

# SLOVENSKI STANDARD

## SIST-TS CLC/TS 50238-3:2014

01-januar-2014

---

**Železniške naprave - Medobratovalnost voznih sredstev in sistemov za detekcijo vlaka - 3. del: Združljivost s števci osi**

Railway applications - Compatibility between rolling stock and train detection systems - Part 3: Compatibility with axle counters

Bahnanwendungen - Kompatibilität zwischen Fahrzeugen und Gleisfreimeldesysteme - Teil 3: Kompatibilität mit Achszähler

Applications ferroviaires - Compatibilité entre le matériel roulant et les systèmes de détection des trains - Partie 3: Compatibilité avec les compteurs d'essieux

<https://standards.iteh.ai/catalog/standards/sist/9ca144d9-8cbd-42e3-b56c-091777f75adc/sist-ts-clc-ts-50238-3-2014>

**Ta slovenski standard je istoveten z: CLC/TS 50238-3:2013**

---

**ICS:**

03.220.30	Železniški transport	Transport by rail
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

**SIST-TS CLC/TS 50238-3:2014**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST-TS CLC/TS 50238-3:2014

<https://standards.iteh.ai/catalog/standards/sist/9ca144d9-8cbd-42e3-b56c-091777f75adc/sist-ts-clc-ts-50238-3-2014>

TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**CLC/TS 50238-3**

October 2013

ICS 29.280; 45.060.10

Supersedes CLC/TS 50238-3:2010 + corr. Sep.2010

English version

**Railway applications -  
Compatibility between rolling stock and train detection systems -  
Part 3: Compatibility with axle counters**

Applications ferroviaires -  
Compatibilité entre le matériel roulant et  
les systèmes de détection des trains -  
Partie 3: Compatibilité avec les compteurs  
d'essieux

Bahnanwendungen -  
Kompatibilität zwischen Fahrzeugen und  
Gleisfreimeldesysteme -  
Teil 3: Kompatibilität mit Achszähler

This Technical Specification was approved by CENELEC on 2013-10-14.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

<https://standards.iteh.ai/catalog/standards/sist/9ca144d9-8cbd-42e3-b56c-091777f9ad/sist-ts-clc-ts-50238-3-2014>  
CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

# CENELEC

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Contents

Page

Foreword .....	3
Introduction .....	4
1 Scope .....	5
2 Normative references .....	5
3 Terms, definitions and abbreviations .....	5
3.1 Terms and definitions .....	5
3.2 Abbreviations .....	6
4 General aspects .....	6
4.1 Interference mechanism .....	6
4.1.1 General .....	6
4.1.2 Axle counter detector .....	6
4.1.3 Susceptibility of the detector on the rail .....	7
4.1.4 Sources of interference fields .....	7
4.2 Availability margin .....	8
4.3 Specific axle counter parameters .....	8
5 Compatibility requirements .....	8
5.1 RST emission limits based on the frequency management of the TSI CCS Interfaces Document (ERA/ERTMS/033281) .....	8
5.2 RST Emission limits for RST compatibility tests for individual axle counters on non-interoperable lines .....	9
5.2.1 General .....	9
5.2.2 Short duration interference limits .....	9
5.2.3 Mitigating arguments when limits are exceeded .....	9
Annex A (normative) Rolling stock emission limits .....	10
A.1 Emissions limits and evaluation parameters (narrow band) .....	10
A.2 Weighting of short duration interference .....	11
Bibliography .....	12

## Figure

Figure 1 – Axle counter detector, schematic diagram .....	7
-----------------------------------------------------------	---

## Tables

Table A.1 – Emission limits and evaluation parameters (narrow band) .....	10
Table A.2 – Weighting of short duration interference ( $T_{int}$ according to Table A.1) .....	11

## Foreword

This document (CLC/TS 50238-3:2013) has been prepared by CLC/SC 9XA "Communication, signalling and processing systems", of Technical Committee CLC/TC 9X "Electrical and electronic applications for railways".

This document supersedes CLC/TS 50238-3:2010.

CLC/TS 50238-3:2013 includes the following significant technical changes with respect to CLC/TS 50238-3:2010:

- this new edition represents a major technical change from the previous edition: the entire document has been changed, from the scope to the last clause, to take into account CLC/TC 9X decision 47-13 "TC9X instructs WGA4-2 Convenor to remove sections about the procedure of testing of rolling stock from the draft TS 50238-3 (project 23571), considering SC9XA Decision 38/2";
- Annexes B to D have been deleted.

This Technical Specification is Part 3 in the following series:

- EN 50238, *Railway applications – Compatibility between rolling stock and train detection systems*;
- CLC/TS 50238-2, *Railway applications – Compatibility between rolling stock and train detection systems – Part 2: Compatibility with track circuits*;
- CLC/TS 50238-3, *Railway applications – Compatibility between rolling stock and train detection systems – Part 3: Compatibility with axle counters*.

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

## Introduction

This Technical Specification defines the interference limits and evaluation criteria for electromagnetic compatibility between rolling stock and axle counter detectors.

The limits have been defined on the basis of a test specification described in prEN 50617-2:2013 [2] (cf. CLC/SC9XA/Sec0779/CD) (laboratory tests).

This Technical Specification defines

- a set of interference limits for magnetic fields resulting from both rail current and equipment on board the vehicles,
- evaluation criteria to verify rolling stock emissions and demonstrate compatibility with the interference limits for magnetic fields,
- traceability of requirements (type of axle counter detectors considered for the limits).

In the relevant frequency range of the axle counter detectors, the magnetic field is dominant and only this type of field is considered. Experience has shown that the effects of electric fields are insignificant and therefore not considered.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST-TS CLC/TS 50238-3:2014](https://standards.iteh.ai/catalog/standards/sist/9ca144d9-8cbd-42e3-b56c-091777f75adc/sist-ts-clc-ts-50238-3-2014)

<https://standards.iteh.ai/catalog/standards/sist/9ca144d9-8cbd-42e3-b56c-091777f75adc/sist-ts-clc-ts-50238-3-2014>

## 1 Scope

For the purpose of demonstrating compatibility between rolling stock and axle counter detectors, this Technical Specification defines the interference limits and evaluation methods to verify rolling stock emissions. Wheel sensors and crossing loops are not covered by this Technical Specification.

This Technical Specification gives recommended individual limits to be applied to establish compatibility between RST and all selected types of axle counter detectors, including any covered by national standards.

The list of selected types of axle counters and their limits for compatibility are drawn on the basis of established performance criteria. It is expected that the trend for newly signalled interoperable lines will be fitted with types that meet the compatibility limits published in the TSI CCS Interfaces Document (ERA/ERTMS/033281).

To ensure adequate operational availability, it is essential that the rolling stock complies with the defined limits; otherwise, the established availability of the valid output function of axle counter detectors may be compromised.

**NOTE** The influences from metal parts or inductively coupled resonant circuits on the vehicle, eddy current brakes or magnetic brakes, are not covered by this Technical Specification but are considered on the basis of national technical specifications.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50238:2003, *Railway applications – Compatibility between rolling stock and train detection systems*  
 ERA/ERTMS/033281, *Interfaces between control-command and signalling trackside and other subsystems*, version 1.0, published on 2012-02-23

## 3 Terms, definitions and abbreviations

For the purposes of this document, the terms, definitions and abbreviations given in EN 50238:2003 and the following apply.

### 3.1 Terms and definitions

#### 3.1.1

##### **axle counter detector**

detector consisting of the axle counter sensor and of the detection circuit, which includes in general filters and rectifiers

#### 3.1.2

##### **axle counter sensor**

sensor head mounted in the track

#### 3.1.3

##### **axle counter system**

whole system including axle counter sensor, axle counter detector and the evaluation unit

**3.1.4****integration time**

time constant of an axle counter detector indicating the range of time in which the immunity of the regarded axle counter detector to sinusoidal in band disturbances rises with shorter time duration of these disturbances (short term interference)

Note 1 to entry: Integration time is one parameter for evaluation of the measurement results of compatibility tests of vehicles (TSI CCS Interfaces Document ((ERA/ERTMS/033281)). It is defined as the window size over which the root mean square (rms) of the output of the band-pass filter is calculated.

**3.1.5****in band**

the whole frequency range (centre frequency plus or minus tolerance range) where a single axle counter works

Note 1 to entry: In relation with the frequency management of TSI CCS Interfaces Document (ERA/ERTMS/033281), it defines the area of the single bands (band 1, band 2, band 3).

**3.2 Abbreviations**

CCS Control-Command and Signalling

FM Frequency Management

rms root mean square

RST Rolling Stock

$T_{int}$  Integration Time

TSI Technical Specification for Interoperability

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)  
<https://standards.iteh.ai/catalog/standards/sist/9ca144d9-8cbd-42e3-b56c-091777f75adc/sist-ts-clc-ts-50238-3-2014>

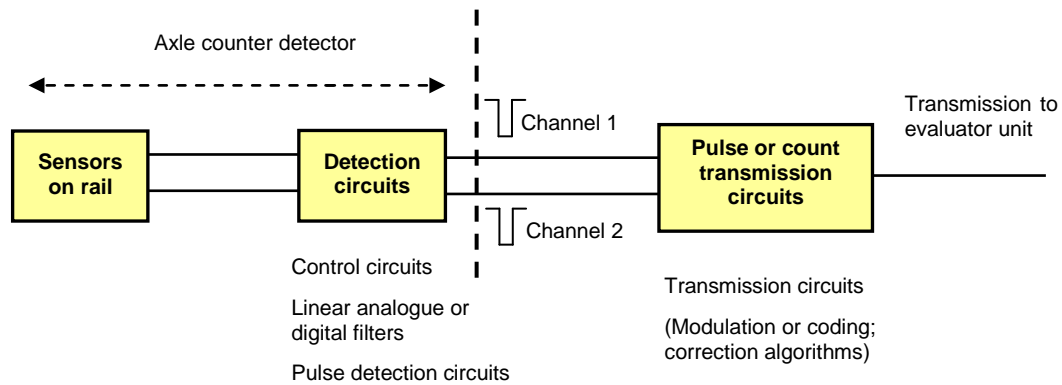
**4 General aspects****4.1 Interference mechanism****4.1.1 General**

Axle counter detectors can be influenced in different ways, e.g. by magnetic fields or metallic parts in the vicinity of wheels and bogies and thus close to the sensors. The influence of magnetic fields in the range of the working frequency of the individual axle counters is dominant. In addition, the duration and/or repetition rate of interference and the magnetic field strength are also relevant.

**4.1.2 Axle counter detector**

The compatibility limits in this Technical Specification are based on the immunity of axle counter detectors and are specified only for the axle counter detector – comprising the sensor on the rail and the detection circuits in the trackside equipment as shown in Figure 1.





**Figure 1 – Axle counter detector, schematic diagram**

Axle counter detectors use various additional filter techniques and algorithms that reject interference pulses in order to maximise reliability while maintaining safety.

#### EXAMPLES

- non-linear pulse duration filters which reject wheel pulses of a duration less than the minimum wheel pulse from a vehicle;
- rejection of wheel pulses in one channel if the axle counter is already in an occupied status.

#### 4.1.3 Susceptibility of the detector on the rail

<https://standards.iteh.ai/catalog/standards/sist/9ca144d9-8cbd-42e3-b56c-017000000000/sist-ts-50238-3-2014>

The precise area of susceptibility is product specific, and defined by manufacturers of individual products. The position of the measurement antenna has been chosen to take into account the relevant sensors.

The immunity (susceptibility limit) is defined as the magnetic field that can generate interference pulses or corrupt the wheel pulses of one or more channels of the axle counter detector.

The magnetic coupling between the transmission and reception units of the axle counter sensor depends among other things on the rail type. Large rail profiles like UIC 60 profiles, which provide higher attenuation of the receiver voltage, are therefore more critical with respect to the susceptibility.

#### 4.1.4 Sources of interference fields

The following sources of interference are considered for immunity:

- electrical equipment on the vehicle and magnetically coupled to the axle counter sensor through the air gap (hence referred to as magnetic fields);
- rail currents in the susceptibility range of operation of the axle counter sensor (hence referred to as rail current fields).

The interference fields from the two above defined sources are superimposed on the axle counter sensor whereby the vector of rail current fields has a predictable direction and the vector of magnetic fields has an unpredictable direction, because it is dependent on the source on the vehicle and on the type of rail.