SLOVENSKI STANDARD
SIST EN 50152-1:2013

01-januar-2013

Nadomešča:
SIST EN 50152-1:2008

Železniške naprave - Stabilne naprave električne vleke - Posebne zahteve za stikalne naprave za izmenični tok - 1. del: Tokovni odklopniki za nazivno napetost nad 1 kV

Railway applications - Fixed installations - Particular requirements for alternating current switchgear - Part 1: Circuit-breakers with nominal voltage above 1 kV

Bahnanwendungen - Ortsfeste Anlagen - Besondere Anforderungen an Wechselstrom-Schalteinrichtungen - Teil 1: Leistungsschalter mit einer Nennspannung größer als 1 kV

Applications ferroviaires - Installations fixes - Spécifications particulières pour appareillage à courant alternatif - Partie 1: Disjoncteurs de tension nominale supérieure à 1 kV

Ta slovenski standard je istoveten z: **EN 50152-1:2012**

ICS:

29.130.99	Druge stikalne in krmilne naprave	Other switchgear and controlgear
29.280	Električna vlečna oprema	Electric traction equipment

SIST EN 50152-1:2013 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50152-1

November 2012

ICS 29.120.40; 29.280

Supersedes EN 50152-1:2007

English version

Railway applications - Fixed installations - Particular requirements for alternating current switchgear - Part 1: Circuit-breakers with nominal voltage above 1 kV

Applications ferroviaires - Installations fixes - Spécifications particulières pour appareillage à courant alternatif - Partie 1: Disjoncteurs de tension nominale supérieure à 1 kV

Bahnanwendungen - Ortsfeste Anlagen – Besondere Anforderungen an Wechselstrom-Schalteinrichtungen – Teil 1: Leistungsschalter mit einer Nennspannung größer als 1 kV

This European Standard was approved by CENELEC on 2012-10-15. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 50152-1:2012 E

Contents

Tables

Foreword

This document (EN 50152-1:2012) has been prepared by CLC/SC 9XC "Electric supply and earthing systems for public transport equipment and ancillary apparatus (Fixed installations)".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2013-10-15
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2015-10-15

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 50152-1:2007.

EN 50152-1:2012 includes the following significant technical changes with respect to EN 50152-1:2007:

This standard was revised to reflect the latest versions of standards referenced and to remove text already included in the EN 62271 series. The scope was extended to include single-phase and two-phase circuit breakers. Definitions were added to provide the necessary precision and to meet the needs of railway applications. Table 1 was reworked according to the changes of EN 50124-1:2001, Table A.2 and Table B.1. Standard values of transient recovery voltage have been taken from different tables to one, Table 2. Ratings of mechanical endurance previously given under the clause 'type tests' were moved to the new Table 4 'Mechanical endurance classes'. Standard values of prospective transient recovery voltage have been taken from different tables to one, Table 5. Table 6 'Coordination table of rated values for circuit-breakers' of the previous version was removed.

EN 50152 series under the generic title *Railway applications — Fixed installations — Particular requirements for alternating current switchgear* is divided as follows:

- *Part 1: Circuit-breakers with nominal voltage above 1 kV*;
- *Part 2: Disconnectors, earthing switches and switches with nominal voltage above 1 kV*;
- *Part 3-1: Measurement, control and protection devices for specific use in a.c. traction systems — Application guide*;
- *Part 3-2: Measurement, control and protection devices for specific use in a.c. traction systems — Single-phase current transformers*;
- *Part 3-3: Measurement, control and protection devices for specific use in a.c. traction systems — Single-phase inductive voltage transformers*.

Introduction

This standard needs to be read in conjunction with EN 62271-1:2008 and EN 62271-100:2009.

Where a particular clause of EN 62271-100 is not mentioned in this standard, that clause applies as far as reasonable. Where requirements relate exclusively to three-phase systems or to voltages outside those in use in traction systems, they are not applicable. Where this standard states "addition" or "replacement", the relevant text of EN 62271-100 needs to be adapted accordingly.

The numbering of clauses in EN 62271 series is not used in this European Standard. The numbering in square brackets refers to the numbering of clauses in EN 62271.

Where terms defined in EN 62271-1 and EN 62271-100 conflict with definitions of the same terms as given in IEC 60050-811:1991 or of the other railway applications documents listed in the normative references, the definitions in EN 62271-1 and EN 62271-100 need to be used.

NOTE The suffix N which appears in this standard for rated values is not present in EN 62271-1 and EN 62271-100.

References in subclauses of EN 62271-1 and EN 62271-100 need to be replaced by references to applicable subclauses in this standard as far as reasonably possible.

1 Scope

This EN 50152-1 is applicable to single-pole and two-pole alternating current (a.c.) circuit-breakers which are:

— for indoor or outdoor fixed installations in tractions systems, and

— operated with an a.c. line voltage and frequency as specified in EN 50163.

NOTE 1 EN 50163 specifies the a.c. traction systems 15 kV 16,7 Hz and 25 kV 50 Hz.

NOTE 2 As rails of a.c. traction systems are connected to earth and included in the return current path all phase to earth voltages will be within the tolerances as specified in EN 50163. Nevertheless phase to phase voltages are sometimes higher e.g. in autotransformer systems.

This European Standard is also applicable to the operating devices of circuit-breakers and to their auxiliary equipment.

This European Standard does not address circuit-breakers with dependent manual operating mechanism.

NOTE 3 It is impossible to specify a rated short-circuit making current for these circuit-breakers and it is likely that such dependent manual operation is not meeting safety considerations.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50121-5, *Railway applications — Electromagnetic compatibility — Part 5: Emission and immunity of fixed power supply installations and apparatus*

EN 50124-1:2001, *Railway applications — Insulation coordination — Part 1: Basic requirements — Clearances and creepage distances for all electrical and electronic equipment*

EN 50152-2:2012, *Railway applications — Fixed installations — Particular requirements for alternating current switchgear — Part 2: Disconnectors, earthing switches and switches with nominal voltage above 1 kV*

EN 50163:2004, *Railway applications — Supply voltages of traction systems*

EN 62271-1:2008, *High-voltage switchgear and controlgear — Part 1: Common specifications (IEC 62271-1:2007)*

EN 62271-100:2009, *High-voltage switchgear and controlgear — Part 100: Alternating-current circuit-breakers (IEC 62271-100:2008)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 62271-1:2008, EN 62271-100:2009 and the following apply.

3.1
single-pole circuit-breaker
circuit-breaker with one electrically separated conducting path for the main circuit suitable for use in a single-phase circuit

3.2
two-pole circuit-breaker
circuit-breaker with two independent electrically separated conducting paths for the main circuit

Note 1 to entry: The two paths may be connected in series for use in a single-phase circuit where the establishment and the separation of the two paths is simultaneous.

3.3
nominal voltage
U_n
suitable approximate voltage value used to designate or identify a given supply system

[SOURCE: EN 50124-1:2001, 1.3.2.1]

Note 1 to entry: This value is also assigned to the circuit-breaker to show its usability in the supply system.

Note 2 to entry: An AT-System which is supplied with 2 phases, having a phase shift of 180° between them, is commonly named 2 x U_n according to the U_n supplied to the catenary system.

3.4
rated voltage
U_{Ne}
value of voltage assigned by the manufacturer to the equipment or part of it and to which operating and performance characteristics are referred

[SOURCE: EN 50124-1:2001, 1.3.2.3, modified]

Note 1 to entry: This value is also used to determine its dielectric characteristics and will be used instead of the rated insulation voltage (U_{Nm}) as defined and used in EN 50124-1.

Note 2 to entry: The abbreviation U_r is not used for railway circuit-breakers.

3.5
Over Voltage category
OV
classification of the circuit protection against internal and external overvoltages

3.6
Pollution Degree
PD
classification of the pollution to be considered due to the micro climate

3.7
index of definitions
same as in 3.8 of EN 62271-100:2009, but amended according to the definitions above

4 Service conditions

Clause 2 of EN 62271-1:2008 is applicable with the following additions:

- the minimum ambient air temperature under normal service conditions for indoor circuit-breakers shall be -5 °C;

- for special service conditions, agreement shall be made between purchaser and supplier. EN 50125-2 should be taken as guidance for the selection of appropriate classifications.

NOTE The altitude reference of EN 50124-1 (up to 2 000 m) applies to insulation coordination only and is not considered in this standard.

5 Rating

5.1 General

Clause 4 of EN 62271-100:2009 is applicable except as noted in 5.2 – 5.14 below:

5.2 Nominal voltage (U_n)

The standard values of nominal voltage U_n are 15 kV and 25 kV as listed in Table 1 of EN 50163:2004.

5.3 Rated voltage (U_{Ne})

Subclause 4.1 of EN 62271-1:2008 is replaced by the following:

The rated voltage U_{Ne} shall be chosen taking into consideration the maximum voltage level suitable to be permanently applied to the circuit-breaker (i.e. highest permanent voltage U_{max1} as defined in EN 50163:2004).

The value of U_{Ne} shall be used whenever EN 62271-1 or EN 62271-100:2009 reference to U_r unless another value is named explicitly.

NOTE 1 The insulation characteristics determined by applying U_{max1} are expected to be suitable to allow the highest non-permanent voltage U_{max2} taken from EN 50163.

NOTE 2 The rated voltage for fixed installations in railway applications is a phase to earth value.

5.4 Insulation coordination

5.4.1 General

Insulation coordination shall be conducted according to EN 50124-1, e.g. selection of values for Over Voltage category (OV) and Pollution Degree (PD).

The rated voltage U_{Ne} shall be used when EN 50124-1 refers to the rated insulation voltage U_{Nm}.

The definition of the four overvoltage categories shall be as in EN 50124-1:2001, 2.2.2.1

The definition of the seven pollution degrees shall be as in EN 50124-1:2001, 2.5 and Table A.4

5.4.2 Rated insulation level [4.2]

Subclause 4.2 of EN 62271-1:2008 is applicable except as follows:

The value of the rated impulse withstand voltage U_{Ni} and of the power-frequency withstand voltage U_d shall be as given in Table 1, taken from the values listed in EN 50124-1:2001.

Table 1 — Nominal voltages (U_n), rated impulse voltages (U_{Ni}) and short-duration power-frequency withstand voltage (U_d) for circuits connected to the contact line

U_n kV	U_{Ne} kV	OV	U_{Ni} kV	U_d kV
15	17,25	3 [a]	95	38
		4	125	50
	17,25 [b]	3 [a]	145	70
		4	170	70
25	27,5	3	170	70
		4	200	95
	27,5 [b]	3	200	95
		4	250	95

NOTE The rated short-duration power-frequency withstand voltage is represented by U_d as used in EN 62271-1:2008 not by U_a as used in EN 50124-1. U_a is used in EN 62271-1:2008 for the rated auxiliary voltage.

a Not commonly used.

b For higher requirements on insulation system
This is common practice in some countries with larger number of installations at altitude up to 2 000 m without additionally applying an altitude correction factor.

In special cases isolation may be requested across the open breaking contacts. In this case values shall be selected from EN 50152-2:2012, Table 1.

All test voltages for dielectric tests on the main circuit shall be taken from Table 1.

5.5 Rated frequency [4.3]

Subclause 4.3 of EN 62271-1:2008 is replaced by the following:

The standard values of the rated frequency shall be 16,7 Hz and 50 Hz as listed in Table 1 of EN 50163:2004.

5.6 Rated supply voltage of closing and opening devices and of auxiliary and control circuits (U_a) [4.8]

Subclause 4.8 of EN 62271-1:2008 is applicable with the following addition.

The relative tolerance as specified in 4.8.3 of EN 62271-1:2008 does not apply to a.c. power supplies fed from a transformer connected to the traction line voltage. This tolerance shall be agreed upon between purchaser and supplier.

NOTE In this case the relative tolerance of 4.8.3 of EN 62271-1:2008 will not be sufficient due to the high fluctuation of the traction line voltage.

5.7 Rated short-circuit breaking current (I_{SC}) [4.101]

Subclause 4.101 of EN 62271-100:2009 is applicable except as follows:

The transient recovery voltage shall equal to the value specified in 5.8 of this standard.

The reference in paragraph b) shall be to 5.13 of this standard.

Only the standard value of 45 ms for the d.c. time constants is used for railway applications.