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Communication networks and systems for power utility automation - Part 80-1: Guideline to exchanging information from a CDC-based data model using IEC 60870-5-101 or IEC 60870-5-104

(IEC/TS 61850-80-1:2008)

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung -
Teil 80-1: Leitfaden zum Informationsaustausch mit einer Datenbasis, die auf gemeinsamen Datenklassen beruht, mit Hilfe von IEC 60870-5-101 oder IEC 60870-5-104
(IEC/TS 61850-80-1:2008)

This Technical Specification was approved by CENELEC on 2009-12-11.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

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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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Ref. No. CLC/TS 61850-80-1:2010 E

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Foreword

This Technical Specification consists of the text of the International Technical Specification IEC 61850-80-1:2008 prepared by IEC TC 57, Power systems management and associated information exchange.

It was circulated for voting in accordance with the Internal Regulations, Part 2, Subclause 11.3.3.3 and was accepted as a CENELEC Technical Specification on 2009-12-11.

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 date was fixed:

– latest date by which the existence of the CLC/TS has to be announced at national level (doa) 2010-06-11

Annex ZA has been added by CENELEC.

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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 Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60870-5-3	-	Telecontrol equipment and systems Part 5-3: Transmission protocols - General structure of application data	EN 60870-5-3	-
IEC 60870-5-4	1993	Telecontrol equipment and systems Part 5-4: Transmission protocols – Definition and coding of application information elements	EN 60870-5-4	1993
IEC 60870-5-5	1995	Telecontrol equipment and systems Part 5-5: Transmission protocols - Basic application functions	EN 60870-5-5	1995
IEC 60870-5-101	2003	Telecontrol equipment and systems Part 5-101: Transmission protocols - Companion standard for basic telecontrol tasks	EN 60870-5-101	2003
IEC 60870-5-104	2006	Telecontrol equipment and systems Part 5-101: Transmission protocols - Network access for IEC 60870-5-101 using standard transport profiles	EN 60870-5-104	2006
IEC 61400-25-2	-	Wind turbines Part 25-2: Communications for monitoring and control of wind power plants - Information models	EN 61400-25-2	-
IEC 61850	Series	Communication networks and systems in substations	EN 61850	Series
IEC 61850-6	-	Communication networks and systems in substations Part 6: Configuration description language for communication in electrical substations related to IEDs	EN 61850-6	-

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Publication	Year	Title	EN/HD	Year
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	-	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 61850-8-1	-	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	-
57/963/INF	-	IEC 61850 – Technical issues (www.tissue.iec61850.com)	-	-
IEEE 754	2008	Binary floating-point arithmetic	-	-
RFC 2200	June 1997	Internet official protocol standards – Request for comments 2200	-	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 80-1: Guideline to exchanging information from a CDC-based data model using IEC 60870-5-101 or IEC 60870-5-104

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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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- 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 61850-80-1, 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
57/916/DTS	57/969/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 bold characters in some tables are used to highlight the most essential terms or functions inside the figures to improve readability. Shading of parts of the figures is used for the same purpose.

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 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

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

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

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COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 80-1: Guideline to exchanging information from a CDC-based data model using IEC 60870-5-101 or IEC 60870-5-104

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1 Scope and object

This technical specification gives a guideline on how to exchange information from a CDC-based data model (for example IEC 61850) using IEC 60870-5-101 or IEC 60870-5-104 between substation(s) and control center(s). Mostly guidelines for functions needed in a substation gateway device are given.

The goal of this technical specification is to describe standardized mapping of device-oriented data models (for example IEC 61850) with already defined attributes of CDC's and services (for example IEC 61850-7) onto the already defined ASDU's and services of IEC 60870-5-104 or IEC 60870-5-101. It is not the goal of this technical specification to add any extensions to published standards (for example IEC 61850 or IEC 60870-5-104 or IEC 60870-5-101).

After an introduction giving a basic description of the mapping, the mapping of the information model with associated data classes, and the mapping of services are described. Clause 9 shows how the mapped data and services according to the IEC 60870-5-104 and IEC 60870-5-101 protocol are marked (selected) in the interoperability sheet.

The scope of this technical specification is to achieve real-time exchange of process information required for operational purposes between a substation using a CDC-based data model (for example IEC 61850) and (a) control centre(s) using a communication link over a wide area network (WAN) compliant to the definitions of IEC 60870-5-101 or IEC 60870-5-104. The amount of real-time information provided by the substation-gateway device can vary dependent on the operational needs. Actors could be regional and nationwide control centers that receive real-time information in order to monitor and control geographically widespread processes. The described mapping can be used for several fields of application of power utilities, such as substations, hydro and wind power plants, and decentralized energy resources DER. The mapping is based on the definitions of the standard series IEC 61850 Edition 1.0 and IEC 60870-5-104:2006/IEC 60870-5-101:2003. The scope of the mapped IEC 60870-5-104 and IEC 60870-5-101 subset is given in Clause 9.

This technical specification focuses mainly on defining rules and functions of a gateway device as a part of the substation. However, the rules and functions are also valid when an IED may optionally be connected directly to a WAN compliant with IEC 60870-5-101 or IEC 60870-5-104 and therefore, the mapping has to be done inside the IED.

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 60870-5-3, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 3: General structure of application data*

IEC 60870-5-4:1993, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 4: Definition and coding of application information elements*

IEC 60870-5-5:1995, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 5: Basic application functions*

IEC 60870-5-101:2003, *Telecontrol equipment and systems – Part 5-101: Transmission protocols – Companion standard for basic telecontrol tasks*

IEC 60870-5-104:2006, *Telecontrol equipment and systems – Part 5-104: Transmission protocols – Network access for IEC 60870-5-101 using standard transport profiles*

IEC 61850 (all parts), *Communication networks and systems in substations*

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 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 61850-8-1, *Communication networks and systems in substations – Part 8-1: Specific Communications Service Mapping (SCSM) – Mapping to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3*

Document 57/963/INF*: IEC 61850 – Technical issues (see www.tissue.iec61850.com)*

IEC 61400-25-2, *Wind turbines – Part 25-2: Communications for monitoring and control of wind power plants – Information models*

IEEE 754:2008, *IEEE Standard for Binary Floating-Point Arithmetic*

RFC 2200*, Internet Official Protocol Standards, Request for Comments 2200 (June 1997)*

3 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

ACSI	Abstract communication service interface (defined for example in IEC 61850-7-2)
ASDU	Application service data unit
CASDU	Common address of ASDU
CDC	Common data class (defined for example in IEC 61850-7-3)
CI	Counter interrogation
COT	Cause of transmission
GI	General interrogation
GOOSE	Generic object oriented substation event
HMI	Human machine interface
IED	Intelligent electronic device
IOA	Information object address
LD	Logical device

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