

INTERNATIONAL STANDARD

**Electrical installations in ships –
Part 302-2: Low voltage switchgear and controlgear assemblies – Marine power**
(standards.iteh.ai)

IEC 60092-302-2:2019

<https://standards.iteh.ai/catalog/standards/sist/c309faed-96fa-4f5c-82e4-3f93add43be1/iec-60092-302-2-2019>



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CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Symbols and abbreviations.....	7
5 Interface characteristics.....	7
6 Information	8
7 Service conditions	9
8 Constructional requirements.....	9
9 Performance requirements.....	12
10 Design verification	13
11 Routine verification.....	15
Annex AAA (informative) Items subject to agreement between the assembly manufacturer and the user	19
Bibliography.....	24
iTeh STANDARD PREVIEW (standards.iteh.ai)	
Figure 201 – Relationship of standards.....	5
Table 1 – Minimum clearances in air (8.3.2).....	15
Table 2 – Minimum creepage distances (8.3.3).....	16
Table 6 – Temperature rise limits (9.2).....	17
Table AAA.1 – Items subject to agreement between the assembly manufacturer and the user	19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS –**Part 302-2: Low voltage switchgear and controlgear assemblies – Marine power**

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 60092-302-2 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This first edition cancels and replaces the fourth edition of IEC 60092-302 published in 1997. This edition constitutes a technical revision.

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

- a) this document has been renumbered to fall in line with IEC 61439 (all parts);
- b) this document has been restructured to fall in line with IEC 61439 (all parts);
- c) the creepage distances have been modified;
- d) the references to non type tested assemblies (NTTA) have been removed;
- e) non-applicable tables have been removed;

- f) the applicability of IEC 61439 (all parts) annexes have been identified.
- g) specific requirements that were detailed in IEC 60092-302:1997, covered under 7.6.101 have partly been moved to 60092-201.

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

FDIS	Report on voting
18/1656/FDIS	18/1668/RVD

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

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

This International Standard is to be used in conjunction with IEC 61439-1:2011 and IEC 61439-2:2011.

This document supplements or modifies the corresponding clauses in IEC 61439-1:2011 and IEC 61439-2:2011. Where this document states "addition", "deletion" or "replacement", the relevant text of IEC 61439-1:2011 and IEC 61439-2:2011 is adapted accordingly.

Clauses and subclauses which are additional to those of IEC 61439-1:2011 and IEC 61439-2:2011 are numbered starting from 201. Additional annexes are numbered starting from AAA.

In this document, terms written in small capitals are defined in Clause 3.

Where the abbreviated term *PSC-assembly* is used in applicable clauses of IEC 61439-2:2011, this refer to *MPSC-assembly*.

A list of all parts in 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 document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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

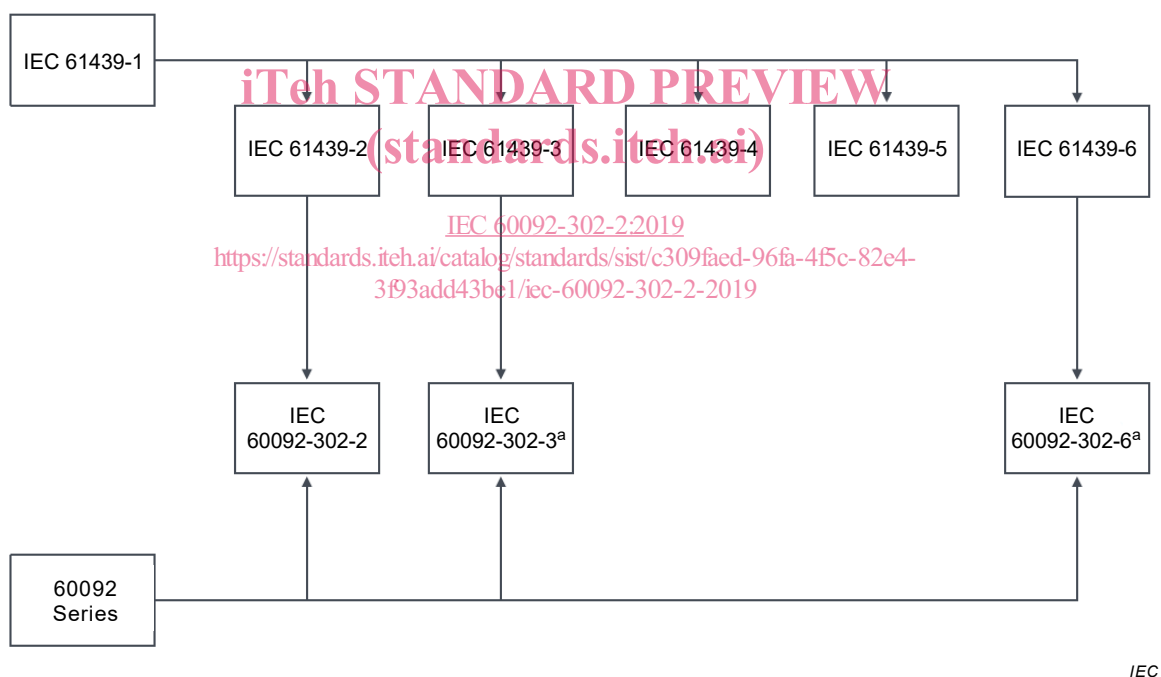
INTRODUCTION

This part of IEC 60092 forms a series of International Standards for electrical installations in sea-going ships, incorporating good practice and coordinating, as far as possible, existing rules.

These standards form a code of practical interpretation and amplification of the requirements of the International Convention for the Safety of Life at Sea, a guide for future regulations which may be prepared and a statement of practice for use by ship owners, shipbuilders and appropriate organizations.

IEC 61439 (all parts) identifies the requirements for land based low voltage switchgear and controlgear assemblies. IEC 60092-302 (all parts) has been developed in-line with Figure 201, which shows the future intention to develop appropriate marine standards for final distribution boards to be operated by ordinary persons; and busbar trunking systems.

IEC 60092 (all parts) remains the lead standard series for electrical installations in ships, and the applicable standards are applied accordingly. Wherever there are differences between IEC 61439 (all parts) and IEC 60092 (all parts), IEC 60092 (all parts) takes precedence.



Key

^a Under consideration.

NOTE At the time of publication, IEC 60092-302-3 and IEC 60092-302-6 are not developed. The figure shows that these standards are potential future projects to align with the IEC 61439 series.

Figure 201 – Relationship of standards

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 302-2: Low voltage switchgear and controlgear assemblies – Marine power

1 Scope

This part of IEC 60092 defines the specific requirements of low voltage marine power switchgear and controlgear assemblies (MPSC-assemblies) as follows:

- stationary assemblies with enclosure for which the rated voltage does not exceed 1 000 V AC or 1500 V DC;
- assemblies intended for use in conjunction with the power generation, distribution and conversion of electric energy, and for the control of electric energy consuming equipment.

This document applies to all assemblies whether they are designed, manufactured and verified on a one-off basis or fully standardised and manufactured in quantity.

The manufacture and/or assembly can be carried out other than by the original manufacturer.

This document does not apply to individual devices and self-contained components, such as motor starters, fuse switches, electronic equipment, which comply with the relevant product standards.

NOTE Individual devices and components include those that are covered by the IEC 60947 series.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60092-101:2018, *Electrical installations in ships – Part 101: Definitions and general requirements*

IEC 60092-201:2019, *Electrical installations in ships – Part 201: System design – General*

IEC 60533, *Electrical and electronic installations in ships – Electromagnetic compatibility (EMC) – Ships with a metallic hull*

IEC 61439-1:2011, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

IEC 61439-2:2011, *Low-voltage switchgear and controlgear assemblies – Part 2: Power switchgear and controlgear assemblies*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

Clause 3 of IEC 61439-2:2011 is applicable except as follows.

3.1 General terms

Additional terms and definitions:

3.1.201

MARINE POWER SWITCHGEAR AND CONTROLGEAR ASSEMBLY

MPSC-assembly

low-voltage switchgear and controlgear assembly used to distribute and control energy for all types of loads, intended for marine applications specifically, in ships, operated by skilled or instructed persons only

Note 1 to entry: It is not excluded for a MPSC-assembly to be located in an area accessible to ordinary persons.

3.1.202

MAIN SWITCHBOARD

MPSC-assembly which is directly supplied by the main source of electrical power and is intended to control and distribute electrical energy to the ships services

3.1.203

MOTOR CONTROL CENTRE

MCC

MPSC-assembly which is supplied by main or emergency switchboards and is intended to control and distribute electrical energy

Note 1 to entry: It is possible for the MCC to be a section or sections of the main switchboard.

3.1.204

EMERGENCY SWITCHBOARD

MPSC-assembly which is normally supplied by the main switchboard, but in the event of failure of the main electrical power system is directly supplied by the emergency source of electrical power and is intended to control and distribute electrical energy to the emergency services

3.1.205

DISTRIBUTION BOARD

MPSC-assembly which is supplied by a main or emergency switchboard, or distribution boards and is used to distribute and control energy to other distribution boards, final distribution boards or final sub circuits

Note 1 to entry: The definition of "section board" as defined in previous versions of IEC 60092-302 has been replaced by the one of "distribution board".

4 Symbols and abbreviations

Clause 4 of IEC 61439-2:2011 is applicable.

5 Interface characteristics

Clause 5 of IEC 61439-2:2011 is applicable except as follows.

5.2 Voltage ratings

5.2.3 Rated insulation voltage (U_i) (of a circuit of an assembly)

Replacement of 5.2.3 of IEC 61439-1:2011:

The rated insulation voltage of a circuit of an assembly is the voltage value to which dielectric test voltages and creepage distances are referred.

Due to the potential effects of the marine environment on creepage distances, the rated insulation voltage of a circuit shall be 1,5 times higher than the values stated for U_n and for U_e for the same circuit up to a final maximum of U_i 1 000 V AC or 1 250 V DC. Any DC application requiring U_i exceeding 1 250 V DC shall need to have special consideration.

For single-phase circuits derived from IT systems (see IEC 60364-5-52), the rated insulation voltage should be at least equal to the voltage between phases of the supply.

While it is advisable to use the above safety factor for all internal components and devices; those that have been tested in accordance with their own product standard need not have this safety factor applied.

5.6 Other characteristics

Replacement of item g) of IEC 61439-1:2011:

g) operated by skilled and instructed persons only;

6 Information

Clause 6 of IEC 61439-2:2011 is applicable except as follows.

6.1 Assembly designation marking

Replacement of item d):

d) IEC 60092-302-2;

Addition of item e):

e) ambient air temperature (see 7.1.1.1 and 7.1.1.2).

6.3 Device and/or component identification

Addition:

Individual circuits and their devices shall have the following durable and permanent markings and meet the requirements of IEC 60092-201:2019, 5.3.

- a) The rated current of the circuit I_{nc} and assigned settings of adjustable protective devices (see 6.2.2 of IEC 61439-1:2011 for documentation of settings requirements).
- b) When, for fuse systems above 500 V, the fuseholders permit the insertion of fuse links for lower rated voltage, special warning labels or symbols, for example "Caution 690 V fuse links only".
- c) Arranging warning labels where polarized circuit-breakers are installed in DC systems so as to guard against the possibility of incorrect connections during maintenance or replacement.
- d) Withdrawable and/or removable parts along with relevant fixed parts of an assembly shall be provided with permanent markings in order to identify where the parts can be correctly reassembled.

Compliance is checked according to the test of 10.2.7 of IEC 61439-1 2011 and by inspection.

7 Service conditions

Clause 7 of IEC 61439-1:2011 is applicable except as follows.

7.1.1.1 Ambient air temperature for indoor installations

Replacement:

The ambient air temperature does not exceed +45 °C, and its average over a period of 24 h does not exceed +40 °C.

The lower limit of the ambient air temperature is 5 °C.

NOTE Where the ambient air temperature of the assembly is different, details of calculation methods are given in 10.10.3.201.

7.1.1.2 Ambient air temperature for outdoor installations

Replacement:

The ambient air temperature does not exceed +45 °C, and its average over a period of 24 h does not exceed +40 °C.

The lower limit of the ambient air temperature is -25 °C.

NOTE Where the ambient air temperature of the assembly is different, details of calculation methods are given in 10.10.3.201.

7.1.2.1 Humidity conditions for indoor installations

Replacement:

In other parts of the IEC 60092 series, where no "high air temperature" has been specified as a design parameter for equipment, the relative humidity of the air does not exceed 95 % at a maximum temperature of +45 °C.

Moderate condensation should be borne in mind which can occasionally occur due to variations in temperature.

Additional subclauses:

7.1.201 Vibration

MPSC-assemblies shall be unaffected by vibration likely to occur under normal service. Design parameters are detailed in 4.6.3.5 of IEC 60092-101:2018.

7.1.202 Angular deviation and motion

MPSC-assemblies shall be unaffected by movement of the ship likely to occur under normal service. Design parameters are detailed in 4.6.3.4 of IEC 60092-101:2018.

8 Constructional requirements

Clause 8 of IEC 61439-2:2011 is applicable except as follows.