SVENSK STANDARD SS-EN 60044-8

Fastställd	Utgåva	Sida	Ingår i
2003-04-24	1	1 (1+129)	SEK Område 38

Svenska Elektriska Kommissionen, SEK

Mättransformatorer – Del 8: Elektroniska strömtransformatorer

Instrument transformers – Part 8: Electronic current transformers

Som svensk standard gäller europastandarden EN 60044-8:2002. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60044-8:2002.

Nationellt förord

Europastandarden EN 60044-8:2002

består av:

- **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
- **IEC 60044-8, First edition, 2002 - Instrument transformers - Part 8: Electronic current transformers**

  utarbetad inom International Electrotechnical Commission, IEC.

ICS 17.22.20

Denna standard är fastställd av Svenska Elektriska Kommissionen, SEK,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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EUROPEAN STANDARD **EN 60044-8**

NORME EUROPÉENNE

EUROPÄISCHE NORM September 2002

ICS 17.220.20

English version

Instrument transformers
Part 8: Electronic current transformers
(IEC 60044-8:2002)

Transformateurs de mesure
Partie 8: Transformateurs de courant électroniques
(CEI 60044-8:2002)

Messwandler
Teil 8: Elektronische Stromwandler
(IEC 60044-8:2002)

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

Ref. No. EN 60044-8:2002 E

Foreword

The text of document 38/280/FDIS, future edition 1 of IEC 60044-8, prepared by IEC TC 38, Instrument transformers, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60044-8 on 2002-09-01.

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) 2003-06-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-09-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes D and ZA are normative and annexes A, B, C and E are informative.
Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60044-8:2002 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 standards indicated:

IEC 60038	NOTE	Harmonized as HD 472 S1:1989 (modified).
IEC 60068-2 Series	NOTE	Harmonized in EN 60068-2/HD 323.2 Series (not modified).
IEC 60071-2	NOTE	Harmonized as EN 60071-2:1997 (not modified).
IEC 60255-24	NOTE	Harmonized as EN 60255-24:2001 (not modified).
IEC 60270	NOTE	Harmonized as EN 60270:2001 (not modified).
IEC 60437	NOTE	Harmonized as EN 60437:1997 (not modified).
IEC 60567	NOTE	Harmonized as EN 60567:1992 (not modified).
IEC 60599	NOTE	EN 60599:1999 is based on IEC 60599:1999 (not modified).
IEC 60721-2-2	NOTE	Harmonized as HD 478.2.2 S1:1990 (not modified).
IEC 60721-2-4	NOTE	Harmonized as HD 478.2.4 S1:1989 (not modified).
IEC 61508-1	NOTE	Harmonized as EN 61508-1:2001 (not modified).
IEC 61508-3	NOTE	Harmonized as EN 61508-3:2001 (not modified).
IEC 61754-1	NOTE	Harmonized as EN 61754-1:1997 (not modified).
IEC 61754-15	NOTE	Harmonized as EN 61754-15:2001 (not modified).

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60028	1925	International standard of resistance for copper	-	-
IEC 60044-1	- [1)]	Instrument transformers Part 1: Current transformers	EN 60044-1	1999 [2)]
IEC 60044-6	- [1)]	Part 6: Requirements for protective current transformers for transient performance	EN 60044-6	1999 [2)]
IEC 60044-7	- [1)]	Part 7: Electronic voltage transformers	EN 60044-7	2000 [2)]
IEC 60050-161	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility	-	-
IEC 60050-321	1986	International electrotechnical vocabulary Chapter 321: Instrument transformers	-	-
IEC 60050-601	1985	Chapter 601: Generation, transmission and distribution of electricity - General	-	-
IEC 60050-604	1987	Chapter 604: Generation, transmission and distribution of electricity - Operation	-	-
IEC 60056	- [1)]	High-voltage alternating-current circuit-breakers	HD 348 S7	1998 [3)]
IEC 60060-1 + corr. March	1989 1990	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1	1991

1) Undated reference.

2) Valid edition at date of issue.

3) HD 348 S7:1998 is superseded by EN 62271-100:2001, which is based on IEC 62271-100:2001.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-6 + corr. March	1995 1995	Environmental testing Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995
IEC 60068-2-17	- [1)]	Part 2: Tests - Test Q: Sealing	EN 60068-2-17	1994 [2)]
IEC 60068-2-75	- [1)]	Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997 [2)]
IEC 60071-1	1993	Insulation co-ordination Part 1: Definitions, principles and rules	EN 60071-1	1995
IEC 60085	1984	Thermal evaluation and classification of electrical insulation	HD 566 S1	1990
IEC 60121	- [1)]	Recommendation for commercial annealed aluminium electrical conductor wire	-	-
IEC 60255-5	2000	Electrical relays Part 5: Insulation coordination for measuring relays and protection equipment - Requirements and tests	EN 60255-5	2001
IEC 60255-22-1	1988	Part 22: Electrical disturbance tests for measuring relays and protection equipment - Section 1: 1 MHz burst disturbance tests	-	-
IEC 60296	1982	Specification for unused mineral insulating oils for transformers and switchgear	-	-
IEC 60304	1982	Standard colours for insulation for low-frequency cables and wires	HD 402 S2	1984
IEC 60376	1971	Specification and acceptance of new sulphur hexafluoride	-	-
IEC 60376B	1974	Second supplement: Clause 26	-	-
IEC 60417	Series	Graphical symbols for use on equipment	EN 60417	Series
IEC 60480	1974	Guide to the checking of sulphur hexafluoride (SF6) taken from electrical equipment	-	-
IEC 60529	- [1)]	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 [2)] 1993
IEC 60664-1 (mod)	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	HD 625.1 S1 + corr. November	1996 1996

Publication	Year	Title	EN/HD	Year
IEC 60694	1996	Common specifications for high-voltage switchgear and controlgear standards	EN 60694 + corr. May	1996 1999
IEC 60707	1999	Flammability of solid non-metallic materials when exposed to flame sources - List of test methods	EN 60707	1999
IEC 60721-3-3	1994	Classification of environmental conditions Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weatherprotected locations	EN 60721-3-3	1995
IEC 60721-3-4	1995	Section 4: Stationary use at non-weatherprotected locations	EN 60721-3-4	1995
IEC 60794	Series	Optical fibre cables	EN 60794	Series
IEC 60812	1985	Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)	HD 485 S1	1987
IEC 60815	1986	Guide for the selection of insulators in respect of polluted conditions	-	-
IEC 60870-5-1	1990	Telecontrol equipment and systems Part 5: Transmission protocols - Section 1: Transmission frame formats	EN 60870-5-1	1993
IEC 61000-4-1	2000	Electromagnetic compatibility (EMC) Part 4-1: Testing and measurement techniques - Overview of IEC 61000-4 series	EN 61000-4-1	2000
IEC 61000-4-2	- [1)]	Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995 [2)]
IEC 61000-4-3	- [1)]	Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2002 [2)]
IEC 61000-4-4	1995	Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	1995
IEC 61000-4-5	- [1)]	Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	1995 [2)]
IEC 61000-4-7	1991	Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto	EN 61000-4-7	1993

Publication	Year	Title	EN/HD	Year
IEC 61000-4-8	- [1)]	Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	1993 [2)]
IEC 61000-4-9	- [1)]	Part 4-9: Testing and measurement techniques - Pulse magnetic field immunity test	EN 61000-4-9	1993 [2)]
IEC 61000-4-10	- [1)]	Part 4-10: Testing and measurement techniques - Damped oscillatory magnetic field immunity test	EN 61000-4-10	1993 [2)]
IEC 61000-4-11	- [1)]	Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	1994 [2)]
IEC 61000-4-12	- [1)]	Part 4-12: Testing and measurement techniques - Oscillatory waves immunity test	EN 61000-4-12	1995 [2)]
IEC 61000-4-13	- [1)]	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 [2)]
IEC 61000-4-29	2000	Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests	EN 61000-4-29	2000
IEC 61025	1990	Fault tree analysis (FTA)	HD 617 S1	1992
IEC 61166	1993	High-voltage alternating current circuit-breakers - Guide for seismic qualification of high-voltage alternating current circuit-breakers	EN 61166	1993
IEC/TS 61462	1998	Composite insulators - Hollow insulators for use in outdoor and indoor electrical equipment - Definitions, test methods, acceptance criteria and design recommendations	-	-
IEC 61850-3	- [1)]	Communication networks and systems in substations Part 3: General requirements	EN 61850-3	2002 [2)]
IEC 61850-9-1	- [4)]	Part 9-1: Specific communication system mappings (SCSM) - Serial unidirectional multidrop point to point link	-	-

4) To be published.

Publication	Year	Title	EN/HD	Year
CISPR 11 (mod)	1997	Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55011	1998
A1	1999		A1	1999
EIA RS-485	- [1)]	Standard for electrical characteristics of generators and receivers for use in balanced digital multipoint systems	-	-
-	-	Voltage characteristics of electricity supplied by public distribution systems	EN 50160	1999

CONTENTS

INSTRUMENT TRANSFORMERS –

Part 8: Electronic current transformers

1 Scope

1.1 General

This part of IEC 60044 applies to newly manufactured electronic current transformers having an analogue voltage output or a digital output, for use with electrical measuring instruments and electrical protective devices at nominal frequencies from 15 Hz to 100 Hz.

NOTE Additional requirements due to the bandwidth are considered. The accuracy requirements on harmonics are given in annex D.

Clause 12 covers the accuracy requirements that are necessary for electronic current transformers for use with electrical measuring instruments.

Clause 13 covers the accuracy requirements that are necessary for electronic current transformers for use with electrical protective relays, and particularly for forms of protection in which the prime requirement is to maintain the accuracy up to several times the rated current. If required, the transient accuracy of an electronic current transformer during fault is also given in this clause.

Electronic current transformers intended for both measurement and protection should comply with all the clauses of this standard and are called multipurpose electronic current transformers.

The transformer technology can be based on optical arrangements equipped with electrical components, on air-core coils (with or without a built-in integrator), or on iron-core coils with integrated shunt used as a current-to-voltage converter, alone or equipped with electronic components.

For analogue output, the electronic current transformer may include the secondary signal cable. Examples of electronic current transformer technologies using air-core coils and iron-core coils with integrated shunt are given in annex C.

For digital output, this standard takes into account a point-to-point connection from the electronic transformer to electrical measuring instruments and electrical devices (see annex B).

Some information has been added in order to ensure the compatibility of this point-to-point link with the overall system of communication in the substation, thus allowing data exchange between all kinds of substation devices. This information builds what is called the mapping of the link layer of the point-to-point serial link. Processbus communication is under consideration.

This mapping allows interoperability between devices from different manufacturers.

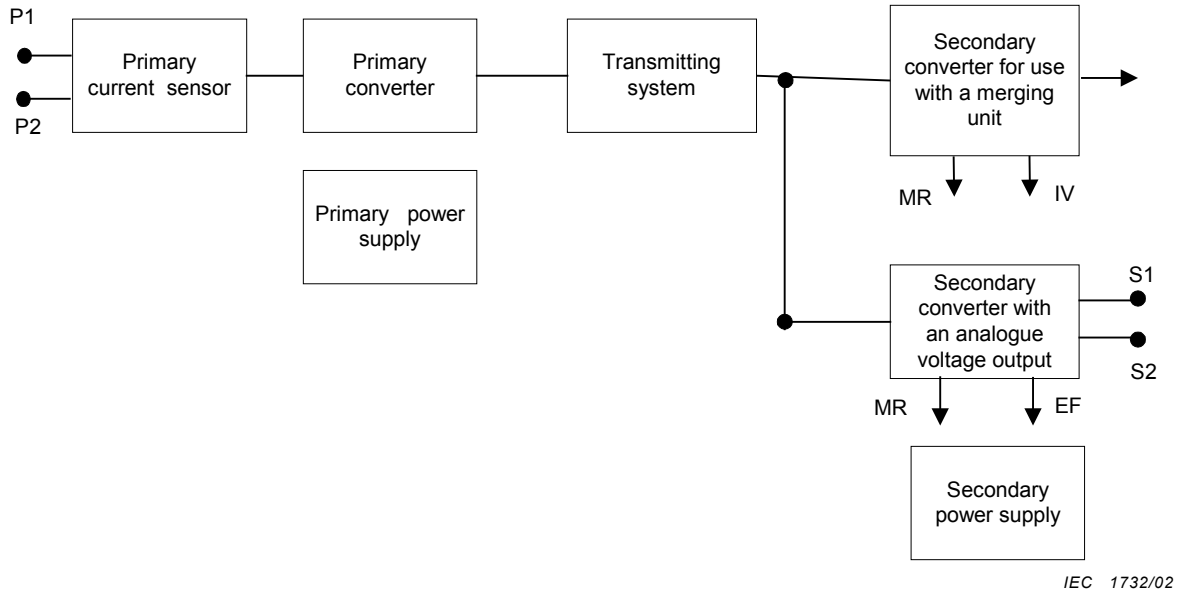
This standard does not specify individual implementations or products, nor does it constrain the implementation of entities and interfaces within a computer system. This standard specifies the externally visible functionality of implementations together with conformance requirements for such functionalities.

NOTE 1 Translation of the analogue requirements on CT and VT into digital parameters, such as the number of bits and the sampling speed, has been carried out as far as was reasonable, since the requirements on the conventional CT and VT are expressed according to the actual technologies used and their shortcomings, rather than on needs from the equipment using the information on current and voltage.

NOTE 2 The approach chosen is to concentrate on what is needed by the secondary equipment and how the performance can be calibrated. The concept is compatible with a processbus.

1.2 General block diagram of electronic current transformers

The applied technology decides which parts are necessary for the realization of an electronic current transformer, i.e. it is not absolutely necessary that all the parts described in figures 1 and 2 be included in the transformer.

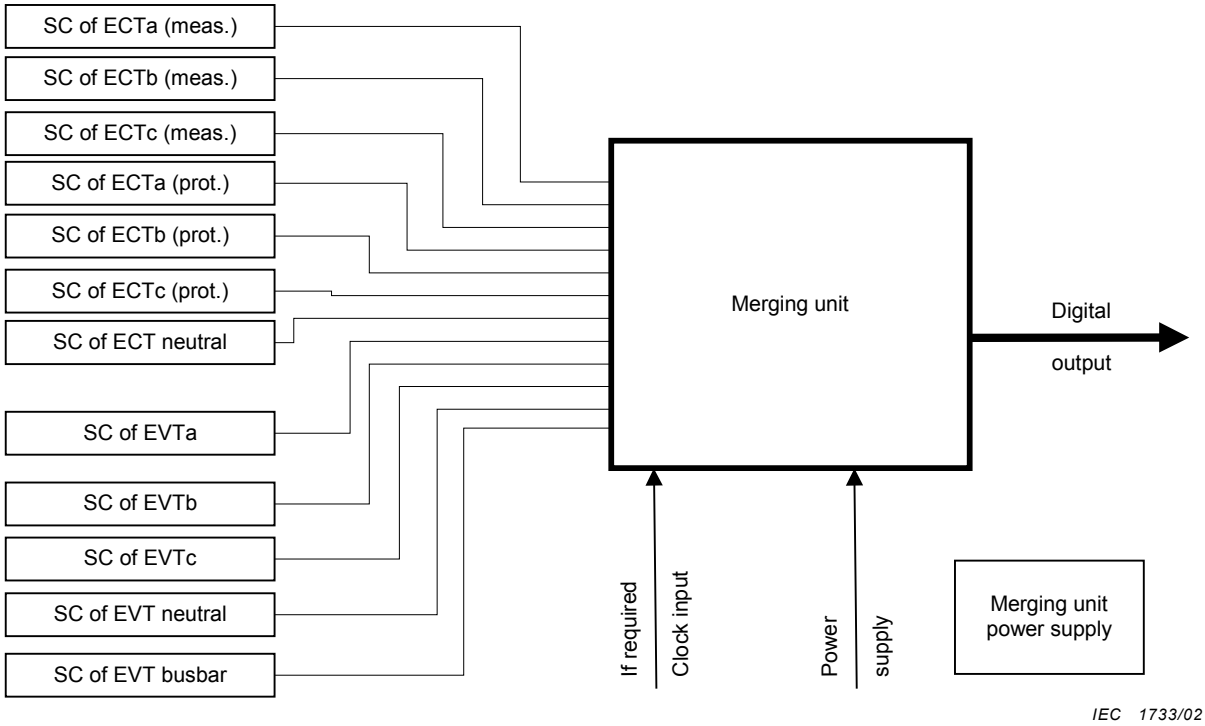


Key

IV Output invalid
EF Equipment failure
MR Maintenance request

Figure 1 – General block diagram of a single-phase electronic current transformer

1.3 General block diagram of electronic transformers with a digital output



NOTE SC of EVTa is the secondary converter of the electronic voltage transformer of phase a (see IEC 60044-7). SC of ECTa is the secondary converter of the electronic current transformer of phase a. Other data channel mappings are possible (see 6.2.3).

Figure 2 – Example of digital interface block diagram

Up to 12 secondary converter data channels are grouped together (merged) using a merging unit (MU). A data channel carries a single stream of sampled measurement values from an electronic current transformer or an electronic voltage transformer (see figure 2). Several data channels may be transmitted via one physical interface from the secondary converter to the merging unit in case of multiphase or combined units. The merging unit supplies the secondary equipment with a time-coherent set of current and voltage samples. A secondary converter can be used also for the acquisition of signals coming from conventional voltage instrument transformers or current instrument transformers and may be integrated into the merging unit.

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 60028:1925, *International standard of resistance for copper*

IEC 60044-1, *Instrument transformers – Part 1: Current transformers*

IEC 60044-6, *Instrument transformers – Part 6: Requirements for protective current transformers for transient performance*

IEC 60044-7: *Instrument transformers – Part 7: Electronic voltage transformers*

IEC 60050(161):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

IEC 60050(321):1986, *International Electrotechnical Vocabulary – Chapter 321: Instrument transformers*

IEC 60050(601):1985, *International Electrotechnical Vocabulary (IEV) – Chapter 601: Generation, transmission and distribution of electricity – Generation*

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

IEC 60056, *High voltage alternating current circuit-breakers*

IEC 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

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

IEC 60068-2-17*: Environmental testing – Part 2: Tests – Test Q: Sealing*

IEC 60068-2-75: *Environmental testing – Part 2: Tests – Test Eh: Hammer test*

IEC 60071-1:1993, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60085:1984, *Thermal evaluation and classification of electrical insulation*

IEC 60121, *Recommendation for commercial annealed aluminium electrical conductor wire*

IEC 60255-5:2000, *Electrical relays – Part 5: Insulation coordination for measuring relays and protection equipment – Requirements and tests*

IEC 60255-22-1:1988, *Electrical relays – Part 22: Electrical disturbance tests for measuring relays and protection equipment – Section 2: Electrostatic discharge tests*

IEC 60296:1982, *Specification for unused mineral insulating oils for transformers and switchgear*

IEC 60304:1982, *Standard colours for insulation for low-frequency cables and wires*

IEC 60376:1971, *Specification and acceptance of new sulphur hexafluoride*

IEC 60376B:1974, *Specification and acceptance of new sulphur hexafluoride – Second supplement – Clause 26*

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

IEC 60480:1974, *Guide to the checking of sulphur hexafluoride (SF6) taken from electrical equipment*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 60664-1:1992, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60694, *Common specifications for high-voltage switchgear and controlgear standards*

IEC 60707:1999, *Flammability of solid non-metallic materials when exposed to flame sources – List of test methods*

IEC 60721-3-3:1994, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weather-protected locations*

IEC 60721-3-4:1995, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: Stationary use at non-weather-protected locations*

IEC 60794 (all parts), *Optical fibre cables*

IEC 60812:1985, *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)*

IEC 60815:1986, *Guide for the selection of insulators in respect of polluted conditions*

IEC 60870-5-1:1990, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section One: Transmission frame formats*

IEC 61000-4-1:2000, *Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – Overview of IEC 61000-4 series*

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

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

IEC 61000-4-4:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test – Basic EMC publication*

IEC 61000-4-5: *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-7:1991, *Electromagnetic compatibility (EMC) – Part 4; Testing and measurement techniques – Section 7: General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*

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

IEC 61000-4-9: *Electromagnetic compatibility (EMC) – Part 4-9: Testing and measurement techniques – Pulse magnetic field immunity test*

IEC 61000-4-10: *Electromagnetic compatibility (EMC) – Part 4-10: Testing and measurement techniques – Damped oscillatory magnetic field immunity test*

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

IEC 61000-4-12: *Electromagnetic compatibility (EMC) – Part 4:12: Testing and measurement techniques – Oscillatory waves immunity test*

IEC 61000-4-13: *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*

IEC 61000-4-29:2000, *Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests*

IEC 61025:1990, *Fault tree analysis (FTA)*

IEC 61166:1993, *High-voltage alternating circuit-breakers – Guide for seismic qualification of high-voltage alternating current*

IEC/TS 61462:1998, *Composite insulators – Hollow insulators for use in outdoor and indoor electrical equipment – Definitions, test methods, acceptance criteria and design recommendations*

IEC 61850-3: *Communication networks and systems in substations – Part 3: General requirements*

IEC 61850-9-1: *Communication networks and systems in substations – Part 9-1: Specific communication system mappings (SCSM) – Serial unidirectional multidrop point-to-point link* [1]

CISPR 11:1999, *Industrial scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

EIA RS-485: *Standard for electrical characteristics of generators and receivers for use in balanced digital multipoint systems*

EN 50160:2000, *Voltage characteristics of electricity supplied by public distribution system*

1 To be published.