

# INTERNATIONAL STANDARD

---

**Mobile and fixed offshore units – Electrical installations –  
Part 3: Equipment**





**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2012 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### **About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### **About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### **Useful links:**

IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading on-line dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).



IEC 61892-3

Edition 3.0 2012-03

# INTERNATIONAL STANDARD

Mobile and fixed offshore units – Electrical installations –  
Part 3: Equipment

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE **XA**

ICS 47.020.60

ISBN 978-2-88912-991-1

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references .....	9
3 Terms and definitions .....	12
4 General requirements .....	15
4.1 Environmental conditions .....	15
4.1.1 General .....	15
4.1.2 Ambient air temperature .....	15
4.1.3 Temperature rise .....	15
4.1.4 Vibration.....	15
4.2 Degree of protection.....	16
4.3 Nameplates and labels .....	16
4.4 Voltage and frequency variations.....	16
4.5 Electromagnetic compatibility .....	17
4.6 Terminations .....	17
5 Generators and motors.....	17
5.1 General.....	17
5.2 Voltage regulation of generators.....	17
5.2.1 General .....	17
5.2.2 DC generators .....	18
5.2.3 AC generators .....	18
5.3 Generators for special purposes .....	19
5.3.1 DC generators .....	19
5.3.2 AC generators .....	19
5.4 Parallel operation of general service generators – AC generators.....	19
5.4.1 Reactive load sharing .....	19
5.4.2 Load sharing .....	19
5.4.3 Flywheel effect for a.c. generators.....	19
5.4.4 Excitation of a.c. generators .....	20
5.5 Mechanical features (generators and motors).....	20
5.5.1 Entry of water.....	20
5.5.2 Accumulation of moisture and condensation .....	20
5.5.3 Balance .....	20
5.5.4 Shaft currents.....	20
5.5.5 Terminals .....	21
5.6 Lubrication (generators and motors).....	21
5.7 Prime movers .....	21
5.7.1 General .....	21
5.7.2 Speed governing characteristics .....	21
5.7.3 Flywheel effect .....	22
5.8 Cyclic irregularity .....	22
5.9 Lubrication (prime movers).....	22
5.10 Running speed .....	23
5.11 Testing.....	23

6	Transformers for power and lighting .....	23
6.1	General .....	23
6.2	Winding arrangement .....	24
6.3	Terminals .....	24
6.4	Cooling arrangement .....	24
6.5	Voltage regulation .....	24
6.6	Tests .....	24
7	Switchgear and controlgear assemblies .....	25
7.1	Service conditions .....	25
7.2	Definitions .....	25
7.3	Locking facilities .....	25
7.4	Low-voltage switchgear and controlgear assemblies .....	25
7.4.1	General .....	25
7.4.2	Temperature rise .....	25
7.4.3	Circuits .....	25
7.4.4	Marking of parts .....	26
7.4.5	Design and construction .....	26
7.4.6	Barriers between generator sections .....	28
7.4.7	Internal electrical circuits and connections .....	28
7.4.8	Design verification .....	29
7.5	Switchgear and controlgear in the range above 1 kV up to and including 35 kV .....	30
7.5.1	General .....	30
7.5.2	Service conditions .....	30
7.5.3	Ratings .....	30
7.5.4	Design and construction .....	30
7.5.5	Degree of protection provided by enclosures .....	30
7.5.6	Circuit breakers, switches and fuses .....	30
7.5.7	Earthing and short-circuiting .....	31
7.5.8	Protection against live parts .....	31
7.5.9	Internal wiring .....	31
7.5.10	Auxiliary systems .....	31
7.6	Instruments for assemblies .....	31
7.6.1	General .....	31
7.6.2	Instrument for a.c. generators .....	32
7.6.3	Instrument for d.c. power sources .....	32
7.6.4	Instruments measuring the insulation level to earth .....	32
7.6.5	Design of instruments .....	32
7.6.6	Transformers provided for instrumentation, protection and control circuits .....	33
7.6.7	Selection of protective devices .....	33
7.6.8	Synchronizing devices .....	33
7.6.9	Speed governor .....	33
8	Semiconductor converters .....	33
8.1	General .....	33
8.2	Internal wiring .....	34
8.3	Cooling arrangements .....	34
8.4	Accessibility .....	34
8.5	Service conditions .....	34

8.6	Application .....	35
8.6.1	Forced cooling.....	35
8.6.2	Effects from and on the supply or load system.....	35
8.7	Diagrams.....	35
8.8	Converter transformers.....	35
9	Secondary cells and batteries.....	36
9.1	General.....	36
9.2	Types of batteries.....	36
9.2.1	General .....	36
9.2.2	Valve-regulated acid batteries (VRLA) .....	36
9.2.3	Nickel-cadmium batteries .....	36
9.3	Charging facilities.....	36
9.4	Ventilation of secondary battery compartments .....	37
10	Luminaires .....	37
10.1	General.....	37
10.2	Luminaires for hazardous areas .....	37
11	Heating and cooking appliances .....	37
11.1	Construction.....	37
11.2	Isolation of supply to galley .....	37
12	Resistance trace heating .....	37
13	Communication.....	38
13.1	General.....	38
13.2	Safety requirements .....	38
13.3	External communication systems.....	38
13.4	Internal communication .....	38
13.4.1	General .....	38
13.4.2	Public address and general alarm systems .....	38
13.4.3	Other internal communication requirements.....	39
13.5	Safety and maintenance .....	39
14	Underwater systems and appliances.....	40
14.1	General.....	40
14.2	Fixed diving systems.....	40
14.3	Temporary diving systems.....	40
15	Control and instrumentation.....	40
15.1	General .....	40
15.2	General requirements .....	40
15.2.1	Operation.....	40
15.2.2	Reliability.....	40
15.2.3	Stability.....	41
15.2.4	Repeatability and accuracy .....	41
15.2.5	Segregation .....	41
15.3	Adjustments.....	41
15.4	Accessibility.....	41
15.5	Replacement .....	41
15.6	Non-interchangeability .....	41
15.7	Cooling air .....	41
15.8	Mechanical load on connecting devices .....	41
15.9	Mechanical features of cabinets.....	42

15.10	Shock and vibration absorbers.....	42
15.11	Internal wiring.....	42
15.12	Cable connections .....	42
15.13	Sensors .....	42
15.13.1	Performance .....	42
15.13.2	Response time.....	42
15.13.3	Reliability.....	42
15.14	Computer-based systems .....	42
15.14.1	Safety applications .....	43
15.14.2	Hardware modularity.....	43
15.14.3	Memory .....	43
15.14.4	Ancillary devices.....	43
15.14.5	Power supplies .....	43
15.14.6	Computer communications.....	43
15.14.7	Monitoring and fault diagnosis .....	44
15.14.8	Man-machine interface .....	44
15.14.9	Software .....	45
15.14.10	Precautions against design failures.....	45
15.14.11	Testing .....	45
15.14.12	Manuals.....	45
15.14.13	Spares.....	46
16	Accessories.....	46
16.1	General.....	46
16.2	Enclosures .....	46
16.3	Switches .....	46
16.4	Socket-outlets and plugs .....	47
17	Portable equipment .....	48
Annex A (informative)	Alternative method of power generation .....	49
Bibliography.....		55
Figure A.1	PV Power generating system – Major functional elements, sub-systems and power flow diagram .....	50
Figure A.2	Power generating system – Major functional elements .....	51
Figure A.3	CCVT operating principle block diagram .....	53
Figure A.4	Micro turbine typical block diagram .....	54
Table 1	Limits of cyclic irregularity .....	22
Table 2	Clearance and creepage distances for assemblies not verified by testing .....	27

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MOBILE AND FIXED OFFSHORE UNITS –  
ELECTRICAL INSTALLATIONS –****Part 3: Equipment****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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, accept IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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 61892-3 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

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

- a) Table 4 in the previous edition of IEC 61892-3 regarding type testing has been deleted. Information regarding environmental conditions, including requirements to vibration, is now given in Clause 4;
- b) for liquid immersed transformers requirement for overheating alarm and shut down has been added;

- c) requirements for low voltage switchgear and controlgear have been rewritten, based on IEC 61439-1 and IEC 61439-2. Only additional requirements to those given in IEC 61439 are given in the standard;
- d) requirements to low voltage circuit breakers, switches, contactors and fuses have been added;
- e) requirement for subdivision of high voltage switchboard has been added;
- f) requirements for luminaires have been deleted and replaced with reference to IEC 60598 series and IEC 60092-306;
- g) requirements for heating and cooking appliances have been deleted and replaced with reference to IEC 60335 series;
- h) requirement for portable equipment has been added.

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

FDIS	Report on voting
18/1241/FDIS	18/1256/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 of 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 of,
- amended.

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

## 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.

# MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

## Part 3: Equipment

### 1 Scope

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

This standard applies to equipment in 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 sets requirements for equipment, which are additional to the requirements given in the product standard for the relevant equipment.

This standard does not apply to the electrical installations in rooms used for medical purposes or in 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 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-14, *Rotating electrical machines – Part 14: Mechanical vibration of certain machines with shaft height 56 mm and higher – Measurement, evaluation and limits of vibration severity*

IEC 60044-1, *Instrument transformers – Part 1: Current transformers*

IEC 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60076-1, *Power transformers – Part 1: General*

IEC 60076-5, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-6, *Power transformers – Part 6: Reactors*

IEC 60076-7, *Power transformers – Part 7: Loading guide for oil-immersed power transformers*

IEC 60076-8, *Power transformers – Part 8: Application guide*

IEC 60076-11, *Power transformers – Part 11: Dry-type transformers*