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Second edition
2006-11

Electricity metering – Data exchange for meter reading, tariff and load control –

Part 61: Object identification system (OBIS)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICITY METERING – DATA EXCHANGE FOR METER READING, TARIFF AND LOAD CONTROL –

Part 61: Object identification system (OBIS)

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The IEC takes no position concerning the evidence, validity and scope of this maintenance service.

The provider of the maintenance service has assured the IEC that he is willing to provide services under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the provider of the maintenance service is registered with the IEC. Information – see also 5.1 – may be obtained from:

DLMS[1] User Association

Geneva / Switzerland

www.dlms.ch

International Standard IEC 62056-61 has been prepared by IEC technical committee 13: Equipment for electrical energy measurement and load control.

[1] Device Language Message Specification

This second edition cancels and replaces the first edition published in 2002 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- some parts of the “Manufacturer specific” ranges have been changed to “Reserved” to open code space for future standard code purposes;
- “Utility specific” ranges have been allocated;
- “Consortia specific” codes similar to “Country specific” codes have been introduced;
- a table explaining the rules for “Manufacturer specific”, “Country specific” and “Consortia specific” codes has been added;
- new time integral types of quantities have been added, some definitions have been clarified;
- new OBIS codes to identify transformer and line loss quantities, voltage dips, power failures, statuses, etc. have been added;
- some list objects and profiles may be now abstract or electricity related;
- a second billing period counter mechanism has been added and the description of handling value group F has been amended.

The text of this standard is based on the following documents:

FDIS	Report on voting
13/1388/FDIS	13/1399/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of the publication may be issued at a later date.

INTRODUCTION

The competitive electricity market requires an ever-increasing amount of timely information concerning the usage of electrical energy. Recent technology developments enable to build intelligent static metering equipment, which is capable of capturing, processing and communicating this information to all parties involved.

For further analysis of this information, for the purposes of billing, load, customer and contract management, it is necessary to uniquely identify all data in a manufacturer independent way, collected manually or automatically, via local or remote data exchange.

The definition of identification codes is based on DIN 43863-3:1997.

ELECTRICITY METERING – DATA EXCHANGE FOR METER READING, TARIFF AND LOAD CONTROL –

Part 61: Object identification system (OBIS)

1 Scope

The OBject Identification System (OBIS) defines the identification codes (ID-codes) for commonly used data items in electricity metering equipment. This part of IEC 62056 specifies the overall structure of the identification system and the mapping of all data items to their identification codes.

OBIS provides a unique identifier for all data within the metering equipment, including not only measurement values, but also abstract values used for configuration or obtaining information about the behaviour of the metering equipment. The ID codes defined in this standard are used for the identification of

- logical names of the various instances of the interface classes, or objects, as defined in IEC 62056-62;
- data transmitted through communication lines, see Clause A.1;
- data displayed on the metering equipment, see Clause A.2.

This standard applies to all types of electricity metering equipment, such as fully integrated meters, modular meters, tariff attachments, data concentrators, etc.

To cover metering equipment measuring energy types other than electricity, combined metering equipment measuring more than one type of energy or metering equipment with several physical measurement channels, the concepts of medium and channels are introduced. This allows meter data originating from different sources to be identified. While this standard fully defines the structure of the identification system for other media, the mapping of non-electrical energy related data items to ID codes needs to be completed separately.

NOTE EN 13757-1 defines identifiers for metering equipment other than electricity: heat cost allocators, cooling, heating, gas, cold water and hot water.

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.

IEC 60050-300:2001, *International Electrotechnical Vocabulary (IEV) – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instrument – Part 314: Specific terms according to the type of instrument*

IEC 61000-2-8:2002: *Electromagnetic compatibility (EMC) – Part 2-8: Environment – Voltage dips and short interruptions on public electric power supply systems with statistical measurement results*

IEC 62051:1999, *Electricity metering – Glossary of terms*

IEC 62051-1:2004, *Electricity metering – Glossary of terms – Part 1: Terms related to data exchange with metering equipment using DLMS/COSEM*

IEC 62053-23:2003, *Electricity metering equipment (a.c.) – Particular requirements – Part 23: Static meters for reactive energy (classes 2 and 3)*

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

IEC 62056-62 Ed. 2:2006, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 62: Interface classes*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-300, IEC 62051 and IEC 62051-1 apply.

3.2 Abbreviations

COSEM	COmpanion Specification for Energy Metering
IC	Interface Class
OBIS	OBject Identification System
VZ	Billing period counter

4 OBIS structure

4.1 General

OBIS codes identify data items used in energy metering equipment, in a hierarchical structure using six value groups A to F, see Figure 1.

Figure 1 – OBIS code structure *IEC 302/02*

4.2 Value group A

The value group A defines the media (energy type) to which the metering is related. Non-media related information is handled as abstract data.

4.3 Value group B

The value group B defines the channel number, i.e. the number of the input of a metering equipment having several inputs for the measurement of energy of the same or different types (e.g. in data concentrators, registration units). Data from different sources can thus be identified. The definitions for this value group are independent from the value group A.

4.4 Value group C

The value group C defines the abstract or physical data items related to the information source concerned, for example current, voltage, power, volume, temperature. The definitions depend on the value of the value group A .

Further processing, classification and storage methods are defined by value groups D, E and F.

For abstract data, value groups D to F provide further classification of data identified by value groups A to C.

4.5 Value group D

The value group D defines types, or the result of the processing of physical quantities identified with the value groups A and C, according to various specific algorithms. The algorithms can deliver energy and demand quantities as well as other physical quantities.

4.6 Value group E

The value group E defines further processing or classification of quantities identified by value groups A to D.

4.7 Value group F

The value group F defines the storage of data, identified by value groups A to E, according to different billing periods. Where this is not relevant, this value group can be used for further classification.

4.8 Manufacturer specific codes

In value groups B, C, D, E and F the following ranges are available for manufacturer-specific purposes:

- group B: 128…199;
- group C: 128…199, 240;
- group D: 128…254;
- group E: 128...254;
- group F: 128…254;

If any of these value groups contain a value in the manufacturer specific range, then the whole OBIS code shall be considered as manufacturer specific, and the value of the other groups does not necessarily carry a meaning defined in this standard or in IEC 62056-62.

In addition, manufacturer specific ranges are defined in Table 14 with A = 0, C = 96 and Table 16 with A = 1, C = 96.

4.9 Reserved ranges

By default, all codes not allocated are reserved. [2]

4.10 Summary of rules for manufacturer, utility, consortia and country specific codes

Table 1 summarizes the rules for handling manufacturer specific codes defined in 4.8, utility specific codes defined in 5.2, consortia specific codes defined in Table 7 and country specific codes defined in Table 8.

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[2] Administered by the DLMS User Association (see Foreword).

Table 1 – Rules for manufacturer, utility, consortia and country specific codes

Code type	Value group						Note
	A	B	C	D	E	F	
Manufacturer specific	0, 1, 4..9	128…199	x	x	x	x	See Note 1
		x	128… 199, 240	x	x	x	
		x	x	128…254	x	x	
		x	x	x	128…254	x	
		x	x	x	x	128…254	
Manufacturer specific abstract	0	0…64	96	50…99	0…255	0…255	See Note 2
Manufacturer specific, media related general purpose	1, 4..9	0…64	96	50…99	0…255	0…255	See Note 2
Utility specific		65…127					See Note 3
Consortia specific	0, 1, 4..9	1…64	93	See Table 7			See Note 4
Country specific		1…64	94	See Table 8			See Note 5

NOTE 1 “x” means any value.

NOTE 2 The range D = 50…99 is available for identifying objects, which are not represented by another defined code, but need representation on the display as well. If this is not required, the range D = 128…254 should be used.

NOTE 3 If the value of B is 65…127, the whole OBIS code should be considered as utility specific and the value of other groups does not necessarily carry a meaning defined neither in IEC 62056-62 nor in this standard.

NOTE 4 The usage of value group E and F are defined in consortia specific documents.

NOTE 5 The usage of value group E and F are defined in country specific documents.

Objects for which this standard defines standard identifiers shall not be re-identified by manufacturer, utility, consortia or country specific identifiers.

On the other hand, an object previously identified by a manufacturer, utility, consortia or country specific identifier may receive a standard identifier in the future, if its use is of common interest for the users of this standard.

5 Value group definitions

5.1 Value group A

The range for value group A is 0 to 15, see Table 2.

Table 2 – Value group A codes

Value group A	
0	Abstract objects
1	Electricity related objects
4	Heat cost allocator related objects
5	Cooling related objects
6	Heat related objects
7	Gas related objects
8	Cold water related objects
9	Hot water related objects
All other	Reserved

5.2 Value group B

The range for value group B is 1 to 255, see Table 3.

Table 3 – Value group B codes

Value group B	
0	No channel specified
1	Channel 1
…	
64	Channel 64
65…127	Utility specific codes
128…199	Manufacturer specific codes
200…255	Reserved

If channel information is not essential, the value 0 shall be assigned.

The range 65…127 is available for utility specific use. If the value of group B is in this range, the whole OBIS code shall be considered as utility specific and the value of other groups does not necessarily carry a meaning defined neither in this standard nor in IEC 62056-62.

5.3 Value group C

The range for value group C is 0 to 255, see Table 4 and Table 5.

5.3.1 Abstract objects

Abstract objects are data items, which are not related to a certain type of physical quantity.

Table 4 – Value group C codes – Abstract objects

Value group C Abstract objects (A = 0)	
0…89	Context specific identifiers [a]
93	Consortia specific identifiers (see 5.4.3)
94	Country specific identifiers (see 5.4.4)
96	General service entries (see 5.7)
97	General error messages (see 5.7)
98	General list objects (see 5.9)
99	Abstract data profiles (see 5.10)
127	Inactive objects [b]
128…199, 240	Manufacturer specific codes
All other	Reserved

[a] Context specific identifiers identify objects specific to a certain protocol and/or application. For the COSEM context, the identifiers are defined in IEC 62056-62, Clause D.1.

[b] An inactive object is an object, which is defined and present in a meter, but which has no assigned functionality.

5.3.2 Electricity related objects

Table 5 – Value group C codes – Electricity

Value group C Electricity related objects (A = 1)	
0	General purpose objects (see 5.8)
1	ΣL_i Active power+ (QI+QIV) (see also Note 2)
2	ΣL_i Active power– (QII+QIII)
3	ΣL_i Reactive power+ (QI+QII)
4	ΣL_i Reactive power– (QIII+QIV)
5	ΣL_i Reactive power QI
6	ΣL_i Reactive power QII
7	ΣL_i Reactive power QIII
8	ΣL_i Reactive power QIV
9	ΣL_i Apparent power+ (QI+QIV) (see also Note 3)
10	ΣL_i Apparent power– (QII+QIII)
11	Current : any phase [a]
12	Voltage : any phase [a]
13	ΣL_i Power factor (see also Note 4)
14	Supply frequency
15	ΣL_i Active power (abs(QI+QIV)+(abs(QII+QIII)) [a]
16	ΣL_i Active power (abs(QI+QIV)-abs(QII+QIII))
17	ΣL_i Active power QI
18	ΣL_i Active power QII
19	ΣL_i Active power QIII
20	ΣL_i Active power QIV
21	L_1 Active power+ (see also Note 1)
22	L_1 Active power–
23	L_1 Reactive power+
24-30	L_1 etc. (See 4-10)
31	L_1 Current [a]
32	L_1 Voltage [a]
33	L_1 Power factor
34	L_1 Supply frequency
35-40	L_1 Active power… etc. (see 15-20)
41	L_2 Active power+
42	L_2 Active power–
43	L_2 Reactive power+
44-60	L_2 etc. (see 24-40)
61	L_3 Active power+
62	L_3 Active power–
63	L_3 Reactive power+
64-80	L_3 etc. (see 24-40)

Table 5 *(continued)*

Value group C Electricity related objects (A = 1)	
81	Angles[b]
82	Unitless quantity (pulses or pieces)
83	Transformer and line loss quantities[c]
84	ΣL_i power factor– (see also Note 4)
85	L_1 Power factor–
86	L_2 Power factor–
87	L_3 Power factor–
88	ΣL_i Ampere-squared hours (QI+QII+QIII+QIV)
89	ΣL_i Volt-squared hours (QI+QII+QIII+QIV)
91	L_0 current (neutral) [a]
92	L_0 voltage (neutral) [a]
93	Consortia specific identifiers (see 5.4.3)
94	Country specific identifiers. (see 5.4.4)
96	Electricity-related service entries (see 5.8)
97	Electricity-related error messages (see 5.8)
98	Electricity list (see 5.9)
99	Electricity data profile (see 5.10)
100…127	Reserved
128…199, 240	Manufacturer specific codes
All other	Reserved

NOTE 1 L_i *Quantity* is the value (to be measured) of a measurement system connected between the phase *i* and a reference point. In 3-phase 4-wire systems, the reference point is the neutral. In 3-phase 3-wire systems, the reference point is the phase L_2.

NOTE 2 ΣL_i *Quantity* is the total measurement value across all systems.

NOTE 3 If just one apparent energy/demand value is calculated over the four quadrants, C = 9 will be used.

NOTE 4 Power factor quantities with C = 13, 33, 53, 73 are calculated either as PF = Active power+ (C = 1, 21, 41, 61) / Apparent power+ (C = 9, 29, 49, 69) or PF = Active power– (C = 2, 22, 42, 62) / Apparent power– (C = 10, 30, 50, 70).

In the first case, the sign is positive (no sign), it means power factor in the import direction (PF+).

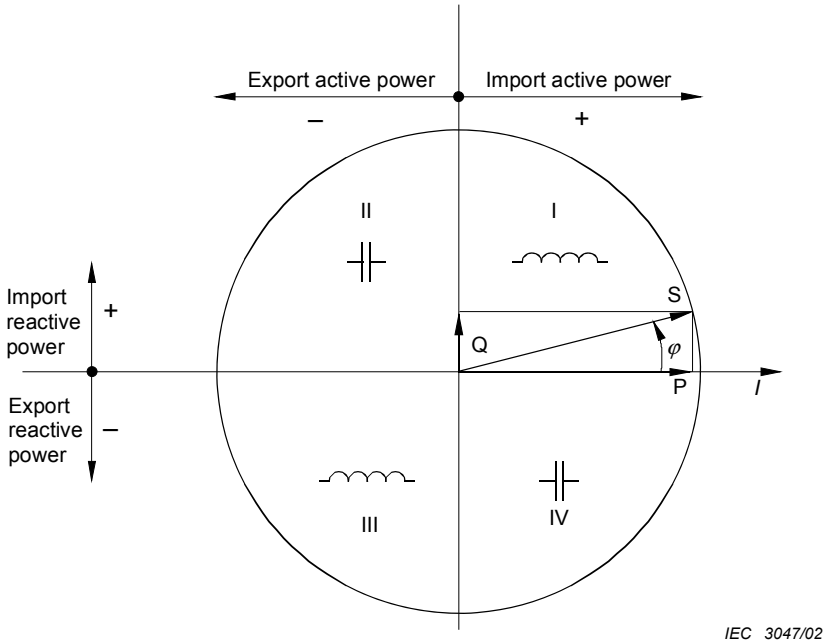
In the second case, the sign is negative, it means power factor in the export direction (PF–).

Power factor quantities C = 84, 85, 86 and 87 are always calculated as PF– = Active power– / Apparent power–. This quantity is the power factor in the export direction; it has no sign.

[a] For details of extended codes, see 5.5.3.

[b] For details of extended codes, see 5.5.4.

[c] For details of extended codes, see 5.5.5.



NOTE The quadrant definitions are according to IEC 62053-23, Figure C.1.

Figure 2 – Quadrant definitions for active and reactive power

5.4 Value group D

5.4.1 General

The range for value group D is 0 to 255; see Table 6, Table 7 and Table 8.

5.4.2 Electricity related objects

Table 6 – Value group D codes – Electricity

Value group D Electricity related objects A = 1, C <> 0, 93, 94, 96, 97, 98, 99	
0	Billing period average (since last reset)
1	Cumulative minimum 1
2	Cumulative maximum 1
3	Minimum 1
4	Current average 1
5	Last average 1
6	Maximum 1
7	Instantaneous value
8	Time integral 1
9	Time integral 2
10	Time integral 3
11	Cumulative minimum 2
12	Cumulative maximum 2
13	Minimum 2
14	Current average 2
15	Last average 2
16	Maximum 2
17	Time integral 7
18	Time integral 8

Table 6 *(continued)*

Value group D Electricity related objects A = 1, C <> 0, 93, 94, 96, 97, 98, 99	
19	Time integral 9
20	Time integral 10
21	Cumulative minimum 3
22	Cumulative maximum 3
23	Minimum 3
24	Current average 3
25	Last average 3
26	Maximum 3
27	Current average 5
28	Current average 6
29	Time integral 5
30	Time integral 6
31	Under limit threshold
32	Under limit occurrence counter
33	Under limit duration
34	Under limit magnitude
35	Over limit threshold
36	Over limit occurrence counter
37	Over limit duration
38	Over limit magnitude
39	Missing threshold
40	Missing occurrence counter
41	Missing duration
42	Missing magnitude
55	Test average
58	Time integral 4
128…254	Manufacturer specific codes
All other	Reserved
NOTES	
Averaging scheme 1	Controlled by measurement period 1, (see Table 16) a set of registers is calculated by a metering device (codes 1…6). The typical usage is for billing purposes
Averaging scheme 2	Controlled by measurement period 2, a set of registers is calculated by a metering device (codes 11…16). The typical usage is for billing purposes
Averaging scheme 3	Controlled by measurement period 3, a set of registers is calculated by a metering device (codes 21…26). The typical usage is for instantaneous values
Averaging scheme 4	Controlled by measurement period 4, a test average value (code 55) is calculated by the metering device
Current average 1, 2, 3	See the definition of the “Demand register” interface class in IEC 62056-62. The value is calculated using measurement period 1, 2 and/or 3 respectively
Last average 1,2,3	See the definition of the “Demand register” interface class in IEC 62056-62. The value is calculated using measurement period 1, 2 or 3 respectively

Table 6 *(continued)*

Value group D Electricity related objects A = 1, C <> 0, 93, 94, 96, 97, 98, 99	
Minimum	The smallest of last average values during a billing period, see Table 16
Maximum	The largest of last average values during a billing period
Cumulative minimum	The cumulative sum of minimum values over all the past billing periods
Cumulative maximum	The cumulative sum of maximum values over all the past billing periods
Current average 5	See the definition of the “Demand register” interface class in IEC 62056-62. The value is calculated using recording interval 1, see Table 16
Current average 6	See the definition of the “Demand register” interface class in IEC 62056-62. The value is calculated using recording interval 2
Time integral 1	For a current billing period (F = 255): Time integral of the quantity calculated from the origin (first start of measurement) to the instantaneous time point. For a historical billing period (F = 0…99): Time integral of the quantity calculated from the origin to the end of the billing period given by the billing period code
Time integral 2	For a current billing period (F = 255): Time integral of the quantity calculated from the beginning of the current billing period to the instantaneous time point. For a historical billing period (F = 0…99): Time integral of the quantity calculated over the billing period given by the billing period code
Time integral 3	Time integral of the positive difference between the quantity and a prescribed threshold value
Time integral 4 ("Test time integral”)	Time integral of the quantity calculated over a time specific to the device or determined by test equipment
Time integral 5	Used as a base for load profile recording: Time integral of the quantity calculated from the beginning of the current recording interval to the instantaneous time point for recording period 1
Time integral 6	Used as a base for load profile recording: Time integral of the quantity calculated from the beginning of the current recording interval to the instantaneous time point for recording period 2
Time integral 7	Time integral of the quantity calculated from the origin (first start of measurement) up to the end of the last recording period with recording period 1
Time integral 8	Time integral of the quantity calculated from the origin (first start of measurement) up to the end of the last recording period with recording period 2
Time integral 9	Time integral of the quantity calculated from the beginning of the current billing period up to the end of the last recording period with recording period 1
Time integral 10	Time integral of the quantity calculated from the beginning of the current billing period up to the end of the last recording period with recording period 2
Under limit values	Values under a certain threshold (e.g. dips)
Over limit values	Values above a certain threshold (e.g. swells)
Missing values	Values considered as missing (e.g. interruptions)

5.4.3 Consortia specific identifiers

Table 7 specifies the use of value group D for consortia specific applications. In this table, there are no reserved ranges for manufacturer specific codes. The usage of value group E and F are defined in consortia specific documents.

Table 7 – Value group D codes – Consortia specific identifiers

Value group D Consortia specific identifiers (A = 0, C = 93 and A = 1, C = 93)	
01	SELMA Consortium
All other	Reserved
NOTE 1 Objects that are already identified in this standard must not be re-identified by consortia specific identifiers. NOTE 2 The SELMA Consortium is an associated member of the DLMS UA.	

5.4.4 Country specific identifiers

Table 8 specifies the use of value group D for country specific applications. Wherever possible, the phone codes are used. In this table, there are no reserved ranges for manufacturer specific codes. The usage of value group E and F are defined in country specific documents.

Table 8 – Value group D codes – Country specific identifiers

Value group D Country specific identifiers [a] (A = 0, C = 94 and A = 1, C = 94)	
00	Finnish identifiers
01	USA identifiers
02	Canadian identifiers
07	Russian identifiers
10	Czech identifiers
11	Bulgarian identifiers
12	Croatian identifiers
13	Irish identifiers
14	Israeli identifiers
15	Ukraine identifiers
16	Yugoslavian identifiers
27	South African identifiers
30	Greek identifiers
31	Dutch identifiers
32	Belgian identifiers
33	French identifiers
34	Spanish identifiers
35	Portuguese identifiers
36	Hungarian identifiers
38	Slovenian identifiers
39	Italian identifiers
40	Romanian identifiers
41	Swiss identifiers
42	Slovakian identifiers
43	Austrian identifiers
44	United Kingdom identifiers
45	Danish identifiers
46	Swedish identifiers
47	Norwegian identifiers
48	Polish identifiers
49	German identifiers
55	Brazilian identifiers
61	Australian identifiers
62	Indonesian identifiers
64	New Zealand identifiers
65	Singapore identifiers
81	Japanese identifiers
86	Chinese identifiers
90	Turkish identifiers
91	Indian identifiers
All other	Reserved
NOTE Objects that are already identified in this standard must not be re-identified by country specific identifiers.	

5.4.5 Use of value group D for identification of other objects

For identifiers of abstract objects see 5.7.

For identifiers of electricity related general-purpose objects see 5.8.

5.5 Value group E

5.5.1 General

The range for value group E is 0 to 255. It can be used for identifying further classification or processing of values defined by value groups A to D, as specified in the paragraphs below. The various classifications and processing methods are exclusive.

5.5.2 Identification of tariff rates

Table 9 shows the use of value group E for identification of tariff rates.

Table 9 – Value group E codes – Tariff rates

Value group E Electricity related objects (A = 1)	
0	Total
1	Rate 1
2	Rate 2
3	Rate 3
…	…
9	Rate 9
…	…
63	Rate 63
128…254	Manufacturer specific codes
All other	Reserved

5.5.3 Identification of harmonics

Table 10 shows the use of value group E for the identification of harmonics of instantaneous values of voltage, current or active power.

Table 10 – Value group E codes – Harmonics

Value group E Electricity related objects (A = 1), measurement of harmonics of voltage (C = 12, 32, 52, 72, 92), current (C = 11, 31, 51, 71, 91) or active power (C = 15, 35, 55, 75), D = 7 or D = 24	
0	Total (fundamental + all harmonics)
1	1st harmonic (fundamental)
2	2nd harmonic
...	*n*th harmonic
120	120th harmonic
124	Total Harmonic Distortion (THD) [a]
125	Total Demand Distortion (TDD) [b]
126	All harmonics [c]
127	All harmonics to nominal value ratio [d]
128...254	Manufacturer specific codes
All other	Reserved

[a] THD is calculated as the ratio of the square root of the sum of the squares of each harmonic to the value of the fundamental quantity, expressed as a percent of the value of the fundamental.

[b] TDD is calculated as the ratio of the square root of the sum of the squares of each harmonic to the maximum value of the fundamental quantity, expressed as percent of the maximum value of the fundamental.

[c] Calculated as the square root of the sum of the squares of each harmonic.

[d] This is calculated as ratio of the square root of the sum of the squares of each harmonic, to the nominal value of the fundamental quantity, expressed as percent of the nominal value of the fundamental.

5.5.4 Identification of phase angles

The following table shows the use of value group E for identification of phase angles.

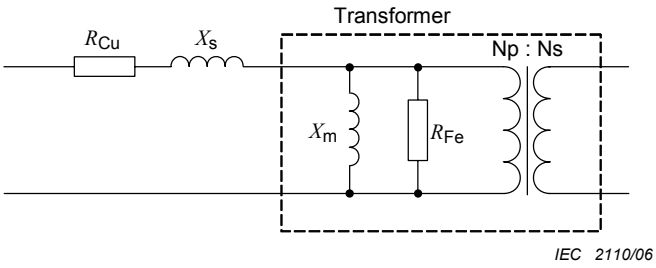
Table 11 – Value group E codes – Extended phase angle measurement

Value group E Electricity related objects (A = 1); angle measurement (C = 81; D = 7)								
Angle	**U(L1)**	**U(L2)**	**U(L3)**	**I(L1)**	**I(L2)**	**I(L3)**	**I(L0)**	**<= From**
U(L1)	(00)	01	02	04	05	06	07	
U(L2)	10	(11)	12	14	15	16	17	
U(L3)	20	21	(22)	24	25	26	27	
I(L1)	40	41	42	(44)	45	46	47	
I(L2)	50	51	52	54	(55)	56	57	
I(L3)	60	61	62	64	65	(66)	67	
I(L0)	70	71	72	74	75	76	(77)	
^ To (reference)								

5.5.5 Identification of transformer and line loss quantities

Table 12 shows the meaning of value group E for the identification of transformer and line loss quantities. The use of value group D shall be according to Table 6, the use of value group F shall be according to Table A.2. For these quantities, no tarification is available.

The model of the line and the transformer used for loss calculation is shown in Figure 3.



Key

- R_{Cu} Line resistance losses, OBIS code 1.x.0.10.2.VZ
- X_s Line reactance losses, OBIS code 1.x.0.10.3.VZ
- X_m Transformer magnetic losses, OBIS code 1.x.0.10.0.VZ
- R_{Fe} Transformer iron losses, OBIS code 1.x.0.10.1.VZ

NOTE Serial elements of the transformer are normally low compared to that of the line, therefore they are not considered here.

Figure 3 – Model of the line and the transformer for calculation of loss quantities

Table 12 – Value group E codes – Transformer and line loss quantities

Value group E Electricity related objects (A = 1); transformer and line loss quantities (C = 83)			
E=	**Quantity**	**Formula**	**Quadrant / comment**
1	ΣL_i Active line losses+	On Load Active, positive OLA+ = (CuA_1+) + (CuA_2+) + (CuA_3+)	QI+QIV
2	ΣL_i Active line losses–	On Load Active, negative OLA– = (CuA_1–) + (CuA_2–) + (CuA_3–)	QII+QIII
3	ΣL_i Active line losses	On Load Active OLA = (CuA_1) + (CuA_2) + (CuA_3)	QI+QII+QIII+QIV
4	ΣL_i Active transformer losses+	No Load Active, positive NLA+ = (FeA_1+) + (FeA_2+) + (FeA_3+)	QI+QIV
5	ΣL_i Active transformer losses–	No Load active, negative NLA– = (FeA_1–) + (FeA_2–) + (FeA_3–)	QII+QIII
6	ΣL_i Active transformer losses	No Load Active NLA = (FeA_1) + (FeA_2) + (FeA_3)	QI+QII+QIII+QIV
7	ΣL_i Active losses+	Total Losses Active, positive TLA+ = (OLA+) + (NLA+)	QI+QIV
8	ΣL_i Active losses–	Total Losses Active, negative TLA– = (OLA–) + (NLA–)	QII+QIII
9	ΣL_i Active losses	Total Losses Active TLA = OLA + NLA = TLA_1 + TLA_2 + TLA_3	QI+QII+QIII+QIV
10	ΣL_i Reactive line losses+	On Load Reactive, positive OLR+ = (CuR_1+) + (CuR_2+) + (CuR_3+)	QI+QII
11	ΣL_i Reactive line losses–	On Load Reactive, negative OLR– = (CuR_1–) + (CuR_2–) + (CuR_3–)	QIII+QIV
12	ΣL_i Reactive line losses	On Load Reactive OLR = (CuR_1) + (CuR_2) + (CuR_3)	QI+QII+QIII+QIV
13	ΣL_i Reactive transformer losses+	No Load reactive, positive NLR+ = (FeR_1+) + (FeR_2+) + (FeR_3+)	QI+QII
14	ΣL_i Reactive transformer losses–	No Load Reactive, negative NLR– = (FeR_1–) + (FeR_2–) + (FeR_3–)	QIII+QIV
15	ΣL_i Reactive transformer losses	No Load Reactive NLR = (FeR_1) + (FeR_2) + (FeR_3)	QI+QII+QIII+QIV
16	ΣL_i Reactive losses+	Total Losses Reactive, positive TLR+ = (OLR+) + (NLR+)	QI+QII
17	ΣL_i Reactive losses–	Total Losses Reactive, negative TLR– = (OLR–) + (NLR–)	QIII+QIV
18	ΣL_i Reactive losses	Total Losses Reactive TLR = OLR + NLR = TLR_1 + TLR_2 + TLR_3	QI+QII+QIII+QIV
19	Total transformer losses with normalized R_{Fe} = 1 MOhm	U^2h 1/R_{Fe} x (U^2h_{L1}+U^2h_{L2}+U^2h_{L3})	QI+QII+QIII+QIV
20	Total line losses with normalized R_{Cu} = 1 Ohm	I^2h R_{Cu} x (I^2h_{L1} + I^2h_{L2} + I^2h_{L3})	QI+QII+QIII+QIV
21	Compensated active gross+	CA+ = (A+) + (TLA+)	QI+QIV; A+ is the quantity A = 1, C = 1
22	Compensated active net+	CA+ = (A+) - (TLA+)	QI+QIV
23	Compensated active gross–	CA– = (A–) + (TLA–)	QII+QIII, A– is the quantity A = 1, C = 2
24	Compensated active net–	CA – = (A–) - (TLA–)	QII+QIII
25	Compensated reactive gross+	CR+ = (R+) + (TLR+)	QI+QII; R+ is the quantity A = 1, C = 3
26	Compensated reactive net+	CR+ = (R+) - (TLR+)	QI+QII

Table 12 *(continued)*

Value group E Electricity related objects (A = 1); transformer and line loss quantities (C = 83)			
27	Compensated reactive gross–	CR– = (R–) + (TLR–)	QIII+QIV;R0– is the quantity A = 1, C = 4
28	Compensated reactive net–	CR– = (R–) - (TLR–)	QIII+QIV
29	Reserved		
30	Reserved		
31	L_1 Active line losses+	$CuA_1+ = I^2h_{L1} \times R_{Cu}$	QI+QIV R_{Cu} is the serial resistive element of the line loss, OBIS code 1.x.0.10.2.VZ
32	L_1 Active line losses–	$CuA_1– = I^2h_{L1} \times R_{Cu}$	QII+QIII
33	L_1 Active line losses	$CuA_1 = I^2h_{L1} \times R_{Cu}$	QI+QII+QIII+QIV
34	L_1 Active transformer losses+	$FeA_1+ = U^2h_{L1}/R_{Fe}$	QI+QIV R_{Fe} is the parallel resistive element of the transformer loss, OBIS code 1.x.0.10.1.VZ
35	L_1 Active transformer losses–	$FeA_1– = U^2h_{L1}/R_{Fe}$	QII+QIII
36	L_1 Active transformer losses	$FeA_1 = U^2h_{L1}/R_{Fe}$	QI+QII+QIII+QIV
37	L_1 Active losses+	$TLA_1+ = (CuA_1+) + (FeA_1+)$	QI+QIV
38	L_1 Active losses–	$TLA_1– = (CuA_1–) + (FeA_1–)$	QII+QIII
39	L_1 Active losses	$TLA_1 = CuA_1 + FeA_1$	QI+QII+QIII+QIV
40	L_1 Reactive line losses+	$CuR_1+ = I^2hL_1 \times X_s$	QI+QII X_s is the serial reactive element of the line loss, OBIS code 1.x.0.10.3.VZ
41	L_1 Reactive line losses–	$CuR_1– = I^2h_{L1} \times X_s$	QIII+QIV
42	L_1 Reactive line losses	$CuR_1 = I^2h_{L1} \times X_s$	QI+QII+QIII+QIV
43	L_1 Reactive transformer losses+	$FeR_1+ = U^2h_{L1}/X_m$	QI+QII X_m is the parallel reactive element of the transformer loss, OBIS code 1.x.0.10.0.VZ
44	L_1 Reactive transformer losses–	$FeR_1– = U^2h_{L1}/X_m$	QIII+QIV
45	L_1 Reactive transformer losses	$FeR_1 = U^2h_{L1}/X_m$	QI+QII+QIII+QIV
46	L_1 Reactive losses+	$TLR_1+ = (CuR_1+) + (FeR_1+)$	QI+QII
47	L_1 Reactive losses–	$TLR_1– = (CuR_1–) + (FeR_1–)$	QIII+QIV
48	L_1 Reactive losses	$TLR_1 = CuR_1 + FeR_1$	QI+QII+QIII+QIV
49	L_1 Ampere-squared hours	A^2h_{L1}	QI+QII+QIII+QIV
50	L_1 Volt-squared hours	V^2h_{L1}	QI+QII+QIII+QIV
51	L_2 Active line losses+	$CuA_2+ = I^2h_{L2} \times R_{Cu}$	QI+QIV R_{Cu} is the serial resistive element of the line loss, OBIS code 1.x.0.10.2.VZ
52	L_2 Active line losses–	$CuA_2– = I^2h_{L2} \times R_{Cu}$	QII+QIII
53…70	L_2 quantities, (See 33…48)		

Table 12 *(continued)*

Value group E Electricity related objects (A = 1); transformer and line loss quantities (C = 83)			
71	L_3 Active line losses +	$CuA_3+ = I^2h_{L3} \times R_{Cu}$	QI+QIV R_{Cu} is the serial resistive element of the line loss, OBIS code 1.x.0.10.2.VZ
72	L_3 Active line losses -	$CuA_3- = I^2h_{L3} \times R_{Cu}$	QII+QIII
73…90	L_3 quantities (See 33…48)		
91… 255	Reserved		
NOTE In this table, no manufacturer specific range is available.			

5.5.6 Identification of UNIPEDE voltage dips

The following table shows the use of value group E for the identification of voltage dips according to the UNIPEDE classification.

Table 13 – Value group E codes – UNIPEDE voltage dip quantities

Value group E Electricity related objects (A = 1), Voltage dips measurement (C = 12, 32, 52, 72, D = 32)							
Depth in % of U_n	Residual voltage U in % of U_n	Duration Δt s					
		$0{,}01 < \Delta t \leq 0{,}1$	$0{,}1 < \Delta t \leq 0{,}5$	$0{,}5 < \Delta t \leq 1$	$1 < \Delta t \leq 3$	$3 < \Delta t \leq 20$	$20 < \Delta t \leq 60$
10%…<15%	$90 > U \geq 85$	00	01	02	03	04	05
15%…<30%	$85 > U \geq 70$	10	11	12	13	14	15
30%…<60%	$70 > U \geq 40$	20	21	22	23	24	25
60%…<90%	$40 > U \geq 10$	30	31	32	33	34	35
90%…<100%	$10 > U \geq 0$	40	41	42	43	44	45
NOTE These classes form a subset of the classes defined in IEC 61000-2-8, Table 2.							

5.5.7 Use of value group E for the identification of other objects

For identifiers of abstract objects see 5.7.

For identifiers of electricity related general-purpose objects see 5.8.

5.6 Value group F

5.6.1 General

The range for value group F is 0 to 255.

In all cases, if value group F is not used, it is set to 255.

5.6.2 Identification of billing periods

Value group F specifies the allocation to different billing periods (sets of historical values) for the objects with following codes:

- value group A: 1;
- value group C: as defined in Table 5;
- value group D: 0 to 3; 6; 8 to 13; 16; 21 to 23; 26.

There are two billing period schemes available (for example to store weekly and monthly values), identified with the following OBIS codes:

- billing period counter: 1.x.0.1.0.VZ or 255, or 1.x.0.1.3. VZ or 255;
- number of available billing periods 1.x.0.1.1.255 or 1.x.0.1.4.255;
- time stamp of the billing period: 1.x.0.1.2.VZ or 255 or 1.x.0.1.5.VZ or 255;
- billing period length 1.x.0.8.6.255 or 1.x.0.8.7.255.

For more, see Clause A.3.

5.6.3 Identification of multiple thresholds

Value group F is also used to identify several thresholds for the same quantity, identified with the following codes:

- value group A = 1;
- value group C = 1…20, 21…40, 41…60, 61…80, 82, 84…89, 91, 92;
- value group D = 31, 35, 39 (under limit, over limit and missing thresholds);
- value group F = 0…99.

NOTE All quantities monitored are instantaneous values: D = 7 or D = 24.

5.7 Abstract objects

Table 14 – Abstract object codes

Abstract objects, general service entries	OBIS code					
	A	B	C	D	E	F
Device ID numbers (non-energy/channel related)						
Complete device ID	0	0	96	1		
Device ID 1 (manufacturing number)	0	0	96	1	0	
…			…	…	…	
Device ID 10	0	0	96	1	9	
Metering point ID (abstract)	0	0	96	1	10	
Parameter changes, calibration and access						
Number of configuration program changes	0	x	96	2	0	
Date [a] of last configuration program change	0	x	96	2	1	
Date [a] of last time switch program change	0	x	96	2	2	
Date [a] of last ripple control receiver program change	0	x	96	2	3	
Status of security switches	0	x	96	2	4	
Date [a] of last calibration	0	x	96	2	5	
Date [a] of next configuration program change	0	x	96	2	6	
Date [a] of activation of the passive calendar	0	x	96	2	7	
Number of protected configuration program changes [b]	0	x	96	2	10	

Table 14 *(continued)*

Abstract objects, general service entries	OBIS code					
	A	B	C	D	E	F
Date [a] of last protected configuration program change [b]	0	x	96	2	11	
Date [a] (corrected) of last clock synchronization/setting	0	x	96	2	12	
Input/output control signals						
State of input/output control signals, global[c]	0	x	96	3	0	
State of input control signals (status word 1)	0	x	96	3	1	
State of output control signals (status word 2)	0	x	96	3	2	
State of input/output control signals (status word 3)	0	x	96	3	3	
State of input/output control signals (status word 4)	0	x	96	3	4	
Internal control signals						
State of the internal controsignals, global[c]	0	x	96	4	0	
State of internal control signals (status word 1)	0	x	96	4	1	
State of internal control signals (status word 2)	0	x	96	4	2	
State of internal control signals (status word 3)	0	x	96	4	3	
State of internal control signals (status word 4	0	x	96	4	4	
Internal operating status signals						
Internal operating status, global[c]	0	x	96	5	0	
Internal operating status (status word 1)	0	x	96	5	1	
Internal operating status (status word 2)	0	x	96	5	2	
Internal operating status (status word 3)	0	x	96	5	3	
Internal operating status (status word 4)	0	x	96	5	4	
Battery entries						
Battery use time counter	0	x	96	6	0	
Battery charge display	0	x	96	6	1	
Date of next change	0	x	96	6	2	
Battery voltage	0	x	96	6	3	
Number of power failures events						
In all three phases	0	0	96	7	0	
In phase L1	0	0	96	7	1	
In phase L2	0	0	96	7	2	
In phase L3	0	0	96	7	3	
Auxiliary supply	0	0	96	7	4	
Number of long power failures						
In all three phases	0	0	96	7	5	
In phase L1	0	0	96	7	6	
In phase L2	0	0	96	7	7	
In phase L3	0	0	96	7	8	
In any phase	0	0	96	7	9	
Time of power failure [d]						
In all three phases	0	0	96	7	10	
In phase L1	0	0	96	7	11	
In phase L2	0	0	96	7	12	
In phase L3	0	0	96	7	13	
In any phase	0	0	96	7	14	
Duration of long power failure [e]						
In all three phases	0	0	96	7	15	
In phase L1	0	0	96	7	16	
In phase L2	0	0	96	7	17	
In phase L3	0	0	96	7	18	

Table 14 *(continued)*

Abstract objects, general service entries	OBIS code					
	A	B	C	D	E	F
In any phase	0	0	96	7	19	
Time threshold for long power failure						
Time threshold for long power failure	0	0	96	7	20	
Operating time						
Time of operation	0	x	96	8	0	
Time of registration rate 1	0	x	96	8	1	
Time of registration rate 2	0	x	96	8	2	
…	…	…	…	…	…	
Time of registration rate 63	0	x	96	8	63	
Environmental related parameters						
Ambient temperature	0	x	96	9	0	
Status register						
Status register (Status register 1 if several status registers are used)	0	x	96	10	1	
Status register 2	0	x	96	10	2	
…	0	x	96	10	…	
Status register 10	0	x	96	10	10	
Communication port log parameters						
Reserved	0	x	96	12	0	
Number of connections	0	x	96	12	1	
Reserved	0	x	96	12	2	
Reserved	0	x	96	12	3	
Communication port parameter 1	0	x	96	12	4	
Reserved	0	x	96	12	5	
Manufacturer specific [f]	0	x	96	50	x	x
…	…	…	…	…	…	…
Manufacturer specific	0	x	96	99	x	x

NOTE If a value field is shaded, then this value group is not used. "*x*" is equal to any value within the range.

[a] Date of the event may contain the date only, the time only or both, encoded as specified in IEC 62056-62 Clause 4.4.

[b] Protected configuration is characterized by the need to open the main meter cover to modify it, or to break a metrological seal.

[c] Global status words with E = 0 contain the individual status words E = 1…4. The contents of the status words is not defined in this standard.

[d] Time of power failure is recorded when either a short or long power failure occurs.

[e] Duration of long power failure holds the duration of the last long power failure.

[f] The range D = 50…99 is available for identifying objects, which are not represented by another defined code, but need representation on the display as well. If this is not required, the range D = 128…254 should be used.

Table 15 – General error messages

Abstract objects, general error messages	OBIS code					
	A	B	C	D	E	F
Error object	0	x	97	97	x [a]	

NOTE If a value field is shaded, then this value group is not used. "x" is equal to any value within the range.

[a] If only one object is instantiated, the value shall be 0.

NOTE The information to be included in the error object is not defined in this standard.

5.8 Electricity-related general purpose objects

Table 16 – General purpose codes – Electricity

Electricity-related general purpose objects	OBIS-code					
	A	B	C	D	E	F
Free ID-numbers for utilities						
Complete combined electricity ID	1	x	0	0		
Electricity ID 1	1	x	0	0	0	
…	…	…	…	…	…	
Electricity ID 10	1	x	0	0	9	
Billing period values/reset counter entries (First billing period scheme if there are two)						
Billing period counter (1)	1	x	0	1	0	VZ or 255
Number of available billing periods (1)	1	x	0	1	1	
Time stamp of the most recent billing period (1)	1	x	0	1	2	
Time stamp of the billing period (1) VZ (last reset)	1	x	0	1	2	VZ
Time stamp of the billing period (1) VZ_{-1}	1	x	0	1	2	VZ_{-1}
…	…	…	…	…	…	…
Time stamp of the billing period (1) VZ_{-n}	1	x	0	1	2	VZ_{-n}
Billing period values/reset counter entries (Second billing period scheme)						
Billing period counter (2)	1	x	0	1	3	VZ or 255
Number of available billing periods (2)	1	x	0	1	4	
Time stamp of the most recent billing period (2)	1	x	0	1	5	
Time stamp of the billing period (2) VZ (last reset)	1	x	0	1	5	VZ
Time stamp of the billing period (2) VZ_{-1}	1	x	0	1	5	VZ_{-1}
…	…	…	…	…	…	…
Time stamp of the billing period (2) VZ_{-n}	1	x	0	1	5	VZ_{-n}
Program entries						
Configuration program version number	1	x	0	2	0	
Parameter record number	1	x	0	2	1	
Parameter record number, line 1	1	x	0	2	1	1
Reserved for future use	1	x	0	2	1	2… 127
Manufacturer specific	1	x	0	2	1	128… 254
Time switch program number	1	x	0	2	2	
RCR program number	1	x	0	2	3	
Meter connection diagram ID	1	x	0	2	4	
Passive calendar name	1	x	0	2	7	
Output pulse values or constants NOTE For units, see IEC 62056-62.						
Active energy, metrological LED	1	x	0	3	0	
Reactive energy, metrological LED	1	x	0	3	1	
Apparent energy, metrological LED	1	x	0	3	2	
Active energy, output pulse	1	x	0	3	3	
Reactive energy, output pulse	1	x	0	3	4	
Apparent energy, output pulse	1	x	0	3	5	
Volt-squared hours, metrological LED	1	x	0	3	6	
Ampere-squared hours, metrological LED	1	x	0	3	7	
Volt-squared hours, output pulse	1	x	0	3	8	

Table 16 *(continued)*

Electricity-related general purpose objects	OBIS-code					
	A	B	C	D	E	F
Ampere-squared hours, output pulse	1	x	0	3	9	
Ratios						
Reading factor for power	1	x	0	4	0	
Reading factor for energy	1	x	0	4	1	
Transformer ratio – current (numerator) [a]	1	x	0	4	2	VZ
Transformer ratio – voltage (numerator) [a]	1	x	0	4	3	VZ
Overall transformer ratio (numerator) [a]	1	x	0	4	4	VZ
Transformer ratio – current (denominator) [a]	1	x	0	4	5	VZ
Transformer ratio – voltage (denominator) [a]	1	x	0	4	6	VZ
Overall transformer ration (denominator)	1	x	0	4	7	VZ
Demand limits for excess consumption metering						
Reserved for Germany	1	x	0	5		
Nominal values						
Voltage	1	x	0	6	0	
Basic/nominal current	1	x	0	6	1	
Frequency	1	x	0	6	2	
Maximum current	1	x	0	6	3	
Reference voltage for power quality measurement	1	x	0	6	4	VZ
Input pulse values or constants [b] NOTE For units, see IEC 62056-62.						
Active energy	1	x	0	7	0	
Reactive energy	1	x	0	7	1	
Apparent energy	1	x	0	7	2	
Volt-squared hours	1	x	0	7	3	
Ampere-squared hours	1	x	0	7	4	
Unitless quantities	1	x	0	7	5	
Active energy, export	1	x	0	7	10	
Reactive energy, export	1	x	0	7	11	
Apparent energy, export	1	x	0	7	12	
Measurement period- / recording interval- / billing period duration						
Measurement period 1, for average value 1	1	x	0	8	0	VZ
Measurement period 2, for average value 2	1	x	0	8	1	VZ
Measurement period 3, for instantaneous value	1	x	0	8	2	VZ
Measurement period 4, for test value	1	x	0	8	3	VZ
Recording interval 1, for load profile	1	x	0	8	4	VZ
Recording interval 2, for load profile	1	x	0	8	5	VZ
Billing period (Billing period 1 if there are two billing period schemes)	1	x	0	8	6	VZ
Billing period 2	1	x	0	8	7	VZ
Time entries						
Time expired since last end of billing period	1	x	0	9	0	
Local time	1	x	0	9	1	
Local date	1	x	0	9	2	
Reserved for Germany	1	x	0	9	3	
Reserved for Germany	1	x	0	9	4	
Week day (0…7)	1	x	0	9	5	
Time of last reset	1	x	0	9	6	
Date of last reset	1	x	0	9	7	

Table 16 *(continued)*

Electricity-related general purpose objects	OBIS-code					
	A	B	C	D	E	F
Output pulse duration	1	x	0	9	8	
Clock synchronization window	1	x	0	9	9	
Clock synchronization method	1	x	0	9	10	
Coefficients						
Transformer magnetic losses, X_m	1	x	0	10	0	VZ
Transformer iron losses, R_{Fe}	1	x	0	10	1	VZ
Line resistance losses, R_{Cu}	1	x	0	10	2	VZ
Line reactance losses, X_s	1	x	0	10	3	VZ
Measurement methods						
Algorithm for active power measurement	1	x	0	11	1	
Algorithm for active energy measurement	1	x	0	11	2	
Algorithm for reactive power measurement	1	x	0	11	3	
Algorithm for reactive energy measurement	1	x	0	11	4	
Algorithm for apparent power measurement	1	x	0	11	5	
Algorithm for apparent energy measurement	1	x	0	11	6	
Algorithm for power factor calculation	1	x	0	11	7	
Metering point ID (electricity related)						
Metering point ID 1 (electricity related)	1	0	96	1	0	
.....						
Metering point ID 10 (electricity related)	1	0	96	1	9	
Internal operating status signals, electricity related						
Internal operating status, global [c]	1	x	96	5	0	
Internal operating status (status word 1)	1	x	96	5	1	
Internal operating status (status word 2)	1	x	96	5	2	
Internal operating status (status word 3)	1	x	96	5	3	
Internal operating status (status word 4)	1	x	96	5	4	
Meter started status flag	1	x	96	5	5	
Electricity related status data						
Status information missing voltage	1	0	96	10	0	
Status information missing current	1	0	96	10	1	
Status information current without voltage	1	0	96	10	2	
Status information auxiliary power supply	1	0	96	10	3	
Manufacturer specific [c]	1	x	96	50	x	x
.....	...	...	...	...	...	...
Manufacturer specific	1	x	96	99	x	x

NOTE If a value field is shaded, then this value group is not used. "x" is equal to any value within the range.

[a] If a transformer ratio is expressed as a fraction the ratio is numerator, divided by denominator. If the transformer ratio is expressed by an integer or real figure, only the numerator is used.

[b] The codes for export active, reactive and apparent energy shall be used only if meters measuring import energy and meters measuring export energy are connected to the pulse inputs.

[c] Global status words with E = 0 contain the individual status words E = 1…5. The contents of the status words is not defined In this standard.

[d] The range D 50…99 is available for identifying objects, which are not represented by another defined code, but need representation on the display as well. If this is not required, the range D= 128…254 should be used.

It should be noted, that some of the codes above are normally used for display purposes only, as the related data items are attributes of objects having their own OBIS name. See IEC 62056-62.

Table 17 – Electricity related error messages

Electricity related error messages	OBIS code					
	A	B	C	D	E	F
Error object	1	x	97	97	x [a]	
NOTE If a value field is shaded, then this value group is not used. "x" is equal to any value within the range.						
[a] If only one object is instantiated, the value shall be 0.						

NOTE The information to be included in the error object is not defined in this standard.

5.9 List objects

Lists – identified with one single OBIS code – are defined as a series of any kind of data (e.g. measurement value, constants, status, events).

Table 18 – General list objects

General list objects	OBIS code					
	A	B	C	D	E	F
Data of billing period (with billing period scheme 1 if there are two schemes available)	0	x	98	1	x [a]	255 [b]
Data of billing period (with billing period scheme 2)	0	x	98	2	x [a]	255 [b]
[a] If only one object is instantiated, the value shall be 0.						
[b] F = 255 means wild card here. See Clause A.3.						

Table 19 – Electricity related list objects

General list objects	OBIS code					
	A	B	C	D	E	F
Electricity related data of billing period (with billing period scheme 1 if there are two schemes available)	1	x	98	1	x [a]	255 [b]
Electricity related data of billing period (with billing period scheme 2)	1	x	98	2	x [a]	255 [b]
[a] If only one object is instantiated, the value shall be 0.						
[b] F = 255 means wild card here. See Clause A.3.						

5.10 Data profile objects

Data profiles – identified with one single OBIS code – are used to hold a series of measurement values of one or more similar quantities and/or to group various data.

Table 20 – Profile codes – Abstract

Abstract data profile objects	OBIS-code					
	A	B	C	D	E	F
Load profile with recording period 1 [b]	0	x	99	1	x [a]	
Load profile with recording period 2 [b]	0	x	99	2	x [a]	
Load profile during test [b]	0	x	99	3	0	
Connection profile	0	x	99	12	x [a]	
Event log [b]	0	x	99	98	x [a]	
[a] "x" is equal to any value within the range.						
[b] These objects should be used if they (also) hold data not specific to the energy type.						

Table 21 – Profile codes – Electricity

Electricity data profile objects	OBIS-code					
	A	B	C	D	E	F
Load profile with recording period 1	1	x	99	1	x [a]	
Load profile with recording period 2	1	x	99	2	x [a]	
Load profile during test	1	x	99	3	0	
Dips voltage profile	1	x	99	10	1	
Swells voltage profile	1	x	99	10	2	
Cuts voltage profile	1	x	99	10	3	
Voltage harmonic profile	1	x	99	11	n^{th}	
Current harmonic profile	1	x	99	12	n^{th}	
Voltage unbalance profile	1	x	99	13	0	
Power failure event log	1	x	99	97	x [a]	
Event log	1	x	99	98	x [a]	
Certification data log	1	x	99	99	x [a]	
[a] "x" is equal to any value within the range. If only one object of each kind is instantiated, the value shall be 0.						

5.11 Register table objects

Register tables – identified with a single OBIS code – are defined to hold a number of values of the same type.

Table 22 – Register table object codes – Abstract

Register table objects	OBIS-code					
	A	B	C	D	E	F
General use, abstract	0	x	98	10	x	
[a] "x" is equal to any value within the range. If only one object of each kind is instantiated, the value shall be 0.						

Table 23 – Register table object codes – Electricity

Register table objects	OBIS-code					
	A	B	C	D	E	F
UNIPEDE voltage dips, any phase	1	x	12	32		
UNIPEDE voltage dips, L_1	1	x	32	32		
UNIPEDE voltage dips, L_2	1	x	52	32		
UNIPEDE voltage dips, L_3	1	x	72	32		
Extended angle measurement	1	x	81	7		
General use, electricity related	1	x	98	10	x	
[a] "x" is equal to any value within the range. If only one object of each kind is instantiated, the value shall be 0.						

Annex A
(normative)

Code presentation

Depending on the environment used, the presentation of codes can be slightly different.

A.1 Reduced ID codes (e.g. for IEC 62056-21)

To comply with the syntax defined for protocol modes A to D of IEC 62056-21, the range of ID codes is reduced to fulfil the limitations which are usually applied to the number of digits and the ASCII representation of them. All value groups are limited to a range of 0…99 and within that range, to the limits given in the relevant chapters.

Some value groups may be suppressed, if they are not relevant to an application:

- optional value groups: A, B, E, F;
- mandatory value groups: C, D.

To allow the interpretation of shortened codes delimiters are inserted between all value groups, see Figure A.1:

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Figure A.1 – Reduced ID code presentation

The delimiter between value groups E and F can be modified to carry some information about the source of a reset (& instead of * if the reset was performed manually).

The manufacturer shall ensure that the combination of the OBIS code and the interface class (see IEC 62056-62) uniquely identifies each COSEM object.

A.2 Display

The usage of OBIS codes to display values is normally limited in a similar way as for data transfer, for example according to IEC 62056-21.

Some codes may be replaced by letters to clearly indicate the differences from other data items[3]:

Table A.1 – Example of display code replacement

Value group C	
OBIS code	**Display code**
96	C
97	F
98	L
99	P

[3] The letter codes may also be used in IEC 62056-21 protocol modes A to D.

A.3 Special handling of value group F

Unless otherwise specified, the value group F is used for the identification of values of billing periods.

The billing periods can be identified relative to the status of the billing period counter or relative to the current billing period.

There are two billing period schemes available in Table 16, each scheme defined by the length of the billing period, the billing period counter, the number of available billing periods and the time stamps of the billing period. See also 5.6.2 and IEC 62056-62, D.1.2.2.

With $0 \leq F \leq 99$, a single billing period is identified relative to the value of the billing period counter, VZ. If the value of the value group of any OBIS code is equal to VZ, this identifies the most recent (youngest) billing period. VZ_{-1} identifies the second youngest, etc. The billing period counter may have different operating modes, for example modulo-12 or modulo-100. The value after reaching the limit of the billing period counter is 0 for the operating mode modulo-100 and 1 for other operating modes (e.g. modulo-12).

With $101 \leq F \leq 125$, a single billing period or a set of billing periods are identified relative to the current billing period. F = 101 identifies the last billing period, F = 102 the second last / two last billing periods, etc., F = 125 identifies the 25^{th} last / 25 last billing periods.

F = 126 identifies an unspecified number of last billing periods, therefore it can be used as a wildcard.

F = 255 means that the value group F is not used, or identifies the current billing period value(s).

For use of interface classes for representing values of historical billing periods, see IEC 62056-62, D.1.2.2.

Table A.2 – Value group F – Billing periods

Value group F	
VZ	Most recent value
VZ_{-1}	Second most recent value
VZ_{-2}	Third most recent value
VZ_{-3}	Fourth most recent value
VZ_{-4}	…
etc.	
101	Last value
102	Second / two last value(s)
….	
125	25^{th} / 25 last value(s)
126	Unspecified number of last values

A.4 COSEM

The usage of OBIS codes in the COSEM environment is defined in IEC 62056-62.

Bibliography

DIN 43863-3:1997, *Electricity meters – Part 3: Tariff metering device as additional equipment for electricity meters – EDIS – Energy Data Identification System*

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