

Electricity metering data exchange - The DLMS/COSEM suite - Part 6-2: COSEM interface classes

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NATIONAL FOREWORD

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English version

**Electricity metering data exchange -
The DLMS/COSEM suite -
Part 6-2: COSEM interface classes
(IEC 62056-6-2:2013)**

Echange de données dans les
équipements de comptage de l'énergie
électrique -
La suite DLMS/COSEM -
Partie 6-2: Classes d'interfaces COSEM
(CEI 62056-6-2:2013)

Datenkommunikation der elektrischen
Energienmessung -
DLMS/COSEM -
Teil 6-2: Interface-Klassen
(IEC 62056-6-2:2013)

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Foreword

The text of document 13/1525/FDIS, future edition 1 of IEC 62056-6-2, prepared by IEC/TC 13 "Electrical energy measurement, tariff- and load control" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62056-6-2:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-04-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-07-04

EN 62056-6-2:2013 cancels and replaces EN 62056-62 published in 2007. It constitutes a technical revision.

The significant technical changes with respect to EN 62056-62 are listed in Annex A.

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Endorsement notice

The text of the International Standard IEC 62056-6-2:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- | | | |
|--------------------|------|---|
| IEC 61334-6:2000 | NOTE | Harmonized as EN 61334-6:2000 (not modified). |
| IEC 62053-23:2003 | NOTE | Harmonized as EN 62053-23:2003 (not modified). |
| IEC 62056-8-3:2013 | NOTE | Harmonized as EN 62056-8-3:2013 (not modified). |

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61334-4-32	1996	Distribution automation using distribution line carrier systems - Part 4: Data communication protocols - Section 32: Data link layer - Logical link control (LLC)	EN 61334-4-32	1996
IEC 61334-4-41	1996	Distribution automation using distribution line carrier systems - Part 4: Data communication protocols - Section 41: Application protocols - Distribution line message specification	EN 61334-4-41	1996
IEC 61334-4-511	2000	Distribution automation using distribution line carrier systems - Part 4-511: Data communication protocols - Systems management - CIASE protocol	EN 61334-4-511	2000
IEC 61334-4-512	2001	Distribution automation using distribution line carrier systems - Part 4-512: Data communication protocols - System management using profile 61334-5-1 - Management Information Base (MIB)	EN 61334-4-512	2002
IEC 61334-5-1	2001	Distribution automation using distribution line carrier systems - Part 5-1: Lower layer profiles - The spread frequency shift keying (S-FSK) profile	EN 61334-5-1	2001
IEC/TR 62051	1999	Electricity metering - Glossary of terms	-	-
IEC/TR 62051-1 + corr. June	2004 2005	Electricity metering - Data exchange for meter - reading, tariff and load control - Glossary of terms - Part 1: Terms related to data exchange with metering equipment using DLMS/COSEM	-	-
IEC 62056-3-1	201X ¹	Electricity metering data exchange – The DLMS/COSEM suite - Part 3-1: Use of local area networks on twisted pair with carrier signalling	EN 62056-3-1	201X ²
IEC 62056-5-3	2013	Electricity metering data exchange - The DLMS/COSEM suite - Part 5-3: DLMS/COSEM application layer	EN 62056-5-3	2013

¹ To be published.

² At draft stage.

IEC 62056-6-1	2013	Electricity metering data exchange - The DLMS/COSEM suite - Part 6-1: COSEM Object Identification System (OBIS)	EN 62056-6-1	2013
IEC 62056-21	2002	Electricity metering - Data exchange for meter reading, tariff and load control - Part 21: Direct local data exchange	EN 62056-21	2002
IEC 62056-46 +A1	2002 2006	Electricity metering - Data exchange for meter reading, tariff and load control - Part 46: Data link layer using HDLC protocol	EN 62056-46	2002
ISO/IEC 8802-2 + corr. October	1998 2000	Information technology - Telecommunications - and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 2: Logical link control	-	-
ISO/IEC/IEEE 60559	2011	Information technology - Microprocessor Systems - Floating-Point arithmetic	-	-
EN 13757-2	2004	Communication systems for and remote reading of meters - Part 2: Physical and link layer	-	-
EN 13757-3	2004	Communication systems for and remote reading of meters - Part 3: Dedicated application layer	-	-
EN 13757-5	2008	Communication systems for meters and remote reading of meters - Part 5: Wireless relaying	-	-
ANSI C12.19:1997/IEEE 1377	1997	Utility Industry End Device Data Tables	-	-
IETF RFC 1332	1992	The PPP Internet Protocol Control Protocol (IPCP)	-	-
IETF RFC 1570	1994	PPP LCP Extensions	-	-
IETF RFC 1661	1994	Point-to-Point Protocol (PPP)	-	-
IETF RFC 1662	1994	PPP in HDLC Framing	-	-
IETF RFC 1700	1994	Assigned Numbers request for comments 1700 (STD 2)	-	-
IETF RFC 2507	1999	IP Header Compression	-	-
IETF RFC 3241	2002	Robust Header Compression (ROHC) over PPP	-	-
STD 0005	1981	Internet Protocol	-	-
STD 0051	1994	The Point-to-Point Protocol (PPP)	-	-

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INTRODUCTION

Driven not only by the business needs of utilities – often in a deregulated competitive market – but also by the increasing desire to manage natural resources efficiently as regards production, distribution and use, the utility meter is increasingly part of an integrated metering, control, and billing system. Not only at grid level but, with the advent of initiatives to involve consumers in energy and resource management, in industry and even down to the domestic level, the meter is no simple data recording device but relies critically on communication capabilities, system integration and interoperability.

COSEM, the Companion Specification for Energy Metering, addresses these challenges by looking at the meter as an integrated part of a communication system which requires above all the ability to convey measurements of the delivered product (energy) from the diverse points where these measurements are made to the business processes which use them, over a variety of connecting media. Such systems handle a gamut of additional information and support setup and control functions which allow operating the meter remotely at virtually all times.

COSEM achieves all this in a way which is essentially non-proprietary and does not make assumptions about the technical processes in place within the meter. Using *object modelling* techniques established in the world of information science, the data to be supplied by the meter is defined in a standard way that is accessible to the utility's business processes and relevant parts of its behaviour are similarly represented, while the communications are defined following the *Open Systems Interconnection* that is fundamental to the telecommunications world. The formal specification of interface classes and objects, which enables this, forms a major part of COSEM.

To allow further analysis of information, for the purposes of billing, load-, customer- and contract management, it is necessary to uniquely identify data items, whether collected manually or automatically, via local or remote data exchange, in a manufacturer-independent way. The definition of identification codes to achieve this – the OBIS 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*.

The COSEM model represents the meter as a server – see 4.7 – used by client applications that retrieve data from, provide control information to, and instigate known actions within the meter via controlled access to the attributes and specific methods of objects making up the server interface. This client may be supporting the business processes of utilities, customers, meter operators, or meter manufacturers.

The information content and abilities of the server are not fixed; instead, the standardized objects and interface classes (ICs) form an extensible library from which the manufacturer can assemble (model) its products according to national specifications or contract requirements. As a key element, the server offers means to retrieve its particular structural model (the list of logical devices and the list of objects visible through the interface). The library is designed so that the entire range of products (from residential to commercial, industrial, and transmission and distribution applications) can be covered. The choice of the subset of ICs used to build a meter, and the instantiation and implementation of those ICs are part of the product design and therefore left to the manufacturer. The concept of the standardized metering interface class library provides the different users and manufacturers with a maximum of diversity without having to sacrifice interoperability.

ELECTRICITY METERING DATA EXCHANGE – THE DLMS/COSEM SUITE –

Part 6-2: COSEM interface classes

1 Scope

This part of IEC 62056 specifies a model of a meter as it is seen through its communication interface(s). Generic building blocks are defined using object-oriented methods, in the form of interface classes to model meters from simple up to very complex functionality.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61334-4-32:1996, *Distribution automation using distribution line carrier systems – Part 4: Data communication protocols – Section 32: Data link layer – Logical link control (LLC)*

IEC 61334-4-41:1996, *Distribution automation using distribution line carrier systems – Part 4: Data communication protocols – Section 41: Application protocols – Distribution line message specification*

IEC 61334-4-511:2000, *Distribution automation using distribution line carrier systems – Part 4-511: Data communication protocols – Systems management – CIASE protocol*

IEC 61334-4-512:2001, *Distribution automation using distribution line carrier systems – Part 4-512: Data communication protocols – System management using profile 61334-5-1 – Management Information Base (MIB)*

IEC 61334-5-1:2001, *Distribution automation using distribution line carrier systems – Part 5-1: Lower layer profiles – The spread frequency shift keying (S-FSK) profile*

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

IEC/TR 62051-1:2004, *Electricity metering – Data exchange for meter reading, tariff and load control – Glossary of terms – Part 1: Terms related to data exchange with metering equipment using DLMS/COSEM*

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

Draft IEC 62056-3-1:—, *Electricity metering data exchange – The DLMS/COSEM suite – Part 3-1: Use of local area networks on twisted pair with carrier signalling²*

IEC 62056-46:2002, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 46: Data link layer using HDLC protocol*
Amendment 1:2006

² To be published.

IEC 62056-5-3:—, *Electricity metering data exchange – The DLMS/COSEM suite – Part 5-3: DLMS/COSEM application layer*³

IEC 62056-6-1:—, *Electricity metering data exchange – The DLMS/COSEM suite – Part 6-1: Object identification system (OBIS)*⁴

ISO/IEC 8802-2:1998, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 2: Logical link control*

ISO/IEC/IEEE 60559:2011, *Information technology – Microprocessor Systems – Floating-Point arithmetic*

EN 13757-2:2004, *Communication system for meters and remote reading of meters – Part 2: Physical and Link layer*

EN 13757-3:2004, *Communication system for meters and remote reading of meters – Part 3: Dedicated application layer*

EN 13757-5:2008, *Wireless meter readout – Communication system for meters and remote reading of meters – Part 5: Relaying*

ANSI C12.19:1997, *IEEE 1377:1997, Utility industry end device data tables*

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³ To be published simultaneously with this part of IEC 62056.

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NOTE See also the Bibliography.

3 Abbreviations

AA	Application Association
AARE	A-Associate Response – an APDU of the ACSE
AARQ	A-Associate Request– an APDU of the ACSE
ACSE	Association Control Service Element
AL	Application Layer
AP	Application Process
APDU	Application Layer Protocol Data Unit
ASE	Application Service Element
A-XDR	Adapted Extended Data Representation
base_name	The short_name corresponding to the first attribute (“logical_name”) of a COSEM object
CHAP	Challenge Handshake Authentication Protocol
class_id	COSEM interface class identification code
COSEM	Companion Specification for Energy Metering
COSEM object	An instance of a COSEM interface class
CtoS	Client to Server challenge
DHCP	Dynamic Host Configuration Protocol
DLMS	Device Language Message Specification
DLMS UA	DLMS User Association
DNS	Domain Name Server
EAP	Extensible Authentication Protocol
GCM	Galois/Counter Mode, an algorithm for authenticated encryption with associated data
GMT	Greenwich Mean Time. Replaced by Coordinated Universal Time (UTC).
GPS	Global Positioning System
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HART	Highway Addressable Remote Transducer see http://www.hartcomm.org/ (in relation with the Sensor manager interface class)
HDLC	High-level Data Link Control
HLS	High Level Security
IANA	Internet Assigned Numbers Authority
IC	Interface Class