

INTERNATIONAL STANDARD

NORME INTERNATIONALE

GROUP SAFETY PUBLICATION
PUBLICATION GROUPEE 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**

**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**



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CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	11
3 Terms and definitions	11
4 Protection against hazards	12
4.1 General.....	12
4.2 Fault and abnormal conditions	13
4.3 Short-circuit and overload protection.....	14
4.3.1 General	14
4.3.2 Specification of input short-circuit withstand strength and output short-circuit current ability	14
4.3.3 Short-circuit coordination (backup protection)	14
4.3.4 Protection by several devices	14
4.3.5 Input ports short time withstand current, I_{CW}	14
4.4 Protection against electric shock.....	14
4.4.1 General	14
4.4.2 Decisive voltage class	15
4.4.3 Provision for basic protection.....	16
4.4.4 Provision for fault protection	17
4.4.5 Enhanced protection.....	18
4.4.6 Protective measures	18
4.4.7 Insulation.....	19
4.4.8 Compatibility with residual current operated protective devices (RCD).....	24
4.4.9 Capacitor discharge.....	24
4.5 Protection against electric energy hazards	26
4.5.1 Operator access areas.....	26
4.5.2 Service access areas.....	28
4.6 Protection against fire and thermal hazards	28
4.6.1 Circuits representing a fire hazard	28
4.6.2 Components representing a fire hazard	28
4.6.3 Fire enclosures.....	28
4.6.4 Temperature limits.....	29
4.6.5 Limited power sources.....	29
4.7 Protection against mechanical hazards	29
4.7.1 General	29
4.7.2 Specific requirements for liquid cooled PECS	29
4.8 Equipment with multiple sources of supply	30
4.9 Protection against environmental stresses	30
4.10 Protection against sonic pressure hazards	30
4.10.1 General	30
4.10.2 Sonic pressure and sound level	31
4.11 Wiring and connections.....	31
4.11.1 General	31
4.11.2 Routing.....	31
4.11.3 Colour coding	31
4.11.4 Splices and connections	31

4.11.5	Accessible connections	31
4.11.6	Interconnections between parts of the PECS	31
4.11.7	Supply connections	31
4.11.8	Terminals	31
4.12	Enclosures	31
4.12.1	General	31
4.12.2	Handles and manual controls	32
4.12.3	Cast metal	32
4.12.4	Sheet metal	32
4.12.5	Stability test for enclosure	32
5	Test requirements	32
5.1	General	32
5.1.1	Test objectives and classification	32
5.1.2	Selection of test samples	33
5.1.3	Sequence of tests	33
5.1.4	Earthing conditions	33
5.1.5	General conditions for tests	33
5.1.6	Compliance	33
5.1.7	Test overview	33
5.2	Test specifications	33
5.2.1	Visual inspections (type test, sample test and routine test)	33
5.2.2	Mechanical tests	34
5.2.3	Electrical tests	35
5.2.4	Abnormal operation and simulated fault tests	38
5.2.5	Material tests	42
5.2.6	Environmental tests (type tests)	42
5.2.7	Hydrostatic pressure test (type test and routine test)	43
6	Information and marking requirements	43
6.1	General	43
6.2	Information for selection	43
6.3	Information for installation and commissioning	43
6.3.1	General	43
6.3.2	Mechanical considerations	43
6.3.3	Environment	43
6.3.4	Handling and mounting	43
6.3.5	Enclosure temperature	43
6.3.6	Connections	43
6.3.7	Protection requirements	44
6.3.8	Commissioning	45
6.4	Information for use	45
6.4.1	General	45
6.4.2	Adjustment	45
6.4.3	Labels, signs and signals	45
6.5	Information for maintenance	45
6.5.1	General	45
6.5.2	Capacitor discharge	45
6.5.3	Auto restart/bypass connection	45
6.5.4	Other hazards	46
6.5.5	Equipment with multiple sources of supply	46

Annex A (normative) Additional information for protection against electric shock	47
A.1 General.....	47
A.2 Protection by means of DVC As	47
A.3 Protection by means of protective impedance	47
A.4 Protection by using limited voltages	47
A.5 Evaluation of working voltage and selection of DVC for touch voltage, PELV and SELV circuits	47
A.6 Evaluation of the working voltage of circuits.....	47
A.7 Examples of the use of elements of protective measures	47
Annex B (informative) Considerations for the reduction of the pollution degree	49
Annex C (informative) Symbols referred to in IEC 62477-1	50
Annex D (normative) Evaluation of clearance and creepage distances	51
Annex E (informative) Altitude correction for clearances	52
Annex F (normative) Clearance and creepage distance determination for frequencies greater than 30 kHz	53
Annex G (informative) Cross-sections of round conductors	54
Annex H (informative) Guidelines for RCD compatibility.....	55
H.1 Selection of RCD type.....	55
Annex I (informative) Examples of overvoltage category reduction.....	56
Annex J (informative) Burn thresholds for touchable surfaces	57
Annex K (informative) Table of electrochemical potentials	58
Annex L (informative) Measuring instrument for touch current measurements	59
L.1 Measuring instrument.....	59
Annex M (informative) Test probes for determining access	60
Annex N (informative) Guidance regarding short-circuit current.....	61
Annex AA (normative) Arc fault test and marking requirements	62
AA.1 Overview.....	62
AA.2 References	62
AA.3 Terms and definition.....	62
AA.4 Ratings	65
AA.4.1 General	65
AA.4.2 Internal arc classification	65
AA.5 Testing	70
AA.5.1 General	70
AA.5.2 Test preparation	71
AA.5.3 Test conditions	77
AA.5.4 Assessment.....	86
AA.6 Arc-prohibiting design	89
AA.6.1 General	89
AA.6.2 Requirements	90
AA.6.3 Testing	91
AA.7 Information and marking requirements	92
AA.7.1 General	92
AA.7.2 IAC rating plate	93
AA.7.3 Information in manuals	94
AA.7.4 Product marking – Internal protection	96
AA.8 Internal arc classification concepts	96

AA.8.1	General	96
AA.8.2	Description of risk and selection of equipment	98
AA.8.3	Causes and preventative measures	98
AA.8.4	Protection	99
AA.8.5	Considerations for selection and installation	100
AA.8.6	Requirements for concepts 5 and 6.....	101
AA.8.7	Installation of PECS with general public access	101
Bibliography.....		103
Figure AA.1	– Mounting frame for vertical indicators	72
Figure AA.2	– Horizontal indicator.....	73
Figure AA.3	– Arrangement of indicators for different height of equipment	75
Figure AA.4	– Example for two adjacent accessible sides	75
Figure AA.5	– Examples for an accessible side to a non-accessible side	76
Figure AA.6	– General setup for testing – Details.....	78
Figure AA.7	– General setup for calibration.....	78
Figure AA.8	– General setup for testing	78
Figure AA.9	– General setup for user installation	79
Figure AA.10	– Power drive system with 12-pulse diode rectifier supplied by an external transformer and a motor at the output.....	80
Figure AA.11	– Power drive system with integrated transformer and a motor at the output	81
Figure AA.12	– Grid interconnection between 50 Hz and 60 Hz grids.....	82
Figure AA.13	– Example for test of sub-assemblies of a PECS	86
Figure AA.14	– Installation example of mixed accessibility types including 4a or 4b.....	102
Table 5	– Steady state voltage limits for the decisive voltage classes	15
Table 6	– Protection requirements for circuit under consideration	16
Table 101	– Impulse withstand voltage and temporary overvoltage versus system voltage from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC.....	20
Table 102	– Clearance distances for functional, basic or supplementary insulation	22
Table 103	– Creepage distances (in millimetres).....	23
Table 104	– Limits for power sources without an overcurrent protective device.....	27
Table 105	– Limits for power sources with an overcurrent protective device.....	28
Table 22	– Test overview	33
Table 23	– Pull values for handles and manual control securement.....	35
Table 106	– Impulse test voltage	36
Table 107	– AC or DC test voltage for circuits connected directly to HV mains supply.....	37
Table A.4	– Examples for protection against electrical shock	48
Table C.1	– Symbols used	50
Table AA.1	– Definition of accessibility types	67
Table AA.2	– Single phase-to-earth internal arc fault current depending on the network neutral earthing.....	69
Table AA.3	– Parameters for internal fault test according to compartment construction.....	85
Table AA.4	– Information requirements	92

Table AA.5 – Example for concepts 2 and 3 (see Clause AA.8).....	93
Table AA.6 – Example for concept 4 (see Clause AA.8)	93
Table AA.7 – Example for not tested or test failed for concepts 5 and 6 (see Clause AA.8)...	93
Table AA.8 – Example for concept 1 (see Clause AA.8)	94
Table AA.9 – Example for accessibility type 0+ for concepts 5 and 6 (see Clause AA.8)	94
Table AA.10 – Internal arc fault safety concepts	97
Table AA.11 – Locations, causes and examples of measures to decrease the probability of internal arc faults	99

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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

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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 intended 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.