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STN	**Vysokonapäťové spínacie a riadiace zariadenia. Časť 212: Kompaktná zostava zariadenia pre distribučné elektrické stanice (CEADS).**	**STN EN 62271-212** 35 4220

High-voltage switchgear and controlgear - Part 212: Compact Equipment Assembly for Distribution Substation (CEADS)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 04/17

Obsahuje: EN 62271-212:2017, IEC 62271-212:2016

Oznámením tejto normy sa od 30.11.2019 ruší
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EUROPEAN STANDARD

NORME EUROPÉENNE

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English Version

High-voltage switchgear and controlgear - Part 212: Compact Equipment Assembly for Distribution Substation (CEADS) (IEC 62271-212:2016)

Appareillage à haute tension - Partie 212: Ensemble Compact d'Equipement pour Postes de Distribution (ECEPD) (IEC 62271-212:2016)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 212: Kompakte Gerätekombinationen für Verteilstationen (CEADS) (IEC 62271-212:2016)

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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

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EN 62271-212:2017

European foreword

The text of document 17C/645/FDIS, future edition 1 of IEC 62271-212, prepared by SC 17C "Assemblies" of IEC/TC 17 "High-voltage switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-212:2017.

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)	2017-08-30
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2019-11-30

This document supersedes EN 50532:2010.

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 62271-212:2016 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 60059:1999	NOTE	Harmonized as EN 60059:1999 (not modified).
IEC 60076-13:2006	NOTE	Harmonized as EN 60076-13:2006 (not modified).
IEC 61936-1:2010	NOTE	Harmonized as EN 61936-1:2010 (modified).
IEC 62271-4:2013	NOTE	Harmonized as EN 62271-4:2013 (not modified).
IEC/TR 62271-208:2009	NOTE	Harmonized as IEC/TR 62271-208:2010 (not modified).

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 60050-441	1984	International Electrotechnical Vocabulary (IEV) - Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 60050-461	2008	International Electrotechnical Vocabulary - Part 461: Electric cables	-	-
IEC 60076	Series	Power transformers	EN 60076	Series
IEC 60076-1	2011	Power transformers - Part 1: General	EN 60076-1	2011
IEC 60076-2	2011	Power transformers - Part 2: Temperature rise for liquid-immersed transformers	EN 60076-2	2011
IEC 60076-3	2013	Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air	EN 60076-3	2013
IEC 60076-5	2006	Power transformers - Part 5: Ability to withstand short circuit	EN 60076-5	2006
IEC 60076-7	-	Power transformers - Part 7: Loading guide for oil-immersed power transformers	-	-
IEC 60076-10	2016	Power transformers - Part 10: Determination of sound levels	EN 60076-10	2016
IEC 60076-11	2004	Power transformers - Part 11: Dry-type transformers	EN 60076-11	2004
IEC 60076-12	2008	Power transformers - Part 12: Loading guide for dry-type power transformers	-	-
IEC 60076-15	2015	Power transformers - Part 15: Gas-filled power transformers	-	-
IEC 60243-1	2013	Electric strength of insulating materials - Test methods - Part 1: Tests at power frequencies	EN 60243-1	2013
IEC 60364-4-41 (mod)	2005	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41 corr. July	2007 2007
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993

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Publication	Year	Title	EN/HD	Year
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60721-1	1990	Classification of environmental conditions - Part 1: Environmental parameters and their severities	EN 60721-1	1995
IEC 60721-2-2	2012	Classification of environmental conditions - Part 2-2: Environmental conditions appearing in nature - Precipitation and wind	EN 60721-2-2	2013
IEC 60721-2-4	1987	Classification of environmental conditions - Part 2: Environmental conditions appearing in nature - Solar radiation and temperature	HD 478.2.4 S1	1989
IEC/TS 60815	Series	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions	-	-
IEC 60947-1	2007	Low-voltage switchgear and controlgear - Part 1: General rules	EN 60947-1	2007
IEC 61439	Series	Low-voltage switchgear and controlgear assemblies	EN 61439	Series
IEC 61439-1	2011	Low-voltage switchgear and controlgear assemblies - Part 1: General rules	EN 61439-1	2011
IEC 62262	2002	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	EN 62262	2002
IEC 62271-1	2007	High-voltage switchgear and controlgear - Part 1: Common specifications	EN 62271-1	2008
+A1	2011		+A1	2011
IEC 62271-200	2011	High-voltage switchgear and controlgear - Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	EN 62271-200	2012
IEC 62271-201	2014	High-voltage switchgear and controlgear - Part 201: AC solid-insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	EN 62271-201	2014
IEC 62271-202	2014	High-voltage switchgear and controlgear - Part 202: High-voltage/low-voltage prefabricated substation	EN 62271-202 +AC	2014 2014
ISO/IEC Guide 51	2014	Safety aspects - Guidelines for their inclusion in standards	-	-

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colour inside

High-voltage switchgear and controlgear – Part 212: Compact Equipment Assembly for Distribution Substation (CEADS)

Appareillage à haute tension – Partie 212: Ensemble Compact d'Equipement pour Postes de Distribution (ECEPD)

IEC 62271-212:2016-10(en-fr)

IEC 62271-212

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INTERNATIONAL STANDARD

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 212: Compact Equipment Assembly for Distribution Substation (CEADS)

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 62271-212 has been prepared by subcommittee 17C: Assemblies, of IEC technical committee 17: High-voltage switchgear and controlgear.

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

FDIS	Report on voting
17C/645/FDIS	17C/650/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.

This International Standard should be read in conjunction with IEC 62271-1:2007, to which it refers and which is applicable unless otherwise specified. In order to simplify the indication of corresponding requirements, the same numbering of clauses and subclauses is used as in IEC 62271-1. Amendments to these clauses and subclauses are given under the same numbering, whilst additional subclauses, are numbered from 101.

A list of all parts of the IEC 62271 series can be found, under the general title *High-voltage switchgear and controlgear*, 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 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.

INTRODUCTION

Traditionally a high-voltage/low-voltage distribution substation has been constructed by installing the main electrical components –high-voltage switchgear, distribution transformer(s) and the corresponding low-voltage distribution panel(s)- within a closed electrical operating area. It can be a room within a building intended for other (non electrical uses) or a separated housing (prefabricated or not) designed specifically to contain the electrical equipment of the substation or an open area limited by fences.

Some years ago in the search for a more standardized and compact substation, the concept of prefabricated substation was developed. IEC 62271-202 covers this type of substation. According to this document, the main electrical components (high-voltage switchgear, transformer and low-voltage switchgear) are fully in compliance with their respective product standard, and the whole substation, including interconnections and enclosure is designed and type tested and later manufactured and routine tested in the factory. Correspondingly the quality of the substation is assured by the manufacturer.

Moreover, also other types of assemblies have been introduced in the market. These are assemblies comprising the main electrical active components of the substation and their interconnections, delivered as a single product. The product can therefore be type tested, manufactured, routine tested in the factory, transported and then installed in a closed electrical operating area.

This type of factory assembled and type-tested product is covered by this document receiving the generic name CEADS from Compact Equipment Assembly for Distribution Substation. Numerous arrangements are possible and this document provides guidance on basic types of assemblies, which might be envisaged.

A CEADS is not covered by IEC 61936-1. However CEADS is intended to become part of a distribution substation.

Taking into account the closer proximity of the components that even can share some parts (enclosure, solid or fluid insulation…) it is very relevant to pay attention to the potential interaction between them. Therefore to cover CEADS is neither sufficient nor always applicable to refer to the relevant product standards. This document covers any additional design and construction requirements and test methods applicable to the different types of CEADS. In addition to the specified characteristics, particular attention has been paid to the specification concerning the protection of persons, both operators and general public.

The CEADS is also for the interest of committee TC 14: Power transformers, and committee TC 121: Switchgear and controlgear and their assemblies for low voltage.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 212: Compact Equipment Assembly for Distribution Substation (CEADS)

1 General

1.1 Scope

This part of IEC 62271 specifies the service conditions, rated characteristics, general structural requirements and test methods of the assemblies of the main electrical functional units of a high-voltage/low-voltage distribution substation, duly interconnected, for alternating current of rated operating voltages above 1 kV and up to and including 52 kV on the high-voltage side, service frequency 50 Hz or 60 Hz. This assembly is to be cable-connected to the network, and intended for installation within an indoor or outdoor closed electrical operating area.

A Compact Equipment Assembly for Distribution Substation (CEADS) as defined in this document is designed and tested to be a single product with a single serial number and one set of documentation.

The functions of a CEADS are:

- switching and control for the operation of the high-voltage circuit(s);
- protection of the high-voltage/low-voltage transformer functional unit;
- high-voltage/low-voltage transformation;
- switching and control for the operation and protection of the low-voltage feeders.

However relevant provisions of this document are also applicable to designs where not all of these functions exist (e.g. equipment comprising only high-voltage/low-voltage transformation and switching and control for the operation and protection of the low-voltage feeder functions or equipment without switching and control for the operation of the high-voltage circuit(s)).

NOTE For the purpose of this document a self-protected transformer is considered not as a CEADS, but as a functional unit, designed and type tested to its own product standard IEC 60076-13:2006.

1.2 Normative references

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.

IEC 60050-441:1984, *International Electrotechnical Vocabulary – Switchgear, controlgear and fuses*

IEC 60050-461:2008, *International Electrotechnical Vocabulary – Part 461: Electric cables*

IEC 60076 (all parts), *Power transformers*

IEC 60076-1:2011, *Power transformers – Part 1: General*

IEC 60076-2:2011, *Power transformers – Part 2: Temperature rise for liquid-immersed transformers*

IEC 60076-3:2013, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60076-5:2006, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-7, *Power transformers – Part 7: Loading guide for oil-immersed power transformers*

IEC 60076-10:2016, *Power transformers – Part 10: Determination of sound levels*

IEC 60076-11:2004, *Power transformers – Part 11: Dry-type transformers*

IEC 60076-12:2008, *Power transformers – Part 12: Loading guide for dry-type power transformers*

IEC 60076-15:2015, *Power transformers – Part 15: Gas-filled power transformers*

IEC 60243-1:2013, *Electrical strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60721-1:1990, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

IEC 60721-2-2:2012, *Classification of environmental conditions – Part 2-2: Environmental conditions appearing in nature – Precipitation and wind*

IEC 60721-2-4:1987, *Classification of environmental conditions – Part 2-4: Environmental conditions appearing in nature – Solar radiation and temperature*

IEC TS 60815 (all parts), *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 61439 (all parts)[1], *Low-voltage switchgear and controlgear assemblies*

IEC 61439-1:2011, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62271-1:2007, *High-voltage switchgear and controlgear – Part 1: Common specifications*
IEC 62271-1:2007/AMD1:2011

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1 This series will supersede some parts of IEC 60439 series.

IEC 62271-200:2011, *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-201:2014, *High-voltage switchgear and controlgear – Part 201: AC solid-insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-202:2014, *High voltage switchgear and controlgear – Part 202: High-voltage/low-voltage prefabricated substation*

ISO/IEC Guide 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

2 Normal and special service conditions

2.1 Normal service conditions

Subclause 2.1 of IEC 62271-1:2007 is applicable with the following additions.

Wave shape and symmetry of supply voltage are in accordance with 4.2 of IEC 60076-1:2011.

For high-voltage/low-voltage transformer functional unit, average ambient air temperature limits of 4.2 of IEC 60076-1:2011 for liquid immersed type and 4.2.3 of IEC 60076-11:2004 shall also apply.

For indoor CEADS

- the minimum air ambient temperature is -5 °C;
- equipment shall also be suitable for conditions of humidity in accordance with 7.1.2.1 of IEC 61439-1:2011.

For outdoor CEADS

- the preferred values of minimum air ambient temperature are -10 °C, -25 °C.

NOTE 1 For air ambient below -25 °C, CEADS can be designed or used according to the relevant product standards, where applicable, or according to agreement between manufacturer and user.

NOTE 2 For higher ambient temperatures inside a room, the user has to specify to the manufacturer the specific operating conditions.

When two or more functional units share a common surrounding medium and in some cases even the same enclosure, the real operating service conditions, in particular temperature, of those functional units can differ largely from the normal service conditions (ambient air) due to the interaction between them. This has to be considered where relevant during type test (see e.g. 6.5.2).

2.2 Special service conditions

Subclause 2.2 of IEC 62271-1:2007 is applicable with the following additions.

Refer to the relevant standards for the different functional units.