



# SLOVENSKI STANDARD SIST EN 50123-3:2003

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

**STANDARD PREVIEW**

Bahnanwendungen - Ortsfeste Anlagen - Gleichstrom-Schaltanlagen -- Teil 3: Gleichstrom-Trennschalter und Lasttrennschalter und Erdungsschalter für Innenräume

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Applications ferroviaires - Installations fixes - Appareillages à courant continu -- Partie 3: Interrupteurs-sectionneurs, sectionneurs et sectionneurs de terre pour l'intérieur

**Ta slovenski standard je istoveten z: EN 50123-3:2003**

**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

**EN 50123-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2003

ICS 29.160.60; 45.020

Supersedes EN 50123-3:1995

English version

**Railway applications –  
Fixed installations – D.C. switchgear  
Part 3: Indoor d.c. disconnectors, switch-disconnectors  
and earthing switches**

Applications ferroviaires –  
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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 the 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 CENLEC as EN 50123-3 on 2002-09-01.

This European Standard supersedes EN 50123-3:1995 + corrigendum September 1996. It has been prepared taking into account IEC 61992-3 in order to align technically as much as possible this EN 50123-3 and IEC 61992-3. These documents are to be considered as technically equivalent except for those references and peculiarities which are due to the European standardisation in the railway application field.

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) 2005-09-01

This Part 3 is to be used in conjunction with EN 50123-1:2003.

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 fixed installations of traction systems.

NOTE 1 Switchgear assemblies, electromagnetic compatibility (EMC) and dependability are not covered in this part of EN 50123, but rather by other parts of this standard or other documents as indicated in EN 50123-1.

NOTE 2 In this standard the word "unit" means "disconnector and/or switch-disconnector and/or earthing switch" as defined in 3.1.4, 3.1.5 and 3.1.6 of EN 50123-1.

NOTE 3 Disconnectors, switch-disconnectors and earthing switches may have electrically latched mechanisms and, in such cases, may be indicated with the current term of "power contactors".

## 2 Normative references

This European Standard incorporates by dated or undated references, 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).

See EN 50123-1:2003,

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## 3 Definitions

For the purposes of this European Standard, the terms and definitions given in EN 50123-1 apply.

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## 4 Service requirements

Environmental conditions applicable to the equipment discussed in this standard are covered in 4.1 of EN 50123-1.

## 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 covered as follows:

- type of unit (5.2);
- rated values (5.3);
- class of use (5.4);
- control circuits (5.5);
- auxiliary circuits (5.6).

## 5.2 Type of unit

A unit shall be defined by the following details as applicable:

- whether the unit is a switch-disconnector, disconnector, earthing switch or a combination of these types;
- number of poles;
- number of positions (if there are more than two);
- provision of an enclosure;
- degree of protection provided by the enclosure (see 3.3.29 of EN 50123-1).

## 5.3 Rated values

### 5.3.1 General

The rated characteristic values shall be specified by the purchaser. Nominal voltage values shall be selected from the values indicated in Table 1 in EN 50123-1; current values should have one of the preferred values in 5.1.2 of EN 50123-1.

These values shall be confirmed by the manufacturer, who shall indicate the rated 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.

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### 5.3.2 Voltages

A unit is defined by the following voltages:

- nominal voltage  $U_n$  (see EN 50163);
- system voltages and limits (see 3.2.1 and 5.1.3 of EN 50123-1);
- rated voltage  $U_{Ne}$  (see 3.2.3 of EN 50123-1);
- rated insulation voltage  $U_{Nm}$  (see 3.2.2 of EN 50123-1). It shall be equal to or higher than  $U_{max}$ ;
- rated impulse withstand voltage  $U_{Ni}$  (see 3.2.4 of EN 50123-1);
- power-frequency voltage withstand level  $U_a$  (see 3.2.5 of EN 50123-1);
- rated auxiliary and control supply voltages (see 3.2.3.1 of EN 50123-1).

### 5.3.3 Currents

A unit is defined by the following currents:

- conventional thermal current  $I_{th}$   $I_{the}$  (see 3.2.8 and 3.2.9 of EN 50123-1);

NOTE 1 Earthing switches are not required to be assigned this rating.

- rated service current  $I_{Ne}$  (see 3.2.10 of EN 50123-1);

NOTE 2 Earthing switches are not required to be assigned this rating.

- rated breaking and making capacities (see 3.2.18 and 3.2.22 of EN 50123-1);
  - 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  $1,2 U_{Ne}$ .
  - 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.
- rated short-time withstand current  $I_{Ncw}$  (see 3.2.11 of EN 50123-1).

NOTE 3 Rated short-time currents  $I_{Ncw}$  need not have the same value as the rated short-circuit current  $I_{Nss}$ .

- Overload capability: the purchaser shall inform the supplier of the load cycle requirements (see 3.2.10, note 2, of EN 50123-1).

#### 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 units shall be at least those in Table 1 for the appropriate category.



Table 1 - Categories of units

Category	Capacities (with $t_c \geq 0,01$ s)		Short-time withstand current	
	Making	Breaking	Current	Duration
I	0	0	$I_{Ncw}/I_{Ncwe}$	0,25 s
II	0	$I_{Ne}$	$I_{Ncw}$	0,25 s
III	$I_{Ne}$	$I_{Ne}$	$I_{Ncw}$	0,25 s
IV	$3 I_{Ne}$	$3 I_{Ne}$	$I_{Ncw}$	0,25 s
V	$I_{Nss}$	0	$I_{Ncw}/I_{Ncwe}$	0,25 s
VI	$I_{Nss}$	$3 I_{Ne}$	$I_{Ncw}$	0,25 s

NOTE 1 Unless otherwise specified  $I_{Nss}$  has the same rating as  $I_{Ncw}$  or, for earthing switches,  $I_{Ncwe}$ .

NOTE 2 A typical application of the above categories is the following:

- Category I: Disconnecter and earthing switch used in locations where the purchaser has taken all precautions to inhibit making on to a fault current.
- Category II: Switch-disconnector required for breaking load current only.
- Category III: Switch-disconnector in series with the feeder, required for making and breaking the rated current only.
- Category IV: Switch-disconnector as in III, but required for making and breaking the train starting current.
- Category V: Disconnecter and earthing switch used in locations where the possibility exists of an inadvertent make on to a fault current.
- Category VI: Switch-disconnector as in IV, but required for making on to a fault current.

NOTE 3 For definition of  $t_c$  see 3.2.15 of EN 50123-1.

NOTE 4 For earthing switches, refer to 8.3.4.3 of EN 50123-6 to establish the value of  $I_{Ncwe}$  which shall be 10 kA sustained as a minimum.

## 5.5 Control circuits

The control circuits are identified by the following:

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

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

Unless otherwise required, the voltage shall be in accordance with 5.2 of EN 50123-1 and the rated insulation voltage shall be in accordance with EN 50124-1.

The supply voltage shall be within a range between 80 % and 110 % of the specified voltage according with 5.2 of EN 50123-1.

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 specified 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, NC or commutation). Unless otherwise required, the rated voltage shall be in accordance with 5.2 of EN 50123-1, and the rated insulation voltage shall be in accordance with EN 50124-1.

The purchaser shall specify the minimum number of auxiliary contacts required.

The auxiliary wiring connected to a circuit at 1 000 V a.c. or 1 500 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.

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## 6 Construction (standards.iteh.ai)

### 6.1 General

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All apparatus and connections required 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 the 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.

#### 6.1.1 Materials

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

NOTE Special attention should be paid to the ability of the material used to resist moisture and fire: materials used should be of the self-extinguishing type, so that the risk of propagation of fire from one cubicle to another is minimised (see Annex B of EN 50123-1).

#### 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 Table 1 of EN 50123-1 and Annex D of EN 50123-1 respectively.

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 occurs 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

For non-withdrawable units, the terminals for the primary connections shall be accessible with the unit as in its normal operating position.

For withdrawable units, the terminals for the primary connections shall be accessible in the conditions detailed in EN 50123-6.

### 6.1.6 Earthing terminal

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.

For 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 connection for this purpose. For non-dedicated earth connection, any bolt or similar fixing used for earth continuity, the maintenance instructions should state the requirements for cleaning the surfaces and ensuring tightness.

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

The earth terminal shall be capable of carrying the rated earth fault current  $I_{Ncwe}$  for 0,25 s (see 8.3.4.3 of EN 50123-6).

### 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.