IEC 62613-1

Edition 2.0 2019-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Plugs, socket-outlets and ship couplers for high-voltage shore connection (HVSC) systems –
Part 1: General requirements**

**Prises de courant et connecteurs de navire pour les systèmes haute tension de raccordement des navires à quai –
Partie 1: Exigences générales**

IEC 62613-1:2019-05 en-fr)

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PLUGS, SOCKET-OUTLETS AND SHIP COUPLERS FOR HIGH-VOLTAGE SHORE CONNECTION (HVSC) SYSTEMS –

Part 1: General requirements

FOREWORD

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International Standard IEC 62613-1 has been prepared by subcommittee 23H: Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles, of IEC technical committee 23: Electrical accessories.

This bilingual version (2019-08) corresponds to the monolingual English version, published in 2019-05.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

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

a) extension of the scope to an unlimited number of pilot contacts (previously limited to 3);
b) update of the Figures and deletion of their embedded texts;

c) insertion of tables of keys whenever required by the Figures.

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

CDV	Report on voting
23H/411/CDV	23H/442A/RVC

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.

The French version of this standard has not been voted upon.

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

In this standard, the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type*;
- notes: in smaller roman type.

A list of all the parts in the IEC 62613 series, under the general title *Plugs, socket-outlets and ship couplers for high-voltage shore connection (HVSC) systems*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This part of IEC 62613 has been primarily written to address the needs of IEC/IEEE 80005-1 in terms of plugs, socket-outlets, ship connectors and ship inlets (hereafter referred to as "accessories"), to deliver electrical power to ships in ports. The purpose of IEC/IEEE 80005-1 is to define requirements that allow compliant ships to connect to compliant high-voltage shore power supplies through a compatible shore-to-ship connection.

These ships are described in IEC/IEEE 80005-1.

Ships that do not require connecting with standardized high-voltage shore power supplies as above may use accessories that are not covered by the standard sheets of IEC 62613-2, but they may find it impossible to connect to these shore supplies.

Low-voltage plugs, socket-outlets, ship connectors and ship inlets used for the connection of certain ship types to low-voltage shore power supplies can be found in IEC 60309 (all parts).

PLUGS, SOCKET-OUTLETS AND SHIP COUPLERS FOR HIGH-VOLTAGE SHORE CONNECTION (HVSC) SYSTEMS –

Part 1: General requirements

1 Scope

This part of IEC 62613 applies to accessories with

- three phases and earth with pilot contacts,
- one pole for neutral.

These accessories have rated currents not exceeding 500 A and rated operating voltages not exceeding 12 kV 50/60 Hz.

NOTE 1 In some countries, the term "ground" is used instead of "earth".

These accessories are primarily intended for use outdoors, in a seawater environment, for the shore supply of ships (ship-to-shore connection), in an ambient temperature within the range of −25 °C to +45 °C.

NOTE 2 In some countries, other ambient temperatures prevail and are considered.

These accessories are not intended for use in hazardous areas. In such locations where special conditions prevail, additional requirements can be necessary.

These accessories are intended to be connected to cables of copper or copper alloy only.

Socket-outlets or ship inlets incorporated in or fixed to electrical equipment are within the scope of this document.

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 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60092 (all parts), *Electrical installations in ships*

IEC 60092-354, *Electrical installations in ships – Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV)*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60228, *Conductors of insulated cables*

IEC 60269-1, *Low-voltage fuses – Part 1: General requirements*

IEC 60269-2, *Low-voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to K*

IEC 60502-4:2010, *Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1,2 kV) up to 30 kV (U_m = 36 kV) – Part 4: Test requirements on accessories for cables with rated voltages from 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV)*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-10-2, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62271-1, *High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear*

ASTM B117-1985, *Standard practice for operating salt spray (fog) apparatus*

IEEE 1580, *IEEE Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities*

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:

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

NOTE Where the terms "voltage" and "current" are used, they imply the alternating current (AC) root mean square (RMS) values.

3.1
accessory
plugs, socket-outlets, ship connectors and ship inlets

Note 1 to entry: The application of accessories is shown in Figure 1.

3.1.1
socket-outlet
part intended to be installed with the fixed wiring or incorporated in equipment

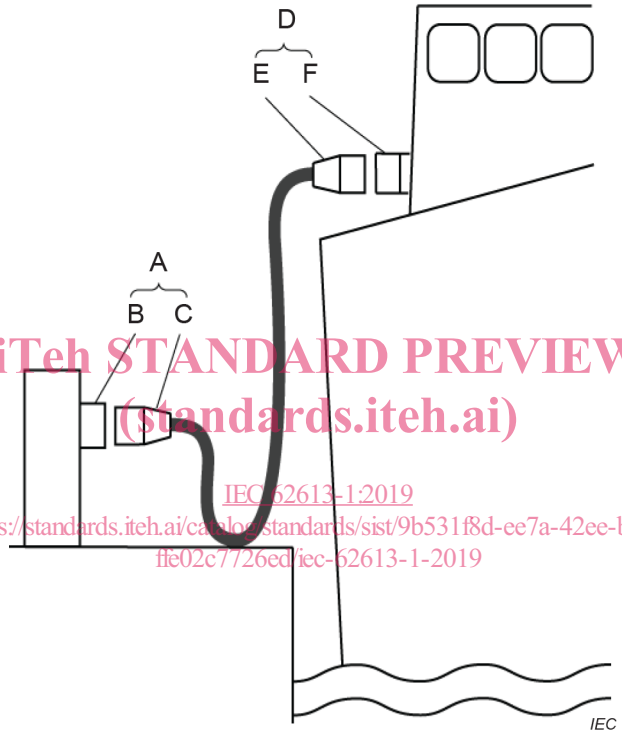
Note 1 to entry: A socket-outlet may also be incorporated in the output circuit of an isolating transformer.

3.1.2
plug
part intended to be attached directly to one flexible cable

3.2
ship coupler
means enabling the connection at will of a flexible cable to the ship, and consisting of a ship connector and ship inlet

3.2.1
ship connector
part intended to be attached to one flexible cable connected to the supply

3.2.2
ship inlet
part incorporated in, or fixed to, the ship



Key

A	Plug and socket-outlet
B	Socket-outlet
C	Plug
D	Ship coupler
E	Ship connector
F	Ship inlet

Figure 1 – Diagram showing the use of the accessories

3.3
interlock
device, either electrical and/or mechanical, which prevents the contacts of a plug from becoming live before it is in proper engagement with a socket-outlet, and which either prevents the plug or the ship connector from being withdrawn while its contacts are live or makes the contacts dead and earthed before separation

3.4
retaining device
mechanical arrangement which holds a plug or ship connector in position when it is in proper engagement, and prevents its unintentional withdrawal

3.5
cap
part separated or attached, which can be used to provide the degree of protection of a plug or ship inlet when it is not engaged with a socket-outlet or ship connector

3.6
lid
means to ensure the degree of protection on a socket-outlet or a ship connector

3.7
insulation voltage
voltage assigned to the accessory by the manufacturer and to which dielectric tests, clearances and creepage distances refer

3.8
rated current
current assigned to the accessory by the manufacturer

3.9
rated operating voltage
nominal voltage of the supply for which the accessory is intended to be used

3.10
conditional short-circuit current
prospective current that an accessory, protected by a specified short-circuit protective device, can satisfactorily withstand for the total operating time of that device under specified conditions of use and behaviour

Note 1 to entry: This definition differs from definition 441-17-20 of IEC 60050-441:1984 by broadening the concept of current-limiting device to a short-circuit protective device, the function of which is not only to limit the current.

3.11
live
a conductor or circuit is live when a difference of potential exists between it and earth

[SOURCE: IEC 60092-101:1994, 1.3.14]

3.12
clamping unit
part of a terminal necessary for the clamping and the electrical connection of the conductor

3.13
terminal
conductive part provided for the connection of a conductor to an accessory

3.14
pillar terminal
<pilot conductor> terminal in which the conductor is inserted into a hole or cavity, where it is clamped under the shank of the screw or screws

Note 1 to entry: The clamping pressure can be applied directly by the shank of the screw or through an intermediate clamping member to which pressure is applied by the shank of the screw (see Figure 2).

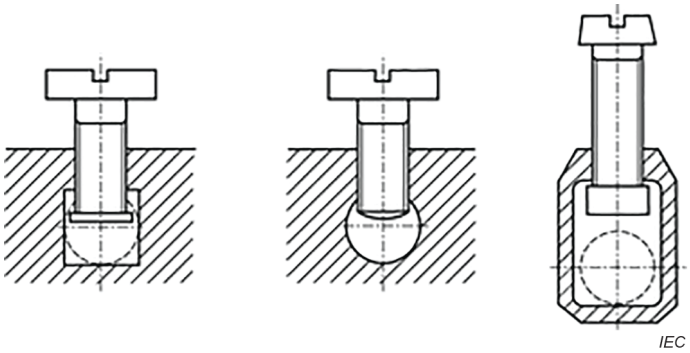


Figure 2 – Pillar terminals

3.15
screw terminal
<pilot conductor> terminal in which the conductor is clamped under the head of the screw

Note 1 to entry: The clamping pressure can be applied directly by the head of the screw or through an intermediate part, such as a washer, clamping plate or anti-spread device (see Figure 3).

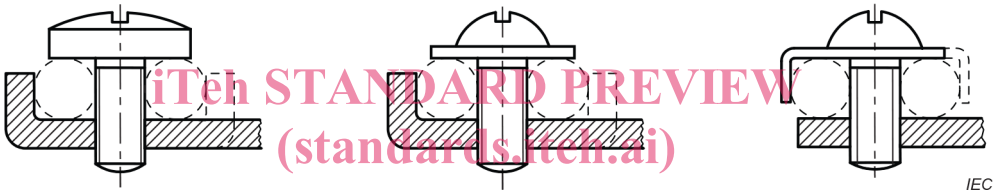


Figure 3 – Screw terminals

3.16
stud terminal
<pilot conductor> terminal in which the conductor is clamped under a nut

Note 1 to entry: The clamping pressure can be applied directly by a suitably shaped nut or through an intermediate part, such as a washer, clamping plate or anti-spread device (see Figure 4).

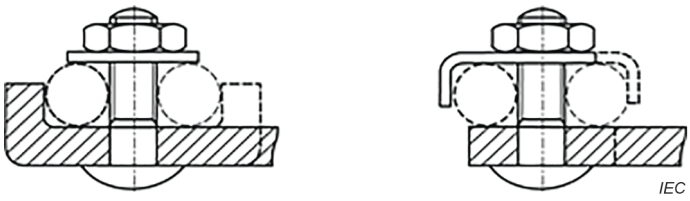


Figure 4 – Stud terminals

3.17
saddle terminal
<pilot conductor> terminal in which the conductor is clamped under a saddle by means of two or more screws or nuts

SEE: Figure 5.

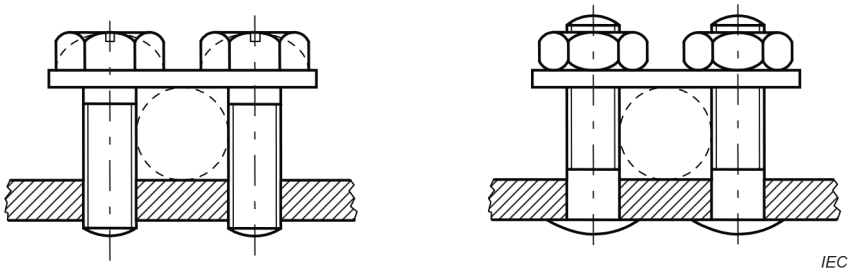


Figure 5 – Saddle terminals

3.18
lug terminal
screw terminal or stud terminal, designed for clamping a cable lug or bar by means of a screw or nut

SEE: Figure 6.

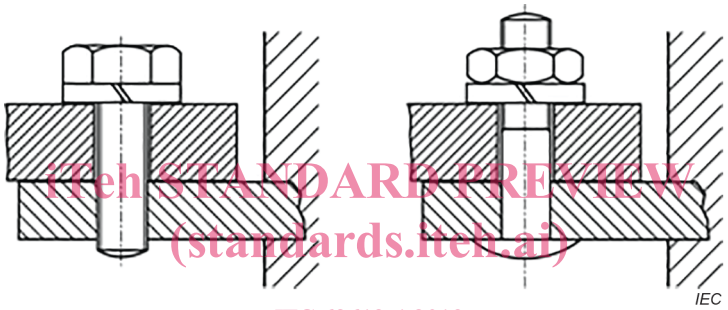


Figure 6 – Lug terminals

3.19
crimping terminal
terminal in which the conductor is crimped by means of an adequate tool

3.20
soldering terminal
terminal in which the conductor is soldered

3.21
mantle terminal
<earth conductor> terminal in which the conductor is clamped against the base of a slot in a threaded stud by means of a nut

Note 1 to entry: The conductor is clamped against the base of the slot by a suitably shaped washer under the nut, by a central peg if the nut is a cap nut, or by equally effective means for transmitting the pressure from the nut to the conductor within the slot (see Figure 7).