



BSI Standards Publication

Low-voltage docking connectors for removable energy storage units

National foreword

This Published Document is the UK implementation of IEC/TS 63066:2017.

The UK participation in its preparation was entrusted by Technical Committee PEL/23, Electrical accessories, to Subcommittee PEL/23/4, Protected type plugs and sockets.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017.
Published by BSI Standards Limited 2017

ISBN 978 0 580 90190 4
ICS 29.120.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 April 2017.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------



TECHNICAL SPECIFICATION

Low-voltage docking connectors for removable energy storage units

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.120.30

ISBN 978-2-8322-4124-0

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

CONTENTS

FOREWORD5

INTRODUCTION7

1 Scope8

2 Normative references8

3 Terms and definitions9

4 General11

 4.1 General requirements11

 4.2 General notes on tests11

 4.3 General construction11

 4.4 Visual examination tests12

 4.5 Cable to be used12

 4.6 Voltage and current for test purposes12

 4.7 Type of accessories12

5 Standard ratings13

6 Classification of accessories13

7 Marking15

8 Dimensions16

9 Protection against electric shock16

10 Provision for earthing17

11 Terminals and terminations18

12 Interlocks18

13 Resistance to ageing of rubber and thermoplastic material19

14 General construction19

15 Construction of accessories19

16 Degrees of protection19

17 Insulation resistance and dielectric strength19

18 Mechanical endurance19

19 Temperature rise20

20 Mechanical strength20

21 Screws, current-carrying parts and connections20

22 Creepage distances, clearances and distances through sealing compound20

23 Resistance to heat, to fire and to tracking21

24 Conditional short-circuit current withstand test21

25 Electromagnetic compatibility21

26 Dynamic mechanical severities21

 26.1 Minimum degree of dynamic mechanical severities21

 26.2 Appropriate functionality22

27 Electrical endurance22

 27.1 General requirements for accessories22

 27.2 Temperature burden for accessories22

 27.3 Damp heat for accessories23

 27.4 Contact resistance23

28	Climatic endurance for contacts	23
28.1	General requirements for contacts	23
28.2	Thermal change for contacts	24
28.3	Dry heat for contacts	24
28.4	Corrosion resistance for contacts	24
28.5	Damp heat for contacts	24
28.6	Functionality for contacts	24
28.7	Shocks for contacts	24
29	Climatic endurance for bodies	25
29.1	General requirements for bodies	25
29.2	Dry heat for bodies	25
29.3	Cold resistance for bodies	25
29.4	Cold temperatures for bodies	25
30	Salt stress endurance	26
30.1	General requirements for accessories	26
30.2	Salt stress resistance	26
31	Operation with misalignments	26
31.1	Misalignment at normal operation	26
31.2	Misalignment after unmating	30
31.3	Misalignment by terminated wires	30
31.4	Mating process effected by misalignment	30
32	Environmental conditions	31
	Annex A (normative) Test cycle electric endurance	33
	Annex B (informative) Environmental performance classes for vehicles	34
	Annex C (informative) Examples for accessories on the market	35
	C.1 General	35
	C.2 Accessory example 1	35
	C.3 Accessory example 2	38
	C.4 Accessory example 3	42
	C.5 Accessory example 4	44
	C.6 Accessory example 5	46
	C.7 Accessory example 6	48
	Bibliography	50
	Figure 1 - Diagram showing the use of the accessories	11
	Figure 2 – Orthogonal misalignment – front view	27
	Figure 3 – Angular misalignment – side view	27
	Figure 4 – Angular misalignment – top view	27
	Figure C.1 – Layout of accessory example 1	36
	Figure C.2 – Accessory example 1 Type A	37
	Figure C.3 – Accessory example 1 Type B	38
	Figure C.4 – Layout of accessory example 2	39
	Figure C.5 – Accessory example 2 Type A	40
	Figure C.6 – Accessory example 2 Type B	41
	Figure C.7 – Accessory example 3 Type A	43
	Figure C.8 – Accessory example 3 Type B	44

Figure C.9 – Drawings for accessory example 4 Type A.....	45
Figure C.10 – Drawings for accessory example 4 Type B.....	46
Figure C.11 – Drawings for accessory example 5 Type A.....	47
Figure C.12 – Drawings for accessory example 5 Type B.....	48
Figure C.13 – Drawings for accessory example 6 Type A.....	49
Figure C. 14 – Drawings for accessory example 6 Type B.....	49
Table 1 – General design and usage of accessories	12
Table 2 – Preferred rated currents	13
Table 3 – Short-time test currents	13
Table 4 – Mechanical endurance	20
Table 5 – Dimensions of misalignments	28
Table 6 – Combinations of misalignments	29
Table 7 – Environmental performance classes	31
Table 8 – Severities for environmental performance classes	32
Table B.1 – Severities for environmental performance classes for vehicles	34
Table C.1 – Parameters for accessory example 1	36
Table C.2 – Parameters for accessory example 2	39
Table C.3 – Parameters for accessory example 3	42
Table C.4 – Parameters for accessory example 4	45
Table C.5 – Parameters for accessory example 5	47
Table C.6 – Parameters for accessory example 6	48

Currently in preview, click buy full version

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LOW-VOLTAGE DOCKING CONNECTORS
FOR REMOVABLE ENERGY STORAGE UNITS**

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, access to 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.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when:

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 63066, which is a technical specification, 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.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
23H/372/DTS	23H/361/RVC

Full information on the voting for the approval of this technical specification 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.

In this document, the following print types are used:

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

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.

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

INTRODUCTION

Pluggable energy storage technology has a large demand and perspective in certain areas. With the advent of electric vehicles, energy storage units for renewable energy and other applications, guidance is needed to ensure safe and reliable operation, interoperability, environmental protection and energy efficiency. The industry needs such a document to promote the technology development and popularization of pluggable energy storage technology.

Compared to other accessories, several specific items are considered. The mating process may not have haptic support by the operator to find the correct position between the two parts of the connector. The mating process may have a mechanical feed which precludes the finding of the correct position between the two parts of the connector. To overcome these issues, the design of the accessories may consist partly of moveable parts to compensate a mechanical feed and tolerances.

LOW-VOLTAGE DOCKING CONNECTORS FOR REMOVABLE ENERGY STORAGE UNITS

1 Scope

This document applies to docking connectors (hereinafter referred to as accessories) incorporated in or fixed to electrical equipment, intended to connect removable energy storage units to a dedicated electric power conversion unit, to an energy consuming unit or to another energy storage unit.

These accessories are intended for DC and may include an earth¹ contact and/or optional auxiliary contacts for signaling and data. These accessories have a rated current of up to 800 A and rated operating voltages not exceeding 1 000 V DC.

These accessories are not suitable for mating or unmating under load. These accessories are intended to be installed by instructed persons (IEC 60050-195:1998, 195-04-02) or skilled persons (IEC 60050-195:1998, 195-04-01) only.

The list of preferred ratings is not intended to exclude other ratings.

This document applies to accessories for use under environmental conditions as described in Clause 32.

These accessories are intended to be connected to current carrying parts in copper or copper alloy only, plated or not plated.

This document also applies to accessories intended to be used at extra-low voltage.

In locations where special conditions prevail, for example on board vehicles, additional requirements may apply.

These accessories are intended to be used with a specific charging system.

NOTE For conditions other than operation, additional requirements could be applicable, for instance IEC 62133 and the UN Recommendations on the Transport of Dangerous Goods section 38.338.3.

2 Normative references

Clause 3 of IEC 60309-1:1999, IEC 60309-1:1999/AMD1:2005 and IEC 60309-1:1999/AMD2:2012 applies, except as follows:

Addition of the following new references:

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

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