SVENSK STANDARD

SS-EN 50388-1, utg 1:2023

Fastställd	Sida	Ansvarig kommitté
2023-03-22	1 (65)	SEK TK 9

Järnvägsanläggningar – Fasta installationer och rullande materiel – Tekniska villkor för samordning mellan banmatningssystem och rullande materiel för att uppnå driftskompatibilitet – Del 1: Allmänt

Railway Applications – Fixed installations and rolling stock – Technical criteria for the coordination between electric traction power supply systems and rolling stock to achieve interoperability – Part 1: General

Som svensk standard gäller europastandarden EN 50388-1:2022. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50388-1:2022.

Nationellt förord

Tidigare fastställd svensk standard SS-EN 50388, utg 2:2012 med eventuella ändringarna och rättelser, gäller ej fr o m 2025-07-04.

Rättelse SS-EN 50388-1, utg 1:2023/R1:2023 är inarbetad i standarden.
Rättelsen innebär att den svenska titeln ändras.

ICS 29.280.00; 45.060.01

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50388-1

July 2022

ICS 29.280; 45.060.01

Supersedes EN 50388:2012; EN 50388:2012/AC:2013

English Version

Railway Applications - Fixed installations and rolling stock - Technical criteria for the coordination between electric traction power supply systems and rolling stock to achieve interoperability - Part 1: General

Applications ferroviaires - Installations fixes et matériel roulant - Critères techniques pour la coordination entre les installations fixes de traction électrique et le matériel roulant pour réaliser l'interopérabilité - Partie 1: généralités

Bahnanwendungen - Ortsfeste Anlagen und Fahrzeuge - Technische Kriterien für die Koordination zwischen elektrische Bahnenergieversorgungssysteme und Fahrzeugen zum Erreichen der Interoperabilität - Teil 1: Allgemeines

This European Standard was approved by CENELEC on 2022-07-04. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 50388-1:2022 E

SEK Svensk Elstandard SS-EN 50388-1, utg 1:2023

Contents

Page

European foreword

This document (EN 50388-1:2022) has been prepared by CLC/SC 9XC, “Electric supply and earthing systems for public transport equipment and ancillary apparatus (Fixed installations)”, of Technical Committee CLC/TC 9X, “Electrical and electronic applications for railways”. It also concerns the 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)	2023-07-04
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2025-07-04

This document supersedes EN 50388:2012 and all of its amendments and corrigenda (if any).

EN 50388−1:2022 includes the following significant technical changes with respect to EN 50388:2012:

- Clause 1: clarification of scope,
- Clause 2: set dated normative references, simplification,
- Clause 3: clarification of definition, renumbering, coherence among terms, addition of abbreviations, withdrawal of terms not used anymore,
- Clause 4: clarification of applicability,
- Clause 5: new structure,
- Clause 6: new drafting taking into account the latest development of traction unit drives,
- Clause 7: new structure taking into account the latest development of traction unit and needs from infrastructure traction power supply system. Addition of power limitation due to frequency variation,
- Clause 8: complete change, giving new parameters to evaluate the capability of the traction power supply system to supply the trains, definition of new indices,
- Previous text of Clause 8 in new Annex B,
- Clause 9: distinction between the table on traction power supply systems and their characterization,
- Clause 10: new structure and text, reference to future EN 50388-2, description of compatibility study process moved to Annex I,
- Clause 11: clarification on the use of this chapter, new information on the sequence of tripping among the circuit breakers, new figure on reclosing sequences, new chapter on maximum inrush current of AC traction unit,
- Clause 12: clarification and improvement, ex Table 8 in new Annex G, new condition for DC systems
- Clause 15: adaptation of the subclauses due to changes in Clauses 5 to 12
- Clause 15.4.1: new text, former Table 10 in Annex B,
- Annex A: improvement on values,
- Annex B, includes part of the previous Clause 8,
- Former Annex C will be located in part 2 of the EN 50388,

- New Annex C on sign convention, includes ex Annex E,
- New Annex D including ex Annex F, on maximum allowable train set current,
- New Annex E on power limitation as a function of line frequency,
- New Annex F on maximum traction and power of a train set against voltage, includes parts of ex Clause 7,
- New Annex G includes ex Table 8 on the use of regenerative braking,
- New Annex H includes former Annex D as long as part 2 of the EN 50388 is not issued,
- New Annex I includes former text from 10.3 on compatibility study
- New Annex J includes former Annex G

This version includes technical changes, clarifications without technical changes and best practises coming from the use of the last version of the document.

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 has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZZ, which is an integral part of this document.

An additional part 2 is in preparation. In relation to assessment of harmonics and dynamic effects, this document (Part 1) sets out the generic process in Clause 10, and a future part 2 of this standard will give details and acceptance criteria related to known stability, harmonic phenomena and technologies.

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

- EN 50388-1, General
- Future EN 50388-2, Stability and harmonics

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.

1 Scope

This document establishes requirements for the electrical aspects to achieve technical compatibility between rolling stock and electric traction systems, limited to:

— co-ordination of protection principles between power supply and traction units, i.e. separation sections, train set current or power limitation, short circuit current discrimination, breaker coordination and use of regenerative braking.

— co-ordination of installed power on the line and the power demand of trains, i.e. traction unit power factor, train set current or power limitation, electric system performance, type and characterization.

— compatibility assessment relating to harmonics and dynamic effects.

Informative values are given for some parts of the existing European railway networks, in annexes.

NOTE For those railways within the scope of EU Interoperability Directive, definitive values are set out in the register of infrastructure published in accordance with Article 49 of Directive (EU) 2016/797, and the list of items included in the register is described in the commission decision (EU) 2019/777.

The following electric traction systems are within the scope of this document:

— railways;

— guided mass transport systems that are integrated with railways;

— material transport systems that are integrated with railways.

Information is given on electrification parameters to enable train operating companies to confirm, after consultation with the rolling stock manufacturers, that risks of non-compatibility are minimized and that there will be no consequential disturbance on the electrification system.

The interaction between pantograph and overhead contact line is dealt with in EN 50367:2020.

The interaction with the control-command and signalling subsystem is not dealt with in this document.

Basic considerations have been included concerning the use of accumulator trains.

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 50122-2:2010, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 2: Provisions against the effects of stray currents caused by d.c. traction systems*

EN 50124-1:2017, *Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment*

EN 50163:2004,[1] *Railway applications - Supply voltages of traction systems (with Corrigenda in May 2010 and January 2013)*

IEC 60050-811:2017, *International Electrotechnical Vocabulary (IEV) - Part 811: Electric traction*

[1] As impacted by EN 50163:2004/A1:2007, EN 50163:2004/AC:2013 and EN 50163:2004/Corrigendum May 2010.