SLOVENSKI STANDARD
SIST EN 1434-3:2016

01-februar-2016

Nadomešča:
SIST EN 1434-3:2008

Toplotni števci - 3. del: Izmenjava podatkov in vmesniki

Heat meters - Part 3: Data exchange and interfaces

Wärmezähler - Teil 3: Datenaustausch und Schnittstellen

Compteurs d'énergie thermique - Partie 3 : Échange de données et interfaces

Ta slovenski standard je istoveten z: EN 1434-3:2015

ICS:

17.200.10 Toplota. Kalorimetrija Heat. Calorimetry

SIST EN 1434-3:2016 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1434-3

December 2015

ICS 17.200.10

Supersedes EN 1434-3:2008

English Version

Heat meters - Part 3: Data exchange and interfaces

Compteurs d'énergie thermique - Partie 3 : Échange de données et interfaces

Wärmezähler - Teil 3: Datenaustausch und Schnittstellen

This European Standard was approved by CEN on 27 September 2015.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword

This document (EN 1434-3:2015) 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 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

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.

This document supersedes EN 1434-3:2008.

The following significant editorial changes compared to the previous edition have been incorporated in this European Standard:

a) update of normative references;

b) update of Table 1 “Possible combinations of interfaces and standards”;

c) addition of explanations to Table B.1 “Values for "UU", register codes”.

EN 1434 consists of the following parts, under the general title "Heat meters":

— *Part 1: General requirements*

— *Part 2: Constructional requirements*

— *Part 4: Pattern approval tests*

— *Part 5: Initial verification tests*

— *Part 6: Installation, commissioning, operational monitoring and maintenance*

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

1 Scope

This European Standard specifies the general requirements and applies to heat meters. Heat meters are instruments intended for measuring the energy which in a heat-exchange circuit is absorbed (cooling) or given up (heating) by a liquid called the heat-conveying liquid. The meter indicates heat in legal units.

Part 3 specifies the data exchange between a meter and a readout device (POINT / POINT communication). For these applications using the optical readout head, the EN 62056-21 protocol is recommended.

For direct or remote local readout of a single or a few meters via a battery driven readout device, the physical layer of EN 13757-6 (local bus) is recommended.

For bigger networks with up to 250 meters, a master unit with AC mains supply according to EN 13757-2 is necessary to control the M-Bus. For these applications the physical and link layer of EN 13757-2 and the application layer of EN 13757-3 is required.

For wireless meter communications, EN 13757-4 describes several alternatives of walk/drive-by readout via a mobile station or by using stationary receivers or a network. Both unidirectionally and bidirectionally transmitting meters are supported by this standard.

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

EN 13757-3:2013, *Communication systems for meters and remote reading of meters — Part 3: Dedicated application layer*

EN 13757-4, *Communication systems for meters and remote reading of meters — Part 4: Wireless meter readout (Radio meter reading for operation in SRD bands)*

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

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)*

3 Meter interfaces and protocols overview

Table 1 — Possible combinations of interfaces and standards

Hardware interface type	Recommended standard	Alternative standards
Optical EN 62056-21:2002, 3.2	EN 13757-2	EN 62056-21:2002, 4.1
M-Bus	EN 13757-2	No alternative
Wireless	EN 13757-4 and EN 13757-5	No alternative
Current loop	EN 62056-21:2002, 3.1	No alternative
Local Bus	EN 13757-6	No alternative
Application layer (All interfaces)	EN 13757-3	EN 13757-1

4 Physical layer

4.1 General

A meter can have either none or a number of interfaces to communicate with the outside world. If a meter has an interface in accordance with this standard, it shall fulfil at least one of the following requirements for the physical layer.

4.2 Physical layer optical interface

The optical interface is used for local data readout. A hand held unit, equipped with an optical readout head, is temporarily connected to one heat meter and the data is read out, one heat meter at a time. The physical properties of the optical interface are defined in EN 62056-21.

4.3 Physical layer M-Bus

The physical layer of the M-Bus is described in EN 13757-2. It can be used for "point to point" or for "multi-point" communication in bus systems. If a heat meter presents more than one unit load to the bus, the number of unit loads has to be shown on the meter documentation as “xUL” where x is the number of unit loads. Only integer values are allowed. Especially in extended installation, meters with an M-Bus interface might need additional protection against surge and lightning. Annex E shows various techniques for either constructing meters with an M-bus interface and integrated enhanced protection elements. In addition, it shows how to construct external protection elements for meters with a standard (unprotected) M-Bus interface. Two variants are given: one (preferred) for situation where a ground connection is available and a variant with weaker protection if no ground connection is available. An enhanced version of the protection additionally protects the meter and its interface from destruction if mains power is connected to the M-Bus terminals of the meter. If the readout frequency of the meter is limited either by software or by the battery capacity, the meter documentation shall signal the readout frequency as “x per day”, “y per h” or “z per min” where x, y or z are the number of readouts within the corresponding period allowed by the software without impairing the battery lifetime. Heat meters with unlimited readout frequency do not need such information.

4.4 Physical layer wireless interface

The physical layer wireless interface shall be according to EN 13757-4.

4.5 Physical layer current loop interface

Type of signal: 20 mA (CL interface in accordance with EN 62056-21:2002, 4.1 with galvanic separation).

Power supply: on the heat meter side, the interface shall be passive. The readout device supplies the necessary power.

Connections: via terminals or suitable connectors.

4.6 Physical layer Local Bus

The Local Bus is an alternative to the M-Bus. It is restricted to small installations (Mini installation/ meter cluster according to EN 13757-2) and optimized for special battery-driven masters. It does not support meter power supply from the bus. Note that this interface is not compatible with M-Bus masters according to EN 13757-2. Its physical layer is described in EN 13757-6.

5 Link layer

5.1 Link layer optical interface

5.1.1 Link layer optical interface with the EN 13757-2 protocol

If the optical interface is used with the EN 13757-2 protocol, a wake-up message can be sent after every idle time of > 330 bit times to the heat meter. The wake up message consists of zeroes and ones alternating at the desired baud rate for a duration of (2,2 ± 0,1) s. After an idle time of 33 bit times to 330 bit times, the communication can start.

5.1.2 Link layer optical interface with the EN 62056-21 protocol

The link layer optical interface shall be according to EN 62056-21.

5.1.3 Link layer optical interface with automatic protocol recognition

If the user or the handheld unit does not know which of the two alternative protocols a meter uses, it is suggested to use a combined wake-up and recognition sequence as described in the informative Annex C.

5.2 Link layer of M-Bus and Local Bus

The link layer of the M-Bus and the Local Bus is described in EN 13757-2. All required functions shall be implemented in a heat meter with an M-Bus or Local Bus connector.

If the readout frequency of the meter is limited either by software or by the battery capacity, the meter documentation shall signal the readout frequency as “x per day”, “y per h” or “z per min” where x, y or z are the number of readouts within the corresponding period allowed by the software without impairing the battery lifetime. Heat meters with unlimited readout frequency do not need such information.

5.3 Link layer wireless interface

The link layer wireless interface shall be according to EN 13757-4.

5.4 Link layer current-loop interface

The link layer current-loop interface shall be according to EN 62056-21:2002, Clause 4 to Clause 5.

6 Application layer

6.1 Application layer optical interface

6.1.1 Protocol modes according to EN 13757-3 for heat meters

Further details are given in the section on the application layer of the M-Bus.

6.1.2 Protocol modes according to EN 62056-21 for heat meters

6.1.2.1 General

This protocol may be used for the optical interface.

The basic rules of the protocol are defined in EN 62056-21. Annex B of that document deals with battery operated devices (i.e. some heat meters).

The manufacturer ID (identification) mentioned in EN 62056-21 (three upper case letters) is used for heat meters using this protocol in the same manner. For heat meter manufacturers using the data transmission protocol of EN 13757-3, the EN 62056-21 ID is also used to calculate the ID number described in Clause 6 of this standard. The formula stated in EN 13757-3:2013, 5.6 shall be used (see also Annex B).

EN 62056-21 describes various modes of operation. All main modes "A", "B", "C" and "D" are allowed for heat meters.

6.1.2.2 Restrictions for heat meters

The EN 62056-21 protocol shall be used with some restrictions. In some cases, EN 62056-21 offers more than one possibility to perform the communication. For communication with heat meters, only the selection described in the following subclauses shall be used. The selection is consistent with EN 62056-21.

6.1.2.3 Calculation of block check character

The calculation of the block check character shall always be used for the data message sent from the heat meter to the readout device.

6.1.2.4 Syntax diagram

The syntax described in EN 62056-21:2002, 5.5 shall be used for heat meters as follows:

— the wake-up message can be sent from the hand held unit to the heat meter to activate the communication facilities in the heat meter;

— the data message for heat meters shall start with the STX character and end with the ETX and BCC sequence;

— the data block consists of one or more data lines;

— each data line may contain up to 78 characters and ends with a CR and LF.

6.1.2.5 Data presentation for heat meter

EN 62056-21 does not describe the data presentation of the data message. For users of heat meters from different suppliers, the data coding for data readout application is defined. This data coding shall be used for all modes (A, B, C and D) of the EN 62056-21 protocol. In mode C, it is only used for submode a) "Data readout". The data coding for the other submodes b) "Programming mode" and c) "Supplier specific operation" are a matter of special agreement between supplier and user.

The normative Annex B describes the data set and the coding for the readout application of heat meters using this alternative protocol.

6.2 Application layer M-Bus and Local Bus

6.2.1 General

This protocol of EN 13757-3 is recommended for the M-Bus and the Local Bus interface. It can be used for the optical interface alternatively and in this case, the heat meter shall be marked with a label “M-Bus” identifying the protocol. Alternatively, the application layer of EN 13757-1 may also be used.

6.2.2 Coding of data records

Of EN 13757-3 only the variable data structure with low byte first multibyte-elements (CI = 72 h) shall be used.

7 Application

7.1 General

The application layer (Clause 6) describes how to code telegrams and data elements. The quoted standards contain many different options for different applications. This clause describes which minimum function of the quoted standards shall be implemented in a heat meter according to this standard.

7.2 Physical layer

As a minimum, two baud rates of 300 baud and 2 400 baud shall be implemented. If the heat meter does not support automatic baud rate detection, the commands for baud rate switching and fallback shall be implemented.

7.3 Link layer

A heat meter shall support both the primary and the secondary addressing via the link layer. The application shall support the assignment of primary addresses via the M-Bus. All application layer command for managing the secondary addressing mode (including the functions of extended secondary addressing) shall be supported. All application layer commands for managing the secondary address shall be supported. When the user is able to change the secondary address of the meter, the commands for the extended secondary addressing mode shall be supported as well.

7.4 Application layer

All readout telegrams shall contain at least the standard header with the meter-ID. The minimum variable data element list shall contain the actual accumulated energy. The default unit shall be the unit on the meter display. The minimum resolution of the accumulated energy shall be the same as on the meter display. The minimum value actuality shall be 15 min. The minimum readout frequency is the readout of up to 250 meters in a segment once per day.

7.5 Control applications

Meter suitable for control applications shall fulfil, in addition to the minimum requirements of 7.4, the requirements of Annex D. The suitability of a heat meter with M-Bus interface for such applications may only be declared (“Suitable for control applications" Annex D) in the meter description if all these requirements are met.

Annex A
(informative)

Recommendation for heat meter test interface

Modern heat meters are mainly equipped with CMOS microprocessors with a very low power consumption, allowing battery operation. Testing and adjusting of this type of meters needs a completely different approach. Until now, almost every meter type needed its own test equipment to handle the manufacturer's specific requirements. This is a very complicated and expensive way for users of several types of meters and for initial verification institutes. The more different types of heat meters a user has installed, the more testing equipment he may need. An economical testing of several meters should be possible and an easy adaptation to the existing test bench is of great interest.

Since this problem came up, experts have been researching an acceptable solution to it. Details of one example of an acceptable solution are given in AGFW FW 203, "Normierter Wärmezähler-Adapter" [3].