
Priključki v pristanišču - 3. del: Nizkonapetostni priključni sistem na kopnem (LVSC) - Splošne zahteve

Utility connections in port - Part 3: Low-voltage shore connection (LVSC) systems - General requirements

Versorgungsanschlüsse im Hafen - Teil 3: Niederspannungs-Landanschlussysteme (LVSC) - Allgemeine Anforderungen

Sample Document

Ta slovenski standard je istoveten z: **prEN IEC/IEEE 80005-3:2026**

ICS:

47.020.60	Električna oprema ladij in konstrukcij na morju	Electrical equipment of ships and of marine structures
-----------	---	--

oSIST prEN IEC/IEEE 80005-3:2026 **en,fr,de**

Sample Document

get full document from standards.iteh.ai

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN IEC/IEEE 80005-3

September 2026

ICS 47.020.60

English Version

**Utility connections in port - Part 3: Low-voltage shore connection
(LVSC) systems - General requirements
(IEC/IEEE 80005-3:2025)**

To be completed
(IEC/IEEE 80005-3:2025)

Versorgungsanschlüsse im Hafen - Teil 3:
Niederspannungs-Landanschlussysteme (LVSC) -
Allgemeine Anforderungen
(IEC/IEEE 80005-3:2025)

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2026-12-04.

The text of this draft consists of the text of IEC/IEEE 80005-3:2025 (18/1878/CDV).

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German).
A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

© 2026 CENELEC All rights of exploitation in any form and by any means reserved worldwide for CENELEC Members.

Project: 83631

Ref. No. prEN IEC/IEEE 80005-3:2026 E

prEN IEC/IEEE 80005-3:2026 (E)**European foreword**

This document (prEN IEC/IEEE 80005-3:2026) consists of the text of document IEC/IEEE 80005-3:2025, prepared by IEC/TC 18 "Electrical installations of ships and of mobile and fixed offshore units".

This document is currently submitted to the Enquiry.

The following dates are proposed:

- latest date by which the existence of (doa) dav + 6 months
this document has to be announced at national level
- latest date by which this document has to be (dop) dav + 12 months
implemented at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards (dow) dav + 36 months
conflicting with this document have to be (to be confirmed or
withdrawn modified when voting)

Sample Document

get full document from standards.iteh.ai

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034	series	Rotating electrical machines	-	series
IEC 60079	series	Explosive atmospheres	EN 60079	series
IEC 60092-101	-	Electrical installations in ships - Part 101: Definitions and general requirements	-	-
IEC 60092-201	2019	Electrical installations in ships - Part 201: System design - General	-	-
IEC 60092-301	-	Electrical installations in ships - Part 301: Equipment - Generators and motors	-	-
IEC 60092-302-2	-	Electrical installations in ships - Part 302-2: Low voltage switchgear and controlgear assemblies - Marine power	-	-
IEC 60092-352	-	Electrical installations in ships - Part 352: Selection, installation, and operating conditions of cables	-	-
IEC 60092-401	-	Electrical installations in ships - Part 401: Installation and test of completed installation	-	-
IEC 60092-504	2016	Electrical installations in ships - Part 504: Automation, control and instrumentation	-	-
IEC 60146	series	Semiconductor converters -General requirements and line commutated converters	EN 60146	series
IEC 60309-1	-	Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes - Part 1: General requirements	EN IEC 60309-1	-
IEC 60309-5	2017	Plugs, socket-outlets and couplers for industrial purposes - Part 5: Dimensional compatibility and interchangeability requirements for plugs, socket-outlets, ship connectors and ship inlets for low-voltage shore connection systems (LVSC)	EN IEC 60309-5	2019

prEN IEC/IEEE 80005-3:2026 (E)

IEC 60332-1-2	-	Tests on electric and optical fibre cables under fire conditions_ - Part:1-2: Test for vertical flame propagation for a single insulated wire or cable_- Procedure for 1_kW pre-mixed flame	-	-
IEC 60364	series	Low-voltage electrical installations	-	series
IEC 60364-6	-	Low voltage electrical installations - Part 6: Verification	HD 60364-6	-
IEC 60909	series	Short-circuit currents in three-phase AC systems	EN 60909	series
IEC 60947-2	-	Low-voltage switchgear and controlgear - Part 2: Circuit-breakers	EN IEC 60947-2	-
IEC 60947-5-1	-	Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices	EN IEC 60947-5-1	-
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 62477-1	-	Safety requirements for power electronic converter systems and equipment - Part 1: General	EN IEC 62477-1	-
1974		International Convention for the Safety of Life at Sea (SOLAS): Consolidated edition 2009, Ch. II-1/D, Regulations 42, 43 and 45		

get full document from standards.iteh.ai



IEC/IEEE 80005-3



Edition 1.0 2025-12

INTERNATIONAL STANDARD

Utility connections in port -

Part 3: Low-voltage shore connection (LVSC) systems - General requirements

Sample Document

get full document from standards.iteh.ai

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	9
4 General requirements	11
4.1 System description	11
4.2 Distribution system	12
4.2.1 General	12
4.2.2 Equipotential bonding	13
4.3 Compatibility assessment before connection	13
4.4 LVSC system design and operation	13
4.4.1 System design	13
4.4.2 System operation	14
4.5 Personnel safety	14
4.6 Design requirements	14
4.6.1 General	14
4.6.2 Protection against moisture and condensation	14
4.6.3 Location and construction	14
4.6.4 Electrical equipment in hazardous areas	15
4.7 Electrical requirements	15
4.8 System study and calculations	16
4.9 Emergency shutdown including emergency-stop facilities	16
5 LV shore supply system requirements	17
5.1 Voltages and frequencies	17
5.2 Quality of LV shore supply	19
6 Shore-side installation	19
6.1 General	19
6.2 System component requirements	19
6.2.1 Shore-side main circuit-breaker	19
6.2.2 Shore power transformer	20
6.2.3 System earthing methodology	20
6.2.4 Protective earthing	20
6.2.5 Equipotential bonding	20
6.3 Shore-to-ship electrical protection system	21
6.4 LV safety protocol, interlocking and communication	22
6.4.1 General	22
6.4.2 Operating of the low-voltage (LV) circuit-breakers and disconnectors	22
6.5 Shore connection convertor equipment	22
6.5.1 General	22
6.5.2 Cooling	23
6.5.3 Protection	23
7 Ship-to-shore connection and interface equipment	23
7.1 General	23
7.2 Cable management system	24
7.2.1 General	24

IEC/IEEE 80005-3:2025 © IEC/IEEE 2025

7.2.2	Monitoring of cable tension or position	25
7.2.3	Monitoring of the cable length	25
7.3	Ship and shore couplers	26
7.3.1	General	26
7.3.2	Safety loop scheme	27
7.3.3	Pilot contacts	30
7.4	Ship-to-shore connection cable	30
7.5	Storage	30
8	Ship-side installation	30
8.1	General	30
8.2	Ship electrical distribution system	30
8.2.1	Short-circuit protection	30
8.2.2	Earth fault protection, monitoring and alarm	30
8.2.3	Distribution system earthing	31
8.3	Shore connection switchboard	31
8.3.1	General	31
8.3.2	Ship-side main circuit-breaker	31
8.3.3	Instrumentation and protection	31
8.3.4	Operation of the circuit-breaker	32
8.4	Onboard transformer	32
8.5	Onboard main switchboard	33
8.5.1	General	33
8.5.2	Circuit-breaker	33
8.5.3	Instrumentation	33
8.5.4	Protection	34
8.5.5	Operation of the circuit-breaker	35
8.6	Ship power restoration	35
9	LVSC system control and monitoring	35
9.1	General requirements	35
9.2	Load transfer via blackout	35
9.3	Load transfer via automatic synchronization	36
9.3.1	General	36
9.3.2	Protection requirements	36
10	Verification and testing	36
10.1	General	36
10.2	Initial tests of shore-side installation	37
10.2.1	General	37
10.2.2	Tests	37
10.3	Initial tests of ship-side installation	37
10.3.1	General	37
10.3.2	Tests	37
10.4	Tests of the LVSC system at the first call	38
10.4.1	General	38
10.4.2	Tests	38
11	Periodic tests and maintenance	38
11.1	General	38
11.2	Tests and verification of the LVSC system at repeated calls	39
12	Documentation	39

IEC/IEEE 80005-3:2025 © IEC/IEEE 2025

12.1	General	39
12.2	System description	39
Annex A	(informative) Shore-to-ship connection cable	40
A.1	General	40
A.2	Rated voltage.....	40
A.3	General design.....	40
A.3.1	General.....	40
A.3.2	Power and earth conductors.....	40
A.3.3	Pilot elements.....	41
A.3.4	Cabling	41
A.3.5	Separator tape.....	41
A.3.6	Outer sheath	42
A.3.7	Markings	42
A.4	Tests on complete cables	42
Annex B	(normative) Ship-to-shore cable management and connector	44
B.1	General	44
Bibliography		46
Figure 1	– Block diagram of a typical LVSC system.....	12
Figure 2	– Phase sequence rotation – Positive direction	18
Figure 3	– Balanced three-phase variables in time domain.....	18
Figure 4	– Shore connection accessories	25
Figure 5	– Safety circuit	28
Figure A.1	– Bending test arrangement.....	43
Figure B.1	– Contact assignment	44
Table 1	– Number of parallel connections with the use of IEC 60309-5.....	26
Table B.1	– Connector types.....	44

Utility connections in port - Part 3: Low-voltage shore connection (LVSC) systems - General requirements

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.

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.

IEEE Standards documents are developed within IEEE Societies and subcommittees of IEEE Standards Association (IEEE SA) Board of Governors. IEEE develops its standards through an accredited consensus development process, which brings together volunteers representing varied viewpoints and interests to achieve the final product. IEEE standards are documents developed by volunteers with scientific, academic, and industry-based expertise in technical working groups. Volunteers involved in technical working groups are not necessarily members of IEEE or IEEE SA and participate without compensation from IEEE. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

IEC collaborates closely with ISO and IEEE in accordance with conditions determined by agreement between the organizations. This Triple Logo International Standard was jointly developed by the IEC, ISO and IEEE under the terms of that agreement.

- 2) The formal decisions 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. In the ISO, Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote. The formal decisions of IEEE on technical matters, once consensus within IEEE Societies and Standards Coordinating Committees has been reached, is determined by a balanced ballot of materially interested parties who indicate interest in reviewing the proposed standard. Final approval of the IEEE Standard document is given by the IEEE Standards Association (IEEE-SA) Standards Board.
- 3) IEC/ISO/IEEE Publications have the form of recommendations for international use and are accepted by IEC National Committees/ISO member bodies /IEEE Societies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC/ISO/IEEE Publications is accurate, IEC, ISO or IEEE 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 (including IEC/ISO/IEEE Publications) transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC/ISO/IEEE Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC, ISO and IEEE do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC, ISO and IEEE are 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, ISO or IEEE or their directors, employees, servants or agents including individual experts and members of technical committees and IEC National Committees and ISO member bodies, or volunteers of IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board, 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/ISO/IEEE Publication or any other IEC, ISO or IEEE 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.

IEC/IEEE 80005-3:2025 © IEC/IEEE 2025

- 9) Attention is drawn to the possibility that implementation of this IEC/ISO/IEEE Publication may require use of material covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. IEC, ISO or IEEE shall not be held responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patent Claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from ISO or the IEEE Standards Association.

IEC/IEEE 80005-3 was prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units, in cooperation with

- IEC subcommittee 23H: Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles, of IEC technical committee 23: Electrical accessories;
- ISO Technical Committee 8: Ships and marine technology, subcommittee 3: Piping and machinery;
- IEEE IAS Petroleum and Chemical Industry Committee (PCIC) of the IEEE Industry Applications Society.

This document is published as a triple logo (IEC, ISO and IEEE) standard.

This first edition cancels and replaces IEC PAS 80005-3:2014. This edition constitutes a technical revision.

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

Draft	Report on voting
18/1970/FDIS	18/1993A/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table. In ISO, the standard has been approved by 8 members out of 8 having a cast vote.

The language used for the development of this International Standard is English.

This document was drafted in accordance with the rules given in the ISO/IEC Directives, Part 2, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

A list of all the parts in the IEC 80005 series, published under the general title *Utility connections in port*, can be found on the IEC website.

The IEC Technical Committee and IEEE Technical Committee have decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

For a variety of reasons, including environmental considerations, it is becoming an increasingly common requirement for ships to shut down ship generators and to connect to shore power for as long as practicable during stays in port.

The intention of this document is to define requirements that support, with the application of suitable operating practices, efficiency and safety of connections by compliant ships to compliant low-voltage shore power supplies through a compatible shore-to-ship connection.

With the support of sufficient planning, cooperation between ship and terminal facilities, and appropriate operating procedures and assessment, compliance with the requirements of this document is intended to allow different ships to connect to low-voltage shore connection (LVSC) systems at different berths. This provides the benefits of standard, straightforward connection without the need for adaptation and adjustment at different locations that can satisfy the requirement to connect for as long as practicable during stays in port.

Ships that do not apply this document can find it impossible to connect to compliant shore supplies.

In relation to the 1 MVA upper scope limitation of this document, ship types that fall under the annexes of IEC/IEEE 80005-1 and require less than 1 MVA when connected to shore power can be designed in accordance with IEC/IEEE 80005-1 with a high-voltage shore connection to ensure interoperability.

Where deviations from the requirements and recommendations in this document are considered for certain designs, it is important to highlight the potential effects on compatibility.

Where the requirements and recommendations of this document are complied with, low-voltage shore supplies arrangements are likely to be compatible for visiting ships for connection.

Clauses 1 to 12 are intended for application to all LVSC systems. They intend to address mainly the safety and effectiveness of LVSC systems with a minimum level of requirements that would standardize on one solution.

This document includes the requirements to complete a detailed compatibility assessment for ship and shore supply prior to a ship arriving to connect to a shore supply for the first time.

Annex A includes cabling recommendations that can be used in LVSC systems and contains performance-based requirements for shore connection cables. Annex A was developed by technical experts from several countries. IEC technical committee 18, subcommittee 18A and IEC technical committee 20 were consulted regarding the cable requirements.

Annex B describes ship to shore cable management and connector to be used in LVSC systems.

1 Scope

This document specifies provisions for the design, installation and testing of low-voltage shore connection (LVSC) systems, onboard ships and on shore, to supply the ship with electrical power from shore.

This document is applicable to:

- ships requiring up to 1 MVA while at berth;
- three-phase shore connection systems rated 250 A and above, and with a nominal voltage rating of 400 V AC to 1 000 V AC;
- shore-side connection systems;
- shore-to-ship connection and interface equipment;
- transformers and reactors;
- semiconductor and rotating frequency convertors;
- ship-side connection systems;
- protection, control, monitoring, interlocking and power management systems.

This document does not apply to:

- inland navigation vessels;
- high-voltage shore connection systems, including ships built in accordance with the annexes of IEC/IEEE 80005-1;
- the electrical power supply during docking periods, for example dry docking and other out-of-service maintenance and repair;
- systems to be operated by ordinary persons as defined in 3.19.

NOTE 1 Other standards are available specifically for inland navigation vessels in Europe.

NOTE 2 IEC 60092-507 is applicable to small vessels.

NOTE 3 Additional or alternative requirements can be imposed by national administrations or the authorities within whose jurisdiction the ship is intended to operate and by the owners or authorities responsible for a shore power supply or distribution system.

NOTE 4 High-voltage shore connection systems are covered by IEC/IEEE 80005-1.

NOTE 5 Some existing 380 V AC ship systems can be supplied by 400 V AC.

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 (all parts), *Rotating electrical machines*

IEC 60079 (all parts), *Explosive atmospheres*

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

IEC 60092-201:2019, *Electrical installations in ships - Part 201: System design - General*

IEC 60092-301, *Electrical installations in ships - Part 301: Equipment - Generators and motors*

IEC/IEEE 80005-3:2025 © IEC/IEEE 2025

IEC 60092-302-2, *Electrical installations in ships - Part 302-2: Low voltage switchgear and controlgear assemblies - Marine power*

IEC 60092-352, *Electrical installations in ships - Part 352: Choice and installation of electrical cables*

IEC 60092-401, *Electrical installations in ships - Part 401: Installation and test of completed installation*

IEC 60092-504:2016, *Electrical installations in ships - Part 504: Automation, control and instrumentation*

IEC 60146 (all parts), *Semiconductor convertors - General requirements and line commutated convertors*

IEC 60309-1, *Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes - Part 1: General requirements*

IEC 60309-5:2017, *Plugs, socket-outlets and couplers for industrial purposes - Part 5: Dimensional compatibility and interchangeability requirements for plugs, socket-outlets, ship connectors and ship inlets for low-voltage shore connection systems (LVSC)*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame*

IEC 60364 (all parts), *Low-voltage electrical installations*

IEC 60364-6, *Low-voltage electrical installations - Part 6: Verification*

IEC 60909 (all parts), *Short-circuit currents in three-phase AC systems*

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

IEC 60947-5-1, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices*

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 62477-1, *Safety requirements for power electronic converter systems and equipment - Part 1: General*

International Convention for the Safety of Life at Sea (SOLAS):1974, *Consolidated edition 2009, Ch. II-1/D, Regulations 42, 43 and 45*