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STN	**Dráhové aplikácie Technické parametre systémov na detekciu vlaku na účely interoperability transeurópskeho železničného systému Časť 1: Koľajové obvody**	**STN EN 50617-1 34 2614**

Railway applications - Technical parameters of train detection systems for the interoperability of the trans-European railway system - Part 1: Track circuits

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Railway applications - Technical parameters of train detection systems for the interoperability of the trans-European railway system - Part 1: Track circuits

Applications ferroviaires - Paramètres techniques des systèmes de détection des trains pour l'interopérabilité du système ferroviaire transeuropéen - Partie 1: Circuits de voie

Bahnanwendungen - Technische Parameter von Gleisfreimeldesystemen für die Interoperabilität des transeuropäischen Eisenbahnsystems - Teil 1: Gleisstromkreise

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European foreword

This document (EN 50617-1:2024) has been prepared by CLC/SC 9XA “Communication, signalling and processing systems” of CLC/TC 9X “Electrical and electronic applications for railways”.

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)	2025-11-30
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2027-11-30

This document supersedes EN 50617-1:2015.

EN 50617-1:2024 includes the following significant technical changes with respect to EN 50617-1:2015:

— Clause 6: Technical parameters have been enhanced to provide the requirements to demonstrate compliance with the Frequency Management published in ERA/ERTMS/033281 v4.0;

— Clause 7: It is now amended and consistent with ERA/ERTMS/033281 v4.0;

— Clause 8: Track parameters have been re-defined;

— Clause 9 has been enhanced with practical examples;

— Annex A: Parameters are revisited for consistency;

— Annex E: New Table has been added for parameters of track circuits which are already defined as compatible with the Frequency Management in ERA/ERTMS/033281 v4.0. A subclause is introduced to define the link between the current standard and the new standard being developed for Measurements of RST emissions for compatibility with track circuits by SC9XB/WG34;

— Annex F “Vehicle Impedance / guidance for RST design to support the FrM” has been deleted, consequently the Annexes G to K have been renumbered as Annexes F to J;

— New Annex K: New informative annex which defines proposed Out of Band Frequency Limits for 25 kV 50 Hz and DC power networks.

— Annex L has been deleted. A new Annex L was added.

EN 50617, *Railway applications – Technical parameters of train detection systems*, will consist of

— Part 1: Track circuits;

— Part 2: Axle counters.

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

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

Introduction

The working group SC9XA WGA4-2 has developed the limits for electromagnetic compatibility between rolling stock and train detection systems, specifically track circuits and axle counter systems and correspondingly published two technical specifications CLC/TS 50238-2 and CLC/TS 50238-3. These limits and associated measurement methods are based on preferred existing systems (as defined in CLC/TS 50238-2 and CLC/TS 50238-3) which are well established and still put forward for signalling renewals by infrastructure managers.

To meet the requirements for compatibility between train detection systems and rolling stock in the future and to achieve interoperability and free movement within the European Union, ERA/ERTMS/033281 v4.0 defines the relevant parameters for compatibility of rolling stock with track circuits and axle counter systems.

The train detection systems, track circuits and axle counters are an integral part of the CCS trackside subsystem in the context of the Rail Interoperability Directive. The relevant technical parameters are enumerated in the CCS and LOC&PAS TSI and ERA/ERTMS/033281 v4.0. ERA/ERTMS/033281 v4.0 specifies the parameters for rolling stock relevant to compatibility with the infrastructure. This document covers all relevant technical parameters of train detection systems (track circuits) in a manner that provides a presumption of conformity with interoperability requirements, but is not limited to interoperable lines. This document refers whenever needed to ERA/ERTMS/033281 v4.0. Although the demand for FrM is driven by Interoperability requirements, it is independent from the drive to introduce systems like ERTMS level 3 or level 2.

This document is based on the current understanding of the railway experts represented at WGA4-2 that track circuits and axle counter systems will continue to be the essential two train detection systems for the foreseeable future.

The published specification CLC/TS 50238-2 can be used to ascertain conformity of rolling stock with existing individual (preferred) track circuits.

In this document, the defined parameters are structured and allocated according to their basic references as follows:

— track circuit system parameters;

— train based parameters;

— track based parameters;

— environmental and other parameters.

Where possible, the parameters as defined are consistent with other European Standards.

Each parameter is defined by a short general description, the definition of the requirement, the relation to other standards and a procedure to show the fulfilment of the requirement as far as necessary. An overview of the safety relevance of each parameter is given – in the context of this document – in a separate table.

1 Scope

This document specifies the technical parameters of track circuits associated with the interference current emissions limits for RST in the context of interoperability defined in the form of Frequency Management in ERA/ERTMS/033281 v4.0. The limits for compatibility between rolling stock and track circuits addressed in this document allow provision for known interference phenomena linked to traction power supply including associated protection (over voltage, short-circuit current and basic transient effects like in-rush current and power cut-off), and other known sources of interference.

This document is intended to be used to assess compliance of track circuits and other forms of train detection systems using the rails as part of their detection principles, in the context of the European Directive on the interoperability of the trans-European railway system and the associated technical specification for interoperability relating to the control-command and signalling track-side subsystems.

The document describes technical parameters to consider for achieving the compatibility of the track circuit with the emissions limits defined in the frequency management for rolling stock (ERA/ERTMS/033281 v4.0). These parameters are structured and allocated according to their basic references as follows:

— technical track circuit parameters;

— train based parameters;

— track based parameters;

— environmental and other parameters including EMC.

Each parameter is defined by a short general description, the definition of the requirement, the relation to other standards and a procedure to show the fulfilment of the requirement as far as necessary. An overview of the safety relevance of each parameter is given – in the context of this document – in a separate table.

This document is applicable to track circuits on all lines, including non-electrified lines. However, for track circuits intended to be installed only on non-electrified lines, some parameters can be disapplied.

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 13146-5:2012[1], *Railway applications - Track - Test methods for fastening systems - Part 5: Determination of electrical resistance*

EN 50121-4:2016[2], *Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus*

EN 50122-1:2011[3], *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit – Part 1: Protective provisions against electric shock*

[1] As impacted by EN 13146-5:2012/AC:2017.

[2] As impacted by EN 50121-4:2016/A1:2019.

[3] As impacted by EN 50122-1:2011/A1:2011, EN 50122-1:2011/A2:2016, EN 50122-1:2011/A3:2016, EN 50122-1:2011/A4:2017 and EN 50122-1:2011/AC:2012.

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 50122-3:2010, *Railway applications - Fixed installations - Electrical safety, earthing and the return circuit - Part 3: Mutual Interaction of a.c. and d.c. traction systems*

EN 50124-2:2017, *Railway applications - Insulation coordination - Part 2: Overvoltages and related protection*

EN 50125-3:2003, *Railway applications - Environmental conditions for equipment - Part 3: Equipment for signalling and telecommunications*

EN 50126-1:2017, *Railway Applications - The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) - Part 1: Generic RAMS Process*

EN 50126-2:2017, *Railway Applications - The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) - Part 2: Systems Approach to Safety*

EN 50128:2011[4], *Railway applications - Communication, signalling and processing systems - Software for railway control and protection systems*

EN 50129:2018[5], *Railway applications - Communication, signalling and processing systems - Safety related electronic systems for signalling*

EN 50160:2010, *Voltage characteristics of electricity supplied by public electricity networks*

EN 60529:1991[6], *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN IEC 60721-3-4:2019, *Classification of environmental conditions - Part 3-4: Classification of groups of environmental parameters and their severities - Stationary use at non-weatherprotected locations (IEC 60721-3-4:2019)*

ERA/ERTMS/033281 v4.0 — *Interfaces between control-command and signalling trackside and other subsystems*

[4] As impacted by EN 50128:2011/AC:2014, EN 50128:2011/A1:2020, and EN 50128:2011/A2:2020.

[5] As impacted by EN 50129:2018/AC:2019-04.

[6] As impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013, EN 60529:1991/A2:2013/AC:2019-02, EN 60529:1991/AC:2016-12, and EN 60529:1991/corrigendum May 1993;