

© Copyright SEK. Reproduction in any form without permission is prohibited.

Järnvägstillämpningar – Energimätning i rälsfordon – Del 5: Bedömning av överensstämmelse

*Railway application –
Energy measurement on board trains –
Part 5: Conformity assessment*

Som svensk standard gäller europastandarden EN 50463-5:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50463-5:2017.

Nationellt förord

Tidigare fastställd svensk standard SS-EN 50463-5, utgåva 1, 2013, gäller ej fr o m 2020-10-06.

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English Version

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

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

Bahnanwendungen - Energiemessung auf Bahnfahrzeugen
- Teil 5: Konformitätsbewertung

This European Standard was approved by CENELEC on 2017-05-08. 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

Contents

Page

European foreword.....	4
Introduction.....	5
1 Scope.....	8
2 Normative references.....	8
3 Terms, definitions and abbreviations	8
3.1 Terms and definitions	8
3.2 Abbreviations.....	9
4 Conformity assessment approach	10
4.1 General	10
4.2 Situation of applicability	10
4.3 General Methodology.....	10
4.4 EMS Specific Methodology	12
4.4.1 General.....	12
4.4.2 EMS integration design review.....	12
4.4.3 EMS integration type test.....	12
4.4.4 EMS installation design review	12
4.4.5 EMS installation type test	12
4.4.6 EMS installation routine test	12
4.4.7 EMS periodic re-verification	12
4.4.8 Replacement of devices and ancillary components	12
5 Conformity assessment procedures	12
5.1 General	12
5.2 EMS integration design review	13
5.2.1 EMS integration design review documentation.....	13
5.2.2 EMS integration design review assessment.....	13
5.2.3 Integration Design Review Report (IDRR).....	13
5.3 EMS integration type test	14
5.3.1 General.....	14
5.3.2 Integration type test procedure.....	14
5.3.3 Integration type tests.....	14
5.3.4 Integration Type Test Report (ITTR)	15
5.4 EMS installation design review.....	15
5.4.1 EMS installation design review documentation	15
5.4.2 EMS installation design review assessment	15
5.4.3 Installation Design Review Report (SDRR)	16
5.5 EMS Installation type test.....	16
5.5.1 General.....	16
5.5.2 Installation procedure	16
5.5.3 Installation type test procedure	16

5.5.4	Installation type tests	17
5.5.5	Installation Type Test Report (STTR).....	17
5.6	EMS installation routine test.....	17
5.6.1	General.....	17
5.6.2	Installation routine test procedure.....	18
5.6.3	Routine tests	18
5.6.4	Installation Routine Test Report (IRTR).....	19
5.7	Periodic re-verification	19
5.7.1	Procedure	19
5.7.2	Re-verification Report (RVR)	20
5.8	Replacement of devices and ancillary components.....	20
5.8.1	General.....	20
5.8.2	Documentation.....	21
5.8.3	Item replacement conformity assessment.....	22
5.8.4	Software.....	22
5.8.5	Programmable parameters	22
5.8.6	Replacement report	22
Annex ZZ (informative) Relationship between this European Standard and the Essential Requirements of Directive 2008/57/EC		23
Bibliography		24

Figures

Figure 1 — EMS functional structure and dataflow diagram	7
Figure 2 — Methods of conformity assessment	11
Figure 3 — Overview of EMS installation routine test process	18
Figure 4 — Replacement of devices and ancillary components	21

European foreword

This document (EN 50463-5:2017) has been prepared by CLC/TC 9X “Electrical and electronic applications for railways”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-04-06
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2020-10-06

This document supersedes EN 50463-5:2012.

EN 50463-5:2017 includes the following significant technical changes with respect to EN 50463-5:2012:

- no technical changes introduced in document; only the introduction has been updated in order to keep consistency in the five parts of the revised version of the EN 50463 series.

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 5 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.

a) 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:

1) 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.

2) 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 AC 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 (CEBD).

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.

3) EN 50463-3 — Data handling:

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

4) 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.

5) 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.

b) 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.

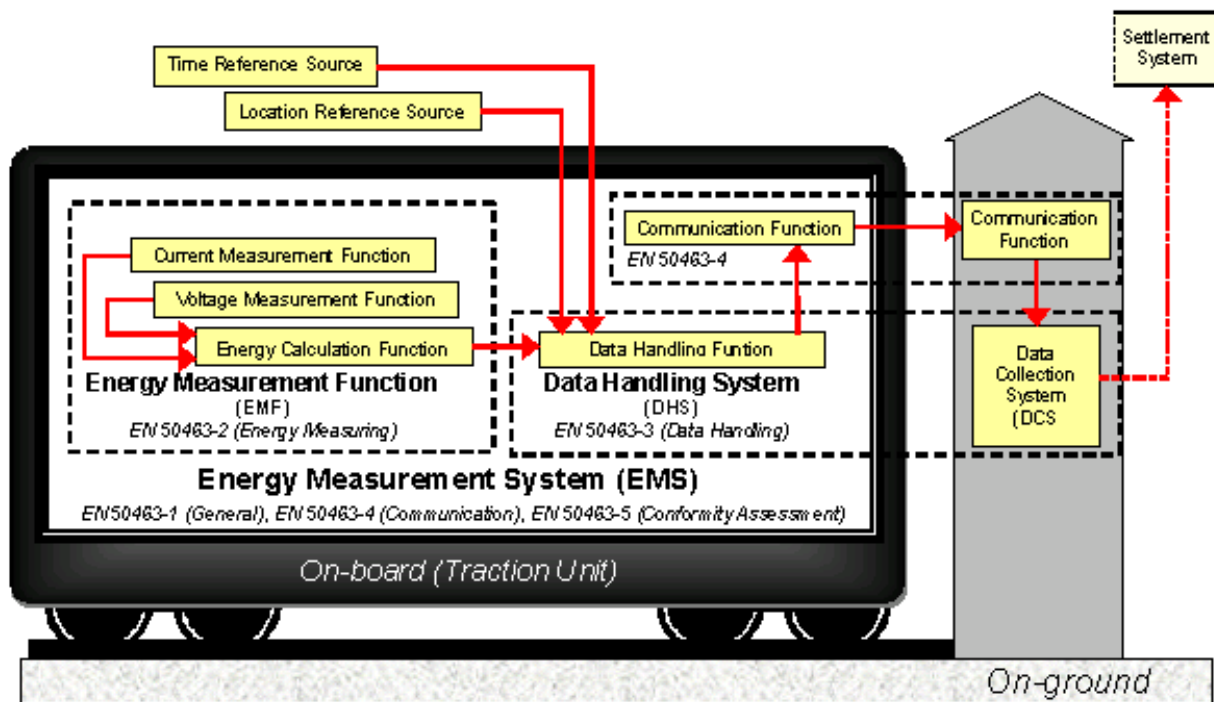


Figure 1 — EMS functional structure and dataflow diagram

1 Scope

This European Standard 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 the CEN-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 50155:2017, *Railway applications — Rolling stock — Electronic equipment*

EN 50463-1:2017, *Railway applications — Energy measurement on board trains — Part 1: General*

EN 50463-2:2017, *Railway applications — Energy measurement on board trains — Part 2: Energy measuring*

EN 50463-3:2017, *Railway applications — Energy measurement on board trains — Part 3: Data handling*

EN 50463-4:2017, *Railway applications — Energy measurement on board trains — Part 4: Communication*