

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61850-7-2:2010 sisaldab Euroopa standardi EN 61850-7-2:2010 ingliskeelset teksti.

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**Communication networks and systems for power utility automation -
Part 7-2: Basic information and communication structure -
Abstract communication service interface (ACSI)
(IEC 61850-7-2:2010)**

Réseaux de communication pour
l'automatisation des systèmes des
compagnies d'électricité -
Partie 7-2: Principes des structures
d'informations et de communication -
Interface de services abstraits de
communication (ACSI)
(CEI 61850-7-2:2010)

Kommunikationsnetze und -systeme für
die Automatisierung in der elektrischen
Energieversorgung -
Teil 7-2: Grundlegende Informations- und
Kommunikationsstruktur -
Abstrakte Schnittstelle für
Kommunikationsdienste (ACSI)
(IEC 61850-7-2:2010)

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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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 57/1065/FDIS, future edition 2 of IEC 61850-7-2, prepared by IEC TC 57, Power systems management and associated information exchange, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61850-7-2 on 2010-10-01.

This European Standard supersedes EN 61850-7-2:2003.

The major technical changes with regard to EN 61850-7-2:2003 are as follows:

- class diagrams have been updated;
- data types not required have been removed;
- errors and typos have been corrected;
- substitution model has been moved to EN 61850-7-3;
- service tracking for control blocks have been added;
- the view concept will be according to the new work on role bases access (RBA);
- security issues are solved by the IEC 62351 series; and
- several terms have been harmonized with those in the other parts.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this document, the following print types are used:

- **bold** is used to highlight defined terms;
- Tahoma is used where the difference between a capital i (I) and a small L (l) is important to see.

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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) | 2011-07-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2013-10-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61850-7-2:2010 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 61400-25-2 | NOTE | Harmonized as EN 61400-25-2. |
| IEC 61850-8 series | NOTE | Harmonized in EN 61850-8 series (not modified). |
| IEC 61850-9 series | NOTE | Harmonized in EN 61850-9 series (not modified). |

IEC 61850-9-1

NOTE Harmonized as EN 61850-9-1.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

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/TS 61850-2	-	Communication networks and systems in substations - Part 2: Glossary	-	-
IEC 61850-5	-	Communication networks and systems in substations - Part 5: Communication requirements for functions and device models	EN 61850-5	-
IEC 61850-6	-	Communication networks and systems for power utility automation - Part 6: Configuration description language for communication in electrical substations related to IEDs	EN 61850-6	-
IEC 61850-7-1	-	Communication networks and systems in substations - Part 7-1: Basic communication structure for substation and feeder equipment - Principles and models	EN 61850-7-1	-
IEC 61850-7-3	-	Communication networks and systems in substations - Part 7-3: Basic communication structure for substation and feeder equipment - Common data classes	EN 61850-7-3	-
IEC 61850-7-4	-	Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes	EN 61850-7-4	-
IEC 61850-8-1	-	Communication networks and systems in substations - Part 8-1: Specific Communication Service Mapping (SCSM) - Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3	EN 61850-8-1	-
IEC 61850-9-2	-	Communication networks and systems in substations - Part 9-2: Specific Communication Service Mapping (SCSM) - Sampled values over ISO/IEC 8802-3	EN 61850-9-2	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 4217	-	Codes for the representation of currencies and funds	-	-
ISO 9506-1	-	Industrial automation systems - Manufacturing Message Specification - Part 1: Service definition	-	-
IEEE 754	-	Binary floating-point arithmetic	-	-

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INTRODUCTION

This document is part of a set of definitions which details a layered utility communication architecture. This architecture has been chosen to provide abstract definitions of classes and services such that the definitions are independent of specific protocol stacks, implementations, and operating systems.

The IEC 61850 series is intended to provide interoperability between a variety of devices. Communication between these devices is achieved by the definition of a hierarchical class model (for example, logical device, logical node, data, data set, report control, or log) and services provided by these classes (for example, get, set, report, define, delete) in IEC 61850-7-x.

This part of IEC 61850 defines the abstract communication service interface (ACSI) for use in the utility application domain that requires real-time cooperation of intelligent electronic devices. The ACSI has been defined so as to be independent of the underlying communication systems. Specific communication service mappings¹⁾ (SCSM) are specified in IEC 61850-8-x and IEC 61850-9-x.

This part of IEC 61850 defines the abstract communication service interface in terms of

- a hierarchical class model of all information that can be accessed via a communication network,
- services that operate on these classes, and
- parameters associated with each service.

The ACSI description technique abstracts away from all the different approaches to implement the cooperation of the various devices.

NOTE 1 Abstraction in ACSI has two meanings. First, only those aspects of a real device (for example, a breaker) or a real function that are visible and accessible over a communication network are modelled. This abstraction leads to the hierarchical class models and their behaviour defined in IEC 61850-7-2, IEC 61850-7-3, and IEC 61850-7-4. Second, the ACSI abstracts from the aspect of concrete definitions on how the devices exchange information; only a conceptual cooperation is defined. The concrete information exchange is defined in the SCSMs.

NOTE 2 This part of IEC 61850 does not provide comprehensive tutorial material. It is recommended that IEC 61850-5 and IEC 61850-7-1 be read first in conjunction with IEC 61850-7-2 and IEC 61850-7-3.

NOTE 3 Examples use names of classes (for example XCBR for a class of a logical node) defined in IEC 61850-7-4 and IEC 61850-7-3. The normative names are defined in IEC 61850-7-4 and IEC 61850-7-3 only.

¹⁾ The ACSI is independent of the specific mapping. Mappings to standard application layers or middle ware technologies are possible.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)

1 Scope

This part of IEC 61850 applies to the ACSI communication for utility automation. The ACSI provides the following abstract communication service interfaces.

- a) Abstract interface describing communications between a client and a remote server for
 - real-time data access and retrieval,
 - device control,
 - event reporting and logging,
 - setting group control,
 - self-description of devices (device data dictionary),
 - data typing and discovery of data types, and
 - file transfer.
- b) Abstract interface for fast and reliable system-wide event distribution between an application in one device and many remote applications in different devices (publisher/subscriber) and for transmission of sampled measured values (publisher/subscriber).

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

IEC 61850-5, *Communication networks and systems in substations – Part 5: Communication requirements for functions and devices models*

IEC 61850-6, *Communication networks and systems for power utility automation – Part 5: Configuration description language for communication in electrical substations related to IEDs*

IEC 61850-7-1, *Communication networks and systems for power utility automation – Part 7-1: Basic communication structure – Principles and models²⁾*

IEC 61850-7-3, *Communication networks and systems for power utility automation – Part 7-3: Basic communication structure – Common data classes²⁾*

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

²⁾ To be published.

IEC 61850-8-1, *Communication networks and systems for power utility automation – Part 8-1: Specific communication service mapping (SCSM) – Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3³⁾*

IEC 61850-9-2, *Communication networks and systems for power utility automation – Part 9-2: Specific communication service mapping (SCSM) – Sampled values over ISO/IEC 8802-3³⁾*

ISO 4217, *Codes for the representation of currencies and funds*

ISO 9506 (all parts), *Industrial automation systems – Manufacturing Message Specification*

IEEE 754, *Standard for Floating-Point Arithmetic*

3 Terms and definitions

For the purposes of this document, the terms and definitions provided in IEC 61850-2 and the following apply.

3.1

class

description of a set of objects that share the same attributes, services, relationships, and semantics

3.2

client

entity that requests a service from a server and that receives unsolicited messages from a server

3.3

device

entity that performs control, actuating and/or sensing functions and interfaces to other such entities within an automation system

NOTE Devices alone do not perform energy generation, transport, or distribution functions.

3.4

external equipment

entity that is stand-alone, or interfaces to an automation system, and that performs energy generation, transport, or distribution functions

EXAMPLE Transformer, circuit-breaker, line.

NOTE 1 Equipment can contain devices.

NOTE 2 Equipment cannot have a direct connection to the communication network – only devices can be directly connected to the communication network.

3.5

instance (of a class)

entity that has unique identity, to which a set of services can be applied, and which has a state that stores the effects of the services

NOTE Instance is a synonym for the term object.

³⁾ To be published.