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Kopplingsapparater för högst 1000 V – Del 1: Allmänna fordringar

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

Som svensk standard gäller europastandarden EN 60947-1:2007. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60947-1:2007.

Nationellt förord

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- **IEC 60947-1, Fifth edition, 2007 - Low-voltage switchgear and controlgear - Part 1: General rules**

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English version

**Low-voltage switchgear and controlgear -
Part 1: General rules
(IEC 60947-1:2007)**

Appareillage à basse tension -
Partie 1: Règles générales
(CEI 60947-1:2007)

Niederspannungsschaltgeräte -
Teil 1: Allgemeine Festlegungen
(IEC 60947-1:2007)

This European Standard was approved by CENELEC on 2007-07-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 17B/1550/FDIS, future edition 5 of IEC 60947-1, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60947-1 on 2007-07-01.

This European Standard supersedes EN 60947-1:2004.

The main changes with respect to EN 60947-1:2004 are as follows:

- modification and restructuration of 7.1;
- introduction of new figures concerning EMC tests;
- introduction of new Annexes Q, R and S.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-07-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directives EMC (98/336/EEC) and EMC2 (2004/108/EC). See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60947-1:2007 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-151	2001	International Electrotechnical Vocabulary (IEV) - Part 151: Electrical and magnetic devices	-	-
IEC 60050-441 + A1	1984 2000	International Electrotechnical Vocabulary (IEV) - Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 60050-604 + A1	1987 1998	International Electrotechnical Vocabulary (IEV) - Chapter 604: Generation, transmission and distribution of electricity - Operation	-	-
IEC 60050-826	2004	International Electrotechnical Vocabulary - Part 826: Electrical installations	-	-
IEC 60060	Series	High-voltage test techniques	EN 60060	Series
IEC 60068-1 + corr. October + A1	1988 1988 1992	Environmental testing - Part 1: General and guidance	EN 60068-1	1994
IEC 60068-2-1 A1 A2	1990 1993 1994	Environmental testing - Part 2: Tests - Tests A: Cold	EN 60068-2-1 ¹⁾ A1 A2	1993 1993 1994
IEC 60068-2-2 A1 A2	1974 1993 1994	Environmental testing - Part 2: Tests - Tests B: Dry heat	EN 60068-2-2 ²⁾ A1 A2	1993 1993 1994
IEC 60068-2-6	1995 1995	Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995
IEC 60068-2-27	1987	Basic environmental testing procedures - Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993
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 60068-2-52	1996	Environmental testing - Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52	1996

¹⁾ EN 60068-2-1 is superseded by EN 60068-2-1:2007, which is based on IEC 60068-2-1:2007.

²⁾ EN 60068-2-2 includes supplement A:1976 to IEC 60068-2-2.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-78	2001	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2001
IEC 60071-1	1993	Insulation co-ordination - Part 1: Definitions, principles and rules	EN 60071-1 ³⁾	1995
IEC 60073	2002	Basic and safety principles for man-machine interface, marking and identification - Coding principles for indicators and actuators	EN 60073	2002
IEC 60085	2004	Electrical insulation - Thermal classification	EN 60085	2004
IEC 60112	2003	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	2003
IEC 60216	Series	Electrical insulating materials - Properties of thermal endurance	EN 60216	Series
IEC 60228	2004	Conductors of insulated cables	EN 60228 + corr. May	2005 2005
IEC 60269-1 A1	1998 2005	Low-voltage fuses - Part 1: General requirements	EN 60269-1 ⁴⁾ A1	1998 2005
IEC 60269-2 A1 A2	1986 1995 2001	Low-voltage fuses - Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application)	EN 60269-2 ⁵⁾ A1 A2	1995 1997 2002
IEC 60344 A1	1980 1985	Guide to the calculation of resistance of plain - and coated copper conductors of low- frequency cables and wires	-	-
IEC 60364-4-44	2001	Electrical installations of buildings - Part 4-44: Protection for safety - Protection against voltage disturbances and electromagnetic disturbances	-	-
IEC 60364-4-44/A1 (mod)	2003	Electrical installations of buildings - Part 4-44: Protection for safety - Protection against voltage disturbances and electromagnetic disturbances - Clause 443: Protection against overvoltages of atmospheric origin or due to switching	HD 60364-4-443	2006
IEC 60417	Data- base	Graphical symbols for use on equipment	-	-
IEC 60439-1 A1	1999 2004	Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies	EN 60439-1 A1	1999 2004

³⁾ EN 60071-1 is superseded by EN 60071-1:2006, which is based on IEC 60071-1:2006.

⁴⁾ EN 60269-1 is superseded by EN 60269-1:2007, which is based on IEC 60269-1:2006.

⁵⁾ EN 60269-2 is superseded by HD 60269-2:2007, which is based on IEC 60269-2:2006.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60445	1999	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system	EN 60445 ⁶⁾	2000
IEC 60447	2004	Basic and safety principles for man-machine interface, marking and identification - Actuating principles	EN 60447	2004
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
A1	1999		+ corr. May A1	1993 2000
IEC 60617	Data-base	Graphical symbols for diagrams	-	-
IEC 60664-1	1992	Insulation coordination for equipment within low-voltage systems -		
+ A1	2000			
+ A2	2002	Part 1: Principles, requirements and tests	EN 60664-1 ⁷⁾	2003
IEC 60695-2-2	1991	Fire hazard testing -	EN 60695-2-2 ⁸⁾	1994
A1	1994	Part 2: Test methods - Section 2: Needle-flame test	A1	1995
IEC 60695-2-10	2000	Fire hazard testing - Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	EN 60695-2-10	2001
IEC 60695-2-11	2000 2001	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	2001
IEC 60695-11-10	1999	Fire hazard testing -	EN 60695-11-10	1999
A1	2003	Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	A1	2003
IEC 60947-5-1	2003	Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices	EN 60947-5-1 + corr. July	2004 2005
IEC 60947-8	2003	Low-voltage switchgear and controlgear -	EN 60947-8	2003
A1	2006	Part 8: Control units for built-in thermal protection (PTC) for rotating electrical machines	A1	2006
IEC 60981	2004	Extra-heavy duty electrical rigid steel conduits -		-
IEC 61000-3-2	2005	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN 61000-3-2	2006

⁶⁾ EN 60445 is superseded by EN 60445:2007, which is based on IEC 60445:2006.

⁷⁾ EN 60664-1 is superseded by EN 60664-1:2007, which is based on IEC 60664-1:2007.

⁸⁾ EN 60695-2-2 is superseded by EN 60695-11-5:2005, which is based on IEC 60695-11-5:2004.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-3-3	1994	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection	EN 61000-3-3	1995
A1	2001		+ corr. July A1	1997
A2	2005		A2	2001
IEC 61000-4-2	1995	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995
A1	1998		A1	1998
A2	2000		A2	2001
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-4	2004	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2004
IEC 61000-4-5	2005	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006
IEC 61000-4-6	2003	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2007
+A1	2004			
+A2	2006			
IEC 61000-4-8	1993	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	1993
A1	2000		A1	2001
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
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	EN 61000-4-13	2002
IEC 61000-6-2	2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2 + corr. September	2005 2005
IEC 61131-2	2003	Programmable controllers - Part 2: Equipment requirements and tests	EN 61131-2 + corr. August	2003 2003
IEC 61140	2001	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2002
A1 (mod)	2004		A1	2006
IEC 61180	Series	High-voltage test techniques for low-voltage equipment	EN 61180	Series

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 11 (mod)	2003	Industrial scientific and medical (ISM) radio-		
+ A1 (mod)	2004	frequency equipment - Electromagnetic	EN 55011	2007
A2	2006	disturbance characteristics - Limits and	A2	2007
		methods of measurement		



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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 1: General rules

1 General

The purpose of this standard is to harmonize as far as practicable all rules and requirements of a general nature applicable to low-voltage switchgear and controlgear in order to obtain uniformity of requirements and tests throughout the corresponding range of equipment and to avoid the need for testing to different standards.

All those parts of the various equipment standards which can be considered as general have therefore been gathered in this standard 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, only two main documents are necessary to determine all requirements and tests:

- 1) this basic standard, referred to as "Part 1" in the specific standards covering the various types of low-voltage switchgear and controlgear;
- 2) the relevant equipment standard hereinafter referred to as the "relevant product standard" or "product standard".

For a general rule to apply to a specific product standard, it shall be explicitly referred to by the latter, by quoting the relevant clause or subclause number of this standard followed by "IEC 60947-1" e.g. "7.2.3 of IEC 60947-1".

A specific product standard may not require, and hence may omit, a general rule (as being not applicable), or it may add to it (if deemed inadequate in the particular case), but it may not deviate from it, unless there is a substantial technical justification.

NOTE The product standards due to be part of the series of IEC standards covering low-voltage switchgear and controlgear are:

60947-2: Part 2: Circuit-breakers

60947-3: Part 3: Switches, disconnectors, switch-disconnectors and fuse combination units

60947-4: Part 4: Contactors and motor-starters

60947-5: Part 5: Control-circuit devices and switching elements

60947-6: Part 6: Multiple function equipment

60947-7: Part 7: Ancillary equipment

1.1 Scope and object

This standard applies, when required by the relevant product standard, to switchgear and controlgear hereinafter referred to as "equipment" and intended to be connected to circuits, the rated voltage of which does not exceed 1 000 V a.c. or 1 500 V d.c.

It does not apply to low-voltage switchgear and controlgear assemblies which are dealt with in IEC 60439.

NOTE In certain clauses or subclauses of this standard, the equipment covered by this standard is also referred to as "device", to be consistent with the text of such clauses or subclauses.

The object of this standard is to state those general rules and requirements which are common to low-voltage equipment as defined in 1.1, including for example:

- definitions;
- characteristics;
- information supplied with the equipment;
- normal service, mounting and transport conditions;
- constructional and performance requirements;
- verification of characteristics and performance.

Digital inputs and/or digital outputs contained in switchgear and controlgear, and intended to be compatible with programmable controllers (PLCs) are covered by Annex S.

1.2 Normative references

The following referenced documents are indispensable for the application 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(151):2001, *International Electrotechnical Vocabulary (IEV) – Chapter 151: Electrical and magnetic devices*

IEC 60050(441):1984, *International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses*
Amendment 1 (2000)

IEC 60050(604):1987, *International Electrotechnical Vocabulary (IEV) – Chapter 604: Generation, transmission and distribution of electricity – Operation*
Amendment 1 (1998)

IEC 60050(826):2004, *International Electrotechnical Vocabulary (IEV) – Chapter 826: Electrical installations*

IEC 60060, *High-voltage test techniques*

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*
Amendment 1 (1992)

IEC 60068-2-1:1990, *Environmental testing – Part 2-1: Tests – Tests A: Cold*
Amendment 1 (1993)
Amendment 2 (1994)

IEC 60068-2-2:1974, *Environmental testing – Part 2-2: Tests – Tests B: Dry heat*
Amendment 1 (1993)
Amendment 2 (1994)

IEC 60068-2-6:1995, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:1987, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*