SLOVENSKI STANDARD

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Pomorska plovba ter radiokomunikacijski oprema in sistemi - Digitalni vmesniki - 1. del: Enosmerna komunikacija en govorec - veļ posluġalcev (IEC 61162-1:2007)

Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners (IEC 61162-1:2007)

Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt - Digitale Schnittstellen - Teil 1: Ein Datensender und mehrere Datenempfänger (IEC 61162-1:2007)

Matériels et systèmes de navigation et de radiocommunication maritimes - Interfaces numériques - Partie 1: Émetteur unique et récepteurs multiples (CEI 61162-1:2007)

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Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners

(IEC 61162-1:2007)

Matériels et systèmes de navigation et de radiocommunication maritimes - Interfaces numériques - Partie 1: Emetteur unique et récepteurs multiples (CEI 61162-1:2007)

Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt - Digitale Schnittstellen - Teil 1: Ein Datensender und mehrere Datenempfänger (IEC 61162-1:2007)

This European Standard was approved by CENELEC on 2008-02-01. 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 Central Secretariat or to any CENELEC member.

This European Standard exists in two official versions (English and 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 Central Secretariat 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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 80/464/FDIS, future edition 3 of IEC 61162-1, prepared by IEC TC 80, Maritime navigation and radiocommunication equipment and systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61162-1 on 2008-02-01.

This European Standard supersedes EN 61162-1:2000.

The main changes with respect to EN 61162-1:2000 are listed below:

– normative references have been renumbered from 1.2 to 2, Terms and definitions from 1.3 to 3 and Manufacturers documentation from 2 to 4. Thereafter all clauses are numbered two ahead of those in EN 61162-1:2000;

– Clause 7 (Clause 5 in EN 61162-1:2000) has been expanded to include two types of start of sentence delimiters. The conventional delimiter “$” is used with the conventional sentences which are now called parametric sentences. A new delimiter “!” identifies sentences that conform to special purpose encapsulation. The example applications in Clause 9 (Clause 7 in EN 61162-1:2000) have been expanded to describe both types;

– the tables in Clause 8 (Clause 6 in EN 61162-1:2000) have been updated. The previous Table 5 (Approved sentence formatters) and the associated Annex A (Minimum required sentences) have been deleted;

– Clause 8 has been expanded to include new and revised sentences;

– four new annexes have been added to support the text.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2008-11-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2011-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61162-1:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60872-1	NOTE	Harmonized as EN 60872-1:1998 (not modified).
IEC 60872-2	NOTE	Harmonized as EN 60872-2:1999 (not modified).
IEC 60872-3	NOTE	Harmonized as EN 60872-3:2001 (not modified).
IEC 60936-1 + A1	NOTE	Harmonized as EN 60936-1:2000 (not modified) + A1: 2002
IEC 60936-2	NOTE	Harmonized as EN 60936-2:1999 (not modified).
IEC 60936-3	NOTE	Harmonized as EN 60936-3:2002 (not modified).

IEC 61023	NOTE	Harmonized as EN 61023:2007 (not modified).
IEC 61075	NOTE	Harmonized as EN 61075:1993 (modified).
IEC 61097-1	NOTE	Harmonized as EN 61097-1:2007 (not modified).
IEC 61108-1	NOTE	Harmonized as EN 61108-1:2003 (not modified).
IEC 61108-2	NOTE	Harmonized as EN 61108-2:1998 (not modified).
IEC 61108-4	NOTE	Harmonized as EN 61108-4:2004 (not modified).
IEC 61174	NOTE	Harmonized as EN 61174:2001 (not modified).
IEC 61209	NOTE	Harmonized as EN 61209:1999 (not modified).
IEC 61924	NOTE	Harmonized as EN 61924:2006 (not modified).
IEC 61993-1	NOTE	Harmonized as EN 61993-1:1999 (not modified).
IEC 61993-2	NOTE	Harmonized as EN 61993-2:2002 (not modified).
IEC 61996	NOTE	Harmonized as EN 61996:2000 (not modified).
IEC 61996-2	NOTE	Harmonized as EN 61996-2:2006 (not modified).
IEC 62065	NOTE	Harmonized as EN 62065:2002 (not modified).
IEC 62252	NOTE	Harmonized as EN 62252:2004 (not modified).
IEC 62287-1	NOTE	Harmonized as EN 62287-1:2006 (not modified).
ISO/IEC 11674	NOTE	Harmonized as EN ISO/IEC 11674:2001 (not modified).
ISO 449	NOTE	Harmonized as EN ISO 449:1999 (not modified).
ISO 8728	NOTE	Harmonized as EN ISO 8728:1998 (not modified).
ISO 9875	NOTE	Harmonized as EN ISO 9875:2001 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. 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 60945	-[1)]	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results	EN 60945	2002[2)]
IEC 61162-2	1998	Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 2: Single talker and multiple listeners, high-speed transmission	EN 61162-2	1998
ISO/IEC 8859-1	1998	Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No.1	-	-
ITU-R M.493	-[1)]	Digital selective-calling system for use in the maritime mobile service	-	-
ITU-R M.821	-[1)]	Optional expansion of the digital selective-calling system for use in the maritime mobile service	-	-
ITU-R M.825	-[1)]	Characteristics of a transponder system using digital selective calling techniques for use with vessel traffic services and ship-to-ship identification	-	-
ITU-R M.1371	-[1)]	Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band	-	-
ITU-T X.27/V.11	1996	Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s	-	-

[1)] Undated reference.

[2)] Valid edition at date of issue.

INTERNATIONAL STANDARD

IEC 61162-1

Third edition
2007-04

Maritime navigation and radiocommunication equipment and systems – Digital interfaces

Part 1: Single talker and multiple listeners

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 1: Single talker and multiple listeners

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.

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International Standard IEC 61162-1 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This third edition cancels and replaces the second edition published in 2000, and constitutes a technical revision. This part of IEC 61162 is closely aligned with NMEA 0183 version 3.01. It also replaces PAS 61162-100 (2002), PAS 61162-101 (2003) and PAS 61162-102 (2003).

The main changes with respect to the previous edition are listed below:

- Normative references have been renumbered from 1.2 to 2, Terms and definitions from 1.3 to 3 and Manufacturers documentation from 2 to 4. Thereafter all clauses are numbered two ahead of those in the previous edition.
- Clause 7 (Clause 5 in the previous edition) has been expanded to include two types of start of sentence delimiters. The conventional delimiter "$" is used with the conventional sentences which are now called parametric sentences. A new delimiter "!" identifies

sentences that conform to special purpose encapsulation. The example applications in Clause 9 (Clause 7 in the previous edition) have been expanded to describe both types.

- The tables in Clause 8 (Clause 6 in the previous edition) have been updated. The previous Table 5 (Approved sentence formatters) and the associated Annex A (Minimum required sentences) have been deleted.
- Clause 8 has been expanded to include new and revised sentences.
- Four new annexes have been added to support the text.

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

FDIS	Report on voting
80/464/FDIS	80/473/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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

International standard IEC 61162 is a four part standard which specifies four digital interfaces for application in marine navigation, radiocommunication and system integration. The four parts are:

IEC 61162-1 Single talker and multiple listeners

IEC 61162-2 Single talker and multiple listeners, high speed transmission

IEC 61162-3 Multiple talkers and multiple listeners – Serial data instrument network (under consideration)

IEC 61162-4 Multiple talkers and multiple listeners – Ship systems interconnection

IEC technical committee 80 interface standards are developed with input from manufacturers, private and government organisations and equipment operators. The information is intended to meet the needs of users at the time of publication, but users should recognise that as applications and technology change, interface standards should change as well. Users of this standard are advised to immediately inform the IEC of any perceived inadequacies therein.

This edition is a complete revision of the second edition of IEC 61162-1. Liaison has been maintained with NMEA and this edition has been aligned as closely as possible with NMEA 0183 version 3.01. It incorporates three previously issued publicly available specifications: PAS 61162-100 *Extra requirements to IEC 61162-1 for UAIS*, PAS 61162-101 *Modified sentences and requirements for IEC 61162* and PAS 61162-102 *Extra requirements to IEC 61162-1 for the voyage data recorder.*

The second edition included details of the ship equipment defined in IMO resolutions together with appropriate sentences for communication between them. It is now the practice to specify the sentence formatters in the individual standards for equipment, so, in this edition the previous Table 5 (Approved sentence formatters) and Annex A (Minimum required sentences) have not been included.

NOTE The equipment responses and behaviour is beyond the scope for this standard and should be included in the individual equipment standards, for example alarm handling.

This edition introduces (from PAS 61162-100) two types of start of sentence delimiters. The conventional delimiter “$” is used with the conventional sentences which are now called parametric sentences. The new delimiter “!” identifies sentences that conform to special purpose encapsulation. The example applications in Clause 9 (Clause 7 in second edition) have been expanded to describe both types.

The list of sentences in Clause 8 (Clause 6 in second edition) has been updated to include all the sentences which were developed in the three public available specifications together with new sentences for display dimming (DDC), NAVTEX (NRM and NRX), rudder order (ROR), heading (THS) and user identification code transmission (UID).

As a result of experience the sentences given in PAS 61162-102 for the voyage data recorder; ALA, AKD, DOR, ETL, EVE, FIR, GEN, HSS, PRC, TRC, TRD and WAT have been modified in this edition.

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 1: Single talker and multiple listeners

1 Scope

This part of IEC 61162 contains the requirements for data communication between maritime electronic instruments, navigation and radiocommunication equipment when interconnected via an appropriate system.

This standard is intended to support one-way serial data transmission from a single talker to one or more listeners. This data is in printable ASCII form and may include information such as position, speed, depth, frequency allocation, etc. Typical messages may be from about 11 to a maximum of 79 characters in length and generally require transmission no more rapidly than one message per second.

The electrical definitions in this standard are not intended to accommodate high-bandwidth applications such as radar or video imagery, or intensive database or file transfer applications. Since there is no provision for guaranteed delivery of messages and only limited error checking capability, this standard should be used with caution in all safety applications.

For applications where a faster transmission rate is necessary, reference should be made to IEC 61162-2.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945: *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162-2:1998, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 2: Single talker and multiple listeners, high-speed transmission*

ISO/IEC 8859-1:1998, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No.1*

ITU-R M.493, *Digital selective-calling system for use in the maritime mobile service*

ITU-R M.821, *Optional expansion of the digital selective-calling system for use in the maritime mobile service*

ITU-R M.825, *Characteristics of a transponder system using digital selective calling techniques for use with vessel traffic services and ship-to-ship identification*

ITU-R M.1371, *Technical characteristics for an automatic identification system using time division multiple access in the VHF band*

ITU-T X.27/V.11:1996, *Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s*

3 Terms and definitions

Common terms are defined in the glossary of Annex A. Where there is a conflict, terms shall be interpreted wherever possible in accordance with the references in Clause 2.

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

talker
any device which sends data to other devices. The type of talker is identified by a 2-character mnemonic as listed in 8.2 (Table 4)

listener
any device which receives data from another device

4 Manufacturer's documentation

Operator manuals or other appropriate literature provided for equipment that is intended to meet the requirements of this standard shall contain the following information:

a) identification of the A and B signal lines;
b) the output drive capability as a talker;
c) a list of approved sentences, noting unused fields, proprietary sentences transmitted as a talker and transmission interval for each sentence;
d) the load requirements as a listener;
e) a list of sentences and associated data fields that are required as a listener;
f) the current software and hardware revision if this is relevant to the interface;
g) an electrical description or schematic of the listener/talker input/output circuits citing actual components and devices used, including connector type and part number;
h) the version number and date of update of the standard for which compliance is sought.

5 Hardware specification

NOTE Guidelines on methods of testing are given in Annex B.

One talker and multiple listeners may be connected in parallel over an interconnecting wire. The number of listeners depends on the output capability and input drive requirements of individual devices.

5.1 Interconnecting wire

Interconnection between devices may be by means of a two-conductor, shielded, twisted-pair wire.

5.2 Conductor definitions

The conductors referred to in this standard are the signal lines A and B, and shield.

5.3 Electrical connections/shield requirements

All signal line A connections are connected in parallel with all device A connections and all signal line B connections are connected in parallel with all device B connections. The shields of all listener cables should be connected to the talker chassis only and should not be connected at each listener.

5.4 Connector

No standard connector is specified. Wherever possible readily available commercial connectors shall be used. Manufacturers shall provide means for user identification of the connections used.

5.5 Electrical signal characteristics

This subclause describes the electrical characteristics of transmitters and receivers.

5.5.1 Signal state definitions

The idle, marking, logical 1, OFF or stop bit states are defined by a negative voltage on line A with respect to line B.

The active, spacing, logical 0, ON or start bit states are defined by a positive voltage on line A with respect to line B.

It should be noted that the above A with respect to B levels are inverted from the voltage input/output requirements of standard UARTs and that many line drivers and receivers provide a logic inversion.

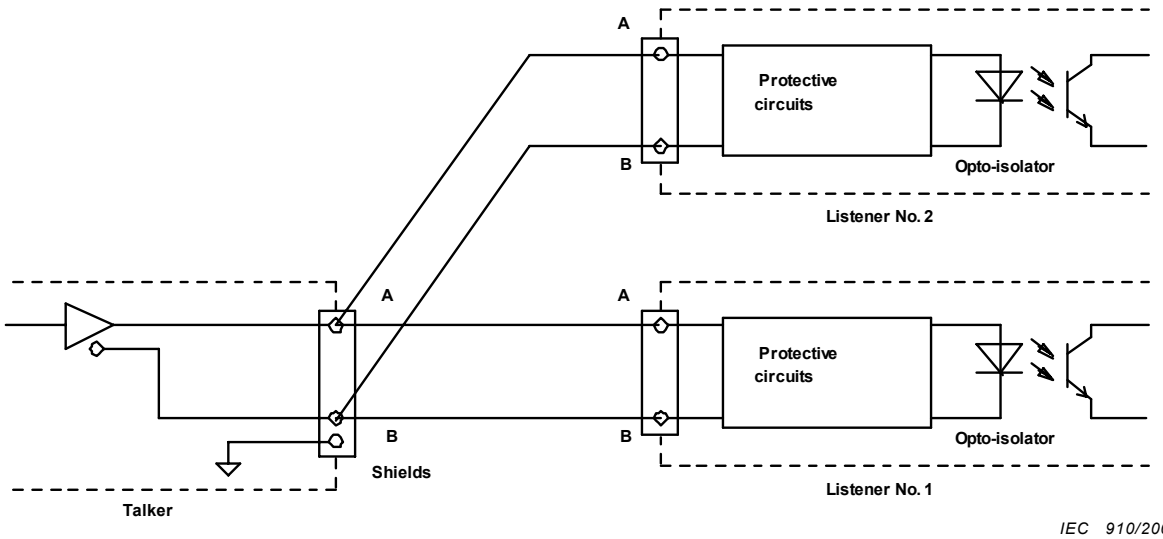
5.5.2 Talker drive circuits

No provision is made for more than a single talker to be connected to the bus. The drive circuit used to provide the signal A and the return B shall meet, as a minimum, the requirements of ITU-T X.27/V.11.

5.5.3 Listener receive circuits

Multiple listeners may be connected to a single talker. The listener receive circuit shall consist of an opto-isolator and shall have protective circuits to limit current, reverse bias and power dissipation at the opto-diode as shown in Figure 1. Reference is made to example circuits in 9.2.

The receive circuit shall be designed for operation with a minimum differential input voltage of 2,0 V [1] and shall not take more than 2,0 mA from the line at that voltage.



IEC 910/2000

Figure 1 – Listener receive circuit

[1] For reasons of compatibility with equipment designed to comply with earlier versions of NMEA 0183, it is noted that the idle, marking, logical "1", OFF or stop bit state had previously been defined to be in the range –15,0 V to +0,5 V. The active, spacing, logical "0", ON or start bit state was defined to be in the range +4,0 V to +15,0 V while sourcing was not less than 15 mA.