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Communication networks and systems for power utility automation -- Part 6: Configuration description language for communication in electrical substations related to IEDs (IEC 61850 -6:2009 (EQV))

I.S. EN 61850-6:2010

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Communication networks and systems for power utility automation - Part 6: Configuration description language for communication in electrical substations related to IEDs

(IEC 61850-6:2009)

Systèmes et réseaux de communication pour l'automatisation des services de distribution d'énergie -
Partie 6: Langage pour la description de configuration pour la communication dans les postes électriques, entre les dispositifs électroniques intelligents (IED)
(CEI 61850-6:2009)

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung -
Teil 6: Sprache für die Beschreibung der Konfiguration für die Kommunikation in Stationen mit intelligenten elektronischen Geräten (IED)
(IEC 61850-6:2009)

This European Standard was approved by CENELEC on 2010-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

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Foreword

The text of document 57/1025/FDIS, future edition 2 of IEC 61850-6, 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 61850-6 on 2010-02-01.

This European Standard supersedes EN 61850-6:2004.

The main changes with respect to EN 61850-6:2004 are as follows:

– functional extensions added based on changes in other Parts, especially Parts 7-2 and 7-3;

– functional extensions concerning the engineering process, especially for configuration data exchange between system configuration tools, added;

– provision of clarifications and corrections. Issues that require clarification are published in a database available at www.tissue.iec61850.com. Arising incompatibilities are listed in 8.2.3.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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)	2010-11-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61850-6:2009 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 61131-3	NOTE	Harmonized as EN 61131-3.
IEC 81346-2	NOTE	Harmonized as EN 81346-2.

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.

Publication	Year	Title	EN/HD	Year
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 61850-7-1	-	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 61850-7-2	-	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	-
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 in substations - Part 7-4: Basic communication structure for substation and feeder equipment - Compatible logical node classes and data 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	-

Publication	Year	Title	EN/HD	Year
IEC 81346-1	-	Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 1: Basic rules	EN 81346-1	-
ISO/IEC 8859-1	-	Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No.1	-	-
RFC 1952	-	GZIP file format specification version 4.3	-	-
RFC 2045	-	Multipurpose Internet Mail Extensions (MIME) - Part 1: Format of Internet Message Bodies	-	-
-	-	Extensible Markup Language (XML) 1.0	-	-
-	-	XML Schema Part 1: Structures	-	-
-	-	XML Schema Part 2: Datatypes	-	-

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 6: Configuration description language for communication in electrical substations related to IEDs

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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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.

International Standard IEC 61850-6 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This second edition cancels and replaces the first edition, published in 2004, and constitutes a technical revision.

The main changes with respect to the previous edition are as follows:

- functional extensions added based on changes in other Parts, especially Parts 7-2 and 7-3;
- functional extensions concerning the engineering process, especially for configuration data exchange between system configuration tools, added;
- provision of clarifications and corrections. Issues that require clarification are published in a database available at www.tissue.iec61850.com. Arising incompatibilities are listed in 8.2.3.

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

FDIS	Report on voting
57/1025/FDIS	57/1041/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 the parts in the IEC 61850 series, under the general title *Communication networks and systems for power utility automation*, can be found on the IEC website. [1)]

This publication contains attached .xml and .xsd files. These files are intended to be used as a complement and do not form an integral part of this standard.

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 standard 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.

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

INTRODUCTION

This part of IEC 61850 specifies a description language for the configuration of electrical substation IEDs. This language is called System Configuration description Language (SCL). It is used to describe IED configurations and communication systems according to IEC 61850-5 and IEC 61850-7-x. It allows the formal description of the relations between the utility automation system and the process (substation, switch yard). At the application level, the switch yard topology itself and the relation of the switch yard structure to the SAS functions (logical nodes) configured on the IEDs can be described.

NOTE The process description, which is in this standard restricted to switch yards and general process functions, will be enhanced by appropriate add-ons for wind mills, hydro plants and distributed energy resources (DER).

SCL allows the description of an IED configuration to be passed to a communication and application system engineering tool, and to pass back the whole system configuration description to the IED configuration tool in a compatible way. Its main purpose is to allow the interoperable exchange of communication system configuration data between an IED configuration tool and a system configuration tool from different manufacturers.

IEC 61850-8-1 and IEC 61850-9-2, which concern the mapping of IEC 61850-7-x to specific communication stacks, may extend these definitions according to their need with additional parts, or simply by restrictions on the way the values of objects have to be used.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 6: Configuration description language for communication in electrical substations related to IEDs

1 Scope

This part of IEC 61850 specifies a file format for describing communication-related IED (Intelligent Electronic Device) configurations and IED parameters, communication system configurations, switch yard (function) structures, and the relations between them. The main purpose of this format is to exchange IED capability descriptions, and SA system descriptions between IED engineering tools and the system engineering tool(s) of different manufacturers in a compatible way.

The defined language is called System Configuration description Language (SCL). The IED and communication system model in SCL is according to IEC 61850-5 and IEC 61850-7-x. SCSM specific extensions or usage rules may be required in the appropriate parts.

The configuration language is based on the Extensible Markup Language (XML) version 1.0 (see XML references in Clause 2).

This standard does not specify individual implementations or products using the language, nor does it constrain the implementation of entities and interfaces within a computer system. This part of the standard does not specify the download format of configuration data to an IED, although it could be used for part of the configuration data.

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 61850-7-1, *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*