

INTERNATIONAL STANDARD

**Mobile and fixed offshore units – Electrical installations –
Part 2: System design**

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**Mobile and fixed offshore units – Electrical installations –
Part 2: System design**

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**MOBILE AND FIXED OFFSHORE UNITS –
ELECTRICAL INSTALLATIONS –****Part 2: System design**

FOREWORD

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International Standard IEC 61892-2 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 2005. This edition constitutes a technical revision.

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

- the d.c. voltage given in clause 1 has been updated to 1 500 V, to ensure consistency through all parts of the IEC 61892 series;
- Clause 4 has been rewritten, such that all requirements to emergency power are now given in 4.3;
- the tables for nominal a.c. voltages have been updated in accordance with the last revision of IEC 60038;

the requirement to cross sectional area for earthing conductors has been made dependent on the system earthing arrangement;

requirement for emergency stop for motor-driven fuel-oil transfer and fuel-oil pressure pumps has been added.

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

FDIS	Report on voting
18/1240/FDIS	18/1255/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 in the IEC 61892 series, under the general title *Mobile and fixed offshore units – Electrical installations*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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- withdrawn,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.

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The contents of the corrigendum of March 2013 have been included in this copy.

INTRODUCTION

IEC 61892 forms a series of International Standards intended to enable safety in the design, selection, installation, maintenance and use of electrical equipment for the generation, storage, distribution and utilisation of electrical energy for all purposes in offshore units, which are being used for the purpose of exploration or exploitation of petroleum resources.

This part of IEC 61892 also incorporates and co-ordinates, as far as possible, existing rules and forms a code of interpretation, where applicable, of the requirements of the International Maritime Organisation (IMO), a guide for future regulations which may be prepared and a statement of practice for offshore unit owners, constructors and appropriate organisations.

This standard is based on equipment and practices, which are in current use, but it is not intended in any way to impede the development of new or improved techniques.

The ultimate aim has been to produce a set of International standards exclusively for the offshore petroleum industry.

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MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

Part 2: System design

1 Scope

This part of IEC 61892 contains provisions for system design of electrical installations in mobile and fixed units used in the offshore petroleum industry for drilling, production, processing and for storage purposes, including pipeline, pumping or 'pigging' stations, compressor stations and exposed location single buoy moorings.

It applies to all installations, whether permanent, temporary, transportable or hand-held, to a.c. installations up to and including 35 000 V and d.c. installations up to and including 1 500 V. (a.c. and d.c. voltages are nominal values). This standard does not apply either to fixed equipment used for medical purposes or to the electrical installations of tankers.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038:2009, *IEC standard voltages*

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

IEC 60092-504:2001, *Electrical installations in ships – Part 504: Special features – Control and instrumentation*

IEC 60447, *Basic and safety principles for man-machine interface, marking and identification – Actuating principles*

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

IEC 60909-0, *Short-circuit currents in three-phase a.c. systems – Part 0: Calculation of currents*

IEC 60909-1, *Short-circuit currents in three-phase a.c. systems – Part 1: Factors for the calculation of short-circuit currents according to IEC 60909-0*

IEC 60947-2:2006, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 61363-1, *Electrical installations of ships and mobile and fixed offshore units – Part 1: Procedures for calculating short-circuit currents in three-phase a.c.*

IEC 61511 (all parts), *Functional safety – Safety instrumented systems for the process industry sector*

IEC 61660-1, *Short-circuit currents in d.c. auxiliary installations in power plants and substations – Part 1: Calculation of short-circuit currents*

IEC 61892-1:2010, *Mobile and fixed offshore units – Electrical installations – Part 1: General requirements and conditions*

IEC 61892-3:2007, *Mobile and fixed offshore units – Electrical installations – Part 3: Equipment*

IEC 61892-5, *Mobile and fixed offshore units – Electrical installations – Part 5: Mobile units*

IEC 61892-7:2007, *Mobile and fixed offshore units – Electrical installations – Part 7: Hazardous areas*

IEC 62271-100:2008, *High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers*

SOLAS, *International Convention for the Safety of Life at Sea*

IMO MODU Code, *Code for the Construction and Equipment of Mobile Offshore Drilling Units*

IMO COLREG Code:1972, *Convention on the International Regulations for Preventing Collisions at Sea*

IALA Recommendation O-1239:2008, *On The Marking of Man-Made Offshore Structures*

ICAO, *International Civil Aviation Organization, Annex 14, Aerodromes*

3 Terms and definitions

For the purposes of this document the terms and definitions given in IEC 61892-1 and the following apply.

3.1 AC systems of distribution

3.1.1

single-phase two-wire a.c. system

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

Note 1 to entry In some countries this is designated as a two-phase system.

3.1.2

three-phase three-wire a.c. system

system comprising three conductors connected to a three-phase supply

3.1.3

three-phase four-wire a.c. 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

3.2

arc-flash hazard

a dangerous condition associated with the release of energy caused by an electric arc

[SOURCE: IEEE 1584:2002, 3.1]

3.3

availability

the state of an item of being able to perform its required function

[SOURCE: IEC 60050-603:1986, 603-05-04]

3.4

backup protection

protection which is intended to operate when a system fault is not cleared in due time because of:

- failure or inability of a protective device closest to the fault to operate, or
- failure of a protective device, other than the protective device closest to the fault, to operate

[SOURCE: IEC 60050-448:1995, 448-11-14, modified]

3.5

centralized control

control of all operations of a controlled system from one central control position

3.6

computer-based system

system that consists of one or more programmable electronic devices with their connections, peripherals and software necessary to carry out automatically specified functions

3.7

continuity of service

condition, that after a fault in a circuit has been cleared, the supply to the healthy circuits is re-established

Note 1 to entry See circuit 3 in Figure 1.

3.8

continuity of supply

condition that during and after a fault in a circuit, the supply to the healthy circuits is permanently ensured

Note 1 to entry See circuit 3 in Figure 1.

3.9

control functions

functions intended to regulate the behaviour of equipment or systems

3.10

control position

control station

group of control devices by which an operator can control the performance of a machine, apparatus, process or assembly of machines and apparatus

3.11 DC systems of distribution

3.11.1

two-wire d.c. system

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

3.11.2**three-wire d.c. system**

system comprising two conductors and a middle wire, the supply being taken from the two outer conductors or from the middle wire and either outer conductor, the middle wire carrying only the difference-current

3.12**diversity factor****demand factor**

ratio of the estimated total load of a group of consumers under their normal working conditions to the sum of their nominal ratings

3.13**fail-to-safe**

principle by which a failure or malfunction of a component of the system causes its output to automatically adjust to a predetermined safe state

[SOURCE: IEC 60050-191:1990, 191-15-04, modified]

3.14**function**

elementary operation performed by the system which, in conjunction with other elementary operations (system functions), enables the system to perform a task

3.15**high voltage**

the set of voltage levels in excess of low voltage

[SOURCE: IEC 60050-601:1985, 601-01-27 modified]

3.16**hull return system**

system in which insulated conductors are provided for connection to one pole or phase of the supply, the structure of the unit or other permanently earthed structure being used for effecting connections to the other pole or phase

3.17**integrity**

capability of a system to satisfactorily perform the required functions under all the stated conditions within a stated period of time

[SOURCE: IEC 6005-191:1990, 191-19-07, modified]

3.18**low voltage**

a set of voltage levels used for the distribution of electricity and whose upper limit is generally accepted to be 1 000 V a.c.

[SOURCE: IEC 60050-601:1985, 601-01-26]

3.19**control room**

room or spaces where centralized controls and measuring and monitoring equipment for main equipment and essential auxiliary machinery are located together with the appropriate means of communication