

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Low-voltage switchgear and controlgear –  
Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination  
units

Appareillage à basse tension –  
Partie 3: Interrupteurs, sectionneurs, interrupteurs-sectionneurs et combinés-  
fusibles

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –****Part 3: Switches, disconnectors, switch-disconnectors  
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International Standard IEC 60947-3 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This fourth edition cancels and replaces the third edition published in 2008, Amendment 1:2012 and Amendment 2:2015. This edition constitutes a technical revision.

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

- addition of critical load current tests for DC switches (see 9.3.9);
- addition of requirements for a conditional short-circuit rating for disconnectors, switches, and switch-disconnectors protected by circuit-breakers (see 9.3.7.2);
- addition of new categories for high-efficiency motors switching (see Annex A);

- addition of new Annex E for connection to aluminium conductors;
- addition of new Annex F for power losses measurement.

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

FDIS	Report on voting
121A/340/FDIS	121A/354/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.

A list of all parts in the IEC 60947 series, published under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

This part is to be used in conjunction with the sixth edition of IEC 60947-1:2020. The numbering of the subclauses is sometimes not continuous because it is based on IEC 60947-1:2020.

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

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## INTRODUCTION

The provisions of the general rules dealt with in IEC 60947-1 are applicable to this document, where specifically called for. Clauses and subclauses, tables, figures and annexes of the general rules thus applicable are identified by reference to the sixth edition of IEC 60947-1:2020, for example, 5.3.4.1 of IEC 60947-1:2020, Table 4 of IEC 60947-1:2020, or Annex A of IEC 60947-1:2020.

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## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

### Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

#### 1 Scope

This part of IEC 60947 applies to switches, disconnectors, switch-disconnectors and fuse-combination units and their dedicated accessories to be used in distribution circuits and motor circuits of which the rated voltage does not exceed 1 000 V AC or 1 500 V DC.

NOTE 1 Accessories are interconnecting units, extended terminals, internal coils, auxiliary contacts, motor operator, etc. offered as options with the basic unit.

This document does not apply to equipment coming within the scope of IEC 60947-2, IEC 60947-4-1 and IEC 60947-5-1.

Particular requirements for switches, disconnectors, switch-disconnectors and fuse-combination units for use in photovoltaic (PV) DC applications are given in Annex D.

Specific requirements for LV switchgear intended for the connections of aluminium conductors are given in Annex E.

Guidance on measurement of power loss is provided in Annex F.

This document does not include the additional requirements necessary for electrical apparatus for explosive gas atmospheres.

NOTE 2 Depending on its design, a switch (or disconnector) can be referred to as "a rotary switch (disconnector)", "cam-operated switch (disconnector)", "knife-switch (disconnector)", etc.

NOTE 3 In this document, the word "switch" also applies to the apparatus referred to in French as "commutateurs", intended to modify the connections between several circuits and *inter alia* to substitute a part of a circuit for another.

NOTE 4 In general, throughout this document, switches, disconnectors, switch-disconnectors and fuse-combination units will be referred to as "equipment".

The object of this document is to state:

- a) the characteristics of the equipment;
- b) the conditions that apply to the equipment with reference to:
  - 1) operation and behaviour in normal service;
  - 2) operation and behaviour in case of specified abnormal conditions, e.g. short-circuit;
  - 3) dielectric properties;
- c) the tests for confirming that these conditions have been met and the methods that are adopted for these tests;
- d) the information relevant to the marking of the equipment or made available by the manufacturer, e.g. in the catalogue.

Specific items requiring agreement between the user and the manufacturer are identified in Annex B.

## 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 60050-441, *International Electrotechnical Vocabulary – Part 441: Switchgear, controlgear and fuses* (available at <http://www.electropedia.org>)

IEC 60034-12:2016, *Rotating electrical machines – Part 12: Starting performance of single-speed three-phase cage induction motors*

IEC 60034-30-1:2014, *Rotating electrical machines – Part 30-1: Efficiency classes of line operated AC motors (IE code)*

IEC 60228:2004, *Conductors of insulated cable*

IEC 60269 (all parts), *Low-voltage fuses*

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

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 60947-1:2020, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

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*

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*

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 61545:1996, *Connecting devices – Devices for the connection of aluminium conductors in clamping units of any material and copper conductors in aluminium bodied clamping units*

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

IEC 62475:2010, *High-current test techniques – Definitions and requirements for test currents and measuring systems*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*  
 ISO 2859-1:1999/AMD1:2011

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*  
 CISPR 11:2015/AMD1:2016

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

### 3 Terms, definitions and index of terms

#### 3.1 General

For the purposes of this document, the terms and definitions given in IEC 60050-441 and IEC 60947-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.2 Alphabetical index of terms IEC 60947-3:2020

<https://standards.iteh.ai/catalog/standards/sist/f54bfd2-8635-4f0e-9ca3-1a82ab4538c1/iec-60947-3-2020>

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### 3.3 General terms

#### 3.3.1

##### **disconnecter**

mechanical switching device which, in the open position, complies with the requirements specified for the isolating function

Note 1 to entry: A disconnecter is capable of opening and closing a circuit when either a negligible current is broken or made, or when no significant change in the voltage across the terminals of each of the poles of the disconnecter occurs. It is also capable of carrying currents under normal circuit conditions and carrying, for a specified time, currents under abnormal conditions such as those of short-circuit.

[SOURCE: IEC 60050-441:2000, 441-14-05, modified – Reference to isolating function instead of isolating distance.]

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#### 3.3.2

##### **fuse-combination unit**

combination of a mechanical switching device and one or more fuses in a composite unit, assembled by the manufacturer or in accordance with his instructions

<https://standards.iteh.ai/catalog/standards/sist/54bfd2-8635-4f0e-9ca3-1441-14-04/iec-60947-3-2020>

[SOURCE: IEC 60050-441:2000, 441-14-04, modified – The note has been deleted.]

#### 3.3.3

##### **switch-fuse**

switch in which one or more poles have a fuse in series in a composite unit

[SOURCE: IEC 60050-441:2000, 441-14-14]

##### 3.3.3.1

##### **switch-fuse single opening**

switch-fuse which provides an interruption in the circuit on one side of the fuse-link only

Note 1 to entry: With this arrangement, safety precautions may be necessary when removing fuse-links.

##### 3.3.3.2

##### **switch-fuse double opening**

switch-fuse which provides an interruption in the circuit on both sides of the fuse-link

Note 1 to entry: With this arrangement, safety precautions may be necessary when removing fuse-links.

#### 3.3.4

##### **fuse-switch**

switch in which a fuse-link or a fuse-carrier with fuse-link forms the moving contact

[SOURCE: IEC 60050-441:2000, 441-14-17]