ICS 29.120.40, 29.130.20 SLOVENSKÁ TECHNICKÁ NORMA Júl 2025

STN	**Nízkonapäťové spínacie a riadiace zariadenia Časť 5-1: Prístroje riadiacich obvodov a spínacie prvky Elektromechanické prístroje riadiacich obvodov**	**STN EN IEC 60947-5-1** 35 4101

Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/25

Obsahuje: EN IEC 60947-5-1:2025, IEC 60947-5-1:2024

Oznámením tejto normy sa od 30.04.2028 ruší
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60947-5-1

April 2025

ICS 29.120.40; 29.130.20

Supersedes EN 60947-5-1:2017; EN 60947-5-1:2017/AC:2020-05

English Version

Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices (IEC 60947-5-1:2024)

Appareillage à basse tension - Partie 5-1: Appareils et éléments de commutation pour circuits de commande - Appareils électromécaniques pour circuits de commande (IEC 60947-5-1:2024)

Niederspannungsschaltgeräte - Teil 5-1: Steuergeräte und Schaltelemente - Elektromechanische Steuergeräte (IEC 60947-5-1:2024)

This European Standard was approved by CENELEC on 2025-02-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 60947-5-1:2025 E

European foreword

The text of document 121A/585/FDIS, future edition 5 of IEC 60947-5-1, prepared by SC 121A "Low-voltage switchgear and controlgear" of IEC/TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60947-5-1:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2026-04-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2028-04-30

This document supersedes EN 60947-5-1:2017 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZZ, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60947-5-1:2024 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60068-2-75:2014	NOTE	Approved as EN 60068-2-75:2014 (not modified)
IEC 60073:2002	NOTE	Approved as EN 60073:2002 (not modified)
IEC 60079 (series)	NOTE	Approved as EN IEC 60079-7 (series)
IEC 60255 (series)	NOTE	Approved as EN 60255 (series)
IEC 60947-5-3:2013	NOTE	Approved as EN 60947-5-3:2013 (not modified)
IEC 60947-5-4:2002	NOTE	Approved as EN 60947-5-4:2003 (not modified)
IEC 61000 (series)	NOTE	Approved as EN IEC 61000 (series)
IEC 61810 (series)	NOTE	Approved as EN 61810 (series)
IEC 61672-1:2013	NOTE	Approved as EN 61672-1:2013 (not modified)

IEC 62246-1:2015	NOTE	Approved as EN 62246-1:2015 (not modified)
IEC 62246-1-1:2018	NOTE	Approved as EN IEC 62246-1-1:2018 (not modified)
IEC 62246-4:2023	NOTE	Approved as EN IEC 62246-4:2023 (not modified)
IEC 62443 (series)	NOTE	Approved as EN IEC 62443 (series)
IEC/TR 63201:2019	NOTE	Approved as CLC IEC/TR 63201:2020 (not modified)
ISO 7731:2003	NOTE	Approved as EN ISO 7731:2008 (not modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-6	2007	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008
IEC 60068-2-14	2023	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN IEC 60068-2-14	2023
IEC 60068-2-27	2008	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	2009
IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60068-2-78	2012	Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state	EN 60068-2-78	2013
IEC 60695-2-10	2021	Fire hazard testing - Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	EN IEC 60695-2-10	2021
			+ AC	2024
IEC 60695-2-11	2021	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (GWEPT)	EN IEC 60695-2-11	2021
IEC 60695-2-12	2021	Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials	EN IEC 60695-2-12	2021
IEC 60730-1	2022	Automatic electrical controls - Part 1: General requirements	EN 60730-1	2016
			+ A1	2019
			+ A2	2022

Publication	Year	Title	EN/HD	Year
IEC 60947-1	2020	Low-voltage switchgear and controlgear - Part 1: General rules	EN IEC 60947-1	2021
			+ AC	2023
			+ AC	2024
IEC 60947-4-1	2018	Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters	EN IEC 60947-4-1	2019
			+ AC	2020
			+ AC	2021
IEC 60947-5-2	2019	Low-voltage switchgear and controlgear - Part 5-2: Control circuit devices and switching elements - Proximity switches	EN IEC 60947-5-2	2020
IEC 60947-5-5	1997	Low-voltage switchgear and controlgear -- Part 5-5: Control circuit devices and switching elements - Electrical emergency stop device with mechanical latching function	EN 60947-5-5	1997
+ A1	2005		+ A1	2005
-	-		+ A11	2013
+ A2	2016		+ A2	2017
IEC 60999-1	1999	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units -- Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)	EN 60999-1	2000
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2020	Electromagnetic compatibility (EMC) -- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN IEC 61000-4-3	2020
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5	2014	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2014
+ A1	2017		+ A1	2017
IEC 61000-4-6	2023	Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN IEC 61000-4-6	2023
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) -- Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010

EN IEC 60947-5-1:2025 (E)

Publication	Year	Title	EN/HD	Year
IEC 61000-4-11	2020	Electromagnetic compatibility (EMC) -- Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN IEC 61000-4-11	2020
			+ AC	2020
			+ AC	2022
IEC 61131-9	2022	Programmable controllers - Part 9: Single-drop digital communication interface for small sensors and actuators (SDCI)	EN IEC 61131-9	2022
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
IEC 62262	2002	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	EN 62262	2002
			+ A1	2021
IEC 62471	2006	Photobiological safety of lamps and lamp systems	EN 62471	2008
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
+ A1	2016		+ A1	2017
-	-		+ A11	2020
+ A2	2019		+ A2	2021
CISPR 32	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements	EN 55032	2015
			+ AC	2016
+ A1	2019		+ A1	2020
-	-		+ A11	2020
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 14159	2002	Safety of machinery – Hygiene requirements for the design of machinery	EN ISO 14159	2008

Annex ZZ
(informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under a Commission's standardisation request relating to harmonised standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

Table ZZ.1 — Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
(1)(a)	6.1 d) to w), 6.2, 6.3, 8.1, Annex D, Annex F, Annex H, Annex J, Annex K, Annex L, Annex M, Annex N	
(1)(b)	6.1 d) to w), 6.3, 6.5, Clause 7, 8.1, 8.2, 9.1, 9.2, 9.3, Annex C, Annex D, Annex F, Annex J	
(1)(c)	6.1 d) to w), 6.2, 6.3, 6.5 *See also references given in (2)(a) to (2)(d) and (3)(a) to (3)(c) in this Table.*	
(2)(a)	6.1 d) to v), 6.3, 6.5, 8.1, 8.2, 9.2, 9.3, Annex D, Annex F	
(2)(b)	8.1, 8.2, 9.2, 9.3, Annex G, Annex H, Annex J	
(2)(c)	6.1 w), 6.3, 6.5, 8.1, 8.2, 9.1, 9.2, 9.3, Annex C, Annex D, Annex J, Annex N	
(2)(d)	6.1 i), j), 6.3, 6.5, Clause 7, 8.1, 8.2, 8.4, 9.2, 9.3, Annex D, Annex F, Annex J	
(3)(a)	6.1 g), m), 6.3, 6.5, Clause 7, 8.1, 8.2, 8.4, 9.1, 9.2, 9.3, Annex C, Annex D, Annex F, Annex G, Annex J	
(3)(b)	6.1 m), n), 6.3, 6.5, Clause 7, 8.1, 8.2, 8.3, 9.3, 9.4, Annex D, Annex F, Annex N, Annex K	

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
(3)(c)	6.1 e), o), p), 6.3, 6.5, 8.1, 8.2, 9.2, 9.3, Annex D, Annex H, Annex J, Annex K, Annex N	

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

IEC 60947-5-1

Edition 5.0 2024-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

Appareillage à basse tension – Partie 5-1: Appareils et éléments de commutation pour circuits de commande – Appareils électromécaniques pour circuits de commande

IEC 60947-5-1:2024-03(en-fr)

IEC 60947-5-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 29.120.40, 29.130.20

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60947-5-1 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. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2016. This edition constitutes a technical revision.

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

a) update of the scope structure and exclusions;
b) requirements for control circuits;
c) update of the normal service conditions (e.g. shock and vibration);
d) update of information and marking requirements including environmental information requirements referencing IEC TS 63058:2021;

e) update of the constructional requirements and the corresponding tests considering safety aspects (e.g. artificial optical radiation, security aspects, limited energy source, stored charge energy circuit);

f) update of the EMC requirements according to the generic documents;

g) new requirements for reed contact magnetic switches in Annex D;

h) requirements for class II circuit devices achieved by double or reinforced insulation in Annex F;

i) update of pull-out tests in Annex G;

j) information requirements for audible signalling device in Annex J;

k) insertion of new Annex O.

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

Draft	Report on voting
121A/585/FDIS	121A/598/RVD

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 International Standard 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.

This International Standard should be used in conjunction with IEC 60947-1.

The provisions of the general rules, IEC 60947-1, are applicable to this document, where specifically called for. General rules, clauses and subclauses thus applicable, as well as tables, figures and annexes are identified by a reference to IEC 60947-1, for example 1.2.3, Table 4 or Annex A of IEC 60947-1:2020.

The following differing practices of a less permanent nature exist in the countries indicated below.

– 8.2.4.1: Making and breaking capacities (United States of America and Canada).

– 9.3.3.5.2: Test circuits and connections (United States of America and Canada).

A list of all the parts in the IEC 60947 series, under the general title *Low-voltage switchgear and controlgear*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices

1 Scope

This part of IEC 60947 applies to control circuit devices and switching elements intended for controlling, signalling, interlocking, etc., of switchgear and controlgear.

It applies to control circuit devices having a rated voltage not exceeding 1 000 V AC (at a frequency not exceeding 1 000 Hz) or 600 V DC.

This document applies to specific types of control circuit devices as contained in the following non exhaustive list:

– manually operated control switches;
– electromagnetically operated control switches, either time-delayed or instantaneous;
– contactor relays;
– pilot switches;
– pressure switches;
– temperature sensitive switches (thermostats);
– programmers;
– position switches;
– control switches operated by part of a machine or mechanism;
– associated control circuit equipment, for example indicator lights;
– control circuit devices incorporating semiconductor switching elements;
– control circuit devices incorporating a built-in single drop digital communication interface.

NOTE 1 Control circuit devices and switching elements are referred to as "equipment" or "device" equally in this document.

This document also applies to specific types of control circuit switching elements associated with other devices (whose main circuits are covered by other standards) as contained in the following non exhaustive list:

– auxiliary contacts of a switching device (e.g. contactor, circuit breaker) which are not dedicated exclusively for use with the coil of that device;
– interlocking contacts of enclosure doors;
– control circuit contacts of rotary switches;
– control circuit contacts of overload relays.

This document does not apply to:

– relays covered in the IEC 60255 or IEC 61810 series;
– automatic electrical control devices for household and similar purposes;
– the use of control circuit devices and switching elements with additional measure within explosive atmospheres. These are given in the IEC 60079 series;

This document does not address specific colour requirements or actuating force values.

NOTE 2 Colour requirements can be found in IEC 60073 and also in CIE S004/E-2001.

The object of this document is to state:

– definitions;
– classification;
– characteristics;
– product information;
– normal service, mounting and transport conditions;
– constructional and performance requirements, including electromagnetic compatibility (EMC) and all related product safety measures;
– tests to verify the requirements and the rated characteristics.

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 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14:2023, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

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

IEC 60068-2-78:2012, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

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

IEC 60695-2-10:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-2-12:2021, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60730-1:2022, *Automatic electrical controls – Part 1: General requirements*

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

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

IEC 60947-5-2:2019, *Low-voltage switchgear and controlgear – Part 5-2: Control circuit devices and switching elements – Proximity switches*

IEC 60947-5-5:1997, *Low-voltage switchgear and controlgear – Part 5-5: Control circuit devices and switching elements – Electrical emergency stop device with mechanical latching function*
IEC 60947-5-5:1997/AMD1:2005
IEC 60947-5-5:1997/AMD2:2016

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm^2 up to 35 mm^2 (included)*

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

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

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 61000-4-6:2023, *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 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61131-9:2022, *Programmable controllers – Part 9: Single-drop digital communication interface for small sensors and actuators (SDCI)*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62471:2006, *Photobiological safety of lamps and lamp systems*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016
CISPR 11:2015/AMD2:2019

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*
CISPR 32:2015/AMD1:2019

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 14159:2002, *Safety of machinery – Hygiene requirements for the design of machinery*