



TECHNICAL SPECIFICATION

**Electric vehicle conductive charging system -
Part 26: EV supply equipment with automatic docking of a vehicle coupler
located at the underbody of an electric vehicle**

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. [Click here to purchase the full version from the ANSI store.](#)

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	8
3 Terms and definitions	9
3.1 Electric supply equipment	9
3.2 Functions	10
3.3 Defined areas and spaces	10
3.4 Service and usage	11
4 System overview	11
4.1 General architecture	11
4.2 Coordinate systems	14
4.2.1 Overview	14
4.2.2 Reference coordinate system	14
4.2.3 Vehicle connector coordinate system	14
4.2.4 Vehicle inlet coordinate system	14
4.2.5 EV plug coordinate system	14
4.2.6 Coordinate system of vehicle	15
4.3 Home space	15
4.4 Typical docking and undocking process	15
5 Classification	16
6 Service conditions	18
7 Protection against electric shock	18
7.1 General	18
7.2 EV supply equipment with socket-outlet with accessible power contacts	18
7.2.1 General	18
7.2.2 Energization of power contacts	18
7.2.3 De-energization of accessible power contacts	18
7.2.4 Switching device monitoring	19
7.2.5 Self-test	19
7.2.6 Protective conductor resistance check	19
7.2.7 Insulation check	19
7.2.8 Separation between accessible power contacts and hazardous-live-parts	20
7.2.9 Touch voltage and accessible energy after unmating	21
7.2.10 Short-circuit current	21
8 Protection against thermal incident	22
9 Protection against mechanically caused injury	22
9.1 General	22
9.2 Height and ramp angles	23
9.3 Limitation of force and pressure	23
9.4 Maximum velocity and energy	23
9.5 Warning of manipulator movement	24
9.6 Emergency stop (optional)	24
10 Constructional requirements	24
10.1 Dimensions	24

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. [Click here to purchase the full version from the ANSI store.](#)

10.3	Cable	25
10.4	Vehicle drive-over	25
10.5	Resilience to movements of the vehicle	25
10.6	Limitation of force and torque onto the vehicle	26
10.7	Prevention of unnecessary movement of accessible moving parts outside of the home space	26
10.8	Indication that manipulator is within home space	26
10.9	Automatic undocking	26
10.10	Manual undocking	26
10.11	Accessibility	26
11	Marking and instructions	27
11.1	General	27
11.2	Marking	27
11.3	User manual	27
11.4	Installation manual	27
12	Measurement and test methods	28
12.1	General	28
12.2	Interoperability test	28
12.3	Vehicle drive-over test	28
Annex A	(informative) Examples of topologies of charging sites with aEVSE	30
A.1	General	30
A.2	Examples	30
Annex B	(informative) Manually triggered operation of automatic docking and undocking function	33
B.1	General	33
B.2	User interface	34
B.3	Indication/user feedback	34
B.4	User manual/installation instructions	35
Annex C	(informative) Interoperability test for aEVSE	36
C.1	Principle	36
C.2	Test bench	36
C.3	Preparation of DUT	37
C.4	Procedure	37
C.5	Expression of results	39
C.6	Test report	39
Annex D	(informative) Alphabetically sorted list of terms	40
Bibliography	41
Figure 1	– Example of a block diagram of a vehicle according to ISO TS 5474-5 with an aEVSE, with the manipulator and vehicle connector attached to the aEVSE	12
Figure 2	– Example of a block diagram of a vehicle according to ISO TS 5474-5 with an aEVSE, with the manipulator and plug attached to the EV	13
Figure 3	– Coordinate systems for aEVSE	14
Figure 4	– Activity diagram of typical docking and undocking process	16
Figure 5	– Surface mounted	17
Figure 6	– Flush mounted	17

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. [Click here to purchase the full version from the ANSI store.](#)

unmated power contacts according to option a)	20
Figure 8 – Switching devices in series providing monitoring of full-disconnection according to option b)	21
Figure 9 – Mating space	25
Figure A.1 – Example of topology with flush-mounted aEVSE with attached manipulator.....	31
Figure A.2 – Example of topology with flush-mounted aEVSE with manipulator attached to the vehicle	32
Figure B.1 – Typical activity diagram of manually triggered docking and undocking process without communication	34
Figure C.1 – Example of a mating space (dashed lines) in a reference coordinate system	38
Figure C.2 – Example of typical vehicle movement during boarding and alighting of a passenger	38
Table C.1 – Example of parameters of a mating space	37
Table D.1 – Alphabetically sorted list of terms	40

**Electric vehicle conductive charging system -
Part 26: EV supply equipment with automatic docking of a vehicle
coupler located at the underbody of an electric vehicle**

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TS 61851-26 has been prepared by IEC technical committee 69: Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
69/1108/DTS	69/1125/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. Click here to purchase the full version from the ANSI store.

accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, 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.

In this document, the following print type is used: *test specifications: in italic type*.

A list of all parts in the IEC 61851 series, published under the general title *Electric vehicle conductive charging system*, can be found on the IEC website.

The committee has 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.

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. [Click here to purchase the full version from the ANSI store.](#)

This part of the IEC 61851 series provides requirements for EV supply equipment with automatic docking for the transfer of electric energy between EV supply equipment and electric road vehicles. The vehicle and the EV supply equipment make up a complete system that is covered by a number of IEC and ISO Standards.

Automatic docking is indispensable for autonomous vehicles, and it is also helpful for disabled users of electric vehicles and for all users of electric vehicles seeking additional comfort. In the case of public electric vehicle supply equipment, automatic docking can also provide a convenient solution for queued vehicles, through automatic electric vehicle supply equipment that is either fully mobile or movable on rails. Automatic docking can increase the number of electric vehicles that are available to the grid to provide grid services.

Within the IEC 61851 series, the following documents cover different aspects of automatic docking:

- IEC 61851-23-1¹: DC electric vehicle charging station with an automated connection device;
- IEC TS 61851-27: EV supply equipment with automatic docking of a vehicle coupler according to IEC 62196-2, IEC 62196-3 or IEC TS 62196-3-1;
- IEC TS 61851-28²: Communication between EV supply equipment with automatic docking and vehicles.

Automatic docking enables conductive energy transfer at the complete range of voltage and current as specified in the following documents:

- IEC 61851-1: general requirements, which is a system standard that serves as a basis for all the subsequent standards in the series; it is the product standard for mode 3 EV supply equipment;
- IEC 61851-23: DC electric vehicle supply equipment;
- IEC 61851-23-3³: DC electric vehicle supply equipment for megawatt charging systems.

At the time of publication of this document, automatic conductive energy transfer is still in an early development stage. The intention of this document is to guide further development of the technology. As a Technical Specification, it is possible this document does not yet contain the full specification for interoperability as needed especially for public applications.

¹ Under preparation. Stage at the time of publication: IEC/CCDV 61851-23-1:2025.

² Under preparation. Stage at the time of publication: IEC TS/ACD 61851-28:2024.

³ Under preparation. Stage at the time of publication: IEC/CCDV 61851-23-3:2025.

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. [Click here to purchase the full version from the ANSI store.](#)

This document, in combination with IEC 61851-1 or IEC 61851-23, gives the requirements for EV supply equipment with automatic docking and undocking functions (aEVSE) at the underbody of electrically propelled road vehicles according to ISO TS 5474-5.

Use of aEVSE with the megawatt charging system is under consideration.

NOTE 1 Where this document refers to IEC 61851-23, it is intended to alternatively use IEC 61851-23-3.

This document provides requirements for aEVSE with a single vehicle connector or a single socket-outlet.

Requirements for aEVSE with more than one vehicle connector or more than one socket-outlet are under consideration.

This document only applies to aEVSE with automatic couplers of category 3, located at the underbody of an electric vehicle.

NOTE 2 Category 3 is planned to use the electro-mechanical interface for AC up to 22 kW defined by IEC TS 63644⁴. Another document that extends category 3 and defines an electro-mechanical interface for combined AC/DC power transfer is under consideration.

This document does not apply to aEVSE with automatic coupler of category 1, which use a vehicle coupler defined by IEC 62196-2, IEC 62196-3 or IEC TS 62196-3-1.

NOTE 3 Category 1 is planned to also include the use of an electro-mechanical interface defined by IEC TS 63379⁵.

This document does not apply to aEVSE with automatic couplers of category 2, which use an electro-mechanical interface defined by EN 50696. EN 50696 also specifies automatic couplers located at the underbody of an electric vehicle. However, these couplers only provide DC power transfer.

NOTE 4 Category 2 is planned to also include the use of an electro-mechanical interface defined by IEC 63407⁶.

EMC requirements for EV supply equipment are defined in IEC 61851-21-2.

Interoperable communication for docking and undocking between an aEVSE and an EV, extending the communication between an EV supply equipment and an EV as specified in IEC 61851-1, IEC 61851-23, IEC 61851-24 and the ISO 15118 series, is under consideration.

NOTE 5 Where this document refers to "interoperable communication for docking and undocking", it is intended to use communication according to IEC TS 61851-28. However, at the time of publication of this document, IEC TS 61851-28 has not yet reached sufficient maturity to be normatively referenced.

This document does not cover all safety aspects related to maintenance.

⁴ Under preparation. Stage at time of publication: IEC TS/ACD 63644:2025.

⁵ Under preparation. Stage at the time of publication: IEC TS/CDTS 63379:2025.

⁶ Under preparation. Stage at the time of publication: IEC/CCDV 63407:2024.

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. [Click here to purchase the full version from the ANSI store.](#)

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 60364-7-722, *Low-voltage electrical installations - Part 7-722: Requirements for special installations or locations - Supplies for electric vehicles*

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

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

IEC 61557-4:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC - Equipment for testing, measuring or monitoring of protective measures - Part 4: Resistance of earth connection and equipotential bonding*

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

IEC 61851-23:2023, *Electric vehicle conductive charging system - Part 23: DC electric vehicle supply equipment*

IEC 62368-1:2023, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

IEC 62752:2024, *In-cable control and protection device (IC-CPD) for mode 2 charging of electric road vehicles*

IEC 62955:2018, *Residual direct current detecting device (RDC-DD) to be used for mode 3 charging of electric vehicles*

ISO TS 5474-5:2024, *Electrically propelled road vehicles - Functional and safety requirements for power transfer between vehicle and external electric circuit - Part 5: Automated conductive power transfer*

ISO 10218-1, *Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots*

ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction*

ISO TS 15066:2016, *Robots and robotic devices - Collaborative robots*

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. Click here to purchase the full version from the ANSI store.

- [1] Knipschild, L., Sicking, F., Künne, B. and Bartz, M. (2025) *Design requirements for aEVCS: Experimental analysis of inlet motion under load* [online]. Dortmund: TU Dortmund [viewed 2025-11-06]. Available at <http://dx.doi.org/10.17877/DE290R-25500>
- [2] IEC 60050-195, *International Electrotechnical Vocabulary (IEV) - Part 195: Earthing and protection against electric shock*, available at www.electropedia.org
- [3] IEC 60204-1, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*
- [4] IEC 61810-1, *Electromechanical elementary relays - Part 1: General and safety requirements*
- [5] IEC 61851-21-2, *Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems*
- [6] IEC 61851-23-1, *Electric vehicle conductive charging system - Part 23-1: DC electric vehicle supply equipment – Automated connection device*⁹
- [7] IEC 61851-23-3, *Electric vehicle conductive charging system - Part 23-3: DC electric vehicle supply equipment - Megawatt charging systems*¹⁰
- [8] IEC 61851-24, *Electric vehicle conductive charging system - Part 24: Digital communication between a DC EV supply equipment and an electric vehicle for control of DC charging*
- [9] IEC TS 61851-27, *Electric vehicle conductive charging system - EV supply equipment with automatic docking of a vehicle coupler according to IEC 62196-2, IEC 62196-3 or IEC TS 62196-3-1*
- [10] IEC TS 61851-28, *Electric vehicle conductive charging system - Part 28: Communication between automatic EV supply equipment and vehicles*¹¹
- [11] IEC 61980-3:2022, *Electric vehicle wireless power transfer (WPT) systems - Part 3: Specific requirements for magnetic field wireless power transfer systems*
- [12] IEC 62196 (all parts), *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles*
- [13] IEC 62196-1:2022, *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements*
- [14] IEC 62196-2, *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility and interchangeability requirements for AC pin and contact-tube accessories*

⁹ Under preparation. Stage at the time of publication: IEC/CCDV 61851-23-1:2025.

¹⁰ Under preparation. Stage at the time of publication: IEC/CCDV 61851-23-3:2025.

¹¹ Under preparation. Stage at the time of publication: IEC TS/ACD 61851-28:2024.

This is a preview of IEC/TS 61851-26 Ed. 1.0 en:2026. Click here to purchase the full version from the ANSI store.

charging of electric vehicles - Part 3: Dimensional compatibility and interchangeability requirements for DC and AC/DC pin and contact-tube vehicle couplers

- [16] IEC TS 62196-3-1, *Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system*
- [17] IEC TS 63379, *Vehicle connector, vehicle inlet and cable assembly for megawatt DC charging*¹²
- [18] IEC 63407, *Conductive charging of electric vehicles - Contact interface for automated connection device (ACD)*¹³
- [19] IEC TS 63644, *Coupler for contact interface for automated connection device underbody (ACD-U) systems*¹⁴
- [20] ISO 6707-1:2020, *Buildings and civil engineering works - Vocabulary - Part 1: General terms*
- [21] ISO 9241 (all parts), *Ergonomics of human-system interaction*
- [22] ISO TR 11065:1992, *Industrial automation glossary*
- [23] ISO 12768-1, *Intelligent transport systems - Automated valet driving systems (AVDS) - Requirements, system framework, communication interfaces and test procedures*¹⁵
- [24] ISO 14539:2000, *Manipulating industrial robots - Object handling with grasp-type grippers - Vocabulary and presentation of characteristics*
- [25] ISO 15118 (all parts), *Road vehicles - Vehicle to grid communication interface*
- [26] EN 124 (all parts), *Gully tops and manhole tops for vehicular and pedestrian areas*
- [27] EN 842:1997, *Safety of machinery - Visual danger signals - General requirements, design and testing*
EN 842:1997/AMD1:2008
- [28] EN 50696, *Contact interface for automated connection device*
- [29] ISO 10218-1:2011, *Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots*¹⁶

¹² Under preparation. Stage at the time of publication: IEC TS/CDTS 63379:2025.

¹³ Under preparation. Stage at the time of publication: IEC/CCDV 63407:2024.

¹⁴ Under preparation. Stage at time of publication: IEC TS/ACD 63644:2025.

¹⁵ Under preparation. Stage at the time of publication: ISO/DIS 12768-1:2025.

¹⁶ This publication has been withdrawn.