

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

Part 42: Physical layer services and procedures for connection-oriented asynchronous data exchange

The European Standard EN 62056-42:2002 has the status of a
British Standard

ICS 91.140.50; 35.100.10

National foreword

This British Standard is the official English language version of EN 62056-42:2002. It is identical with IEC 62056-42:2002.

The UK participation in its preparation was entrusted to Technical Committee PEL/13, Electricity meters, which has the responsibility to:

- aid enquirers to understand the text;
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**Electricity metering -
Data exchange for meter reading, tariff and load control
Part 42: Physical layer services and procedures
for connection-oriented asynchronous data exchange
(IEC 62056-42:2002)**

Equipements de mesure
de l'énergie électrique -
Echange des données pour la lecture
des compteurs, le contrôle des tarifs
et de la charge
Partie 42: Services et procédures
de la couche physique pour l'échange
de données à l'aide de connexion
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Messung der elektrischen Energie -
Zählerstandsübertragung,
Tarif- und Laststeuerung
Teil 42: Bitübertragungsschichtdienste
und Verfahren für verbindungsorientierten
asynchronen Datenaustausch
(IEC 62056-42:2002)

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

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 13/1266/FDIS, future edition 1 of IEC 62056-42, prepared by IEC TC 13, Equipment for electrical energy measurement and load control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62056-42 on 2002-03-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2003-01-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-03-01

The International Electrotechnical Commission (IEC) and CENELEC draw attention to the fact that it is claimed that compliance with this International Standard / European Standard may involve the use of a maintenance service concerning the stack of protocols on which the present standard IEC 62056-42 / EN 62056-42 is based.

The IEC and CENELEC take 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 6.3.3) may be obtained from:

DLMS¹⁾ User Association
Geneva / Switzerland
www.dlms.ch

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexe ZA is normative and annexes A and B are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62056-42:2002 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 61334-4-41	NOTE	Harmonized as EN 61334-4-41:1996 (not modified).
IEC 61334-6	NOTE	Harmonized as EN 61334-6:2000 (not modified).

¹⁾ Device Language Message Specification

CONTENTS

1	Scope	4
2	Normative references	4
3	Terms, definitions and abbreviations	5
4	Overview	6
5	Service specification	7
5.1	List of services	7
5.1.1	Connection establishment/release related services	7
5.1.2	Data communication services	7
5.1.3	Layer management services	7
5.2	Use of the physical layer services	8
5.3	Service definitions	8
5.3.1	PH-CONNECT.request	8
5.3.2	PH-CONNECT.indication	9
5.3.3	PH-CONNECT.confirm	9
5.3.4	PH-ABORT.request	10
5.3.5	PH-ABORT.confirm	10
5.3.6	PH-ABORT.indication	10
5.3.7	PH-DATA.request	11
5.3.8	PH-DATA.indication	11
6	Protocol specification	12
6.1	Physical layer protocol data unit	12
6.2	Transmission order and characteristics	12
6.3	Physical layer operation – description of the procedures	12
6.3.1	General	12
6.3.2	Setting up a physical connection	13
6.3.3	The identification service	14
6.3.4	Data communications	18
6.3.5	Disconnection of an existing physical connection	18
	Annex A (informative) An example: PH service primitives and Hayes commands	19
	Annex B (informative) Data model and protocol	24
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	27
	Bibliography	25
	Figure 1 – Typical PSTN configuration	6
	Figure 2 – The location of the physical layer	7
	Figure 3 – Protocol layer services of the COSEM 3-layer connection oriented profile	8
	Figure 4 – MSC for physical connection establishment	14
	Figure 5 – MSC for IDENTIFY.request/.response message exchange	16
	Figure 6 – Handling the identification service at the COSEM server side	16
	Figure 7 – Partial state machine for the client side physical layer	17
	Figure A.1 – MSC for physical connection request	19
	Figure A.2 – Physical connection establishment at the CALLING station	20
	Figure A.3 – MSC for physical connection establishment	21
	Figure A.4 – Data exchange between the calling and called stations	22
	Figure A.5 – MSC for a physical disconnection	23
	Figure B.1 – The three-step approach of COSEM	24

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

Part 42: Physical layer services and procedures for connection-oriented asynchronous data exchange

1 Scope

This part of IEC 62056 specifies the physical layer services and protocols within the Companion Specification for Energy Metering (COSEM) three-layer connection oriented profile for asynchronous data communication. The document does not specify physical layer signals and mechanical aspects. Local, implementation-specific issues are also not specified.

In annex A, an example of how this physical layer can be used for data exchange through the Public Switched Telephone Network (PSTN) using intelligent Hayes modems is given.

The use of the physical layer for the purposes of direct local data exchange using an optical port or a current loop physical interface is specified in IEC 62056-21.

Annex B gives an explanation of the role of data models and protocols in electricity meter data exchange.

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 instruments – Part 314: Specific terms according to the type of instrument*

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

IEC 62056-53, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 53: COSEM application layer*¹

IEC 62056-61, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 61: OBIS Object identification system*¹

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

NEMA C12.21:1999, *Protocol Specification for Telephone Modem Communication*

¹ To be published.

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

client

a station asking for services, normally the master station

3.1.2

master

central station – station which takes the initiative and controls the data flow

3.1.3

server

a station delivering services. The tariff device (meter) is normally the server, delivering the requested values or executing the requested tasks

3.1.4

slave

station responding to requests of a master station. The tariff device (meter) is normally a slave station

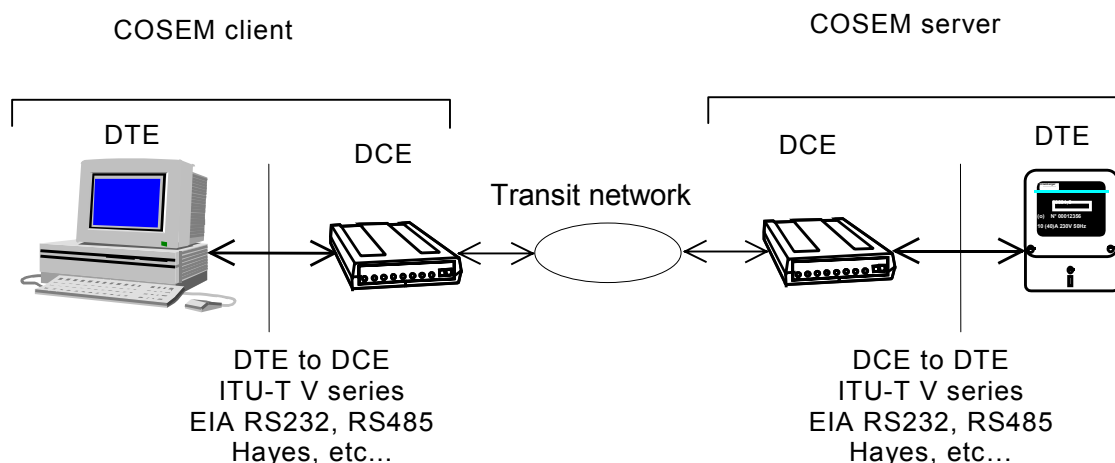
3.2 Abbreviations

COSEM	COmpanion Specification for Energy Metering
DCE	Data Communication Equipment (communications interface or modem)
DTE	Data Terminal Equipment (computers, terminals or printers)
MSC	Message Sequence Chart
PDU	Protocol Data Unit
PH	PHysical layer
PHPDU	PHysical layer Protocol Data Unit
PHSDU	PHysical layer Service Data Unit
SDU	Service Data Unit

4 Overview

From the external point of view, the physical layer provides the interface between the DTE and the DCE, see

Figure 2. Figure 1 shows a typical configuration for data exchange through a wide area network, for example the PSTN.



IEC 235/02

Figure 1 – Typical PSTN configuration

From the physical connection point of view, all communications involve two sets of equipment represented by the terms caller system and called system. The caller is the system that decides to initiate a communication with a remote system known as the called party; these denominations remain valid throughout the duration of the communication. A communication is broken down into a certain number of transactions. Each transaction is represented by a transmission from the transmitter to the receiver. During the sequence of transactions, the caller and called systems take turns to act as transmitter and receiver.

From the data link point of view the central station normally acts as a master, taking the initiative and controlling the data flow. The tariff device is the slave, responding to the master station.

From the application point of view the central station normally acts as a client asking for services, and the tariff device acts as a server delivering the requested services.

The situation involving a caller client and a called server is undoubtedly the most frequent case, but a communication based on a caller server and a called client is also possible, in particular to report the occurrence of an urgent alarm.

For the purpose of local data exchange, two DTEs can be directly connected using appropriate connections.

To allow using a wide variety of media, this standard does not specify the physical layer signals and their characteristics. However, the following assumptions are made:

- the communication is point to point or point to multipoint;
- both half-duplex and duplex connections are possible;
- asynchronous transmission with 1 start bit, 8 data bits, no parity and 1 stop bit (8N1).

From the internal point of view, the physical layer is the lowest layer in the protocol stack.

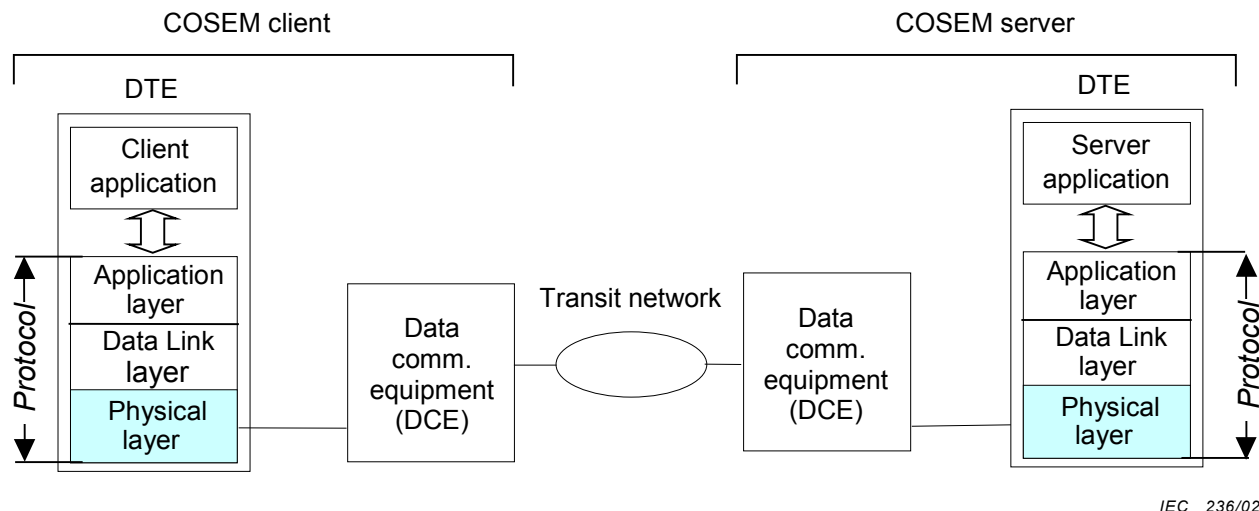


Figure 2 – The location of the physical layer

This standard defines the services of the physical layer towards its peer layer(s) and the upper layers, and the protocol of the physical layer.

5 Service specification

5.1 List of services

ITU-T X.211 defines a set of capabilities to be made available by the physical layer over the physical media. These capabilities are available via service primitives, as follows:

5.1.1 Connection establishment/release related services

PH-CONNECT.request / PH-CONNECT.indication / PH-CONNECT.confirm

PH-ABORT.request / PH-ABORT.confirm / PH-ABORT.indication

5.1.2 Data communication services

PH-DATA.request / PH-DATA.indication

5.1.3 Layer management services

In addition to the services above, some additional physical layer services may be necessary, which are used by or provided for the layer management process, which is part of the application process. Some examples are given below:

PH-INITIALIZE.request / PH-INITIALIZE.confirm

PH-GET_VALUE.request / PH-GET_VALUE.confirm

PH-SET_VALUE.request / PH-SET_VALUE.confirm

PH-LM_EVENT.indication

As these services are of local importance only, their definition is not within the scope of this standard.