

STN	Dráhové aplikácie. Systémy riadenia mestskej dopravy s vyhradenou vodiacou dráhou a povelové/ovládacie systémy. Časť 2: Špecifikácia funkčných požiadaviek.	STN EN 62290-2
		34 1522

Railway applications - Urban guided transport management and command/control systems - Part 2: Functional requirements specification

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/15

Obsahuje: EN 62290-2:2014, IEC 62290-2:2014

Oznámením tejto normy sa od 14.08.2017 ruší
STN EN 62290-2 (34 1522) z februára 2012

120104

Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, odbor SÚTN, 2015
Podľa zákona č. 264/1999 Z. z. v znení neskorších predpisov sa môžu slovenské technické normy rozmnožovať a rozširovať iba so súhlasom Úradu pre normalizáciu, metrológiu a skúšobníctvo SR.

EUROPEAN STANDARD

EN 62290-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2014

ICS 45.060

Supersedes EN 62290-2:2011

English Version

**Railway applications - Urban guided transport management and
command/control systems - Part 2: Functional requirements
specification
(IEC 62290-2:2014)**

Applications ferroviaires - Systèmes de contrôle/commande
et de gestion des transports guidés urbains -
Partie 2: Spécification des exigences fonctionnelles
(CEI 62290-2:2014)

Bahnanwendungen - Betriebsleit- und
Zugsicherungssysteme für den städtischen
schienengebundenen Personennahverkehr -
Teil 2: Funktionale Anforderungsspezifikation
(IEC 62290-2:2014)

This European Standard was approved by CENELEC on 2014-08-14. 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, 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

Foreword

The text of document 9/1914/FDIS, future edition 2 of IEC 62290-2, 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 62290-2:2014.

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) 2015-05-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-08-14

This document supersedes EN 62290-2:2011.

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.

Endorsement notice

The text of the International Standard IEC 62290-2:2014 was approved by CENELEC as a European Standard without any modification.

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 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62290-1	-	Railway applications - Urban guided transport management and command/control systems - Part 1: System principles and fundamental concepts	EN 62290-1	-



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Railway applications – Urban guided transport management and
command/control systems –
Part 2: Functional requirements specification**

**Applications ferroviaires – Systèmes de contrôle/commande et de gestion des
transports guidés urbains –
Partie 2: Spécification des exigences fonctionnelles**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2014 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 14 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 55 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Railway applications – Urban guided transport management and
command/control systems –
Part 2: Functional requirements specification**

**Applications ferroviaires – Systèmes de contrôle/commande et de gestion des
transports guidés urbains –
Partie 2: Spécification des exigences fonctionnelles**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XB**
CODE PRIX

ICS 45.060

ISBN 978-2-8322-1661-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	9
2 Normative references	9
3 Terms, definitions and abbreviations	9
4 Operational concept	9
4.1 Organisation of operation for urban guided transport	9
4.2 Basic operational principles	11
4.3 Principles to ensure safe route.....	11
4.4 Principles to ensure safe separation of trains.....	12
4.5 Principles to ensure safe speed	12
4.6 Degraded modes of train operation	13
5 Functions for train operation.....	13
5.1 Ensure safe movement of trains.....	14
5.1.1 Ensure safe route	14
5.1.2 Ensure safe separation of trains	17
5.1.3 Determine permitted speed.....	20
5.1.4 Authorize train movement.....	22
5.1.5 Supervise train movement	25
5.1.6 Provide interface with external interlocking.....	29
5.2 Drive train.....	29
5.2.1 Determine operating speed profile	30
5.2.2 Control train movement in accordance with train operating speed profile	31
5.2.3 Stop train in station	31
5.3 Supervise guideway.....	33
5.3.1 Prevent collision with obstacles	33
5.3.2 Prevent collisions with persons on tracks.....	34
5.3.3 Protect staff on track by work zone	38
5.4 Supervise passenger transfer	39
5.4.1 Control train and platform doors	39
5.4.2 Prevent injuries to persons between cars or between platform and train	42
5.4.3 Ensure starting conditions	42
5.5 Operate a train.....	44
5.5.1 Put in or take out of operation.....	44
5.5.2 Manage driving modes.....	45
5.5.3 Manage movement of trains between two operational stops.....	46
5.5.4 Manage depots and stabling areas	46
5.5.5 Manage UGTMS transfer tracks.....	47
5.5.6 Restrict train entry to station.....	47
5.5.7 Change the travel direction.....	47
5.5.8 Couple and split a train.....	48
5.5.9 Supervise the status of the train	49
5.5.10 Manage traction power supply on train.....	51
5.6 Ensure detection and management of emergency situations	52
5.6.1 React to detected fire/smoke	52
5.6.2 React to detected derailment	53

5.6.3	React to detected or suspected broken rail	53
5.6.4	Manage passenger requests	54
5.6.5	React to loss of train integrity	55
5.6.6	Supervise closed and locked status of train doors	56
6	Functions for operation management and supervision	57
6.1	Manage the daily timetable	57
6.1.1	Import timetables	57
6.1.2	Select the timetable	57
6.1.3	Modify the operational timetable	58
6.2	Manage the train service	58
6.2.1	Manage train missions	58
6.2.2	Set routes automatically	60
6.2.3	Regulate trains	61
6.2.4	Ensure connecting services	61
6.2.5	Manage operational disturbances	62
6.2.6	Dispatch trains	62
6.3	Supervise train operations	63
6.3.1	Supervise train tracking	63
6.3.2	Supervise trains and wayside equipment	64
6.3.3	Supervise passengers	65
6.4	Control traction power	66
6.4.1	Monitor traction power supply	66
6.4.2	Command traction power supply	66
6.4.3	Control regenerative braking	66
6.5	Manage the interface with the HMI	66
6.5.1	Manage the interface with operations control HMI	67
6.5.2	Manage the interface with the train HMI	67
6.6	Provide interface with the communication system for passengers and staff	67
6.7	Provide interface with the passengers information system	68
6.8	Provide interface with passenger surveillance system	68
6.9	Support maintenance	68
6.10	Manage rolling stock and staff resources	69
6.10.1	Assign rolling stock to operation needs	69
6.10.2	Assign or reassign train staff	69
	Bibliography	71
	Figure 1 – The three-step process followed by the UGTMS standard	7
	Figure 2 – Organisation of operation	10
	Figure 3 – Train protection profile and speed supervision	13
	Figure 4 – Specification of a safe route	14

INTERNATIONAL ELECTROTECHNICAL COMMISSION

RAILWAY APPLICATIONS – URBAN GUIDED TRANSPORT MANAGEMENT AND COMMAND/CONTROL SYSTEMS –

Part 2: Functional requirements specification

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62290-2 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This second edition cancels and replaces the first edition issued in 2011. It constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

- all terms and definitions have been moved to Part 1.

The text of this standard is based on the following documents:

FDIS	Report on voting
9/1914/FDIS	9/1942/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62290 series, under the general title *Railway applications – Urban guided transport management and command/control systems*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

IEC 62290 standard series specifies the functional, system and interface requirements for the command, control, and management systems intended to be used on urban, guided passenger transport lines and networks. This series does not apply to lines that are operated under specific railway regulations, unless otherwise specified by the authority having jurisdiction.

These systems are designated here as Urban Guided Transport Management and Command/Control Systems (UGTMS). UGTMS cover a wide range of operations needs from non-automated (GOA1) to unattended (GOA4) operation. A line may be equipped with UGTMS on its full length or only partly equipped.

This series does not specifically address security issues. However, aspects of safety requirements may apply to ensuring security within the urban guided transit system.

The main objective of this series is to achieve interoperability, interchangeability and compatibility.

This series is a recommendation for those transport authorities wishing to introduce interoperable, interchangeable and compatible equipment.

It is the responsibility of the transport authority concerned in accordance with the authority having jurisdiction to decide on how to apply this series and to take into account their particular needs.

IEC 62290 series is also intended to support applications for upgrading existing signalling and command control systems. In this case, interchangeability and compatibility could be ensured only for the additional UGTMS equipment. Checking the possibility for upgrading existing equipment and the level of interoperability is the responsibility of the transport authority concerned.

Application of the series should take into account the differences between the various networks operated in different nations. Those differences include operational and regulatory requirements as well as different safety cultures.

This series defines a catalogue of UGTMS requirements split into mandatory and optional functions. The functions used are based on the given grade of automation. By fulfilling the requirements, a supplier can create one or more generic applications including all mandatory functions and all or a subset of optional functions. A generic application will achieve interoperability within the defined specific application conditions. Customising a generic application will create a specific application taking into account of local conditions such as track layout and headway requirements. It is the choice of supplier and transport authority to add additional functions to a generic or specific application. These additional functions are not described in this series.

According to IEC 62278, it is the responsibility of the transport authority, in agreement with the authority having jurisdiction, to decide, taking into account their risk acceptance principles to conduct specific hazard and risk analysis for each specific application. The safety levels for the functions of each specific application have to be determined by a specific risk analysis.

Terms like "safety related command", "safety conditions", "safe station departure" are mentioned without having performed any hazard analysis.

Standard series IEC 62290 is intended to consist of four parts:

- Part 1 "System principles and fundamental concepts" provides an introduction to the standard and deals with the main concepts, the system definition, the principles and

the basic functions of UGTMS (Urban Guided Transport Management and Command/Control Systems).

The three other parts correspond to the three steps (see Figure 1) required in the process of specifying UGTMS and are to be used accordingly.

- Part 2 “Functional requirements specification” specifies the functional requirements associated to the basic functions provided by Part 1, within the system boundaries and interfaces as defined in Figure 3 of Part 1.

The FRS (Functional Requirements Specification) identifies and defines the functions that are necessary to operate an urban guided transport system. Two types of functions are distinguished for a given grade of automation: mandatory functions (e.g. train detection) and optional functions (e.g. interfaces to passenger information and passenger surveillance systems). Requirements of functions have the same allocation, unless they are marked otherwise.

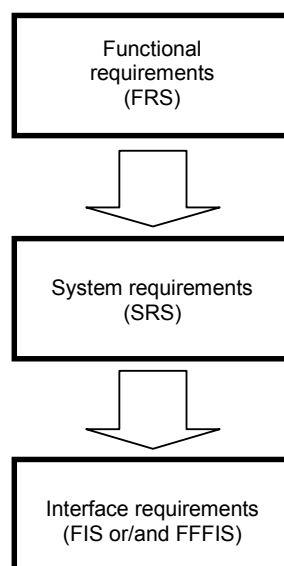
- Part 3 (under consideration) “System requirements specifications” deals with the architecture of the system and the allocation of the requirements and functions identified in Part 2 to architecture constituents.

The SRS (System Requirement Specification) specifies the architecture of a UGTMS system, with mandatory and optional constituents.

- Part 4 (under consideration) “Interface specifications” deals with the definition of the interfaces, as well as the data exchanged by them (FIS and FFFIS), for the interoperable and interchangeable constituents identified in Part 3.

For interfaces between UGTMS constituents, the logical interface or FIS (Functional Interface Specification) and/or the physical and logical interface or FFFIS (Form Fit Functional Interface Specification) will be considered.

NOTE The specific structures of Part 3 and Part 4 will be established following completion of Part 2 to accommodate optional and mandatory constituents, and to reflect local conditions. In principle, only one FIS or/and FFFIS will be defined for the same interface. However, when justified in some cases, several FISs or several FFFISs will be defined for the same interface.



IEC 891/11

Figure 1 – The three-step process followed by the UGTMS standard

Requirements are those necessary to fulfil all operational needs for safe and orderly operation requested by transport authorities without regard to technical solutions.

The chosen level of detail in describing requirements enables customers as well as authorities having jurisdiction to be assured that generic applications delivered by different suppliers will cover at least the same functionality as specified in this part of IEC 62290.

Requirements which are established by this series are indicated clearly with a requirement identification number related to the function to be covered.

RAILWAY APPLICATIONS – URBAN GUIDED TRANSPORT MANAGEMENT AND COMMAND/CONTROL SYSTEMS –

Part 2: Functional requirements specification

1 Scope

This part of IEC 62290 specifies the functional requirements of UGTMSs (Urban Guided Transport Management and Command/Control Systems) for use in urban guided passenger transport lines and networks. This part of IEC 62290 is applicable for new lines or for upgrading existing signalling and command control systems.

This part of IEC 62290 is applicable to applications using:

- continuous data transmission
- continuous supervision of train movements by train protection profile
- localisation of trains by external wayside equipment or reporting trains.

This standard is not applicable to existing command and control systems or projects in progress prior to the effective date of this standard.

In this Part 2 of the standard, the functional requirements set the framework to which detailed functions should be added to define any generic or specific application.

Because of that, although this part of the standard is applicable as a basis to define SRS, FIS and FFFIS, elements may be added for a generic or specific application.

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 62290-1, *Railway applications – Urban guided transport management and command/control systems – Part 1: System principles and fundamental concepts*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN