SLOVENSKI STANDARD
SIST EN 50388-2:2025

01-maj-2025

Fiksni postroji in vozna sredstva za železniške naprave - Tehnični kriteriji za uskladitev med napajalnimi viri in voznimi sredstvi za doseganje interoperabilnosti - 2. del: Stabilnost in harmoniki

Fixed installations and rolling stock for railway applications - Technical criteria for the coordination between electric traction power supply systems and rolling stock to achieve interoperability - Part 2: Stability and harmonics

Bahnanwendungen - Ortsfeste Anlagen und Bahnfahrzeuge - Technische Kriterien für die Koordination zwischen Anlagen der Bahnenergieversorgung und Fahrzeugen zum Erreichen der Interoperabilität - Teil 2: Stabilität und Oberschwingungen

Installations Fixes et Matériel Roulant pour les Applications ferroviaires - Critères techniques pour la coordination entre les installations fixes de traction électrique et le matériel roulant pour réaliser l'interopérabilité

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29.280	Električna vlečna oprema	Electric traction equipment
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English Version

Fixed installations and rolling stock for railway applications - Technical criteria for the coordination between electric traction power supply systems and rolling stock to achieve interoperability - Part 2: Stability and harmonics

Installations Fixes et Matériel Roulant pour les Applications ferroviaires - Critères techniques pour la coordination entre les installations fixes de traction électrique et le matériel roulant pour réaliser l'interopérabilité - Partie 2 : Stabilité et harmoniques

Ortsfeste Anlagen und Bahnfahrzeuge für Bahnanwendungen - Technische Kriterien für die Koordinierung zwischen elektrischen Bahnenergieversorgungssystemen und Fahrzeugen zum Erreichen der Interoperabilität - Teil 2: Stabilität und Oberschwingungen

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CENELEC

European Committee for Electrotechnical Standardization
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European foreword

This document (EN 50388-2:2025) has been prepared by CLC/SC 9XC, “Electric supply and earthing systems for public transport equipment and auxiliary apparatus (Fixed installations)”, of CLC/TC 9X, “Electrical and electronic applications for railways”.

It is also relevant to the scope and expertise of CLC/SC 9XB, “Electromechanical material on board of rolling stock”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2026-03-31
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2028-03-31

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.

EN 50388 “Railway applications – Fixed installations and rolling stock - Technical criteria for the coordination between traction power supply and rolling stock to achieve interoperability” consists of the following parts:

— Part 1: General

— Part 2: Stability and harmonics

This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZZ, which is an integral part of this document.

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.

Introduction

This document is linked to EN 50388-1:2022, which describes the general technical criteria for the coordination between power supply and rolling stock to achieve interoperability.

To improve readability, this document is structured as shown in Table 1, which only shows references to the most important clauses and subclauses.

Table 1 — Structure of this document

Topic	**Requirements**		**Tests and documentation**	
	Clause	**Main requirements**	**Clause**	**Most important elements**
Electrical resonance stability	4.1	Definition of a limit frequency f_L — Lowest electric traction power supply system resonance frequency is > f_L . — All controlled elements are passive for all frequencies > f_L. Requirements for filter capacitors.	5.1	For controlled elements, in most cases measurement of frequency response of input admittance is required. 5.1.1.2 Defines in which cases input admittance has to be measured and how it has to be measured. 5.1.1.3 Defines the combined test. 5.1.1.4 Defines in which cases simulation is sufficient and specifies the requirements for the simulator. 5.1.1.5 Defines in which cases declaration of conformity is sufficient. 5.1.2 Defines the methods to be used to assess the lowest resonant frequency of the power supply.
	A.1	Technical background about electrical resonance stability		
	B.1	Examples of real electrical resonance instability experiences		
Low-frequency stability	4.2	Demonstration of stable operation for predefined operation scenarios of electric traction power supply system and one or several identical traction units at one location.	5.2	Verification either by — time domain simulation (or measurements); or — any other validated method.
	A.2	Technical background about low-frequency stability A.2.1 Background and experiences. A.2.2 Acceptance criteria and verification.		
	B.2	Examples of experienced low frequency power oscillations.		
Overvoltages caused by harmonics	4.3	4.3.2 Rolling stock Defines the limit of the overvoltage and specifies the calculation method by using line current spectrum, bandpass filtering, summation methods and standardized power supply impedances. 4.3.2.3 Overvoltage detection. Suggests methods of overvoltage detection. 4.3.3 Defines applicability	5.3	5.3.1 Demonstration of compliance for rolling stock by: — Calculation of line current spectrum including plausibility check by measurement. — Calculation of harmonic voltage assessment using the method given in 4.3. — Check of interlacing between units. — Check of overvoltage protection. — If diode rectification is used to reduce risk of overvoltages check of

Topic	Requirements		Tests and documentation	
	Clause	**Main requirements**	**Clause**	**Most important elements**
		and the overvoltage limits for static converter stations. 4.3.4 Infrastructure related topics.		correct transition between pulsing and blocking of line converter. 5.3.2 Demonstration of compliance for static converters by: — Assessing the overvoltage by combining the converter with a line of variable length. — defining the assessment method in time domain. — plausibility check of the simulation model by measurement. 5.3.3 Demonstration of compliance for infrastructure.
	A.3	Technical background relating to overvoltages caused by harmonics including example calculations for rolling stock		
	B.3	Examples of real overvoltage experiences caused by harmonics		
Topics related to all phenomena	A.4	Depot cases		
	Annex C	Data related to the compatibility study of harmonics and dynamic effects		
	Annex D	Examples experienced in DC systems		