



SLOVENSKI STANDARD
SIST HD 587 S1:2001
01-marec-2001

Instruments transformers - Three-phase voltage transformers for voltage levels having Um up to 52 kV

Instruments transformers - Three-phase voltage transformers for voltage levels having Um up to 52 kV

Meßwandler - Dreiphasige Spannungswandler für Spannungsebenen mit Um bis 52 kV

Transformateurs de mesure - Transformateurs de tension triphasés pour niveaux de tension inférieurs à 52 kV

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Ta slovenski standard je istoveten z: HD 587 S1:1993

ICS:

17.220.20	T ^ b} b Á \ dā} āā { æ} ^c} āā ^ ā ā	Measurement of electrical and magnetic quantities
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SIST HD 587 S1:2001 **en**

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HARMONIZATION DOCUMENT

HD 587 S1

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

September 1993

UDC 621.314.21:621.3.027.4/.7:620.1

Descriptors: Transformer, instrument transformer, voltage transformer,
three-phase transformer, specification, rating, test, marking

ENGLISH VERSION

Instrument transformers - Three-phase voltage
transformers for voltage levels having U_m up to 52 kV

Transformateurs de mesure
Transformateurs de tension
triphasés pour niveaux de
tension avec U_m jusqu'à 52 kV

Messwandler - Dreiphasische
Spannungswandler für
Spannungsniveau U_m bis 52 kV

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This Harmonization Document was approved by CENELEC on 1993-03-09.
CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations
which stipulate the conditions for implementation of this Harmonization Document
on a national level.

Up-to-date lists and bibliographical references concerning national implementation
may be obtained on application to the Central Secretariat or to any CENELEC member.

This Harmonization Document exists in three official versions (English, French,
German).

CENELEC members are the national electrotechnical committees of Austria, Belgium,
Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg,
Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

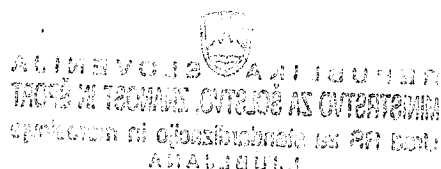
CENELEC

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

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

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Ref. No. HD 587 S1:1993 E



Foreword

During the harmonization work on HD 554 S1 (IEC 186:1987 + A1:1988, modified), it was noted that in a number of countries three-phase voltage transformers, which are not covered by said Harmonization Document are in use.

It was decided to draft a standard for said equipment as its use in several countries required standardization. The draft was prepared by BTTF 56-3 following the structure of HD 554 S1 and making reference to it whenever possible.

The text of the draft was submitted to the Unique Acceptance Procedure (UAP) in June 1992 and was approved by CENELEC as HD 587 S1 on 9 March 1993.

The following dates were fixed:

- latest date of announcement
of the HD at national level (doa) 1993-09-01
- latest date of publication of
a harmonized national standard (dop) 1994-03-01
- latest date of withdrawal of
conflicting national standards (dow) 1994-03-01

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CHAPTER I: GENERAL REQUIREMENTS APPLICABLE TO ALL THREE-PHASE VOLTAGE TRANSFORMERS

SECTION ONE - GENERAL

1 Scope

This document specifies the requirements and tests for new three-phase voltage transformers with U_m up to 52 kV and frequencies from 15 Hz to 100 Hz, for use with electrical instruments or electrical protective devices.

NOTE: Single-phase voltage transformers connected in a three-phase bank are not covered in this document.

2 General

2.1 Normative references

This Harmonization Document is based on IEC 186:1987 + A1:1988, as endorsed with modifications by HD 554 S1. It refers to said HD as indicated in the following clauses.

2.2 General requirements

Clause 2 of HD 554 S1 applies.

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3 Service conditions

Clause 3 of HD 554 S1 applies. <https://standards.iteh.ai/catalog/standards/sist/34540222-eab8-4751-9681-8ac0af7b97e9/sist-hd-587-s1-2001>

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4 Definitions

Clause 4 of HD 554 S1 is applicable with the following additions:

4.28 Three-phase voltage transformer

A voltage transformer which has three line-to-neutral primary windings the neutral point of which can be earthed or unearthed and one or more sets of three line-to-neutral secondary windings which can be connected for three-phase operation or residual voltage operation.

4.29 Rated output of a three-phase voltage transformer

The per phase value of the apparent power (in volt-amperes at a specified power factor) that a three-phase voltage transformer is intended to supply to the secondary circuit, at the rated secondary voltage and with rated per-phase burden connected to it.

SECTION TWO - RATING AND PERFORMANCE REQUIREMENTS APPLICABLE TO ALL THREE-PHASE VOLTAGE TRANSFORMERS

5 Standard values of rated voltage

5.1 *Rated primary voltages*

The standard values of rated line-to-line primary voltage of three-phase voltage transformers shall be one of the values of nominal system voltage designated by IEC 38:1983.

NOTE: The performance of a voltage transformer as a measuring or protection transformer is based on the rated primary voltage, whereas the rated insulation level is based on one value of the highest voltages for equipment of IEC 71.

5.2 *Rated secondary voltages*

The rated line-to-line secondary voltage shall be chosen according to practice at the location where the transformer is to be used. The values given below are considered standard values for three-phase voltage transformers:

100 V and 110V;
200 V, for extended secondary circuits.

NOTE: Whenever possible, the rated transformation ratio should be of a simple value. If one of the following values: 10 - 12 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 80 and their decimal multiples is used for the rated transformation ratio together with one of the rated secondary voltages of this subclause, the majority of the standard values of nominal system voltage of IEC 83 will be covered.

5.3 *Rated secondary voltages for residual windings*

The rated secondary voltages of windings intended to be connected in broken-delta with similar windings to produce a residual voltage are given in SECTION FIFTEEN of this document.

6 Standard values of rated output

The standard values of rated output at a power factor of 0,8 lagging, expressed in volt-amperes, are:

10 - 15 - 25 - 30 - 50 - 75 - 100 - 150 - 200 VA

The values underlined are preferred values.

NOTE: For a given transformer, provided one of the values of rated output is standard and associated with a standard accuracy class, the declaration of other rated outputs, which may be non-standard values but associated with other standard accuracy classes, is not precluded.

7 Standard values of rated voltage factor

Clause 7 of HD 554 S1 applies.

8 Limits of temperature rise

Unless otherwise specified below the temperature rise of a voltage transformer at the specified voltage, at the rated frequency and at the rated burden or at the highest burden, if there are several rated burdens, at any power factor between 0,8 lagging and unity, shall not exceed the appropriate value given in table II of HD 554 S1.

The voltage to be applied to the transformer shall be in accordance with item a), b), or c) below as appropriate:

- a) All three-phase transformers, irrespective of voltage factor (VF) and time rating, shall be capable of operating continuously with a balanced three-phase voltage of 1,2 times rated primary voltage. The steady state temperature rise shall not exceed the limits given in table II of HD 554 S1.
- b) Three-phase earthed transformers having a voltage factor of 1,5 for 30 s or 1,9 for 30 s shall after the application of 1,2 times rated primary voltage for sufficient time to reach stable thermal conditions, be capable of operating with a balanced three-phase voltage of respectively 0,866 or 1,1 times the rated primary voltage applied for 30 s, one line terminal of the primary winding being connected to the neutral of that winding. The temperature rise shall not exceed by more than 10 K the value specified in table II of HD 554 S1.
- c) Three-phase earthed transformers having a voltage factor of 1,9 for 8 h shall after the application of 1,2 times rated primary voltage for a time sufficient to reach stable thermal conditions, be capable of operating with a balanced three-phase voltage of 1,1 times rated line-to-line voltage applied for 8 h, one line terminal of the primary winding being connected to the neutral point of that winding. The temperature rise shall not exceed by more than 10 K the value specified in table II of HD 554 S1.

Table II of HD 554 S1 as well as the text and the notes, except a), b) and c) above, apply.

9 Insulation requirements

9.1 Rated insulation levels, primary windings

The rated insulation level shall be one of those given in table III A of HD 554 S1.

9.2 Other requirements for primary winding insulation

9.2.1 Power-frequency withstand voltage

Subclause 9.2.1 of HD 554 S1 applies.

9.2.2 Power-frequency withstand voltage for earthed terminal

Subclause 9.2.2 of HD 554 S1 applies.

9.2.3 Partial discharges

Partial discharge requirements are applicable to three-phase voltage transformers with solid insulation having $U_m \geq 7,2$ kV. The partial discharge level shall not exceed the limits specified in table IV A, at the partial discharge test voltages specified in the same table after prestressing according to the procedures of clause 17.

Table IV A: Permissible partial discharge levels for various neutral earthing systems and test voltages

Type of network earthing	Type of voltage transformer	Single-phase partial discharge test voltage	Permissible partial discharge level pC
Neutral with an effectively earthed neutral VF ≤ 1,5	Earthed transformer	$1,2 U_m \sqrt{3}$	20
		U_m	50
	Unearthed transformer	$1,2 U_m \sqrt{3}$	20
		U_m	50
Neutral with an isolated or a resonant earthed neutral VF > 1,5	Earthed transformer	$1,2 U_m \sqrt{3}$	20
		$1,2 U_m$	50
	Unearthed transformer	$1,2 U_m \sqrt{3}$	20
		$1,2 U_m$	50

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9.2.4 Chopped lightning-impulse

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Subclause 9.2.4 of HD 554 S1 applies.
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9.3 Between-section insulation requirements

Subclause 9.3 of HD 554 S1 applies.

9.4 Insulation requirements for secondary windings

Subclause 9.4 of HD 554 S1 applies.

9.5 Creepage distance

Subclause 9.5 of HD 554 S1 applies.

9.6 Altitude

Subclause 9.6 of HD 554 S1 applies.

9 a Short-circuit withstand capability

The voltage transformer shall be designed and constructed to withstand without damage, when energized at rated voltage, the mechanical and thermal effects of an external three-phase short-circuit for the duration of 1 s.