

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electrical installations in ships –
Part 507: Small vessels**

**Installations électriques à bord des navires –
Partie 507: Petits navires**

IEC 60092-507:2008

<https://standards.iteh.ai/catalog/standards/iec/405ed15e1-aeb8-406d-9417-6bde254e901a/iec-60092-507-2008>

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Part 507: Small vessels**

**Installations électriques à bord des navires –
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ELECTRICAL INSTALLATIONS IN SHIPS –**Part 507: Small vessels**

FOREWORD

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International Standard IEC 60092-507 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This second edition cancels and replaces the first edition published in 2000 and constitutes a technical revision.

This second edition includes the following significant technical changes with respect to the previous edition:

- a) DC, AC single phase, and AC 3-phase systems are now included in one document.
- b) The standard now specifies requirements for electrical installations relevant to all small commercial or leisure vessels up to 50 m or which have a Gross Registered Tonnage (GRT) not exceeding 500 GRT designed for use on inland waters or at sea.

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

FDIS	Report on voting
18/1067/FDIS	18/1073/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 the parts of the IEC 60092 series, published under the general title *Electrical installations in ships*, can be found on the IEC website.

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- withdrawn,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.

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WITHDRAWN

INTRODUCTION

This International Standard incorporates and coordinates, as far as possible, the existing requirements for electrical installations relevant to small vessels as published in other parts of the IEC 60092 series and the IEC 60364 series.

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ELECTRICAL INSTALLATIONS IN SHIPS –

Part 507: Small vessels

1 Scope

This part of IEC 60092 specifies requirements for the design, construction and installation of electrical systems in small vessels, which have a length of up to 50 m, or which have a gross registered tonnage not exceeding 500 GRT, designed for use on inland waters or at sea. It is not intended to apply to small craft equipped with a battery supplying circuits for engine starting and navigation lighting only, recharged from an inboard or outboard engine driven alternator.

NOTE 1 For alternating current systems having voltages exceeding 250 V single-phase or 500 V three-phase, for direct current systems exceeding 50 V, and for vessels larger than 500 GRT or with a length greater than 50 m, other standards within the IEC 60092 series apply.

NOTE 2 Attention is drawn to regulations which govern specific requirements for navigation lights for small vessels.

NOTE 3 Attention is drawn to the fact that, in some countries the EC Directives covering EMC (89/336/EEC), low voltage (73/23/EEC) and general product safety (92/59/EEC) may be applied. In addition, Council Directive 97/70 applies to fishing vessels of 24 m in length and over, and Council Directive 98/18/EC applies to passenger ships. Attention is also drawn to the recreational craft directive 94/25/EC and 2003/44/EF. For high speed crafts, attention is drawn to the International code of safety for high-speed craft (HSC Code).

This standard applies to the following types of d.c. and a.c. electrical systems, individually or in combination:

- a) direct current system which operates at a nominal voltage not exceeding 50 V;

NOTE For example, for many small vessels, this will be the main electrical system. Alternatively, a vessel equipped with an a.c. system as its principal electrical system may be also equipped with a d.c. system for navigation and communications equipment supplied from batteries.

- b) single-phase alternating current system which operates at a nominal voltage not exceeding 250 V,

NOTE Such a system may be the principal electrical power system of a vessel or a system which may only be energized when connected to a shore supply. AC extra-low voltage, safety extra-low voltage, and other circuits may also comprise part of a single-phase a.c. system. A vessel may also be equipped with d.c. system(s) as in a) above.

- c) three-phase alternating current system which operates at a nominal voltage not exceeding 1 000 V.

NOTE The three-phase system is likely to be the principal electrical power system of a vessel's electrical installation. Such a vessel may also be equipped with single-phase a.c. subsystem(s) and d.c. subsystem(s).

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 60079 (all parts), *Explosive atmospheres*

IEC 60092-101:1994, *Electrical installations in ships – Part 101: Definitions and general requirements*

IEC 60092-201:1994, *Electrical installations in ships – Part 201: System design – General*

IEC 60092-202:1994, *Electrical installations in ships – Part 202: System design – Protection*

IEC 60092-301:1980, *Electrical installations in ships – Part 301: Equipment – Generators and motors*

IEC 60092-302, *Electrical installations in ships – Part 302: Low-voltage switchgear and controlgear assemblies*

IEC 60092-303, *Electrical installations in ships – Part 303: Equipment – Transformers for power and lighting*

IEC 60092-304, *Electrical installations in ships – Part 304: Semiconductor convertors*

IEC 60092-306, *Electrical installations in ships – Part 306: Equipment – Luminaires and accessories*

IEC 60092-307, *Electrical installations in ships – Part 307: Equipment – Heating and cooking appliances*

IEC 60092-350, *Electrical installations in ships – Part 350: Shipboard power cables – General construction and test requirements*

IEC 60092-352:2005, *Electrical installations in ships – Part 352: Choice and installation of electric cables*

IEC 60092-401, *Electrical installations in ships – Part 401: Installation and test of completed installation*

IEC 60092-502:1994¹⁾, *Electrical installations in ships – Part 502: Tankers – Special features*

IEC 60092-504:2001²⁾, *Electrical installations in ships – Part 504: Special features – Control and instrumentation*

IEC 60309-1, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60309-2, *Plugs, socket-outlets and couplers for industrial purposes – Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

IEC 60332-1 (all parts), *Tests on electric and optical fibre cables under fire conditions – Part 1: Test for vertical flame propagation for a single insulated wire or cable*

IEC 60332-3-22, *Tests on electric cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically mounted bunched wires or cables – Category A*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60533, *Electrical and electronic installations in ships – Electromagnetic compatibility*

1) The fourth edition of IEC 60092-502 (1994) has been replaced by a new edition (IEC 60092-502:1999) which no longer contains the data referenced in Table 1 of this document.

2) The second edition of IEC 60092-504 (1994) has been replaced by a new edition (IEC 60092-504:2001) which no longer contains the data referenced in Table 1 of this document.

IEC 60898-1, *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation*

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

IEC 60947-7-1, *Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors*

ISO 8846, *Small craft – Electrical devices – Protection against ignition of surrounding flammable gases*

ISO 9094-1, *Small craft – Fire protection – Part 1: Craft with a hull length of up to and including 15 m*

ISO 9094-2, *Small craft – Fire protection – Part 2: Craft with a hull length of over 15 m*

ISO 10239, *Small craft – Liquefied petroleum gas (LPG) systems*

*International Convention for the Safety of Life at Sea (SOLAS):1974
Amendment (1983)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given IEC 60092-101 (some of which are repeated here for convenience), as well as the following, apply.

3.1 General

3.1.1

safety voltage

voltage which does not exceed 50 V a.c. r.m.s. between conductors, or between any conductor and earth, in a circuit isolated from the supply by means such as a safety isolating transformer, or converter with separate windings;

voltage which does not exceed 50 V d.c. between conductors, or between any conductor and earth, in a circuit which is isolated from higher voltage circuits

NOTE 1 Consideration should be given to the reduction of the limit of 50 V under certain conditions, such as wet surroundings or exposure to heavy seas or where direct contact with live parts is involved.

NOTE 2 The voltage limit should not be exceeded either at full load or no load, but it is assumed, for the purpose of this definition, that any transformer or converter is operated at its rated supply voltage.

[IEC 60092-101, definition 1.3.19]

3.1.2

essential services

services essential for the navigation, steering or maneuvering of the ship, or for the safety of human life, or for special characteristics of the ship (for example, special services)

[IEC 60092-101, 1.3.4]

3.1.3

earthed

connected to the general mass of the hull of the ship in such a manner as will ensure at all times an immediate discharge of electrical energy without danger

NOTE 1 A conductor is said to be “solidly earthed” when it is electrically connected to the hull without a fuse-link, switch, circuit-breaker, resistor, or impedance, in the earth connection.

NOTE 2 In the USA, “grounded” is used instead of “earthed”.

[IEC 60092-101, 1.3.9]

3.1.4

engine negative terminal

terminal on the engine to which the negative cable of a battery system is connected

3.2 DC systems of distribution

3.2.1

two-wire d.c. system

d.c. system comprising two conductors only, between which the load is connected

[IEC 60092-201, 2.2.1]

3.3 AC systems of distribution

3.3.1

single-phase two-wire a.c. system

single-phase a.c. system comprising two conductors only, between which the load is connected

[IEC 60092-201, 2.3.1]

3.3.2

single-phase three-wire a.c. system

single-phase a.c. system comprising two conductors and a neutral wire, the supply being taken from the two outer conductors or from the neutral wire and either outer conductor, the neutral wire carrying only the difference-current

[IEC 60092-201, 2.3.2]

3.3.3

three-phase three-wire system

system comprising three conductors connected to a three-phase supply

[IEC 60092-201, 2.3.3]

3.3.4

three-phase four-wire system

system comprising four conductors of which three are connected to a three-phase supply and the fourth to a neutral point in the source of supply

[IEC 60092-201, 2.3.4]

3.4 Protection

3.4.1

final circuit

that portion of a wiring system extending beyond the final overcurrent protection device for that circuit

[IEC 60092-101, 1.3.17, modified]

3.4.2

overcurrent protection device

device, such as a fuse or circuit-breaker, designed to interrupt the circuit when the current flow exceeds a predetermined value for a predetermined time.

3.4.3

fuse

device that by the fusing of one or more of its specifically designed and proportioned components, opens the circuit in which it is inserted by breaking the current when this exceeds a given value for a sufficient time. The fuse comprises all the parts that form the complete device

3.4.4

circuit-breaker

mechanical switching device capable of making, carrying and breaking currents under normal circuit conditions, and also making, carrying for a specified time and breaking currents under specified abnormal conditions such as those of a short circuit

3.4.5

residual (differential) current device (RCD) /ground-fault circuit interrupter (GFCI)

mechanical switching device designed to make, carry and break currents under normal service conditions and to cause the opening of the contacts when the residual current attains a given value under specified conditions

3.4.6

low-voltage switchgear and controlgear

combination of one or more low-voltage switching devices together with associated control, measuring, signaling, protective, regulating equipment etc. often contained within an enclosure or mounted on a panel

NOTE Examples of devices are circuit-breakers, fuses, switches, instruments and indicators.

3.4.7

protective conductor

conductor provided for purposes of safety, for example, protection against electric shock by electrically connecting any of the exposed and extraneous conductive-parts of electrical equipment of a vessel with non-metallic hull to the vessel's main earth

NOTE In the case of a vessel with metallic hull, exposed and extraneous conductive parts may be bonded to the ship's hull by permanent and reliable metal to metal joints of negligible impedance.

[IEV 195-02-09, modified]

3.4.8

bond

connection of non-current-carrying parts to ensure continuity of electrical connection, or to equalize the potential between parts comprising, for example, the armour or lead sheath of adjacent length of cable, the bulkhead, etc. For example, bulkhead and cables in a radio-receiving room

[IEC 60092-101, 1.3.7]

3.4.9

neutral conductor

conductor electrically connected to the neutral point and capable of contributing to the distribution of electrical energy

[IEV 195-02-06]