



BSI Standards Publication

Communication systems for meters

Part 3: Application protocols

National foreword

This British Standard is the UK implementation of EN 13757-3:2025. It supersedes BS EN 13757-3:2018, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/894, Remote Meter Reading.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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European foreword

This document (EN 13757-3:2025) 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of an identical text or by endorsement, at the latest by October 2025, and conflicting national standards shall be withdrawn at the latest by October 2025.

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 EN 13757-3:2018.

EN 13757-3:2025 includes the following significant technical changes with respect to EN 13757-3:2018:

- support of sensor devices and alarm devices in new subclause 6.5 and Table 13;
- change of device type codes for thermal energy meters (heat and cooling);
- addition of a new Table 14 - Bit field definition of “Installation conditions”;
- marking of unused VIF/VIFE in Table 10 and Table 12 as deprecated;
- extension of the coding of message application in Table 26;
- addition of alternative non-metric units in Annex C;
- revision of the clock synchronisation protocol in Clause E.3.

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 — Part 4: Wireless M-Bus communication;*
- *Communication systems for meters — Part 5: Wireless M-Bus relaying;*
- *Communication systems for meters — Part 7: Transport and security services ;*
- *Communication systems for meters — Part 8: Adaptation Layer;*
- *CEN/TR 17167, Communication systems for meters — Accompanying TR to EN 13757-2,-3 and -7, Examples and supplementary information.*

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

This document falls under Mandate EU M/441 “Standardisation mandate to CEN, CENELEC and ETSI in the field of measuring instruments for the development of an open architecture for utility meters involving communication protocols enabling interoperability” by providing the relevant definitions and methods for meter data transmission on application layer level. The M/441 Mandate is driving significant development of standards in smart metering.

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 document belongs to the EN 13757 series, which covers communication systems for meters. EN 13757-1 contains generic descriptions and a communication protocol. EN 13757-2 contains a physical and a link layer for twisted pair based Meter-Bus (M-Bus). EN 13757-4 specifies wireless communication (often called wireless M-Bus or wM-Bus). EN 13757-5 specifies the wireless network used for repeating, relaying and routing for the different modes of EN 13757-4. EN 13757-7 specifies transport mechanism and security methods for data. The Technical Report CEN/TR 17167 contains informative annexes for EN 13757-2, EN 13757-3 and EN 13757-7.

These upper M-Bus protocol layers can be used with various Physical Layers and with Data Link Layers and Network Layers, which support the transmission of variable length binary transparent messages. Frequently, the Physical and Link Layers of EN 13757-2 (twisted pair) and EN 13757-4 (wireless) as well as EN 13757-5 (wireless with routing function) or the alternatives specified in EN 13757-1 are used. These upper M-Bus protocol layers have 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 message length to minimize the wireless channel occupancy and hence the collision rate. Thirdly, it is 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 document 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.

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

NOTE 1 CEN/TR 17167:2023, Annex C specifies how parts of this document and of EN 13757-2 and EN 13757-4 can be used to implement smart meter functionalities. Similar functionalities could also be implemented using other physical and link layers.

NOTE 2 For information on installation procedures and their integration in meter management systems, see CEN/TR 17167:2023, Annex D.

The European Committee for Standardization (CEN) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning Image Transfer given in Annex I and which is claimed to be relevant for the following clause(s) of this document: Clause 15.

CEN takes no position concerning the evidence, validity and scope of this patent right. The holder of this patent right has ensured CEN that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with CEN. Information may be obtained from:

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1 Scope

This document specifies application services for communication systems for meters, sensors, and actuators, used to provide metering services.

This document specifies application protocols, especially the M-Bus application protocol.

This document is intended to be used with the lower layer specifications determined in the relevant parts of the EN 13757 series.

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

EN 13757-7:2025, *Communication systems for meters — Part 7: Transport and security services*

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

ISO/IEC 60559:2020, *Information technology — Microprocessor Systems — Floating-Point arithmetic*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

byte

octet of bits

3.2

datagram

unit of data transferred from source to destination

Note 1 to entry: In previous versions of EN 13757-3 datagram was called telegram.

3.3

fragment

datagram of a fragmented message

3.4

final DIFE

additional last DIFE with the value 00h that marks a storage number as a register number

3.5

hex-ASCII

base-16 numbers encoded as ASCII characters ('0'–'9', 'A'–'F')

[SOURCE: ANSI X9 TR-31:2010]

3.6

message

functional set of data transferred from source to destination

Note 1 to entry: A message can consist of one or more datagrams.

3.7

meter

measuring device for water or energy consumption, including sensors or actuators used to provide metering services

Note 1 to entry: Meter is in general understood as including metrological devices, sensors, and actuators.

Note 2 to entry: Combination of the term meter in combination with "electricity", "water", "gas", "thermal energy", "heat/cooling" is to be considered as a metrological device.

3.8

metrological device

measuring device for water or energy consumption, excluding sensors or actuators used to provide metering services

EXAMPLES electricity meter, water meter, gas meter, thermal energy meter, heat cost allocator

3.9

register number

number of a predefined historical value register (like consumption value) corresponding to an OBIS value group F value

3.10

sublayer

subdivision of a layer

[SOURCE: ISO/IEC 7498-1:1994, 5.2.1.4]

4 Abbreviations and symbols

4.1 Abbreviations

ACK	Acknowledge
AES	Advanced Encryption Standard
AFL	Authentication and Fragmentation Sublayer
APL	Application Layer
ASCII	American Standard Code for Information Interchange
BCD	Binary Coded Decimal numbers
CI	Control Information field

CMD	Command
FCB	Frame count bit (see EN 13757-2)
FCV	Frame count valid bit (see EN 13757-2)
DIB	Data Information Block
DIF	Data Information Field
DIFE	Data Information Field Extensions
DLMS	Device Language Message Specification
DRH	Data Record Header
E	Extension bit
LSB	Least Significant Byte
LSBit	Least Significant Bit
MDH	Manufacturer Data Header
MSB	Most Significant Byte
MSBit	Most Significant Bit
OBIS	Object Identification System (see EN 62056-6-1)
REQ-UD	Request User Data (class 1 or 2), (see EN 13757-4)
RSP-UD	Respond User Data (see EN 13757-4)
RSSI	Received Signal Strength Indicator
SND-NKE	Send Link Reset (see EN 13757-4)
SND-UD	Send User Data (see EN 13757-4)
SND-UD2	Send User Data 2 (see EN 13757-4)
TPL	Transport Layer
VIB	Value Information Block
VIF	Value Information Field
VIFE	Value Information Field Extensions

4.2 Symbols

Hexadecimal numbers are designated by a following “_h”.

Binary numbers are designated by a following “_b”.

Decimal numbers have no suffix.

5 Selection of an application protocol

This document supports several application protocols. A specific protocol shall be chosen accordingly to the selected CI-Field specified in EN 13757-7:2025, 5.2. Beside the M-Bus protocol there are specific protocols specified in the following clauses. Further application protocols applying DLMS/COSEM or M-Bus based usage of OBIS-type value descriptors are referenced in EN 13757-7:2025, Table 2. Annex H specifies translation from M-Bus type record descriptors to OBIS-type record descriptors.

The support for the different commands or protocols declared by the CI-field is optional in the meter.

6 M-Bus protocol

6.1 General

The application data, together with information regarding coding, length and the type of data, is transmitted in data records in arbitrary sequence.

The M-Bus Application Layer data may consist of two segments of data. The first segment holds M-Bus data records (see 6.2). The second, optional segment, holds manufacturer specific data. (see Table 1).

Table 1 — Structure of an M-Bus APL with manufacturer specific data

APL Variable data blocks (Records)	MDH (optional)	Manufacturer specific data (optional)
Variable number	1 byte	Variable number

A Manufacturer Data Header (MDH) shall be inserted before the manufacturer specific data. The MDH is one of the characters 0F_h or 1F_h. The MDH 0F_h shall be omitted if there is no manufacturer specific data (see 6.6).

Unencrypted data following encrypted data shall start at a data record boundary, i.e. the first byte of unencrypted data shall be interpreted as a DIF.

Special data structures are specified in Annex F and in Annex G.

If nothing other declared, then multi byte fields shall be transmitted with least significant byte first (little endian).

6.2 M-Bus data record

The structure of an M-Bus data record is shown in Table 2. The transmission order of the element is from left to right.

Table 2 — Data record structure

DIF	DIFE	VIF	VIFE	Data
1 byte	0 to 10 (1 byte each)	1 byte	0 to 10 (1 byte each)	0 to N bytes
Data Information Block (DIB)		Value Information Block (VIB)		
Data Record Header (DRH)				

Each data record consists of a Data Record Header (DRH) and the value (data). The DRH consists of a Data Information Block (DIB) and a Value Information Block (VIB). The DIB specifies the length, type and coding of the data. The VIB specifies the unit for the data and the multiplier to use.

NOTE An application message can contain either just a single data record but also an arbitrary number of such data records in arbitrary order, each describing and containing a data element. For examples of such multi record messages see CEN/TR 17167:2023, Annex A, or for further information on M-Bus see CEN/TR 17167:2023, Annex C.

6.3 Data Information Block (DIB)

6.3.1 General

The DIB contains at least one byte of Data Information Field (DIF) and can be extended by a maximum of 10 Data Information Field Extensions (DIFE).

6.3.2 Data Information Field (DIF)

The coding of the DIF is shown in Table 3.

Table 3 — Data Information Field (DIF)

Bit 7	6	5	4	3	2	1	0
Extension bit (E)	LSBit of storage number	Function Field		Data field: Length and coding of data			

6.3.3 Data field

The data field shows how length and coding of data shall be interpreted. Table 4 shows the allowed codes for the data field.

Table 4 — Coding of the data field

Code	Length in bit	Data type
0000 _b	0	No data
0001 _b	8	8 bit integer/binary
0010 _b	16	16 bit integer/binary
0011 _b	24	24 bit integer/binary
0100 _b	32	32 bit integer/binary
0101 _b	32	32 bit real
0110 _b	48	48 bit integer/binary
0111 _b	64	64 bit integer/binary
1000 _b	0	Selection for readout
1001 _b	8	2 digit BCD
1010 _b	16	4 digit BCD
1011 _b	24	6 digit BCD
1100 _b	32	8 digit BCD
1101 _b	N	Variable length
1110 _b	48	12 digit BCD
1111 _b	—	Special functions

For a detailed description of data types, refer to Annex A (e.g. BCD = type A, Real = type H). The coding as integer/binary by default implies coding type B (signed integer). The coding may however be overridden by the settings in VIF/VIFE of the record (e.g. date/time).

Variable length:

A Code of 1101_b implies data with variable length. The length is coded in the first byte of the data, after the DRH and is named LVAR. (e.g. LVAR = 02_h shows that two bytes of data follows.)

If LVAR is used as the variable length of a wireless M-Bus data container (see CEN/TR 17167:2023, Annex F) it counts the number of bytes inside the container (see Table 5).

Table 5 — LVAR interpretation

Range	Data Type	Calculation
00 _h –BF _h ^a	8-bit text string according to ISO/IEC 8859-1	LVAR (0 to 191) characters
C0 _h –C9 _h	Positive BCD number	(LVAR–C0h)*2 digits, 0 to 18 digits
D0 _h –D9 _h	Negative BCD number	(LVAR–D0h)*2 digits, 0 to 18 digits
E0 _h –EF _h	Binary number	(LVAR–E0h) bytes, 0 to 15 bytes
F0 _h –F4 _h	Binary number	4*(LVAR–ECh) bytes, 16, 20, 24, 28, 32 bytes
F5 _h	Binary number	48 bytes
F6 _h	Binary number	64 bytes
Others LVAR values	Reserved	

^a If a wireless M-Bus data container is used it counts the number of bytes inside the container (see also Table 12, Footnote f).

All multi byte fields following LVAR (according to Table 5) shall be transmitted with Least Significant Byte first.

A Code of 1111_b implies coding for special functions as specified in Table 6.

Table 6 — DIF-coding for special functions

DIF	Function
0F _h	Start of manufacturer specific data structures to end of user data (see 6.6)
1F _h	Same meaning as DIF = 0F _h + more records follow in next datagram (see 6.6)
2F _h	Idle filler (not to be interpreted), following byte = DIF of next record
3F _h to 6F _h	Reserved
7F _h	Global readout request (all storage numbers, units, tariffs, Function Fields)

6.3.4 Function Field

The Function Field gives the type of value as specified in Table 7.

Table 7 — Function Field

Code	Description
00 _b	Instantaneous value
01 _b	Maximum value
10 _b	Minimum value
11 _b	Value during error state

6.3.5 Storage number

Bit 6 of the DIF serves as the LSBit of the storage number of the data concerned, and the slave can in this way indicate and transmit various stored or historical values of the metrological device. This bit is the least significant bit of the storage number and allows therefore the storage numbers 0 and 1 to be coded. If storage numbers higher than “1” are needed, following (optional) DIFE’s contain the higher bits. The storage number 0 signals a current value.

Each storage number is associated with a dedicated time point. Each data record with the same storage number refers the value to this (common) time point given by this storage number. A time/date record for each storage number can be included somewhere in the message to signal this time point associated with this storage number. This date or date/time is coded with a data record with a VIF = E110110n_b. Normally (but not necessarily) higher storage numbers indicate an older time point. A sequential block of storage numbers can be associated with a sequence of equidistantly spaced time points (profile). Such a block can be specified by its starting time, the time spacing, the first storage number (of such a block) and the length of the block. For an example see Annex F.

Some metrological devices require the assignment of historical values (like consumption values) to register numbers that are represented by OBIS value group F values. In this case the storage number is used to indicate the register number while the DIB shall be extended by a Final DIFE with the value 00h in order to mark the storage number as a register number. Register numbers up to 125 can be coded in this way (see Clause H.2).

6.3.6 Extension bit (E)

Bit 7, the Extension bit of the DIF, indicates when set, that additional data description follows in one or more Data Field Extension, DIFE, bytes.

6.3.7 Data Information Field Extension (DIFE)

There may be up to 10 successive DIFE bytes. The coding of the DIFE is shown in Table 8. Bit 7 (E) of a DIFE byte shows whether a further DIFE byte follows. Bit 6 is a part of the numbering of subunits. Bit 5 and 4 is a part of the numbering of the Tariff and bits 3 through 0 are a part of the Storage number. The full Storage number/Tariff/Subunit number is made up of a concatenation of the information from all of the DIFE’s for a parameter.

Table 8 — Coding of the Data Information Field Extension (DIFE)

Bit	7	6	5	4	3	2	1	0
Value	Extension Bit (E)	(Device) Subunit	Tariff		Storage number			

With the maximum of 10 DIFEs, which are provided, there are 41 bits for the storage number, 20 bits for the tariff and 10 bits for the subunit of the meter. There is no application conceivable in which this immense number of bits could all be used.

The use of the Final DIFE is explained in 6.3.5.

6.3.8 Tariff information

For each (unique) value type designation given by the following VIB at each unique time point (given by the storage number) of each unique function (given by the Function Field), there might exist still various different data, measured or accumulated under different conditions. Such conditions could be time of day, various value ranges of the variable (i.e. separate storage of positive accumulated values and negative accumulated values) itself or of other signals or variables or various averaging durations. Such variables, which could not be distinguished otherwise, are made different by assigning them different values of the tariff variable in their data information block.

NOTE This includes but is not necessarily restricted to various tariffs in a monetary sense. It is at the distinction of the manufacturer to specify for each tariff (except 0) what is different for each tariff number. Again, as with the storage numbers, all variables with the same tariff information share the same tariff associating condition.

6.3.9 Subunit information

A device (meter) may consist of several functionally/logically independent subunits. Such a device may either use multiple different primary/secondary addresses or use the subunit information in the DIFE's to address independent subunits. The use of multiple addresses is recommended for collections of physically independent devices. Devices, that share common information, but have different logical entities, are recommended to use a single address and to differentiate between the different entities using the subunit information.

6.4 Value Information Block (VIB)

6.4.1 General

A DIB will, with the exception of the special values given in Table 6, be followed by a VIB. The VIB consists of a Value Information Field (VIF) byte and zero or more (up to 10) Value Information Field Extension (VIFE) bytes. VIF/VIFE use the same extension mechanism as specified for DIF and DIFE (see 6.3.6 and 6.3.7). The basic coding of the VIF is shown in Table 9.

Table 9 — Coding of the Value Information Field (VIF)

Bit	7	6	5	4	3	2	1	0
Value	Extension Bit (E)	Unit and multiplier (value)						

There are five types of coding depending on the VIF:

- a) Primary VIF: $E000\ 0000_b$ to $E111\ 1010_b$

The unit and multiplier are taken from Table 10.

- b) Plain-text VIF: $E111\ 1100_b$

In case of $VIF = 7C_h/FC_h$, the true VIF is represented by the following ASCII string with the length given in the first byte.

Clause C.2 shows an example for a plain text VIF.

- c) Linear VIF-extension: FD_h and FB_h

In case of $VIF = FD_h$ and $VIF = FB_h$ (see Table 11) the true VIF is given by the next byte (i.e. the first VIFE) and the coding is taken from Table 12 and Table 15, respectively. This extends the available VIFs by another 256 codes.

- d) Any VIF: $7E_h/FE_h$

This VIF-Code can be used in direction master to slave for readout selection of all VIFs. See special function in 6.3.3.

- e) Manufacturer specific: $7F_h/FF_h$

In this case, the remainder of this data record including VIFs has manufacturer specific coding.

6.4.2 Primary VIFs (main table)

The first section of the main table contains integral values, the second typically averaged values, the third typically instantaneous values and the fourth block contains parameters (E: extension bit).

Table 10 — Primary VIF-codes

Coding	Description	Range coding	Range
E000 0nnn	Energy	$10^{(nnn-3)}$ Wh	0,001 Wh to 10 000 Wh
E000 1nnn	Energy	$10^{(nnn)}$ J	0,001 kJ to 10 000 kJ
E001 0nnn	Volume ^a	$10^{(nnn-6)}$ m ³	0,001 l to 10 000 l
E001 1nnn	Mass	$10^{(nnn-3)}$ kg	0,001 kg to 10 000 kg
E010 00nn	On time	nn ^d	Duration of meter power up
E010 01nn	Operating time	nn ^d	Duration of meter accumulation
E010 1nnn	Power	$10^{(nnn-3)}$ W	0,001 W to 10 000 W
E011 0nnn	Power	$10^{(nnn)}$ J/h	0,001 kJ/h to 10 000 kJ/h
E011 1nnn	Volume flow	$10^{(nnn-6)}$ m ³ /h	0,001 l/h to 10 000 l/h
E100 0nnn	Volume flow ext.	$10^{(nnn-7)}$ m ³ /min	0,000 l/min to 1 000 l/min
E100 1nnn	Deprecated (formerly Volume flow ext.)	$10^{(nnn-9)}$ m ³ /s	0,001 ml/s to 10 000ml/s
E101 0nnn	Deprecated (formerly Mass flow)	$10^{(nnn-3)}$ kg/h	0,001 kg/h to 10 000 kg/h
E101 10nn	Flow temperature	$10^{(nn-3)}$ °C	0,001 °C to 1 °C
E101 11nn	Return temperature	$10^{(nn-3)}$ °C	0,001 °C to 1 °C
E110 00nn	Temperature difference	$10^{(nn-3)}$ K	1 mK to 1 000 mK
E110 01nn	External temperature	$10^{(nn-3)}$ °C	0,001 °C to 1 °C
E110 10nn	Pressure	$10^{(nn-3)}$ bar	1 mbar to 1 000 mbar
E110 1100	Date (actual or associated with a storage number/function)	YYYY-MM-DD ^c	Data field = 0010 _b , type G
E110 1101 ^b	Date and Time (actual or associated with a storage number/function)	YYYY-MM-DD hh-mm ^c	Data field = 0100 _b , type F
E110 1101 ^b	Time (actual or associated with a storage number/function)	hh:mm:ss ^c	Data field = 0011 _b , type J
E110 1101 ^b	Date and Time (actual or associated with a storage number/function)	YYYY-MM-DD hh:mm:ss ^c	Data field = 0110 _b , type I
E110 1101 ^b	Date and Time or duration (actual or associated with a storage number/function)	YYYY-MM-DD hh:mm:ss,pppp ^c Or ssssssss,pppp ^c	Data field = 1101 _b , type M
E110 1110	Units for HCA		Dimensionless

Coding	Description	Range coding	Range
E110 1111	Reserved for a future third table of VIF-extensions		
E111 00nn	Averaging duration	nn ^d	
E111 01nn	Actuality duration	nn ^d	
E111 1000	Fabrication no		See CEN/TR 17167:2023, A.8
E111 1001	(Enhanced) identification		
E111 1010	Address		For EN 13757-2: data field 0001 _b (1 byte link layer address, data type C) For EN 13757-4: data field 0110 _b (6 byte header-ID) or 0111 _b (full 8 byte header)
^a For gas it is the temperature converted volume, unless a VIFE signals volume at metering-conditions or volume at base conditions. ^b Meaning depends on data field. Other data fields shall be handled as invalid. ^c YYYY – year MM – month DD – day hh – hour mm – minute ss – second pp – part of a second ^d nn = 00 _b - seconds nn = 01 _b - minutes nn = 10 _b - hours nn = 11 _b – days			

6.4.3 VIF-codes for special purposes

Table 11 — Special VIF-codes

Coding	Description	Purpose
1111 1011 (FB _h)	First extension of VIF-codes	True VIF is given in the first VIFE and is coded using (Table 15) (128 new VIF-Codes)
E111 1100 (7C/FC)	VIF in following string (length in first byte)	Allows user definable VIF's (in plain ASCII-String), see C.2 ^a
1111 1101 (FD _h)	Second extension of VIF-codes	True VIF is given in the first VIFE and is coded using (Table 12) (128 new VIF-Codes)
1110 1111 (EF _h)	Reserved for third extension table of VIF-codes	reserved for a future table especially for electricity meters
E111 1110 (7E/FE)	Any VIF	Used for readout selection of all VIF's (see 6.3.3, 6.4)
E111 1111 (7F/FF)	Manufacturer specific	VIFEs and data of this block are manufacturer specific
^a Coding the VIF in an ASCII-String is also allowed in combination with data as ASCII-String (using data field in DIF = 1101 _b).		

6.4.4 VIFE-code extension tables

6.4.4.1 Main VIFE-code extension table (following VIF = FDh for primary VIF)

Table 12 — Main VIFE-code extension table

Coding	Description	Group
E000 00nn	Credit of 10^{nn-3} of the nominal local legal currency units	Currency units
E000 01nn	Deprecated (formerly Debit of 10^{nn-3} of the nominal local legal currency units)	
E000 1000	Unique message identification (previously named “Access number (transmission count)”)g,k	
E000 1001	Device type ^k	
E000 1010	Manufacturer ^k	
E000 1011	Parameter set identification ^k	Enhanced identification
E000 1100	Model/Version ^k	
E000 1101	Hardware version number ^k	
E000 1110	Metrology (firmware) version number ^k	
E000 1111	Other software version number ^k	
E001 0000	Customer location ^k	
E001 0001	Customer ^k	
E001 0010	Deprecated (formerly Access code user ^k)	
E001 0011	Deprecated (formerly Access code operator ^k)	Improved selection
E001 0100	Deprecated (formerly Access code system operator ^k)	and other user requirements
E001 0101	Deprecated (formerly Access code developer ^k)	
E001 0110	Deprecated (formerly Password ^k)	
E001 0111	Error flags (binary) (device type specific) ^j (see also Clause E.1)	
E001 1000	Error mask (binary) ^j	
E001 1001	Deprecated (formerly Security key ^{i,l,k})	
E001 1010	Digital output (binary) ^j	
E001 1011	Digital input (binary) ^j	
E001 1100	Baud rate [baud] ^k	
E001 1101	Deprecated (formerly Response delay time [bit-times] ^k)	
E001 1110	Deprecated (formerly Retry)	
E001 1111	Remote control (device specific, e.g. gas valve) ^j (see Clause C.3)	
E010 0000	First storage number for cyclic storage ^k	
E010 0001	Last storage number for cyclic storage ^k	
E010 0010	Size of storage block (see Clause F.1) ^k	

Coding	Description	Group
E010 0011	Descriptor for tariff and subunit ^k (see CEN/TR 17167:2023, Annex G)	
E010 01nn	Storage interval [sec(s) to day(s)] ^a	management
E010 1000	Storage interval month(s) (see F.1)	
E010 1001	Storage interval year(s)	
E010 1010	Operator specific data ^h	
E010 1011	Deprecated (formerly Time point second (0 to 59) ^k)	
E010 11nn	Duration since last readout [sec(s) to day(s)] ^{a,k}	
E011 0000	Deprecated (formerly Start (date/time) of tariff ^b)	
E011 00nn	Deprecated (formerly Duration of tariff (nn = 01 to 11: min to days) ^k)	
E011 01nn	Deprecated (formerly Period of tariff [sec(s) to day(s)] ^{a,k})	
E011 1000	Deprecated (formerly Period of tariff months(s) ^k)	Enhanced tariff
E011 1001	Deprecated (formerly Period of tariff year(s) ^k)	management
E011 1010	Dimensionless/no VIF	
E011 1011	Data container for wireless M-Bus protocol ^f	See CEN/TR 17167:2023
E011 11nn	Period of nominal data transmissions [sec(s) to day(s)] ^{a,k} (e.g. for RF-transmissions)	Installation and start up
E100 0000 – E100 0101	Deprecated (formerly used for Volt)	
E100 0110 – E100 1100	10^{nnnn-9} V (E100 nnnn for nnnn = [6 ... 12]) ^m	Electrical units, Volt
E100 1101 – E100 1111	Deprecated (formerly used for Volt)	
E101 0000 – E101 0010	Deprecated (formerly used for Ampère)	
E101 0011 – E101 1100	$10^{nnnn-12}$ A (E101 nnnn for nnnn = [3 ... 12]) ^m	Electrical units, Ampère
E101 1101 – E101 1111	Deprecated (formerly used for Ampère)	
E110 0000	Reset counter	
E110 0001	Cumulation counter	
E110 0010	Control signal	
E110 0011	Day of week ^{e,k}	
E110 0100	Week number ^k	
E110 0101	Deprecated (formerly Time point of day change)	
E110 0110	State of parameter activation ^k	

Coding	Description	Group
E110 0111	Special supplier information ^k	
E110 10pp	Duration since last cumulation [hour(s) to years(s)] ^{c,k}	
E110 11pp	Operating time battery [hour(s) to years(s)] ^c	
E111 0000	Date and Time of battery change ^b	
E111 0001	RF level units: dBm ^d	
E111 0010	Daylight savings (beginning, ending, deviation) data type K	
E111 0011	Listening window management data type L	
E111 0100	Remaining battery life time (days) ^k	
E111 0101	Number times the meter was stopped ^k	
E111 0110	Data container for manufacture specific protocol ^f	See CEN/TR 17167:2023
E111 0111	Data container for M-Bus upper layers (starting with a CI-Field) ^f	See CEN/TR 17167:2023
E111 1000 – E111 1100	Reserved	
E111 1101	2nd level VIFE code extension table (Table 13)	
E111 1110 – E111 1111	Reserved	
^a nn = 00_b second(s) 01_b minute(s) 10_b hour(s) 11_b day(s) ^b The information about usage of data type F (Date and Time) or data type G (date), I (Date and Time), J (time) or M (Date and Time or duration) can be derived from the data field (see Table 4). ^c pp = 00_b hour(s) 01_b day(s) 10_b month(s) 11_b year(s) ^d Typically this VIFE is used in context with a Function Field of 00_b of the leading DIF. If this VIFE used together with the Function Field 10_b it declares a preset quality limit of the reception level which was exceeded (e.g. RF-Level > -80dBm). If this VIFE is used together with the Function Field 11_b it declares the typical noise level detected by this radio device. ^e Data type A (1 = Monday; 7 = Sunday, 0 = all the days). ^f Using this VIFE as a data container for wireless M-Bus, upper layer M-Bus or manufacturer specific protocol in combination with the variable length DIF = 0D_h (LVAR from 00_h to BF_h, see CEN/TR 17167:2023, Annex F). ^g The unique message identification is not resettable. ^h This data point is reserved for the transport of any special information for the operator. It shall not be used by the vendor! ⁱ Typically the security key needs to be set with data field LVAR, due to its large size. ^j Data type D according to Annex A. ^k Unsigned value coded with data type A (unsigned BCD) or data type C (unsigned integer) according to Annex A. ^l This VIFE is deprecated! The Security Information Transfer Protocol according to EN 13757-7:2025, Annex A shall be used instead. ^m This VIF only applies a subset of the nnnn-values as specified. The remaining nnnn-values are used for other VIFEs.		

6.4.4.2 2nd level VIFE-code extension table (following VIF = FD_h and VIFE = FD_h)Table 13 — 2nd level VIFE code extension table

Coding	Description	Range Coding	Range
E000 0000	Currently selected application ^a		
E000 0001	Sub device type ^b	See Table 20	
E000 001p ^c	Remaining battery lifetime (month or years) ^d		
E000 0100	Number of available communication credits on the local interface ^d		
E000 0101	Number of available communication credits on the wireless M-Bus interface ^d		
E000 011n	Reserved for communication credits on other interfaces		
E000 1000	Installation conditions ^e	See Table 14	
E000 1001 – E000 1111	Reserved		
E001 000n	CO ₂ content	10 ⁿ ppm	1ppm to 10ppm
E001 001n	CO content	10 ⁿ ppm	1ppm to 10ppm
E001 010n	VOC content (belongs to air quality sensor)	10 ⁿ ppb	1ppb to 10ppb
E001 0110	VOC content (belongs to air quality sensor)	µg/m ³	1µg/m ³
E001 0111	Particles, unspecific range	µg/m ³	1µg/m ³
E001 1000	Particles, PM1	µg/m ³	1µg/m ³
E001 1001	Particles, PM2,5	µg/m ³	1µg/m ³
E001 1010	Particles, PM10	µg/m ³	1µg/m ³
E001 1011	Particles, unspecific range	10 ⁵ M/m ³	10 ⁵ M/m ³
E001 1100	Particles, PM1	10 ⁵ M/m ³	10 ⁵ M/m ³
E001 1101	Particles, PM2,5	10 ⁵ M/m ³	10 ⁵ M/m ³
E001 1110	Particles, PM10	10 ⁵ M/m ³	10 ⁵ M/m ³
E001 1111	Illuminance	lx	1lx
E010 0000	Luminous intensity	cd	1cd
E010 0001	Irradiance, Radiant flux density	W/m ²	1W/m ²
E010 0010	Wind speed	km/sh	1 km/sh
E010 0011	Rainfall	liter/mm ²	1 l/mm ²
E010 0100	Noise	dBA	1dBA
E010 0101	Turbidity ^f	10 ⁻² FNU	10 ⁻² FNU
E010 0110	Reserved		
E010 0111	pH value	10 ⁻¹ pH value	0,1pH unit
E010 1000	Reserved		

Coding	Description	Range Coding	Range
E010 1001 - E010 1011	Reserved		
E010 1100	Number of dismounts / removal counter ^d		
E010 1101	Number of test button operated counter ^d		
E010 1110	Number of alarms ^d		
E010 1111	Number of alarm mute switch operated counter ^d		
E011 0000	Number of obstacle detected counter ^d		
E011 0001	Smoke entries blocking cumulated counter ^d		
E011 0010	Smoke chamber defect cumulated counter ^d		
E011 0011	Number of selftest failed counter ^d		
E011 0100	Number of sounder defect counter ^d		
E011 0101	Number of CO alarms low level (≥ 50 ppm / < 100 ppm) ^d		
E011 0110	Number of CO alarms medium level (≥ 100 ppm / < 300 ppm) ^d		
E011 0111	Number of CO alarms high level (≥ 300 ppm) ^d		
E011 1000	Battery status ^d	%	0 %-100 %
E011 1001	Chamber Pollution Level ^d	%	0 %-100 %
E011 101n	Distance	10 ⁿ mm	1 mm to 10 mm
E011 1100	Reserved		
E011 1101	Reserved		
E011 1110	Moisture Level	%	
E011 1111	Type or class of approval	See 6.5.4	
E100 0000	Status bits for pressure device ^{e, g}	See Table 21	
E100 0001	Status bits for smoke alarm devices ^{e, g}	See Table 22	
E100 0010	Status bits for CO alarm devices ^{e, g}	See Table 23	
E100 0011	Status bits for Heat alarm devices ^{e, g}	See Table 24	
E100 0100	Status bits for Door/Window Contact Sensor and Locked Door/Window Detector ^{e, g}	See Table 25	
E100 0101 – E111 1111	Reserved		

^a The coding of the data content shall be according to 7.2.

^b See 6.5, "Sensor specific Information"

^c $p = 0_b$ month(s)

$p = 1_b$ year(s)

^d Unsigned value coded with data type A (unsigned BCD) or data type C (unsigned integer) according to Annex A.

^e Data type D according to Annex A.

^f See [14]

Coding	Description	Range Coding	Range
^g These status bits have no mutual dependency with the TPL status bits. Unused bits shall be set to 0 _b . If the data field specifies less bits than defined in this data point, the lowest bit numbers are used.			

Table 14 — Bit field definition of “Installation conditions”

Bits	Field name	Value	Meaning
7	Standardized installation condition byte following	0 _b	Manufacturer specific installation condition byte follow
		1 _b	Standardized installation condition byte follows (reserved for future versions)
5 – 6	Prefix of Volume register of the metrological device display	11 _b	Reserved
		10 _b	k (e.g. m3, kUSGal, kiGal)
		01 _b	No prefix (e.g. litre, USGal, iGal)
		00 _b	No information provided
2 – 4	Prefix of Energy register of the metrological device display	101 _b – 111 _b	Reserved
		100 _b	G (e.g. GJ, GWh, Gcal)
		011 _b	M (e.g. MJ, MWh, Mcal)
		010 _b	k (e.g. kJ, kWh, kcal)
		001 _b	No prefix (e.g. J, Wh, cal)
		000 _b	No information provided
0 – 1	Mounting position	11 _b	Reserved
		10 _b	Return pipe installation, outlet
		01 _b	Flow pipe installation, inlet (default for water meter)
		00 _b	No information provided

6.4.5 Alternate VIFE-code extension table (following VIF = FB_n for primary VIF)

Table 15 — Alternate extended VIF-code table

Coding	Description	Range Coding	Range
E000 000n	Energy	$10^{(n-1)}$ MWh	0,1 MWh to 1 MWh
E000 001n	Reactive energy	$10^{(n)}$ kvarh	1 to 10 kvarh
E000 010n	Apparent energy	$10^{(n)}$ kVAh	1 to 10 kVAh
E000 0110	Coefficient of performance (COP) ^d	10^{-1}	0,1 (dimensionless)
E000 0111	Reserved		
E000 100n	Energy	$10^{(n-1)}$ GJ	0,1 GJ to 1 GJ
E000 101n	Reserved		
E000 11nn	Energy	$10^{(nn-1)}$ Mcal	0,1 Mcal to 100 Mcal
E001 000n	Volume	$10^{(n+2)}$ m ³	
E001 001n	Reserved		
E001 01nn	Reactive power	$10^{(nn-3)}$ kVAR	0,001 kVAR to 1 kVAR
E001 100n	Mass ^c	$10^{(n+2)}$ t	100 t to 1 000 t
E001 101n	Relative humidity ^c	$10^{(n-1)}$ %	0,1 % to 100 %
E001 1100 – E001 1111	Reserved		
E010 0000	Volume		feet ³
E010 0001	Volume		0,1 feet ³
E010 0010	Reserved		
E010 0011	Phase I-U (current to volt.)		0,1°
E010 0100	Reserved		
E010 0101	Reserved		
E010 0110	Reserved		
E010 0111	Reserved		
E010 100n	Power	$10^{(n-1)}$ MW	0,1 MW to 1 MW
E010 1010	Phase U-U (volt. to volt.)		0,1°
E010 1011	Phase U-I (volt. to current)		0,1°
E010 11nn	Frequency	$10^{(nn-3)}$ Hz	0,001 Hz to 1 Hz
E011 000n	Power	$10^{(n-1)}$ GJ/h	0,1 GJ/h to 1 GJ/h
E011 001n	Reserved		
E011 01nn	Apparent power	$10^{(nn-3)}$ kVA	0,001 kVA to 1 kVA
E011 1000 – E011 0111	Reserved		

Coding	Description	Range Coding	Range
E101 1000 – E110 0111	Reserved		
E110 1000	Resulting rating factor, K^c	$2^{(-12)}$ (Units for HCA)/h ^a	
E110 1001	Thermal output rating factor, Kq^c	Watt	
E110 1010	Thermal coupling rating factor overall, Kc^c	$2^{(-12)}$	0 to 4 ^b
E110 1011	Thermal coupling rating factor room side, Kcr^c	$2^{(-12)}$	0 to 4 ^b
E110 1100	Thermal coupling rating factor heater side, Kch^c	$2^{(-12)}$	0 to 4 ^b
E110 1101	Low temperature rating factor, Kt^c	$2^{(-12)}$	0 to 4 ^b
E110 1110	Display output scaling factor, KD^c	$2^{(-12)}$ (Units for HCA)/KWh ^a	0 to 4 kWh ^{(-1)b}
E110 1111	Reserved		
E111 00nn	Reserved		
E111 01nn	Cold/warm temperature limit	$10^{(nn-3)}$ °C	0,001 °C to 1 °C
E111 1nnn	Cum. max. of active power	$10^{(nnn-3)}$ W	0,001 W to 10 000 W

NOTE Refer also to Annex C for non-metric units.

^a “Units for HCA” is not physically unit, but a dimensionless quantity.

^b Limited to the physical reasonable range.

^c Unsigned value coded with data type A (unsigned BCD) or data type C (unsigned integer) according to Annex A.

^d Coefficient of performance (COP) is used to measure the efficiency of equipment for example heat pumps where the coefficient is the ratio of produced heat energy divided by consumed electricity energy. The coefficient of performance is typically greater than 1,0.

6.4.6 Combinable (orthogonal) VIFE-Code extension table

The code from Table 16 follows immediately the VIF or the VIFE (in case of code extension) and modifies its meaning.

Table 16 — Combinable (orthogonal) VIFE-table

VIFE-Code	Description
E000 xxxx	Reserved for object actions (master to slave): see 6.4.7 or for error codes (slave to master): see 6.4.8
E001 0000 – E001 0001	Reserved
E001 0010	Average value
E001 0011	Inverse compact profile ^c
E001 0100	Relative deviation ^a
E001 0101 – E001 1100	Record error codes (slave to master); (see 6.4.8)
E001 1101	Standard conform data content ^b

VIFE-Code	Description
E001 1110	Compact profile with register numbers ^c
E001 1111	Compact profile ^c
E010 0000	Per second
E010 0001	Per minute
E010 0010	Per hour
E010 0011	Per day
E010 0100	Per week
E010 0101	Per month
E010 0110	Per year
E010 0111	Per revolution/measurement
E010 100p	Increment per input pulse on input channel number p
E010 101p	Increment per output pulse on output channel number p
E010 1100	Per litre
E010 1101	Per m ³
E010 1110	Per kg
E010 1111	Per K (Kelvin)
E011 0000	Per kWh
E011 0001	Per GJ
E011 0010	Per kW
E011 0011	Per (K · l) (Kelvin · litre)
E011 0100	Per V (volt)
E011 0101	Per A (ampere)
E011 0110	Multiplied by s
E011 0111	Multiplied by s/V
E011 1000	Multiplied by s/A
E011 1001	Start date(/time) of ^d
E011 1010	VIF contains uncorrected unit or value at metering conditions instead of converted unit
E011 1011	Accumulation only if positive contributions (e.g. forward flow contribution)
E011 1100	Accumulation of abs value only if negative contributions ^h
E011 1101	Used for non-metric unit system (according to Table C.1)
E011 1110	Value at base conditions ^e
E011 1111	OBIS-declaration (data type C follows in case of binary coding)
E100 u000	U = 1: upper, u = 0: lower limit value
E100 u001	Number of exceeds of lower u = 0)/upper (U = 1) limit
E100 uf1b	Date (/time) of: b = 0: begin, b = 1: end of, f = 0: first, f = 1: last, u = 0: lower, u = 1: upper limit exceed ^d

VIFE-Code	Description
E100 0100	Multiplied by flow temperature divided by 100
E100 0101	Multiplied by return temperature divided by 100
E101 ufnn	Duration of limit exceed (u, f: as above, nn = duration ^g)
E110 0fnn	Duration of ^d (f: as above, nn = duration ^g)
E110 1u00	Value during lower (u = 0), upper (u = 1) limit exceed
E110 1001	Leakage values
E110 1101	Overflow values
E110 1f1b	Date (/time) of ^d (f, b: as above)
E111 0nnn	Multiplicative correction factor for value (not unit): 10^{nnn-6}
E111 10nn	Additive correction constant: 10^{nn-3} unit of VIF (offset) ^f
E111 1100	Extension of combinable (orthogonal) VIFE-Code (refer to Table 17)
E111 1101	Multiplicative correction factor for value (not unit): 10^3
E111 1110	Future value
E111 1111	Next VIFEs and data of this block are manufacturer specific
^a Use the multiplier VIFE E111 0nnn to generate % or ppm values, e.g. multiplier of 10^{-2}. ^b This VIFE shall be attached to a special VIFE if the content of the related data point has not a manufacture specific use but conforms exclusively to the specifications of Annex E. ^c This VIFE declares a series of data points as compact profile. According to Annex F. ^d The information about usage of data type F (Date and Time) or data type G (date), I (Date and Time), J (time) or M (Date and Time or duration) can be derived from the data field (see Table 4). ^e Used either to indicate that the consumption value is referenced, respectively converted to base conditions (e.g. gas volume at base temperature and base pressure) or for the base condition itself (e.g. reference/base temperature or reference/base pressure). ^f The additive correction constant is given as a separate data record. ^g nn = 00_b second(s) 01_b minute(s) 10_b hour(s) 11_b day(s) ^h This VIFE shall be used to identify e.g. reverse volume consumption of a water meter, cooling energy consumption of a combined heat/cooling meter, etc.	

The codes of Table 17 follow immediately after the VIFE = FC_h of Table 16.

Table 17 — Extension of combinable VIFE-table (following VIFE = FC_h of combinable (orthogonal) VIFE-table)

VIFE-Code	Description
E000 0000	Reserved
E000 0001 ^g	At phase L1
E000 0010 ^g	At phase L2
E000 0011 ^g	At phase L3

VIFE-Code	Description
E000 0100	At neutral (N)
E000 0101 ^g	Measured from L2 to L1
E000 0110 ^g	Measured from L3 to L2
E000 0111 ^g	Measured from L1 to L3
E000 1000	At quadrant Q1
E000 1001	At quadrant Q2
E000 1010	At quadrant Q3
E000 1011	At quadrant Q4
E000 1100	Delta between import and export ($\text{abs}(Q1+Q4) - \text{abs}(Q2+Q3)$)
E000 1101	Used for alternative non-metric unit system (according to Table C.2)
E000 1110	Measurement related to a secondary sensor of the device
E000 1111	Additional register variant with higher resolution than the main register of the meter
E001 0000	Accumulation of absolute value for both positive and negative contribution (absolute count) ^a
E001 0001	Data presented with type C according Annex A ^b
E001 0010	Data presented with type D according Annex A ^b
E001 0011	End date(/time) of ^{c,d}
E001 0100	Direction: from communication partner to meter ^e
E001 0101	Direction: from meter to communication partner ^e
E001 0110	Liquid pressure ^f
E001 0111	Gas pressure ^f
E001 1000	Value measured outdoors
E001 1001 – E010 0100	Reserved
E010 0101 ^g	Measured from L1 to L2
E010 0110 ^g	Measured from L2 to L3
E010 0111 ^g	Measured from L3 to L1
E010 1000 – E111 1111	Reserved
^a This extension is used in special case if the meter index counts up independent of the polarity of the meter (for both directions). ^b Only applicable for data types “integer/binary” according to Table 4. ^c “Date(/time) of” or “Duration of” relates to the information which the whole Data Record Header contains. ^d The information about usage of data type F (Date and Time) or data type G (date), I (Date and Time), J (time) or M (Date and Time or duration) can be derived from the data field (see Table 4). ^e Specifies the applicable direction of specific parameters like RSSI-level. ^f Qualifier for E110 10nn from Table 10, Primary VIF-codes. ^g See examples in Annex J	

6.4.7 Generalized object layer

The fundamental idea of an object is the encapsulation of data and methods or actions for the data. In case of writing data to a slave the master software can pack data and information about the action, which the slave shall do with this data, in one data record. This variable data record with actions is now called an object. Following any VIF including a VIF = FD_h or VIF = FB_h with the true value information in the first VIFE, another (usually the last) VIFE can be added which contains a code signalling object actions according to Table 18.

Table 18 — Action codes for the generalized object layer (master to slave)

VIFE-Code binary	Action	Explanation
E000 0000	SET (write)	Replace old with new data
E000 0001	Add value	Add data to old data
E000 0010	Subtract value	Subtract data from old data
E000 0011	OR (set bits)	Data OR old data
E000 0100	AND	Data AND old data
E000 0101	XOR (toggle bits)	Data XOR old data
E000 0110	AND NOT (clear bits)	NOT data AND old data
E000 0111	Clear	Set data to zero
E000 1000	Add entry	Create a new data record
E000 1001	Delete entry	Delete an existing data record
E000 1010	Delayed action	A CI = 5Ch will follow and execute the desired action
E000 1011	Freeze data	Freeze data to storage no.
E000 1100	Add to readout-list	Add data record to RSP-UD
E000 1101	Delete from readout-list	Delete data record from RSP-UD
E000 1110	Reserved	
E000 1111	GET (read)	Read a single data record
NOTE The object action “write/replace” (VIFE = E000 0000) is the default and is assumed if there is no VIFE with an object action for this record.		

6.4.8 Record errors

To report errors belonging just to a special record and not to the full application, the slave can add to the defective record a VIFE containing one of the values of Table 19 to code the type of application error, which has occurred for this record.

Table 19 — Codes for record errors (E = Extension bit)

VIFE-Code	Type of record error	Error group
E000 0000	None	DIF errors
E000 0001	Too many DIFEs	
E000 0010	Storage number not implemented	
E000 0011	Unit number not implemented	
E000 0100	Tariff number not implemented	
E000 0101	Function not implemented	
E000 0110	Data class not implemented	
E000 0111	Data size not implemented	
E000 1000 - E000 1001	Reserved	
E000 1010	Reserved	VIF errors
E000 1011	Too many VIFEs	
E000 1100	Illegal VIF-Group	
E000 1101	Illegal VIF-Exponent	
E000 1110	VIF/DIF mismatch	
E000 1111	Unimplemented action	
E001 0000 - E001 0100	Not used for record errors	
E001 0101	No data available (undefined value)	Data errors
E001 0110	Data overflow	
E001 0111	Data underflow	
E001 1000	Data error	
E001 1001 - E001 1011	Reserved	
E001 1100	Premature end of record	Other errors

In case of record errors, the data may be invalid. The slave has some options to transmit the data:

- data field = 0000_b: no data;
- data field = 0000_b: no data and idle filler (DIF = 02Fh): fill record up to the normal length;
- other data field: dummy data of correct length;
- other data field: unsafe or estimated data.

6.5 Sensor specific information

6.5.1 General

Unlike metrological devices (3.8), sensor devices do not provide accumulated values (meter indexes), but rather measuring values that do not increase monotonously over time. Sensor values are typically unrelated to fixed calendar events (such as due dates) but come up typically as current values or as values related to an event, e.g. maximum/minimum values.

A sub-class of sensor devices are alarm devices, such as smoke, heat or CO alarm devices. They analyse sensor data and generate alarm events and status data.

6.5.2 Sub device type for Sensors

6.5.2.1 General

For sensors using the generic device type “sensor device” (1F_h) as defined in EN 13757-7:2025, 7.5.4 an additional data point “sub device type” should be provided together with the measurement values. This is used to specify one or more sensor types accurately.

If the VIFE “sub device type” is applied according to Table 13, the coding of the sub device type values is given in Table 20.

Table 20 — Sub device types

Value	Description	Remarks
0	Void	This value serves as length filler for lists of sub device types (see 6.5.2.2) in case the data field in the DIF does not provide the exact length needed for the list
1	Humidity sensor	Provides information about the concentration of water vapor present in the air (see also “Moisture sensor”).
2	Moisture sensor	Provides information about the presence of a liquid, especially water, often in trace amounts. Small amounts of water may be found, for example, in foods, and in some commercial products.
3	Temperature sensor	Consider weather impact for energy consumption
4	Reserved	
5	Light sensor	Consider weather impact for energy consumption
6	Rainfall sensor	Consider weather impact for energy consumption
7	pH sensor	Measure pH level of consumed/distributed water
8	Anemometer	Consider weather impact for energy consumption

Value	Description	Remarks
		Supervising the ventilation of the building
9	Glass break detector	Detect tampering of substations (distribution of energy / water)
10	Door/window contact sensor	Provides information whether a window/door is opened or closed. Detect tampering of substations (distribution of energy / water). Use for controlling radiator valves.
11	Locked window/Door detector	Provides information whether a window/door is locked or unlocked. Detect tampering of substations (distribution of energy / water)
12	Water leakage detector	Detecting leakage of water
13	Air quality sensor	Ventilation advice/control to optimize energy consumption
14	CO ₂ sensor	Ventilation advice/control to optimize energy consumption
15	Turbidity sensor	Supervise water quality of consumed/distributed water
16	Reserved	
17	Reserved	
18	CO alarm device	Detection of CO concentrations
19	Heat alarm device	Detection of abnormal high temperatures
20	Smoke alarm device	Detection of fire
21	Pressure sensor	Detect pressure in a tank or pipe
22	Level sensor	Filling level of a fluid tank / reservoir / waste water level sensor
23	Noise sensor	Acoustic / environmental / ambient noise level
24...254	Reserved	
255	Other sensor	

If a sensor device has more than one single sensor, there are two ways to declare the sub device type. See 6.5.2.2 and 6.5.2.3.

6.5.2.2 List of sub device types

The sub device types of a multi sensor device are listed in a single data record.

EXAMPLE Combined temperature, humidity and CO₂ sensor device

Device type	1F _h (Sensor device)
Data record with list of sub device types (hex)	03 FD FD 01 03 01 0E
Related temperature value 33,3 °C (hex)	02 66 4D 01
Related humidity value 75 % (hex)	01 FB 1B 4B
Related CO ₂ content value 999 ppm (hex)	02 FD FD 10 E7 03

6.5.2.3 Assign sub device types to subunits

Sub device types and the corresponding sensor value data records are assigned to different subunits.

EXAMPLE Combined temperature, humidity and CO₂ sensor device

Device type	1F _h (Sensor device)
Assign sub device type “temperature” to subunit 0 (hex)	01 FD FD 01 03
Related temperature value 33,3 °C (hex)	02 66 4D 01
Assign sub device type “humidity” to subunit 1 (hex)	81 40 FD FD 01 01
Related humidity value 75 % (hex)	81 40 FB 1B 4B
Assign sub device type “CO ₂ sensor device” to subunit 2 (hex)	81 80 40 FD FD 01 0E
Related CO ₂ content value 999 ppm (hex)	82 80 40 FD FD 10 E7 03

6.5.3 Status bits of specific sensors

6.5.3.1 Overview

Table 13 contains VIFE for the coding of status bites for selected sensors. The following sub clauses specify the details of these status bits.

6.5.3.2 Pressure device

The definition of the status bits for pressure devices is given in Table 21.

Table 21 — Status bits for pressure devices

Bit	Description	Remarks
0	High pressure ^a	0 _b = no; 1 _b = yes
1	Low pressure ^b	0 _b = no; 1 _b = yes
2	Battery low ^c	0 _b = no; 1 _b = yes
3	Sensor communication error ^d	0 _b = no; 1 _b = yes
4	Controller restart ^e	0 _b = no; 1 _b = yes
5	Mechanical Tamper ^f	0 _b = no; 1 _b = yes
6	Reserved ^g	
7	Manufacturer specific bytes following	0 _b = no; 1 _b = yes
^a the measured pressure is above a configurable threshold value ^b the measured pressure is below a configurable threshold value ^c set in case of undervoltage or predicted end-of-life ^d communication module lost connection to sensor ^e restart detected, (e.g. checksum error of memory, watchdog timeout, stack overflow) ^f in case of critical mechanical modification ^g always 0		

6.5.3.3 Smoke alarm device

The definition of the status bits for smoke alarm devices is given in Table 22.

Table 22 — Status bits for smoke alarm devices

Bit	Description	Remarks
0	Device dismounted	0 _b = no; 1 _b = yes
1	Battery low	0 _b = no; 1 _b = yes
2	Hardware or software error	0 _b = no; 1 _b = yes
3	Smoke sensor fault (e.g. smoke chamber)	0 _b = no; 1 _b = yes
4	Sounder (audible) fault disabled ^a	0 _b = no; 1 _b = yes
5	Obstacle detection disabled ^a	0 _b = no; 1 _b = yes
6	Smoke entries blocked detection disabled ^a	0 _b = no; 1 _b = yes
7	Smoke alarm Condition now enabled	0 _b = no; 1 _b = yes
8	Sounder (audible) fault	0 _b = no; 1 _b = yes
9	Obstacle detected	0 _b = no; 1 _b = yes
10	Smoke entries blocked	0 _b = no; 1 _b = yes

Bit	Description	Remarks
11	Smoke alarm (Alarm condition now)	0 _b = no; 1 _b = yes
12	Active / Storage state	0 _b = active; 1 _b = storage
13	Reserved ^b	
14	Reserved ^b	
15	Manufacturer specific bytes following	0 _b = no; 1 _b = yes
^a shall always be 0 in case of Type C smoke alarm devices due to compliance to normative principles of [DIN 14676-1] in combination with [DIN SPEC 91388] ^b always 0		

6.5.3.4 CO Alarm device

The definition of the status bits for CO alarm devices is given in Table 23.

Table 23 — Status bits for CO alarm devices

Bit	Description	Remarks
0	Device dismounted	0 _b = no; 1 _b = yes
1	Battery low	0 _b = no; 1 _b = yes
2	Hardware or software error	0 _b = no; 1 _b = yes
3	CO sensor fault	0 _b = no; 1 _b = yes
4	Sounder (audible) fault disabled ^a	0 _b = no; 1 _b = yes
5	CO alarm Condition now enabled	0 _b = no; 1 _b = yes
6	CO level, LSBit	00 _b : < 50ppm 01 _b : > = 50ppm but < 100ppm 10 _b : > = 100ppm but < 300ppm 11 _b : > = 300ppm
7	CO level, MSBit	
8	Sounder (audible) fault	0 _b = no; 1 _b = yes
9	CO alarm (Alarm condition now)	0 _b = no; 1 _b = yes
10	Active / Storage state	0 _b = active; 1 _b = storage
11	Reserved ^b	
12	Reserved ^b	
13	Reserved ^b	
14	Reserved ^b	
15	Manufacturer specific bytes following	0 _b = no; 1 _b = yes
^a shall be always 0 due to compliance to normative principles of [EN 50292] ^b always 0		