

SLOVENSKI STANDARD
SIST EN 62056-3-1:2014**01-maj-2014****Nadomešča:****SIST EN 62056-31:2000**

Merjenje električne energije - Izmenjevanje podatkov za odbiranje stanja števcov, tarife in krmiljenje obremenitve - 31. del: Uporaba lokalnih omrežij prek zvitih parov s signalizacijo po nosilcu (IEC 62056-3-1:2013)

Electricity metering - Data exchange for meter reading, tariff and load control - Part 31: Use of local area networks on twisted pair with carrier signalling

Messung der elektrischen Energie - Zählerstandsübertragung, Tarif- und Laststeuerung - Teil 31: Nutzung örtlicher Bereichsnetze mit Trägerfrequenz-Signalübertragung auf verdrehten Zweidrahtleitungen

Comptage de l'électricité - Echange de données pour la lecture des compteurs, le contrôle des tarifs et de la charge - Partie 31: Utilisation des réseaux locaux sur paire torsadée avec signal de porteuse

Ta slovenski standard je istoveten z: EN 62056-3-1:2014

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
35.110	Omreževanje	Networking
91.140.50	Sistemi za oskrbo z elektriko	Electricity supply systems

SIST EN 62056-3-1:2014**en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62056-3-1:2014

<https://standards.iteh.ai/catalog/standards/sist/ccd05e22-32cc-47b4-aa77-5650998bd75b/sist-en-62056-3-1-2014>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62056-3-1

March 2014

ICS 17.220; 35.110; 91.140.50

Supersedes EN 62056-31:2000

English version

**Electricity metering data exchange - The DLMS/COSEM suite -
Part 3-1: Use of local area networks on twisted pair with carrier signalling
(IEC 62056-3-1:2013)**

Échange des données de comptage de
l'électricité -
La suite DLMS/COSEM -
Partie 3-1: Utilisation des réseaux locaux
sur paire torsadée avec signal de
porteuse
(CEI 62056-3-1:2013)

Datenkommunikation der elektrischen
Energiesmessung -
DLMS/COSEM -
Teil 3-1: Nutzung lokaler Netzwerke mit
Trägerfrequenz-Signalübertragung auf
verdrehen Zweidrahtleitungen
(IEC 62056-3-1:2013)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2013-09-24. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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

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

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

Foreword

The text of document 13/1546/FDIS, future edition 1 of IEC 62056-3-1, 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 62056-3-1:2014.

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) 2014-09-07
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-09-24

This document supersedes EN 62056-31:2000.

EN 62056-3-1:2014 includes the following significant technical changes with respect to EN 62056-31:2000:

- addition of a profile which makes use of the EN 62056 DLMS/COSEM Application layer and COSEM object model;
- review of the data link layer which is split into two parts:
 - a pure Data Link layer;
 - a "Support Manager" entity managing the communication media;
- ability to negotiate the communication speed, bringing baud rate up to 9 600 bauds.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62056-3-1:2013 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 62056-6-1:2013	NOTE	Harmonized as EN 62056-6-1:2013 (not modified).
IEC 62056-6-2:2013	NOTE	Harmonized as EN 62056-6-2:2013 (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 61334-4-41	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 62056-51	1998	Electricity metering - Data exchange for meter reading, tariff and load control - Part 51: Application layer protocols	-	-
IEC 62056-5-3	2013	Electricity metering data exchange - The DLMS/COSEM suite - Part 5-3: DLMS/COSEM application layer	EN 62056-5-3	2014
ISO/IEC 8482	1993	Information technology - Telecommunications and information exchange between systems - Twisted pair multipoint interconnections	-	-
EIA 485		Electrical characteristics of generators and receivers for use in balanced digital multipoint systems	-	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62056-3-1:2014

<https://standards.iteh.ai/catalog/standards/sist/ccd05e22-32cc-47b4-aa77-5650998bd75b/sist-en-62056-3-1-2014>



IEC 62056-3-1

Edition 1.0 2013-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electricity metering data exchange – The DLMS/COSEM suite –
Part 3-1: Use of local area networks on twisted pair with carrier signalling
(standards.iteh.ai)

Échange des données de comptage de l'électricité – La suite DLMS/COSEM –
Partie 3-1: Utilisation des réseaux locaux sur paire torsadée avec signal de
porteuse
5650998bd75b/sist-en-62056-3-1-2014

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

XE

ICS 17.220; 35.110; 91.140.50

ISBN 978-2-8322-1046-8

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	7
1 Scope	9
2 Normative references	9
3 Abbreviations	10
4 General description	11
4.1 Basic vocabulary	11
4.2 Profiles, layers and protocols	11
4.2.1 Overview	11
4.2.2 Base profile (without DLMS)	12
4.2.3 Profile with DLMS	12
4.2.4 Profile with DLMS/COSEM	13
4.3 Specification language	13
4.4 Communication services for local bus data exchange without DLMS	13
4.4.1 Overview	13
4.4.2 Remote reading exchange	14
4.4.3 Remote programming exchange	14
4.4.4 Point to point remote transfer exchange	16
4.4.5 Broadcast remote transfer frame	16
4.4.6 Bus initialization frame	16
4.4.7 Forgotten station call exchange	17
4.4.8 Frame fields	17
4.4.9 Principle of the energy remote supply	18
4.4.10 Non-energized station preselection exchange	19
4.4.11 Communication exchange after preselection	20
4.4.12 Alarm function	20
4.5 Communication services for local bus data exchange with DLMS	21
4.6 Systems management	22
5 Local bus data exchange without DLMS	22
5.1 Physical layer	22
5.1.1 Physical-62056-3-1 protocol	22
5.1.2 Physical parameters	23
5.1.3 Timing diagrams	25
5.1.4 Physical services and service primitives	26
5.1.5 State transitions	27
5.1.6 List and processing of errors	34
5.2 Data Link layer	35
5.2.1 Link-62056-3-1 protocol	35
5.2.2 Management of exchanges	35
5.2.3 Data Link services and service primitives	35
5.2.4 Data Link parameters	36
5.2.5 State transitions	36
5.2.6 List and processing of errors	41
5.3 Application layer	42
5.3.1 Application-62056-3-1 protocol	42
5.3.2 Application services and service primitives	42
5.3.3 Application parameters	42

5.3.4	State transitions	43
5.3.5	List and processing of errors	45
6	Local bus data exchange with DLMS	45
6.1	Physical layer	45
6.2	Data Link layer	46
6.2.1	Link-E/D protocol	46
6.2.2	Management of exchanges	46
6.2.3	Data Link services and service primitives	47
6.2.4	Data Link parameters	47
6.2.5	State transitions	48
6.2.6	List and processing of errors	54
6.3	Application layer	54
6.3.1	General	54
6.3.2	Transport sub-layer	54
6.3.3	Application sub-layer	54
7	Local bus data exchange with DLMS/COSEM	55
7.1	Model	55
7.2	Physical Layer	55
7.2.1	General	55
7.2.2	Physical Parameters	55
7.2.3	Speed negotiation	55
7.2.4	E/COSEM Physical Services and service primitives	56
7.2.5	State transitions	57
7.3	Data Link layer	65
7.3.1	General	65
7.3.2	Identification of data units	66
7.3.3	Role of the Data Link layer	66
7.3.4	Management of exchanges	66
7.3.5	Data Link services and service primitives	66
7.3.6	Data Link parameters	68
7.3.7	State transitions	68
7.4	Support Manager layer	75
7.4.1	Overview	75
7.4.2	Initialisation of the bus	75
7.4.3	Discover service	76
7.4.4	Speed negotiation	76
7.4.5	Support Manager parameters	76
7.4.6	State transitions	77
7.5	Transport Layer	78
7.5.1	General	78
7.5.2	Transport Data Units	78
7.5.3	State transitions	80
7.6	Application Layer	82
7.6.1	General	82
7.6.2	Broadcast Management	82
7.6.3	Management of EventNotifications or InformationReports	83
7.6.4	Priority Management	83
7.6.5	Management of releasing Application Associations	83
8	Local bus data exchange – Hardware	83

8.1	General	83
8.2	General characteristics	83
8.2.1	Signal transmission at 50 kHz	83
8.2.2	Energy supply signal transmission	84
8.2.3	Simple Secondary Station and multiple Secondary Station	87
8.3	Bus specification	88
8.3.1	General characteristics	88
8.3.2	Cable characteristics	88
8.3.3	Wiring	89
8.4	Magnetic plug	90
8.4.1	Function	90
8.4.2	Common mechanical characteristics	90
8.4.3	Electrical block diagram with simple plug	91
8.4.4	Electrical Block Diagram with energy supply plug	92
8.5	Functional specifications of Primary Station transmitter (for 50 kHz signal)	93
8.6	Functional specifications of Primary Station receiver (for 50 kHz signal)	93
8.7	Functional specification of Secondary Station transmitter (for 50 kHz signal)	94
8.8	Functional specifications of Secondary Station receiver (for 50 kHz signal)	95
Annex A	(normative) Specification language	97
Annex B	(normative) Timing types and characteristics	100
Annex C	(normative) List of fatal errors	102
Annex D	(normative) Coding the command code field of frames	103
Annex E	(normative) Principle of the CRC	105
Annex F	(normative) Random integer generation for response from forgotten stations	106
Annex G	(normative) Random number generation for authentication (profile without DLMS)	107
Annex H	(normative) Systems management implementation	108
Annex I	(informative) Information about exchanges	109
	Bibliography	113
	Figure 1 – IEC 62056-3-1 communication profiles	12
	Figure 2 – Alarm mechanism	21
	Figure 3 – Exchanges in continuous operation	25
	Figure 4 – Alarm event without any communication in progress	25
	Figure 5 – Alarm event with a communication in progress	25
	Figure 6 – Signal envelope on the bus	84
	Figure 7 – Bus representation	85
	Figure 8 – Power supply characteristics	85
	Figure 9 – States associated to a session: for selected Secondary station	86
	Figure 10 – States associated to a session: for non-selected Secondary station	86
	Figure 11 – Simple and multiple Secondary stations	87
	Figure 12 – Equivalent diagram of the test equipment	89
	Figure 13 – Ferrite pot and bobbin	90
	Figure 14 – Associated components of the magnetic plug	91
	Figure 15 – Associated components of the energy supply plug	92
	Figure B.1 – Logical timing type	100

Figure B.2 – Physical timing type	100
Figure B.3 – Results processing for timing defined with low and high limits	101
Figure B.4 – Results processing for timing defined by a nominal value	101
Figure I.1 – Non-energized station session	109
Figure I.2 – Remote reading and programming exchanges	110
Figure I.3 – Bus initialization	111
Figure I.4 – Forgotten station call exchange	112
Table 1 – Primary Station timing	23
Table 2 – Secondary station timing	24
Table 3 – Physical services and service primitives	26
Table 4 – <i>Physical-62056-3-1</i> state transitions: Primary station	27
Table 5 – Power supply management state transitions (only for non-energized secondary station)	29
Table 6 – <i>Physical-62056-3-1</i> state transitions: Secondary station	31
Table 7 – Meaning of the states listed in the previous tables	32
Table 8 – Definition of the procedures, functions and events classified in alphabetical order	33
Table 9 – Error summary table	34
Table 10 – Data Link services and service primitives	35
Table 11 – <i>Link-62056-3-1</i> state transitions: Primary station	36
Table 12 – <i>Link-62056-3-1</i> State transitions: Secondary station	39
Table 13 – Meaning of the states listed in the previous tables	40
Table 14 – Definition of the procedures and functions classified in alphabetical order	40
Table 15 – Error summary table	41
Table 16 – Application services and service primitives	42
Table 17 – <i>Application-62056-3-1</i> state transitions: Primary station	43
Table 18 – <i>Application-62056-3-1</i> state transitions: Secondary station	44
Table 19 – Meaning of the states listed in the previous tables	44
Table 20 – Definition of the procedures and functions classified in alphabetical order	45
Table 21 – Error summary table	45
Table 22 – Data Link services and service primitives	47
Table 23 – <i>Link-E/D</i> state transitions: Primary station	48
Table 24 – <i>Link-E/D</i> state transitions: Secondary station	50
Table 25 – Meaning of the states listed in the previous tables	52
Table 26 – Definition of the procedures and functions classified in alphabetical order	52
Table 27 – Error summary table	54
Table 28 – Client_connect function definition	54
Table 29 – E/COSEM Physical services and service primitives	56
Table 30 – <i>E/COSEM Physical</i> state transitions: Primary station	57
Table 31 – Power supply management state transitions (only for non-energized Secondary station)	60
Table 32 – <i>E/COSEM Physical</i> State transitions: Secondary station	61
Table 33 – Meaning of the states listed in the previous tables	63

Table 34 – Definition of the procedures, functions and events classified in alphabetical order.....	64
Table 35 – Error summary table.....	65
Table 36 – Data Link services and service primitives.....	66
Table 37 – <i>DLMS/COSEM Data Link E/D</i> state transitions: Primary station.....	68
Table 38 – <i>DLMS/COSEM Link E/D</i> state transitions: Secondary station.....	71
Table 39 – Meaning of the states listed in the previous tables.....	73
Table 40 – Definition of the procedures and functions classified in alphabetical order.....	74
Table 41 – Commands managed by the Support Manager layer.....	75
Table 42 – List of parameters.....	76
Table 43 – Support Manager layer state transitions: Primary station.....	77
Table 44 – Support Manager layer state transitions: Secondary station.....	77
Table 45 – Meaning of the states listed in the previous table.....	77
Table 46 – Definition of procedures, functions and events.....	78
Table 47 – Transport services and services primitive.....	79
Table 48 – Transport state transitions.....	80
Table 49 – Meaning of the states listed in the previous table.....	81
Table 50 – Definition of the procedures and functions classified in alphabetical order.....	82
Table 51 – Primary station transmitter: Tev0 and Tev1 values.....	93
Table 52 – Primary station receiver: Tev0 and Tev1 values.....	94
Table 53 – Secondary station transmitter: Tev0 and Tev1 values.....	94
Table 54 – Secondary station receiver: Tev0 and Tev1 values.....	95
Table C.1 – FatalError error numbers.....	102
Table D.1 – Command codes for local bus data exchange.....	103
Table D.2 – Command codes with DLMS and DLMS/COSEM.....	104
Table H.1 – Discovery service.....	108
Table H.2 – Service specification.....	108

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICITY METERING DATA EXCHANGE –
THE DLMS/COSEM SUITE –**
**Part 3-1: Use of local area networks on twisted pair
with carrier signalling**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62056-3-1 has been prepared by IEC technical committee 13: Electrical energy measurement, tariff- and load control.

This first edition cancels and replaces the first edition of IEC 62056-31, issued in 1999, and constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

- addition of a profile which makes use of the IEC 62056 DLMS/COSEM Application layer and COSEM object model,
- review of the data link layer which is split into two parts:
 - a pure Data Link layer;
 - a “Support Manager” entity managing the communication media;
- ability to negotiate the communication speed, bringing baud rate up to 9 600 bauds.

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

FDIS	Report on voting
13/1546/FDIS	13/1552/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.

A list of all parts of IEC 62056 series, published under the general title *Electricity metering data exchange – The DLMS/COSEM suite*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The numbering scheme has changes from IEC 62056-XY to IEC 62056-X-Y. For example, IEC 62056-31 becomes IEC 62056-3-1.

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 stability 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 62056-3-1:2014](https://standards.iteh.ai/catalog/standards/sist/ccd05e22-32cc-47b4-aa77-5650998bd75b/sist-en-62056-3-1-2014)

<https://standards.iteh.ai/catalog/standards/sist/ccd05e22-32cc-47b4-aa77-5650998bd75b/sist-en-62056-3-1-2014>

ELECTRICITY METERING DATA EXCHANGE – THE DLMS/COSEM SUITE –

Part 3-1: Use of local area networks on twisted pair with carrier signalling

1 Scope

This part of IEC 62056 describes three profiles for local bus data exchange with stations either energized or not. For non-energized stations, the bus supplies energy for data exchange.

Three different profiles are supported:

- base profile: this three-layer profile provides remote communication services;
NOTE This first profile has been published in IEC 61142:1993 and became known as the Euridis standard.
- profile with DLMS: this profile allows using DLMS services as specified in IEC 61334-4-41;
NOTE This second profile has been published in IEC 62056-31 Ed. 1.0:1999;
- profile with DLMS/COSEM: this profile allows using the DLMS/COSEM Application layer and the COSEM object model as specified in IEC 62056-5-3 Ed. 1.0:— and in IEC 62056-6-2 Ed. 1.0:— respectively.

The three profiles use the same physical layer and they are fully compatible, meaning that devices implementing any of these profiles can be operated on the same bus.

The transmission medium is twisted pair using carrier signalling and it is known as the Euridis Bus.

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

IEC 62056-51:1998 *Electricity Metering – Data exchange for meter reading, tariff and load control – Part 51: Application Layer Protocols*

IEC 62056-5-3 Ed. 1.0:—, *Electricity metering data exchange – The DLMS/COSEM suite – Part 5-3: DLMS/COSEM application layer*

ISO/IEC 8482:1993, *Information technology – Telecommunications and information exchange between systems – Twisted pair multipoint interconnections*

EIA 485 – *Standard for Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems*