



**Irish Standard**  
**I.S. EN ISO 18246:2023**

**Version 2.00**

# Electrically propelled mopeds and motorcycles - Safety requirements for conductive connection to an external electric power supply (ISO 18246:2023)

## I.S. EN ISO 18246:2023 V2.00

### The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

NSAI/... xxx: A National adoption of a Technical Regulation (TR), Technical Specification (TS), CEN and/or CENELEC Workshop Agreement (CWA).

I.S. EN ISO 18246:2023 V2.00 was published under the authority of the NSAI and came into effect on: 2023-04-06

ICS number(s): 43.140

NSAI  
1 Swift Square  
Northwood, Santry  
Dublin 9  
D09 A0E4  
+353 1 807 3800  
standards@nsai.ie  
[NSAI.ie](https://www.nsa.ie)

Sales  
+353 1 857 6730  
[Standards.ie](https://www.standards.ie)

Údarás um Chaighdeáin Náisiúnta na hÉireann

## **National Foreword**

I.S. EN ISO 18246:2023 V2.00 is the version of the NSAI adopted European document EN ISO 18246:2023, *Electrically propelled mopeds and motorcycles - Safety requirements for conductive connection to an external electric power supply (ISO 18246:2023)*, including any Corrections, Amendments etc. to EN ISO 18246:2023.

This normative document by CEN/CENELEC the elaboration of which includes a public enquiry, followed by a Formal Vote of CEN/CENELEC national members and final ratification. This European Standard is published as an identical national standard and every conflicting national standard will be withdrawn. The content of a European Standard does not conflict with the content of any other EN (and HD for CENELEC).

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

For relationships with other publications refer to the NSAI web store.

**Conformance with this document does not of its self confer immunity from legal obligations.**

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

**I.S. EN ISO 18246:2023 V2.00**

This page intentionally left blank

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN ISO 18246

April 2023

ICS 43.140

Supersedes EN ISO 18246:2017

English Version

Electrically propelled mopeds and motorcycles - Safety  
requirements for conductive connection to an external  
electric power supply (ISO 18246:2023)

Cyclomoteurs et motocycles à propulsion électrique -  
Exigences de sécurité relatives au couplage conductif à  
une station extérieure d'alimentation d'énergie externe  
(ISO 18246:2023)

Elektrisch angetriebene Mopeds und Motorräder -  
Sicherheitsanforderungen für die leitende Verbindung  
mit einer externen Energieversorgung (ISO  
18246:2023)

This European Standard was approved by CEN on 24 March 2023.

CEN 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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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

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



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

## **Contents**

Page

<b>European foreword.....</b>	<b>3</b>
-------------------------------	----------

## **European foreword**

This document (EN ISO 18246:2023) has been prepared by Technical Committee ISO/TC 22 "Road vehicles" in collaboration with Technical Committee CEN/TC 301 "Road vehicles" the secretariat of which is held by DIN.

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 2023, and conflicting national standards shall be withdrawn at the latest by October 2023.

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 18246:2017.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## **Endorsement notice**

The text of ISO 18246:2023 has been approved by CEN as EN ISO 18246:2023 without any modification.

This page intentionally left blank



# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>Introduction</b>	<b>vi</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>2</b>
3.1 General	2
3.2 Charging	4
3.3 Connection	5
3.4 Electrical safety	6
<b>4 Environmental and operational conditions</b>	<b>9</b>
<b>5 General requirements</b>	<b>10</b>
<b>6 Connection between the plug or vehicle couplers and RESS of the vehicle</b>	<b>10</b>
6.1 General	10
6.1.1 Connections among charger, RESS, and vehicle	10
6.1.2 General requirements for connection	12
6.1.3 Requirements for connection or no connection to the earth	12
6.1.4 Specific requirements for the vehicle inlet	18
6.1.5 Vehicle behaviour during charging	19
6.2 AC connection	19
6.2.1 Requirements for the connection to AC supply network (mains)	19
6.2.2 Requirements of connection and/or disconnection process in AC contacts	19
6.2.3 Protection from unintended voltage for AC connection	19
6.2.4 Additional requirements for AC electric power supply	20
6.3 DC connection	20
6.3.1 Requirements of connection and/or disconnection process in DC contacts	20
6.3.2 Protection from unintended voltage for DC connection	20
6.3.3 Specific requirements	20
<b>7 Protection against electric shock</b>	<b>21</b>
7.1 General requirements	21
7.1.1 General requirements for connected sections of a circuit	21
7.1.2 General requirements for voltage class A	21
7.1.3 General requirements for voltage class B	21
7.2 Basic protection	21
7.3 Fault protection and additional measures	21
7.3.1 Equipotential bonding	21
7.3.2 Alternative protection measures	22
7.3.3 Requirements for protective barrier or enclosures	22
7.3.4 Requirements for insulation	23
7.4 Protection against access to hazardous-live-parts	23
7.4.1 General	23
7.4.2 Requirements of the degree of protection of barrier/enclosures against electric shock	23
7.5 Insulation coordination	23
7.5.1 AC connection	23
7.5.2 DC connection	24
7.6 Touch current	24
<b>8 Protection against thermal incident</b>	<b>24</b>
8.1 Overcurrent protection	24
8.1.1 Overload protection	24
8.1.2 Short circuit protection for AC connection	24
8.1.3 Short-circuit protection for DC connection	25

**I.S. EN ISO 18246:2023 V2.00****ISO 18246:2023(E)**

8.2	Arc protection for DC connections .....	25
8.3	Residual energy after disconnection .....	25
<b>9</b>	<b>Additional requirements and test procedure .....</b>	<b>25</b>
9.1	General conditions on tests .....	25
9.2	Protection against ingress of solid foreign objects and water .....	26
9.3	Withstand voltage test .....	26
9.3.1	General .....	26
9.3.2	Test voltage .....	26
9.3.3	Dielectric withstand voltage of voltage class A direct current part .....	27
9.4	Isolation resistance .....	27
9.4.1	General .....	27
9.4.2	Additional measures at a non-maintained isolation resistance .....	27
9.5	Creepage distance and clearance .....	27
9.6	Requirements for the emission of hazardous gases and other hazardous substances .....	27
9.7	Permissible surface temperature .....	28
9.8	Unintentional charging system behaviour .....	28
9.8.1	General .....	28
9.8.2	Unintended reverse power flow .....	28
9.9	Electromagnetic compatibility .....	28
9.9.1	Susceptibility .....	28
9.9.2	Emissions .....	28
9.10	Service .....	28
<b>10</b>	<b>Marking, instructions, and indications .....</b>	<b>28</b>
10.1	Marking .....	28
10.2	Legibility .....	29
10.3	Connection instructions .....	29
10.4	Indication .....	29
	<b>Annex A (informative) Charging types .....</b>	<b>30</b>
	<b>Annex B (normative) EV connected to DC EV supply equipment according to IEC 61851-25 .....</b>	<b>34</b>
	<b>Annex C (normative) Connection of an EV to a DRI EV supply equipment according to the IEC TS 61851-3 series .....</b>	<b>36</b>
	<b>Bibliography .....</b>	<b>37</b>

## 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 38, *Motorcycles and mopeds*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 301, *Electrically propelled road vehicles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 18246:2015), which has been technically revised.

The main changes are as follows:

- terms and definitions have been updated;
- requirements for protection against electric shock ([Clause 7](#)) have been rewritten;
- descriptions for additional requirements and test procedure ([Clause 9](#)) have been simplified;
- requirements for the specific DC charging systems have been described in the Annexes (Annex B for IEC 61851-25 and Annex C for IEC TS 61851-3 series).

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](http://www.iso.org/members.html).

## Introduction

This document prescribes basic safety requirements for electrically propelled mopeds and motorcycles, which are called electrically propelled vehicles (EVs), for simplicity, while connected to an external electric power supply. The safety requirements for off-board appliances/equipment are not described in this document.<sup>1)</sup>

This document does not standardize specific charging method in the body text. The requirements for specific DC charging systems are described in [Annex B](#) and [Annex C](#).

Moped and motorcycle are defined in ISO 3833:1977, 3.4 and 3.5.

---

1) See IEC 60335-2-29, IEC 61851-25, and IEC TS 61851-3 series.

# Electrically propelled mopeds and motorcycles — Safety requirements for conductive connection to an external electric power supply

## 1 Scope

This document specifies safety requirements for conductive connection of electrically propelled mopeds and motorcycles (referred to as the EVs) to external electric circuits.

NOTE 1 External electric circuits include external electric power supplies and external electric loads.

It does not provide comprehensive safety information for manufacturing, maintenance and repair personnel.

It applies only to on-board charging systems between the plug or vehicle inlet and RESS circuits.

NOTE 2 The requirements when not connected to external electric circuits are specified in the ISO 13063 series.

Requirements for bidirectional energy transfer DC to AC are under consideration and are not part of this document.

NOTE 3 The safety requirements for DC EV supply equipment where protection relies on electrical separation are specified in IEC 61851-25.

NOTE 4 The safety requirements for DC EV supply equipment where protection relies on double or reinforced insulation are specified in IEC TS 61851-3-1 and IEC TS 61851-3-2.

## 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 6469-3:2021, *Electrically propelled road vehicles — Safety specifications — Part 3: Electrical safety*

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

ISO 13063-3:2022, *Electrically propelled mopeds and motorcycles — Safety specifications — Part 3: Electrical safety*

ISO 17409:2020, *Electrically propelled road vehicles — Conductive power transfer — Safety requirements*

ISO 20653, *Road vehicles — Degrees of protection (IP code) — Protection of electrical equipment against foreign objects, water and access*

IEC 60664 SER, *Insulation coordination for equipment within low-voltage systems — All Parts*

IEC 61140:2016, *Protection against electric shock — Common aspects for installation and equipment*

IEC 61851-1:2017, *Electric vehicle conductive charging system — Part 1: General requirements*

IEC 61851-23, *Electric vehicle conductive charging system — Part 23: DC electric vehicle charging station*

IEC 61851-25:2020, *Electric vehicle conductive charging system — Part 25: DC EV supply equipment where protection relies on electrical separation*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- Looking for additional Standards? Visit Intertek Inform Infostore
  - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-