SLOVENSKI STANDARD
SIST EN 61850-7-4:2010/A1:2020

01-junij-2020

Komunikacijska omrežja in sistemi za avtomatizacijo porabe električne energije - 7 -4. del: Osnovna komunikacijska struktura - Združljivi logični vozliščni in podatkovni razredi - Dopolnilo A1

Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung - Teil 7-4: Grundlegende Kommunikationsstruktur - Kompatible Logikknoten- und Datenklassen

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques - Partie 7-4: Structure de communication de base - Classes de nud logique et classes de donnée objet compatibles

Ta slovenski standard je istoveten z: **EN 61850-7-4:2010/A1:2020**

ICS:

29.240.30	Krmilna oprema za elektroenergetske sisteme	Control equipment for electric power systems
33.200	Daljinsko krmiljenje, daljinske meritve (telemetrija)	Telecontrol. Telemetering

SIST EN 61850-7-4:2010/A1:2020 **en**

EUROPEAN STANDARD

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EN 61850-7-4:2010/A1

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ICS 33.200

English Version

Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes (IEC 61850-7-4:2010/A1:2020)

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques- Partie 7-4: Structure de communication de base - Classes de nœuds logiques et classes d'objets de données compatibles (IEC 61850-7-4:2010/A1:2020)

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung - Teil 7-4: Grundlegende Kommunikationsstruktur - Kompatible Logikknoten- und Datenklassen (IEC 61850-7-4:2010/A1:2020)

This amendment A1 modifies the European Standard EN 61850-7-4:2010; it was approved by CENELEC on 2020-03-18. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 CEN-CENELEC Management Centre or to any CENELEC member.

This amendment 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 CEN-CENELEC Management Centre 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 61850-7-4:2010/A1:2020 E

European foreword

The text of document 57/2102A/FDIS, future IEC 61850-7-4/A1, prepared by IEC/TC 57 "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61850-7-4:2010/A1:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-12-18
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-03-18

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 61850-7-4:2010/A1:2020 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 61869-9:2016	NOTE	Harmonized as EN IEC 61869-9:2019 (not modified)
IEC 62271-3:2015	NOTE	Harmonized as EN 62271-3:2015 (not modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Add the following references:

Publication	Year	Title	EN/HD	Year
IEC/IEEE 61850-9-3	-	Communication networks and systems for power utility automation - Part 9-3: Precision time protocol profile for power utility automation	-	-
IEC/IEEE 61850-9-3	2016	Communication networks and systems for power utility automation - Part 9-3: Precision time protocol profile for power utility automation	-	-
IEC/IEEE 60255-118-1	2018	Measuring relays and protection equipment - Part 118-1: Synchrophasor for power systems - Measurements	-	-
IEC 60255-24	2013	Measuring relays and protection equipment - Part 24: Common format for transient data exchange (COMTRADE) for power systems	-	-

Delete the following reference:

Publication	Year	Title	EN/HD	Year
IEEE 1588	-	Precision clock synchronization protocol for networked measurement and control systems	-	-

IEC 61850-7-4

Edition 2.0 2020-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

AMENDMENT 1
AMENDEMENT 1

**Communication networks and systems for power utility automation –
Part 7-4: Basic communication structure – Compatible logical node classes and data object classes**

**Réseaux et systèmes de communication pour l'automatisation des systèmes électriques –
Partie 7-4: Structure de communication de base – Classes de noeuds logiques et classes d'objets de données compatibles**

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FOREWORD

This amendment has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The motivation and goal of the amendment is to improve consistency of the data model over all application domains of IEC 61850. Data (Logical Nodes, Data Objects, Data Attributes) with the same semantics shall have the same naming where this part of IEC 61850 refers to Logical Nodes and Data Objects and IEC 61850-7-3 to the Data Attributes.

Therefore, the amendement complements and updates the second edition of this part of IEC 61850, which was published in 2010. It constitutes editorial revisions for consistency and technical corrections of bugs as far as interoperability is touched.

To reach this goal and to keep it for all future as common working source a comprehensive back-office UML version was created and will be maintained for future standard development. The published parts of IEC 61850such as IEC 61850-7-4, on which the amendment is based, are generated automatically from the UML version. This allows publishing, voting and reading the various parts of IEC 61850-7 as in the past.

This amendment includes the following changes with respect to IEC 61850-7-4:2010:

- provides clarifications and corrections to the second edition of IEC 61850-7-4, based on the tissues = {671, 672, 674, 675, 676, 677, 679, 680, 682, 683, 685, 686, 689, 693, 694, 695, 696, 712, 713, 714, 715, 716, 724, 725, 732, 734, 735, 736, 742, 743, 744, 748, 749, 772, 773, 774, 775, 776, 800, 802, 808, 819, 830, 831, 835, 838, 842, 843, 844, 849, 871, 877, 878, 879, 881, 882, 902, 908, 909, 910, 911, 912, 913, 920, 928, 932, 933, 937, 939, 940, 952, 967, 991, 1007, 1029, 1044, 1046, 1071, 1075, 1076, 1077, 1081, 1086, 1117, 1119, 1128, 1137, 1139, 1176, 1177, 1190, 1191, 1203, 1205, 1229, 1235, 1236, 1244, 1250, 1256, 1258, 1259, 1261, 1269, 1273, 1278, 1282, 1292, 1294, 1310, 1316, 1330, 1331, 1333, 1339, 1347, 1348, 1364, 1368, 1375, 1380, 1390, 1404, 1411, 1420, 1423, 1425, 1426, 1456, 1568};
- adds to each functional LN group a parent abstract Logical node where the functional nodes are children from (full object oriented model). Since all abstract LNs are in a common clause, the relative position of the functional LNs is not changed within their clause.
- adds new abbreviated terms
- has extension of the list of abbreviate terms to be used for object names
- has more precise combination rules for abbreviated terms to object names
- has extensions by new logical nodes mainly from power quality domains and others
- has corrections of editorial errors.

Clauses 4 through 8 and their subclauses (except for 5.1, 5.2, and 5.3) and XML enumerations from Annex H are automatically generated from the UML model.

The structure of the document has been changed for the following reasons:

– To split the description of logical nodes preliminaries (Clause 5) from logical node specification (Clause 6). Some content of this clause has been moved from the previous description of logical nodes (was in IEC 61850-7-4:2007(revision A – 5.1 and 5.2).

– To include abstract logical nodes. These abstract logical nodes have been described in 6.2.

– The specification of logical nodes begins with 6.3 (was in IEC 61850-7-4:2007 (revision A – 5.3). In consequence all clauses in IEC 61850-7-4:2007 (revision A beginning with 5.3 count one number higher (beginning with 6.3) than they were in IEC 61850-7-4 (revision A).

– The description of data object semantics and enumerations starts with Clause 7. A new clause has been included to specify the enumerations used in IEC 61850-7-4 separately.

Annex J and Annex K have been added.

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

FDIS	Report on voting
57/2102A/FDIS	57/2133/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

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 objects 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.

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.

This IEC standard includes Code Components i.e. components that are intended to be directly processed by a computer. Such content is any text found between the markers <CODE BEGINS> and <CODE ENDS>, or otherwise is clearly labeled in this standard as a Code Component. In the current version of this document, such indication is made at the beginning of each concerned top-level clauses.

The purchase of this IEC standard carries a copyright license for the purchaser to sell software containing Code Components from this standard directly to end users and to end users via distributors, subject to IEC software licensing conditions, which can be found at: http://www.iec.ch/CCv1.

If any updates are required to the published code component that needs to apply immediately and can not wait for an amendment (i.e. fixing a major problem), a new release of the Code Component will be issued and distributed through the IEC WebSite. Any new release of the Code Component related to this part will supersede any previously published Code Component including the one published within the current document.

This publication contains attached nsd files which compose the Code Component of this part. 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 amendment and the base publication will remain unchanged until the stability date indicated on the IEC website 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.

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 Scope

1.1 General

*Add a new subtitle **1.1 General** before the first paragraph of the Scope.*

Replace the last two bullet points of the fifth paragraph with the following new bullet points:

- information exchange for distribution energy resources,
- information exchange for metering,
- information exchanged for hydro power plants, or
- information exchange for wind generation plants.

Add the following new Subclauses 1.2 and 1.3 after the existing last paragraph of the Scope:

1.2 Namespace name and version

This new subclause is mandatory for any IEC 61850 namespace (as defined by IEC 61850-7-1:2011).

The parameters which identify this new release of this namespace are:

- Namespace Version: 2007
- Namespace Revision: B
- Namespace name: “IEC 61850-7-4:B”
- Namespace release: 3
- Namespace release date: 2019-10-31

IEC 61850-7-4 depends on IEC 61850-7-3:2007B latest release.

The table below provides an overview of all published versions of this namespace.

Edition	Publication date	Webstore	Namespace
Edition 1.0	2003-05	IEC 61850-7-4:2003	IEC 61850-7-4:2003
Edition 2.0	2010-03	IEC 61850-7-4:2010	IEC 61850-7-4:2007
Amendment 1 of Edition 2.0	2020-02	IEC 61850-7-4:2010/AMD1:2020	IEC 61850-7-4:2007B
Edition 2.1	2020-02	IEC 61850-7-4:2010+AMD1:2020 CSV	IEC 61850-7-4:2007B

1.3 Code Component distribution

The Code Component will be available in light and full version:

– Full version will contain definition of the whole LNs defined in this standard with the documentation associated and access will be restricted to purchaser of this part

– Light version will not contain the documentation but will contain the whole definition of the LNs as per full version, and this light version will be freely accessible on the IEC website for download, but the usage remains under the licensing conditions.

The link for downloading the light version of this code component is:

http://www.iec.ch/tc57/supportdocuments/IEC_61850-7-4.NSD.2007B3.light.zip

The Code Component will be available in light and full version:

– Full version will contain definition of the whole LNs defined in this standard with the documentation associated and access will be restricted to purchaser of this part

– Light version will not contain the documentation but will contain the whole definition of the LNs as per full version, and this light version will be freely accessible on the IEC website for download, but the usage remains under the licensing conditions.

The Code Components for IEC 61850 data models (like LN definition in this IEC standard) are available as the file format NSD defined by standard IEC 61850-7-7.

The Code Component included in this IEC standard are potentially subject to maintenance works and user shall select the latest release in the repository located at:
http://www.iec.ch/tc57/supportdocuments

The latest version/release of the document will be found by selecting the file IEC 61850-7-4.NSD.{VersionStateInfo}.full.zip with the filed VersionStateInfo of the highest value.

Each Code Component is a ZIP package containing the electronic representation of the Code Component itself, with a file describing the content of the package (IECManifest.xml).

The IECManifest contains different sections giving information on:

– The copyright notice
– The identification of the code component
– The publication related to the code component
– The list of the electronic files which compose the code component
– An optional list of history files to track changes during the evolution process of the code component

The life cycle of a code component is not restricted to the life cycle of the related publication. The publication life cycle goes through two stages, Version (corresponding to an edition) and Revision (corresponding to an amendment). A third publication stage (Release) allow publication of Code Component without need to publish an amendment.

This is useful when InterOp Tissues need to be fixed. Then a new release of the Code Component will be released, which supersedes the previous release, and distributed through the IEC TC57 web site.

2 Normative references

Add the following new normative references:

IEC IEEE 61850-9-3, *Communication networks and systems for power utility automation - Part 9-3: Precision time protocol profile for power utility automation*

IEC/IEEE 61850-9-3:2016, *Communication networks and systems for power utility automation – Part 9-3: Precision time protocol profile for power utility automation*

IEC/IEEE 60255-118-1:2018, *Measuring relays and protection equipment – Part 118-1: Synchrophasor for power systems – Measurements*

IEC 60255-24:2013 / IEEE Std C37.111-2013, *Measuring relays and protection equipment – Part 24: Common format for transient data exchange (COMTRADE) for power systems*

Delete the following normative reference:

IEEE 1588, *Precision clock synchronisation protocol for networked measurement and control systems*

3 Terms and definitions

Add the following new terms and definitions:

3.1
<<abstract>> logical node class
abstract logical node class which is never instantiated, used to group common data objects into a semantically meaningful entity and reuse them in a logical node class through inheritance

3.2
<<admin>> logical node class
abstract logical node class with one special rule for changing the presence condition of some of its data objects when they are inherited in the derived statistics (“ds”) context: in a logical node that does not inherit from statistics logical node (i.e., Group L), the inherited “ds” presence condition is not applicable (‘na’)

3.3
deprecated element
element still maintained in this edition of the standard, for backwards compatibility purpose, but which is intended to be phased out in the next version of the standard

Note 1 to entry: A deprecated element by definition indicates what should be used instead.

3.4
presence condition
condition which specifies the occurance rules of data objects of logical node classes in LNinstances of implementations

Note 1 to entry: Annex I shows an overview about possibles presence conditions.

3.5
scheduled entity
data object of one of the following common data classes APC, ASG, INS, ING SPC, SPG, ENC or ENG where the control output or the value of the setting may be determined by the scheduling system

3.6
scheduling system
collection containing a schedule controller and the schedules to which the schedule controller refers

Note 1 to entry: The scheduling system is associated to a scheduled entity (by reference in the schedule controller) and determines the behaviour of the scheduled entity.

4 Abbreviated terms

Replace the existing text of Clause 4 with the following new text:

4.1 General purpose abbreviated terms

CT	current transducer / transformer
ds	derived statistics
LD	logical device
LN	logical node

PresCond	presence condition
nds	not derived statistics
R0	zero sequence resistance
RMS	root mean square
SCSM	specific communication service mapping
VT	voltage transducer / transformer
Z0	zero sequence impedance
Z1	positive sequence impedance

4.2 Abbreviated terms used in data object names

The following terms are used to build concatenated data object names. For example, ChNum is constructed by using two terms "Ch" which stands for "Channel" and "Num" which stands for "Number". Thus the concatenated name represents a "channel number".

Table 1 shows normative terms that are combined to create data object names for all domains of IEC 61850 and for the domain of IEC 61400-25.

Table 1 – Normative abbreviations for data object names

Term	Description	Term	Description
A	Current; phase A (L1)	Air	Air
AC	AC, alternating current	Alg	Algorithm
AGC	Automatic generation control	Alm	Alarm
ASG	Analogue setting CDC	Als	Alarm set
AWatt	Wattmetric component of current	Alt	Altitude
Abr	Abrasion	Altn	Alternate
Abs	Absolute	Amnt	Amount
Absb	Absorbing	Amp	Ampere, current DC or non-phase-related AC
Acc	Accuracy; acceleration (deprecated: use Accl instead)	An	Analogue
		Anc	Ancillary
Accl	Acceleration	Ane	Anemometer
Accm	Accumulated	Ang	Angle
Ack	Acknowledgement, acknowledge	Ap	Access point
Acs	Access	Apc	Analogue point control
Act	Action, activity, active, activate	App	Apparent
Actr	Actuator	Ar	Amperes reactive (reactive current)
Acu	Acoustic	Arc	Arc
Addr	Address	Area	Area
Adj	Adjustment	Arr	Array
Admin	Administrative	Asyn	Asynchronous
Adp	Adapter, adaptation	At	At
Aff	Affected	Auth	Authorisation
Age	Ageing	Auto	Automatic
Ahr	Ampere hours	Aux	Auxiliary

Term	Description
Av	Average
Avl	Availability
Ax	Axial
Azi	Azimuth
B	Bushing; phase B (L2)
BG	Before Gain
Bac	Binary-controlled analogue value
Bar	Barrier
Base	Base
Bat	Battery
Bck	Backup
Bec	Beacon
Beh	Behaviour
Ber	Bit error rate
Bias	Bias
Bl	Blade
Blb	Bulb
Blk	Block, blocked
Blow	Blowby
Bnd	Band, bandwidth
Boil	Boiler
Bot	Bottom
Brcb	Buffered report control block
Brg	Bearing
Brk	Brake
Bsc	Binary status control
Bst	Boost
Bt	Heartbeat
Bub	Bubbling
Bus	Bus
Byp	Bypass
C	Carbon; phase C (L3)
C2H2	Acetylene
C2H4	Ethylene
C2H6	Ethane
CB	Circuit breaker
CE	Cooling equipment (see also Cl)
CG	Core ground
CH4	Methane
CHP	Combined heat and power
CO	Carbon monoxide
CO2	Carbon dioxide
Cab	Cable
Cal	Calorie, caloric

Term	Description
Cam	Cam, e.g. rotating non-circular disk
Can	Cancel
Cap	Capability, capacity
Capac	Capacitance
Car	Carrier
Cbr	Calibration
Ccw	Counter clockwise
Ccy	Currency
Cds	Condensation
Ceil	Ceiling
Cel	Cell
Cf	Crest factor
Cff	Coefficient
Cfg	Configuration
Cg	Combusted Gas
Ch	Channel
Cha	Charger
Chg	Change
Chk	Check
Chr	Characteristic
Chs	Chassis
Circ	Circulating, circuit
Cl	Cooling, coolant, cooling system (see also CE)
Clc	Calculate, calculated
Clip	Clip
Clk	Clock
Cloud	Cloud
Clr	Clear
Cls	Close, closed
Cm	Centimetres
Cmbu	Combustible, combustion
Cmd	Command
Cmpl	Completed, completion, complete
Cmut	Commute, commutator
Cndct	Conductivity, Conducting
Cnt	Counter
Cntt	Contractual
Cnv	Converter
Col	Coil
Comm	Communication
Comp	Compensation
ConfRev	Configuration revision (confRev from IEC 61850-7-2)
Conn	Connected, connections