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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 61850-7-4:2003)

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

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Kommunikationsnetze und -systeme in Stationen -- Teil 7-4: Grundlegende Kommunikationsstruktur für stations- und feldbezogene Ausrüstung - Kompatible Logikknoten- und Datenklassen

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Réseaux et systèmes de communication dans les postes -- Partie 7-4: Structure des communications de base pour les postes électriques et les équipements de lignes - Classes de données et classes de noeuds logiques compatibles

Ta slovenski standard je istoveten z: **EN 61850-7-4:2003**

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Réseaux et systèmes de communication dans les postes
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(CEI 61850-7-4:2003)

Kommunikationsnetze und -systeme in Stationen
Teil 7-4: Grundlegende Kommunikationsstruktur für stations- und feldbezogene Ausrüstung – Kompatible Logikknoten- und Datenklassen
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Foreword

The text of document 57/622/FDIS, future edition 1 of IEC 61850-7-4, prepared by IEC TC 57, Power system control and associated communications, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61850-7-4 on 2003-06-01.

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) 2004-03-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-06-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A and ZA are normative and annexes B and C are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61850-7-4:2003 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 60255-24	- [1)]	Electrical relays Part 24: Common format for transient data exchange (COMTRADE) for power systems	EN 60255-24	2001 [2)]
IEC 61000-4-7	- [1)]	Electromagnetic compatibility (EMC) Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto	EN 61000-4-7	2002 [2)]
IEC/TS 61850-2	- [1)]	Communication networks and systems in substations Part 2: Glossary	-	-
IEC 61850-5	- [1)]	Part 5: Communication requirements for functions and devices models	-	-
IEC 61850-7-1	- [1)]	Part 7-1: Basic communication structure for substation and feeder equipment - Principles and models	-	-
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)]

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1) Undated reference.

2) Valid edition at date of issue.

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Publication	Year	Title	EN/HD	Year
IEEE 519	1992	IEEE Recommended Practises and Requirements for Harmonic Control in Electrical Power Systems	-	-
IEEE 1459	2000	IEEE Trial Use Standard Definitions for the Measurement of Electric Power Quantities Under Sinusoidal, Nonsinusoidal, Balanced or Unbalanced Conditions	-	-
IEEE C37.2	1996	Electrical Power System Device Function Numbers and Contact Designation	-	-

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Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS IN SUBSTATIONS –

Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
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International Standard IEC 61850-7-4 has been prepared by IEC technical committee 57: Power system control and associated communications.

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

FDIS	Report on voting
57/622/FDIS	57/640/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.

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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 [1]

Part 3: General requirements

Part 4: System and project management

Part 5: Communication requirements for functions and device models [2]

Part 6: Configuration description language for communication in electrical substations related to IEDs [1]

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/IEC 9506-1 and ISO/IEC 9506-2) and to ISO/IEC 8802-3 [1]

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 [1]

Part 10: Conformance testing [1]

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The content of this part of IEC 61850 is based on existing or emerging standards and applications. In particular the definitions are based upon:

- the specific data types defined in IEC 60870-5-101 and IEC 60870-5-103;
- the common class definitions from the Utility Communication Architecture 2.0: Generic Object Models for Substation and Feeder Equipment (GOMSFE) (IEEE TR 1550);
- CIGRE Report 34-03, Communication requirements in terms of data flow within substations, December 1996.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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[1] Under consideration.

[2] To be published.

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INTRODUCTION

This part of IEC 61850 is a part of set of specifications (IEC 61850). IEC 61850 defines a substation communication architecture. This architecture has been chosen to provide abstract definitions of classes and services such that the specifications are independent of specific protocol stacks, implementations, and operating systems. The mapping of these abstract classes and services to communication stacks is outside the scope of IEC 61850-7-x and may be found in IEC 61850-8-x and in IEC 61850-9-x.

IEC 61850-7-1 gives an overview of this communication architecture. IEC 61850-7-3 defines common attribute types and common data classes related to substation applications. The attributes of the common data classes may be accessed using services defined in IEC 61850-7-2. These common data classes are used in this part to define the compatible data classes.

To reach interoperability, all data in the data model need a strong definition with regard to syntax and semantics. The semantics of the data is mainly provided by names assigned to logical nodes and data they contain, as defined in this part. Interoperability is easiest if as much as possible of the data are defined as mandatory. Because of different philosophies and technical features, settings were declared as optional in this edition of the standard. After some experience has been gained with this standard, this decision may be reviewed in an amendment or in the next revision of this part.

It should be noted that data with full semantics is only one of the elements required to achieve interoperability. Since data and services are hosted by devices (IED), a proper device model is needed along with compatible, domain specific services (see IEC 61850-7-2).

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The compatible logical node name and data name definitions found in this part and the associated semantics are fixed. The syntax of the type definitions of all data classes are abstract definitions provided in IEC 61850-7-2 and IEC 61850-7-3. Not all features of logical nodes are listed in this part for example data sets and logs are covered in IEC 61850-7-2.

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COMMUNICATION NETWORKS AND SYSTEMS IN SUBSTATIONS –

Part 7-4: Basic communication structure for substation and feeder equipment – Compatible logical node classes and data classes

1 Scope

This part of IEC 61850 specifies the information model of devices and functions related to substation applications. In particular, it specifies the compatible logical node names and data names for communication between Intelligent Electronic Devices (IED). This includes the relationship between Logical Nodes and Data.

The Logical Node Names and Data Names defined in this document are part of the class model introduced in IEC 61850-7-1 and defined in IEC 61850-7-2. The names defined in this document are used to build the hierarchical object references applied for communicating with IEDs in substations and on distribution feeders. The naming conventions of IEC 61850-7-2 are applied in this part.

To avoid private, incompatible extension rules this part specifies normative naming rules for multiple instances and private extensions of Logical Node (LN) Classes and Data Names.

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In Annex A, all rules are given (making use of examples) for:

- multiple instances of logical node classes by use of a LN instance identification (ID);
- multiple instances of data by use of a data instance ID;
- selecting data not included in LN out of the complete data name set;
- creating new logical node classes and data names.

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In Annex B, examples are given for:

- the use of Logical Nodes in complex situations like line protection schemes;
- multiple instances of Logical Nodes with different levels of functionality.

This part does not provide tutorial material. It is recommended those parts IEC 61850-5 and IEC 61850-7-1 be read first, in conjunction with IEC 61850-7-3, and IEC 61850-7-2. This part does not discuss implementation issues. The relationship between this standard and IEC 61850-5 is outlined in Annex C.

This standard is applicable to describe device models and functions of substation and feeder equipment. The concepts defined in this standard may also be applied to describe device models and functions for:

- substation to substation information exchange,
- substation to control centre information exchange,
- power plant to control centre information exchange,
- information exchange for distributed generation,
- information exchange for distributed automation, or
- information exchange for metering.

Figure 1 provides a general overview of this document.