INTERNATIONAL STANDARD

IEC 61162-402

First edition
2005-09

Maritime navigation and radiocommunication equipment and systems – Digital interfaces –

Part 402: Multiple talkers and multiple listeners – Ship systems interconnection – Documentation and test requirements

Reference number
IEC 61162-402:2005(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE W

For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 402: Multiple talkers and multiple listeners – Ship systems interconnection – Documentation and test requirements

FOREWORD

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IEC 61162-402 has been prepared by Technical Committee 80: Maritime navigation and radiocommunication equipment and systems.

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

FDIS	Report on voting
80/411/FDIS	80/421/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.

IEC 61162 consists of the following parts, under the general title *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*:

Part 1: Single talker and multiple listeners

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

Part 3: Multiple talkers and multiple listeners – Serial data instrument network (under consideration)

Part 400: Multiple talkers and multiple listeners – Ship systems interconnection – Introduction and general principles

Part 401: Multiple talkers and multiple listeners – Ship systems interconnection – Application profile

Part 402: Multiple talkers and multiple listeners – Ship systems interconnection – Documentation and test requirements

Part 410: Multiple talkers and multiple listeners – Ship systems interconnection – Transport profile requirements and basic transport profile

Part 420: Multiple talkers and multiple listeners – Ship systems interconnection – Companion standard requirements and basic companion standards

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.

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 402: Multiple talkers and multiple listeners – Ship systems interconnection – Documentation and test requirements

1 Scope

1.1 General

This standard series, IEC 61162-400 and upwards, specifies a communication protocol for use in integrated ship systems. It also specifies an interface description language for use together with the protocol, a set of rules for the use of this language and a set of standard interfaces described in the language.

This part of the standard specifies a minimum set of tests to be done, test results to be achieved and documents that shall be available for all implementations of general protocol software and applications that are compliant with the IEC 61162-4 standard. Although this set of standard documents is collectively referred to as IEC 61162-4, the actual part numbers are in the 400-series (see 1.4 of IEC 61162-400).

1.2 Limitations in scope

The tests and documentation requirements do not cover electrical, physical or environmental requirements that may apply to the use of software or computers onboard ships. Such requirements may be covered by IEC 60945 or IEC 60092-504. Other standards may also be applicable.

This standard does not necessarily cover all requirements from classification societies or other authorities. It is the responsibility of the user of this standard to ensure that all appropriate regulations are addressed.

This standard contains tests to check that an application using the IEC 61162-4 protocol adheres to its advertised interface specification. These tests cannot guarantee the correct functionality of that application beyond the possibility of connecting it to the network and with a limited degree of accuracy in the messages transferred.

This standard does not cover the system in which the IEC 61162-4 communication standard is used. Additional requirements will normally apply to the total system configuration.

Fundamental requirements relating to ensuring reliable and timely transfer of data across data communication links are included in other standards associated with the integration of equipment such as IEC 60092-504 and IEC 61209. This standard does not contain tests to verify compliance with these requirements. In addition, specific equipment related standards may also contain requirements for correctness and timeliness of data transmissions. Neither does this standard contain any tests to verify such requirements. Thus, results from tests carried out in accordance with this standard cannot be used to demonstrate compliance with the requirements of any other standards for system or equipment functionality.

1.3 Limitations in test coverage

The test plan only specifies general tests of the protocols and a limited set of other general properties (black box tests). The test procedures will not generally cover tests of operating systems, communication libraries or other software components that are used to implement the standard. Neither does this standard specify any tests related to the way the system is implemented (white or glass box testing).

1.4 Limitations in degree of detail

The test procedures are general in nature and do not generally specify detailed test programs and procedures. The procedures specify a minimum set of functional aspects that need to be tested, with, in some cases, a minimum required set of excitations and corresponding required responses. The testers must develop the detailed procedures and test tools themselves.

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 60092-504, *Electrical Installations in ships – Special features – Control and instrumentation*

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

IEC 61162-4, *(shorthand for all parts in the IEC 61162-400 series), Maritime navigation and radio-communication equipment and systems – Digital interfaces – Part 4xx: Multiple talkers and multiple listeners – Ship systems interconnection*

IEC 61162-400, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 400: Multiple talkers and multiple listeners – Ship systems interconnection – Introduction and general principles*

IEC 61162-401, *Multiple talkers and multiple listeners – Ship systems interconnection – Application profile*

IEC 61162-410, *Multiple talkers and multiple listeners – Ship systems interconnection – Transport profile requirements and basic transport profile*

IEC 61162-420, *Multiple talkers and multiple listeners – Ship systems interconnection – Companion standard requirements and basic companion standards*

IEC 61209, *Maritime navigation and radiocommunication equipment and systems – Integrated Bridge Systems (IBS) – Operational and performance requirements, methods of testing and required test results*

IEC 61508-3, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 3: Software requirements.*

IEC 61508-4*, Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 4: Definitions and abbreviations*

ISO 9001: 2000, *Quality management systems – Requirements.*

ISO/IEC 90003: 2004, *Software engineering – Guidelines for the application of ISO 9001: 2000 to computer software.*

3 Definitions

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

3.1
black-box testing
testing that ignores the internal workings and internal structure of a component and focuses on the responses generated as a result of controlled stimuli and execution conditions. Typically used to evaluate the compliance of a component with specified functional requirements. See also *white-box testing*

3.2
defect
latent faults in a component ("bug" in software), that either represent or can cause an error and by that a failure

3.3
error
that part of the system state that is liable to lead to a failure (IEC 61508-4) IEC 61508-4 does not classify a software defect as an error, but as a fault. In this standard, the term defect will be used to mean also software defects. The term fault will not be used.

3.4
fault
see error and defect

3.5
failure
occurs when a delivered service deviates from the intended service. It is the effect of an *error* on the service (IEC 61508-4)

3.6
memory leak
situation where a program is not able to reclaim dynamically allocated memory that should be released as a result of the removal of an internal object. It typically occurs during sequences of connect and disconnect

3.7
safety integrity level
discrete level (one out of a possible four) where safety integrity level 4 has the highest level of safety integrity and safety integrity level 1 has the lowest. Safety integrity is the probability of a safety-related system satisfactorily performing the required safety functions under all the stated conditions within a stated period of time (see IEC 61508-4).

3.8
white-box testing
testing that uses knowledge of the internal structure and internal workings of a component to exercise, for example selected internal execution paths or sub-component interactions in the component. See also *black-box testing*.