



SLOVENSKI STANDARD SIST EN 50123-4:1999

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Railway applications - Fixed installation - D.C. switchgear - Part 4: Outdoor d.c. in-line switch-disconnectors, disconnectors and d.c. earthing switches

Railway applications - Fixed installations - D.C. switchgear -- Part 4: Outdoor d.c. in-line switch-disconnectors, disconnectors and d.c. earthing switches

Bahnanwendungen - Ortsfeste Anlagen - Gleichstrom-Schaltanlagen -- Teil 4: Freiluft-Gleichstrom-Lasttrennschalter, -Trennschalter und -Gleichstrom-Erdungsschalter

Applications ferroviaires - Installations fixes - Appareillage à courant continu -- Partie 4: Interrupteurs-sectionneurs, sectionneurs et sectionneurs de mise à la terre pour l'extérieur

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**Railway applications - Fixed installations - D.C. switchgear
Part 4: Outdoor d.c. in-line switch-disconnectors, disconnectors and
d.c. earthing switches**

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CENELEC

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

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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 50123-4 on 1998-08-01.

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) 1999-10-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 1999-10-01

This part 4 is to be used in conjunction with EN 50123-1:1995, Railway applications - Fixed installations - D.C. switchgear - Part 1: General.

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex A is normative and annex B is informative.

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1 Scope

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

NOTE 1: EN 50121-5 specifies requirements for electromagnetic compatibility (EMC).

NOTE 2: EN 50126 specifies requirements for dependability.

NOTE 3: In this document the word "unit" means " switch-disconnector and/or disconnector and/or earthing switch" as defined in 3.1.3, 3.1.4 and 3.1.5 of EN 50123-1:1995.

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 (including amendments).

The normative references given in EN 50123-1:1995 apply with the following additions:

EN 50123-2	1995	Railway applications - Fixed installations - D.C. switchgear Part 2: D.C. circuit breakers https://standards.iteh.ai/catalog/standards/sist/4b3809ac-37a8-4201-aeac-a3a158486991/sist-en-50123-4-1999
EN 50123-6	1998	Railway applications - Fixed installations - D.C. switchgear Part 6: D.C. switchgear assemblies
EN 50125	series	Railway Applications - Environmental conditions for equipment
EN 60129	1994	Alternating current disconnectors and earthing switches (IEC 60129:1986)
EN 60529	1991	Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)
EN 60694	1996	Common specifications for high-voltage switchgear and controlgear standards (IEC 60694:1996)
HD 588.1 S1	1991	High voltage test techniques - Part 1: General definitions and test requirements (IEC 60060-1:1989)

3 Definitions

The definitions given in EN 50123-1:1995 apply.

4 Service conditions

The equipment covered in this document is mainly intended for outdoor installations. The requirements given for outdoor equipment in EN 50125-2 or in 2.1.2 of EN 60694 shall be used. In this European Standard the pollution degree (PD) 4A (see EN 50124-1) is considered as normal condition. Where service conditions and environmental class differ from those defined in the above standards, require to be specified or a particular environmental class is required, the purchaser shall state this fact in the tender specification. The supplier shall confirm that the unit is suitable for the service conditions specified.

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

A unit is defined by the following rated voltages:

a) Nominal voltage (U_n)

See 3.2.1.1 of EN 50123-1, EN 50163 and attached table 1.

Table 1: Nominal voltages (U_n), rated impulse voltages (U_{Ni}) and power-frequency a.c. voltage withstand levels (wet and dry) (U_a) for circuits connected to the contact line

U_n [kV]	$U_{Nm} \leq$ [kV]	<i>OV</i>	$U_{Ni} A$ 1,2/50 μ s [kV]	$U_{Ni} B$ 1,2/50 μ s [kV]	$U_a A$ [kV]	$U_a B$ [kV]
0,6	0,9	3	6	7,2	3,3	4
		4	8	9,6	4,3	5,2
0,75	1,2	<u>3</u>	<u>8</u>	<u>9,6</u>	<u>4,3</u>	<u>5,2</u>
		4	12	14,4	6,5	7,8
	1,6	3	10	12	5,5	6,5
		4	15	18	8,5	10
1,5	2,3	3	12	14,4	6,5	7,8
		4	18	21,6	10	12
<u>3</u>	<u>4,8</u>	<u>3</u>	<u>15</u>	<u>18</u>	<u>8,5</u>	<u>10</u>
		4	20	24	11	12
<u>3</u>	<u>4,8</u>	<u>3</u>	<u>25</u>	<u>30</u>	<u>12</u>	<u>15</u>
		4	40	48	20	24

U_{Ni} : Figures are derived from table A.2 of EN 50124-1. Underlined type figures for preferred values
 U_a : Figures are derived from table B.1 of EN 50124-1.
A: To earth and between poles.
B: Across the isolating distance (not applicable to earthing switches).
OV3 - OV4: Overvoltage categories for equipment directly connected to the contact line. The choice depends on the risk of overvoltages (see 2.2.2.1 of EN 50124-1).
 U_{Ni} : Can be chosen higher than the figures stated above to cope with the insulation level of the contact line (see 6.3.1.2 of EN 50124-1).
OV3: Recommended for inherently protected situations like tunnels or urban transportation systems.
OV4: Recommended for other cases.

NOTE: Guidance on wet test procedure is given in HD 588.1 S1. The rated impulse voltages are meant also for design purposes; test requirements and applicability are given in 8.3.3.2.

b) System voltages and limits

See 3.2.1 of EN 50123-1:1995 and attached table 1.

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 and attached table 1.

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 and attached table 1.

f) Power-frequency voltage withstand level (dry) (U_a)

See 3.2.5 of EN 50123-1:1995 and attached table 1.

The value, derived from EN 50124-1, is considered for a test in dry conditions, even though the units are used outdoors.

g) Power-frequency voltage withstand level (wet) (U_a)

Where outdoor units can be subjected to rain, then a wet test shall be performed. The value of the test voltage shall be the same as for dry test unless otherwise agreed between purchaser and supplier.

NOTE: Guidance in performing the power-frequency wet test is given in HD 588.1 S1.

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.

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

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b) Rated service current (I_{Ne})

See 3.2.10 of EN 50123-1:1995.

c) Rated breaking and making capacity

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 $1,2 U_{Ne}$. 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.

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

See 3.2.11 of EN 50123-1:1995.

5.4 Class of use

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

The minimum breaking, making and short-time withstand currents of the units shall be at least those given in table 2 for the appropriate category.

Table 2: Categories of units

Category	Capacities (with $t_c = 10$ ms)		Short-time withstand current	
	Making	Breaking	Current	Duration
I	0	0	I_{Ncw}	250 ms
II	0	I_{Ne}	I_{Ncw}	250 ms
III	I_{Ne}	I_{Ne}	I_{Ncw}	250 ms
IV	$3I_{Ne}$	$3I_{Ne}$	I_{Ncw}	250 ms
V	I_{Nss}	0	I_{Ncw}	250 ms
VI	I_{Nss}	$3I_{Ne}$	I_{Ncw}	250 ms

NOTE 1: Unless otherwise specified, I_{Nss} has the same rating as I_{Ncw} .

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

- Category I: Earthing switches and disconnectors used in locations where the purchaser has taken all precautions to inhibit making on to a fault current.
- Category II: Switch-disconnector suitable to break the rated service current only.
- Category III: Switch-disconnector in series with the feeder, suitable for making and breaking the rated service current only.
- Category IV: Switch-disconnector as in III, but suitable for making and breaking e.g. the train starting current.
- Category V: Earthing switches and disconnectors used in locations where the possibility of an inadvertent make on to a fault current exists.
- Category VI: Where a switch-disconnector is subject to very high duties, then a Category VI may be required, which has the same requirements as in Category IV, except for the making capacity which is as per Category V.

NOTE 3: For definition of t_c , see EN 50123-1, subclause 3.2.15.

5.5 Control circuits

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.

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 in accordance with subclause 5.2 of EN 50123-1:1995.

When the control voltage is the same supply as 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 in accordance with 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 circuits at a voltage below these limits.

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

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6 Construction

6.1 General

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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.

6.2 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 is minimised. See EN 50123-1:1995, annex B.

6.3 Arcing contacts

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