

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Mobile and fixed offshore units – Electrical installations –
Part 5: Mobile units**

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**Unités mobiles et fixes en mer – Installations électriques –
Partie 5: Unités mobiles**

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**MOBILE AND FIXED OFFSHORE UNITS –
ELECTRICAL INSTALLATIONS –****Part 5: Mobile units****FOREWORD**

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International Standard IEC 61892-5 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

The requirements specified in this International Standard are based on the Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU Code) published by the International Maritime Organization (IMO), and might include additional provisions.

This fourth edition cancels and replaces the third edition published in 2014. This edition constitutes a technical revision.

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

- a) the technical requirements as to electric propulsion have been replaced with a reference to IEC 60092-501:2013;

- b) the requirement for handrails on main and emergency switchboards has been added;
- c) requirements as to control systems and indicators for watertight doors and hatch covers have been made more specific;
- d) requirements concerning the holding capacity for jacking systems have been rewritten;
- e) requirements as to thruster-assisted mooring system have been rewritten;
- f) the annex regarding enhanced system verification (HIL test) for dynamic positioned mobile units has been relocated to IEC 61892-2:2019.

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

FDIS	Report on voting
18/1653/FDIS	18/1665/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 61892 series, published 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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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- replaced by a revised edition, or
- amended.

INTRODUCTION

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

This part of IEC 61892 incorporates and coordinates, as far as possible, existing rules and forms a code of interpretation, where applicable, of the requirements of the International Maritime Organization (IMO), and constitutes a guide for future regulations which may be prepared and a statement of practice for offshore unit owners, designers, installers and appropriate organizations.

This document is based on solutions and methods which are in current use, but it is not intended to impede development of new or improved techniques.

In this revision, voltage limitations have been removed. However, voltage limitations may be given in the referenced equipment standards. The removal of voltage limitations is considered necessary due to the interconnection of, and supply from shore to offshore units. In such cases transmission voltages up to 132 kV AC and 150 kV DC are used and higher voltages are being planned.

The IEC 61892 series aims to constitute a set of International Standards for the offshore petroleum industry, but it is not intended to prevent their use beyond petroleum installations.

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[IEC 61892-5:2019](https://standards.iteh.ai/catalog/standards/sist/0610ee2a-3ace-4599-9bfb-9389fa218e8b/iec-61892-5-2019)

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MOBILE AND FIXED OFFSHORE UNITS – ELECTRICAL INSTALLATIONS –

Part 5: Mobile units

1 Scope

This part of IEC 61892 specifies additional characteristics for electrical installations in mobile units.

It applies to installations that depend on buoyancy, such as column-stabilized units (semi-submersible units), ship- or barge-type units as well as self-elevating units. It specifies additional characteristics for such units, used during transfer from one location to another and for drilling, production, accommodation, processing, storage and offloading purposes.

It applies to all installations, whether permanent, temporary, transportable or hand-held, to AC installations and DC installations without any limitation on voltage level. Referenced equipment standards may give voltage level limitations.

This document specifies requirements such as those concerning

- environmental conditions,
- limits of inclination for the unit where the equipment is required to operate,
- bilge pumps,
- navigation and obstruction lights,
- steering gear,
- ballast system,
- jacking systems, and
- anchoring systems.

For electric propulsion, reference is made to IEC 60092-501.

For dynamic positioning systems, reference is made to relevant IMO requirements.

This document does not apply to

- fixed equipment for medical purposes,
- electrical installations of tankers, and
- control of ignition sources other than those created by electrical equipment.

NOTE 1 For medical rooms, IEC 60364-7-710 provides specific requirements. Requirements for tankers are given in IEC 60092-502.

NOTE 2 Guidance on protection of non-electrical equipment can be found in ISO 80079-36, ISO 80079-37 and IMO 2009 MODU Code, 6.7.

NOTE 3 Attention is drawn to further requirements concerning electrical installations on such mobile offshore units contained in the IMO MODU Code.

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 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60092-501:2013, *Electrical installations in ships – Part 501: Special features – Electric propulsion plant*

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

IEC 61892-2:2019, *Mobile and fixed offshore units – Electrical installations – Part 2: System design*

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

IEC 61892-6, *Mobile and fixed offshore units – Electrical installations – Part 6: Installation*

IALA, *Recommendation O-139 on The Marking of Man-Made Offshore Structures*, 2013

IMO, *Convention on the International Regulations for Preventing Collisions at Sea (COLREG)*

IMO, MSC Circular 645, *Guidelines for vessels with dynamic positioning systems, Annex*

IMO, *International Convention for the Safety of Life at Sea (SOLAS)*, consolidated edition 2014

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61892-1, IEC 61892-2, IEC 61892-3, IEC 61892-6, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

auxiliary steering gear

equipment, other than any part of the main steering gear, necessary to steer the unit in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose

3.2

dynamic positioning system

DP system

equipment necessary to provide means of controlling the position and heading of a mobile unit within predetermined limits by means of resultant vectored thrust

Note 1 to entry: This note applies to the French language only.

3.3**electric steering gear**

power operated steering gear where an electric motor applies torque to the rudder stock through mechanical means only

3.4**electrohydraulic steering gear**

power operated steering gear where a hydraulic pump, driven by an electric motor, applies torque to the rudder stock through hydraulic and mechanical means

3.5**main steering gear**

machinery, rudder actuators, steering gear power units and ancillary equipment and the means of applying torque to the rudder stock (for example tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the unit under normal service conditions

3.6**propulsion machinery**

rotating machine normally intended to provide propulsive power

3.7**redundancy**

existence, in an item, of more than one means for performing a required function

[SOURCE IEC 60050-351:2013, 351-42-28, modified – The definition has been reformulated and the notes to entry have been deleted.]

3.8**steering gear control system**

equipment by which orders are transmitted from the navigating bridge to the steering gear power units

Note 1 to entry: Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables, etc.

3.9**steering gear power unit**

electric motor and its associated electrical and/or hydraulic equipment used to operate the steering gear

4 General requirements**4.1 Environmental conditions****4.1.1 Ambient temperature**

Unless otherwise given in the project specification, the values given in Table 1 are applicable.

Table 1 – Ambient temperature

Location	Minimum ambient air temperature for continuous operation at rated capacity °C	
	Min.	Max.
Engine rooms, boiler rooms, galleys and similar spaces, accommodation spaces ^a	0	+45
Open deck, dry cargo holds, steering gear compartments, deckhouses and similar spaces which are not provided with space heating	–25	+45
Refrigerated chambers and holds, general	The minimum temperature specified for the unit, but not above –20	+45

^a Components and systems shall be designed to operate at ambient temperature in the machinery space between 0 °C and +55 °C (but not necessarily at rated capacity and continuous operation).

Where equipment is designed to operate with temperatures higher or lower than those stated in Table 1, permissible temperature rises may be reduced or increased accordingly.

4.1.2 Relative humidity

Electrical equipment shall be designed for a relative humidity up to 95 %.

4.2 Protection against flooding

In every mobile unit, in which electric power is used for the services necessary for the safety of the unit, the generators, switchgear, motors, energy storage devices and associated controlgear for such services shall be so situated or arranged that the intended function of the system is upheld in the event of partial flooding of the unit, within inclination limits referred to in Clause 5.

The emergency services for the safety of personnel and the unit including emergency source of power, switchgear, motors and associated controlgear for such services as well as emergency control systems and communication systems should be located above the worst damage waterline and be readily accessible.

For mobile and buoyant production units, the location of equipment as described above shall be above the waterline that would exist if the unit was in a damaged condition, on or above the uppermost continuous deck or equivalent and shall be readily accessible from the open deck.

4.3 Rotating machines

Rotating machines shall be installed to minimise the effects of motion. The design of bearings of all machines and the arrangement for their lubrication shall be adequate to withstand the motions encountered in heavy weather and operation for prolonged periods at the list and trim specified in Clause 5 without the spillage of oil.

4.4 Conductors, equipment and apparatus

Conductors, equipment and apparatus shall be placed at such a distance from each magnetic compass or shall be so disposed that the interfering external magnetic field is negligible; that is, the total singular deviation shall not exceed 30 min when any combination of circuits is switched on and off.

4.5 Main switchboards

The main switchboard shall be subdivided into at least two parts. The subdivision may be effected by circuit-breakers or other suitable means so that the main generators and any supplies to duplicated services which are directly connected to the busbars are, as far as is practicable, equally divided between the sections.

4.6 Handrails or handles on mobile units

Every main or emergency switchboard, generator control panel, UPS and relevant control gear required during stability damage or extreme motions shall be provided with a handrail, located on a fixed part, or handles suitably fitted on the front of the switchboard. Where access to the rear of above-mentioned switchboards is necessary for operational or maintenance purposes, a handrail, located on a fixed part, or handles shall be fitted. It may be necessary to provide handrails or handles for distribution boards if the dimensions are similar to main or emergency switchboards.

4.7 Axes of rotation

For units where the requirements in relation to dynamic conditions as specified in 5.6 apply, horizontal rotation machines shall, to the extent possible, be installed preferably with the shaft in the fore-and-aft direction. Where a machine is installed athwartship, it shall be ensured that the design of the bearings and the arrangements for lubrication are satisfactory to withstand the rolling specified in Clause 5. The manufacturer shall be informed when a machine for installation athwartship is ordered.

iTeh STANDARD PREVIEW

5 Limits of inclination of the unit (standards.iteh.ai)

5.1 Authority requirement

IEC 61892-5:2019

Dependent upon the outcome of all studies relevant to the intact and damaged stability of the unit, the appropriate authority may require or permit deviations from the angles stated in 5.2, 5.3 and 5.4.

5.2 Machines, equipment and apparatus – General

All machines, equipment and apparatus shall operate satisfactorily under all conditions with the unit upright and when inclined up to the following angles from the normal, unless otherwise required by the design basis for the unit in the agreed location:

- a) for column stabilized units, 15° in any direction;
- b) for self-elevating units, 10° in any direction;
- c) for surface units, 15° either way in list and simultaneously trimmed 5° by the bow or stern.

NOTE The figures given in 5.2 are in accordance with the 2009 MODU Code.

5.3 Propulsion machinery

Main propulsion machinery and all auxiliary machinery essential to the propulsion and safety of the mobile unit shall be capable of operating under the static conditions specified in 5.2 and the following dynamic conditions, unless otherwise required by the design basis for the unit in the agreed location:

- a) for column stabilized units, 22° 30' in any direction;
- b) for self-elevating units, 15° in any direction;
- c) for surface units, 22° 30' rolling and simultaneously pitching 7° 30' by the bow or stern.

NOTE The figures given in 5.3 are in accordance with the 2009 MODU Code.

5.4 Essential source of power

The essential source of electrical power shall be designed to function at full rated power when the unit is upright and when it is at any inclination up to a maximum angle as given in the following a), b) and c), unless more stringent requirements are specified by the design study for the unit:

- a) column stabilized unit – from upright to an angle of inclination of 15° in any direction;
- b) self-elevating units – from upright to an angle of 10° in any direction;
- c) surface units – from upright and in level trim to an angle of inclination of 15° either way and simultaneously trimmed up to 5° by the bow or stern.

NOTE The requirements are taken from the IMO 2009 MODU Code, 4.1.4. If the essential power source is also being used for main propulsion, the requirements are given in 7.1.3 of the 2009 MODU Code.

5.5 Emergency machinery

Emergency machines, equipment and apparatus fitted in accordance with requirements of the appropriate authority for emergency plants shall operate satisfactorily under all conditions with the unit upright and when inclined, up to the following maximum angles from the normal:

- a) for column stabilized units, 25° in any direction;
- b) for self-elevating units, 15° in any direction;
- c) for surface units, 22° 30' about the longitudinal axis and/or when inclined 10° about the transverse axis, unless otherwise required by the design basis for the unit in the agreed location.

NOTE The figures given in 5.5 is in accordance with the 2009 MODU Code.

5.6 Dynamic condition

IEC 61892-5:2019

Where required by the appropriate authority, dynamic condition limits shall apply as follows:

- a) rotation about fore-and-aft axis (rolling), $\pm 22^{\circ} 30'$;
- b) rotation about athwartship (pitching), $\pm 7^{\circ} 30'$, unless otherwise required by the design basis for the unit in the agreed location.

NOTE 1 The figures given in 5.6 are in accordance with the 2009 MODU Code.

NOTE 2 These motions can occur simultaneously.

6 Bilge pumps

6.1 Power supply

Motors of permanently installed emergency bilge pumps, if any, shall be connected to an emergency switchboard.

6.2 Cables and cable connections

Cables and their connections to submersible pumps within the unit shall be capable of operating under a head of water equal to their distance below the worst damaged condition waterline. The cables shall either be armoured or mechanically protected by other means and shall not be installed within the assumed extent of damage. They shall be installed in continuous lengths from connection point located above the worst damaged condition waterline to the motor terminals.

6.3 Location of starting arrangement

Under all circumstances, it shall be possible to start the motor of a permanently installed bilge pump from a convenient point above the worst damaged condition waterline and in a space not within the assumed extent of damage.

NOTE Information regarding the worst damaged condition waterline and the spaces within the assumed extent of damage is given in IMO requirements, for example in the IMO MODU Code.

7 Navigation and obstruction lights

7.1 General

Except when a unit is stationary and engaged in operations, IMO COLREGs apply. These regulations give for example requirements to the provision of primary and alternative lanterns for each of the navigation lights.

7.2 Obstruction lights when in operation

When a unit is stationary and engaged in operations, attention is drawn to the requirements for the safety of navigation of the coastal state in whose territorial sea or on whose continental shelf the unit is operating.

Unless otherwise required by national authorities for obstruction lighting, the lighting shall be in accordance with IALA Recommendation O-139.

7.3 Navigation lights

All units shall be provided with navigation lights which comprise masthead, side, stern, anchor, not-under-command and, if applicable, special-purpose lights. The construction and installation of navigation lights shall be to the satisfaction of the appropriate authority.

7.4 Power supply and monitoring systems

The following electrical arrangements relate only to the navigation lights referred to in 7.3.

- a) Each light shall be connected by a separate cable to a distribution board reserved solely for navigation lights, fitted in an accessible place under the control of watchkeeping personnel.
- b) There shall be two separate power supply systems to the distribution board, one being from the main switchboard and one from the emergency switchboard. Where a transitional source of emergency power is required by the IMO International Convention for the Safety of Life at Sea (SOLAS), the arrangements shall enable the lights to be supplied from this source in addition to the emergency switchboard. An alarm shall be activated in the event of failure of a power supply to the distribution board.
- c) As far as practicable, the arrangements should be such that a fire, a fault or mechanical damage at any one point will not render both systems inoperative. It is, however, accepted that the systems shall come together at some point where the changeover can be performed. This should, preferably, be at or near the distribution board.
- d) Each light shall be controlled and protected in each insulated pole by a switch and fuse or by a circuit-breaker mounted in the distribution board.
- e) Each light shall be provided with an automatic indicator to give an acoustic and/or optical alarm in the event of complete extinction of the light. If an optical signal is used, which is connected in series with the navigation light, means to prevent failure of the indicator extinguishing the navigation light shall be provided. If an acoustic device alone is used, it shall be connected to an independent source of supply, for example a battery, and provision shall be made for testing this supply.