

**Communication networks and systems
for power utility automation -- Part 7-
410: Hydroelectric power plants -
Communication for monitoring and
control**

Communication networks and systems for power
utility automation -- Part 7-410: Hydroelectric power
plants - Communication for monitoring and control

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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| <p>Käesolev Eesti standard EVS-EN 61850-7-410:2007 sisaldab Euroopa standardi EN 61850-7-410:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 17.12.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p> | <p>This Estonian standard EVS-EN 61850-7-410:2007 consists of the English text of the European standard EN 61850-7-410:2007.</p> <p>This document is endorsed on 17.12.2007 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:</p> <p>IEC 61850-7-410 is part of the IEC 61850 series. This part of IEC 61850 specifies the additional common data classes, logical nodes and data objects required for the use of IEC 61850 in a hydropower plant. The Logical Nodes and Data Objects defined in this part of IEC 61850 belong to the following fields of use:• Electrical functions. This group includes LN and DO used for various control functions, essentially related to the excitation of the generator. New LN and DO defined within this group are not specific to hydropower plants; they are more or less general for all types of larger power plants. • Mechanical functions. This group includes functions related to the turbine and associated equipment. The specifications of this document are intended for hydropower plants, modifications might be required for application to other types of generating plants. Some more generic functions are though defined under Logical Node group K. • Hydrological functions. This group of functions includes objects related to water flow, control and management of reservoirs and dams. Although specific for hydropower plants, the LN and DO defined here can also be used for other types of utility water anagement systems. • Sensors. A power plant will need sensors providing measurements of other than electrical data.</p> | <p>Scope:</p> <p>IEC 61850-7-410 is part of the IEC 61850 series. This part of IEC 61850 specifies the additional common data classes, logical nodes and data objects required for the use of IEC 61850 in a hydropower plant. The Logical Nodes and Data Objects defined in this part of IEC 61850 belong to the following fields of use:• Electrical functions. This group includes LN and DO used for various control functions, essentially related to the excitation of the generator. New LN and DO defined within this group are not specific to hydropower plants; they are more or less general for all types of larger power plants. • Mechanical functions. This group includes functions related to the turbine and associated equipment. The specifications of this document are intended for hydropower plants, modifications might be required for application to other types of generating plants. Some more generic functions are though defined under Logical Node group K. • Hydrological functions. This group of functions includes objects related to water flow, control and management of reservoirs and dams. Although specific for hydropower plants, the LN and DO defined here can also be used for other types of utility water anagement systems. • Sensors. A power plant will need sensors providing measurements of other than electrical data.</p> |
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**Communication networks and systems for power utility automation -
Part 7-410: Hydroelectric power plants -
Communication for monitoring and control
(IEC 61850-7-410:2007)**

Réseaux et systèmes de communication
pour l'automatisation des services
de distribution d'énergie -
Partie 7-410: Centrales hydroélectriques -
Communication pour la surveillance
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(CEI 61850-7-410:2007)

Kommunikationsnetze und -systeme
für die Automatisierung
in der elektrischen Energieversorgung -
Teil 7-410: Wasserkraftwerke -
Kommunikation für Überwachung,
Regelung und Steuerung
(IEC 61850-7-410:2007)

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Comité Européen de Normalisation Electrotechnique
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Foreword

The text of document 57/886/FDIS, future edition 1 of IEC 61850-7-410, 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 61850-7-410 on 2007-10-01.

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) 2008-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-10-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61850-7-410:2007 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 61362 | NOTE | Harmonized as EN 61362:1998 (not modified). |
| IEC 61400-25-2 | NOTE | Harmonized as EN 61400-25-2:2007 (not modified). |
| IEC 61850-7-1 | NOTE | Harmonized as EN 61850-7-1:2003 (not modified). |
| IEC 61850-10 | NOTE | Harmonized as EN 61850-10:2005 (not modified). |
| IEC 61970-301 | NOTE | Harmonized as EN 61970-301:2004 (not modified). |
| IEC 62270 | NOTE | Harmonized as EN 62270:2004 (not modified). |

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

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

INTERNATIONAL STANDARD

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Part 7-410: Hydroelectric power plants – Communication for monitoring and
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INTERNATIONAL STANDARD

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-410: Hydroelectric power plants – Communication for monitoring and control

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 61850-410 has been prepared by IEC technical committee 57:
Power systems management and associated information exchange.

It has been decided to amend the general title of the IEC 61850 series to *Communication networks and systems for power utility automation*. Henceforth, new editions within the IEC 61850 series will adopt this new general title.

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

| FDIS | Report on voting |
|-------------|------------------|
| 57/886/FDIS | 57/905/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.

A list of all parts of the IEC 61850 series, 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 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 version of this publication may be issued at a later date.

INTRODUCTION

The present standard includes all additional logical nodes, not included in IEC 61850-7-4:2003, required to represent the complete control and monitoring system of a hydropower plant.

Most of the Logical Nodes in IEC 61850-7-410 that are of general use, Logical Nodes the names of which do not start with the letter “H”, will be transferred to the future Edition 2 of IEC 61850-7-4. In the same manner, all Common Data Classes specified in IEC 61850-7-410 will be transferred to future Edition 2 of IEC 61850-7-3.

Once future Editions 2 of IEC 61850-7-3 and IEC 61850-7-4 are published, IEC 61850-7-410 will be revised to include only those Logical Nodes that are specific to hydropower use.

Before Edition 2 of IEC 61850-7-410 is published, there will be a period where the Common Data Class (CDC) and Logical Node (LN) specifications will overlap with IEC 61850-7-3 (future Edition 2) and IEC 61850-7-4 (future Edition 2). During this time, the specifications in IEC 61850-7-3 (future Edition 2) and IEC 61850-7-4 (future Edition 2) will apply.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 7-410: Hydroelectric power plants – Communication for monitoring and control

1 Scope

IEC 61850-7-410 is part of the IEC 61850 series. This part of IEC 61850 specifies the additional common data classes, logical nodes and data objects required for the use of IEC 61850 in a hydropower plant.

The Logical Nodes and Data Objects defined in this part of IEC 61850 belong to the following fields of use:

- **Electrical functions.** This group includes LN and DO used for various control functions, essentially related to the excitation of the generator. New LN and DO defined within this group are not specific to hydropower plants; they are more or less general for all types of larger power plants.
- **Mechanical functions.** This group includes functions related to the turbine and associated equipment. The specifications of this document are intended for hydropower plants, modifications might be required for application to other types of generating plants. Some more generic functions are though defined under Logical Node group K.
- **Hydrological functions.** This group of functions includes objects related to water flow, control and management of reservoirs and dams. Although specific for hydropower plants, the LN and DO defined here can also be used for other types of utility water management systems.
- **Sensors.** A power plant will need sensors providing measurements of other than electrical data. With a few exceptions, such sensors are of general nature and not specific for hydropower plants.

NOTE All Logical Nodes with names not starting with the letter "H" will be included in a future edition 2 of IEC 61850-7-4. When that document is published, the Logical Nodes in IEC 61850-7-4 (Edition 2) will take precedence over Logical Nodes with the same name in this part IEC 61850-7-410.

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 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 61850-7-2:2003, *Communication networks and systems in substations – Part 7-2: Basic communication structure for substation and feeder equipment – Abstract communication services interface (ACSI)*

IEC 61850-7-3:2003, *Communication networks and systems in substations – Part 7-3: Basic communication structure for substation and feeder equipment – Common data classes*

IEC 61850-7-4:2003, *Communication networks and systems in substations – Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes*

3 Terms and definitions

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

4 Abbreviations

In general, the abbreviations defined in IEC 61850-2 apply. The following abbreviations are repeated here for convenience.

| | |
|-----|---|
| ASG | Analogue setting |
| BSC | Binary controlled step position information |
| CDC | Common data class |
| CIM | Common information model (reference to IEC 61970-301) |
| CMV | Complex measured value |
| DO | Data object |
| DPC | Double point control |
| DPL | Device name-plate |
| DPS | Double point status information |
| HMI | Human machine interface |
| IED | Intelligent electronic device |
| INC | Controllable integer status |
| ING | Integer status setting |
| INS | Integer status |
| LD | Logical device |
| LN | Logical node |
| MV | Measured value |
| PD | Physical device |
| PID | Proportional – Integrating – Derivative regulator |
| SAV | Sampled analogue value |
| SMV | Sampled measured value |
| SPC | Single point control |
| SPS | Single point status |