SLOVENSKI STANDARD
SIST EN 61850-3:2014

01-oktober-2014

Nadomešča:
SIST EN 61850-3:2004

Komunikacijska omrežja in sistemi za avtomatizacijo porabe električne energije - 3. del: Splošne zahteve (IEC 61850-3:2013)

Communication networks and systems for power utility automation - Part 3: General requirements

/

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques - Partie 3: Exigences générales

Ta slovenski standard je istoveten z: **EN 61850-3:2014**

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 61850-3:2014 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61850-3

July 2014

ICS 33.200

Supersedes EN 61850-3:2002

English Version

Communication networks and systems for power utility automation - Part 3: General requirements (IEC 61850-3:2013)

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques - Partie 3: Exigences générales (CEI 61850-3:2013)

Kommunikationsnetze und -systeme für die Automatisierung in der elektrischen Energieversorgung - Teil 3: Allgemeine Anforderungen (IEC 61850-3:2013)

This European Standard was approved by CENELEC on 2014-01-16. 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 CEN-CENELEC Management Centre 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 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, 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: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 61850-3:2014 E

Foreword

The text of document 57/1391/FDIS, future edition 2 of IEC 61850-3, 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 61850-3:2014.

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)	2014-10-18
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-01-16

This document supersedes EN 61850-3:2002.

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

Endorsement notice

The text of the International Standard IEC 61850-3:2013 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 60127-1	NOTE	Harmonized as EN 60127-1.
IEC 60255-27:2005	NOTE	Harmonized as EN 60255-27:2005 (not modified).
IEC 60297-3-101	NOTE	Harmonized as EN 60297-3-101.
IEC 60721-3-3	NOTE	Harmonized as EN 60721-3-3.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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
CISPR 22	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022 + AC:2011 [1)]	2010 2011
CISPR 24 + corr. June	2010 2011	Information technology equipment - Immunity characteristics - Limits and methods of measurement	EN 55024	2010
EN 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold		
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-14	2009	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	2009
IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60068-2-78	2001	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78 [2)]	2001
IEC 60255-21-1		Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 1: Vibration tests (sinusoidal)	EN 60255-21-1	
IEC 60255-21-2		Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 2: Shock and bump tests	EN 60255-21-2	
IEC 60255-21-3		Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 3: Seismic tests	EN 60255-21-3	
IEC 60255-27	2013	Measuring relays and protection equipment - Part 27: Product safety requirements	EN 60255-27	2014

[1)] EN 55022 is superseded by EN 50561-1:2013, which is based on .

[2)] EN 60068-2-78 is superseded by EN 60068-2-78:2013, which is based on IEC 60068-2-78:2012.

Publication	Year	Title	EN/HD	Year
IEC 60417	data base		HD 243 S12[3) 4)]	1995
IEC 60529		Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60664-1		Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	
IEC 60695-11-10		Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	
IEC 60825-1		Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	
IEC 60990	1999	Methods of measurement of touch current and protective conductor current	EN 60990	1999
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2008	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test		
IEC 61000-4-4 + corr. June	2004 2007	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4[5)]	2004
IEC 61000-4-5 + corr. October	2005 2009	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006
IEC 61000-4-6	2008	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6[6)]	2009
IEC 61000-4-8	2001	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test		
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
IEC 61000-4-16	2002	Electromagnetic compatibility (EMC) - Part 4-16: Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz		

[3)] HD 243 S12 includes supplement(s) M to K to IEC 60417.

[4)] HD 243 S12 is superseded by EN 60417-2:1999, which is based on IEC 60417-2:1998.

[5)] EN 61000-4-4 is superseded by EN 61000-4-4:2012, which is based on IEC 61000-4-4:2012.

[6)] EN 61000-4-6 is superseded by EN 61000-4-6:2014, which is based on IEC 61000-4-6:2013.

Publication	Year	Title	EN/HD	Year
IEC 61000-4-17	2009	Electromagnetic compatibility (EMC) - Part 4-17: Testing and measurement techniques - Ripple on d.c. input power port immunity test	-	-
IEC 61000-4-18	2006	Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test	EN 61000-4-18 + corr. September	2007 2007
IEC 61000-4-29	2000	Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests	EN 61000-4-29	2000
IEC 61010-1 + corr. May	2010 2011	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements	EN 61010-1	2010
IEC 61180-1	1992	High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements	EN 61180-1	1994
IEC 61180-2		High-voltage test techniques for low-voltage equipment - Part 2: Test equipment	EN 61180-2	
IEC/TS 61850-2	2003	Communication networks and systems in substations - Part 2: Glossary		
IEC 61850	(Series)	Communication networks and systems in substations - Part 6: Configuration description language for communication in electrical substations related to IEDs	EN 61850	(Series)
IEC 62271-1		High-voltage switchgear and controlgear - Part 1: Common specifications	EN 62271-1	
IEEE 1613	2009	IEEE Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations		
ISO 780	1997	Packaging - Pictorial marking for handling of goods	EN ISO 780	1999
ISO 7000		Graphical symbols for use on equipment - Registered symbols		
ISO 9772		Cellular plastics - Determination of horizontal burning characteristics of small specimens subjected to a small flame		

IEC 61850-3

Edition 2.0 2013-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Communication networks and systems for power utility automation – Part 3: General requirements

Réseaux et systèmes de communication pour l'automatisation des systèmes électriques – Partie 3: Exigences générales

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX XB

ICS 33.200

ISBN 978-2-8322-1216-5

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 7
3 Terms, definitions and abbreviations 9
3.1 Terms and definitions 9
3.2 Abbreviations 20
4 Environmental conditions 20
4.1 General 20
4.2 Normal environmental conditions 20
4.3 Special environmental conditions 21
4.4 Storage conditions 22
5 Ratings 22
5.1 General 22
5.2 Rated voltage – Auxiliary energizing voltage 22
5.2.1 AC voltage 22
5.2.2 DC voltage 22
5.2.3 Operating range 22
5.3 Binary input and output 22
5.3.1 Binary input 22
5.3.2 Binary output 22
5.4 Rated burden 22
5.5 Rated ambient temperature 22
6 Design and construction 23
6.1 Marking 23
6.1.1 General 23
6.1.2 Identification 23
6.1.3 Auxiliary supplies, I/O 23
6.1.4 Fuses 24
6.1.5 Terminals and operating devices 25
6.1.6 Equipment protected by double or reinforced insulation 25
6.1.7 Batteries 26
6.1.8 Test voltage marking 27
6.1.9 Warning markings 28
6.1.10 Marking durability 29
6.2 Documentation 29
6.2.1 General 29
6.2.2 Equipment ratings 29
6.2.3 Equipment installation 30
6.2.4 Equipment commissioning and maintenance 31
6.2.5 Equipment operation 31
6.3 Packaging 31
6.3.1 General 31
6.3.2 Marking of packaging 32
6.4 Dimensions 32
6.5 Functional performance requirements 32
6.6 Product safety requirements 32

6.6.1 Clearances and creepage distances 32
6.6.2 IP rating 34
6.6.3 Impulse voltage 34
6.6.4 AC or d.c. dielectric voltage test 36
6.6.5 Protective bonding resistance 39
6.6.6 Flammability of insulation materials, components and fire enclosure 39
6.6.7 Single-fault condition 41
6.7 Electromagnetic compatibility (EMC) 44
6.7.1 General 44
6.7.2 Electromagnetic environment 45
6.7.3 Immunity requirements and type tests 45
6.7.4 Emission requirements and type tests 54
6.8 Burden test 55
6.8.1 Burden for AC power supply 55
6.8.2 Burden for DC power supply 55
6.8.3 Burden for binary input 55
6.9 Climatic performance 55
6.9.1 General 55
6.9.2 Verification procedure 56
6.9.3 Climatic environmental tests 57
6.10 Mechanical performance 61
6.10.1 Vibration response and endurance (sinusoidal) 61
6.10.2 Shock response, shock withstand and bump 61
6.10.3 Seismic 61
6.11 Enclosure protection 62
7 Tests 62
7.1 General 62
7.2 Test reference conditions 62
7.3 Device reliability classes 62
7.4 Communication conditions during tests 62
7.5 Conditions to be met (acceptance criteria) 63
7.5.1 General 63
7.5.2 Conditions to be met by class 1 and class 2 devices 63
7.5.3 Additional condition to be met by class 1 devices 63
7.5.4 Additional condition to be met by class 2 devices 63
7.5.5 Equipment functioning 64
7.5.6 Exceptions 64
7.6 Test overview 64
7.7 Test report content 65
8 Marking, labelling and packaging 66
9 Rules for transport, storage, installation, operation and maintenance 66
10 Product documentation 66
Bibliography 67

Figure 1 – Example of power station and substation: selection of the specifications for apparatus and related connections 47
Figure 2 – Example air-insulated substation (AIS): selection of the specifications for apparatus and related connections 49

Table 1 – Normal environmental conditions 21
Table 2 – Special environmental conditions 21
Table 3 – Symbols 26
Table 4 – Symbols and marking of test voltage(s) 28
Table 5 – Current levels in normal operational condition 34
Table 6 – Charge of energy of capacitance levels 34
Table 7 – AC test voltages 38
Table 8 – Current levels in single fault condition 44
Table 9 – Immunity specification – Enclosure port 49
Table 10 – Immunity specifications – Signal ports 50
Table 11 – Immunity specifications – Low voltage a.c. input power ports and low voltage a.c. output power ports 51
Table 12 – Immunity specifications – Low voltage d.c. input power ports and low voltage d.c. output power ports 52
Table 13 – Immunity specifications – Functional earth port 53
Table 14 – Emission tests – Auxiliary power supply port 54
Table 15 – Emission tests – Telecommunication port 54
Table 16 – Emission tests below 1 GHz – Enclosure port at a measuring distance of 10 m 54
Table 17 – Emission tests above 1 GHz – Enclosure port at a measuring distance of 3 m 54
Table 18 – Dry heat test operational 57
Table 19 – Cold test operational 58
Table 20 – Dry heat test maximum storage temperature 58
Table 21 – Cold test minimum storage temperature 59
Table 22 – Change of temperature test 59
Table 23 – Damp heat steady state test 60
Table 24 – Damp heat cyclic test 61
Table 25 – Test reference conditions 62
Table 26 – Device communications profiles (conditions) during tests for Ethernet equipment with specified ranges of frame size (for example, an Ethernet switch) 63
Table 27 – Device communications profiles (conditions) during tests for serial devices without specified ranges of frame size (for example, serial media converters) 63
Table 28 – Test overview 64

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 3: General requirements

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.
2) The formal decisions or agreements of 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 IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
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 61850-3 has been prepared by IEC technical committee 57: Power systems management and associated information exchange system.

This second edition cancels and replaces the first edition published in 2002. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) requirements are in line with those of other equipment used in the same environment (e.g. protection relays);
b) product safety added based on IEC 60255-27;
c) EMC requirements completed and in line with IEC 60255 series and IEC 61000-6-5.

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

FDIS	Report on voting
57/1391/FDIS	57/1416/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.

In this standard, the following print types are used:

– compliance statements: in italic type;

– markings: in bold type and caps.

A list of all parts in 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 stability 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.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 3: General requirements

1 Scope

This part of IEC 61850 defines the general requirements, mainly regarding construction, design and environmental conditions for utility communication and automation IEDs and systems in power plant and substation environments. These general requirements are in line with requirements for IEDs used in similar environments, for example measuring relays and protection equipment.

When communication or automation IEDs are an integral part of another device in the power plant or substation, then the environmental requirements for the device itself apply to the communications equipment.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat,steady state*

IEC 60255-21-1, *Electrical relays – Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment – Section 1: Vibration tests (sinusoidal)*

IEC 60255-21-2, *Electrical relays – Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment – Section 2: Shock and bump tests*

IEC 60255-21-3, *Electrical relays – Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment – Section 3: Seismic tests*

IEC 60255-27:2013, *Measuring relays and protection equipment – Part 27: Product safety requirements*

IEC 60417, *Graphical symbols for use on equipment.* Available from <http://www.graphical-symbols.info/equipment>