

Communication networks and systems in substations Part 10: Conformance testing

Communication networks and systems in
substations Part 10: Conformance testing

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

| | |
|--|---|
| <p>Käesolev Eesti standard EVS-EN 61850-10:2005 sisaldab Euroopa standardi EN 61850-10:2005 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 06.07.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p> | <p>This Estonian standard EVS-EN 61850-10:2005 consists of the English text of the European standard EN 61850-10:2005.</p> <p>This document is endorsed on 06.07.2005 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p> |
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| <p>Käsitlusala: Specifies standard techniques for testing of conformance of implementations, as well as specific measurement techniques to be applied when declaring performance parameters. The use of these techniques will enhance the ability of the system integrator to integrate IEDs easily, operate IEDs correctly, and support the applications as intended.</p> | <p>Scope: Specifies standard techniques for testing of conformance of implementations, as well as specific measurement techniques to be applied when declaring performance parameters. The use of these techniques will enhance the ability of the system integrator to integrate IEDs easily, operate IEDs correctly, and support the applications as intended.</p> |
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ICS 33.200

Võtmesõnad:

Communication networks and systems in substations
Part 10: Conformance testing
(IEC 61850-10:2005)

Réseaux et systèmes de communication
dans les postes
Partie 10: Essais de conformité
(CEI 61850-10:2005)

Kommunikationsnetze- und -systeme
in Stationen
Teil 10: Konformitätsprüfung
(IEC 61850-10:2005)

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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 57/742/FDIS, future edition 1 of IEC 61850-10, 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 61850-10 on 2005-05-01.

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) | 2006-03-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2008-05-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61850-10:2005 was approved by CENELEC as a European Standard without any modification.

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 Where 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 | - ¹⁾ | Communication networks and systems in substations Part 2: Glossary | - | - |
| IEC 61850-4 | - ¹⁾ | Part 4: System and project management | EN 61850-4 | 2002 ²⁾ |
| IEC 61850-5 | - ¹⁾ | Part 5: Communication requirements for functions and device models | EN 61850-5 | 2003 ²⁾ |
| IEC 61850-6 | - ¹⁾ | Part 6: Configuration description language for communication in electrical substations related to IEDs | EN 61850-6 | 2004 ²⁾ |
| IEC 61850-7-1 | - ¹⁾ | Part 7-1: Basic communication structure for substation and feeder equipment - Principles and models | EN 61850-7-1 | 2003 ²⁾ |
| IEC 61850-7-2 | - ¹⁾ | Part 7-2: Basic communication structure for substation and feeder equipment - Abstract communication service interface (ACSI) | EN 61850-7-2 | 2003 ²⁾ |
| IEC 61850-7-3 | - ¹⁾ | Part 7-3: Basic communication structure for substation and feeder equipment - Common data classes | EN 61850-7-3 | 2003 ²⁾ |
| IEC 61850-7-4 | - ¹⁾ | Part 7-4: Basic communication structure for substation and feeder equipment - Compatible logical node classes and data classes | EN 61850-7-4 | 2003 ²⁾ |
| IEC 61850-8-1 | - ¹⁾ | 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 | 2004 ²⁾ |

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-----------------|---|-------------------|--------------------|
| IEC 61850-9-1 | - ¹⁾ | Part 9-1: Specific Communication Service Mapping (SCSM) - Sampled values over serial unidirectional multidrop point to point link | EN 61850-9-1 | 2003 ²⁾ |
| IEC 61850-9-2 | - ¹⁾ | Part 9-2: Specific Communication Service Mapping (SCSM) - Sampled values over ISO/IEC 8802-3 | EN 61850-9-2 | 2004 ²⁾ |
| ISO/IEC 9646-1 | - ¹⁾ | Information technology - Open Systems Interconnection - Conformance testing methodology and framework Part 1: General concepts | EN/ISO IEC 9646-1 | 1996 ²⁾ |
| ISO/IEC 9646-2 | - ¹⁾ | Part 2: Abstract Test Suite specification | EN/ISO IEC 9646-2 | 1996 ²⁾ |
| ISO/IEC 9646-4 | - ¹⁾ | Part 4: Test realization | EN/ISO IEC 9646-4 | 1996 ²⁾ |
| ISO/IEC 9646-5 | - ¹⁾ | Part 5: Requirements on test laboratories and clients for the conformance assessment process | EN/ISO IEC 9646-5 | 1996 ²⁾ |
| ISO/IEC 9646-6 | - ¹⁾ | Part 6: Protocol profile test specification | EN/ISO IEC 9646-6 | 1996 ²⁾ |

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Communication networks and systems in substations –

Part 10: Conformance testing



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Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

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Communication networks and systems in substations –

Part 10: Conformance testing

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS IN SUBSTATIONS –

Part 10: Conformance testing

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.
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International Standard IEC 61850-10 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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

| FDIS | Report on voting |
|-------------|------------------|
| 57/742/FDIS | 57/749/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.

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

IEC 61850 consists of the following parts, under the general title *Communication networks and systems in substations*:

- Part 1: Introduction and overview
- Part 2: Glossary
- Part 3: General requirements
- Part 4: System and project management
- Part 5: Communication requirements for functions and device models
- Part 6: Configuration description language for communication in electrical substations related to IEDs
- Part 7-1: Basic communication structure for substation and feeder equipment – Principles and models
- Part 7-2: Basic communication structure for substation and feeder equipment – Abstract communication service interface (ACSI)
- Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes
- Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes
- Part 8-1: Specific Communication Service Mapping (SCSM) – Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3
- Part 9-1: Specific Communication Service Mapping (SCSM) – Sampled values over serial unidirectional multidrop point to point link
- Part 9-2: Specific Communication Service Mapping (SCSM) – Sampled values over ISO/IEC 8802-3
- Part 10: Conformance testing

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

A bilingual edition of this standard may be issued at a later date.

INTRODUCTION

This part of IEC 61850 is part of a set of specifications which details a layered substation communication architecture.

This part of IEC 61850 defines:

- the methods and abstract test cases for conformance testing of devices used in substation automation systems, and
- the metrics to be measured within devices according to the requirements defined in IEC 61850-5.

The intended readers are test system developers.

NOTE 1 Tests regarding EMC requirements and environmental conditions are subject to IEC 61850-3 and not included in this part of IEC 61850.

NOTE 2 It is recommended that IEC 61850-5 and IEC 61850-7-1 be read first in conjunction with IEC 61850-7-2, IEC 61850-7-3, and IEC 61850-7-4.

NOTE 3 Abbreviations used in IEC 61850-10 are listed in Clause 4 or may be found in other parts of IEC 61850 that are relevant for conformance testing.

COMMUNICATION NETWORKS AND SYSTEMS IN SUBSTATIONS –

Part 10: Conformance testing

1 Scope

This part of IEC 61850 specifies standard techniques for testing of conformance of implementations, as well as specific measurement techniques to be applied when declaring performance parameters. The use of these techniques will enhance the ability of the system integrator to integrate IEDs easily, operate IEDs correctly, and support the applications as intended.

NOTE 1 The role of the test facilities for conformance testing and certifying the results are beyond the scope of this part of IEC 61850.

NOTE 2 The test approach and test system design to test a client device is likely to be different across the broad range of clients. There are many possibilities to test clients. The client tests are beyond the scope of this part of IEC 61850. It is intended to define client test requirements during the maintenance of this part.

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 61850-4, *Communication networks and systems in substations – Part 4: System and project management*

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

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

IEC 61850-7-1, *Communication networks and systems in substations – Part 7-1: Basic communication structure for substation and feeder equipment – Principles and models*

IEC 61850-7-2, *Communication networks and systems in substations – Part 7-2: Basic communication structure for substation and feeder equipment – Abstract communication service interface (ACSI)*

IEC 61850-7-3, *Communication networks and systems in substations – Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes*

IEC 61850-7-4, *Communication networks and systems in substations – Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes*

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*

IEC 61850-9-1, *Communication networks and systems in substations – Part 9-1: Specific Communication Service Mapping (SCSM) – Sampled values over serial unidirectional multidrop point to point link*

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*

ISO/IEC 9646-1, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts*

ISO/IEC 9646-2, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2: Abstract test suite specification*

ISO/IEC 9646-4, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 4: Test realization*

ISO/IEC 9646-5, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 5: Requirements on test laboratories and clients for the conformance assessment process*

ISO/IEC 9646-6, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 6: Protocol profile test specification*

3 Terms and definitions

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

3.1

Factory Acceptance Test

FAT

customer agreed functional tests of the specifically manufactured substation automation system or its parts using the parameter set for the planned application as specified in a specific customer specification. The FAT will be carried out in the factory of the manufacturer or other agreed-upon location by the use of process simulating test equipment.

3.2

hold point

point, defined in the appropriate document beyond which an activity shall not proceed without the approval of the initiator of the conformance test. The test facility shall provide a written notice to the initiator at an agreed time prior to the hold point. The initiator or his representative is obligated to verify the hold point and approve the proceeding of the activity.

3.3

interoperability

ability of two or more IEDs from the same vendor (or different vendors) to exchange information and use that information for correct co-operation.

A set of values having defined correspondence with the quantities or values of another set.

3.4

Model Implementation Conformance Statement

MICS

details the standard data object model elements supported by the system or device