

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

**Electrical installations in ships – Primary DC distribution – System design
architecture**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 General requirements	8
4.1 General.....	8
4.2 Acceptance of substitutes or alternatives	9
4.3 Provisions for maximum load	9
4.4 Additions and alterations.....	9
4.5 Environmental conditions	9
4.6 Power supply system characteristics.....	9
4.6.1 General	9
4.6.2 DC distribution systems limits	9
4.7 Mechanical protection	9
4.8 Enclosures.....	9
5 System design.....	10
5.1 General.....	10
5.2 Power quality	10
5.3 Combined AC and DC distribution systems	10
5.4 Black-out start up and start from dead ship condition	10
5.5 DC distribution systems	10
5.6 AC distribution systems	10
5.7 Shore powered charging systems	10
5.8 Short-circuit currents in combined AC and DC systems.....	11
5.8.1 General	11
5.8.2 Short-circuit current in DC systems.....	11
5.9 System studies and calculations	11
5.10 Protection	11
5.10.1 General	11
5.10.2 Fixed and variable speed AC generator protection.....	12
5.10.3 Battery circuits.....	12
5.10.4 Safety barriers for energy storage systems.....	12
5.10.5 Protection against electric shock	13
5.11 Protection of interconnection to shore	13
6 Sources of electrical power.....	13
6.1 General.....	13
6.2 AC power generation with variable speed	13
6.3 DC power generation with variable speed	14
6.4 Various DC power sources.....	14
6.5 Load sharing.....	14
6.6 Transient operation.....	14
7 Power distribution systems	14
7.1 General.....	14
7.2 AC distribution systems	14
7.3 DC distribution systems	14

7.4	DC distribution systems feeding AC distribution systems	15
8	Equipment	15
8.1	General.....	15
8.2	Generators.....	15
8.3	DC assemblies.....	15
8.3.1	General	15
8.3.2	Cooling	15
8.3.3	Individual circuits	16
9	Control systems.....	17
9.1	General.....	17
9.2	Control architecture	17
9.3	Automatic control of vessel energy systems	17
9.3.1	General	17
9.3.2	Initiation of start-commands.....	18
9.3.3	Transfer of start-command.....	18
9.3.4	Events and indications.....	18
9.3.5	Automatic reconnection to dead DC distribution system	18
9.3.6	Automatic load sharing	18
10	Installation.....	18
11	Testing, verification and documentation.....	19
11.1	General requirements	19
11.2	Factory acceptance test	19
11.3	On-board testing (site testing).....	19
11.4	Documentation.....	19
	Bibliography.....	20

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS –**Primary DC distribution – System design architecture****FOREWORD**

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A PAS is a technical specification not fulfilling the requirements for a standard, but made available to the public.

IEC PAS 63108 has been processed by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

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

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft DPAS	Report on voting
18/1560/DPAS	18/1574/RVDPAS

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single period up to a maximum of 3 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

INTRODUCTION

The majority of existing distribution systems of ships are AC systems with electric power generated by fixed speed generator sets and a fixed frequency and voltage for the distribution system. This is also reflected by the current parts of the IEC 60092 series. The ship owners are facing new environmental regulations and are asking for more flexible solutions to meet the new market demands. It is acknowledged that the maritime industry is developing new innovative power and distribution solutions enabling reduced emissions to air, as well as reduced fuel consumption. Next generation of distribution systems involves use of a variety of power sources and DC distribution architecture. Novel concepts for design and operation of electrical systems with energy storage and advanced control of main and emergency power sources, including essential load services such as propulsion systems have evolved. These energy systems combine a wide range of technologies that will improve the fuel and emission profiles and performance of ship operations.

The primary DC distribution system exploit new and radical approaches for system design/configuration, operation and control compared to conventional solutions for power generation and distribution systems.

This PAS intends to describe these solutions. A new IEC International Standard is scheduled to replace this PAS.

The main intention with this PAS is to set design and test criteria to power systems with primary DC distribution. Semiconductor devices used as breaker shall fulfil requirements for breaking current and isolation according to IEC 60947-2 and IEC 60947-3.

ELECTRICAL INSTALLATIONS IN SHIPS –

Primary DC distribution – System design architecture

1 Scope

This PAS specifies the requirements of primary DC distribution systems and interconnected installations.

The requirements of this PAS establish general principles for

- operations, without degrading unit and human safety, capable of a reduced environmental footprint,
- existing and new power generating units, new DC distribution concepts for electrical power, energy storage and advanced control of a total power balance, including semiconductor converters (AC to DC, DC to DC and DC to AC power converters) and dynamic load controllers, and
- relevant system studies and calculations demonstrating a protection philosophy as needed for necessary selectivity, segregation methods and equipment.

This PAS also gives guidelines for integration of energy sources of different nature and suitable ways to identify locations of such installations.

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 60034 (all parts), Rotating electrical machines

IEC 60092 (all parts), *Electrical installations in ships*

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

IEC 60092-101:1994/AMD1:1995

IEC 60092-301, *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 60092-352, *Electrical installations in ships – Part 352: Choice and installation of electrical cables*

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

IEC 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

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

IEC 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 61557-8, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems*