Raudtee elektroonikaseadmed. Rongisisene kommunikatsioonivõrk. Osa 2-1: Juhtmeline rongisiin

Electronic railway equipment - Train communication network (TCN) - Part 2-1: Wire Train Bus (WTB)

EESTI STANDARDIKESKUS
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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 61375-2-1:2012 sisaldab Euroopa standardi EN 61375-2-1:2012 ingliskeelset teksti.	This Estonian standard EVS-EN 61375-2-1:2012 consists of the English text of the European standard EN 61375-2-1:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 03.08.2012.	Date of Availability of the European standard is 03.08.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 45.060

EUROPEAN STANDARD

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Electronic railway equipment - Train communication network (TCN) - Part 2-1: Wire Train Bus (WTB)

(IEC 61375-2-1:2012)

Matériel électronique ferroviaire - Réseau embarqué de train (TCN) - Partie 2-1: Bus de Train Filaire (WTB) (CEI 61375-2-1:2012)

Elektronische Betriebsmittel für Bahnen - Zug-Kommunikations-Netzwerk - Teil 2-1: WTB - Wire Train Bus Konformitätsprüfung (IEC 61375-2-1:2012)

This European Standard was approved by CENELEC on 2012-07-26. 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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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.

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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

Ref. No. EN 61375-2-1:2012 E

Foreword

The text of document 9/1642/FDIS, future edition 1 of IEC 61375-2-1, prepared by IEC/TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61375-2-1:2012.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2013-04-26
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-07-26

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 the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 61375-2-1:2012 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60870-5-1 NOTE Harmonized as EN 60870-5-1.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60571	-	Electronic equipment used on rail vehicles	-	-
IEC 60807	Series	Rectangular connectors for frequencies below 3 MHz	-	-
IEC 61375-1	-	Electronic railway equipment - Train communication network - Part 1: TCN - Train Communication Network general architecture	EN 61375-1	-
IEC 61375-2-2	2012	Electronic railway equipment - Train communication network (TCN) - Part 2-2: Wire Train Bus conformance testing	EN 61375-2-2	2012
IEC 61375-3-1	-	Electronic railway equipment - Train communication network (TCN) - Part 3-1: Multifunction Vehicle Bus (MVB)	EN 61375-3-1	-
ISO/IEC 8802-2	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 2: Logical link control	-	-
ISO/IEC 8824	Series	Information technology - Abstract Syntax Notation One (ASN.1)	-	-
ISO/IEC 8825	Series	Information technology - ASN.1 encoding rules	-	-
ISO/IEC 8859-1	-	Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No.1	-	-
ISO/IEC 9646	Series	Information technology - Open Systems Interconnection - Conformance testing methodology and framework	-	-
ISO/IEC 10646	-	Information technology - Universal multiple-octet coded character set (UCS)	-	-
ISO/IEC 13239	-	Information technology - Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures	-	-
ITU-T Recommendation V.24	-	List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)	-	-
ITU-T Recommendation Z.100	-	Specification and Description Language (SDL)	-	-

Publication	Year	Title	EN/HD	Year
IEEE 754	-	Binary floating-point arithmetic	-	-
UIC CODE 556	-	Information transmission in the train (train-bus)	-	-
UIC CODE 557	-	Diagnostics on passenger rolling stock	-	-

Annex ZZ
(informative)

Coverage of Essential Requirements of EU Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Annex III of the EU Directive 2008/57/EC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

CONTENTS

INTRODUCTION

This part of IEC 61375 specifies one component of the Train Communication Network, the Wire Train Bus (WTB), a serial data communication bus designed primarily, but not exclusively, for interconnecting consists which are frequently coupled and uncoupled, as is the case of international UIC trains.

Figure 1 illustrates the WTB application.

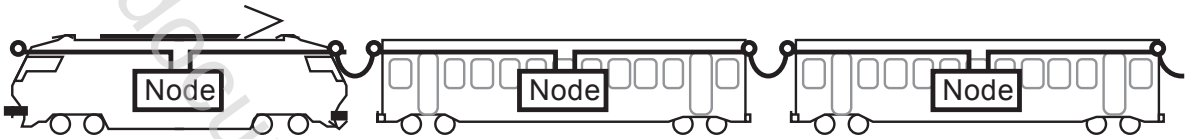


Figure 1 – Wire Train Bus

This standard defines these interfaces as connections to a data communication network, called the Train Communication Network (TCN).

The TCN has a hierarchical structure with two levels of networks, a Train Backbone and a Consist network:

a) for interconnecting consists in Open Trains (see definition) such as international UIC trains, this standard specifies a Train Bus called the Wire Train Bus (WTB);

b) for connecting standard on-board equipment a Consist network e.g. the Multifunction Vehicle Bus (MVB) can be used.

In the TCN architecture, WTB features Real-Time Protocols, which offer two communication services:

c) Process Variables, a distributed, real-time database, periodically refreshed through broadcasting;

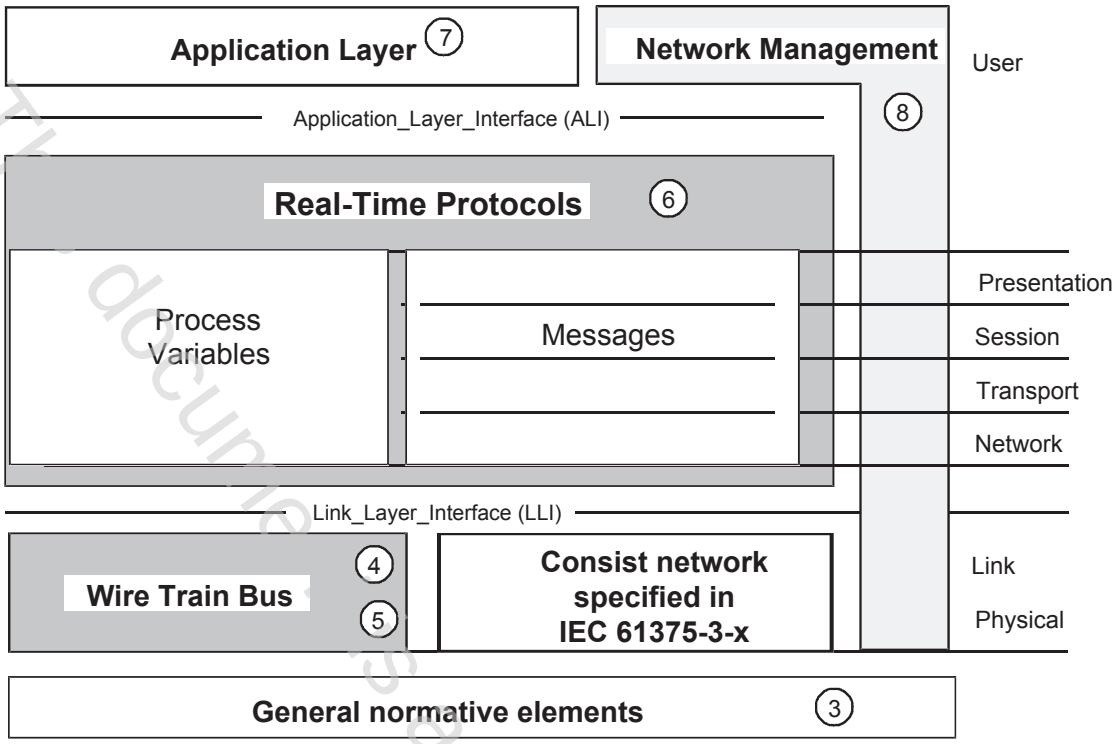
d) messages, transmitted on demand either as:

- unicast messages (point-to-point) or/and
- multicast messages.

WTB in the TCN offers a common Network Management, which allows debugging, commissioning and maintenance over the network.

The Consist network MVB shares Real-Time Protocols and Network Management with WTB. Other implementations of consist networks need adaption to the Real-Time Protocols and Network Management of WTB.

The TCN is structured similarly to the Open System Interconnection model defined in ISO/IEC 7498-1 (see Figure 2).



NOTE The circled numbers refer to the clauses of this standard.

Figure 2 – Layering of the TCN

This standard has been, for editorial reasons, divided into eight clauses:

Clause 1

– Scope;

Clause 2

– Normative references;

Clause 3

– Terms and definitions, abbreviations, conventions;

Clause 4 and 5: Wire Train Bus,

– Physical layer and Link Layer Control;

Clause 6: Real-Time protocols,

– Variables: Link Layer Interface and Application Layer Interface;
– Messages: Link Layer Interface, Protocols, Application Layer Interface;
– Data Representation;

Clause 7: Application Layer

– Process Data Marshalling
– WTB Line Fault Location Detection

Clause 8: Train Network Management

– Configuration, supervision and control of the network.

ELECTRONIC RAILWAY EQUIPMENT – TRAIN COMMUNICATION NETWORK (TCN)–

Part 2-1: Wire Train Bus (WTB)

1 Scope

This part of IEC 61375 applies to data communication in Open Trains, i.e. it covers data communication between consists of the said open trains and data communication within the consists of the said open trains.

The applicability of this standard to the train communication bus (WTB) allows for interoperability of individual consists within Open Trains in international traffic. The data communication bus inside consists (e.g. MVB) is given as recommended solution to cope with the said TCN. In any case, proof of compatibility between WTB and a proposed consist network will have to be brought by the supplier.

This standard may be additionally applicable to closed trains and multiple unit trains when so agreed between purchaser and supplier.

NOTE 1 For a definition of Open Trains, Multiple Unit Trains and Closed Trains, see Clause 3.

NOTE 2 Road vehicles such as buses and trolley buses are not considered in 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.

IEC 60571, *Electronic equipment used on rail vehicles*

IEC 60807 (all parts), *Rectangular connectors for frequencies below 3 MHz*

IEC 61375-1, *Electronic railway equipment – Train communication network (TCN) – Part 1: General architecture*

IEC 61375-2-2:2012, *Electronic railway equipment – Train communication network (TCN) – Part 2-2: Wire Train Bus conformance testing*

IEC 61375-3-1, *Electronic railway equipment – Train communication network (TCN) – Part 3-1: Multifunction Vehicle Bus (MVB)*

ISO/IEC 8802-2, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 2: Logical link control*

ISO/IEC 8824 (all parts), *Information technology – Abstract Syntax Notation One (ASN.1)*

ISO/IEC 8825 (all parts), *Information technology – ASN.1 encoding rules*

ISO/IEC 8859-1, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1*

ISO/IEC 9646 (all parts), *Information technology – Open Systems Interconnection – Conformance testing methodology and framework*

ISO/IEC 10646, *Information Technology – Universal Multipl-Octet Coded Character Set (UCS)*

ISO/IEC 13239, *Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures*

ITU-T Recommendation V24*, List of definitions for interchange circuits between data terminal equipment (DTE) and data-circuit terminating equipment (DCE)*

ITU-T Recommendation Z.100, *Specification and Description Language (SDL)*

IEEE 754, *Standard for Binary Floating-Point Arithmetic*

UIC CODE 556, *Information transmission in the train (train-bus)*

UIC CODE 557, *Diagnostics on passenger rolling stock*

3 Terms and definitions, abbreviations, conventions

3.1 Terms and definitions

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

NOTE Keywords in this standard are written with the first letter of each word in upper case and, when they are composed of two or several words, these are joined by an underscore. This convention allows keywords to be tracked in the documents.

3.1.1
address
identifier of a communication partner, of which several types exist, depending on the layer

3.1.2
agent
application process in a Station which accesses the local managed objects on behalf of the Manager

3.1.3
Aperiodic Data
transmission of Process Data on a demand basis. This service is not used

3.1.4
Application Layer
upper layer in the OSI model, interfacing directly to the Application

3.1.5
Application Layer Interface
definition of the services offered by the Application Layer

3.1.6
Application Messages Adapter
code directly called by the application implementing the Messages services