

Railway applications - Fixed installations - Traction transformers

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 50329:2003 sisaldab Euroopa standardi EN 50329:2003 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 08.05.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 50329:2003 consists of the English text of the European standard EN 50329:2003.</p> <p>This document is endorsed on 08.05.2003 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: This European Standard covers specific characteristics of traction transformers as defined in 1.3.1, used in traction substation or along the track for the supply of power to a.c. and d.c. traction systems or to provide power to auxiliary services. Traction transformers are either - single-phase traction transformers, - single-, three- or poly-phase rectifier-transformers or converter/inverter-transformers for d.c. or a.c. contact line, - single phase auto-transformers for traction power supply, - single- or three-phase auxiliary transformers at traction supply voltage.</p>	<p>Scope: This European Standard covers specific characteristics of traction transformers as defined in 1.3.1, used in traction substation or along the track for the supply of power to a.c. and d.c. traction systems or to provide power to auxiliary services. Traction transformers are either - single-phase traction transformers, - single-, three- or poly-phase rectifier-transformers or converter/inverter-transformers for d.c. or a.c. contact line, - single phase auto-transformers for traction power supply, - single- or three-phase auxiliary transformers at traction supply voltage.</p>
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ICS 29.180, 29.280

Võtmesõnad:

EUROPEAN STANDARD

EN 50329

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2003

ICS 29.180; 29.280

Supersedes HD 591 S1:1993 and EN 60146-1-3:1993 (partly)

English version

**Railway applications –
Fixed installations –
Traction transformers**

Applications ferroviaires –
Installations fixes –
Transformateurs de traction

Bahnanwendungen –
Ortsfeste Anlagen –
Bahn-Transformatoren

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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

This European Standard was prepared by SC 9XC, Electric supply and earthing systems for public transport equipment and ancillary apparatus (fixed installations), of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50329 on 2002-05-01.

This European Standard supersedes HD 591 S1:1993 and, for the transformers mentioned in the scope of this EN 50329, EN 60146-1-3:1993.

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) 2003-09-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-05-01

Annexes designated “normative” are part of the body of the standard.

Annexes designated “informative” are given for information only.

In this standard, Annexes B and C are normative and Annexes A, D, E and F are informative.

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Introduction

HD 591 S1 was prepared jointly by SC 9XC and TC 14 to face specific aspects of the transformers used in fixed installations of traction systems, which differ from other transformers. In effect transformer standards are mainly dealing with three-phase transformers or single-phase units assembled to a three-phase bank.

Application of such standards to single- or bi-phase transformers as used in traction systems is not evident.

Moreover, EN 61378-1 deals with converter transformers for industrial use which have loading characteristics different from traction transformers for converters.

Therefore HD 591 S1 and this document were set up to clarify such particular aspects.

HD 591 S1 was studied in early '90 and published in 1993 and experienced during the period 1993 to 1997. Then, having decided to convert the HD into an EN, the opportunity was taken to revise the document to introduce the improvements that have been found suitable during this trial period.

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1 General

1.1 Scope

This European Standard covers specific characteristics of traction transformers as defined in 1.3.1, used in traction substation or along the track for the supply of power to a.c. and d.c. traction systems or to provide power to auxiliary services. Traction transformers are either

- single-phase traction transformers,
- single-, three- or poly-phase rectifier-transformers or converter/inverter-transformers for d.c. or a.c. contact line,
- single phase auto-transformers for traction power supply,
- single- or three-phase auxiliary transformers at traction supply voltage.

Transformers feeding a.c. contact lines are covered by EN 60076. Dry-type transformers are covered by HD 464. These standards are valid with the additional requirements given in this document.

For transformers feeding contact lines through static converters EN 61378-1 may assist, but modified or additional requirements are given in this document.

NOTE Transformers mounted on-board traction vehicles are covered by EN 60310 and are excluded from the scope of this document.

Electromagnetic compatibility is ruled by EN 60076-1 which states that a transformer may be considered a passive element in this respect.

Some accessories however are subject to EMC requirements and shall comply with EN 50121-5.

1.2 Normative references

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.

EN 50121-5	2000	Railway applications - Electromagnetic compatibility Part 5: Emission and immunity of fixed power supply installations and apparatus
EN 50122-1	1997	Railway applications - Fixed installations Part 1: Protective provisions relating to electrical safety and earthing
EN 50124-1	2001	Railway applications - Insulation coordination Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment
EN 50125-2	2002	Railway applications - Environmental conditions for equipment Part 2: Fixed electrical installations
EN 50152-1	1997	Railway applications - Fixed installations - Particular requirements for a.c. switchgear Part 1: Single-phase circuit-breakers with Um above 1 kV
EN 50163	1995	Railway applications - Supply voltages of traction systems
EN 50327	2003	Railway applications - Fixed installations - Harmonisation of the rated values for converter groups and tests on converter groups
EN 50328	2003	Railway applications - Fixed installations - Electronic power converters for substations
EN 60076-1 + A11	1997 1997	Power transformers - Part 1: General (IEC 60076-1:1993, mod.)
EN 60076-2	1997	Power transformers - Part 2: Temperature rise (IEC 60076-2:1993, mod.)

EN 60076-3	2001	Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air (IEC 60076-3:2000 + corrigendum December 2000)
EN 60076-5	2000	Power transformers - Part 5: Ability to withstand short circuit (IEC 60076-5:2000)
EN 61000-2-12	- ¹⁾	Electromagnetic Compatibility (EMC) Part 2-12: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public medium-voltage power supply systems
EN 61378-1	1998	Convertor transformers - Part 1: Transformers for industrial applications (IEC 61378-1:1997)
HD 428.4 S1	1994	Three phase oil-immersed distribution transformers 50 Hz, from 50 to 2 500 kVA with highest voltage for equipment not exceeding 36 kV Part 4: Determination of the power rating of a transformer loaded with non-sinusoidal currents
HD 464 S1	1988	Dry-type power transformers (IEC 60726:1982 + A1:1986, mod.)
+ A2	1991	
+ A3	1992	
+ A4	1995	
HD 538.3 S1	1997	Three-phase dry-type distribution transformers 50 Hz, from 100 to 2 500 kVA, with highest voltage for equipment not exceeding 36 kV Part 3: Determination of the power rating of a transformer loaded with non-sinusoidal current
IEC 60354	1991	Loading guide for oil-immersed power transformers
IEC 60905	1987	Loading guide for dry-type power transformers

1.3 Definitions

For the purpose of this European Standard, the terms and definitions given in EN 60076-1 and EN 50328 and the following apply.

NOTE Figure 1 and Figure 2 of EN 50327 give a graphic orientation among various quantities.

1.3.1

traction transformer

transformer (with separate or auto-connected windings) connected to an a.c. or d.c. contact line, directly or through a converter, used in fixed installations of railway applications

NOTE The above definition relates to the contents of this standard and is introduced to simplify the following definitions, which, in most cases, are not valid for all transformers and autotransformers.

1.3.1.1

traction converter transformer

traction transformer on the supply side of a converter group and supplying contact line(s) through static converter(s)

1.3.1.2

traction inverter transformer

traction transformer on the traction (contact) line side of a converter group and supplied by a static converter(s) (inverter)

1.3.1.3

directly-coupled traction transformer

traction transformer supplying contact line(s) without the interposition of static converter(s)

¹⁾ To be published.