

INTERNATIONAL STANDARD

IEC 60439-1

1999

AMENDMENT 1
2004-01

Amendment 1

**Low-voltage switchgear and
controlgear assemblies –**

**Part 1:
Type-tested and partially type-tested assemblies**

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*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

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International Electrotechnical Commission
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FOREWORD

This amendment has been prepared by subcommittee 17D: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

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

FDIS	Report on voting
17D/294/FDIS	17D/296/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 the base publication and its amendments will remain unchanged until 2006. At this date, the publication will be

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- withdrawn;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

The contents of the corrigendum of November 2004 have been included in this copy.

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CONTENTS

Add the title of Annex H as follows:

Annex H (normative) Electromagnetic compatibility (EMC)

Page 13

1.1 Scope and object

Delete the following text from the fifth paragraph:

“for machine tools”.

This second correction applies to the French text only.

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

This standard applies also to ASSEMBLIES designed for electrical equipment of machines. However, where applicable the additional requirements of IEC 60204-1 have to be fulfilled.

1.2 Normative references

Delete from the existing list the following standards:

IEC 60050(826):1982

IEC 60750:1983

IEC 61000-4-3:1995

CISPR 11:1990

Add to the existing list the titles of the following standards:

IEC 60204-1:1997, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60695-2-10:2000, *Fire hazard testing - Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products*

IEC 61000-3-2:2000, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-4-3:2002, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-6:2003, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:1993, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:1994, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variation immunity tests*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low-frequency immunity tests*

IEC 61000-6-3:1996, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*

IEC 61000-6-4:1997, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 61082 (all parts), *Preparation of documents used in electrotechnology*

IEC 61346-1:1996, *Industrial systems, installation and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules*

CISPR 11:1997, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement Amendment 1 (1999)*

Page 21

2.1.4 busbar

This correction applies to the French text only.

2.1.9 test situation

Replace the existing definition 2.1.9 by the following new definition:

condition of an ASSEMBLY or part of it in which the relevant main circuits are open on its supply side but not necessarily isolated whilst the associated auxiliary circuits are connected, allowing tests of the operation of incorporated devices

2.1.10 disconnected situation

Replace the existing title and text of definition 2.1.10 as follows:

2.1.10 isolated situation

condition of an ASSEMBLY or part of it in which the relevant main circuits are isolated on their supply side and the associated auxiliary circuits are also isolated

Pages 23, 25 and 27

Remove all annex C figure references attached to definitions.

Page 23

**2.2.7
withdrawable part**

Replace the existing definition 2.2.7 by the following new definition:

removable part which can be moved from the connected position to the isolated position and to a test position, if any, whilst remaining mechanically attached to the ASSEMBLY

Delete the NOTE.

**2.2.9
test position**

Replace, in the text of this definition, the phrase “but not necessarily disconnected (isolated)” by “but not necessarily isolated”.

**2.2.10
disconnected position (isolated position)**

Replace the existing term and text of definition 2.2.10 as follows:

**2.2.10
isolated position**

position of a withdrawable part in which an isolating distance (see 7.1.2.2) is established in main and auxiliary circuits on its supply side, the withdrawable part remaining mechanically attached to the ASSEMBLY

Page 25

**2.2.12.3
withdrawable connection**

Replace the existing definition 2.2.12.3 by the following new definition:

connection which is connected or disconnected by bringing the functional unit into the connected or isolated situation

**2.3.2
dead-front ASSEMBLY**

Delete the words “of at least IP 2X”.

**2.3.3
enclosed ASSEMBLY**

Delete the words: “of at least IP 2X”.

Page 27

**2.4.5
enclosure**

Replace the existing definition 2.4.5 by the following new definition:

housing affording the type and degree of protection suitable for the intended application

[IEV 195-02-35]

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**2.4.11
barrier**

Replace the existing term and definition 2.4.11 by the following:

**2.4.11
(electrically) protective barrier**

part providing protection against direct contact from any usual direction of access

[IEV 195-06-15]

**2.4.12
obstacle**

Replace the existing term and definition 2.4.12 by the following:

**2.4.12
(electrically) protective obstacle**

part preventing unintentional direct contact, but not preventing direct contact by deliberate action

[IEV 195-06-16]

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**2.4.17
insertion interlock**

Replace the words "fixed part" by "location".

Page 33

**2.6.3
protective conductor (PE)**

Replace the existing term and definition 2.6.3 by the following:

**2.6.3
protective conductor**
(identification: PE)

conductor provided for purposes of safety, for example protection against electric shock

[IEV 195-02-09]

NOTE As an example, the protective conductor can electrically connect the following parts:

- exposed conductive parts;
- extraneous conductive parts;
- main earthing terminal;
- earth electrode;
- earthed point of the source or artificial neutral.

**2.6.4
neutral conductor (N)**

Replace the existing term and definition 2.6.4 by the following:

2.6.4**neutral conductor**

conductor electrically connected to the neutral point and capable of contributing to the distribution of electric energy

[IEV 195-02-06]

2.6.5**PEN conductor**

Replace the existing definition 2.6.5 by the following new definition:

conductor combining the functions of both a protective earthing conductor and a neutral conductor

[IEV 195-02-12]

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Add, after definition 2.10.3, the following new term:

2.11**electromagnetic compatibility (EMC)**

NOTE For EMC related terms and definitions, see annex H.

3 Classification of ASSEMBLIES

This correction applies to the French text only.

Page 41

4.1.2 Rated insulation voltage (U_i) (of a circuit of an ASSEMBLY)

Delete, in the first sentence of the second paragraph, the word "maximum".

Replace, in the second sentence of the second paragraph, "rated operational voltage" by "working voltage".

Add, after the NOTE, the following new paragraph:

For polyphase circuits, it is stated as the voltage between phases.

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4.3 Rated short-time current (I_{cw}) (of a circuit of an ASSEMBLY)

Insert, in the title, in the first paragraph and in NOTES 1 and 2 the word "withstand" to read "rated short-time withstand current".

Delete the last sentence of NOTE 2.

4.5 Rated conditional short-circuit current (I_{CC}) (of a circuit of an ASSEMBLY)

This correction applies to the French text only.

4.6 Rated fused short-circuit current (I_{cf}) (of a circuit of an ASSEMBLY)

Replace the text of this subclause with the word "Void".

Page 45

5.1 Nameplates

Delete item 5.1 h).

Item 5.1 j)

Replace "of each circuit" by "of each main circuit".

Page 47

Item 5.1 m)

Replace the text of item 5.1 m) as follows:

measures for protection against electric shock (see 7.4);

Item 5.1 r)

This correction applies to the French text only.

Item 5.1 t)

Replace the text of item 5.1 t) by the following:

environment A and/or B (see 7.10.1).

5.2 Markings

Replace the second paragraph by the following:

Where items of equipment of the ASSEMBLY are designated, the designations used shall be identical with those in IEC 61346-1 and with those in the wiring diagrams which shall be in accordance with IEC 61082.

5.3 Instructions for installation, operation and maintenance

Add, at the end of this subclause, the following new paragraphs:

The ASSEMBLY manufacturer shall specify the measures to be taken, if any, with regard to EMC associated with the installation, operation and maintenance of the ASSEMBLY.

If an ASSEMBLY specifically intended for environment A is to be used in environment B the following warning shall be included in the operating instructions:

Warning:
This is a product for environment A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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6.2.10 Consideration of appropriate remedies

Replace the title and text of subclause 6.2.10 as follows:

6.2.10 Consideration of appropriate remedies against:

- conducted and radiated disturbances other than EMC;
- EMC disturbances in environments other than those described in annex H.

Page 53

7.1.1 General

Add the following sentence at the end of the first paragraph:

Parts of ASSEMBLIES which are made of insulating material shall provide a specified degree of resistance to abnormal heat and fire.

7.1.2.1 Clearances and creepage distances

Replace, in the second paragraph, "or impulse withstand voltages" by "or rated impulse withstand voltages (U_{imp})".

Page 55

7.1.2.3 Dielectric properties

Replace, in the second line of the first paragraph, "7.1.2.3.7" by "7.1.2.3.6".

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7.1.3.2

Replace the first sentence of the second paragraph as follows:

Where aluminium conductors are used, terminals which cater for the maximum size of solid or stranded conductors given in table A.1 are usually dimensionally adequate.

7.1.3.3

Add the following NOTE at the end of this subclause:

NOTE In the USA national regulations define the minimum wire bending space requirements for the proper connection of external conductors.

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Add, after subclause 7.1.3.7, the following new subclause:

7.1.4 Resistance to abnormal heat and fire

Parts of insulating materials which might be exposed to thermal stresses due to electrical effects, and the deterioration of which might impair the safety of the ASSEMBLY, shall not be adversely affected by abnormal heat and by fire.

The suitability of these parts shall be verified by test in accordance with IEC 60695-2-10 and IEC 60695-2-11.

Parts of insulating materials necessary to retain current-carrying parts in position shall conform to the glow-wire test of 8.2.9 at a test temperature of 960 °C.

Parts of insulating materials other than those specified in the previous paragraph, including parts necessary to retain the protective conductor, shall conform to the requirements of the glow-wire test of 8.2.9 at a temperature of 650 °C.

This requirement does not apply to parts or components, which have been previously tested according to this standard or according to their own product standard.

For small parts (having surface dimensions not exceeding 14 mm x 14 mm), a different test may be selected (for example, the needle flame test of IEC 60695-2-2). The same procedure may be applicable for other practical reasons where the metal material of a part is large compared to the insulating material.

7.2.1.2

Insert in the first sentence after the word "ASSEMBLY" the following new text:

, or from the front of a dead-front ASSEMBLY,