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Železniške naprave - Merjenje energije na vlaku - 5. del: Ugotavljanje skladnosti

Railway applications - Energy measurement on board trains - Part 5: Conformity assessment

Bahnanwendungen - Energiemessung auf Bahnfahrzeugen - Teil 5: Konformitätsbewertung

Applications ferroviaires - Mesure d'énergie à bord des trains - Partie 5: Evaluation de la conformité

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45.060.10	Vlečna vozila	Tractive stock

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Railway applications - Energy measurement on board trains - Part 5: Conformity assessment

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

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Foreword

This document (EN 50463-5:2012) 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- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2015-10-15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 50463-5:2012), together with parts 1, 2, 3 and 4, supersedes EN 50463:2007.

EN 50463-5:2012 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 5 of EN 50463 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 EN 50463

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.

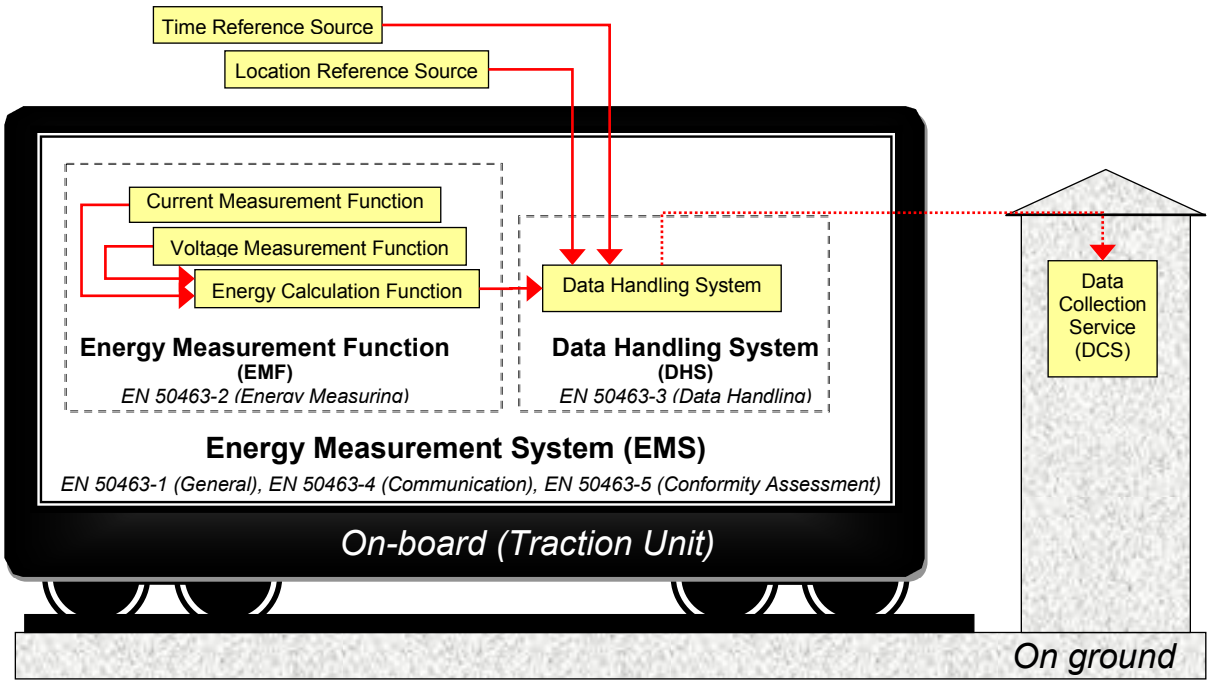

Figure 1 – EMS functional structure and dataflow diagram

1 Scope

This European Standard specifies the conformity assessment arrangements for newly manufactured EMS installed on a traction unit. This includes the integration conformity assessment and installation conformity assessment. In addition, this document also specifies the conformity assessment procedures for device and ancillary component replacement (e.g. due to damage in service), and periodic check to verify the EMS conformity assessment remains valid.

This European Standard does not include elements related to conformity assessment aspects other than design review and testing provisions for the products, processes or services specified. Consequently, this part does not delete, change or interpret the general requirements for conformity assessment procedures and vocabulary detailed in EN/ISO/IEC 17000.

This European Standard does not cover the conformity assessment schemes that, according to CENELEC Internal Regulations, are the responsibility of ISO policy committee “Committee on conformity assessment” (ISO/CASCO).

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 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 50463-3:2012, *Railway applications — Energy measurement on board trains — Part 3: Data handling*

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

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
conformity assessment
demonstration that specified requirements are fulfilled

3.1.2
Conformity Assessment File
CAF
folder holding all documentation produced during conformity assessment

3.1.3
EMS installation
installation of an EMS equipment type into a traction unit of a specified type

3.1.4
EMS integration
integration of devices, interconnections and ancillary components, forming a specific EMS equipment type

3.1.5
Implementation Under Assessment
IUA
specific EMS equipment type used throughout the conformity assessment

3.1.6
installer
entity responsible for the installation of an EMS equipment type into a traction unit type

3.1.7
integrator
entity responsible for integrating devices, interconnections and ancillary components, forming an EMS equipment type

3.1.8
periodic re-verification
activities carried out periodically to check that the conformity assessment of an in-service EMS remains valid

Note 1 to entry: These re-verification activities are solely for the purpose stated, consequently other in-service activities such as maintenance and fault finding etc are not covered by this term.

3.1.9
protective interface
interface which permits intended data to be exchanged, and prevents unintended data being exchanged

3.1.10
traction unit type
specific design of traction unit, produced by one manufacturer and having similar properties, the same uniform construction of parts determining these properties and the same functional components.

Note 1 to entry: The type is represented by the traction unit sample provided for the EMS installation type tests.

3.2 Abbreviations

For the purposes of this part, the following abbreviations apply.

All the abbreviations are listed in alphabetical order.

CAF	Conformity Assessment File
CEBD	Compiled Energy Billing Data
CPID	Consumption Point ID
DCS	Data Collection Service
DHS	Data Handling System
ECF	Energy Calculation Function
EMF	Energy Measurement Function
EMS	Energy Measurement System
IDRR	Integration Design Review Report
IRTR	Installation Routine Test Report
ITTR	Integration Type Test Report
IUA	Implementation Under Assessment
RVR	Re-verification Report

SRDR Installation Design Review Report

STTR Installation Type Test Report

4 Conformity assessment approach

4.1 General

This clause specifies the structure and methodology for the conformity assessment. The procedures, design review requirements, testing requirements, and conformity assessment documentation requirements are specified in Clause 5. Completion of devices level conformity assessment is a pre-requisite to carry out EMS conformity assessment. The conformity assessment is undertaken in the following key stages:

1. device level;

2. EMS level;

3. EMS re-verification and device / ancillary component replacement.

Stage 1 is mandatory for newly manufactured devices and is covered by EN 50463-2, EN 50463-3 and EN 50463-4. Stages 2, 3 are mandatory for every EMS in accordance with the scope as specified in Clause 1. The conformity assessment, undertaken during stages 2 and 3, deals primarily with system level requirements, and it does not replicate the detail in stage 1.

4.2 Situation of applicability

The EMS conformity assessment described in this part applies in case of:

- EMS integration,
- EMS installation,
- EMS periodic re-verification,
- EMS device / ancillary component replacement.

4.3 General Methodology

The conformity assessment is undertaken using the following methods:

a) device design review;

b) device type test;

c) device routine test;

d) EMS integration design review;

e) EMS integration type test

f) EMS installation design review;

g) EMS installation type test;

h) EMS installation routine test.

Furthermore the following methods are covering the re-verification and replacement: