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Date: 16 September 2024

Origin: International

Latest date for receipt of comments: 2 October 2024

Project No. 2024/02591

Responsible committee: PEL/22 Power electronics

Interested committees:

Title: BS EN IEC 61800-5-1/AMD1 Amendment 1 - Adjustable speed electrical power drive systems

Part 5-1: Safety requirements - Electrical, thermal and energy

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- iii) requires additional national guidance or information

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Introduction

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UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



22G/496/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 61800-5-1/AMD1 ED3

DATE OF CIRCULATION:

2024-09-06

CLOSING DATE FOR COMMENTS:

2024-11-01

SUPERSEDES DOCUMENTS:

22G/494/RR

IEC SC 22G : ADJUSTABLE SPEED ELECTRIC POWER DRIVE SYSTEMS (PDS)

SECRETARIAT:

United States of America

SECRETARY:

Mr Christopher Johnson

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 2, TC 22, TC 44, SC 121A, SC 121B

HORIZONTAL FUNCTION(S):

TC 22/SC 22G Horizontal Group Energy Efficiency

ASPECTS CONCERNED:

Digital content, Electricity transmission and distribution, Electromagnetic Compatibility, Energy Efficiency, Environment, Information security and data privacy

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TITLE:

Amendment 1 - Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS - PART: –

Part 5-1: Safety requirements - electrical, thermal and energy

AMENDMENT 1

FOREWORD

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Amendment 1 to IEC 61800-5-1:2022 has been prepared by subcommittee 22G: Adjustable speed electric power drive systems (PDS), of IEC technical committee 22: Power electronic systems and equipment.

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

Draft	Report on voting
XX/XX/XXXX	XX/XX/XXX

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

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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.

List of changes intended for IEC 61800-5-1:2022, AMD 1

	Design Clause 4	Tests Clause 5	Marking Clause 6	Other
1. Update of the environmental conditions	4.4.2.1 General 4.4.2.6.2 Limits of the working voltage for the DVC, Table 2 4.9.1 General 4.9.1.1 Conditions during normal operating conditions 4.9.1.2 Conditions during transportation, storage and handling	5.1.5.3 Operating parameters for tests 5.2.6 Environmental tests (type tests) 5.2.6.1 General 5.2.6.3.1 Preconditioning or recovery procedure for climatic tests 5.2.6.3.2 Dry heat test (steady state) (type test) 5.2.6.3.3 Cold test (type test) 5.2.6.3.4 Damp heat test (steady state) (type test) 5.2.6.3.5 Damp heat test (cyclic) (type test) 5.2.6.4 Vibration test (type test) 5.2.6.5 Salt mist test (type test)	6.1.1 Overview 6.2.1.4 g) Supplementary information for each port 6.2.1.5 Liquid cooled BDM/CDM/PDS 6.3.3 Environment 6.3.4 Handling and mounting 6.3.6.3.1 Operating ambient temperature	Annex V (informative) Considerations for environmental operating, transportation, storage and handling conditions V.1 General V.2 Examples for environmental operating conditions V.3 Environmental conditions during transportation, storage and handling V.4 Interdependence of air temperature and relative or absolute air humidity Bibliography

		5.2.6.6 Dust test (type test)		
		5.2.6.7 Sand test (type test)		
2. Topics relevant for the O:J: listing/harmonisation as required by the European HAS consultant (No change, yet)				
3. Minimum required prospective S/C current	4.3.2.2 Rated conditional short- circuit current (I _{cc}) on input power ports	5.2.4.2 Supply voltage, current and frequency	6.2.1.4 g) Supplementary information for each port	
4. Clarification of DVC Determination for composite working voltage				A.5.2 Classification of the working voltage A.5.5 Composite AC and DC working voltage A.5.5.1 Typical waveform for a composite AC and DC working voltage A.5.5.2 DVC As evaluation A.5.5.3 DVC B, DVC C and DVC D evaluation A.5.6 Examples with a “PWM waveform” of working voltage Annex L (informative) Measuring instrument for touch current measurements and working voltage classification L.1 Measuring test circuit for touch current L.2 Measuring test circuit for DVC As evaluation

				L.3 Requirements for measuring instruments
5. Arc fault (New Annex)				3.97 arc flash Annex R, Table R.1 Annex U (normative) Arc Flash and Internal Arc Fault U.1 Arc Flash and Internal Arc Fault U.2 Arc Flash Study U.3 Internal Arc fault test and labelling requirements Bibliography
6. Cemented joints	4.4.7.9 Connection of parts of solid insulation (cemented joints)	5.2.5.6 Cemented joints test (type test)		
7. Update scope to reflect a PDS may contain multiple BDM/CDM (No change, yet)				

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69 3 Terms and definitions

70 *Add the following new term and definition:*

71 3.97

72 arc flash

73 hazardous condition associated with the release of energy caused by an electric arc

74 [SOURCE: IEC 60050-651:2023, 651-27-01]

75

76 Cemented joints

77 4.4.7.9 Connection of parts of solid insulation (cemented joints)

78 *Replace the content of clause 4.4.7.9 by the following new one:*

79 The *clearance* and *creepage distance* paths in the presence of a cemented joint between two insulating
80 parts are determined as follows.

81 For cemented joint of Type 1 protection:

- 82 • the cemented joint is not considered as *solid insulation* with respect to *clearance* and *creepage*
83 *distance* measurements, however the pollution degree within the joint itself is pollution degree 1.
84 See clause D.1. Examples are given in Figures D.6 – D.9.
- 85 • the cemented joint shall comply with the test requirements of 5.2.5.6.

86

87 For cemented joint of Type 2 protection:

- 88 • the cemented joint is considered as *solid insulation* with respect to *clearance* and *creepage distance*
89 measurements. An example is given in Figure D.5.
- 90 • the distance through the cemented joint (i.e. the thickness of the material relative to the shortest
91 distance between *live parts*) shall not be less than that specified in IEC 60664-3:2016, Table 1,
92 which is reproduced as Table O.1.
- 93 • the cemented joint shall comply with the test requirements of 5.2.5.6.

94

95 A cemented joint that is not evaluated as providing protection of Type 1 or Type 2 is neither considered
96 *solid insulation* nor to reduce pollution degree. The *clearance* and *creepage distances* of 4.4.7.4 and
97 4.4.7.5 apply for the pollution degree of the environment around the cemented joint.

98

99 5.2.5.6 Cemented joints test (type test)

100 *Replace the text of c) by the following:*

101 c) The complete mechanical assembly of a cemented joint investigated for

- 102 1. Type 1 protection shall comply with the requirements for the impulse voltage type test according
103 to 5.2.3.2, requirements for clearance.
- 104 2. Type 2 protection shall comply with the requirements for type tests according to 4.4.7.10.

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Short circuit test**4.3.2.2 Rated conditional short-circuit current (I_{cc}) on input power ports**

Replace *t* the end of the 5th paragraph the sentence “See IEC 61800-2:2021, Annex A” by the following new sentence:

See IEC 61800-2:2021, Figure 3 and Annex A.

5.2.4.2 Supply voltage, current and frequency

Replace the text below Table 36 by the following:

The prospective short-circuit currents of Table 36 are considered to represent the situation of low-voltage *mains supplies* or low-voltage *non-mains supplies*.

According to 4.3.2.2 a)

- the minimum required prospective short-circuit current ($I_{cp,mr}$) shall not exceed the conditional short-circuit current (I_{cc}), and
- the conditional short-circuit current (I_{cc}) shall not be less than the prospective short-circuit current (I_{cp}) provided in Table 36.

For high-voltage *BDM/CDM*, the typical prospective short-circuit current is 25 kA or 50 kA, and the conditional short-circuit current shall not be less than 10 kA. In case of topologies where the *BDM/CDM* includes converter transformer and converter sections in separate enclosures, conditional short-circuit currents less than 10 kA for the converter section is allowed.

The tests shall be performed using the selected values of the minimum required prospective short-circuit current ($I_{cp,mr}$) and the conditional short-circuit current (I_{cc}). The power factor shall not exceed the level specified in Table 36 for the selected test current levels.

If the maximum short circuit current level selected exceeds 42 kA, the power factor shall not be greater than 0,2 to 0,3, however, a lower power factor may be required due to available laboratory circuits.

NOTE Since the *BDM/CDM/PDS* are protected by up-stream short-circuit protective devices, it is important to understand the prospective short-circuit current of Table 36 as the conditional short-circuit current (I_{cc}) of IEC 62477-1:2022, 4.3.2.2.

If the analysis of 4.2 shows, that a lower prospective short-circuit current value will have the same ultimate result, then that lower supply prospective short-circuit current is sufficient for the test.

In cases where the manufacturer is specifying I_{cc} according 4.3.2.2 a) with the protective device rated voltage, current, interrupt rating, I_p and I^2t at I_{cc} , the protective device used during test shall be representative of those ratings.

In cases where the manufacturer is specifying I_{cc} according 4.3.2.2 b) with peak current and duration, an oscilloscope or other suitable instrument shall be used to measure the peak input current during the test and duration of the test in 5.2.4.5.

6.2.1.4 Supplementary information for each port

Add in g) “short-circuit current rating(s) in terms of” below the bullet list the following sentence:

If a manufacturer has chosen I_{cc} equal to $I_{cp,mr}$, both values shall be marked.