

**Raudteelased rakendused. Energiamõõtmised
rongides. Osa 3: Andmekäsitlus**

Railway applications - Energy measurement on board trains
- Part 3: Data handling

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 50463-3:2013 sisaldab Euroopa standardi EN 50463-3:2012 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.01.2013 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 21.12.2012.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 50463-3:2013 consists of the English text of the European standard EN 50463-3:2012.

This standard is ratified with the order of Estonian Centre for Standardisation dated 31.01.2013 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 21.12.2012.

The standard is available from Estonian standardisation organisation.

ICS 45.060.10

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: 605 5050; E-mail: info@evs.ee

English version

**Railway applications -
Energy measurement on board trains -
Part 3: Data handling**

Applications ferroviaires -
Mesure d'énergie à bord des trains -
Partie 3 : Traitement des données

Bahnanwendungen -
Energiesmessung auf Bahnfahrzeugen -
Teil 3: Daten-Behandlung

This European Standard was approved by CENELEC on 2012-10-15. 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, 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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Contents

Foreword	3
Introduction	4
1 Scope	6
2 Normative references	6
3 Terms, definitions and abbreviations	6
3.1 Terms and definitions	6
3.2 Abbreviations	8
4 Requirements	9
4.1 General	9
4.2 Time data	9
4.3 Energy data	10
4.4 Location data	11
4.5 Other received or produced data	12
4.6 Consumption point ID	12
4.7 Production of CEBD	12
4.8 DHS data storage	14
4.9 Transmission of CEBD from DHS to DCS	14
4.10 Marking and essential information	15
4.11 Event recording	15
4.12 DCS	16
5 Conformity assessment	16
5.1 General	16
5.2 Testing framework	17
5.3 Design review	18
5.4 Type testing	19
5.5 Routine testing	27
Annex ZZ (informative) Coverage of Essential Requirements of EU Directives	28
Bibliography	29

Figures

Figure 1 - EMS functional structure and dataflow diagram	5
Figure 2 – Example of energy index value	7

Tables

Table 1 – Location data formats	11
---------------------------------------	----

Foreword

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

EN 50463-3:2012 includes the following significant technical changes with respect to EN 50463:2007:

- this 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 3 of EN 50463 which consists of the following parts, under the common title *Railway applications — Energy measurement onboard 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 Contact Line system and the Current Measurement Function measures the current taken from and returned to the Contact Line 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.

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

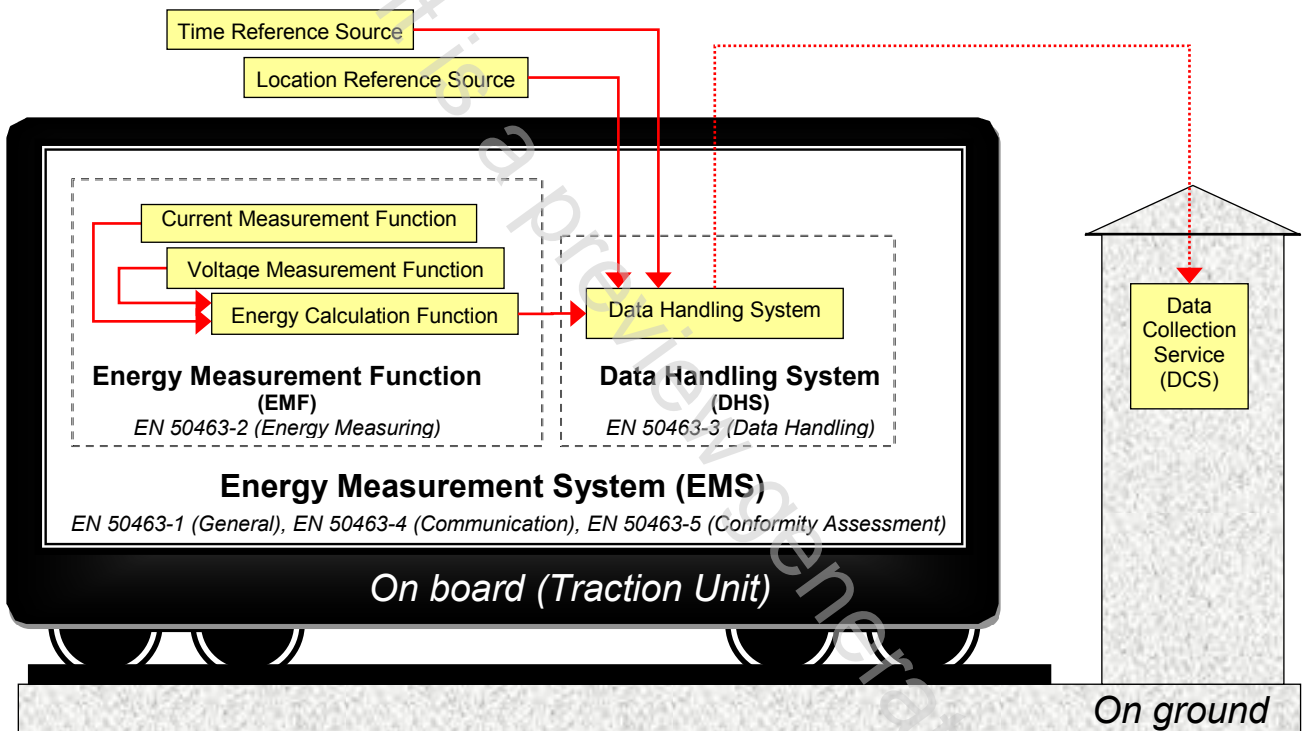


Figure 1 - EMS functional structure and dataflow diagram

1 Scope

This European Standard covers the requirements applicable to the Data Handling System (DHS) of an Energy Measurement System.

This document also includes the basic requirements for the Data Collection Service on ground, relating to the acquisition and storage of Compiled Energy Billing Data.

The Conformity Assessment arrangements for the DHS are specified in this document.

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.

CEN/TS 45545-2:2009, *Railway applications — Fire protection on railway vehicles — Part 2: Requirements for fire behaviour of materials and components*

CLC/TS 45545-5:2009, *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 50121-3-2:2006, *Railway applications — Electromagnetic compatibility — Part 3-2: Rolling stock — Apparatus*

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

EN 50463-1:2012, *Railway applications — Energy measurement on board trains — Part 1: General*

EN 50463-2:2012, *Railway applications — Energy measurement on board trains — Part 2: Energy measuring*

EN 50463-4:2012, *Railway applications — Energy measurement on board trains — Part 4: Communication*

EN 50463-5:2012, *Railway applications — Energy measurement on board trains — Part 5: Conformity assessment*

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

EN 61373:2010, *Railway Applications — Rolling stock equipment — Shock and vibration tests*

World Geodetic System, revision WGS 84

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50463-1:2012 and the following apply.

NOTE When possible, the following definitions have been taken from the relevant chapters of the International Electrotechnical Vocabulary (IEV), IEC 60050-311, IEC 60050-312, IEC 60050-313, IEC 60050-314, IEC 60050-321 and IEC 60050-811. 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.