# RAUDTEEALASED RAKENDUSED. ENERGIAMÕÕTMISED RONGIDES. OSA 1: ÜLDNÕUDED

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

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

| | |
|---|---|
| See Eesti standard EVS-EN 50463-1:2013 sisaldab Euroopa standardi EN 50463-1:2012 ingliskeelset teksti. | This Estonian standard EVS-EN 50463-1:2013 consists of the English text of the European standard EN 50463-1:2012. |
| Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. | This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. |
| Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 21.12.2012. | Date of Availability of the European standard is 21.12.2012. |
| Standard on kättesaadav Eesti Standardikeskusest. | The standard is available from the Estonian Centre for Standardisation. |



Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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EUROPEAN STANDARD

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Supersedes EN 50463:2007 (partially)

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



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CENELEC

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

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# Contents

# Foreword

This document (EN 50463-1:2012) has been prepared by CLC/TC9X "Electrical and electronic applications for railways".

The following dates are proposed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-10-15
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2015-10-15

This document (EN 50463-1:2012), together with parts 2, 3, 4 and 5, supersedes EN 50463:2007.

This series of European Standards includes the following significant technical changes with respect to EN 50463:2007:

— the series is based on and supersedes EN 50463:2007;

— the scope is extended, new requirements are introduced and conformity assessment arrangements are added.

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.

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 relationship with EU Directive 2008/57/EC amended by Commission Directive 2011/18/EU, 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 Annex A, “Principles of conformity assessment”, of EN ISO/IEC 17000 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. 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:

**EN 50463-1 – General**

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

EN 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 supply 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).

The on board DHS receives, produces and stores data, ready for transmission to any authorised receiver of data on board or on ground. The main goal of the DHS is to produce Compiled Energy Billing Data and transfer it 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.

EN 50463-3 also defines the conformity assessment of the DHS.

**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.

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.

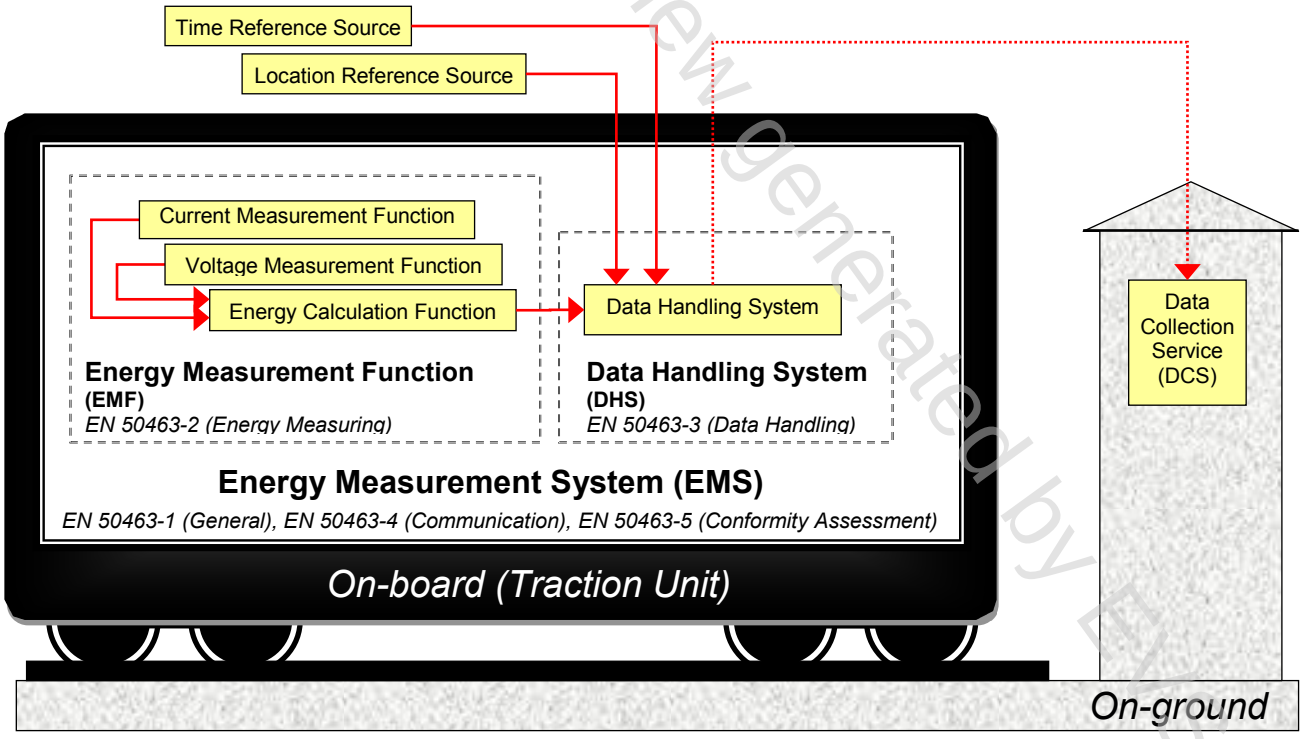


**Figure 1 — EMS functional structure and dataflow diagram**

## 1 Scope

This European Standard describes the primary purpose of the EMS, which is to meter energy consumption for billing. The EMS may also be used for other functions such as energy management.

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 the 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 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 50463-2 , *Railway applications — Energy measurement on board trains — Part 2: Energy measuring*

EN 50463-3 , *Railway applications — Energy measurement on board trains — Part 3: Data handling*

EN 50463-4 , *Railway applications — Energy measurement on board trains — Part 4: Communication*

EN 50463-5 , *Railway applications — Energy measurement on board trains — Part 5: Conformity assessment*

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

EN 60529:1991+A1:2000, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989+A1:1999)*

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*)*

CEN/TS 45545-2, *Railway applications — Fire protection on railway vehicles — Part 2: Requirements for fire behaviour of materials and components*

CLC/TS 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*