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Železniške naprave - Merjenje energije na vlaku - 3. del: Ravnanje s podatki

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

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

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

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English Version

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

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).
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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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European foreword

This document (prEN 50463-3:2015) 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• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)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 50463-3:2012.

prEN 50463-3:2015 includes the following significant technical changes with respect to EN 50463-3:2012:

— updated requirements for DCS, CEBD, quality codes and logs (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 3 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. 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 railway 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. EN 50463-2 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 EN 50463-2.

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

— prEN 50463-3 — Data handling:

The scope of prEN 50463-3 is the Data Handling System (DHS).

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 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.

prEN 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:**

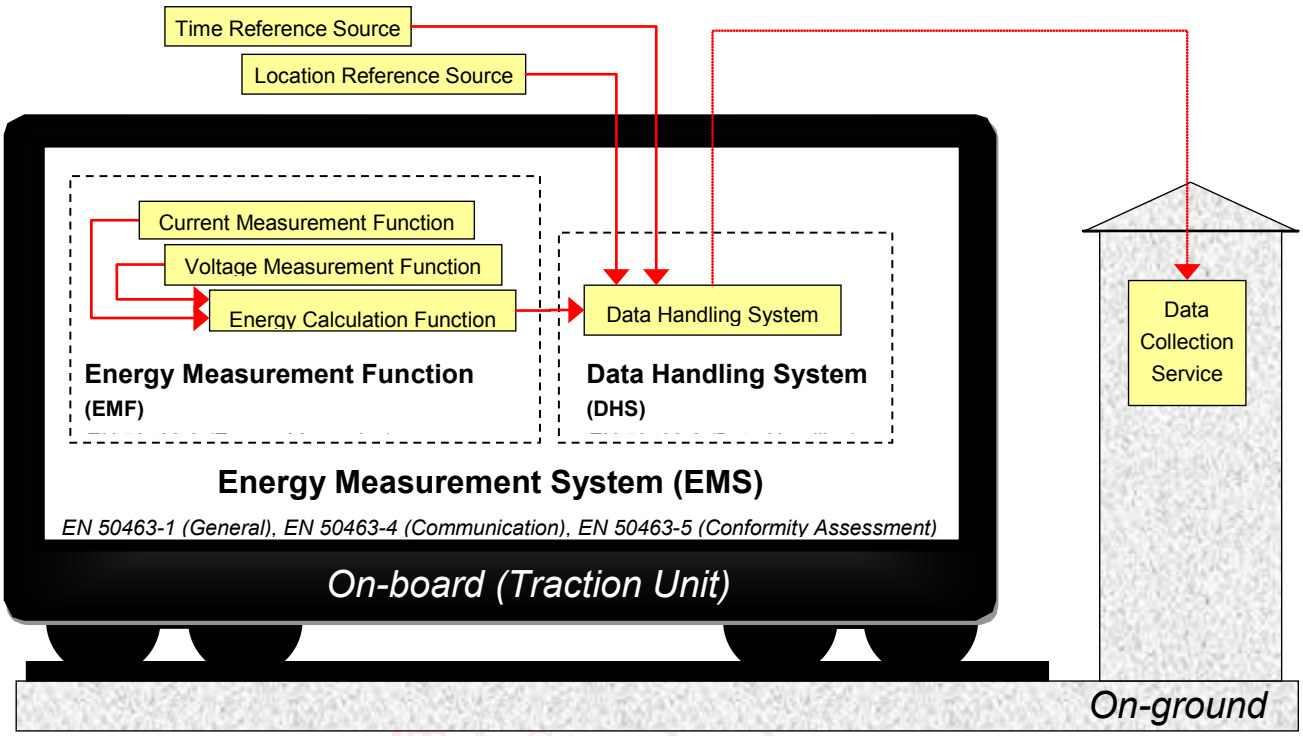
The scope of EN 50463-5 is the conformity assessment procedures for the EMS.

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.



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

1 Scope

This draft 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 and export of Compiled Energy Billing Data.

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

The settlement system is outside the scope of this standard, and the specification of the interface between DCS and settlement system is outside the scope of this standard.

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 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*

prEN 50463-1:2015, *Railway applications — Energy measurement on-board trains — Part 1: General*

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

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

EN 61373:2010, *Railway applications — Rolling stock equipment — Shock and vibration tests (IEC 61373)*

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 prEN 50463-1 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.

3.1.1
Coordinated Universal Time
UTC
time scale which forms the basis of a coordinated radio dissemination of standard frequencies and time signals, and corresponds exactly in rate with international atomic time, but differs from it by an integral number of seconds

Note 1 to entry: Coordinated universal time is established by the International Bureau of Weights and Measures (BIPM) and the International Earth Rotation Services (IERS).

Note 2 to entry: The UTC scales is adjusted by the insertion or deletion of seconds, so called positive or negative leap seconds, to ensure approximate agreement with UT1.

[SOURCE: ITU-R Recommendation TF.686, modified]

3.1.2
energy delta value
energy consumed and/or regenerated during a time period

Note 1 to entry: See Figure 2 for example.

3.1.3
energy index value
total accumulated energy consumption and/or energy regeneration at the end of a time period

Note 1 to entry: See Figure 2 for example.

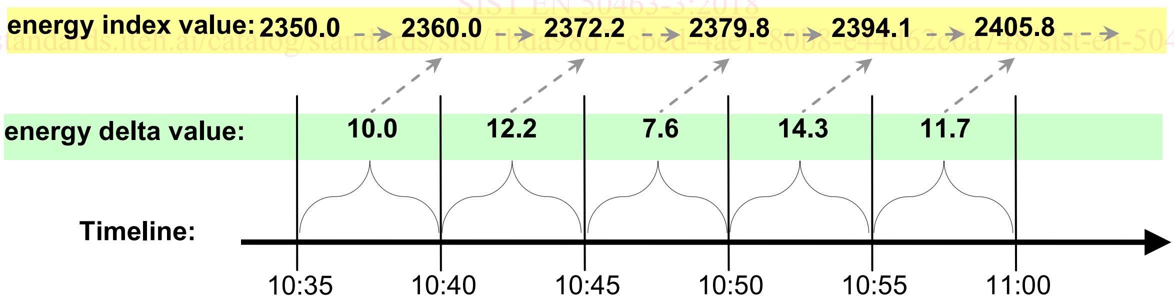

Figure 2 — Example of energy index value

3.1.4
flag
code indicating information relevant to the functioning of the EMS

Note 1 to entry: Examples include operational status, etc.

3.1.5
index value overrun
return to zero of the index value after reaching the maximum value allowed by the register

3.1.6
k-factor
multiplicand necessary to convert a secondary value into a primary value

Note 1 to entry: Each Voltage Measurement Function and/or Current Measurement Function can have a specific k-factor. If the k-factor is applied to Energy Data, this factor is the product of the k-factors of the Voltage Measurement Function and/or Current Measurement Function used.

3.1.7
location data
data describing the geographical position of the traction unit

3.1.8
log
list or set of lists of recorded events

3.1.9
primary value
value referred to the measuring inputs of an EMF

3.1.10
secondary value
value of current, voltage, power or energy which needs to be multiplied by a k-factor to become a primary value

3.1.11
time data
data describing a time and date of a defined time source

3.2 Abbreviations

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

CEBD	Compiled Energy Billing Data
CL	Contact Line
DCS	Data Collection Service
DHS	Data Handling System
ECF	Energy Calculation Function
EMF	Energy Measurement Function
EMS	Energy Measurement System
RAMS	Reliability, Availability, Maintenance and Safety
TRP	Time Reference Period
UTC	Coordinated Universal Time

4 Requirements

4.1 General

The requirements in prEN 50463-1:2015, Clause 4 apply to any device containing one or more functions of the DHS where applicable. prEN 50463-3 defines additional requirements specific to the DHS and basic requirements for the DCS.