



SLOVENSKI STANDARD
SIST EN 50123-3:1998

01-november-1998

Railway applications - Fixed installations - D.C. switchgear - Part 3: Indoor d.c. disconnectors and switch-disconnectors

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Bahnanwendungen - Ortsfeste Anlagen - Gleichstromschalteinrichtungen -- Teil 3: Gleichstrom-Trennschalter und -Lastenschalter für Innenräume

Applications ferroviaires - Installations fixes - Appareillages de coupure en courant continu (CC) -- Partie 3: Sectionneurs pour l'intérieur et interrupteurs sectionneurs

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Ta slovenski standard je istoveten z: EN 50123-3:1995

ICS:

29.130.99	Druge stikalne in krmilne naprave	Other switchgear and controlgear
29.280	Ò\ dã } æ\ ^ } æ\] ^ { æ	Electric traction equipment

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EUROPEAN STANDARD
 NORME EUROPÉENNE
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EN 50123-3

May 1995

ICS 29.160.60; 45.020

Descriptors: Railway fixed equipment, electric traction, d.c., switch-disconnector, performance evaluation, equipment specification, temperature rise, electric endurance test, fatigue test, heating test, dielectric strength test, information

English version

Railway applications
Fixed installations - D.C. switchgear
Part 3: Indoor d.c. disconnectors and switch-disconnectors

Applications ferroviaires
 Installations fixes
 Appareillage à courant continu
 Partie 3: Sectionneurs pour l'intérieur
 et interrupteurs sectionneurs

Bahnanwendungen
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 Gleichstrom-Schaltanlagen
 Teil 3: Gleichstrom-Trennschalter
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat 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 Central Secretariat has the same status as the official versions.

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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 Unique Acceptance Procedure and was approved by CENELEC as EN 50123-3 on 1994-12-06.

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) 1995-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1995-12-01

This part 3 is to be used in conjunction with EN 50123-1:1995, Railway applications - Fixed installations - D.C. switchgear - Part 1: General.

Annexes designated "informative" are given for information only. In this standard, annex A is informative.

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1 SCOPE

This Part of EN 50123 specifies requirements for d.c. disconnectors, switch-disconnectors and earthing switches for use in indoor stationary installations of traction systems.

NOTE 1: EN 50123-6 specifies requirements for d.c. switchgear assemblies.

NOTE 2: EN 50121-5 specifies requirements for electromagnetic compatibility (EMC).

NOTE 3: EN 50126 specifies requirements for dependability.

NOTE 4: In this document the word "unit" means "disconnector and/or switch-disconnector and/or earthing switch" as defined in 3.1.3, 3.1.4 and 3.1.5 of EN 50123-1:1995.

NOTE 5: Disconnectors, switch-disconnectors and earthing switches may have electrically latched mechanism and, in such a case, may be indicated with the current term of "power contactors".

2 NORMATIVE REFERENCES

For the purposes of this standard, the normative references given in EN 50123-1:1995 apply.

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3 DEFINITIONS

For the purposes of this standard, the definitions given in EN 50123-1:1995 apply.

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4 SERVICE CONDITIONS

Where service conditions differ from those defined as "normal" in clause 4 and annex B of EN 50123-1:1995, the purchaser shall state this fact in the tender specification. Where a unit is suitable for use in service conditions different from those defined as "normal" in clause 4 and annex B of EN 50123-1:1995, the manufacturer shall state this fact.

5 CHARACTERISTICS OF THE UNIT

5.1 Enumeration of the characteristics

The characteristics of the unit and its assigned designations and values (where applicable) are as follows:

- type of unit (5.2);
- rated values (5.3);
- class of use (5.4);
- auxiliary circuits (5.5).

5.2 Type of unit

A unit shall be defined by the following details (where applicable):

- number of poles;
- number of positions (if there are more than two);
- provision of an enclosure;
- degree of protection provided by the enclosure (see EN 60529).

5.3 Rated values

5.3.1 General

Requirements for the rated characteristics shall be stated by the purchaser as far as the rating for voltages (5.3.2) and minimum acceptable values for rating for currents (5.3.3).

These values shall be confirmed by the manufacturer, who shall indicate the limit values for the type of unit proposed, and shall be complemented with other data.

All these values are to be stipulated in accordance with 5.3.2 to 5.3.4, but it is not necessary to specify all the listed rated values.

5.3.2 Voltages iTeh STANDARD PREVIEW

A unit is defined by the following rated voltages:

a) Nominal voltage (U_n)

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See EN 50163.

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b) System voltages and limits

See 3.2.1 of EN 50123-1:1995.

c) Rated voltage (U_{Ne})

See 3.2.3 and 5.1.3 of EN 50123-1:1995.

d) Rated insulation voltage (U_{Nm})

See 3.2.2 of EN 50123-1:1995.

It shall be equal to or higher than U_{max} .

e) Rated impulse withstand voltage (U_{Ni})

See 3.2.4 of EN 50123-1:1995.

f) Power-frequency voltage withstand level

See 3.2.5 of EN 50123-1:1995.

The value, derived from EN 50124-1, is considered for a test in dry conditions, provided that units are used indoors.

5.3.3 Currents

A unit is defined by the following rated currents:

a) Rated conventional thermal current (I_{th} I_{the})

See 3.2.8 and 3.2.9 of EN 50123-1:1995.

b) Rated service current (I_{Ne})

See 3.2.10 of EN 50123-1:1995.

c) Rated breaking and making capacities

See 3.2.18 and 3.2.22 of EN 50123-1:1995.

Switch-disconnectors and those disconnectors for which the manufacturer declares a making capacity, shall be able to make the stated prospective current at a voltage U equal to $1,2 U_{Ne}$.

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A rated breaking capacity requires the unit to be able to interrupt any current of a value lower than or equal to this rated breaking capacity.

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d) Rated short-time withstand current (I_{Ncw})

See 3.2.11 of EN 50123-1:1995.

5.4 Class of use

Disconnectors shall close and open at no-load except if otherwise declared by the manufacturer.

Switch-disconnectors shall close and open on-load, including highly inductive loads.

Both devices have either electrically latched or mechanically latched mechanisms.

The minimum breaking, making and short-time withstand currents of the switch-disconnectors shall be at least those given in table 1 for the appropriate category of switch-disconnector.

Table 1 - Categories of switch-disconnectors

CATEGORY	CAPACITIES (with $t_c = 10$ ms)		SHORT-TIME WITHSTAND CURRENT	
	MAKING	BREAKING	CURRENT	DURATION
I	I_{Ne}	I_{Ne}	I_{Nss}	250 ms
II	$3 I_{Ne}$	$3 I_{Ne}$	I_{Nss}	250 ms
III	I_{Nss}	$3 I_{Ne}$	I_{Nss}	250 ms
IV	I_{Nss}	0	I_{Nss}	250 ms

The above categories may correspond to the following conditions:

NOTE: A typical application of the above categories is the following:

Category I: Switch-disconnector in series with the feeder, suitable to make and break rated current only.

Category II: Switch-disconnector as in I, but suitable for making and breaking the train starting current.

Category III: Switch-disconnector as in II, but suitable to make under short-circuit. It could be used in place of a rectifier or interconnecting circuit breaker (R or I).

Category IV: Switch-disconnector suitable to be used for test or safety purposes as short-circuiting or earthing switch. It could also be used in place of R or I circuit breakers.

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5.5 Control circuits

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The control circuits are identified by the following:

- the rated voltage of the control circuits;
- the kind of current (d.c. or a.c.);
- the current frequency, in case of a.c.

The rated voltage of the supply source and its frequency are the values on which the performance, the thermal behaviour and the insulation characteristics are based.

NOTE: Supply voltage means the actual voltage measured at the terminals of the unit control circuit when carrying the operating current. The control circuit is taken to include the auxiliary resistors and any accessory (e.g. rectifiers), supplied by the manufacturer or indicated by the manufacturer as essential for the correct operation of the unit.

The rated voltage and the insulation characteristics shall be in accordance with EN 50124-1.

The supply voltage shall remain within 80% and 110% of the rated voltage according with 5.2 of EN 50123-1:1995.

When the control voltage is the same as in the main circuit, the same variations as in the main circuit apply.

The manufacturer shall indicate the value(s) of the current drawn by the control circuits at the rated voltage. In case of control circuits which draw current intermittently, the duration of the current flow shall be given.

5.6 Auxiliary contacts and circuits

Auxiliary circuits are mainly defined by the number of contacts provided, their rating (thermal current and voltage) and by their characteristics (NO or NC or commutation). Unless otherwise required, the rated voltage shall be in accordance with 5.2 of EN 50123-1:1995, the rated insulation voltage according to EN 50124-1 and the purchaser shall specify the minimum number of auxiliary contacts required.

The auxiliary wiring connected to a circuit at 1000 V a.c. or 1500 V d.c. or above shall be physically separated from those connected to a circuit at a voltage below said limits.

For other characteristics of the auxiliary circuits, the requirements of 5.5 apply.

6 CONSTRUCTION

6.1 General

6.1.1 Materials

No materials containing asbestos shall be used in the construction of the switchgear.

NOTE: Special attention is to be paid to the ability of the material used to resist moisture and fire: materials used should be of the self extinguishing type, such that the risk of propagation of fire from one cubicle to another is minimized. See EN 50123-1:1995, annex B.

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All like plant and apparatus, supplied by a manufacturer for a given use and with the same characteristics, shall be interchangeable as a whole and also as regards its parts.

All apparatus and connections for the safe and satisfactory operation, control and protection of the equipment concerned, shall be provided whether or not specifically mentioned. The equipment shall be earthed, insulated, screened or enclosed as may be appropriate to ensure the protection of the equipment and safety of those concerned in its operation and maintenance.

Control and auxiliary circuits and contacts shall comply with the requirements of 5.2 of EN 50123-1:1995.

6.1.2 Arcing contacts

Arcing contacts, if any, which are liable to be consumed during arc interruption shall be easy to replace.

6.1.3 Clearances and creepage distances

Clearances and creepage distances shall not be lower than those indicated in EN 50124-1.

NOTE: Clearance and creepage distances may be increased to take into account the presence of foreign substances after the number of operations, in normal and short-circuit conditions, occurring during the normal life-span between cleaning procedures.

Where applicable, ribs shall be provided in order to break the continuity of conducting deposit which occur during operation.

6.1.4 Primary connections

The units shall be equipped with fixed, removable (bolted or clamped) or plug-in coupling.

6.1.5 Location of the primary connections

In case of non-withdrawable units, the terminals for the primary connections shall be easily accessible with the unit as in normal operating conditions. Their position shall be agreed between purchaser and supplier, unless covered by an European Standard.

In case of withdrawable units, the terminals for the primary connections shall be easily accessible either with the unit withdrawn or with the unit as in normal operating conditions.

6.1.6 Earthing terminal

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The frames, the structure and the fixed parts of the metallic enclosures shall be connected to each other and to a suitable earthing terminal, placed in an accessible position, in order to allow earthing.

NOTE 1: This condition may be fulfilled by normal construction elements, ensuring an adequate electric continuity.

In case of withdrawable units the earth connection shall be made before the shutters are opened and the shutters shall be closed before the earth connection is disconnected.

NOTE 2: The purchaser may require a dedicated earth connections for these purposes. In case of non-dedicated earth connections, for any bolts or similar fixing used for earth continuity the maintenance instructions shall state the requirements to clean surfaces and ensure tightness.

The earthing terminal shall be suitably protected against corrosion. The standard earth symbol shall be adequately and permanently marked.

6.1.7 Manual operation means

All units shall be provided with a manual closing handle for service, emergency and/or maintenance use as indicated in 6.6.1.

6.2 Unit enclosures

Unit enclosures shall conform to EN 50123-6.

6.3 Temperature rises

6.3.1 Limits

The temperature shall not rise by more than the values given in clause 6 of EN 50123-1:1995.

6.3.2 Main circuit

The main circuit of a unit, including all electrically connected parts, shall withstand to the rated conventional free-air or enclosed thermal current (I_{th} or I_{the}). It shall also comply with the overcurrent load cycle which may be specified by the purchaser, see 3.2.10 of EN 50123-1:1995.

6.3.3 Control circuit

The control circuit, as well as the control devices, used for the opening and closing operations of a unit shall not exceed the rated temperature rises, during their operation.

6.3.4 Auxiliary circuits

The auxiliary circuits, as well as the auxiliary devices, shall withstand to their conventional thermal current (for switching devices) or their rated service current (for other equipment), without exceeding the rated temperature rises.

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6.4 Dielectric strength

Dielectric strength shall conform to the values stipulated in EN 50124-1.

6.5 Mechanical and electric endurance

The unit shall be capable of carrying out the following number of operations when tested in accordance with 7.3.2 and 7.3.3 of EN 50123-1:1995:

- a) for checking of mechanical endurance, without current in the main circuit, the following operating cycles shall be performed:
 - 1) dependent manually operated units only: 100 operating cycles;
 - 2) units used in place of rectifier circuit breakers (R) or interconnecting circuit breaker (I): 4 000 operating cycles;
 - 3) units used in place of line circuit breaker (L): 20 000 operating cycles;
 - 4) other units: as stated by the manufacturer;
- b) for checking of electrical endurance, with the rated conventional thermal current in the main circuit, the following operating cycles shall be performed:
 - 1) switch-disconnectors: minimum 50 operating cycles;
 - 2) disconnectors: as stated by the manufacturer.

NOTE: Each operating cycle consists of a closing operation followed by an opening operation.