



BSI Standards Publication

Small craft — Electrical systems — Alternating and direct current installations

National foreword

This British Standard is the UK implementation of EN ISO 13297:2021+A11:2023. It is derived from ISO 13297:2020, incorporating amendment 1:2022. It supersedes [BS EN ISO 13297:2020+A1:2022](#), which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted to Technical Committee GME/33, Small craft.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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30 November 2022	Implementation of ISO amendment 1:2022 with CEN endorsement A1:2022
29 February 2024	Implementation of CEN amendment A11:2023: Annex ZA amended.

EUROPEAN STANDARD
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EUROPÄISCHE NORM

**EN ISO 13297:2021
+A11**

April 2023

ICS 47.080

Supersedes EN ISO 10133:2017, EN ISO 13297:2018

English Version

**Small craft - Electrical systems - Alternating and direct
current installations (ISO 13297:2020)**

Petits navires - Installations électriques
- Installations à courant alternatif
et continu (ISO 13297:2020)

Kleine Wasserfahrzeuge - Elektrische
Systeme - Wechselstrom- und
Gleichstromanlagen (ISO 13297:2020)

This European Standard was approved by CEN on 6 July 2020.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document ([EN ISO 13297:2021](#)) has been prepared by Technical Committee ISO/TC 188 "Small craft" in collaboration with CCMC.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2021, and conflicting national standards shall be withdrawn at the latest by October 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes [EN ISO 10133:2017](#) and [EN ISO 13297:2018](#).

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Endorsement notice

The text of ISO 13297:2020 has been approved by CEN as [EN ISO 13297:2021](#) without any modification.

European foreword to amendment A1

This document (EN ISO 13297:2021/A1:2022) has been prepared by Technical Committee ISO/TC 188 "Small craft" in collaboration with Technical Committee CEN/TC 464 "Small Craft" the secretariat of which is held by SIS.

This Amendment to the European Standard [EN ISO 13297:2021](#) shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.

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of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 13297:2020/Amd 1:2022 has been approved by CEN as EN ISO 13297:2021/A1:2022 without any modification.

European foreword to amendment A11

This document (EN ISO 13297:2021/A11:2023) has been prepared by Technical Committee CEN/TC 464 “Small Craft” the secretariat of which is held by SIS.

This Amendment to the European Standard [EN ISO 13297:2021](#) shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2023, and conflicting national standards shall be withdrawn at the latest by October 2023.

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Annex ZA (informative)

Relationship between this European Standard and the Essential Requirements of Directive 2013/53/EU aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/542 C(2015) 8736 final to provide one voluntary means of conforming to Essential Requirements of Directive 2013/53/EU.

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in [Table ZA.1](#) confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 2013/53/EU

Essential Requirements of Directive 2013/53/EU	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Annex I, Part A, 5.3 - Electrical systems	All clauses (except Clauses 1, 2, 3, 26), Annex A	This standard does not deal with battery ventilation to prevent the accumulation of explosive gases or electric propulsion circuits.
Annex I, Part A, 5.6.1 - Fire protection; general	Clause 20.6	In respect of routing electrical conductors away from exhaust components and heat sources.
Annex I, Part A, 2.5 - Owner's manual	Annex B	Annex B specifies the information to be included in the owner's manual, it does specify the requirements for the owner's manual

Table ZA.2 — Applicable Standards to confer presumption of conformity as described in this [Annex ZA](#)

Column 1 Reference in Clause 2	Column 2 International Standard Edition	Column 3 Title	Column 4 Corresponding European Standard Edition
ISO 7010:2019	ISO 7010:2019	Graphical symbols - Safety colours and safety signs - Registered safety signs	EN ISO 7010:2020
ISO 8846:1990	ISO 8846:1990	Small craft - Electrical devices - Protection against ignition of surrounding flammable gases	EN ISO 8846:2017
IEC 60309-2:2021	IEC 60309-2:2021	Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes - Part 2: Dimensional compatibility requirements for pin and contact-tube accessories	EN IEC 60309-2:2022
IEC 60529:1989	IEC 60529:1989	Degrees of protection provided by enclosures (IP Code)	EN 60529:1991

The documents listed in the Column 1 of [Table ZA.2](#), in whole or in part, are normatively referenced in this document, i.e. are indispensable for its application. The achievement of the presumption

of conformity is subject to the application of the edition of Standards as listed in Column 4 or, if no European Standard Edition exists, the International Standard Edition given in Column 2 of [Table ZA.2](#).

WARNING 1 Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 188, *Small craft*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 464, *Small craft*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fifth edition of ISO 13297 cancels and replaces ISO 13297:2014 and ISO 10133:2012, which have been technically revised.

The main changes compared to the previous editions are as follows:

- combined the standard for alternating current (ISO 13297:2014) and the standard for direct current (ISO 10133:2012) into a single marine electrical standard.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Small craft — Electrical systems — Alternating and direct current installations

IMPORTANT — The colours represented in the electronic file of this document can be neither viewed on screen nor printed as true representations. For the purposes of colour matching, see [ISO 3864-4](#), which provides colorimetric and photometric properties together with, as a guideline, references from colour order systems.

1 Scope

This document specifies the requirements for the design, construction and installation of the following types of DC and AC electrical systems, installed on small craft either individually or in combination:

- a) extra-low-voltage direct current (DC) electrical systems that operate at nominal potentials of 50 V DC or less;
- b) single-phase alternating current (AC) systems that operate at a nominal voltage not exceeding AC 250 V.

This document does not cover the following:

- electrical propulsion systems of direct current less than 1 500 V DC, single-phase alternating current up to 1 000 V AC, and three-phase alternating current up to 1 000 V AC, which are addressed by ISO 16315;
- any conductor that is part of an outboard engine assembly and that does not extend beyond the outboard engine manufacturers supplied cowling;
- three-phase AC installations that operate at a nominal voltage not exceeding 500 V AC, which are addressed by IEC 60092-507.

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.

ISO 7010:2019, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 8846:1990, *Small craft — Electrical devices — Protection against ignition of surrounding flammable gases*

 Text deleted

IEC 60309-2:2021 , *Plugs, socket-outlets and couplers for industrial purposes — Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1 craft's ground/earth protective grounding

connection, provided for safety purposes, that is established by a conducting connection with the common ground/earth (potential of the earth's surface)

3.2 equipotential bonding conductor

normally non-current-carrying conductor used to put various *exposed conductive parts* (3.15) of direct current electrical devices and *extraneous conductive parts* (3.33) at a substantially equal potential

3.3 engine negative terminal

terminal on the engine, starter or solenoid to which the negative battery cable is connected

3.4 main grounding earthing point

main point that provides connection for the DC negative conductor, AC *protective grounding conductor* (3.10) and bonding conductor to the craft's ground that is established by a conducting connection (intended or accidental) with the common ground (potential of the earth's surface)

Note 1 to entry: It can include any conductive part of the wetted surface of the hull in permanent contact with the water, depending on the overall system design.

3.5 overcurrent protection device

device designed to interrupt the circuit when the current flow exceeds a predetermined value for a predetermined time

EXAMPLE A fuse (3.29) or circuit breaker.

3.6 residual current device RCD

electro-mechanical switching device or association of devices designed to make, carry and break currents under normal service conditions and to cause the opening of contacts when the residual current attains a given value under specified conditions

Note 1 to entry: RCDs serve to reduce the risk of injury to people from electrical shock hazard, and damage to equipment from leakage of stray currents to earth or to other circuits.

3.7 polarization transformer

transformer that automatically orientates the neutral and *active (phase) conductors* (3.12) in the system in the same polarity orientation as the *polarized system* (3.17) of the craft

3.8 isolation transformer

transformer installed in the shore power supply circuit on a craft to electrically isolate all the normally *live conductors* (3.11) and the *protective conductor* (3.10) on the craft from the AC system conductors of the shore power supply

3.9 neutral conductor

conductor intentionally maintained at ground potential and capable of contributing to the transmission of electrical energy

3.10

protective conductor

protective grounding conductor

conductor, not normally carrying current, used for some measure of protection against electric shock, for electrically connecting any of the following parts of electrical equipment to the craft's ground/earth and to the shore AC grounding conductor through the shore power cable:

- a) *exposed conductive parts* (3.15) of electrical equipment;
- b) *extraneous conductive parts* (3.33);
- c) the main grounding (earthing) terminal;
- d) earth electrode(s);
- e) the earth point of a source, or an artificial neutral

3.11

live conductor

conductor or conductive part intended to be energized in normal use, including a *neutral conductor* (3.9)

3.12

active (phase) conductor

conductor that is maintained at a difference of potential from the *neutral conductor* (3.9) or *protective conductor* (3.10)

Note 1 to entry: In a system that does not include a neutral or protective conductor, all conductors are considered active conductors.

3.13

ignition-protected

<equipment> designed and constructed to give protection against ignition of surrounding flammable gases

Note 1 to entry: The protection against ignition of surrounding flammable gases is covered in ISO 8846:1990.

3.14

system voltage

nominal voltage supplied to the craft from a power source

3.15

exposed conductive part

conductive part of electrical equipment, which can be touched and which is not normally live, but which can become live under fault conditions

3.16

panel board

switchboard

assembly of devices for the purpose of controlling and/or distributing electrical power

Note 1 to entry: It can include devices such as circuit breakers, *fuses* (3.29), switches, instruments, and indicators.

3.17

polarized system

system in which the *live conductors* (3.11) (active and neutral) are connected in the same relation to all terminals on devices or receptacles (socket outlets) in a circuit