INTERNATIONAL STANDARD

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2002-02

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)

FOREWORD

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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 chapter 5.1) may be obtained from:

DLMS [1] User Association
Geneva / Switzerland
www.dlms.ch

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

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

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

FDIS	Report on voting
13/1269/FDIS	13/1275/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.

[1] Device Language Message Specification.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annex A forms an integral part of this standard.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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- withdrawn;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

A bilingual version of this 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 are 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 meters – Part 3: Tariff metering device as additional equipment for electricity meters – EDIS – Energy Data Identification System*

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 concept of channels and medium 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 CEN TC 294, "Communication systems for meters and remote reading meters" have implemented some non-electrical energy related codes in draft prEn 13757.

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 – 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 61268:1995, *Alternating current static var-hour meters for reactive energy (classes 2 and 3)*

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

IEC 62056-21, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange* [1]

IEC 62056-62, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 62: Interface classes* [1]

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purpose of this part of IEC 62056 the terms and definitions given in IEC 60050-300 and IEC 62051, as well as the following apply:

3.2 Abbreviations

COSEM COmpanion Specification for Energy Metering

IC Interface Class

OBIS OBject Identification System

4 OBIS structure

OBIS codes are a combination of six value groups, which describe – in a hierarchical way – the exact meaning of each data item (see figure 1).

IEC 302/02

Figure 1 – OBIS code structure

4.1 Value group A

The value group A defines the characteristic of the data item to be identified (abstract data, electricity-, gas-, heat-, water-related data).

4.2 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.

4.3 Value group C

The value group C defines the abstract or physical data items related to the information source concerned, e.g. current , voltage , power, volume, temperature. The definitions depend on the value of the value group A . Measurement, tariff processing and data storage methods of these quantities are defined by value groups D, E and F.

For abstract data, the hierarchical structure of the 6 code fields is not applicable.

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[1] To be published

4.4 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.

4.5 Value group E

The value group E defines the further processing of measurement results identified with value groups A to D to tariff registers, according to the tariff(s) in use. For abstract data or for measurement results for which tariffs are not relevant, this value group can be used for further classification.

4.6 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.

4.7 Manufacturer specific codes

If any value group C to F contains a value between 128 and 254, the whole code is considered as manufacturer specific.

5 Value group definitions

5.1 Value group A

The range for value group A is 0 to 15 (see table 1).

Table 1 – 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 possible values are reserved [1].	

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

5.2 Value group B

The range for value group B is 1 to 255 (see table 2).

Table 2 – Value group B codes

Value group B	
0	No channel specified
1	Channel 1
…	
64	Channel 64
65…127	Reserved
128 .. 254	Manufacturer specific codes
255	Reserved

With implementations that contain one channel only, even non-channel-specific data can be assigned to channel 1.

5.3 Value group C

The range for value group C is 0 to 255 (see table 3 and table 4).

5.3.1 Abstract objects

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

Table 3 – Value group C codes (abstract objects)

Value group C Abstract objects (A = 0)	
0…89	Context specific identifiers [a]
94	Country specific identifiers
96	General service entries, see 5.7
97	General error messages, see 5.7
98	General list objects, see 5.9
127	Inactive objects [b]
128…254	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.

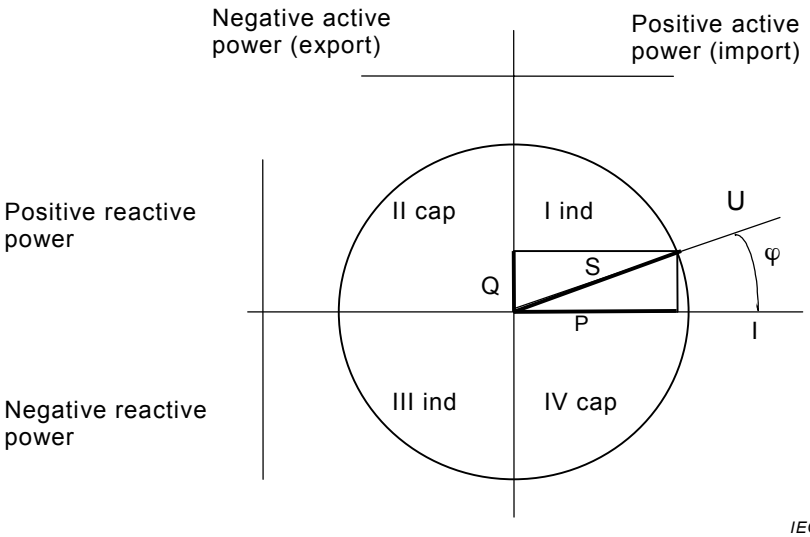
5.3.2 Quantities for electricity related objects

Table 4 – Value group C codes (electricity objects)

Value group C Electricity related objects (A = 1)	
0	General purpose objects (see 5.8)
1	ΣL_i Active power+
2	ΣL_i Active power–
3	ΣL_i Reactive power+
4	ΣL_i Reactive power–
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+
10	ΣL_i Apparent power–
11	Current : any phase
12	Voltage : any phase
13	Average power factor
14	Supply frequency
15	ΣL_i Active power QI+QIV+QII+QIII
16	ΣL_i Active power QI+QIV-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+
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
33	L_1 Power factor
34	L_1 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)
81	Angles [b]
82	Unitless quantity (pulses or pieces)

Table 4 *(continued)*

91	L_0 current (neutral)
92	L_0 voltage (neutral)
96	Electricity-related service entries, see 5.7
97	Electricity-related error messages
98	Electricity list
99	Electricity data profile see 5.10
...127	Reserved
128 .. 254	Manufacturer specific code
255	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.	
[a] For details of extended codes, see 5.5.1. [b] For details of extended codes, see 5.5.2.	



NOTE The quadrant definitions are according to IEC 61268:1995 – Annex E, Figure E.1.

Figure 2 – Quadrants for power measurement

5.4 Value group D

The range for value group D is 0 to 255 (see table 5 and table 6).

5.4.1 Electricity related objects

Table 5 –Value group D codes (electricity)

Value group D Electricity related objects A = 1, C <> 0, 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
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

Table 5 *(continued)*

55	Test average
58	Time integral 4
128 .. 254	Manufacturer specific codes
all other	Reserved

NOTE

Averaging Scheme 1

Controlled by measurement period 1 (see 5.8), 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 (see 5.8), 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 (see 5.8), 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 (see 5.8), a test average value. (code 55) is calculated by the metering device.

Last average

The value of the demand register at the end of the last measurement period.

Current average 5

The value of a current demand register using recording interval 1 as a time base.

Current average 6

The value of a current demand register using recording interval 2 as a time base.

Time integral 1

Without the inclusion of a billing period code (F <> 255): time integral of the *quantity* calculated from the origin (first start of measurement) to the instantaneous time point.

With a billing period code included (0 ≤ F < 100): 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

Without the inclusion of a billing period code(F <> 255): Time integral of the *quantity* calculated from the beginning of the current billing period to the instantaneous time point.

With a billing period code included (0<=F<100): 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.

Table 5 *(continued)*

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).

For identifiers of abstract objects see 5.7.

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

5.4.2 Value group D for country specific identifiers

Table 6 specifies the identifiers 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 6 – Value group D codes (country specific)

Value group D Country specific identifiers [a] (A = 0, 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

Table 6 *(continued)*

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
NOTE 1 All other codes reserved. NOTE 2 Objects that are already identified in this document but not included in 5.4.2 must not be re-identified by a country specific identifier. [a] Must be limited to two characters.	

5.5 Value group E

The range for value group E is 0 to 255.

Table 7 – Value group E codes (electricity)

Value group E **Electrical energy 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 code
all other	Reserved

This table is not valid if one of the following separate specifications for value group E apply.

5.5.1 Usage of value group E for current and voltage measurements

Table 8 show the meaning of the group E value while measuring current or voltage.

Table 8 – Extended current/voltage measurement

Value group E Electrical energy related objects (A = 1); current /voltage measurement (C = 31, 51, 71, 32, 52 or 72; D = 7)	
0	Total
1	1st harmonic (fundamental)
2	2nd harmonic
…	*n*th harmonic
127	127th harmonic
128…254	Manufacturer specific
255	Reserved

5.5.2 Usage of value group E for measuring angles

The following table shows the meaning of the group E value while measuring angles.

Table 9 – Extended angle measurement

Value group E Electrical energy 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)								

For identifiers of abstract objects, see 5.7.

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

5.6 Value group F

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.

5.6.1 Usage of value group F for 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: 1 to 99
- Value Group D: 0 to 3; 6; 8 to 13; 16; 21 to 23; 26.

This allocation is valid for 0 ≤ F< 100. See table A.2.

5.7 Abstract objects

Table 10 – 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	
Parameter changes, calibration and access						
Number of configuration program changes	0	x	96	2	0	
Date of last configuration program change	0	x	96	2	1	
Date of last time switch program change	0	x	96	2	2	
Date of last ripple control receiver program change	0	x	96	2	3	
Status of security switches	0	x	96	2	4	
Date of last calibration	0	x	96	2	5	
Date of next configuration program change	0	x	96	2	6	
Number of protected configuration program changes[a]	0	x	96	2	10	
Date of last protected configuration program change[a]	0	x	96	2	11	
Input/output control signals						
State of the input control signals	0	x	96	3	1	
State of the output control signals	0	x	96	3	2	
State of the internal control signals	0	x	96	4	0	
Internal operating status	0	x	96	5	0	
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						
Total failure of all three phases longer than internal autonomy	0	0	96	7	0	
Phase L1	0	0	96	7	1	
Phase L2	0	0	96	7	2	
Phase L3	0	0	96	7	3	

Table 10 *(continued)*

Abstract objects, general service entries	OBIS code					
	A	B	C	D	E	F
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	
Manufacturer specific	0	x	96	50	x	x
…….						
Manufacturer specific	0	x	96	96	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] Protected configuration is characterized by the need to open the main meter cover to modify it, or to break a metrological seal.

In the manufacturer-specific objects, only those values which are not represented by another defined code, but need representation on the display as well shall be placed. If this is not required, the code shall use the possibilities of a value group above 127.

Table 11 – 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.

5.8 Electricity-related general purpose objects

Table 12 – 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						
Billing period counter	1	x	0	1	0	
Number of available billing periods	1	x	0	1	1	

Table 12 *(continued)*

Electricity-related general purpose objects	OBIS-code					
	A	B	C	D	E	F
Time stamp of the billing period VZ (last reset)	1	x	0	1	2	VZ
Time stamp of the billing period VZ_{-1}	1	x	0	1	2	VZ_{-1}
.....			.....	.....	.....	.....
Time stamp of the billing period VZ_{-n}	1	x	0	1	2	VZ_{-n}
Program entries						
Configuration program version number	1	x	0	2	0	
Parameter record number	1	x	0	2	1	
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	
Output pulse constants						
R_{LW} (Active energy, metrological LED)	1	x	0	3	0	
R_{LB} (Reactive energy, metrological LED)	1	x	0	3	1	
R_{LS} (Apparent energy, metrological LED)	1	x	0	3	2	
R_{AW} (Active energy, output pulse)	1	x	0	3	3	
R_{AB} (Reactive energy, output pulse)	1	x	0	3	4	
R_{AS} (Apparent energy, output pulse)	1	x	0	3	5	
Ratios						
Reading factor for power	1	x	0	4	0	
Reading factor for energy	1	x	0	4	1	
Transformer ratio – current (numerator) [b]	1	x	0	4	2	V_{-y} [a]
Transformer ratio – voltage (numerator) [b]	1	x	0	4	3	V_{-y} [a]
Overall transformer ratio (numerator) [b]	1	x	0	4	4	V_{-y} [a]
Transformer ratio – current (denominator) [b]	1	x	0	4	5	V_{-y} [a]
Transformer ratio – voltage (denominator) [b]	1	x	0	4	6	V_{-y} [a]
Overall transformer ratio (denominator) [b]	1	x	0	4	7	V_{-y} [a]
Nominal values						
Voltage [V]	1	x	0	6	0	
Basic/nominal current [A]	1	x	0	6	1	
Frequency [Hz]	1	x	0	6	2	
Maximum current [A]	1	x	0	6	3	
Reference voltage for power quality measurement	1	x	0	6	4	V_{-y} [a]
Input pulse constants						
R_{EW} [Imp/kWh] (active energy)	1	x	0	7	0	
R_{EB} [Imp/kvarh] (reactive energy)	1	x	0	7	1	
R_{ES} [Imp/kVAh] (apparent energy)	1	x	0	7	2	
Measurement-/registration-period duration						
Measurement period 1, for average value 1	1	x	0	8	0	V_{-y} [a]
Measurement period 2, for average value 2	1	x	0	8	1	V_{-y} [a]
Measurement period 3, for instantaneous value	1	x	0	8	2	V_{-y} [a]
Measurement period 4, for test value	1	x	0	8	3	
Recording interval 1, for load profile	1	x	0	8	4	V_{-y} [a]
Recording interval 2, for load profile	1	x	0	8	5	V_{-y} [a]
Billing period	1	x	0	8	6	V_{-y} [a]

Table 12 *(continued)*

Electricity-related general purpose objects	OBIS-code					
	A	B	C	D	E	F
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	1	x	0	9	3	
Reserved	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	
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	1	x	0	10	0	V-y[a]
Transformer thermal losses	1	x	0	10	1	V-y[a]
Line resistance losses	1	x	0	10	2	V-y[a]
Line reactance losses	1	x	0	10	3	V-y[a]
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	

NOTE If the value field F is shaded, then value group F is not used.

[a] y can be set at any value between –1 and n ; for current values group F is not used.

[b] 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.

It should be noted, that some of the codes above are normally not used, as the related data items are covered by attributes of already defined objects (application dependent). See IEC 62056-62.

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 13 – General list objects

General list objects	OBIS code					
	A	B	C	D	E	F
Data of billing period	0	x	98	1	x	VZ [a]
[a] see A.3.						

5.10 Electricity data profile objects

Data profiles – identified with one single OBIS code – are defined as a series of measurement values of the same type or of groups of the same kind consisting of a number of different measurement values (see table 14).

Table 14 – 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	0
Swells voltage profile	1	X	99	10	2	0
Cuts voltage profile	1	X	99	10	3	0
Voltage harmonic profile	1	X	99	11	n^{th}	0
Current harmonic profile	1	X	99	12	n^{th}	0
Voltage unbalance profile	1	X	99	13	0	0
Event log	1	x	99	98	x [a]	
Certification data log	1	x	99	99	x [a]	
[a] 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).

For compatibility with existing implementations, in value group A an identifier for an energy type may be used even for abstract objects.

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

A.2 Display

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

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

Table A. 1 – Example of display code replacement

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

A.3 Special handling of value group F

Identifying values from previous billing periods uses the group F field to indicate the actual time periods/point.

Table A.2 – Values of billing periods

Value group F	
VZ_{+1}	Future period
VZ	Period 1
VZ_{-1}	Period 2
VZ_{-2}	Period 3
VZ_{-3}	Period 4
VZ_{-4}	…
etc.	
101	Most recent value
102	Two most recent values
....	
125	25 most recent values
126	unspecified number of most recent values

The value of the most recent (youngest) billing period is identified using the ID-code VZ (state of the billing period counter), and the second youngest is identified by the code VZ_{-1} etc. The operating mode of the billing period counter can differ, e.g. modulo-12 or modulo-100. The value that is represented after reaching the limit of the billing period counter, contains the billing period value code 0 for modulo-100, and 1 for other (e.g. modulo-12).

Values above 100 allow to identify profiles which contain values of more than one billing period. The maximum allowed value for this is 125.

The value 126 identifies a profile with values of an unspecified number of billing periods.

For thresholds the value group F contains a reference into several threshold levels for the same quantity (if applicable).

A.4 COSEM

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

Index

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