

INTERNATIONAL STANDARD

NORME INTERNATIONALE

GROUP SAFETY PUBLICATION
PUBLICATION GROUPEE DE SÉCURITÉ

AMENDMENT 1
AMENDEMENT 1

**Safety requirements for power electronic converter systems and equipment –
Part 1: General**

**Exigences de sécurité applicables aux systèmes et matériels électroniques de
conversion de puissance –
Partie 1: Généralités**

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FOREWORD

This amendment has been prepared by the IEC technical committee TC22: Power electronic systems and equipment.

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

FDIS	Report on voting
22/270A/FDIS	22/274/RVD

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

The committee has decided that the contents of this amendment and the base 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- withdrawn,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.

3 Terms and definitions

Replace the existing term and definition 3.35 by the following new term and definition:

3.35

prospective short-circuit current

I_{cp}

r.m.s. value of the current which would flow if the supply conductors to the circuit are short-circuited by a conductor of negligible impedance located as near as practicable to the supply terminals of the PECS

[SOURCE: IEC 61439-1:2011, 3.8.7], modified – "ASSEMBLY" is replaced by "PECS".]

Add the following new terms and definitions:

3.66

conditional short-circuit current

I_{cc}

r.m.s. value of a *prospective short-circuit current* available from a supply source, declared by the PECS manufacturer under specified conditions, using a specific type of *short-circuit protective device* protecting the PECS

Note 1 to entry: See also Figure N.1.

Note 2 to entry: The supply source might be a mains or non-mains supply.

Note 3 to entry: The declared I_{cc} is the minimum current value used for calibration of the supply source.

[SOURCE: IEC 61439-1: 2011. 3.8.10.4], modified – The definition is modified to fit to the use of PECS applications.]

3.67

current-limiting protective device

protective element that, during its operation and specified current range, limits the current to a substantially lower value than the peak value of the prospective current

Note 1 to entry: A current-limiting device is normally a current-limiting fuse or a current-limiting circuit breaker. See IEC 60050-441:1984, 441-18-10.

3.68

minimum required prospective short-circuit current

$I_{cp, mr}$

r.m.s. value of a minimum short-circuit current, which is needed to be available from a supply source in order to ensure safe interruption of the fault, and which is declared by the *PECS* manufacturer and tested under specified conditions, using a specific type of short-circuit protective device protecting the *PECS*.

3.69

overcurrent protective device

OCPD

device provided to interrupt an electric circuit in case the current in the electric circuit exceeds a predetermined value for a specified duration

[SOURCE: IEC 60050-826:2004 826-14-14, modified – "conductor" deleted]

3.70

peak withstand current

I_{pk}

value of peak short-circuit current, declared by the *PECS* manufacturer, that can be carried without damage under specified conditions, defined in terms of current and time

Note 1 to entry: For the purpose of this standard, I_{pk} refers to the initial asymmetric peak value of the prospective test current.

Note 2 to entry: Time may be specified as the number of successive cycles at 50 Hz or 60 Hz.

[SOURCE: IEC 61439-1:2011, 3.8.10.2, modified – The definition is modified to fit to the use of PECS application.]

3.71

short-circuit protective device

SCPD

device intended to protect a circuit or parts of a circuit against short-circuit currents by interrupting them

Note 1 to entry: A *short-circuit protective device* is suitable for protection against short-circuit only, not for protection against overload. An *OCPD* may also incorporate the function of a *SCPD*.

[SOURCE: IEC 61439-1:2011, 3.1.11, modified – Note added]

3.72

short time withstand current

I_{cw}

r.m.s. value of short time current, declared by the *PECS* manufacturer, that can be withstood under specified conditions, defined in terms of current and time

[SOURCE: IEC 61439-1:2011, 3.8.10.3, modified – "rated" removed from the term and "ASSEMBLY" replaced by "PECS"]

4.2 Fault and abnormal conditions

Add, after the second paragraph, the following new paragraph:

Components in 4.2 also include insulation systems, *ports*, etc.

Add, at the end of the bullet list, the following new bullet:

- electromagnetic force and thermal hazard according to 4.3.

4.3.1 General

Add, after the first paragraph, the following new paragraph:

To ensure proper coordination with *short-circuit protective devices* and the available *prospective short-circuit current*, the *PECS* manufacturer shall specify and test for each *mains supply input port* of the *PECS*:

- *conditional short-circuit current* (I_{cc}) according to 4.3.2.2, or
- *rated short time withstand current* (I_{cw}) according to 4.3.5.

Individual *mains supply ports* of a *PECS* shall have specific short-circuit ratings of either I_{cc} or I_{cw} , or of both.

Only in case where compliance does not rely on the characteristic of *SCPD*, the I_{cw} in 4.3.5 can apply.

In case an output *port* is connected or intended to be connected to the input *mains supply port*, the output *port* shall also be specified with an I_{cc} or I_{cw} rating (e.g. bypass between input *mains supply port* and output *port*).

For marking see 6.2.

See Annex N for further information.

4.3.2.2 Input ports short-circuit withstand current

Replace the title and text as follows:

4.3.2.2 Specification of the rated *conditional short-circuit current* (I_{cc}) on input ports

In case the *PECS* manufacturer selects the *conditional short-circuit current* (I_{cc}) rating according to 4.3.1, the following shall be specified:

- *conditional short-circuit current* (I_{cc}),
- characteristics of the *short-circuit protective device*, and
- *minimum required prospective short-circuit current* ($I_{cp,mr}$).

Compliance is shown, through evaluation according to 4.2 to determine the appropriate combination of testing according to 5.2.4.4, 5.2.4.6 and 5.2.3.11.3 in order to evaluate single fault and abnormal conditions, including insulation faults.

If it is shown by analysis that the result of one test is representative of the worst case, less severe combinations need not be tested.