SLOVENSKI STANDARD
SIST EN 50123-7-2:1999

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Railway applications - Fixed installation - D.C. switchgear - Part 7: Mesurement, control and protection devices for specific use in d.c. traction systems - Section 2: Isolating current transducers and other current measuring devices

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Bahnanwendungen - Ortsfeste Anlagen - Gleichstrom-Schalteinrichtungen -- Teil 7: Meß -, Steuer- und Schutzeinrichtungen in Gleichstrom-Bahnanlagen -- Hauptabschnitt 2: Stromwandler und andere Meßeinrichtungen

Applications ferroviaires - Installations fixes - Appareillage à courant continu -- Partie 7: Appareils de mesure, de commande et de protection pour utilisation spécifique dans les systèmes de traction à courant continu -- Section 2: Transducteurs et autres appareils de mesure du courant

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Railway applications - Fixed installations - D.C. switchgear Part 7: Measurement, control and protection devices for specific use in d.c. traction systems Section 2: Isolating current transducers and other current measuring devices

Applications ferroviaires - Installations fixes - Accessoires à courant continu
Partie 7: Dispositifs de mesurage, de commande et de protection pour usage spécifique dans les systèmes de traction à courant continu
Section 2: Transducteurs de courant d'isolement et autres dispositifs de mesurage de courant

Bahnanwendungen - Ortsfeste Anlagen Gleichstrom-Schalteinrichtungen
Teil 7: Meß-, Steuer- und Schutzeinrichtungen in Gleichstrom-Bahnanlagen
Hauptabschnitt 2: Stromwandler und andere Meßeinrichtungen

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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

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Foreword

This European Standard was prepared by SC9XC, 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 50123-7-2 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 7 is divided into sections to cover an application guide and a number of protecting devices with specific features for d.c. railway applications.

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Introduction

EN 50123-7 is divided in a number of sections as follows:

Section 1: Application guide
Section 2: Isolating current transducers and other current measuring devices
Section 3: Isolating voltage transducers and other voltage measuring devices

This number of sections is subject to future additions as soon as a protection device is considered suitable for standard requirements.

Section 1 is a guide and its content is informative.

Further sections are normative and apply with respect to equipment falling within the scope of that section.

1 Scope

EN 50123-7-2 gives the requirements for isolating current transducers and other current measuring devices used in d.c. railway applications, fixed installations.

This transducer is normally positioned between the sensor on the live switchboard conductor or rail and the secondary device, giving galvanic insulation between the input and the output.

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).

EN 50121-5	199X	Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus
EN 50123-1	1995	Railway applications - Fixed installations - D.C. switchgear - Part 1: General
ENV 50123-7-1	1998	Railway applications - Fixed installations - D.C. switchgear Part 7: Measurement, control and protection devices for specific use in d.c. traction systems -- Section 1: Application guide
EN 50124-1	199X	Railway applications - Insulation co-ordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment

3 Definitions

The definitions given in clause 3 of EN 50123-1:1995 and in 3.3 of ENV 50123-7-1 apply.

4 Service conditions

Where the equipment described in this standard is mounted on devices or in assemblies covered by the EN 50123 series of standards, the service conditions of the devices or assemblies apply. The normal service conditions are given in EN 50123-1:1995, annex B.

5 Characteristics

5.1 Electrical characteristics

5.1.1 General

The isolation transducer has an insulation level between its primary and secondary terminals, the same as that of the main circuit.

An isolation transducer shall have an insulation level in accordance with the following table 1.

Table 1: Insulation level

U_n kV	U_{Nm} kV	U_{Ni} A kV	U_{Ni} B kV	U_a (A) kV	U_a (B) kV	*Clearance* A mm	*Clearance* B mm
0,6	0,9	6	7,2	3,3	4	10	12
0,75	1,2	8	9,6	4,3	5,2	14	17
0,75	1,6	10	12	5,5	6,5	18	20
1,5	2,3	12	14,4	6,5	7,8	22	26
1,5	3	15	18	8,5	10	27	33
3	4,8	25	30	12	15	45	54

A: to earth between primary and secondary and against other circuits
B: across the isolating distance if applicable.
The above values are taken assuming that the overvoltage category 3 and PD4 as defined in EN 50124-1 are used.

Transducers shall be suitable for providing inputs to measuring devices and/or protection devices. The output impedance, accuracy, linearity of response and phase shift between the input and the output shall be compatible with its designated application.

The purchaser shall indicate whether the transducer is to be used for measurement purposes or for protection or both. He shall also indicate the accuracy range desired.

The sensor(s) for the current transducers shall be of one of the types described in ENV 50123-7-1, clause 3. It may be of a design suitable for temporary insertion or permanent connection onto live primary circuit conductors.

The frequency range shall be from d.c. to a minimum of 1 kHz.

A current transducer shall operate correctly up its continuous thermal current (I_{th}), which shall be at the maximum ambient temperature, at two times the specified main or primary circuit thermal current and shall be able to withstand I_{Ncw} of the main or primary circuit for the time specified. Rated accuracy, within specified tolerances, shall apply within the range from 0 to 1,2 I_{th}, for measuring transducers and in the range from 0 to 2 I_{th} for protection transducers. Performance requirements different from these shall be by agreement between the supplier and the purchaser.

NOTE: Attention should be paid to EMC emissions and susceptibility in locating the sensor.

The preferred secondary signal (specified by the purchaser in accordance with 5.2.4 of ENV 50123-7-1) may either be a voltage in the range from 0 V to 10 V or a current in the range from 0 mA to 20 mA (e.g. 0 mA to 20 mA, 4 mA to 20 mA or 0 mA to 10 mA).

When the transducer uses an auxiliary power supply, means shall be provided to indicate that the power supply is not available. If the principle of operation of the transducer is electronic, then self-checking means shall be provided. The need for this requirement depends on the duty of the transducer and will be specified by the purchaser.

Attention shall be paid to provide adequate protection of the transducer and associated circuits against overloads and short circuits. Care shall be taken that inductive circuits can alter the inherent *di/dt* response.

5.1.2 Isolating transducer requirements

The following requirements characterise the isolating transducer:

a) Rated input voltage (V);
b) Rated insulation voltage (V);
c) Input signal at 100 % signal (mV);
d) Input impedance at 100 % signal (Ω);
e) Output signal at 100 % signal (mA or mV or V);
f) Output impedance at 100 % signal (Ω);
g) Accuracy range at 100 % signal (%);
h) Accuracy (±%);
i) Upper limit of response frequency (kHz);
j) Power frequency withstand (60 s) (kV);
k) Impulse withstand voltage (if applicable) (kV_{cr});
l) Power consumption (W);
m) Auxiliary voltage (V).
n) Loss of auxiliary power signal *
o) Electronic circuitry self checking *

* Requirement to be specified by the purchaser

5.1.3 d.c. shunt requirements

The following requirements characterise the shunt:

a) Normal current rating (A);
b) Rated insulation voltage *) (V);
c) Output signal at I_{th} (V);
d) Accuracy range based on I_{th} (%);
e) Accuracy (± %);
f) Rated short-time withstand current I_{Ncw} (A);
g) Upper limit of response frequency (kHz);
h) Overload capability ;
i) Ambient temperature to which rating refers (°C).

*) Refers to insulation mounting, if any.

5.1.4 Hall effect sensor requirements

The same as for an isolation transducer with the addition of:

p) Number of Hall effect devices.

5.2 Mechanical characteristics

The enclosure of the transducer may be metal enclosed, or of insulating material. Both may have earthed metal mounting feet.

Mechanical stress caused by the operation of other devices within the switchgear or adjacent to the transducer shall not cause damage or loss of accuracy to the transducer.

Transducers intended for location near live conductors shall be provided with an insulated enclosure, unless alternative arrangements are agreed with the purchaser.

6 Information to be exchanged between purchaser and supplier

The supplier shall, when practicable, fulfil the requirements specified in 5.1.2, 5.1.3 and 5.1.4 as far as they are applicable, and the purchaser shall confirm or complement these requirements as necessary.

If requested the following information shall be provided by the supplier in addition to the requirements specified above:

a) Insulation levels of the circuits;
b) Short time withstand current of the primary circuit (I_{Ncw} in kA);
c) Overload capability (current and time);
d) Linearity range and tolerances;
e) Thermal deviation of the secondary signal expressed per °C;
f) *di/dt* correctly followed in A/µs;