# SLOVENSKI STANDARD
# oSIST prEN 50463-1:2016

**01-februar-2016**

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**Železniške naprave - Merjenje energije na vlaku - 1. del: Splošno**

Railway applications - Energy measurement on board trains - Part 1: General

Bahnanwendungen - Energiemessung auf Bahnfahrzeugen - Teil 1: Allgemeines

Applications ferroviaires - Mesure d'énergie à bord des trains - Partie 1: Généralités

**Ta slovenski standard je istoveten z:** **prEN 50463-1:2015**

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**ICS:**



45.060.10 Vlečna vozila Tractive stock

**oSIST prEN 50463-1:2016** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

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**DRAFT**
**prEN 50463-1**

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ICS 45.060.10

Will supersede EN 50463-1:2012

English Version

# Railway applications - Energy measurement on board trains - Part 1: General

Applications ferroviaires - Mesure d'énergie à bord des trains - Partie 1: Généralités

Bahnanwendungen - Energiemessung auf Bahnfahrzeugen - Teil 1: Allgemeines

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2016-02-19.

It has been drawn up by CLC/TC 9X.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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, 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.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.



Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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**

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Figure

# European foreword

This document (prEN 50463-1:2015) has been prepared by CLC/TC 9X “Electrical and electronic applications for railways”.

This document is currently submitted to the Enquiry.

The following dates are proposed:

| | | |
|---|---|---|
| • latest date by which the existence of this document has to be announced at national level | (doa) | dor + 6 months |
| • latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | dor + 12 months |
| • latest date by which the national standards conflicting with this document have to be withdrawn | (dow) | dor + 36 months (to be confirmed or modified when voting) |

This document will supersede EN 50463-1:2012.

prEN 50463-1:2015 includes the following significant technical changes with respect to EN 50463-1:2012:

— extended CPID definition (Clause 3 and Clause 4).

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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



This document is Part 1 of the EN 50463 series which consists of the following parts, under the common title *Railway applications — Energy measurement on board trains*:

— *Part 1: General*;

— *Part 2: Energy measuring*;

— *Part 3: Data handling*;

— *Part 4: Communication*;

— *Part 5: Conformity assessment*.

This series of European Standards follows the functional guidelines description in EN ISO/IEC 17000:2004, Annex A “Principles of conformity assessment”, tailored to the Energy Measurement System (EMS).

The requirements for Energy Measurement Systems in the relevant Technical Specifications for Interoperability are supported by this series of European Standards.

# Introduction

The Energy Measurement System provides measurement and data suitable for billing and may also be used for energy management, e.g. energy saving.

This series of European Standards uses the functional approach to describe the Energy Measurement System and on-ground Data Collection Service. These functions are implemented in one or more physical devices. The user of this Series of standards is free to choose the physical implementation arrangements.

**— Structure and main contents of the EN 50463 series:**

This series of European Standards is divided into five parts. The titles and brief descriptions of each part are given below:

**— prEN 50463-1 — General:**

The scope of prEN 50463-1 is the Energy Measurement System (EMS).

prEN 50463-1 provides system level requirements for the complete EMS and common requirements for all devices implementing one or more functions of the EMS.

**— EN 50463-2 — Energy measuring:**

The scope of EN 50463-2 is the Energy Measurement Function (EMF).

The EMF provides measurement of the consumed and regenerated active energy of a traction unit. If the traction unit is designed for use on a.c. traction systems, the EMF also provides measurement of reactive energy. The EMF provides the measured quantities via an interface to the Data Handling System.

The EMF consists of the three functions: Voltage Measurement Function, Current Measurement Function and Energy Calculation Function. For each of these functions, accuracy classes are specified and associated reference conditions are defined. This part also defines all specific requirements for all functions of the EMF.

The Voltage Measurement Function measures the voltage of the CL system and the Current Measurement Function measures the current taken from and returned to the CL system. These functions provide signal inputs to the Energy Calculation Function.

The Energy Calculation Function inputs the signals from the Current and Voltage Measurement Functions and calculates a set of values representing the consumed and regenerated energies. These values are transferred to the Data Handling System and are used in the creation of Compiled Energy Billing Data.

The standard has been developed taking into account that in some applications, the EMF may be subjected to legal metrological control. All relevant metrological aspects are covered in this part of EN 50463.

EN 50463-2 also defines the conformity assessment of the EMF.

**— EN 50463-3 — Data handling:**

The scope of EN 50463-3 is the Data Handling System (DHS) and the associated requirements of Data Collection Service (DCS).

The on board DHS receives, produces and stores data, ready for transmission to any authorized receiver of data on board or on ground. The main goal of the DHS is to produce Compiled Energy Billing Data and transfer it on an interoperable basis to an on-ground Data Collection Service (DCS). The DHS can support other functionality on board or on-ground with data, as long as this does not conflict with the main goal.

The DCS on-ground receives Compiled Energy Billing Data and transfer it to settlement system.

EN 50463-3 also defines the conformity assessment of the DHS and for the transfer of CEBD to an on-ground Data Collection Service (DCS).

**— EN 50463-4 — Communication:**

The scope of EN 50463-4 is the communication services.

This part of EN 50463 gives requirements and guidance regarding the data communication between the functions implemented within EMS as well as between such functions and other on board units where data are exchanged using a communications protocol stack over a dedicated physical interface or a shared network.

It includes the on board to ground communication service and covers the requirements necessary to support data transfer between DHS and DCS including the transfer of CEBD on an interoperable basis.

EN 50463-4 also defines the conformity assessment of the communications services.

**— EN 50463-5 — Conformity assessment:**

The scope of EN 50463-5 is the conformity assessment procedures for the EMS.

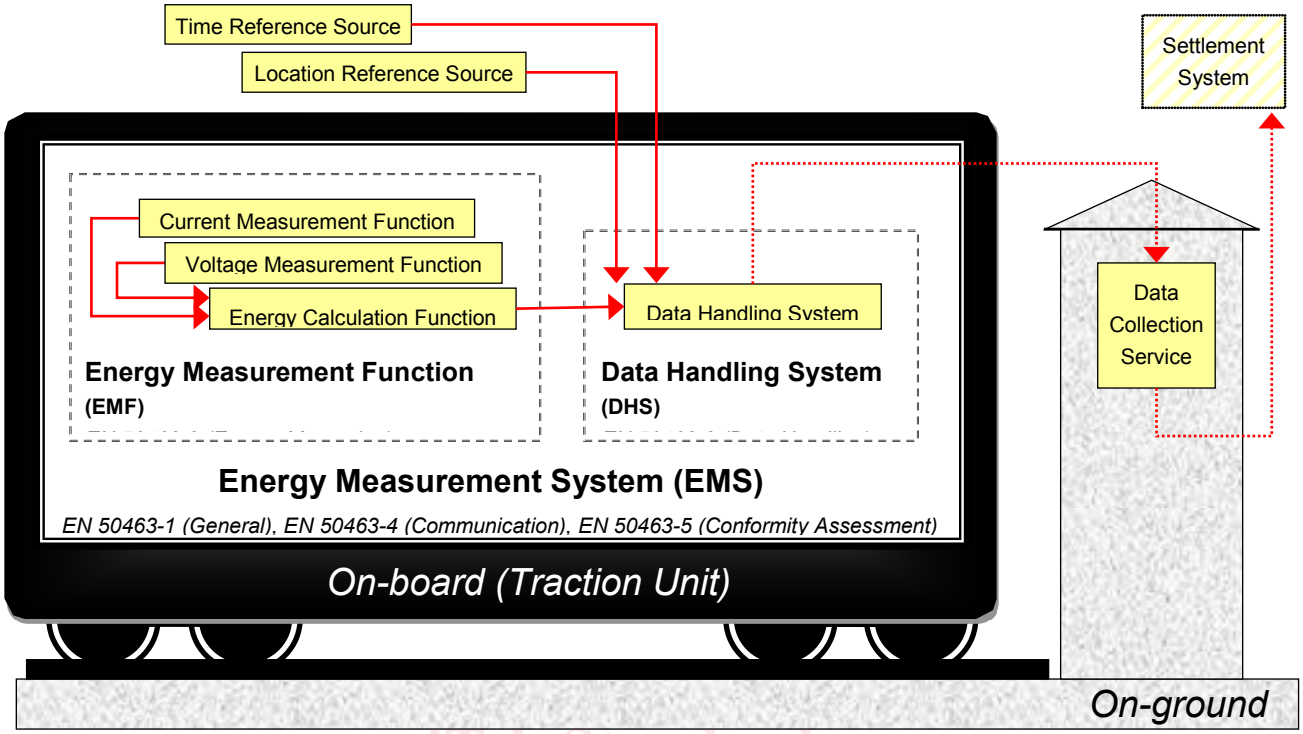
EN 50463-5 also covers re-verification procedures and conformity assessment in the event of the replacement of a device of the EMS.



**— EMS functional structure and dataflow:**

Figure 1 illustrates the functional structure of the EMS, the main sub-functions and the structure of the dataflow and is informative only. Only the main interfaces required by this standard are displayed by arrows.

Since the communication function is distributed throughout the EMS, it has been omitted for clarity. Not all interfaces are shown.

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128 **Figure 1 — EMS functional structure and dataflow diagram**

# 1 Scope

This draft European Standard describes the primary purpose of the EMS, which is to meter energy consumption for billing and provide compiled energy billing data (CEBD) to a DCS. The EMS may also be used for other functions such as energy management. In addition, this draft European Standard also describes the primary purpose of a DCS and its interactions with an EMS and settlement system.

This part of EN 50463:

- gives requirements for the complete Energy Measurement System and also requirements for all devices implementing one or more functions of the Energy Measurement System;
- applies to newly manufactured Energy Measurement Systems for use on board railway traction units, powered by a.c. and/or d.c. supply voltages as listed in EN 50163;
- does not apply to portable Energy Measurement Systems.

# 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 45545-2, *Railway applications — Fire protection on railway vehicles — Part 2: Requirements for fire behavior of materials and components*

EN 45545-5, *Railway applications — Fire protection on railway vehicles — Part 5: Fire safety requirements for electrical equipment including that of trolley buses, track guided buses and magnetic levitation vehicles*

EN 50124-1:2001, *Railway applications — Insulation coordination — Part 1: Basic requirements — Clearances and creepage distances for all electrical and electronic equipment*

EN 50124-1:2001/A2:2005, *Railway applications — Insulation coordination — Part 1: Basic requirements — Clearances and creepage distances for all electrical and electronic equipment*

EN 50125-1:1999, *Railway applications — Environmental conditions for equipment — Part 1: Equipment on board rolling stock*

EN 50153, *Railway applications — Rolling stock — Protective provisions relating to electrical hazards*

EN 50155:2007, *Railway applications — Electronic equipment used on rolling stock*

EN 50463 (all parts), *Railway applications — Energy measurement on board trains*

EN 60085, *Electrical insulation — Thermal evaluation and designation (IEC 60085)*

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

EN 60529:1991/A2:2013, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989/A2:2013)*

EN 61010-1, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements (IEC 61010-1)*

EN ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1)*

# 3 Terms, definitions and abbreviations

## 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE When possible, the following definitions have been taken from the relevant chapters of the International Electrotechnical Vocabulary (IEV), the IEC 60050 series. In such cases, the appropriate IEV reference is given. Certain new definitions or modifications of IEV definitions have been added in this standard in order to facilitate understanding. Expression of the performance of electrical and electronic measuring equipment has been taken from EN 60359.

**3.1.1**
**authenticity**
security measures ensuring that the interface only transfers data or signals when the source and destination are correctly matched

**3.1.2**
**CEBD-related data**
data produced by any function of the EMS required for the production of CEBD

Note 1 to entry: This includes energy data, time data location data, quality codes and traction system code.

**3.1.3**
**Compiled Energy Billing Data**
**CEBD**
dataset compiled by the DHS suitable for energy billing



**3.1.4**
**Consumption Point Identification**
**CPID**
unique identifier allocated to each EMS installed on-board a traction unit



**3.1.5**
**Contact Line**
**CL**
conductor system for supplying electric energy to a traction unit through current-collecting equipment

[SOURCE: IEV 811-33-01, modified]

**3.1.6**
**Current Measurement Function**
**CMF**
function of an EMF measuring the current taken from and returned to the CL by the traction unit

**3.1.7**
**Data Collection Service**
**DCS**
on ground service collecting the CEBD from an EMS

**3.1.8**
**Data Handling System**
**DHS**
function combining the energy data produced by an EMF with other data, storing and transmitting the data to a DCS and other systems