

# TECHNICAL REPORT

# IEC TR 62051-1

First edition  
2004-01

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**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**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**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**

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IEC 62051-1, which is a technical report, has been prepared by IEC technical committee 13: Equipment for electrical energy measurement and load control.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
13/1299/DTR	13/1302/RVC

Full information on the voting for the approval of this technical report 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 2008. At this date, the publication will be

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- withdrawn;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

The contents of the corrigendum of June 2005 have been included in this copy.

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# 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

### 1 Scope

This part of IEC 62051 reflects the most important terms used in International Standards after the publication of IEC 62051 in 1999. The new terms are mainly related to data exchange with metering equipment for meter reading, tariff and load control using DLMS/COSEM as specified in the IEC 62056 series of standards.

### 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 60050-714:1992, *International Electrotechnical Vocabulary (IEV) – Chapter 714: Switching and signalling in telecommunications*

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IEC 60050-716-1:1995, *International Electrotechnical Vocabulary (IEV) – Chapter 716-1: Integrated services digital network (ISDN) – Part 1: General aspects*

### 3 Terms, definitions and abbreviations

#### 3.1 Terms and definitions

For the purposes of this document, the following definitions, as well as those given in IEC 60050-714 and IEC 60050-716-1, apply.

##### 3.1.1

**3-layer, connection-oriented, HDLC-based profile** (relevant to IEC 62056-46)  
communication profile based on the OSI collapsed architecture, which consists of a physical layer, a data link layer based on the HDLC standard and the COSEM application layer containing the connection-oriented Application Control Service Element (ACSE)

##### 3.1.2

**abstract data and objects** (relevant to IEC 62056-61 and IEC 62056-62)  
data, other than measurement values, which may be related to an energy type and which are modelled using abstract interface objects

##### 3.1.3

**ACTION** (relevant to IEC 62056-53)  
xDLMS data communication service used with logical name (LN) referencing for the invocation of methods of COSEM interface objects. The availability of this service is indicated in the xDLMS conformance block and its use is negotiated upon application association establishment

### 3.1.4

#### **activation mask** (relevant to IEC 62056-62)

element of the mask\_list attribute of the COSEM interface class “Register activation”. Activation masks define which “Register”, “Extended Register” and “Demand Register” objects are enabled when an activation mask is active. Masks can be added to or deleted from the mask list. At any time, only one mask is active

### 3.1.5

#### **activity calendar** (relevant to IEC 62056-62)

COSEM interface class used to model handling of different tariff structures. It defines scheduled actions inside the meter, which follow the classical method of using calendar-based schedules by defining seasons, weeks, etc. An “activity calendar” object may coexist with the more general object “Schedule” and can even overlap with it

### 3.1.6

#### **application association (AA)** (relevant to IEC 62056-53 and IEC 62056-62)

logical connection between two application processes, defining the context of the information exchange. In DLMS/COSEM, application associations are always established by the client application process, using the COSEM-OPEN services. Application associations are identified by lower layer addresses (SAP-s)

### 3.1.7

#### **application association request (AARQ)** (relevant to IEC 62056-53)

application protocol data unit (APDU) sent by the client application layer to the server application layer, as a result of invoking the COSEM-OPEN.request service. It holds the parameters defining the proposed application context and xDLMS context. It is carried by the supporting layer

### 3.1.8

#### **application association response (AARE)** (relevant to IEC 62056-53)

application protocol data unit (APDU) which may be sent by the server application layer to the client application layer proposing the association, as a result of invoking the COSEM-OPEN.response service. It holds the parameters of the negotiated application context and xDLMS context, or in case of failure, diagnostic information. It is carried by the supporting layer

### 3.1.9

#### **application context** (relevant to IEC 62056-53)

common set of rules that govern the data exchange in a given application association. In DLMS/COSEM, application contexts are pre-defined and they are identified by the Application\_Context\_Name parameter of the COSEM-OPEN service

### 3.1.10

#### **application control service element (ACSE)** (relevant to IEC 62056-53)

service element of the application layer, controlling the establishment and release of application associations

### 3.1.11

#### **association LN** (relevant to IEC 62056-62)

COSEM interface class used to model application associations between client and server application processes when the server uses logical name (LN) referencing. A COSEM Logical Device has one instance of this IC for each association the device is able to support. An Association LN object holds the parameters of the application association context and the xDLMS context, it provides a list of COSEM objects available within the given application association together with access rights to their attributes and methods, and it handles the authentication process (see also 3.1.12.)



### 3.1.12

#### **association SN** (relevant to IEC 62056-62)

COSEM interface class used to model application associations between client and server application processes when the server uses short name (SN) referencing. A COSEM Logical Device has one instance of this IC for each association the device is able to support. An Association SN object provides a list of COSEM objects available within the given association and it has specific methods to provide information about access rights to their attributes and methods and to handle the authentication process (see also 3.1.11)

### 3.1.13

#### **attribute** (relevant to IEC 62056-62)

element of an interface object, having a defined meaning, together with the data type to be used and a statement of the set of possible values it may take. In COSEM, the first attribute of each object is the logical name (see also 3.1.82)

### 3.1.14

#### **attribute\_0 reference** (relevant to IEC 62056-53)

feature provided by xDLMS to refer to all public attributes of an interface object in a single GET or SET service. The availability of this feature is indicated in the xDLMS conformance block and its use is negotiated upon application association establishment (see also 3.1.84)

### 3.1.15

#### **attribute descriptor** (relevant to IEC 62056-53)

parameter of the xDLMS attribute-related GET and SET services, used with logical name (LN) referencing. An attribute is fully identified by the COSEM interface class identifier, the COSEM object instance identifier (logical name) and the attribute identifier within the given object. GET and SET services may access the whole attribute, or only a part of it (selective access). A GET and SET service may refer to one attribute only, or several attributes. In this latter case, the GET/SET.request service includes a list of attribute descriptors

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### 3.1.16

#### **authentication** (relevant to IEC 62056-53 and IEC 62056-62)

process to establish the true identity of the communicating partners before requesting and providing data communication services. It is one element of the security mechanisms provided by DLMS/COSEM. There are three levels of authentication security defined:

- lowest level security: in this case neither the client nor the server is identified;
- low-level security (LLS, see 3.1.69);
- high-level security (HLS, see 3.1.57)

### 3.1.17

#### **automatic capturing** (relevant to IEC 62056-62)

concept used in relation with interface class "Profile generic". When automatic capturing is chosen, the capture\_objects are collected periodically, as defined by the capture\_period attribute (see also 3.1.223)

### 3.1.18

#### **base\_name** (relevant to IEC 62056-62)

When short-name (SN) referencing is used, the base\_name determines the short name to which the logical name attribute of a COSEM interface object in the server is mapped. The other attributes and the methods of the object are mapped to short names with an offset defined for each COSEM interface class. This mapping is done for each object during the implementation phase of the server. The base\_names for each object are retrieved by reading the object\_list attribute of the association SN object

### 3.1.19

#### **billing period identifier** (relevant to IEC 62056-61)

In COSEM, values related to one or more previous billing periods are identified by the value group F of the OBIS code identifying objects, generally profiles, holding historical data

### 3.1.20

**block transfer** (relevant to IEC 62056-46 and IEC 62056-53)

method of transferring long-service parameters, not fitting in the maximum PDU size. When LN referencing is used, an application layer level block transfer is defined with the GET service in the server to client direction, with the SET service in the client to server direction and with the ACTION service in both directions. The availability of this feature is indicated in the xDLMS conformance block, and its use is negotiated upon application association establishment. When the lower layers provide segmentation (for example, with the HDLC-based data link layer), block transfer is defined in a transparent manner to the application layer, for the direction server to client

### 3.1.21

**calendar** (relevant to IEC 62056-62)

see also 3.1.5

### 3.1.22

**capture** (relevant to IEC 62056-62)

method of the COSEM interface class "Profile generic", which, when invoked, copies the values of capture\_object into the buffer by reading the specified attributes (or, if the attribute is complex, the part of the attribute defined by the data index)

### 3.1.23

**capture\_object** (relevant to IEC 62056-62)

attribute of a "Data", "Register", "Extended register", "Demand register", "Clock" or "Profile generic" object captured into the buffer of a "Profile generic object"

### 3.1.24

**challenge** (relevant to IEC 62056-62)

information passed from the client to the server and from the server to the client when the HLS authentication mechanism is used. The challenges are processed by both parties in a secret way and the results are sent back

### 3.1.25

**channel** (relevant to IEC 62056-61)

measuring input of a physical or logical metering device, used to measure energy from different sources, to be identified and handled separately. The channel is identified by group B of the OBIS code

### 3.1.26

**class\_id** (relevant to IEC 62056-62)

identifier of a COSEM interface class characterized by a specific set of attributes and methods. COSEM objects are instances of COSEM interface classes. A COSEM object is unambiguously identified with the class\_id of the interface class to which it belongs and its logical name (COSEM instance identifier)

### 3.1.27

**client** (relevant to IEC 62056-42, IEC 62056-46 and IEC 62056-53)

In DLMS/COSEM, data exchange between metering equipment and data collection systems is based on the client/server paradigm. The client is an application process running in the data collection system, the server is an application process running in the metering equipment and providing a view of the resources of the meter as available through its communication interfaces. The client application process requests remote services from the server, which provides them

### 3.1.28

**client management application process** (relevant to IEC 62056-46 and IEC 62056-53)

client application process having a reserved address whose role is to support event notification from the servers

**3.1.29****clock** (relevant to IEC 62056-62)

COSEM interface class modelling the handling of all date- and time-related information

**3.1.30****communication profile** (relevant to IEC 62056-53)

given set of protocol layers, including the application layer characterized by the type of layer and by the application control service element of the application layer. An example is the 3-layer, connection-oriented, HDLC-based communication profile

**3.1.31****confirmed services** (relevant to IEC 62056-53)

services involving a single .request primitive at a service element access point, an .indication primitive at a different service element access point and a .confirm primitive at the same service access point as the .request primitive. In DLMS/COSEM confirmed services can be used for establishing and releasing confirmed application associations and for exchanging data with a response from the server

**3.1.32****conformance block** (relevant to IEC 62056-53 and IEC 62056-62)

parameter of the COSEM\_OPEN service, listing the xDLMS services and features, proposed by the client and negotiated by the server

**3.1.33****conformance testing**

See 3.1.50

**3.1.34****COSEM** (relevant to IEC 62056-62)

(acronym for COmpanion Specification for Energy Metering)

interface model of communicating energy metering equipment, providing a view of the functionality available through the communication interfaces. The modelling uses an object-oriented approach

**3.1.35****COSEM interface object** (relevant to IEC 62056-62)

instance of a COSEM interface class. The set of objects instantiated in the logical devices of a physical device model the functionality of the metering equipment as seen through its communicating interfaces

**3.1.36****COSEM meter model** (relevant to IEC 62056-62)

COSEM models metering equipment as physical devices, containing one or more logical devices. Each logical device contains a number of COSEM objects, modelling the functionality of the logical device. Each logical device supports one or more application associations with clients. An application association defines the context of the data exchange and the scope of access to the objects and their attributes and methods. Each logical device is uniquely identified world wide by its logical device name. Each physical device must contain a management logical device

**3.1.37****cumulative values** (relevant to IEC 60256-62)

In COSEM, objects which are instances of the interface class "Register"

**3.1.38****current and last average value objects** (relevant to IEC 62056-62)

In COSEM, respective attributes of COSEM objects which are instances of interface class "Demand register" using the OBIS code of the current value as logical name

**3.1.39****data** (relevant to IEC 62056-62)

COSEM interface class typically used to store configuration data and parameters

**3.1.40****date and time** (relevant to IEC 62056-62)

In COSEM, attributes with the data type “octet-string”. The formatting of each element is defined precisely

**3.1.41****day\_profile\_table** (relevant to IEC 62056-62)

attribute of the interface class “Activity calendar” defining an ordered list of actions and the corresponding activation times for each day type

**3.1.42****daylight saving** (relevant to IEC 62056-62)

attributes of the “Clock” interface object controlling the management of daylight saving. The interface class “Schedule” defines the rules for the execution of scripts when the clock is moved forward or backward

**3.1.43****dedicated\_key** (relevant to IEC 62056-53)

parameter of the COSEM-OPEN.request service and an element of the xDLMS-Initiate.request PDU used when ciphered data communication services (APDU-s) are used

**3.1.44****demand register** (relevant to IEC 62056-62)

COSEM interface class used to store a demand value with its associated scaler\_unit, status and time information. It provides the current average and last average values. Both block demand and sliding demand calculation are supported. It provides a reset method and a next\_period method to terminate an integration period and to start a new one

**3.1.45****device ID** (relevant to IEC 62056-61 and IEC 62056-62)

device identifiers defined by the manufacturer and/or by the user and generally represented by instances of interface class “Data”

**3.1.46****device language message specification – user association (DLMS UA)**

provider of maintenance services

**3.1.47****DLMS** (relevant to IEC 62056-53)

(acronym for distribution line message specification)

application layer specification, independent of the lower layers and thus of the communication channel, designed to support messaging to and from (energy) distribution devices in a computer-integrated environment. It is an International Standard published as IEC 61334-4-41. The concept has been driven forward to become device language message specification with the aim of providing an interoperable environment for structured modelling and meter data exchange. Applications like remote meter reading, remote control and value added services for metering any kind of energy, like electricity, water, gas or heat are supported

**3.1.48****DLMS/COSEM** (relevant to IEC 62056-53 and IEC 62056-62)

standard specification using COSEM for interface modelling metering equipment and using DLMS for exchanging data with such metering equipment