INTERNATIONAL STANDARD

IEC 61892-2

First edition
2005-03

Mobile and fixed offshore units – Electrical installations –

Part 2: System design

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE XB

For price, see current catalogue

CONTENTS

FOREWORD....5
INTRODUCTION....7

1 Scope....8
2 Normative references....8
3 Terms and definitions....9
4 Sources of electrical power....14
4.1 General....14
4.2 Main source of electrical power....15
4.3 Emergency source of electrical power....15
4.4 Additional requirements for periodically unattended machinery spaces....17
4.5 General requirements for renewable sources of electrical power....17
4.6 Arrangement and location....18
4.7 Output....19
4.8 Additional requirements for electrical emergency power systems....20
4.9 Starting arrangements for emergency generators....20
5 System earthing....21
5.1 General....21
5.2 General requirements....21
5.3 Neutral earthing methods....21
5.4 Neutral earthing for systems up to and including 1 000 V....21
5.5 Neutral earthing for systems above 1 000 V....22
5.6 Generators operated in parallel with source transformers....22
5.7 Earthing resistors, connection to hull structure....23
6 Distribution systems....24
6.1 DC distribution systems....24
6.2 AC distribution systems....29
7 Distribution system requirements....33
7.1 Earthed distribution systems....33
7.2 Methods of distribution....34
7.3 Balance of loads....34
7.4 Final circuits....34
7.5 Control circuits....35
7.6 Socket-outlets....35
7.7 Shore connections for mobile units....36
7.8 Motor circuits....36
8 Diversity (demand) factors....37
8.1 Final circuits....37
8.2 Circuits other than final circuits....37
8.3 Application of diversity (demand) factors....37
8.4 Motive-power circuits - General....37
9 System study and calculations....38
9.1 General....38
9.2 Electrical load study....38
9.3 Load flow calculations....39

9.4 Short-circuit calculations 39
9.5 Protection and discrimination study 41
9.6 Power system dynamic calculations 41
9.7 Calculation of harmonic currents and voltages 43
10 Protection 43
10.1 General 43
10.2 Characteristic and choice of protective devices with reference to short-circuit rating 44
10.3 Choice of protective devices with reference to overload 45
10.4 Choice of protective devices with regard to their application 45
10.5 Undervoltage protection 48
10.6 Overvoltage protection 49
11 Lighting 49
11.1 General 49
11.2 General lighting system 50
11.3 Emergency lighting system 51
11.4 Escape lighting system 51
11.5 Lighting circuits in machinery spaces, accommodation spaces, open deck spaces, etc. 52
11.6 Luminaires 53
11.6.1 Discharge lamp luminaires of voltages above 250 V 53
11.6.2 Searchlights 53
12 Control and instrumentation 53
12.1 Safeguarding 53
12.2 Supply arrangement 53
12.3 Dependability 53
12.4 Safety 53
12.5 Segregation 53
12.6 Performance 54
12.7 Integration 54
12.8 Development activities 54
12.9 Electromagnetic compatability 54
12.10 Design 54
12.11 Installation and ergonomics 55
12.12 Specific installations 56
12.13 Automatic control installations for electrical power supply 58
12.14 Machinery control installations 60
12.15 Public address and general alarm systems 60
12.16 Computer based systems 61
12.17 Software 63
12.18 Tests 65
12.19 Documentation 66
13 Degrees of protection by enclosures 67
13.1 General 67

Bibliography 69

Figure 1 – Continuity of supply/continuity of service 14
Figure 2 – TN-S d.c. system 25
Figure 3 – TN-C d.c. system 26
Figure 4 – TN-C-S d.c. system 27
Figure 5 – IT d.c. system 28
Figure 6 – TN-S a.c. system 30
Figure 7 – TN-C-S a.c. system 30
Figure 8 – TN-C a.c. system 31
Figure 9 – IT a.c. system 31

Table 1 – Summary of principal features of the neutral earthing methods 23
Table 2 – Voltages for d.c. systems 29
Table 3 – AC systems having a nominal voltage between 100 V and 1 000 V inclusive and related equipment 32
Table 4 – AC three-phase systems having a nominal voltage above 1 kV and not exceeding 35 kV and related equipment* 33
Table 5 – General lighting illumination levels 50
Table 6 – Escape Lighting illumination levels 52
Table 7 – Minimum requirements for the degree of protection for mobile and fixed offshore units 67

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

Part 2: System design

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61892-2 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

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

FDIS	Report on voting
18/965/FDIS	18/995/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.

IEC 61892 consists of the following parts, under the general title: *Mobile and fixed offshore units – Electrical installations:*

Part 1: General requirements and conditions

Part 2: System design

Part 3: Equipment

Part 4: Cables[1)]

Part 5: Mobile units

Part 6: Installation

Part 7: Hazardous areas

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.

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

1) Under consideration. Before IEC 61892-4 is published, reference is made to the IEC 60092-35X series.

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, 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 development of new or improved techniques.

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

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 750 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 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 60038:2002, *IEC standard voltages*

IEC 60092-101:2002, *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 60617-DB:2001[2)] *Graphical symbols for diagrams – Architectural and topographical installation plans and diagrams*

IEC 60947-2:2003, *Low voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 61000-2-4, *Electromagnetic compatibility (EMC) – Part 2-4: Environment – Compatibility levels in industrial plants for low-frequency conducted disturbances*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

---

2) "DB" refers to the on-line IEC database.

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

IEC 61892-1:2001, *Mobile and fixed offshore units – Electrical installations – Part 1: General requirements and conditions*

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

IEC 61892-5:2000, *Mobile and fixed offshore units – Electrical installations – Part 5: Mobile units*

IEC 61892-7:1997, *Mobile and fixed offshore units – Electrical installations – Part 7: Hazardous areas*

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

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

IMO MODU Code:1990, *Code for the Construction and Equipment of Mobile Offshore Drilling Units,*