Irish Standard
I.S. EN 62271-3:2015

High-voltage switchgear and controlgear - Part 3: Digital interfaces based on IEC 61850

I.S. EN 62271-3:2015

Incorporating amendments/corrigenda/National Annexes issued since publication:

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN 62271-3

May 2015

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Supersedes EN 62271-3:2006

English Version

High-voltage switchgear and controlgear - Part 3: Digital interfaces based on IEC 61850 (IEC 62271-3:2015)

Appareillage à haute tension - Partie 3: Interfaces numériques basées sur l'IEC 61850 (IEC 62271-3:2015)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 3: Digitale Schnittstellen nach IEC 61850 (IEC 62271-3:2015)

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Ref. No. EN 62271-3:2015 E

Foreword

The text of document 17C/617/FDIS, future edition 2 of IEC 62271-3, prepared by SC 17C "High-voltage switchgear and controlgear assemblies" of IEC/TC 17 "Switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-3:2015.

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)	2016-01-14
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2018-04-14

This document supersedes EN 62271-3:2006.

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Endorsement notice

The text of the International Standard IEC 62271-3:2015 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 60265 Series	NOTE	Harmonized as EN 60265 Series [1)].
IEC 60794 Series	NOTE	Harmonized as EN 60794 Series.
IEC 61754-20:2012	NOTE	Harmonized as EN 61754-20:2012 (not modified).
IEC 61850-6:2009	NOTE	Harmonized as EN 61850-6:2010 (not modified).
IEC 61850-7-1:2011	NOTE	Harmonized as EN 61850-7-1:2011 (not modified).
IEC 61850-7-410:2012	NOTE	Harmonized as EN 61850-7-410:2013 (not modified).
IEC 61850-7-420:2009	NOTE	Harmonized as EN 61850-7-420:2009 (not modified).
IEC 61869-9 [2)]	NOTE	Harmonized as EN 61869-9 [2)] (not modified).
IEC 62271-102:2001	NOTE	Harmonized as EN 62271-102:2002 (not modified).
IEC 62271-102:2001/A1:2011	NOTE	Harmonized as EN 62271-102:2002/A1:2011 (not modified).
IEC 62271-102:2001/A2:2013	NOTE	Harmonized as EN 62271-102:2002/ A2:2013 (not modified).
IEC 62271-103	NOTE	Harmonized as EN 62271-103.
IEC 62271-104	NOTE	Harmonized as EN 62271-104.
IEC 62271-202	NOTE	Harmonized as EN 62271-202.
ISO/IEC 7498-1:1994	NOTE	Harmonized as EN ISO/IEC 7498-1:1994 [3)] (not modified).

[1)] Superseded by EN 62271 Series.

[2)] At draft stage.

[3)] Withdrawn publication.

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 1 When 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

Publication	Year	Title	EN/HD	Year
IEC 60870-4	1990	Telecontrol equipment and systems - Part 4: Performance requirements	HD 546.4 S1	1992
IEC 61850-3	2013	Communication networks and systems for power utility automation - Part 3: General requirements	EN 61850-3	2014
IEC 61850-4	2011	Communication networks and systems for power utility automation - Part 4: System and project management	EN 61850-4	2011
IEC 61850-5	2013	Communication networks and systems for power utility automation - Part 5: Communication requirements for functions and device models	EN 61850-5	2013
IEC 61850-7-2	2010	Communication networks and systems for power utility automation - Part 7-2: Basic information and communication structure - Abstract communication service interface (ACSI)	EN 61850-7-2	2010
IEC 61850-7-3	2010	Communication networks and systems for power utility automation - Part 7-3: Basic communication structure - Common data classes	EN 61850-7-3	2011
IEC 61850-7-4	2010	Communication networks and systems for power utility automation - Part 7-4: Basic communication structure - Compatible logical node classes and data object classes	EN 61850-7-4	2010
IEC 61850-8-1	2011	Communication networks and systems for power utility automation - 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	2011

Publication	Year	Title	EN/HD	Year
IEC 61850-9-2	2011	Communication networks and systems for power utility automation - Part 9-2: Specific Communication Service Mapping (SCSM) - Sampled values over ISO/IEC 8802-3	EN 61850-9-2	2011
IEC 61850-10	2012	Communication networks and systems for power utility automation - Part 10: Conformance testing	EN 61850-10	2013
IEC/TR 61850-90-4	2013	Communication networks and systems for power utility automation - Part 90-4: Network engineering guidelines	-	-
IEC 62271-1	2007	High-voltage switchgear and controlgear - Part 1: Common specifications	EN 62271-1	2008
A1	2011		A1	2011
IEC 62271-100	2008	High-voltage switchgear and controlgear - Part 100: Alternating current circuit-breakers	EN 62271-100	2009
A1 + corr. December 2012	2012		A1	2012

IEC 62271-3

Edition 2.0 2015-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

High-voltage switchgear and controlgear – Part 3: Digital interfaces based on IEC 61850

Appareillage à haute tension – Partie 3: Interfaces numériques basées sur l'IEC 61850

IEC 62271-3:2015-03(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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INTERNATIONAL STANDARD

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High-voltage switchgear and controlgear – Part 3: Digital interfaces based on IEC 61850

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 3: Digital interfaces based on IEC 61850

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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International Standard IEC 62271-3 has been prepared by subcommittee 17C: High-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

This second edition cancels and replaces the first edition published in 2006. This edition constitutes a technical revision.

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

a) an update to the latest edition(s) of IEC 61850 series;

   (e.g. Annex B "LNs for sensors and monitoring" of edition 1 has been deleted since these LNs are now covered by standard IEC 61850-7-4:2010)

b) an update of normative references;

c) the minimum voltage range this standard refers to, was changed from 72,5 kV to above 1 kV;

d) the description of performance tests and conformance tests became more specific;

e) the new – informative – Annex C gives an example for performance type testing;

f) 6.2.3 “transmission systems” as well as appropriate subclauses have been superseded by standard IEC TR 61850-90-4:2013;

g) fibre optical connector type LC becomes only recommended type of fibre optic connector in accordance with IEC TR 61850-90-4:2013;

h) electronic nameplates have been redefined as extension of LN XCBR and LN XSWI with data objects, reflecting required additional name plate information.

NOTE A new common data class Visible String Description (VSD) will be added to the IEC 61850-7-3 to support these new data objects.

This standard has the status of a product family standard and may be used as a normative reference in a dedicated product standard for highvoltage switchgear and controlgear.

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

FDIS	Report on voting
17C/617/FDIS	17C/623/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 parts in the IEC 62271 series, published under the general title *High voltage switchgear and controlgear*, 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.

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.

INTRODUCTION

0.1 General

This standard is a product family standard for high-voltage switchgear and controlgear and assemblies thereof. It provides an application of the horizontal standard series IEC 61850 which details layered power utility communication architecture, in the world of high-voltage switchgear and controlgear.

By providing tutorial material such as examples and explanations, it also gives an access for switchgear experts to concepts and methods applied in the IEC 61850 series.

Compared to switchgear equipment, digital communication technology is subject to ongoing changes which are expected to continue in the future. Profound experience with electronics integrated directly into switchgear has yet to be gathered on a broader basis, as this type of equipment is not widely spread in the industry and a change of metabolism has not yet occurred.

This situation is taken into account in this standard by setting an appropriate validity date and by specifying several options to most of the communication-related requirements, such as connectors or fibres.

0.2 Position of this standard in relation to the IEC 61850 series

The IEC 61850 series is a horizontal standard intended to be used for communication and systems in the power utility. The most important parts of this series define:

1) information models for the power utility automation system.
   These information models include both the models of the switchgear (like circuit-breakers and disconnectors) and other process equipment (like instrument transformers), and the models of the power utility automation system (like protection relays);
2) the communication between intelligent electronic devices (IEDs) of the power utility automation system;
3) a configuration language used to describe the configuration aspects of the power utility automation system;
4) conformance testing of the communication interfaces of the IEDs of the power utility automation system including their data models.

Typically, IEDs like bay level controllers interface to switchgear. In that case, the data models of the switchgear are implemented in these devices. However, this is not the only realization. In the case where electronics are integrated direct into switchgear, the above-mentioned data models should be implemented within the switchgear and the switchgear supports a communication interface.

IEC 61850, being a horizontal standard series, leaves many options open in order to support present and future requirements of all sizes of power utility automation system at all voltage levels.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 3: Digital interfaces based on IEC 61850

1 Scope

This part of IEC 62271 is applicable to high-voltage switchgear and controlgear for all rated voltage levels above 1 kV and assemblies thereof and specifies equipment for digital communication with other parts of the power utility automation and its impact on testing. This equipment for digital communication, replacing metal parallel wiring, can be integrated into the high-voltage switchgear, controlgear, and assemblies thereof, or can be external equipment in order to provide compliance for existing switchgear and controlgear and assemblies thereof with the standards of the IEC 61850 series.

This International Standard is a product standard based on the IEC 61850 series. It deals with all relevant aspects of switchgear and controlgear, and assemblies thereof with a serial communication interface according to the IEC 61850 series. In particular it defines:

a) a selection of the information models from the IEC 61850 series that are supported by such switchgear and controlgear, and assemblies thereof;

b) conformance classes for the set of communication services that are supported by the switchgear and controlgear, and assemblies thereof;

c) modifications and extensions to type and routine tests of switchgear and controlgear, and assemblies thereof that are required due to the serial communication interface.

The standard specifies the requirements for digital communication equipment used within high-voltage switchgear, controlgear, and assemblies thereof, as well as the relevant testing requirements.

The relevant switchgear standards of the IEC 62271 series are applicable in general, with the additional specifications described in this standard.

NOTE 1 This standard intends to promote interoperability of communication interfaces. Interchangeability is outside the scope of this standard, as there is no requirement for it. Interchangeability is also outside the scope of the IEC 61850 series.

NOTE 2 For an introduction to power utility automation communication and the related terms, definitions and models, refer to IEC 61850-1 which provides an overview of the objectives and requirements of the IEC 61850 series in general. IEC 61850-7-1 provides an overview of modelling techniques.

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 60870-4:1990, *Telecontrol equipment and systems – Part 4: Performance requirements*

IEC 61850-3:2013, *Communication networks and systems for power utility automation – Part 3: General requirements*

IEC 61850-4:2011, *Communication networks and systems for power utility automation – Part 4: System and project management*