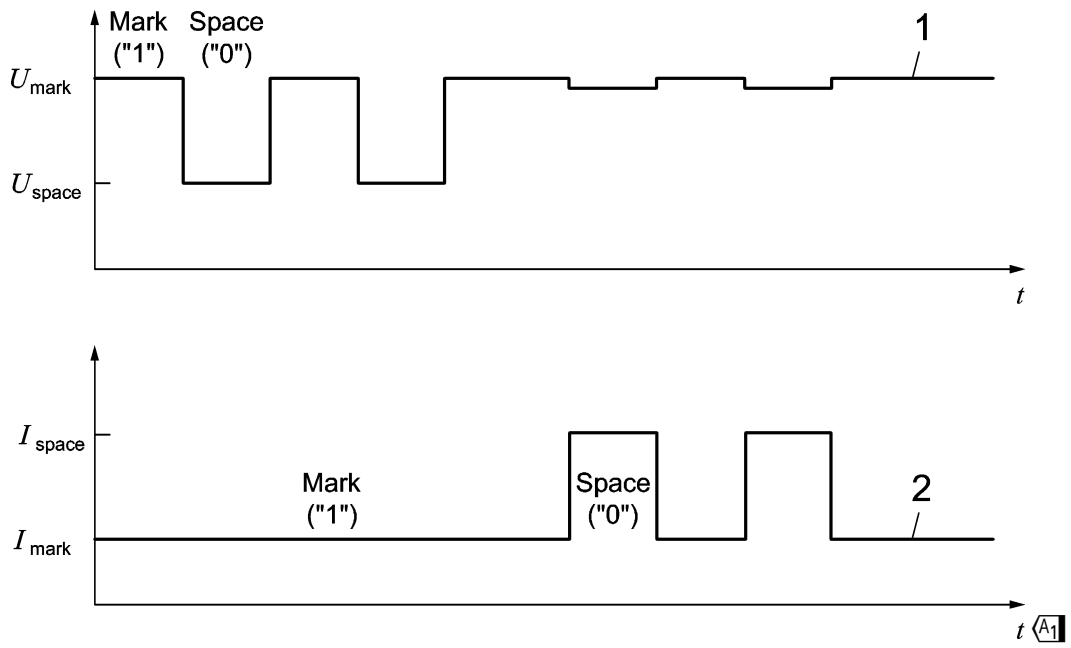
A1⟩ **Abbreviation**	**Term**
FCB	frame count bit
FCV	frame count valid bit ⟨A1

4 Physical layer specifications

4.1 General

Figure 1 shows the principal electrical concept of the physical layer: Information from the master to the slaves is transmitted via voltage level changes. A mark state voltage U_{Mark} (idle state, typically 36 V) and an space state voltage which is typically 12 V below U_{Mark} (but at least 12 V) is used for the data transmission. The high voltage step improves the noise immunity in the master to slave direction. The required minimum voltage supports a stable remote powering of all slaves of a segment. Signalling via a voltage change rather than by absolute voltage levels supports even large voltage drops due to wiring resistance of the cable installation. All slaves are constant current sinks. Their mark state current of typically 1,0 mA to 1,5 mA can be used for powering the transceiver IC in the slave and optionally also the slave (meter). The active (space state) current transmit of a slave is signalled by an increase of this constant current by (11 to20) mA. Signalling via constant current improves the immunity against induced voltages and is independent on wiring resistance. On the input of each slave transceiver a rectifier bridge makes each slave independent of the wiring polarity and reduces installation errors. Protective resistors in front of each slave transceiver simplify the implementation of overvoltage protection and safeguards, the bus against a semiconductor short circuit in a slave by limiting the current of such a defective slave to 100 mA. Annex A shows the principal function of a slave transceiver. Integrated slave transceivers which include a regulated buffered voltage output for slave (meter) powering, support of battery supply with supply switchover and power down signalling are commercially available.

A1



Key

1 Bus Voltage at Repeater, Master transmits to Slave

2 Current composition of a Slave, Slave transmits to Master

t time

Figure 1 — Representation of bits on the M-Bus

All specification requirements shall be held over the full range of temperature and operating voltage for the responsible system component.

4.2 Electrical requirements slave

4.2.1 Master to slave bus voltages

Maximum permanent voltage: - 50 V to 0 V to + 50 V (no damage).

Voltage range for meeting all specifications: ± (12 V to 42 V).

The Bus voltage at the slave terminals in mark-(quiescent) state of master slave communication (= U_{Mark}) shall be ± (21 V to 42 V).

The mark voltage shall be stored by a voltage maximum detector with an asymmetric time constant. The discharge time constant shall be greater than 30 × (charge constant) but less than 1 s.

The stored voltage maximum U_{Mark} may drop in 50 ms by not more than 0,2 V for all voltages between 12 V and U_{Mark}.

a) Bus voltage Mark/Space state for master slave communication:

   1) Space: $U_{\mathrm{Bus}} < U_{\mathrm{Mark}}$ - 8,2 V;