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Electrical installations in ships –
Part 304: Equipment – Semiconductor converters

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL INSTALLATIONS IN SHIPS –

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FOREWORD

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IEC 60092-304 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 1980 and Amendment 1:1995. This edition constitutes a technical revision.

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

a) scope limited to converters greater than 1 kW;
b) terms and definitions: essential services added;
c) deleted selenium rectifier;
d) changed service conditions to 6. Effects from and on supply system new text added with parts from Clause 7 of IEC 60092-304:1980;
e) Clause 7: application changed to converters for essential services construction and documentation new text added;

f) Clause 8: application added;

g) Clause 9: test added;

The text of this International Standard is based on the following documents:

Draft	Report on voting
18/1780/FDIS	18/1782/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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 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- withdrawn,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.

INTRODUCTION

IEC 60092 (all parts) forms a series of International Standards for electrical installations in sea-going ships, incorporating good practice and co-ordinating, as far as possible, existing rules.

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

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 304: Equipment – Semiconductor converters

1 Scope

This part of IEC 60092 specifies special provisions to power electronic converters and systems, using semiconductor elements for use in ships. The conversion may be from AC to DC, from DC to AC, from DC to DC or from AC to AC with a rated output power greater than 1 kW.

This document does not apply to semiconductor converters used in electrical propulsion plant. For semiconductors converters used in electrical propulsion plant, see IEC 60092-501.

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

IEC 60092-504:2016, *Electrical installations in ships – Part 504: Automation, control and instrumentation*

IEC 60146-1 (all parts), *Semiconductor converters – General requirements and line commutated converters*

IEC 60146-1-1, *Semiconductor converters – General requirements and line commutated converters – Part 1-1: Specification of basic requirements*

IEC TR 60146-1-2, *Semiconductor converters – General requirements and line commutated converters – Part 1-2: Application guidelines*

IEC 60146-1-3, *Semiconductor converters – General requirements and line commutated converters – Part 1-3: transformers and reactors*

IEC 60146-2, *Semiconductor converters – Part 2: Self-commutated converters including direct d.c. converters*

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

IEC 60947-4-2, *Low-voltage switchgear and controlgear – Part 4-2: Contactors and motor-starters – Semiconductor motor controllers, starters and soft-starters*

IEC 61204 (all parts), *Low voltage switch mode power supplies*

IEC 61378-1, *Converter transformers – Part 1: Transformers for industrial applications*

IEC 61800 (all parts), *Adjustable speed electrical power drive systems*

IEC 62040 (all parts), *Uninterruptible power systems (UPS)*

IEC 62271-200, *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62310 (all parts), *Static transfer systems (STS)*

IEC 62477-1, S*afety requirements for power electronic converter systems and equipment – Part 1: General*

IEC 62477-2, *Safety requirements for power electronic converter systems and equipment – Part 2: Power electronic converters from 1000 V AC or 1500 V DC up to 36 kV AC or 54 kV DC*

IEC 62909 (all parts), *Bi-directional grid connected power converters*