ICS 29.200 SLOVENSKÁ TECHNICKÁ NORMA Marec 2019

STN	**Bezpečnostné požiadavky na systémy a zariadenia výkonových elektronických meničov Časť 2: Výkonové elektronické meniče od 1 000 V striedavého napätia alebo 1 500 V jednosmerného napätia do 36 kV striedavého napätia alebo 54 kV jednosmerného napätia**	**STN EN IEC 62477-2** 35 1531

Safety requirements for power electronic converter systems and equipment - Part 2: Power electronic converters from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC

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. 02/19

Obsahuje: EN IEC 62477-2:2018, IEC 62477-2:2018

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62477-2

September 2018

ICS 29.200

English Version

Safety requirements for power electronic converter systems and equipment - Part 2: Power electronic converters from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC (IEC 62477-2:2018)

Exigences de sécurité applicables aux systèmes et matériels électroniques de conversion de puissance - Partie 2: Convertisseurs électroniques de puissance entre 1 000 V en courant alternatif ou 1 500 V en courant continu et 36 kV en courant alternatif ou 54 kV en courant continu (IEC 62477-2:2018)

Sicherheitsanforderungen an Leistungshalbleiter-Umrichtersysteme und -Betriebsmittel - Teil 2: Leistungselektronik Umrichter von 1 000 V a.c. oder 1 500 V d.c. bis 36 kV a.c. oder 54 kV d.c. (IEC 62477-2:2018)

This European Standard was approved by CENELEC on 2018-07-26. 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, 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 IEC 62477-2:2018 E

European foreword

The text of document 22/290/FDIS, future edition 1 of IEC 62477-2, prepared by IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62477-2:2018.

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) 2019-04-26
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-07-26

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.

Endorsement notice

The text of the International Standard IEC 62477-2:2018 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 60071-1:2006	NOTE	Harmonized as EN 60071-1:2006 (not modified)
IEC 60071-2:1996	NOTE	Harmonized as EN 60071-2:1997 (not modified)
IEC 60146-1-1	NOTE	Harmonized as EN 60146-1-1
IEC 60243-1:2013	NOTE	Harmonized as EN 60243-1:2013 (not modified)
IEC 60529:1989	NOTE	Harmonized as EN 60529:1991 (not modified)
IEC 60721-3 series	NOTE	Harmonized as EN 60721-3 series
IEC 60990:2016	NOTE	Harmonized as EN 60990:2016 (not modified)
IEC 61936-1	NOTE	Harmonized as EN 61936-1
IEC 62271-200:2011	NOTE	Harmonized as EN 62271-200:2012 (not modified)
IEC 62271-201:2014	NOTE	Harmonized as EN 62271-201:2014 (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.

Publication	Year	Title	EN/HD	Year
IEC 60204-11	-	Safety of machinery - Electrical equipment of machines - Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV	-	-
IEC 60417-DB	-	Graphical symbols for use on equipment	-	-
IEC 60617-DB	-	Graphical symbols for diagrams	-	-
IEC 60730-1	-	Automatic electrical controls - Part 1: General requirements	EN 60730-1	-
IEC 61230	-	Live working - Portable equipment for earthing or earthing and short-circuiting	EN 61230	-
IEC 62271-102	-	High-voltage switchgear and controlgear - Part 102: Alternating current disconnectors and earthing switches	EN IEC 62271-102	-
IEC 62477-1	2012	Safety requirements for power electronic converter systems and equipment - Part 1: General	EN 62477-1	2012
-	-		+ A11	2014
+ A1	2016		+ A1	2017
IEC Guide 104	-	The preparation of safety publications and the use of basic safety publications and group safety publications	-	-
ISO/IEC Guide 51	2014	Safety aspects - Guidelines for their inclusion in standards	-	-

IEC 62477-2

Edition 1.0 2018-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

GROUP SAFETY PUBLICATION
PUBLICATION GROUPÉE DE SÉCURITÉ

Safety requirements for power electronic converter systems and equipment – Part 2: Power electronic converters from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC

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IEC 62477-2:2018-06(en-fr)

IEC 62477-2

Edition 1.0 2018-06

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SAFETY REQUIREMENTS FOR POWER ELECTRONIC CONVERTER SYSTEMS AND EQUIPMENT –

Part 2: Power electronic converters from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC

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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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 62477-2 has been prepared by IEC technical committee 22: Power electronic systems and equipment.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
22/290/FDIS	22/293/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

It has the status of a group safety publication in accordance with IEC Guide 104.

This International Standard is to be used in conjunction with IEC 62477-1:2012 and IEC 62477-1:2012/AMD1:2016.

This document supplements or modifies the corresponding clauses in IEC 62477-1:2012 and IEC 62477-1:2012/AMD1:2016. Where this document states "addition", "modification" or "replacement", the relevant requirement, test specification or explanatory matter in IEC 62477-1:2012 and IEC 62477-1:2012/AMD1:2016 is adapted accordingly. Where no change is necessary, this document indicates that the relevant clause or subclause applies. Where this document states “does not apply” this clause of the mentioned version of IEC 62477-1 does not apply to any section of the equipment. Products that are designed to be compliant to IEC 62477-1:2012 and IEC 62477-1:2012/AMD1:2016 are acceptable as components within the equipment designed to this document. Additional subclauses, tables and figures are numbered starting at 101. Additional annexes are numbered with double capital characters, starting with AA.

A list of all the parts in the IEC 62477 series, published under the general title *Safety requirements for power electronic converter systems and equipment* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

This part of IEC 62477 relates to products that include power electronic converters, with a rated system voltage from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC. It specifies requirements to reduce risks of fire, electric shock, thermal, energy and mechanical hazards, except functional safety as defined in IEC 61508 (all parts). The objectives of this document are to establish a common terminology and basis for the safety requirements of products that contain power electronic converters across several IEC technical committees.

This document has been developed with the intention

- to be used as a reference document for product committees inside TC 22 in the development of product standards for power electronic converter systems and equipment;
- to replace IEC 62103 as a product family standard providing minimum requirements for safety aspects of power electronic converter systems and equipment in apparatus for which no product standard exists, and

  NOTE The scope of IEC 62103 contains reliability aspects, which are not covered by this document.
- to be used as a reference document for product committees outside TC 22 in the development of product standards of power electronic converter systems and equipment intented renewable energy sources. Especially TC 82, TC 88, TC 105 and TC 114 have been identified as relevant technical committees at the time of publication.

Technical committees using this document should carefully consider the relevance of each paragraph in this document for the product under consideration and reference, add, replace or modify requirement as relevant. Product specific topics not covered by this document are in the responsibility of the technical committees using this document as reference document.

This document will not take precedence on any product specific standard according to IEC Guide 104. IEC Guide 104 provides information about the responsibility of product committees to use group safety standards for the development of their own product standards.

The most significant differences compared to IEC 62477-1:2012 and IEC 62477-1:2012/AMD1:2016 are the following:

- this document extends the range of rated system voltages for high-voltage (HV) up to 36 kV AC or 54 kV DC;
- this document adds arc fault rating label requirements with testing instructions.

SAFETY REQUIREMENTS FOR POWER ELECTRONIC CONVERTER SYSTEMS AND EQUIPMENT –

Part 2: Power electronic converters from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC

1 Scope

This part of IEC 62477 applies to power electronic converter systems (PECS) and equipment, their components for electronic power conversion and electronic power switching, including the means for their control, protection, monitoring and measurement, such as with the main purpose of converting electric power, with rated system voltages from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC.

This document can also be used as a reference standard for product committees producing product standards for

- adjustable speed electric power drive systems (PDS),
- standalone uninterruptible power systems (UPS), and
- stabilized DC power supplies.

For PECS for which no product standard exists, this document provides minimum requirements for safety aspects.

This document has the status of a group safety publication in accordance with IEC Guide 104 for power electronic converter systems and equipment for solar, wind, tidal, wave, fuel cell or similar energy sources.

According to IEC Guide 104, one of the responsibilities of technical committees is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of their product standards.

This document

- establishes a common terminology for safety aspects relating to PECS and equipment,
- establishes minimum requirements for the coordination of safety aspects of interrelated parts within a PECS,
- establishes a common basis for minimum safety requirements for the PEC portion of products that contain PEC,
- specifies requirements to reduce risks of fire, electric shock, thermal, energy and mechanical hazards, during use and operation and, where specifically stated, during service and maintenance,
- specifies minimum requirements to reduce risks with respect to pluggable and permanently connected equipment, whether it consists of a system of interconnected units or independent units, subject to installing, operating and maintaining the equipment in the manner prescribed by the manufacturer,
- establishes an arc fault rating label requirement with testing instructions for PEC and PECS, and
- covers power electronic converters and systems in open type design, which are catalog (pre-defined commercially available) power electronic converters and systems or engineered solutions from same.

This document does not cover

- telecommunications apparatus other than power supplies to such apparatus,
- functional safety aspects as covered by, for example, IEC 61508 (all parts),
- electrical equipment and systems for railways applications and electric vehicles, and
- power electronic converters and systems in open type design, which are – in their major part – dimensioned, designed and constructed according to the user's individual requirements and specifications and follow power installation standards, for example IEC 61936-1.

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 60204-11, *Safety of machinery – Electrical equipment of machines – Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1 500 V d.c. and not exceeding 36 kV*

IEC 60417, *Graphical symbols for use on equipment* (available at http://www.graphical-symbols.info/equipment)

IEC 60617, *Graphical symbols for diagrams* (available at http://std.iec.ch/iec60617)

IEC 60730-1, *Automatic electrical controls – Part 1: General requirements*

IEC 61230, *Live working – Portable equipment for earthing or earthing and short-circuiting*

IEC 62271-102, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*

IEC 62477-1:2012, *Safety requirements for power electronic converter systems and equipment – Part 1: General*
IEC 62477-1:2012/AMD1:2016

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

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