INTERNATIONAL STANDARD

IEC 61162-2

First edition
1998-09

Maritime navigation and radiocommunication equipment and systems – Digital interfaces –

Part 2: Single talker and multiple listeners, high-speed transmission

Matériels et systèmes de navigation et de radiocommunication maritimes – Interfaces numériques –

Partie 2: Emetteur unique et récepteurs multiples, transfert rapide de données

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Terminology, graphical and letter symbols

For general terminology, readers are referred to IEC 60050: *International Electrotechnical Vocabulary* (IEV).

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams.*

* See web site address on title page.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 2: Single talker and multiple listeners, high-speed transmission

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
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6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61162-2 has been prepared by technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This part of IEC 61162 is based upon NMEA 0183, version 2.30, and it is the intention of IEC and NMEA to maintain this commonality as far as possible.

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

FDIS	Report on voting
80/189/FDIS	80/206/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.

Annexes A and B are for information only.

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

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 2: Single talker and multiple listeners, high-speed transmission

1 General

1.1 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 interface.

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 any information as specified by approved sentences or information coded according to the rules for proprietary sentences. Typical messages may be from 11 to a maximum of 79 characters in length and generally require repetition rates up to once per 20 ms.

The electrical definitions in this standard are intended to accommodate higher data rates than are specified in IEC 61162-1. 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.

Annex A contains a list of relevant IMO resolutions and ITU recommendations to which this standard applies.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61162. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61162 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60945:1996, *Maritime navigation and radiocommunication equipment and systems – General requirements, methods of testing and required test results*

IEC 61162-1:1995, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

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

NMEA 0183 – Version 2.30:1998, *National marine electronics association (USA) – Standard for interfacing marine electronic navigational devices*

EIA 485:1991, *Electrical characteristics of generators and receivers for use in balanced digital multipoint systems*

1.3 Definitions

Common terms are defined in the glossary of annex B. Where there is a conflict, terms shall be interpreted, wherever possible, in accordance with the references in 1.2.

For the purposes of this part of IEC 61162, the following definitions apply.

talker
any device which sends data to other devices. The type of talker is identified by a two-character mnemonic as listed in 6.2 (table 4) of IEC 61162-1.

listener
any device which receives data from another device

latency
time interval between an event and its resulting information, including time for processing, transmission and/or reception

2 Manufacturer's documentation

2.1 Standard documents

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

a) identification of the A, B and common (C) 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, data latency 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 by, or are acceptable to, 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.

2.2 Additional information

As latency, filtering, error handling and data transmission interval can have a serious influence on the performance of a system, the manufacturer shall give careful consideration to these aspects. Documentation should include such data where applicable.

3 Hardware specification

One talker and multiple listeners may be connected in parallel over interconnecting wires. Because of EMC requirements shielded cables are recommended. The number of listeners depends on the output capability, the input drive requirements of the connected devices, and on the use of termination resistors.

3.1 Interconnecting wires

Interconnection between devices may be by means of a shielded two-conductor twisted-pair wire (A, B) plus any means to secure common signal ground potential (C) for transmitting and receiving devices. For this purpose, a third wire additional to the twisted pair or the inner shield of double-shielded cable with insulated shields may be used.

3.2 Conductor definitions

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

3.3 Electrical connection/shield requirements

All signal and common line connections A, B and C are connected in parallel.

With single-shielded cables and a separate wire as common line C (signal ground), the shield shall be connected to the talker chassis and shall not be connected to any listener. However, the shield shall be continuous (unbroken) between all listeners (see figure 1 and figure 2a)).

With double-shielded cables and the inner shield used as common line C (signal ground), the outer shield shall be connected to the talker chassis and shall not be connected to any listener. However, the outer shield shall be continuous (unbroken) between all listeners (see figure 1 and figure 2b)).

With double-shielded cables and a separate wire as common line C (signal ground), the inner shield shall be connected to the talker chassis and shall not be connected to any listener. However, the inner shield shall be continuous (unbroken) between all listeners. The outer shield may be connected to the chassis on either side if required (see figure 1 and figure 2c)).

The cabling shall be designed in a way that stubs are avoided or kept as short as possible. If long cables are necessary, termination at the end of the line according to ITU-T V.11 shall be considered.

3.4 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.

3.5 Electrical signal characteristics

This subclause describes the electrical characteristics of transmitters and receivers.

3.5.1 Signal state definitions

The idle, marking, logical 1, OFF or stop bit state is defined by a negative voltage on line A with respect to line B, as in IEC 61162-1.

The active, spacing, logical 0, ON or start bit state is defined by a positive voltage on line A with respect to line B, as in IEC 61162-1.

3.5.2 Talker drive circuits

No provision is made for more than a single talker to be connected to the bus. The drive circuit shall meet, as a minimum, the requirements of ITU-T V.11.

Improved and compatible driver circuits (e.g. EIA-485) used in a compliant way are allowed.

3.5.3 Listener receive circuits

Multiple listeners may be connected to a single talker. The listener's receive circuit shall comply with ITU-T V.11. Optional termination resistors for the line shall be provided. The input terminals A, B and C shall be electrically isolated from the remaining electronics of the listening device. Reference is made to 3.5.4 and a sample circuit shown in figure 1 of this standard.

3.5.4 Electrical isolation

Within a listener there shall be no direct electrical connection between the signal lines A and B, the signal ground C or the shield to ship's mains ground or power line. This isolation shall be in accordance with IEC 60945.

3.5.5 Maximum voltage on the bus

The maximum applied voltage between signal lines A and B and between either line and ground C shall be in accordance with ITU-T V.11.

For protection against miswiring and for unintended connection to earlier TALKER designs, all receive circuit devices shall be capable of withstanding 15 V between either lines and signal ground for an indefinite period.

4 Data transmission

Data is transmitted in serial asynchronous form in accordance with 1.2. The first bit is a start bit and is followed by data bits, least-significant-bit first as in figure 3.

The following parameters are used:

– baud rate 38 400 (bits/s);
– data bits 8 (D7 = 0), parity none;
– stop bits 1.

5 Data format protocol

5.1 Characters

All transmitted data shall be interpreted as ASCII characters. The most significant bit of the eight-bit character shall always be transmitted as zero (D7 = 0).

5.1.1 Reserved characters

The reserved character set consists of those ASCII characters shown in 6.1 (table 1) of IEC 61162-1. These characters are used for specific formatting purposes, such as sentence and field delimiting, and shall not be used in data fields.

5.1.2 Valid characters

The valid character set consists of all printable ASCII characters (HEX 20 to HEX 7E) except those defined as reserved characters. The list of the valid character set is given in 6.1 (table 2) of IEC 61162-1.

5.1.3 Undefined characters

ASCII values not specified as either reserved characters or valid characters are excluded and shall not be transmitted at any time.

5.1.4 Character symbols

When individual characters are used in this standard to define units of measurement, to indicate the type of data field, type of sentence, etc., they shall be interpreted according to the character symbol in 6.1 (table 3) of IEC 61162-1.

5.2 Fields

A field consists of a string of valid characters, or no characters (null field), located between two appropriate delimiter characters.

5.2.1 Address field

An address field is the first field in a sentence and follows the "$" delimiter; it serves to define the sentence. Characters within the address field are limited to digits and upper-case letters. The address field shall not be a null field. Only sentences with the following three types of address fields shall be transmitted.

5.2.1.1 Approved address field

Approved address fields consist of five characters defined by this standard. The first two characters are the talker identifier, listed in 6.2 (table 4) of IEC 61162-1. The next three characters form the sentence formatter used to define the format and the type of data. A list of approved sentence formatters is given in 6.2 (table 5) of IEC 61162-1.

5.2.1.2 Query address field

The query address field consists of five characters and is used for the purpose of requesting transmission of a specific sentence on a separate bus from an identified talker.

5.2.1.3 Proprietary address field

The proprietary address field consists of the proprietary character P followed by a three-character manufacturer's mnemonic code, used to identify the talker issuing a proprietary sentence, and any additional characters as required. A list of valid manufacturer's mnemonic codes may be obtained from NMEA.

5.2.2 Data fields

Data fields in approved sentences follow a "," delimiter and contain valid characters in accordance with the formats illustrated in 6.2 (table 6) of IEC 61162-1. Data fields in proprietary sentences contain only valid characters but are not defined by this standard.

Because of the presence of variable data fields and null fields, specific data fields shall only be located within a sentence by observing the field delimiters ",". Therefore, it is essential for the listener to locate fields by counting delimiters rather than counting the total number of characters received from the start of the sentence.

5.2.2.1 Variable length fields

Although some data fields are defined to have fixed length, many are of variable length in order to allow devices to convey information and to provide data with more or less precision, according to the capability or requirements of a particular device.

Variable length fields may be alpha-numeric or numeric fields. Variable numeric fields may contain a decimal point and may contain leading or trailing zeros.

5.2.2.2 Data field types

Data fields may be alpha, numeric, alphanumeric, variable length, fixed length, fixed/variable (with a portion fixed in length while the remainder varies). Some fields are constant, with their value dictated by a specific sentence definition. The allowable field types are summarized in 6.2 (table 6) of IEC 61162-1.

5.2.2.3 Null fields

A null field is a field of length zero, i.e. no characters are transmitted in the field. Null fields shall be used when the value is unreliable or not available.

For example, if heading information were not available, sending data of "000" is misleading because a user cannot distinguish between "000" meaning no data and a legitimate heading of "000". However, a null field, with no characters at all, clearly indicates that no data is being transmitted.

Null fields with their delimiters can have the following appearance depending on where they are located in the sentence:

",," ",*"

The ASCII NULL character (HEX 00) shall not be used as the null field.

5.2.3 Checksum field

A checksum field shall be transmitted in any sentence. The checksum field is the last field in a sentence and follows the checksum delimiter character "*". The checksum is the eight-bit exclusive OR (no start or stop bits) of all characters in the sentence, including "," delimiters, between but not including the "$" and the "*" delimiters.

The hexadecimal value of the most significant and least significant four bits of the result is converted to two ASCII characters (0-9, A-F) for transmission. The most significant character is transmitted first.

Examples of the checksum field are: $GPGLL,5057.970,N,00146.110,E,142451,A*27 and $GPVTG,089.0,T,,,15.2,N,,*7F.

5.3 Sentences

This subclause describes the general structure of sentences. Details of specific sentence formats are found in 6.3 of IEC 61162-1. Some sentences may specify restrictions beyond the general limitations given in this part of this standard. Such restrictions may include defining some fields as fixed length, numeric or text only, required to be non-null, transmitted with a certain frequency, etc.

The maximum number of characters in a sentence shall be 82, consisting of a maximum of 79 characters between the starting delimiter "$" and the terminating delimiter <CR> <LF>.

The minimum number of fields in a sentence is one (1). The first field shall be an address field containing the identity of the talker and the sentence formatter which specifies the number of data fields in the sentence, the type of data they contain and the order in which the data fields are transmitted. The remaining portion of the sentence may contain zero or multiple data fields.

The maximum number of fields allowed in a single sentence is limited only by the maximum sentence length of 82 characters. Null fields may be present in the sentence and shall always be used if data for that field is unavailable.

All sentences begin with the sentence starting delimiter character "$" and end with the sentence terminating delimiter <CR> <LF>.

5.3.1 Description of approved sentences

Approved sentences are those designed for general use and detailed in this standard. Approved sentences are listed in 6.3 of IEC 61162-1 and shall be used wherever possible. Other sentences, not recommended for new designs, may be found in practice. Such sentences are listed in NMEA 0183. Information on such sentences may be obtained from NMEA (see 5.3.3).

An approved sentence contains, in the order shown, the following elements:

ASCII	*HEX*	*Description*
"$"	24	– start of sentence
<address field>		– talker identifier and sentence formatter
"," <data field>		– zero or more data fields
"," <data field>		
"*" <checksum field>		– checksum field
<CR> <LF>	0D 0A	– end of sentence

5.3.1.1 Approval sentence structure

The following provides a summary explanation of the approved sentence structure:

$aaccc, c–––c*hh<CR> <LF>

ASCII	*HEX*	*Description*
"$"	24	*Start of sentence:* starting delimiter
aaccc		*Address field:* alphanumeric characters identifying type of talker, and sentence formatter. The first two characters identify the talker. The last three are the sentence formatter mnemonic code identifying the data type and the string format of the successive fields. Mnemonics will be used as far as possible to facilitate read-outs by users.
","	2C	*Field delimiter:* starts each field except address and checksum fields. If it is followed by a null field, it is all that remains to indicate no data in a field.
c–––c		*Data sentence block:* follows address field and is a series of data fields containing all of the data to be transmitted. Data field sequence is fixed and identified by third and subsequent characters of the address field (the sentence formatter). Data fields may be of variable length and are preceded by delimiters ",".
"*"	2A	*Checksum delimiter:* follows last data field of the sentence. It indicates that the following two alphanumeric characters show the HEX value of the checksum.
hh		*Checksum field:* the absolute value calculated by exclusive-OR'ing the eight data bits (no start bits or stop bits) of each character in the sentence, between, but excluding "$" and "*". The hexadecimal value of the most significant and least significant four bits of the result are converted to two ASCII characters (0-9, A-F) for transmission. The most significant character is transmitted first.
<CR> <LF>	0D 0A	*End of sentence:* sentence terminating delimiter.

5.3.2 Query sentences

Query sentences are intended to request approved sentences to be transmitted in a form of two-way communication. The use of query sentences implies that the listener shall have the capability of being a talker with its own bus.

The approved query sentence contains, in the order shown, the following elements:

ASCII	*HEX*	*Description*
"$"	24	– start of sentence
<aa>		– talker identifier of requester
<aa>		– talker identifier for device from which data is being requested
"Q"		– query character identifies query address
","		– data field delimiter
<ccc>		– approved sentence formatter of data being requested
"*" <checksum field>		– checksum field
<CR> <LF>	0D 0A	– end of sentence

5.3.2.1 Reply to query sentence

The reply to a query sentence is the approved sentence that was requested. The use of query sentences requires cooperation between the devices that are interconnected. A reply to a query sentence is not mandatory and there is no specified time delay between the receipt of a query and the reply.

5.3.3 Proprietary sentences

These are sentences not included within this standard; these provide a means for manufacturers to use the sentence structure definitions of this standard to transfer data which does not fall within the scope of approved sentences. This will generally be for one of the following reasons.

a) Data is intended for another device from the same manufacturer, is device specific, and not in a form or of a type of interest to the general user.

b) Data is being used for test purposes prior to the adoption of approved sentences.

c) Data is not of a type and general usefulness which merits the creation of an approved sentence.

The manufacturer's reference list of mnemonic codes is a component of the equivalent specification NMEA 0183.*

———————

* The NMEA secretariat maintains the master reference list which comprises codes registered and formally adopted by NMEA.

A proprietary sentence contains, in the order shown, the following elements:

ASCII	*HEX*	*Description*
"$"	24	– start of sentence
"P"	50	– proprietary sentence ID
<aaa>		– manufacturer's mnemonic code
<address field>		– talker identifier and sentence formatter
<valid characters, manufacturer's data>		
"*" <checksum field>		– checksum field
<CR> <LF>	0D 0A	– end of sentence

Beyond limiting overall sentence length and requiring the use of only valid characters, details of proprietary data fields are not included in this standard. However, it is required that such sentences be published in the manufacturer's manuals for reference.

5.3.4 Valid sentences

Approved sentences, query sentences and proprietary sentences are the only valid sentences. Sentences of any other form are non-valid and shall not be transmitted on the bus.

5.3.5 Sentence transmission timing

Frequency of sentence transmission shall be consistent with the basic measurement or calculation cycle but generally not more frequently than once per 20 ms.

It is desirable that sentences be transmitted with a minimum inter-character spacing, preferable as near continuous burst, but under no circumstances shall the time to complete the transmission of a sentence be greater than 100 ms.

5.3.6 Additions to approved sentences

In order to allow for improvements or additions, future revisions of this standard may modify existing sentences by adding new data fields after the last data field but before the checksum delimiter character "*" and checksum field. Listeners shall determine the end of the sentence by recognition of "<CR> <LF>" and "*" rather than by counting field delimiters. The checksum value shall be computed on all received characters between, but not including, "$" and "*" whether or not the listener recognizes all fields.

5.4 Error detection and handling

Listening devices shall detect errors in data transmission including:

– checksum error;
– invalid characters;
– incorrect length of talker identifier and/or formatter;
– time out.

Listening devices shall use only correct sentences.

6 Data content

This clause is identical with clause 6 of IEC 61162-1.

7 Applications

This clause is identical with clause 7 of IEC 61162-1. For the purpose of compatibility with that standard, in case of modifications, no dedicated specification is made in this standard.

8 Methods of testing and required test results

8.1 Test preparation

8.1.1 General

The manufacturer shall, unless otherwise agreed, set up the EUT (equipment under test) as well as all necessary test equipment and ensure that it is operational before testing commences. The manufacturer shall provide sufficient technical documentation of the EUT.

8.1.2 Testing under ambient conditions

All tests shall be carried out under the ambient conditions defined in the specific standard for the EUT. If no ambient conditions are defined the temperature range between +10 °C and +35 °C shall be applied.

8.2 Test sequence

Where appropriate, tests against different clauses of this standard may be carried out simultaneously.

8.3 Standard test signals

For testing transmitting interfaces those standard IEC 61162 sentences and proprietary messages shall be used which the EUT transmits during normal operation.

For testing receiving interfaces of the EUT those IEC 61162 sentences and proprietary messages shall be applied which are received/used by the EUT during its normal operation.

8.4 Test of the interface

8.4.1 Electrical test of the interface

8.4.1.1 Normal operation range

For compatibility of the hardware, standard tests shall be used as defined in ITU-T V.11. The electrical isolation of input circuits shall be checked by inspection of the manufacturer's documentation and tests according to the values given in IEC 60945.

8.4.1.2 Ability of input circuits to withstand maximum voltage on the bus

Between the connectors 'A', 'B' and 'C' of the interface a voltage of 15 V shall be applied for at least 1 min. Each test shall be carried out with both polarities of the applied test voltage. After all tests the function and the hardware of the interface shall be checked for any reading errors or damage.

8.4.2 Protocol test of input and output

The transmitting output of the EUT shall be checked for conformity with the coding methods of data as specified in this standard and the proprietary sentences of the manufacturer by inspection of the manufacturer's documentation.

The receiver of the EUT shall be tested, by connecting it to a source which transmits all sentences which the EUT is able to receive. All sentences shall be detected and no error shall occur.

8.4.3 Test under maximum interface workload

After activating all ports of the EUT with the maximum number of sentences to be transmitted and/or received the data repetition rate(s) shall not decrease under the value specified by the manufacturer, and the data transmission time for one sentence shall not exceed 100 ms.

For input circuits no data-reading errors shall be detected under maximum interface workload.

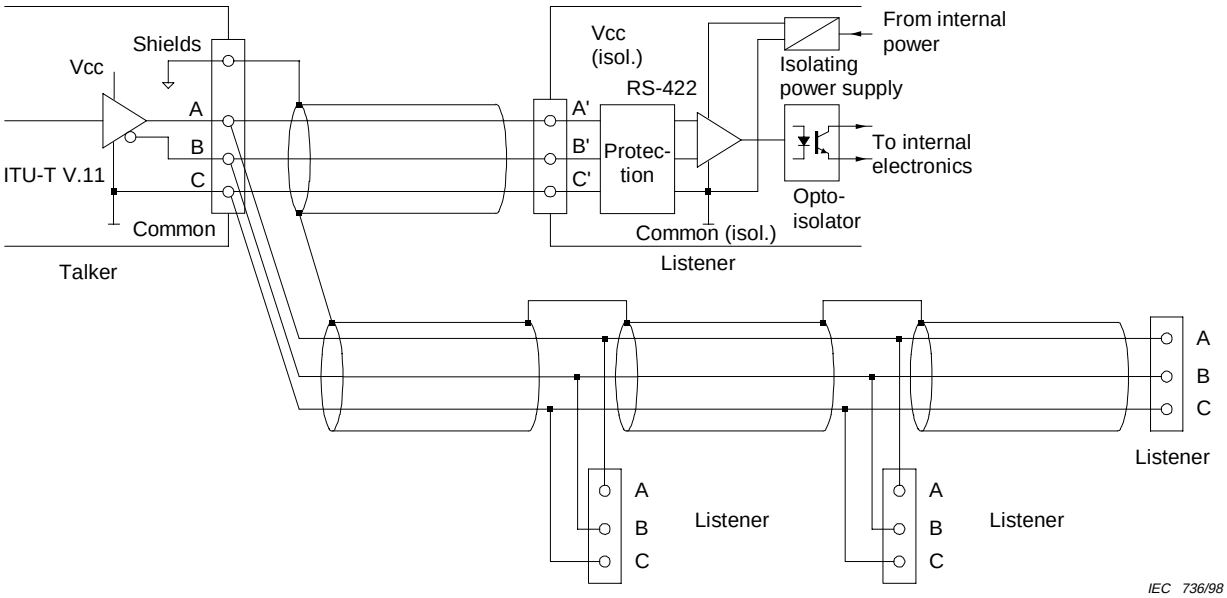

Figure 1 – Talker/listener connections

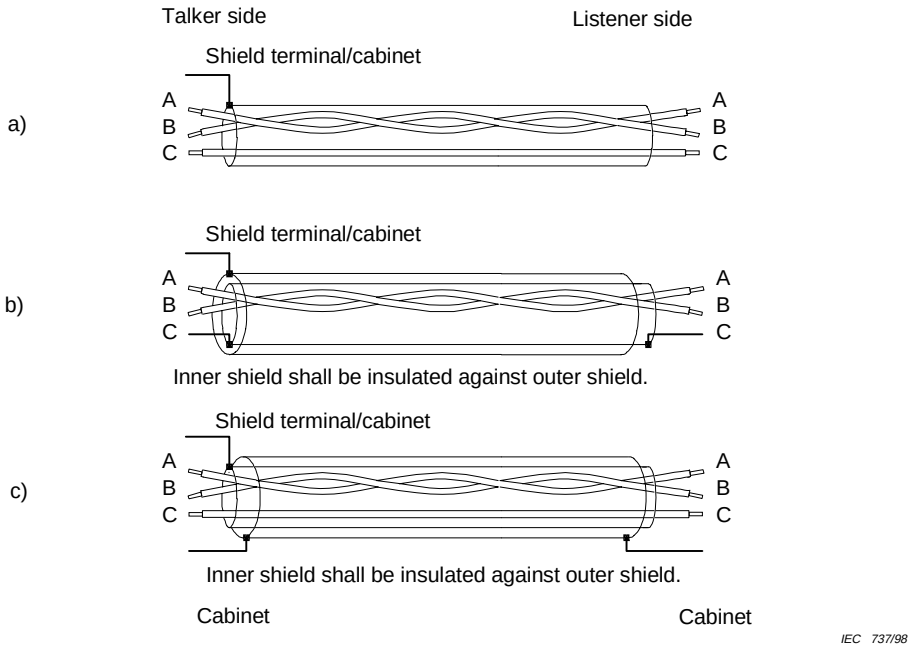

Figure 2 – Cables – Electrical shield requirements

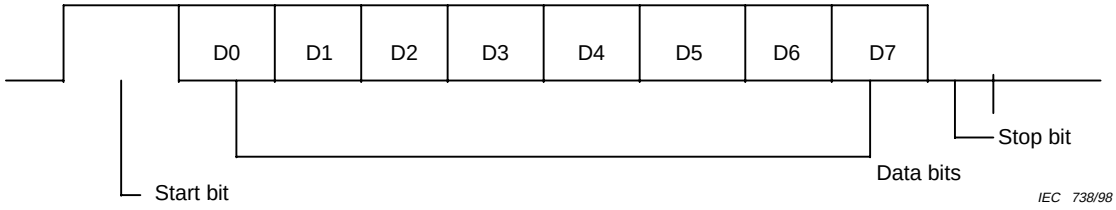

Figure 3 – Data transmission format

Annex A
(informative)

IMO resolutions and ITU recommendations and relevant IEC/ISO standards to which this standard applies for maritime navigation and radiocommunication equipment and systems

Table A.1 – Navigation

Navigation instrument	Talker	Listener	IMO resolution	IEC/ISO standards
IMO mandatory				
Magnetic compass	YES	NO	A.382(X)	ISO 449 ISO 2269
Gyro compass	YES	YES	A.424(XI)	ISO 8728
Gyro compass (high-speed craft)	YES	YES	A.821(19)	ISO 8728**
Radar	YES	YES	MSC 64(67)	IEC 60936-1
Radar (high-speed craft)	YES	YES	A.820(19)	IEC 60936-2**
ARPA	YES	YES	A.823(19)	IEC 60872-1
Echo sounder	YES	YES	A.224(VII)	ISO 9875
SDME(LOG)	YES	NO	A.824(19)	IEC 61023
R.O.T.I.	YES	NO	A.526(13)	
RDF	YES	YES	A.665(16)	
IMO optional				
OMEGA + Differential	YES	YES	A.479(XII)	IEC 61110
LORAN-C/CHAYKA receiver	YES	YES	A.818(19)	IEC 61075*
DECCA receiver	YES	YES	A.816(19)	IEC 61135
GPS receiver	YES	YES	A.819(19)	IEC 61108-1
GLONASS	YES	YES	MSC 53(66)	IEC 61108-2**
Differential GPS/GLONASS	YES	YES	MSC 64(67)	IEC 61108-4**
Combined GPS/GLONASS	YES	YES	MSC ZZ(69)**	IEC 61108-3**
Autopilot (heading control)	YES	YES	MSC 64(67)	IEC/ISO 11674**
Autopilot (high-speed craft)	YES	YES	A.822(19)	IEC/ISO 11674**
ECDIS	YES	YES	A.817(19)	IEC 61174**
* Under revision ** Under development				

Table A.2 – Radiocommunications for the global maritime distress and safety system (GMDSS)

1988 SOLAS	IMO resolution	ITU-R recommendation	INMARSAT COSPAS-SARSAT	IEC standard*
1 Primary systems				
1.1 VHF radio installation	A.803(19)			61097-8
	A.609(15)			
DSC	A.385(X)	493,541,689		61097-3
RT	A.524(13)	RR appendix 19		61097-7
1.2 MF radio installation	A.804(19)			61097-8
DSC	A.610(15)	493,541		61097-3
RT	A.334(IX)			61097-9
	A.613(15)			
1.3 MF/HF radio installation	A.806(19)			61097-8
DSC	A.610(15)	493,541		61097-3
RT	A.334(IX)			61097-9
NBDP	A.613(15)	491,492,625		61097-11
1.4 INMARSAT ship earth station	A.570(14)			
	A.663(16)		SDM	61097-4
	A.698(17)			
	A.807(19)			
	A.808(19)			
2 Secondary means of alerting				
3 Facilities for reception of maritime safety information				
3.1 NAVTEX receiver (518 kHz)	A.525(13)	540,625		61097-6
3.2 EGC receiver	A.664(16)		SDM	61097-6
3.3 HF NBDP receiver	A.700(17)	491,492,625,688		61097-11
4 Satellite E.P.I.R.B.				
4.1 COSPAS-SARSAT (406 MHz)	A.662(16)	633	C/S T 001	61097-2
	A.763(18)			
	A.810(19)			
4.2 INMARSAT	A.661(16)	632	SDM	61097-5
	A.812(19)			
5 VHF E.P.I.R.B.	A.612(15)	693		
	A.805(19)			
6 Ships radar transponder (SART)	A.530(13)	628		61097-1
	A.802(19)			
7 RT watch receiver	A.383(X)	489,583,689,1082		61097-8
8 RT alarm signal	A.412(XI)	219		61097-16
9 VHF portable (survival craft)	A.605(15)			61097-12
	A.762(18)			
	A.809(19)			
10 General requirements	A.694(17)			60945
11 Reserve source of energy	SOLAS IV-13			61097-14

* The IEC 61097 series is currently being developed. Some parts have been published – the remainder are under development or under consideration. Clause A.1 includes all those parts published.

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NOTE – All ITU-R/T references developed before 1993 were formerly CCIR/CCITT Recommendations.

Annex B
(informative)

Glossary

NOTE – The definitions which follow are included for additional understanding of this standard, but may not command universal acceptance.

address field: For sentences in this standard, fixed length field following the beginning sentence delimiter "$" (HEX 24); for approved sentences, composed of a two-character talker identifier and a three-character sentence formatter; for proprietary sentences, composed of the character "P" (HEX 50) followed by a three-character manufacturer identification code.

approved sentence: Sentence which is listed in this standard and annexes.

ASCII: American standard code for information interchange. A seven-bit wide serial code describing numbers, upper- and lower-case alphabetical characters, special and non-printing characters. See American National Standards Institute (ANSI) – ANSI X 3.15, ANSI X 3.16 and ANSI X 3.4.

checksum: For this standard, a validity check performed on the data contained in the sentences, calculated by the talker, appended to the message, then re-calculated by the listener for comparison to determine if the message was received correctly.

communication protocol: Method established for message transfer between a talker and a listener which includes the message format and the sequence in which the messages are to be transferred. Also includes the signalling requirements such as baud rate, stop bits, parity, and bits per character.

data field: In a sentence, field which contains a data value.

delimiter: In this standard, character or characters used to separate fields or sentences. The following delimiters are used in this standard:

Field delimiters:

ASCII "$" (HEX 24) for address field

ASCII "," (HEX 2C) for data fields

ASCII "*" (HEX 2A) for checksum field

Sentence delimiters

carriage return <CR> and line feed <LF> (HEX 0D0A)

NOTE – <CR><LF> is not required preceding the first sentence transmitted.

field: In this standard, character or string of characters immediately preceded by a field delimiter (see delimiter).

fixed field: In this standard, field in which the number of characters is fixed. For data fields, such fields are shown in the sentence definitions with no decimal point. Other fields which fall into this category are the address field and the checksum field.

listener: In this standard, recipient of messages across an interconnecting link.

manufacturer identification code: In this standard, three-character manufacturer identifier, usually an acronym derived from the company name, for use by a manufacturer as part of the address field in formulation of proprietary sentences.

null field: Indicates that data is not available for the field. Indicated by two ASCII commas, i.e. ",," (HEX 2C2C), or, for the last data field in a sentence, one comma followed by the checksum delimiter "*" (HEX 2A).

NOTE – The ASCII null character (HEX 00) is not to be used for null fields.

one-way communication protocol: Protocol established between a talker and a listener in which only the talker may send messages (compare to two-way communication protocol).

proprietary sentence: Sentence to be sent across the interconnecting link which is not included in the list of approved sentences of this standard. All proprietary sentences sent over the interconnecting link contain a unique talker identifier which begins with a "P" (HEX 50) followed by a three-character manufacturer identification code.

semi-fixed field: Data fields having a base other than 10, but use base 10 to express precision of the final term (such as minutes expressed as units with a decimal trailer instead of seconds in a base 60 field, or seconds expressed with a decimal trailer).

sentence formatter: In this standard, three-character sentence identifier which follows the talker identifier and is included as part of the address field. The sentence formatters are an integral part of the sentence definitions provided by this standard and annexes.

talker: Originator of messages across a link.

talker identifier: First two characters following the "$" (HEX 24) in a sentence (address characters 1 and 2); selected from table 4.

two-way communication protocol: Protocol established between a talker and a listener in which the listener may also issue requests to the talker when required (compare to one-way communication protocol).

UART: Universal asynchronous receiver/transmitter which produces an electrical signal and timing for transmission of data over a communications path, and circuitry for detection and capture of such data transmitted from another UART.

variable field: Data field which may or may not contain a decimal point and which may vary in precision following the decimal point depending on the requirements and the accuracy of the measuring device (talker).

———————

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librarian ❑
researcher ❑
design engineer ❑
safety engineer ❑
testing engineer ❑
marketing specialist ❑
other.....

Q3 I work for/in/as a: *(tick all that apply)*

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consultant ❑
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Q4 This standard will be used for: *(tick all that apply)*

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product research ❑
product design/development ❑
specifications ❑
tenders ❑
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thesis ❑
manufacturing ❑
other.....

Q5 This standard meets my needs: *(tick one)*

not at all ❑
nearly ❑
fairly well ❑
exactly ❑

Q6 If you ticked NOT AT ALL in Question 5 the reason is: *(tick all that apply)*

standard is out of date ❑
standard is incomplete ❑
standard is too academic ❑
standard is too superficial ❑
title is misleading ❑
I made the wrong choice ❑
other .....

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(2) below average,
(3) average,
(4) above average,
(5) exceptional,
(6) not applicable

timeliness.....
quality of writing.....
technical contents.....
logic of arrangement of contents .....
tables, charts, graphs, figures.....
other .....

Q8 I read/use the: *(tick one)*

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both English and French texts ❑

Q9 Please share any comment on any aspect of the IEC that you would like us to know:

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