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Replace GB/T 18487.1-2015

Electric Vehicle Conductive Charging System
—Part 1: General Requirements
电动汽车传导充电系统 第1部分：通用要求

(English Translation)

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FOREWORD

This document is drafted in accordance with the rules given in GB/T 1.1-2020 “*Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents*”.

This document is Part 1 of GB/T 18487. The following parts of GB/T 18487 have been issued:

- Electric vehicle conductive charging system—Part 1: General requirements (GB/T 18487.1-2023);
- Electric vehicle conductive charging system—Part 2: EMC requirements for off-board electric vehicle supply equipment (GB/T 18487.2-2017);
- Electric vehicle conductive charging system—Part 3: A.C./D.C. electric vehicle charging station (GB/T 18487.3-2001).

This document replaces GB/T 18487.1-2015 “*Electric vehicle conductive charging system—Part 1: General requirements*”. In addition to structural adjustments and editorial modifications, the following significant technical deviations have been made with respect to GB/T 18487.1-2015:

- a) Added "Bi-directional charging" (see 3.1.2), "Conductive charge" (see 3.1.3), "Case D connection" (see 3.1.5.4), "Case E connection" (see 3.1.5.5), "charging and discharging equipment" (see 3.1.6.2), "Electric vehicle bi-directional charging system" (see 3.1.8), "Charging/bi-directional charging session" (see 3.1.9), "Initialization (stage)" (see 3.1.9.1), "Energy transfer (stage)" (see 3.1.9.2), "Shutdown (stage)" (see 3.1.9.3), "Emergency shutdown" (see 3.1.9.3.1), "Error shutdown" (see 3.1.9.3.2), "Normal shutdown" (see 3.1.9.3.3), "DC power supply circuit" (see 3.1.10), "Asymmetrical insulation faults" (see 3.2.8), "Symmetrical insulation faults" (see 3.2.9), "conductive part" (see 3.2.10), "surge protective device (SPD)" (see 3.2.21), "threshold of perception" (see 3.2.22), "threshold of reaction" (see 3.2.23), "energy transfer controller" (see 3.3.4), "battery electric vehicle (BEV)" (see 3.4.1), "off-vehicle-chargeable hybrid electric vehicle (OVC-HEV)" (see 3.4.2), "fuel cell hybrid electric vehicle (FCHEV)" (see 3.4.3), "rechargeable electrical energy storage system (REESS)" (see 3.4.4), "EV disconnection device" (see 3.4.5), "vehicle power supply circuit" (see 3.4.6), "EV simulator" (see 3.4.7), "test load" (see 3.4.8), "cable management system" (see 3.5.2), "Vehicle adaptor" (see 3.5.8), "Automatic connector coupler" (see 3.5.10), "automated connection device (ACD)" (see 3.5.10.1), "ACD counterpart" (see 3.5.10.2), "locking device" (see 3.5.11), "mechanical lock" (see 3.5.11.1), "electronic lock" (3.5.11.2), "equipment for locations with restricted access" (see 3.6.5), "equipment for locations with non-restricted access" (see 3.6.6), "portable equipment" (see 3.6.7), "mobile equipment" (see 3.6.8), "fixed equipment" (see 3.6.9), "(electrically) skilled person" (see 3.6.10), "(electrically) instructed person" (see 3.6.11), "ordinary person" (see 3.6.12), "user" (see 3.6.13), "Applicable maximum current" (see 3.7.1), "Present measured current" (see 3.7.2), "Present measured voltage" (see 3.7.3), "Rated current (side A)" (see 3.7.4), "Rated voltage (side A)" (see 3.7.5), "Operating voltage range" (see 3.7.6), "Rated continuous current" (see 3.7.7), "Rated maximum voltage" (see 3.7.8), "Rated maximum power" (see 3.7.9), "Rated minimum current" (see 3.7.10), "Rated minimum voltage" (see 3.7.11), "Target current (EV)" (see 3.7.12), "Target voltage (EV)" (see 3.7.13), "Pulse heating" (see 3.8.1), "maximum discharging pulse current" (see 3.8.2), "maximum charging pulse current" (see 3.8.3), "minimum discharging pulse voltage" (see 3.8.4), "maximum charging pulse voltage" (see 3.8.5), "maximum discharging pulse time" (see 3.8.6), "maximum charging pulse time" (see 3.8.7), "minimum discharging pulse time" (see 3.8.8), "minimum charging pulse time" (see 3.8.9), "discharging pulse time" (see 3.8.10), "charging pulse time" (see 3.8.11), "Maximum heating time" (see 3.8.12), "discharging pulse limiting voltage" (see 3.8.13), "charging pulse limiting voltage" (see 3.8.14), "discharging pulse current amplitude" (see 3.8.15), "charging pulse current amplitude" (see 3.8.16), "Supply network" (see 3.9.1), "Side A" (see 3.9.2), "Side B" (see 3.9.3), "Digital communication" (see 3.9.4), "vehicle to X (V2X)" (see 3.9.5), and "vehicle to grid (V2G)" (see 3.9.6);
- b) Deleted “Function box” (See 3.4.3 of GB/T 18487.1-2015) and “Micro-environment (of a clearance or creepage distance)” (See 3.5.3 of GB/T 18487.1-2015);
- c) Modified “EV supply equipment” (See 3.1.6 vs. 3.1.5 of GB/T 18487.1-2015), “EV charging equipment” (See 3.1.6.1 vs. 3.1.4 of GB/T 18487.1-2015), “DC electric vehicle charging system” (See

3.1.7.1 vs. 3.1.7 of GB/T 18487.1-2015), “AC electric vehicle charging system” (See 3.1.7.2 vs. 3.1.8 of GB/T 18487.1-2015), “cable assembly” (See 3.5.1 vs. 3.4.1 of GB/T 18487.1-2015), “in-cable control and protection device (IC-CPD)” (See 3.5.4 vs. 3.4.4 of GB/T 18487.1-2015), “standard plug/socket-outlet” (See 3.5.5 vs. 3.4.5 of GB/T 18487.1-2015), “EV plug and socket-outlet” (See 3.5.6 vs. 3.4.6 of GB/T 18487.1-2015), “EV plug” (See 3.5.6.1 vs. 3.4.7 of GB/T 18487.1-2015), and “EV socket-outlet” (See 3.5.6.2 vs. 3.4.8 of GB/T 18487.1-2015);

- d) Changed “by characteristics of power supply input” (See 4.1 of GB/T 18487.1-2015) into “supply network input characteristics” (See 4.1), and changed “by characteristics of power supply output” (See 4.2 of GB/T 18487.1-2015) into “supply network connection method” (See 4.3);
- e) Added “Supply Network Connection Method” (See 4.2) for the classification according to the connection method of supply network that it is intended to be connected to; added “Location of installation and use” for the classification according to the operating environment conditions (See 4.4.3);
- f) Changed “by supply equipment output voltage” (See 4.4 of GB/T 18487.1-2015) into “EVSE Output” (See 4.5), and modified the DC rated maximum voltage, DC operating voltage range, and DC rated continuous current;
- g) In the non-stationary mounting method, added the portable supply equipment for Mode 4 (See 4.6);
- h) Modified the use of standard plug and socket-outlet on the supply side in Mode 2 and the corresponding current requirements, and added the requirements for additional functions of standard coupler (See 5.1.2 vs. 5.1.2 of GB/T 18487.1-2015);
- i) For Mode 4, added the requirements for the equipment connected to the supply network through a standard plug cable assembly or an AC vehicle inlet, additional functions of vehicle coupler, V2G requirements, Case D connection and Case E connection applicable to Mode 4, and DC charging/bi-directional charging control pilot function of supply equipment using the vehicle coupler specified in GB/T 20234.4 (See 5.1.4);
- j) In the case of loss of electrical continuity of the protective earthing conductor, modified the EVSE response requirements in different charging modes (See 5.2.1.2 vs. 5.2.1.2 of GB/T 18487.1-2015);
- k) Added the requirements for discharging function (See 5.2.1.1, 5.2.1.4, 5.2.1.5 and 5.2.1.6);
- l) Deleted the requirements for cutting off power supply “or actions such as opening charging equipment door result in exposure of live parts” (See 5.2.1.5 of GB/T 18487.1-2015);
- m) Changed “Monitoring charging current” (See 5.2.1.6 of GB/T 18487.1-2015) into “Allowable applicable maximum current” (See 5.2.1.6), and added the applicable maximum current protection requirements;
- n) Added the EV charging wakeup function (See 5.2.1.7);
- o) Deleted “Ventilation requirements during charging” (See 5.2.2.1 of GB/T 18487.1-2015);
- p) Incorporated “Connection of vehicle connector and/or plug” (See 5.2.2.3 of GB/T 18487.1-2015) and “Unintentional disconnection prevention” (See 5.2.2.4 of GB/T 18487.1-2015) into “Locking function of charging coupler for Mode 2 and Mode 3” (See 5.2.2.2); the locking function is optional when the rated current of the EVSE and the EV is less than or equal to 16A;
- q) Added “Adaptive voltage switchover of vehicle power supply circuit”, which is an optional function applicable to the charging system specified in Annex B (See 5.2.2.3);
- r) Added “V2G DC bi-directional charging function” which is an optional function applicable to the bi-directional charging system specified in Annex C (See 5.2.2.3);
- s) Added the applicability requirements for the use of digital communication for Modes 2 and 3 (See Clause 6);
- t) Changed “General Requirements” (See 7.1 of GB/T 18487.1-2015) into “General” (See 7.1.1),

“Intended use and reasonably foreseeable misuse” (See 7.1.2), “Limit of touch current or touch voltage” (See 7.1.3) and “Threshold of perception and startle reaction” (See 7.1.4); added “Basic Protection” (See 7.2);

- u) Modified “Fault Protection” (See 7.3 vs. 7.3.3 of GB/T 18487.1-2015);
- v) Added the requirements for protective earthing conductor in Mode 3 and Mode 4 (See 7.4);
- w) Changed “Discharge of capacitors” (See 7.3 of GB/T 18487.1-2015) into “Stored Energy” (See 7.7), modified “Disconnection of standard plug” (See 7.3.1 of GB/T 18487.1-2015); and added “Disconnection of vehicle coupler” (See 7.7.2), “Disconnection of EV plug and socket-outlet in Mode 3 and Case B connection” (See 7.7.3), and “Disconnection of supply network” (See 7.7.4);
- x) Added “Contactor Adhesion” (See 7.9);
- y) Added “Clause 8 is applicable to one vehicle connector being used to charge one EV, while more than one vehicle connector being used to charge one EV shall be as agreed between the user and the manufacturer”, and the requirements for the supply equipment connected to several EVs simultaneously (See 8.1);
- z) Modified “In Case B connection, the neutral conductor shall be connected to the vehicle connector” (See 8.2 vs. 8.2 of GB/T 18487.1-2015);
- aa) Modified the functional description of EV plug & socket-outlet and vehicle coupler for Mode 1 and Mode 2 (See 8.4 vs. 8.4 of GB/T 18487.1-2015);
- bb) Added the functional description of vehicle coupler specified in GB/T 20234.4 (See 8.6);
- cc) Added the requirements for vehicle adapter (See Clause 9);
- dd) Added “the vehicle coupler specified in GB/T 20234.4 shall have the thermal management function” (See 10.1);
- ee) Modified “secondary cable assembly shall not be used for the connection between the EV and EVSE” (See 10.2 vs. 9.2 of GB/T 18487.1-2015);
- ff) Changed “Latching device” (See 9.6 of GB/T 18487.1-2015) into “Locking Device” (See 10.6), and added the requirements for locking device of vehicle coupler set out in GB/T 20234.4-2023;
- gg) Added the requirements for impulse current in Mode 2 and Mode 3 (See 10.7);
- hh) Added the requirements for vehicle coupler specified in GB/T 20234.4 (See 11.1);
- ii) Modified the requirements for switch and switch-disconnector and Contactor (See 11.2.1 and 11.2.2 vs. 10.2.1 and 10.2.2 of GB/T 18487.1-2015);
- jj) Deleted “Metering” (See 10.2.5 of GB/T 18487.1-2015);
- kk) Modified the requirements for Residual Current Device (RCD) (See 10.3 of GB/T 18487.1-2015), specifying the requirements for the RCDs for AC and DC supply equipment respectively (See 11.3);
- ll) Modified the requirements for clearances and creepage distances of EVSE under different connection modes (See 11.4 vs. 10.4 of GB/T 18487.1-2015);
- mm) Added the requirements for protection degree of the IC-CPD in Mode 2 (See 11.5.1);
- nn) Added the requirements for selecting and mounting Surge Protective Device (SPD) (See 11.7);
- oo) Deleted the general description of EVSE performance requirements (See 11.1 of GB/T 18487.1-2015);
- pp) Modified the test requirements for “Touch Current” (See 12.1 vs. 11.2 of GB/T 18487.1-2015), “Insulation Resistance” (See 12.2 vs. 11.3 of GB/T 18487.1-2015), “Dielectric Strength” (See 12.3 vs. 11.4 of GB/T 18487.1-2015), and “Impulse withstand voltage” (See 12.4 vs. 11.5 of GB/T 18487.1-2015);

- qq) Added the requirements for installation and type selection of SPD when being connected to the AC supply network (See 12.6);
- rr) Changed “General description” (See 12.1 of GB/T 18487.1-2015) into “General” (See 13.1), and modified the overload protection and short-circuit protection requirements for connecting points;
- ss) The installation of emergency shutdown device is considered as an optional function (See Clause 14 vs. Clause 13 of GB/T 18487.1-2015);
- tt) Incorporated “Ambient air temperature for indoor installations” (See 14.1.1.2 of GB/T 18487.1-2015) and “Ambient air temperature for outdoor installations” (See 14.1.1.3 of GB/T 18487.1-2015) into “Ambient air temperature” (See 15.1.1), and modified the upper limit of operating temperature;
- uu) Modified the description of humidity conditions (See 15.1.2 vs. 14.1.2 of GB/T 18487.1-2015);
- vv) Modified the marking and instructions of the EVSE (See Clause 17 vs. Clause 16 of GB/T 18487.1-2015);
- ww) Modified the voltage status of Detecting Point 1 and the corresponding charging process status and AC charging connection control timing sequence in Annex A “AC Charging Control Pilot Circuit and Control Principle” (See Annex A vs. Annex A of GB/T 18487.1-2015);
- xx) Modified “DC Charging Control Pilot Circuit and Control Principle” into “DC Charging Control Pilot Circuit and Control Principle of the Charging Connection Set Specified in GB/T 20234.3”, and modified communication timeout and abnormal insulation response, etc., and added the requirements for vehicle controller detecting the voltage of Detecting Point 2, charger shutdown requirements, abnormal electronic lock in the energy transfer stage, and load dump (See Annex B vs. Annex B of GB/T 18487.1-2015);
- yy) According to the annex reference sequence and content, modified “Example of locking device of vehicle coupler for DC charging” (See Annex C of GB/T 18487.1-2015) into “Locking Device of Charging Connection Set” (See Annex I), added the structure of locking device of AC charging coupler and the structure of locking device of DC charging coupler, and modified into a normative annex;
- zz) Added “DC Charging Control Pilot Circuit and Control Principle of the Charging Connection Set Specified in GB/T 20234.4” (See Annex C), “Adaptive Voltage Switchover of Vehicle Power Supply Circuit” (See Annex D), “Technical Solution on V2G DC Bi-Directional Charging of the Charging Connection Set Specified in GB/T 20234.4” (See Annex E), “DC Charging Technology with Multiple Vehicle Couplers” (See Annex F), “DC Charging Compatibility Technical Solution with the Vehicle Adapter Specified in GB/T 20234.4” (See Annex G), “DC Charging Compatibility Technical Solution Applicable to the Charging System of CHAdeMO 2.x or below and the CCS Charging System” (See Annex H), and “Pulse Heating Control Principle of the Charging Connection Set Specified in GB/T 20234.4” (See Annex J).

This document was proposed by, and is under the jurisdiction of, the China Electricity Council.

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The previous editions of this document and its substitutes are as follows:

- This document was firstly issued in 2001 as GB/T 18487.1-2001 and firstly revised in 2015;
- This is the second revision.

INTRODUCTION

GB/T 18487 aims to establish the general requirements for EV and off-board conductive energy transfer equipment in the electric vehicle conductive charging system, and is proposed to consist of the following three parts.

— Part 1: General requirements, which is intended to specify the general principles and relevant requirements for safety and interoperability to be met by the EV and off-board conductive energy transfer equipment.

— Part 2: EMC requirements for off-board electric vehicle supply equipment, which is intended to specify the EMC requirements and test methods of off-board conductive supply equipment for electric vehicles.

— Part 3: A.C./D.C. electric vehicle charging station, which is intended to specify the specific requirements for electric vehicle charging stations

The issuing body of this document draws attention to the fact that claims of compliance with this document may involve the use of a patent concerning control pilot circuit given in Annex C.

The issuing body of this document takes no position concerning the evidence, validity and scope of this patent right.

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Electric Vehicle Conductive Charging System

—Part 1: General Requirements

1 SCOPE

This document specifies the classification, general requirements, communications, protection against electric shock, connection between EV and EV energy transfer equipment, vehicle adapter, special requirements for vehicle coupler and EV plug & socket-outlet, constructional requirements for EV energy transfer equipment, performance requirements for EV energy transfer equipment, overload and short-circuit protection, emergency shutdown, service conditions, repair and maintenance, marking and instructions, with respect to electric vehicle conductive charging system.

Note 1: To avoid confusion, "EV energy transfer equipment" is referred to as "supply equipment" in this document.

This document applies to the off-board conductive supply equipment with current and/or voltage controlled to achieve unidirectional/bidirectional energy flow between the EV REESS and the supply network (power source), which has a rated voltage up to 1,000 V AC or 1,500 V DC at the supply network side (A side) and a rated maximum voltage up to 1,000 V AC or 1,500 V DC at the EV side (B side).

This document also applies to the supply equipment supplied from on-site storage systems (e.g., buffer batteries).

This document applies to the conductive charging or bi-directional charging system of the off-vehicle-chargeable/bi-directionally chargeable electric vehicles, including battery electric vehicles, off-vehicle-chargeable hybrid electric vehicles and fuel cell hybrid electric vehicles.

The conductive charging or bi-directional charging system of the tramcars, rail vehicles, and industrial vehicles may use this standard as a reference.

This document does not apply to the safety requirements related to maintenance of electric vehicle conductive charging/bi-directional charging system, the on-board charging equipment specified in GB/T 40432, or the trolley buses.

The parts other than key components (e.g., vehicle inlet at the EV side, control pilot circuit, and EV disconnection device) of electric vehicles specified in this document shall comply with the requirements of appropriate EV standards.

Note 2: The EMC requirements for off-board electric vehicle supply equipment refer to GB/T18487.2-2017.

Note 3: The requirements for electric vehicle top contact charging system refer to GB/T 40425 (all parts).

Note 4: The requirements for in-cable control and protection device (IC-CPD) for mode 2 refer to GB/T 41589.

2 NORMATIVE REFERENCES

The following normative documents contain provisions which, through normative reference in this text, constitute essential provision of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendment) applies.

GB 1002 Single Phase Plugs and Socket-outlets for Household and Similar Purposes - Types, Basic Parameters and Dimensions

GB 1003 Three Phases Plugs and Socket-outlets for Household and Similar Purposes - Types, Basic Parameters and Dimensions

GB/T 2099.1 Plugs and Socket-outlets for Household and Similar Purposes - Part 1: General Requirements

GB/T 2423.3 Environmental testing—Part 2: Test methods—Test Kca: High concentration sulfur dioxide

GB/T 2423.4 Environmental testing—Part 2: Test methods—Test Ff: Vibration—Time-history and sine-beat method

GB/T 7251.1-2013 Low-voltage switchgear and controlgear assemblies—Part 1: General rules

GB/T 10963.1 Electrical Accessories - Circuit-breakers for Overcurrent Protection for Household and Similar Installations - Circuit-breakers for A.C. Operation

GB/T 10963 (all parts) Electrical accessories—Circuit-breakers for overcurrent protection for household and similar installations

GB/T 11918.1 Plugs, Socket-outlet and Couplers for Industrial Purposes - Part 1: General Requirements

GB/T 11918.2 Plugs, socket-outlets and couplers for industrial purposes—Part 2: Dimensional compatibility and interchangeability requirements for pin and contact-tube accessories

GB/T 12113-2003 Methods of Measurement of Touch Current and Protective Conductor Current

GB/T 13539 (all parts) Low-voltage fuses

GB/T 13870.1-2022 Effects of current on human beings and livestock—Part 1: General aspects

GB/T 13870.2-2016 Effects of Current on Human Beings and Livestock - Part 2: Special Aspects

GB/T 14048.2 Low-voltage Switchgear and Controlgear Assemblies - Part 2: Circuit-breakers

GB/T 14048.3 Low-voltage Switchgear and Controlgear Assemblies - Part 3: Switches, Disconnectors, Switch-disconnectors and Fuse-combination Units

GB/T 14048.4 Low-voltage Switchgear and Controlgear - Part 4-1: Contactors and Motor-starters - Electromechanical Contactors and Motor-starters (Including Motor Protector)

GB/T 14048.9 Low-voltage switchgear and controlgear - Section 6-2: Multiple function equipment control and protective switching devices (or equipment) (CPS)

GB 14050 Types and safety technical requirements of system earthing

GB/T 14285 Technical code for relaying protection and security automatic equipment

GB/T 16895.3 Low-voltage Electrical Installations - Part 5-54: Selection and Erection of Electrical Equipment - Earthing Arrangements and Protective Conductors

GB/T 16895.22 Electrical Installations of Buildings - Part 5-53: Selection and Erection of Electrical Equipment Isolation, Switching and Control - Section 534: Devices for Protection against Overvoltages

GB/T 16916.1 Residual Current Operated Circuit-breakers without Integral Overcurrent Protection for Household and Similar Uses (RCCB) - Part 1: General Rules

GB/T 16917.1 Residual Current Operated Circuit-breakers with Integral Overcurrent Protection for Household and Similar Uses (RCBOs) - Part 1: General Rules

GB/T 16935.1-2008 Insulation Coordination for Equipment within Low-voltage Systems - Part 1: Principles, Requirements and Tests

GB/T 17045-2020 Protection against Electric Shock - Common Aspects for Installations and Equipment

GB 18384-2020 Electric Vehicles Safety Requirements

GB/T 18487.2-2017 Electric Vehicle Conductive Charging System - Part 2: EMC Requirements for Off-board Electric Vehicle Supply Equipment

GB/T 18802.11 Low-voltage Surge Protective Devices (SPD) - Part 11: Surge Protective Devices Connected to Low-voltage Power Systems - Requirements and Test Methods

GB/T 18802.21 Low-voltage Surge Protective Devices - Part 21: Surge Protective Devices (SPD) Connected to Telecommunications and Signaling Networks - Performance Requirements and Testing Methods

GB/T 19596-2017 Terminology of Electric Vehicles

GB/T 20234.1-2023 Connection set for conductive charging of electric vehicles—Part 1: General requirements

GB/T 20234.2-2015 Connection set for conductive charging of electric vehicles—Part 2: AC charging coupler

GB/T 20234.3-2023 Connection set for conductive charging of electric vehicles—Part 3: DC charging coupler

GB/T 20234.4-2023 Connection set of conductive charging for electric vehicles—Part 4: High power DC charging coupler

GB/T 21711.1-2008 Electromechanical Elementary Relays - Part 1: General and Safety Requirements

GB/T 22794 Type F and Type B Residual Current Operated Circuit-breakers with and without Integral Overcurrent Protection for Household and Similar Uses

GB/T 27930-2023 Digital communication protocols between off-board conductive charger and electric vehicle

GB/T 29317-2021 Terminology of Electric Vehicle Charging/Battery Swap Infrastructure

GB/T 32694-2021 Plug-in Hybrid Electric Passenger Cars

GB/T 40432 Conductive On-board Charger for Electric Vehicles

GB/T 40820-2021 Residual direct current detecting device (RDC-DD) to be used for mode 3 charging of electric vehicles

GB/T 41589 In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)

GB 50057-2010 Code for Design Protection of Structures against Lightning

DL/T 584 Setting guide for 3kV~110kV power system protection equipment

DL/T 621 Grounding for AC Electrical Installations

NB/T 10202 Plugs with Thermal Protection Function for Charging Mode 2 of Electric Vehicles

NB/T 10902 Technical Conditions and Installation Requirements for Off-board DC Charger of 20kW and below

NB/T 33001-2018 Specification for Electric Vehicle Off-board Conductive Charger

NB/T 33002-2018 Specification for Electric Vehicle AC Charging Spot

ISO 17049:2020 Electrically propelled road vehicles-Conductive power transfer-Safety requirements

IEC 62477-1:2016 Safety Requirements for Power Electronic Converter Systems and Equipment - Part 1: General

3 TERMS AND DEFINITIONS

For the purposes of this document, the terms and definitions given in GB/T 19596-2017, GB/T 20234.4-2023, GB/T 29317-2021 and GB/T 32694-2021, as well as the followings apply.

3.1 Charging/Bi-Directional Charging System

3.1.1 Charging

Condition voltage/current provided by the AC or DC supply network (mains) to an appropriate value to supply electric energy to the EV's rechargeable electrical energy storage system (REESS)

3.1.2 bi-directional charging

Condition voltage/current provided by the AC or DC supply network (mains) to an appropriate value to supply electric energy to the EV's REESS, or condition voltage/current provided by the EV that serves as power supply to an appropriate value and output to the AC or DC supply network (mains), or supply electric energy to the load

3.1.3 Conductive charge

A method to charge the battery via electrical conduction

[Source: GB/T 19596-2017, 3.4.2.1]

3.1.4 Charging modes

A method for connection of an EV to the supply network (mains) to supply energy to the EV

Note: Mode 1, mode 2, mode 3 and mode 4 also apply to bi-directional charging.

3.1.4.1 Mode 1

a method for the connection of an EV to the supply network (mains) utilizing a plug and socket-outlet on the supply side which meet the requirements of GB 2099.1 and GB 1002, and utilizing phase, neutral and protective earthing conductors on the supply side

3.1.4.2 Mode 2

a method for the connection of an EV to the supply network (mains) utilizing a standard plug/socket-outlet on the supply side, and utilizing phase, neutral and protective earthing conductors on the supply side, together with an in-cable control and protection device (IC-CPD) for charging connection

3.1.4.3 Mode 3

a method for the connection of an EV to the supply network (mains) utilizing dedicated supply equipment which directly connects the EV to the AC supply network, where a control pilot device is installed on the dedicated supply equipment

3.1.4.4 Mode 4

a method for the connection of an EV to the supply network (mains) utilizing a DC supply equipment with control pilot function

3.1.5 Type of connection

A method for the connection of an EV to the supply network using cables and connectors

3.1.5.1 Case A connection

Connection of an EV to the supply network/supply equipment using a cable assembly fitted with a standard plug/EV plug permanently attached to the EV, see Figure 1

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