

## **Instrument transformers - Part 7: Electronic voltage transformers**

Instrument transformers - Part 7: Electronic voltage transformers

**EESTI STANDARDI EESSÕNA****NATIONAL FOREWORD**

<p>Käesolev Eesti standard EVS-EN 60044-7:2002 sisaldab Euroopa standardi EN 60044-7:2000 ingliskeelset teksti.</p>	<p>This Estonian standard EVS-EN 60044-7:2002 consists of the English text of the European standard EN 60044-7:2000.</p>
<p>Standard on kinnitatud Eesti Standardikeskuse 18.12.2002 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p>	<p>This standard is ratified with the order of Estonian Centre for Standardisation dated 18.12.2002 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p>
<p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on .</p>	<p>Date of Availability of the European standard text .</p>
<p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>The standard is available from Estonian standardisation organisation.</p>

ICS 17.220.20

**Võtmesõnad:** current transformers, marking, rating, requirements, tests**Standardite reprodutseerimis- ja levitamisoigus kuulub Eesti Standardikeskusele**

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English version

**Instrument transformers**  
**Part 7: Electronic voltage transformers**  
(IEC 60044-7:1999)

Transformateurs de mesure  
Partie 7: Transformateurs de  
tension électroniques  
(CEI 60044-7:1999)

Meßwandler  
Teil 7: Elektronische Spannungswandler  
(IEC 60044-7:1999)

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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 38/242/FDIS, future edition 1 of IEC 60044-7, prepared by IEC TC 38, Instrument transformers, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60044-7 on 1999-12-01.

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) 2000-10-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2002-12-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A and ZA are normative and annexes B and C are informative.

Annex ZA has been added by CENELEC.

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### Endorsement notice

The text of the International Standard IEC 60044-7:1999 was approved by CENELEC as a European Standard without any modification.

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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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60038 (mod) 1983		IEC standard voltages <sup>1)</sup>	HD 472 S1	1989
IEC 60044-2 (mod)	1997	Instrument transformers Part 2: Inductive voltage transformers	EN 60044-2	1999
IEC 60050-161	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility	-	-
IEC 60050-321	1986	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 60060-1 + corr. March	1989 1990	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1	1991
IEC 60071-1	1993	Insulation co-ordination Part 1: Definitions, principles and rules	EN 60071-1	1995
IEC 60186 (mod) 1987		Voltage transformers	HD 554 S1 <sup>2)</sup>	1992
IEC 60255-5	1977	Electrical relays Part 5: Insulation tests for electrical relays	-	-
IEC 60255-6 (mod)	1988	Part 6: Measuring relays and protection equipment	EN 60255-6 + corr. February	1994 1995
IEC 60255-11	1979	Part 11: Interruptions to and alternating component (ripple) in d.c. auxiliary energizing quantity of measuring relays	-	-

1) The title of HD 472 S1 is: Nominal voltages for low-voltage public electricity supply systems.

2) HD 554 S1 includes A1:1988 to IEC 60186, mod.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60255-22-1	1988	Part 22: Electrical disturbance tests for measuring relays and protection equipment Section 1: 1 MHz burst disturbance tests	-	-
IEC 60270	1981	Partial discharge measurements	-	-
IEC 60617-1	1985	Graphical symbols for diagrams Part 1: General information, general index, Cross-reference tables	-	-
IEC 60694	1996	Common specifications for high-voltage switchgear and controlgear standards	EN 60694 + corr. May	1996 1999
IEC 60721	series	Classification of environmental conditions	EN 60721 HD 478	series series
IEC 60815	1986	Guide for the selection of insulators in respect of polluted conditions	-	-
IEC 61000-4-1	1992	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 1: Overview of immunity tests	EN 61000-4-1	1994
IEC 61000-4-2	1995	Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995
IEC 61000-4-3 (mod)	1995	Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	1996
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	1995	Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	1995
IEC 61000-4-8	1993	Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	1993
IEC 61000-4-9	1993	Part 4-9: Testing and measurement techniques - Pulse magnetic field immunity test	EN 61000-4-9	1993
IEC 61000-4-10	1993	Part 4-10: Testing and measurement techniques - Damped oscillatory magnetic field immunity test	EN 61000-4-10	1993

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-11	1994	Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	1994
IEC 61000-4-12	1995	Part 4-12: Testing and measurement techniques - Oscillatory waves immunity test - Basic EMC publication	EN 61000-4-12	1995
CISPR 11 (mod)	1997	Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55011	1998
		Electromagnetic compatibility - Generic emission standard Part 2: Industrial environment	EN 50081-2	1993

# INTERNATIONAL STANDARD

IEC  
60044-7

First edition  
1999-12

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## Instrument transformers –

### Part 7: Electronic voltage transformers

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number  
IEC 60044-7:1999(E)



## Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

## Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

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The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

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- **IEC Just Published**

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# INTERNATIONAL STANDARD

**IEC**  
**60044-7**

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1999-12

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## Instrument transformers –

### Part 7: Electronic voltage transformers

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INSTRUMENT TRANSFORMERS –****Part 7: Electronic voltage transformers**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60044-7 has been prepared by IEC technical committee 38: Instrument transformers

The text of this standard is based on the following documents:

FDIS	Report on voting
38/242/FDIS	38/243/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The committee has decided that this publication remains valid until 2002. At this date, in accordance with the committee's decision, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition; or
- amended.

## INSTRUMENT TRANSFORMERS –

### Part 7: Electronic voltage transformers

#### 1 General

##### 1.1 Scope

This part of International Standard IEC 60044 applies to newly manufactured electronic voltage transformers with analogue output, for use with electrical measuring instruments and electrical protective devices at frequencies from 15 Hz to 100 Hz.

NOTE 1 Optical arrangements usually include electronic components and are therefore considered to be within the application of this standard.

NOTE 2 Detailed information is given in annex B.

NOTE 3 Requirements specific to three-phase voltage transformers are not included in this standard but, so far as they are relevant, the requirements in clauses 3 to 11 apply to these transformers and a few references to them are included in those clauses (e.g. see 2.1.5, 5.1.1, 5.2, 11.2.1 and 11.2.2).

##### 1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60044. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60044 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60038:1983, *IEC standard voltages*

IEC 60044-2:1997, *Instrument transformers – Part 2: Inductive voltage transformers*

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

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

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

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

IEC 60060 (all parts), *High-voltage techniques*

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

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

IEC 60186:1987, *Voltage transformers*

IEC 60255-5:1977, *Electrical relays – Part 5: Insulation tests for electrical relays*

IEC 60255-6:1988, *Electrical relays – Part 6: Measuring relays and protection equipment*

IEC 60255-11:1979, *Electrical relays – Part 11: Interruptions to and alternating component (ripple) in d.c. auxiliary energizing quantity of measuring relays*

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

IEC 60270:1981, *Partial discharges measurements*

IEC 60617-1:1985, *Graphical symbols for diagrams – Part 1: General information, general index. Cross-reference tables*

IEC 60694:1996, *Common specifications for high-voltage switchgear and controlgear standards*

IEC 60721 (all parts), *Classification of environmental conditions*

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

IEC 61000 (all parts), *Electromagnetic compatibility (EMC)*

IEC 61000-4-1:1992, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 1: Overview of immunity test. Basic EMC publication*

IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test. Basic EMC publication*

IEC 61000-4-3:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency, electromagnetic 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 61000-4-5:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 5: Surge immunity test*

IEC 61000-4-8:1993, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 8: Power frequency magnetic field immunity test. Basic EMC publication*

IEC 61000-4-9:1993, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 9: Pulse magnetic field immunity test. Basic EMC publication*

IEC 61000-4-10:1993, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 10: Damped oscillatory magnetic field immunity test. Basic EMC publication*

IEC 61000-4-11:1994, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 11: Voltage dips, short interruption and voltage variation immunity test*

IEC 61000-4-12:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 12: Oscillatory waves immunity tests. Basic EMC publication*

CISPR 11 (EN 55011), *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

EN 50081-2:1993, *Electromagnetic compatibility – Generic immunity standard – Part 2: Industrial environment*

### 1.3 General block diagram of electronic voltage transformers

The applied technology decides which parts are necessary for realisation of an electronic voltage transformer, i.e. it is not absolutely essential that all parts described be in the transformer (see figures 1 and 2).

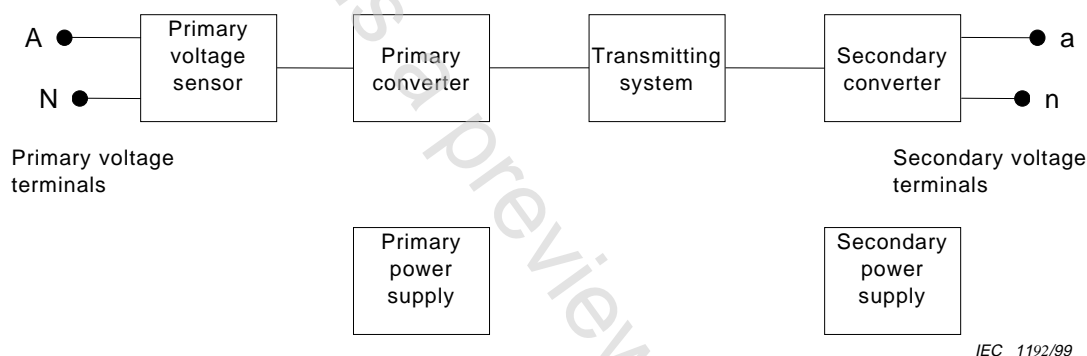


Figure 1 – General block diagram of earthed single-phase electronic voltage transformers

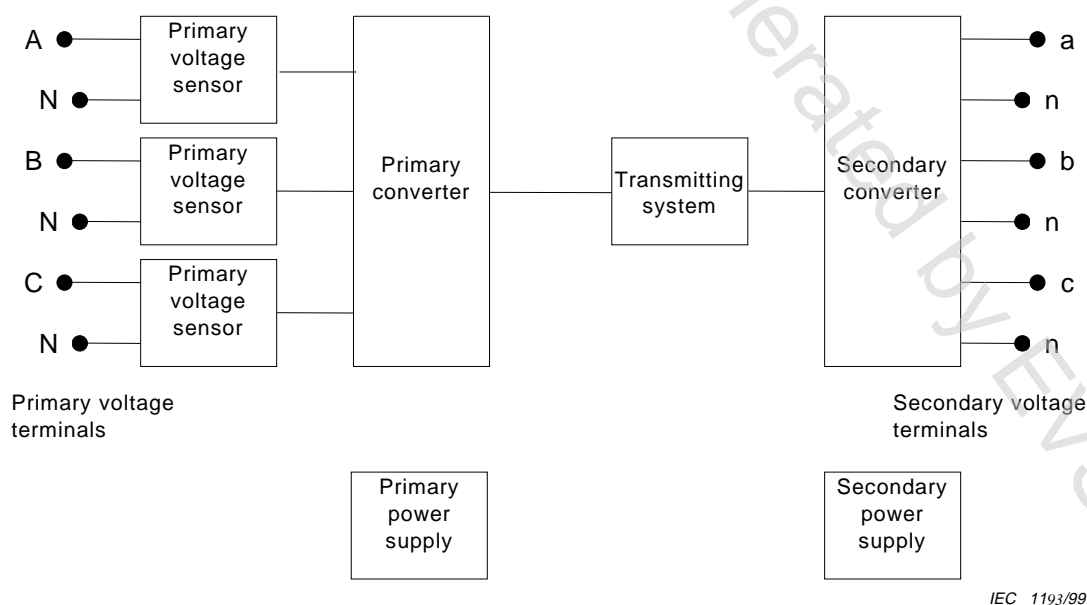


Figure 2 – General block diagram of earthed three-phase electronic voltage transformers