IEC 60364-5-53

Edition 4.0 2019-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Devices for protection for safety, isolation, switching, control and monitoring

Installations électriques à basse tension – Partie 5-53: Choix et mise en œuvre des matériels électriques – Dispositifs de protection pour assurer la sécurité, le sectionnement, la coupure, la commande et la surveillance

IEC 60364-5-53:2019-02(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 5-53: Selection and erection of electrical equipment – Devices for protection for safety, isolation, switching, control and monitoring

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International Standard IEC 60364 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

This bilingual version (2019-11) corresponds to the monolingual English version, published in 2019-02.

This fourth edition cancels and replaces the third edition published in 2001, Amendment 1:2002 and Amendment 2:2015. This edition constitutes a technical revision.

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

a) revision of all clauses except 531 and 534;
b) introduction of a new Clause 537 Monitoring;
c) Clause 530 contains all normative references and all terms and definitions.

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

FDIS	Report on voting
64/2352/FDIS	64/2359/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 French version of this standard has not been voted upon.

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

The reader's attention is drawn to the fact that Annex F lists all of the “in-some-country” clauses on differing practices relating to the subject of this standard.

A list of all parts in the IEC 60364 series, published under the general title *Low-voltage electrical installations*, 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

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- withdrawn,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

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 5-53: Selection and erection of electrical equipment – Devices for protection for safety, isolation, switching, control and monitoring

530.1 Scope

This document provides requirements for:

a) isolation, switching, control and monitoring, and

b) selection and erection of:

   1) devices for isolation, switching, control and monitoring, and

   2) devices to achieve compliance with measures of protection for safety.

530.2 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 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60269-2, *Low-voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to K*

IEC 60269-3, *Low-voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) – Examples of standardized systems of fuses A to F*

IEC 60269-4, *Low-voltage fuses – Part 4: Supplementary requirements for use-links for the protection of semiconductor devices*

IEC 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*

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 60364-4-42:2010, *Low-voltage electrical installations – Part 4-42: Protection for safety – Protection against thermal effects*
IEC 60364-4-42:2010/AMD1:2014

IEC 60364-4-43:2008, *Low-voltage electrical installations – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*
IEC 60364-4-44:2007/AMD1:2015

IEC 60364-5-55, *Electrical installations of buildings – Part 5-55: Selection and erection of electrical equipment – Other equipment*

IEC 60364-6:2016, *Low voltage electrical installations– Part 6: Verification*

IEC 60417 (all parts), *Graphical symbols for use on equipment*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60669-1, *Switches for household and similar fixed-electrical installations – Part 1: General requirements*

IEC 60669-2-1, *Switches for household and similar fixed electrical installations – Part 2-1: Particular requirements – Electronic switches*

IEC 60669-2-2, *Switches for household and similar fixed electrical installations – Part 2-2: Particular requirements – Electromagnetic remote-control switches (RCS)*

IEC 60669-2-3, *Switches for household and similar fixed electrical installations – Part 2-3: Particular requirements – Time-delay switches (TDS)*

IEC 60669-2-4, *Switches for household and similar fixed electrical installations – Part 2-4: Particular requirements – Isolating switches*

IEC 60669-2-5, *Switches for household and similar fixed electrical installations – Part 2-5: Particular requirements – Switches and related accessories for use in home and building electronic systems (HBES)*

IEC 60669-2-6, *Switches for household and similar fixed electrical installations – Part 2-6: Particular requirements – Fireman's switches for exterior and interior signs and luminaires*

IEC 60670-24, *Boxes and enclosures for electrical accessories for household and similar fixed electrical installations – Part 24: Particular requirements for enclosures for housing protective devices and other power dissipating electrical equipment*

IEC 60884 (all parts), *Plugs and socket-outlets for household and similar purposes*

IEC 60898 (all parts), *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations*

IEC 60906 (all parts), *IEC system of plugs and socket-outlets for household and similar purposes*

IEC 60947-2:2016, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

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

IEC 60947-4-2, *Low-voltage switchgear and controlgear – Part 4-2: Contactors and motor-starters – AC semiconductor motor controllers and starters*

IEC 60947-4-3, *Low-voltage switchgear and controlgear – Part 4-3: Contactors and motor-starters – AC semiconductor controllers and contactors for non-motor loads*

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

IEC 60947-6-1, *Low-voltage switchgear and controlgear – Part 6-1: Multiple function equipment – Transfer switching equipment*

IEC 60947-6-2, *Low-voltage switchgear and controlgear – Part 6-2: Multiple function equipment – Control and protective switching devices (or equipment) (CPS)*

IEC 61008 (all parts), *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs)*

IEC 61009 (all parts), *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)*

IEC 61095, *Electromechanical contactors for household and similar purposes*

IEC 61439-2, *Low-voltage switchgear and controlgear assemblies – Part 2: Power switchgear and controlgear assemblies*

IEC 61439-3, *Low-voltage switchgear and controlgear assemblies – Part 3: Distribution boards intended to be operated by ordinary persons (DBO)*

IEC 61439-6, *Low-voltage switchgear and controlgear assemblies – Part 6: Busbar trunking systems (busways)*

IEC 61534 (all parts), *Powertrack systems*

IEC 61557-8, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems*

IEC 61557-9, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 9: Equipment for insulation fault location in IT systems*

IEC 61643-11, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and test methods*

IEC 61643-12, *Low-voltage surge protective devices – Part 12: Surge protective devices connected to low-voltage power distribution systems – Selection and application principles*

IEC 61984:2008, *Connectors – Safety requirements and tests*

IEC 61995 (all parts), *Devices for the connection of luminaires for household and similar purposes*

IEC 62020, *Electrical accessories – Residual current monitors for household and similar uses (RCMs)*

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

IEC 62305 (all parts), *Protection against lightning*

IEC 62423, *Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses*

IEC 62606, *General requirements for arc fault detection devices*

IEC 62626-1, *Low-voltage switchgear and controlgear enclosed equipment – Part 1: Enclosed switch-disconnectors outside the scope of IEC 60947-3 to provide isolation during repair and maintenance work*

530.3 Terms and definitions

For the purposes of this document, the following terms and definitions 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.

530.3.1
disconnector
mechanical switching device which in the open position complies with the requirements specified for the isolating function

Note 1 to entry: A disconnector is capable of opening and closing a circuit when either negligible current is broken or made, or when no significant change in the voltage across the terminals of each of the poles of the disconnector 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 – Referring to isolating function instead of isolating distance.]

530.3.2
switch disconnector
switch which, in the open position, satisfies the isolating requirements specified for a disconnector

[SOURCE: IEC 60050-441:1984, 441-14-12]

530.3.3
mechanical switch
device capable of making, carrying and breaking currents through contacts controlled by mechanical operation under normal circuit conditions which may include specified operating overload conditions and also carrying for specified time currents under specified abnormal circuit conditions such as those of short-circuit

Note 1 to entry: A switch can be capable of making but not breaking short-circuit currents.

[SOURCE: IEC 60050-441:2000, 441-14-10, modified – "through contacts controlled by mechanical operation" has been added.]

530.3.4
switching-off for mechanical maintenance
opening operation of a switching device intended to inactivate an item or items of electrically powered equipment for the purpose of preventing a hazard, other than due to electric shock or to arcing, during non-electrical work on the equipment

[SOURCE: IEC 60050-826:2004, 826-17-02]

530.3.5
emergency switching-off
opening operation of a switching device intended to remove electric power from an electrical installation to avert or alleviate a hazardous situation

[SOURCE: IEC 60050-826:2004, 826-17-03]

530.3.6
emergency stopping
operation intended to stop as quickly as possible a movement which has become dangerous

[SOURCE: IEC 60050-826:2004, 826-17-04]

530.3.7
functional switching
operation intended to switch on or off or vary the supply of electric energy to an electrical installation or parts of it for normal operating purposes

[SOURCE: IEC 60050-826:2004, 826-17-05]

530.3.8
SPD assembly

one SPD or a set of SPDs, in both cases including all SPD disconnectors required by the SPD manufacturer, providing the required overvoltage protection for a type of system earthing

530.3.9
SPD disconnector

disconnector
device for disconnecting an SPD, or part of an SPD, from the power system

Note 1 to entry: This disconnecting device is not required to have isolating capability for safety purposes. It is to prevent a persistent fault on the system and is used to give an indication of an SPD's failure. Disconnectors can be internal (built in) or external (required by the manufacturer). There may be more than one disconnector function, for example an overcurrent protection function and a thermal protection function. These functions may be in separate units.

[SOURCE: IEC 61643-11:2011, 3.1.28]

530.3.10
mode of protection of an SPD
intended current path, between terminals that contains protective components, e.g. line-to-line, line-to-earth, line-to-neutral, neutral-to-earth

[SOURCE: IEC 61643-11:2011, 3.1.8]

530.3.11
follow current interrupt rating
I_{fi}
prospective short-circuit current that an SPD is able to interrupt without operation of a disconnector

[SOURCE: IEC 61643-11:2011, 3.1.39]

530.3.12
short-circuit current rating
I_{SCCR}
maximum prospective short-circuit current from the power system for which the SPD, in conjunction with the disconnector specified, is rated

[SOURCE: IEC 61643-11:2011, 3.1.27]

530.3.13
voltage protection level
U_P
maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape

Note 1 to entry: The voltage protection level is given by the manufacturer and may not be exceeded by:

- the measured limiting voltage determined for front-of-wave sparkover (if applicable) and the measured limiting voltage determined from the residual voltage measurements at amplitudes corresponding to I_n and/or I_{imp} respectively for test classes II and/or I;
- the measured limiting voltage at the open circuit voltage of the combination wave generator (U_{OC}), determined for the combination wave for test class III.

[SOURCE: IEC 61643-11:2011, 3.1.14]

530.3.14
rated impulse voltage
U_W
impulse withstand voltage value assigned by the manufacturer to the equipment or to a part of it, characterizing the specified withstand capability of its insulation against transient overvoltages

[SOURCE: IEC 60664-1:2007, 3.9.2]

530.3.15
maximum continuous operating voltage
U_C
maximum RMS voltage, which may be continuously applied to the SPD's mode of protection

Note 1 to entry: The U_C value covered by this document may exceed 1 000 V.

[SOURCE: IEC 61643-11:2011, 3.1.11]

530.3.16
nominal discharge current for class II test
I_n
crest value of the current through the SPD having a current waveshape of 8/20 µs

[SOURCE: IEC 61643-11:2011, 3.1.9]

530.3.17
impulse discharge current for class I test
I_{imp}
crest value of a discharge current through the SPD with specified charge transfer Q and specified energy W/R in the specified time

[SOURCE: IEC 61643-11:2011, 3.1.10]