



**NSAI**  
Standards

Irish Standard  
I.S. EN 50463-2:2012

# Railway applications - Energy measurement on board trains -- Part 2: Energy measuring

## I.S. EN 50463-2:2012

*Incorporating amendments/corrigenda issued since publication:*

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I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

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**Railway applications -  
Energy measurement on board trains -  
Part 2: Energy measuring**

Applications ferroviaires -  
Mesure d'énergie à bord des trains -  
Partie 2 : Mesure d'énergie

Bahnanwendungen -  
Energiesmessung auf Bahnfahrzeugen -  
Teil 2: Energiemessung

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.

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**CENELEC**

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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## Foreword

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- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2015-10-15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

EN 50463-1:2012 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 2 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.*

EN 50463-2 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.

Part 4 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.

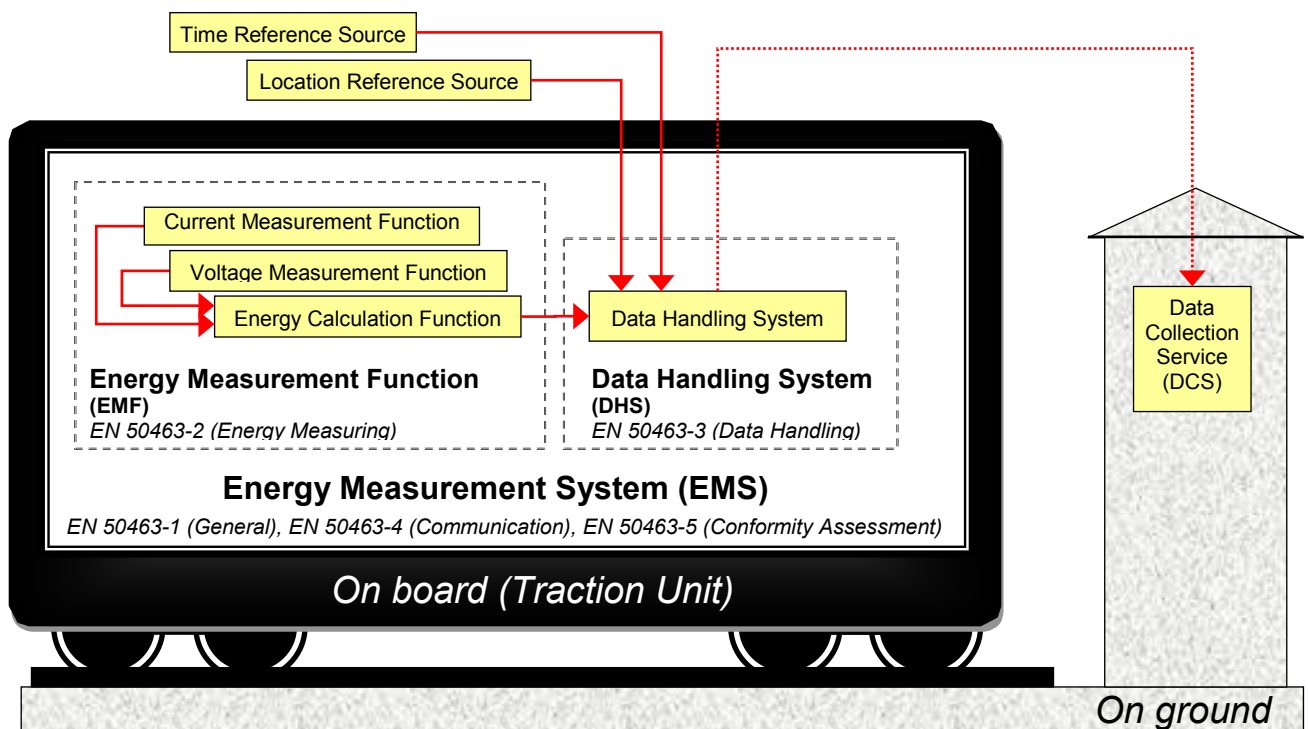


Figure 1 – EMS functional structure and dataflow diagram

## 1 Scope

This European Standard covers the requirements applicable to the Energy Measurement Function (EMF) of an Energy Measurement System (EMS) for use on board traction units for measurement of energy supplied directly from/to the Contact Line system.

This European Standard also gives requirements for the Current Measurement Function (e.g. current sensor), the Voltage Measurement Function (e.g. voltage sensor) and the Energy Calculation Function (e.g. energy meter).

The Conformity Assessment arrangements for the Voltage Measurement Function, Current Measurement Function, the Energy Calculation Function and a complete Energy Measurement Function are also specified in this document.

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.

Figure 2 shows the flow between the functional blocks of the EMF. Only connections between the functional blocks required by this standard are displayed.

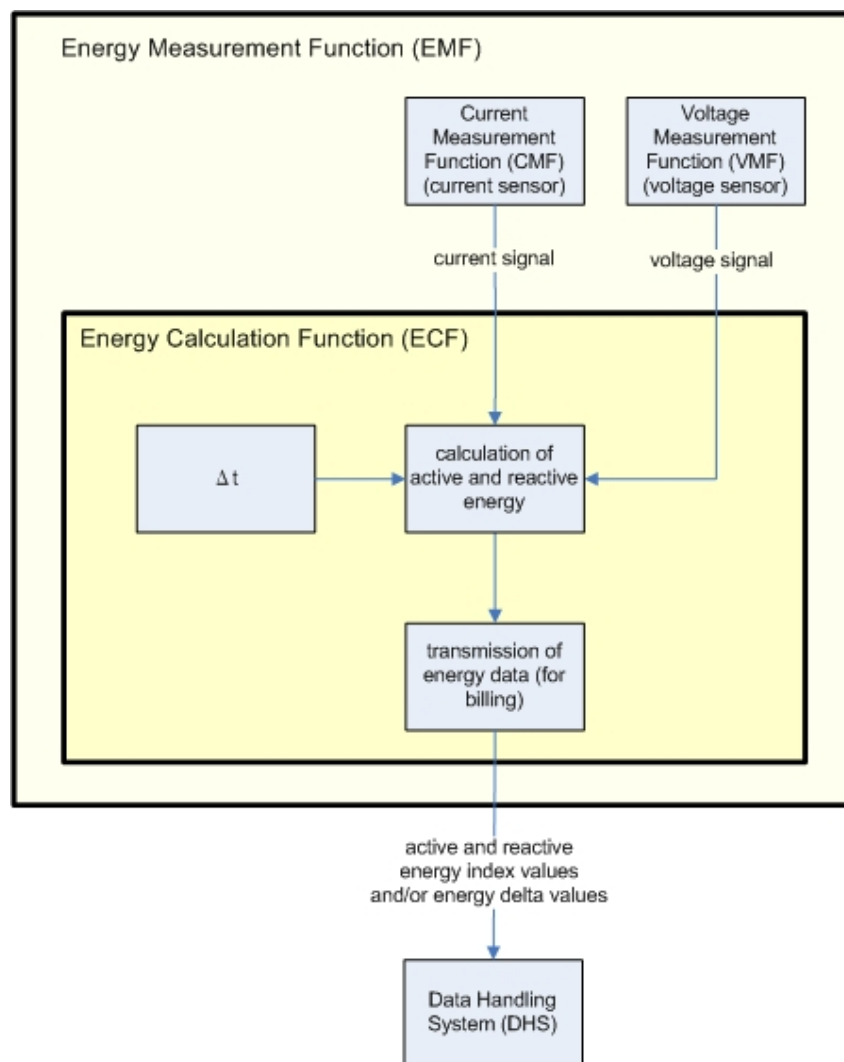


Figure 2 – EMF functional block diagram

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