



SLOVENSKI STANDARD
SIST-TS CLC/TS 50238-2:2026

01-junij-2026

Nadomešča:

SIST-TS CLC/TS 50238-2:2020

**Železniške naprave - Združljivost tirnih vozil in sistemov za detekcijo vlaka - 2. del:
Združljivost s tirnimi tokokrogi**

Railway applications - Compatibility between rolling stock and train detection systems -
Part 2: Compatibility with track circuits

Bahnanwendungen - Kompatibilität zwischen Fahrzeugen und Gleisfreimeldesysteme -
Teil 2: Kompatibilität mit Gleisstromkreisen

Applications ferroviaires - Compatibilité entre le matériel roulant et les systèmes de
détection des trains - Partie 2: Compatibilité avec les circuits de voie

Ta slovenski standard je istoveten z: CLC/TS 50238-2:2026

ICS:

03.220.30	Železniški transport	Transport by rail
29.280	Električna vlečna oprema	Electric traction equipment
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

SIST-TS CLC/TS 50238-2:2026 en

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TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CLC/TS 50238-2

April 2026

ICS 29.280; 45.060.10

Supersedes CLC/TS 50238-2:2020

English Version

**Railway applications - Compatibility between rolling stock and
train detection systems - Part 2: Compatibility with track circuits**

Applications ferroviaires - Compatibilité entre le matériel
roulant et les systèmes de détection des trains - Partie 2:
Compatibilité avec les circuits de voie

Bahnanwendungen - Kompatibilität zwischen Fahrzeugen
und Gleisfreimeldesysteme - Teil 2: Kompatibilität mit
Gleisstromkreisen

This Technical Specification was approved by CENELEC on 2026-03-23.

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

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European foreword

This document (CLC/TS 50238-2:2026) has been prepared by CLC/SC 9XA “Communication, signalling and processing systems” of CLC/TC 9X, “Electrical and electronic applications for railways”.

This document supersedes CLC/TS 50238-2:2020.

CLC/TS 50238-2:2026 includes the following significant technical changes with respect to CLC/TS 50238-2:2020:

- The interference current limits for RST have been updated in the normative Annex A.
- Annex B regarding train measurements has been removed as they are now covered by EN 50728:2024.

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

This document is Part 2 of the EN 50238 series published under the title *Railway applications — Compatibility between rolling stock and train detection systems*. The series consists of:

- Part 1: General;
- Part 2: Compatibility with track circuits [this document];
- Part 3: Compatibility with axle counters.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

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Introduction

This document defines the interference limits and evaluation criteria for electromagnetic compatibility between rolling stock and track circuits.

The limits have been defined on the basis of national specifications described in NTRs.

This Part 2 of the series defines:

- a set of interference current limits for rolling stock based on defined track circuits;
- measurement and evaluation methods to verify rolling stock interference current emissions and demonstrate compatibility with the track circuits;
- traceability of compatibility requirements (types of track circuit and associated limits).

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1 Scope

This document defines, for the purpose of ensuring compatibility between rolling stock and track circuits, the limits for interference current emissions from rolling stock. The measurement and evaluation methods for verifying conformity of rolling stock to these limits are presented in a dedicated annex.

The interference limits are only applicable to rolling stock that is intended to run on lines exclusively equipped with preferred track circuits listed in this document. The rolling stock test methodology (infrastructure conditions, test configurations, operational conditions, etc.) presented in this document is applicable to establish compatibility with any track circuits.

This document gives guidance on the derivation of interference current limits specified for rolling stock and defines measurement methods and evaluation criteria in a dedicated annex.

This document defines:

- a) a set of interference current limits for RST (Rolling Stock) applicable for each of the following types of traction system:
 - 1) DC (750 V, 1,5 kV and 3 kV);
 - 2) 16,7 Hz AC;
 - 3) 50 Hz AC;
- b) a methodology for the demonstration of compatibility between rolling stock and track circuits;
- c) a measurement method to verify interference current limits and evaluation criteria.

NOTE 1 The basic parameters of track circuits associated with the interference current limits for RST are not in the scope of this document.

NOTE 2 Any phenomena linked to traction power supply and associated protection (over voltage, short-circuit current, under- and over-voltage if regenerative brakes are used) is part of the track circuit design and outside the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50238-1, *Railway applications - Compatibility between rolling stock and train detection systems - Part 1: General*

CLC/TS 50238-3, *Railway applications - Compatibility between rolling stock and train detection systems - Part 3: Compatibility with axle counters*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50238-1, CLC/TS 50238-3 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

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3.1.1

coupled vehicles

part of the influencing unit which can be considered as an individual source of interference, different to the traction subsystem

Note 1 to entry: See Figure 1 for examples.

Note 2 to entry: Since one influencing unit can consist of multiple sources of influence, it is normally ensured that the resulting interference current emitted by the influencing unit into the power supply network does not exceed the interference current limits for RST value.

3.1.2

influencing unit

rolling stock influencing the train detection system

Note 1 to entry: One influencing unit comprises all coupled/connected vehicles, e.g. complete train with single or multiple traction, single vehicle, multiple connected/coupled vehicles and wagons, e.g. one complete passenger train, consisting of one or more TUs and up to 16 coaches.

Note 2 to entry: The influencing unit can consist of several "traction units" (TU). Each TU is fed from one pantograph. One TU can be:

- one locomotive;
- one electric multiple unit, with one or several propulsion systems or traction power units (motor cars);
- one set of passenger coaches is considered as a separate TU if it contributes to the total current of the IU.

Note 3 to entry: The number of TUs that form one IU depends on the type of rolling stock and its application. Therefore, the definition of such numbers is out of the scope of this document. The following figure shows some examples for various types and compositions of traction units, forming one influencing unit in each case:

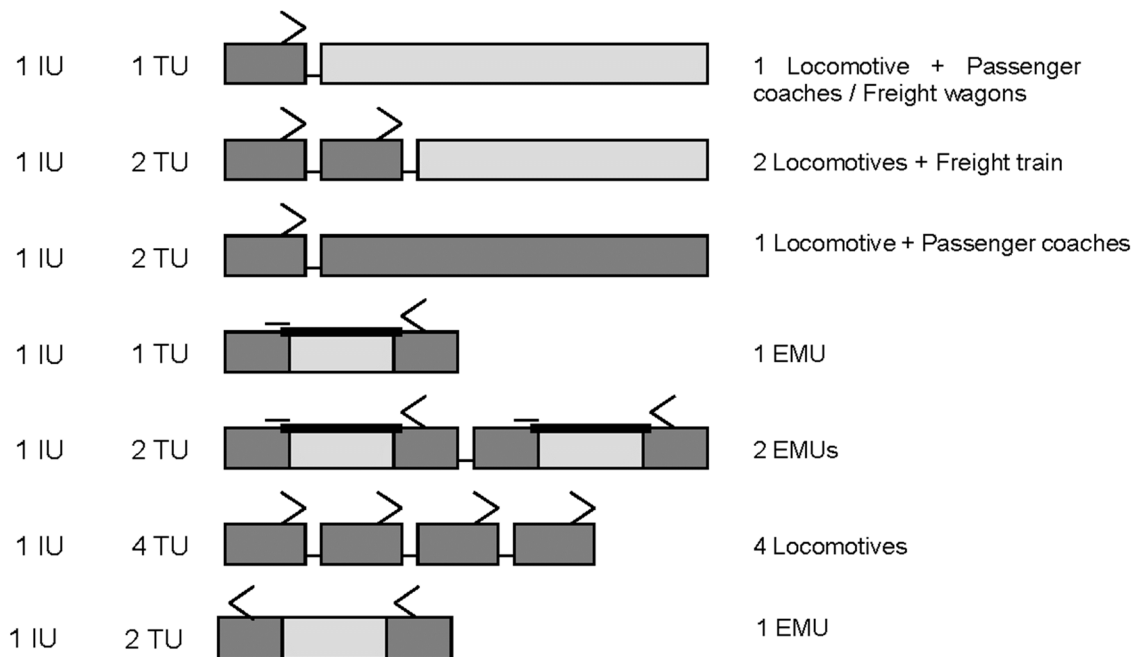


Figure 1 — Examples of IUs

3.1.3**integration time**

window size over which the root mean square (RMS) of the output of the bandpass filter is calculated

[SOURCE: EN 50617-2:2024, 3.1.12]

3.1.4**interference source**

equivalent to traction unit which is fed from its own power supply interface point (pantograph or shoe gear)

3.1.5**propulsion system**

electrical/mechanical system that produces mechanical force to push the train forward

3.1.6**sources**

interference sources which can generate harmonics independently

3.1.7**train detection system**

system which comprises of equipment to detect the presence of a train

3.1.8**traction power unit**

unit on the train housing, the converter/inverter equipment and its associated control to drive the propulsion system

Note 1 to entry: It is also known as the motor car.

3.1.9**traction subsystem**

subset of the traction unit which produces traction force or electric brake force

3.1.10**train under test**

influencing unit used for the test measurements

3.1.11**traction unit**

locomotive, motor coach or train-unit

[SOURCE: IEC 60050-811:2017, 811-02-04]

3.1.12**transmitter breakthrough**

background interference which can be present at the track circuit receiver from rolling stock on adjacent tracks or substation harmonics due to shared cross bonds and/or electrical imbalance of the track circuit

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

AC	alternating current
AT	autotransformer
ATP	automatic train protection system
A/D	analogue to digital