



TECHNICAL SPECIFICATION



**Communication networks and systems for power utility automation –
Part 80-4: Translation from the COSEM object model (IEC 62056) to the
IEC 61850 data model**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.200

ISBN 978-2-8322-3222-4

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	6
4 Data modelling hierarchy	8
4.1 General.....	8
4.2 IEC 62056 principles	9
4.3 The data models and the application layer of IEC 62056	10
4.4 The IEC 61850 principles	11
5 Translation of IEC 62056 COSEM objects into IEC 61850-Logical Nodes.....	11
5.1 General translation principles	11
5.1.1 General	11
5.1.2 IEC 61850 DataTypeTemplates to IEC 62056 Common Data Types	12
5.2 Translation tables.....	13
5.2.1 General	13
5.2.2 Metering and measurement.....	14
Figure 1 – Overview of relationship between data models.....	9
Figure 2 – The IEC 62056 framework	9
Table 1 – IEC 62056 terminology	7
Table 2 – IEC 61850 terminology	8
Table 3 – IEC 62056 Register Class.....	11
Table 4 – Conventions	12
Table 5 – Data Type mapping	12
Table 6 – Column heading descriptions	13
Table 7 – Metering and measurement logical node classes.....	14
Table 8 – MMTR	14
Table 9 – MMTN	15
Table 10 – MMXU	16
Table 11 – MMXN	18

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COMMUNICATION NETWORKS AND SYSTEMS
FOR POWER UTILITY AUTOMATION –****Part 80-4: Translation from the COSEM object model
(IEC 62056) to the IEC 61850 data model**

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.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 61850-80-4, which is a technical specification, has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

Enquiry draft	Report on voting
57/1602/DTS	57/1659/RVC

Full information on the voting for the approval of this technical specification 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 content of this part of IEC 61850 is based on existing or emerging standards and applications.

A list of all parts of the IEC 61850 series, published under the general title *Communication networks and systems for power utility automation*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 61850 defines communication networks and systems for power utility automation, and more specifically the communication architecture for subsystems such as substation automation systems, feeder automation systems and SCADA for distributed energy resources. In essence, IEC 61850 is a description of the communication architecture for the overall power system management when the combined total of the above mentioned subsystems are considered.

The devices in the electricity grid are becoming more intelligent with an increasing number of elements and increasing complexity of data to be processed in a distributed environment. Introduction of comprehensive data models simplifies the handling and management of the data drastically since the models can be re-used once standardized. By defining a number of standardized hierarchical names, it can drastically reduce errors in the field. The names in the standard can be directly used for the configuration of devices and the communication between devices.

This part of IEC 61850, which is a technical specification, defines the one-to-one relationship of IEC 62056 OBIS codes to IEC 61850 Logical Nodes. The purpose is to increase the availability of revenue meter information to other applications defined within the IEC 61850 framework. This increased visibility will contribute to information available for smart grid applications.

The other benefit of defining these relationships is in regards to the design of protocol converters. With a clear specification, test cases can be developed as well as end user understanding of the quantities is unambiguous. Finally, end user configuration is simplified by limiting the options for translation.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 80-4: Translation from the COSEM object model (IEC 62056) to the IEC 61850 data model

1 Scope

Included within the IEC 61850 power utility automation architecture are its concepts, data models, communication protocols and the mapping data exchanges on the substation network. This extends beyond just IEDs to other IEC 61850 enabled devices like meters, system applications and remote access gateways.

This part of IEC 61850, which is a technical specification, considers the requirements of power utility automation applications; i.e. the scope is limited by the use cases relevant for meter data exchange in HV/MV substations and MV/LV substations. Only use cases that require the data exchange involving a revenue meter are considered. Applications not covered by the existing standards listed in Clause 2 are out of scope.

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 TS 61850-2, *Communication networks and systems in substations – Part 2: Glossary*

IEC 61850-7-2, *Communication networks and systems for power utility automation – Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)*

IEC 61850-7-3:2010, *Communication networks and systems for power utility automation – Part 7-3: Basic communication structure – Common data classes*

IEC 61850-7-4:2010, *Communication networks and systems for power utility automation – Part 7-4: Basic communication structure – Compatible logical node classes and data object classes*

IEC 62056-6-1:2015, *Electricity metering data exchange – The DLMS/COSEM suite – Part 6-1: Object Identification System (OBIS)*

IEC 62056-6-2:2016, *Electricity metering data exchange – The DLMS/COSEM suite – Part 6-2: COSEM interface classes*