INTERNATIONAL STANDARD

ISO 18246

Second edition
2023-01

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

Cyclomoteurs et motocycles à propulsion électrique — Exigences de sécurité relatives au couplage conductif à une borne d'alimentation électrique externe

Reference number
ISO 18246:2023(E)

© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2023 – All rights reserved

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
3.1 General 2
3.2 Charging 4
3.3 Connection 5
3.4 Electrical safety 6
4 Environmental and operational conditions **9**
5 General requirements **10**
6 Connection between the plug or vehicle couplers and RESS of the vehicle **10**
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
7 Protection against electric shock **21**
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
8 Protection against thermal incident **24**
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

© ISO 2023 – All rights reserved

8.2 Arc protection for DC connections ... 25
8.3 Residual energy after disconnection ... 25

9 Additional requirements and test procedure ... 25
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

10 Marking, instructions, and indications ... 28
10.1 Marking ... 28
10.2 Legibility ... 29
10.3 Connection instructions ... 29
10.4 Indication ... 29

Annex A (informative) **Charging types ... 30**

Annex B (normative) **EV connected to DC EV supply equipment according to IEC 61851-25 ... 34**

Annex C (normative) **Connection of an EV to a DRI EV supply equipment according to the IEC TS 61851-3 series ... 36**

Bibliography ... 37

© ISO 2023 – All rights reserved

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).

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).

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 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.

© ISO 2023 – All rights reserved

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.[1)]

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.

© ISO 2023 – All rights reserved

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*

© ISO 2023 – All rights reserved

IEC/TS 61851-3-1:—,[2)] *Electric Vehicles conductive charging system — Part 3-1: DC EV supply equipment where protection relies on double or reinforced insulation – General rules and requirements for stationary equipment*

IEC 62196-2, *Plugs, socket-outlets, vehicle connectors and vehicle inlets — Conductive charging of electric vehicles — Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories*

IEC/TS 62196-4, *Plugs, socket-outlets, vehicle connectors and vehicle inlets — Conductive charging of electric vehicles — Part 4: Dimensional compatibility and interchangeability requirements for d.c. pin and contact-tube accessories for class II or class III applications*

IEC 62196-6, *Plugs, socket-outlets, vehicle connectors and vehicle inlets — Conductive charging of electric vehicles — Part 6: Dimensional compatibility requirements for DC pin and contact-tube vehicle couplers for DC EV supply equipment where protection relies on electrical separation*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 General

3.1.1
electrically propelled vehicle
EV
vehicle with one or more electric drive(s) for vehicle propulsion

Note 1 to entry: In the context of this document, the term electrically propelled vehicle (EV) includes only moped or motorcycle.

[SOURCE: ISO 13063-3:2022, 3.14, modified — Terminological entry "EV" and note 1 to entry are added.]

3.1.2
rechargeable energy storage system
RESS
rechargeable system that stores energy for delivery of electric energy for the electric drive

EXAMPLE Battery, capacitor, flywheel.

[SOURCE: ISO 13063-3:2022, 3.23]

3.1.3
removable RESS
RESS (3.1.2) that can be moved/removed from an *EV* (3.1.1) by hand (portable RESS) or with the assistance of an installation/device (mobile RESS)

[SOURCE: EN 50604-1:2016 +A1:2021, 3.18]

3.1.4
indoor use
intended for operation under normal ambient conditions in a building

[SOURCE: IEC 61851-1:2017, 3.6.1]

2) Under preparation. Stage at the time of publication: IEC 69/845/DTS:2022.

© ISO 2023 – All rights reserved

3.1.5
outdoor use
capable of operating under specific range of outdoor conditions

[SOURCE: IEC 61851-1:2017, 3.6.2]

3.1.6
maximum working voltage
highest value of AC voltage (rms) or of DC voltage that can occur in an electric system under any normal operating conditions according to the manufacturers' specifications, disregarding transients and ripple

[SOURCE: ISO 13063-3:2022, 3.20]

3.1.7
voltage class A
classification of an electric component or circuit, if its *maximum working voltage* (3.1.6) is ≤30 V a.c. or ≤60 V d.c., respectively

Note 1 to entry: The values 60 V d.c. and 30 V a.c. are selected taking into account humid weather conditions.

3.1.8
voltage class B
classification of an electric component or circuit, if its *maximum working voltage* (3.1.6) is >30 and ≤1 000 V a.c. or >60 and ≤1 500 V d.c., respectively

Note 1 to entry: The values 60 V d.c. and 30 V a.c. are selected taking into account humid weather conditions.

3.1.9
electric chassis
conductive parts of a vehicle that are electrically connected and whose potential is taken as reference

[SOURCE: ISO 13063-3:2022, 3.11]

3.1.10
accessible part
part which can be touched by means of the standard test finger

[SOURCE: IEV 442-01-15, modified — "a" is deleted.]

3.1.11
degree of protection
protection provided by an enclosure against access, foreign objects and/or water and verified by standardized test methods

EXAMPLE IPXXB (by test finger), IPXXC (by test rod), or IPXXD test wire (by test wire), in accordance with ISO 20653

[SOURCE: ISO 20653:2013, 3.2, modified — EXAMPLES are added.]

3.1.12
single fault condition
condition in which one means for protection against electric shock is defective or one fault is present which could cause a hazard

Note 1 to entry: If a single fault condition results in one or more other fault conditions, all are considered as one single fault condition.

[SOURCE: IEC 61140:2016, 3.1.4]

© ISO 2023 – All rights reserved

3.2 Charging

3.2.1
EV charging system
complete system including the *EV supply equipment* (3.2.5) and the EV functions that are required to supply electric energy to an *EV* (3.1.1) for the purpose of charging

[SOURCE: IEC 61851-1:2017, 3.1.4]

3.2.2
on-board charging system
on-board sections of *EV charging system* (3.2.1), which may have dedicated control functions used for the connection of the vehicle to an external electric circuit

3.2.3
on-board charging equipment
equipment or a combination of equipment in the *on-board charging system* (3.2.2)

3.2.4
external electric power supply
electric power source that is not part of the vehicle for supplying electric energy to an *EV* (3.1.1) using an *EV supply equipment* (3.2.5)

[SOURCE: ISO 17409:2020, 3.28]

3.2.5
EV supply equipment
equipment or a combination of equipment providing dedicated functions to supply electric energy from a fixed electrical installation or supply network to an *EV* (3.1.1) for the purpose of charging

[SOURCE: ISO 17409:2020, 3.25, modified — EXAMPLE 1 and 2 are not cited.]

3.2.6
charger
power converter that performs the necessary functions for charging a battery

3.2.7
charger assembly
power converter that performs the necessary functions for charging a battery, including cables

3.2.8
vehicle power supply circuit
voltage class B (3.1.8) electric circuit which includes all parts that are galvanically connected to the vehicle inlet (case B, case C) or the plug (case A) and that is operational when connected to an *external electric power supply* (3.2.4)

Note 1 to entry: Case A, case B and case C are defined in IEC 61851-1.

3.2.9
primary circuit
circuit in the *charger* (3.2.6) intended to be galvanically connected to a supply network (mains)

3.2.10
secondary circuit
circuit that has no direct connection to a *primary circuit* (3.2.9) and derives its power from a transformer, converter or equivalent isolation device

[SOURCE: IEC 61851-23:2014, 3.112]

© ISO 2023 – All rights reserved

3.2.11
RESS circuit
electric circuit which includes all live parts that are galvanically connected to the *secondary circuits* (3.2.10) of the *charger* (3.2.6) and charging circuits of *RESS* (3.1.2), excluding propulsion circuits

3.2.12
control pilot circuit
circuit designed for the transmission of signals or communication between the *EV* (3.1.1) and the *EV supply equipment* (3.2.5)

[SOURCE: IEC 61851-1:2017, 3.3.2, modified — Note 1 to entry was deleted.]

3.3 Connection

3.3.1
AC connection
connection at a vehicle inlet or plug, with an external AC power supply

3.3.2
DC connection
connection at a vehicle inlet or plug, with an external DC power supply

3.3.3
charging cable assembly
assembly consisting of flexible cable or cord fitted with a plug and/or a vehicle connector, that is used to establish the connection between the *EV* (3.1.1) and the supply network or an EV charging station

Note 1 to entry: A cable assembly can be detachable or be a part of the EV or the EV charging station.

Note 2 to entry: A cable assembly can include one or more cables, with or without a fixed jacket, which can be in a flexible tube, conduit or wire way.

3.3.4
socket-outlet
accessory having socket-contacts designed to engage with the pins of a plug and having terminals for the connection of cables or codes

[SOURCE: IEC 61851-1:2017, 3.5.10]

3.3.5
plug
accessory having pins designed to engage with the contacts of a *socket-outlet* (3.3.4)

Note 1 to entry: It also incorporate means for the electrical connection and mechanical retention of flexible cables or codes.

[SOURCE: IEV 442-03-01, modified — The second part of sentence is moved to Note 1 to entry.]

3.3.6
vehicle coupler
means enabling the connection and disconnection at will, of a flexible cable to an *EV* (3.1.1)

Note 1 to entry: It consists of two parts: a vehicle connector and a vehicle inlet.

3.3.7
vehicle connector
part integral with, or intended to be attached to, one flexible cable

[SOURCE: IEC 62196-1:2022, 3.56 modified — Terminological entry "electric vehicle connector" is not cited.]

© ISO 2023 – All rights reserved

3.3.8
vehicle inlet
part incorporated in, or fixed to, the *EV* (3.1.1)

[SOURCE: IEC 62196-1:2022, 3.57 modified — Terminological entry "electric vehicle inlet" is not cited, and "electric vehicle" is replaced with "EV".]

3.3.9
RESS coupler
means enabling the connection and disconnection of *RESS* (3.1.2) to a flexible cable, an *EV* (3.1.1) or a *charger assembly* (3.2.7)

Note 1 to entry: It consists of two parts: a RESS connector and a RESS inlet.

3.3.10
RESS connector
part of a *RESS coupler* (3.3.9) integral with, or intended to be attached to, a flexible cable, an *EV* (3.1.1) or a *charger assembly* (3.2.7)

3.3.11
RESS inlet
part of a *RESS coupler* (3.3.9) incorporated in, or fixed to, *RESS* (3.1.2)

3.3.12
terminal
conductive part provided for the connection of a conductor to an accessory

[SOURCE: IEC 62196-1:2022, 3.50]

3.4 Electrical safety

3.4.1
live part
conductor or conductive part intended to be energized in normal use, but by convention, not the *electric chassis* (3.1.9)

[SOURCE: ISO 6469-1:2019, 3.16]

3.4.2
hazardous-live-part
live part (3.4.1) which, under certain conditions, can give a harmful electric shock

[SOURCE: IEV 826–12–13]

3.4.3
basic protection
protection against electric shock under fault-free conditions

[SOURCE: IEC 61140:2016, 3.1.1]

3.4.4
fault protection
protection against electric shock under *single-fault conditions* (3.1.12)

[SOURCE: IEC 61140:2016, 3.1.2]

3.4.5
additional protection
protection against electric shock in addition to *basic protection* (3.4.3) and/or *fault protection* (3.4.4)

[SOURCE: IEC 61140:2016, 3.1.3]

© ISO 2023 – All rights reserved

3.4.6
basic insulation
insulation of *hazardous-live-parts* (3.4.2) which provides *basic protection* (3.4.3)

Note 1 to entry: This concept does not apply to insulation used exclusively for functional purposes.

[SOURCE: IEV 195-06-06]

3.4.7
supplementary insulation
independent insulation applied in addition to *basic insulation* (3.4.6), for *fault protection* (3.4.4)

[SOURCE: IEV 195-06-07]

3.4.8
double insulation
insulation comprising both *basic insulation* (3.4.6) and *supplementary insulation* (3.4.7)

[SOURCE: IEV 195-06-08]

3.4.9
reinforced insulation
insulation of *hazardous-live-parts* (3.4.2) which provides a *degree of protection* (3.1.11) against electric shock equivalent to *double insulation* (3.4.8)

Note 1 to entry: Reinforced insulation may comprise several layers which cannot be tested singly as basic insulation or supplementary insulation.

[SOURCE: IEV 195-06-09]

3.4.10
galvanic separation
prevention of electric conduction between two electric circuits intended to exchange power and/or signals

Note 1 to entry: Galvanic separation can be provided e.g. by an isolating transformer or an opto-coupler.

[SOURCE: IEV 151-12-26]

3.4.11
simple separation
separation between electric circuits or between an electric circuit and local earth by means of *basic insulation* (3.4.6)

[SOURCE: IEC 61140:2016, 3.23]

3.4.12
protective separation
electrically protective separation
separation of one electric circuit from another by means of:

— *double insulation* (3.4.8); or

— *basic insulation* (3.4.6) and electrically protective screening (shielding); or

— *reinforced insulation* (3.4.9)

[SOURCE: IEC 61140:2016, 3.24]

© ISO 2023 – All rights reserved

3.4.13
exposed conductive part
conductive part of equipment which can be touched and which is not normally live, but which can become live when *basic insulation* (3.4.6) fails

[SOURCE: ISO 17409:2020, 3.26]

3.4.14
equipotential bonding
provision of electric connections between conductive parts, intended to achieve equipotentiality

[SOURCE: IEV 195-01-10]

3.4.15
equipotential bonding terminal
terminal (3.3.12) provided on equipment or on a device and intended for the electric connection with the equipotential bonding system

[SOURCE: IEV 195-02-32]

3.4.16
protective conductor
conductor provided for the purposes of safety, for example protection against electric shock

[SOURCE: IEC 61140:2016, 3.16.4]

3.4.17
PE conductor
protective conductor (3.4.16) provided for protective earthing

[SOURCE: IEC 61140:2016, 3.16.5]

3.4.18
residual current device
RCD
mechanical switching device designed to make, carry and break currents under normal service conditions and to cause the opening of the contacts when the residual current attains a given value under specified conditions

Note 1 to entry: A residual current device can be a combination of various separate elements designed to detect and evaluate the residual current and to make and break current.

[SOURCE: IEV 442-05-02]

3.4.19
isolation resistance monitoring system
system that monitors the isolation resistance between *live parts* (3.4.1) and the *electric chassis* (3.1.9) or *exposed conductive parts* (3.4.13)Table 1 provides an alphabetical cross-reference listing of terms.

© ISO 2023 – All rights reserved

Table 1 — Alphabetical list of terms

Term	Term number	Term	Term number
AC connection	3.3.1	on-board charging system	3.2.2
accessible part	3.1.10	outdoor use	3.1.5
additional protection	3.4.5	PE conductor	3.4.17
basic insulation	3.4.6	plug	3.3.5
basic protection	3.4.3	primary circuit	3.2.9
charger	3.2.6	protective conductor	3.4.16
charger assembly	3.2.7	protective separation	3.4.12
charging cable assembly	3.3.3	RCD	3.4.18
control pilot circuit	3.2.12	rechargeable energy storage system	3.1.2
DC connection	3.3.2	reinforced insulation	3.4.9
degree of protection	3.1.11	removable RESS	3.1.3
double insulation	3.4.8	residual current device	3.4.18
electric chassis	3.1.9	RESS	3.1.2
electrically propelled vehicle	3.1.1	RESS circuit	3.2.11
electrically protective separation	3.4.12	RESS connector	3.3.10
equipotential bonding	3.4.14	RESS coupler	3.3.9
equipotential bonding terminal	3.4.15	RESS inlet	3.3.11
EV	3.1.1	secondary circuit	3.2.10
EV charging system	3.2.1	simple separation	3.4.11
EV supply equipment	3.2.5	single fault condition	3.1.12
exposed conductive part	3.4.13	socket-outlet	3.3.4
external electric power supply	3.2.4	supplementary insulation	3.4.7
fault protection	3.4.4	terminal	3.3.12
galvanic separation	3.4.10	vehicle connector	3.3.7
hazardous-live-part	3.4.2	vehicle coupler	3.3.6
indoor use	3.1.4	vehicle inlet	3.3.8
isolation resistance monitoring system	3.4.19	vehicle power supply circuit	3.2.8
live part	3.4.1	voltage class A	3.1.7
maximum working voltage	3.1.6	voltage class B	3.1.8
on-board charging equipment	3.2.3		

4 Environmental and operational conditions

The requirements given in this document shall be met across the range of environmental and operational conditions for which the EVs are designed to operate when connected to an external electric circuit (e.g. external electric power supply), as specified by the vehicle manufacturer.

NOTE 1 See ISO 16750, ISO/PAS 19295, ISO 21498 and ISO 19453 for guidance.

The requirements specified in this document shall be fulfilled under all relevant energy levels (e.g. SOC of RESS) of the electric power sources of the EV.

© ISO 2023 – All rights reserved