IEC 61439-1

Edition 3.0 2020-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage switchgear and controlgear assemblies –
Part 1: General rules

Ensembles d'appareillage à basse tension –
Partie 1: Règles générales

IEC 61439-1:2020-05(en-fr)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.130.20

ISBN 978-2-8322-8154-3

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 1: General rules

FOREWORD

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International Standard IEC 61439-1 has been prepared by subcommittee 121B: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This third edition cancels and replaces the second edition published in 2011. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) clarification that power electric converter systems, switch mode power supplies, uninterruptable power supplies and adjustable speed power drive systems are tested to their particular products standard, but when they are incorporated in assemblies the incorporation is in accordance with the IEC 61439 series of standards;
b) introduction of a group rated current for circuits within a loaded assembly and the refocusing of temperature-rise verification on this new characteristic;

c) addition of requirements in respect of DC;

d) introduction of the concept of class I and class II assemblies regarding protection against electric shock.

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

FDIS	Report on voting
121B/99/FDIS	121B/103/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.

The reader's attention is drawn to the fact that Annex N lists all the "in-some-countries" clauses on differing practices of a less permanent nature regarding this document.

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

A list of all parts of the IEC 61439 series, under the general title *Low-voltage switchgear and controlgear assemblies*, 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

The purpose of this document is to harmonize as far as practicable all rules and requirements of a general nature applicable to low-voltage switchgear and controlgear assemblies, in order to obtain uniformity of requirements and verification for assemblies and to avoid the need for verification in other standards. All those requirements for the various assembly standards which can be considered as general have therefore been gathered in this document together with specific subjects of wide interest and application, e.g. temperature-rise, dielectric properties, etc.

For each type of low-voltage switchgear and controlgear assembly, only two main standards are necessary to determine all requirements and the corresponding methods of verification:

– the basic standard, (this document) referred to as “IEC 61439-1” in the specific standards, covering the various types of low-voltage switchgear and controlgear assemblies;

– the specific assembly standard hereinafter also referred to as the relevant assembly standard.

For a general rule to apply to a specific assembly standard, it should be explicitly referred to by quoting this document followed by the relevant clause or subclause number e.g. “IEC 61439-1:2020, 9.1.3”.

A specific assembly standard may not require, and hence need not call up, a general rule where it is not applicable, or it can add requirements if the general rule is deemed inadequate in the particular case, but it may not deviate from it unless there is substantial technical justification detailed in the specific assembly standard.

Where, in this document, a cross-reference is made to another clause, the reference is to be taken to apply to that clause as amended by the specific assembly standard, where applicable.

Requirements in this document that are subject to agreement between the assembly manufacturer and the user are summarized in Annex C (informative). This schedule also facilitates the supply of information on basic conditions and additional user specifications to enable proper design, application and utilization of the assembly.

For the IEC 61439 series, the following parts are published:

a) IEC 61439-1: General rules

b) IEC 61439-2: Power switchgear and controlgear assemblies (PSC-assemblies)[1]

c) IEC 61439-3: Distribution boards intended to be operated by ordinary persons (DBO)

d) IEC 61439-4: Particular requirements for assemblies for construction sites (ACS)

e) IEC 61439-5: Assemblies for power distribution in public networks

f) IEC 61439-6: Busbar trunking systems (busways)

g) IEC 61439-7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicle charging stations

h) IEC TR 61439-0: Guidance to specifying assemblies.

This list is not exhaustive; additional parts can be developed as the need arises.

[1] IEC 61439-2 includes requirements for assemblies for use in photovoltaic installations.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES –

Part 1: General rules

1 Scope

This part of IEC 61439 lays down the general definitions and service conditions, construction requirements, technical characteristics and verification requirements for low-voltage switchgear and controlgear assemblies.

NOTE Throughout this document, the term assembly(s) (see 3.1.1) is used for a low-voltage switchgear and controlgear assembly(s).

For the purpose of determining assembly conformity, the requirements of the relevant part of the IEC 61439 series, Part 2 onwards, apply together with the cited requirements of this document. For assemblies not covered by Part 3 onward, Part 2 applies.

This document applies to assemblies only when required by the relevant assembly standard as follows:

– assemblies for which the rated voltage does not exceed 1 000 V AC or 1 500 V DC;
– assemblies designed for a nominal frequency of the incoming supply or supplies not exceeding 1 000 Hz;
– assemblies intended for indoor and outdoor applications;
– stationary or movable assemblies with or without an enclosure;
– assemblies intended for use in connection with the generation, transmission, distribution and conversion of electric energy, and for the control of electrical energy consuming equipment.

This document does not apply to individual devices and self-contained components such as motor starters, fuse switches, power electronic converter systems and equipment (PECS), switch mode power supplies (SMPS), uninterruptable power supplies (UPS), basic drive modules (BDM), complete drive modules (CDM), adjustable speed power drives systems (PDS), and other electronic equipment which comply with their relevant product standards. This document describes the integration of devices and self-contained components into an assembly or into an empty enclosure forming an assembly.

For some applications involving, for example, explosive atmospheres, functional safety, there can be a need to comply with the requirements of other standards or legislation in addition to those specified in the IEC 61439 series.

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 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-11:1981, *Basic environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60073:2002, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60364 (all parts), *Low-voltage electrical installations*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*
IEC 60364-4-41:2005/AMD1:2017

IEC 60364-5-51:2005, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 60364-5-52:2009, *Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60439 (all parts), *Low-voltage switchgear and controlgear assemblies*[2]

IEC 60445:2017, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60447:2004, *Basic and safety principles for man-machine interface, marking and identification – Actuating principles*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*[3]
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60695-2-10:2013, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products* (GWEPT)

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60865-1:2011, *Short-circuit currents – Calculation of effects – Part 1: Definitions and calculation methods*

IEC TR 60890:2014, *A method of temperature-rise verification of low-voltage switchgear and controlgear assemblies by calculation*

IEC 60947-4-1:2018, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

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2 Withdrawn. The IEC 60439 series has been cancelled and replaced by the IEC 61439 series.

3 There is a consolidated document edition 2.2 (2013) that includes IEC 60529 (1989) and its Amendment 1 (1999) and Amendment 2 (2013).

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio frequency, electromagnetic field immunity test*[4]
IEC 61000-4-3:2006/AMD1:2007
IEC 61000-4-3:2006/AMD2:2010

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*[5]
IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*
IEC 61000-4-11:2004/AMD1:2017

IEC 61000-6-3:2006, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*
IEC 61000-6-3:2006/AMD1:2010

IEC 61000-6-4:2018, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 61082-1:2014, *Preparation of documents used in electrotechnology – Part 1: Rules*

IEC 61180:2016, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

IEC 61439 (all parts), *Low-voltage switchgear and controlgear assemblies*

IEC 61921:2017, *Power capacitors – Low-voltage power factor correction banks*

IEC 62208:2011, *Empty enclosures for low-voltage switchgear and controlgear assemblies – General requirements*

IEC 81346-1:2009, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules*

IEC 81346-2:2019, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 2: Classification of objects and codes for classes*

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4 There is a consolidated edition 3.2 (2010) that includes IEC 61000-4-3 (2006) and Amendment 1 (2007) and Amendment 2 (2010).

5 There is consolidated edition 3.1 (2017) that includes IEC 61000-4-5 (2014) and its Amendment 1 (2017).