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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 44852-2024

**Electric motorcycles and electric mopeds - Safety requirements
for conductive connection to an external electric power supply**

电动摩托车和电动轻便摩托车 与外部电源传导连接的安全要求

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1 Scope

GB/T 44852-2024 sets the safety requirements for charging an electric motorcycle or moped from an external supply. This is the standard behind a problem China has been trying to solve for years: electric two-wheelers are charged by the hundred million, very often indoors, in a stairwell or a corridor, from a domestic socket with a cheap charger, and the fires that result are one of the country's more persistent causes of death in dwellings. The standard addresses the electrical side of that directly. It sets the requirements on the charging modes and the connection, on the vehicle inlet and the connector, on the protection against electric shock in normal and single fault conditions, on the insulation and the protective bonding, on the charging control and the communication between vehicle and supply, on the protection against overcurrent, overvoltage, overtemperature and overcharge and on the behaviour of the battery management system at end of charge, on the cable and its retention, and on the marking and the instructions, together with the test methods. For a two-wheeler maker or a charger supplier in China, this is the safety text.

This document specifies the safety requirements and test methods for conductive charge of electric motorcycles and electric mopeds (hereinafter referred to as "motorcycles") when conductively connected to external electric power supply. This document applies to the design, production and inspection of the on-board charging system, off-board charging system (as shown in Figures A.4 and A.5), and motorcycle off-board charger assembly (as shown in Figures A.4 and A.5) between the standard plug/plug (case A connection) or vehicle inlet (case B connection and case C connection) on the motorcycle vehicle and the REESS circuit (such as Figure A.2 and Figure A.3 in Annex A). This document does not apply to external electric power supply and supply equipment for motorcycles.

2 Normative references

The following referenced documents are indispensable for the application 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.

GB/T 1002, Single phase 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

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 19596- 2017, GB 18384-2020, GB/T 18487.1-2023 as well as the followings apply.

3.1 General

3.1.1 rechargeable electrical energy storage system; REESS A rechargeable electrical energy storage system that can provide electrical energy. [Source: GB 18384-2020, 3.1]

3.1.2 removable REESS A rechargeable electrical energy storage system that is moved/removed from a motorcycle by hand or with the aid of a device/equipment.

3.1.3 maximum working voltage The voltage at which the effective value of the AC voltage (r.m.s.) or the maximum value of the DC voltage may occur in the power system under normal working conditions. A circuit, part of a circuit or an electrical component having a maximum working voltage not exceeding 30 V (AC, r.m.s.) or a voltage not exceeding 60 V (DC). [Source: GB/T 19596-2017, 3.1.3.2.18, modified]

3.2 Charging

3.2.1 charging Adjust the AC or DC power grid (power supply) to the appropriate voltage/current to provide power to the motorcycle's rechargeable electrical energy storage system.

3.2.2 conductive charge A method of charging a rechargeable electrical energy storage system using electrical conduction.

4 Safety requirements

4.1 General requirements The design of the on-board charging system shall meet the following conditions.

4.2 Connection between standard plug/plug or vehicle coupler and vehicle rechargeable electrical energy storage system

4.2.1 General requirements 4.2.1.3.4 for requirements.

4.2.1.2 General requirements for connection 4.2.1.2.1 Connection and disconnection The interface or plug used by the manufacturer is specified as follows: 4.2.1.3.4 Requirements for separate grounding In the case of charging type A, the on-board charger shall at least meet the following conditions to complete this connection. 4.2.1.3.5 Requirements for partial grounding In the case of charging type A, the on-board charger shall meet the following conditions to complete this connection.

4.2.1.4 Special requirements for standard plugs/plugs and vehicle inlets 4.2.1.4.1 Requirements for connecting compatible EVSE The standard plug for charging mode 2 (case A connection) shall comply with the requirements of GB/T 1002 and GB/T 2099.1. 4.2.1.4.2 Requirements for connecting motorcycle supply equipment When the vehicle inlet is not equipped with the on-load disconnection function and is not accidentally disconnected, the motorcycle shall be provided with an appropriate locking device or retaining device.

4.2.1.5 Vehicle requirements during charging If the plug is connected to an external electric power supply, the motorcycle shall not be moved by its own drive system.

4.2.2.1 Requirements for connection to the AC power supply network (power supply)

4.2.2.2 AC connecting point connection and/or disconnection 4.2.2.2.1 Connection sequence If there is a ground connection, it shall be connected before the phase and neutral connections. The sequence of other connecting points, if any, shall be specified by the vehicle manufacturer.

4.3.1 General requirements

4.3.1.1 General requirements for circuit connection parts If not otherwise specified, circuits consisting of conductively connected parts having different maximum working voltages shall be classified according to the maximum working voltage.

5 Test methods

5.1 General conditions If there are no special provisions, the test objects shall be the power supply circuit and off-board charger assembly on the motorcycle.

5.2 Test for degree of protection Compliance shall be checked by inspection or test as specified in GB/T 30038.

5.3.3 Test steps

5.3.3.1 The test shall include the shield and the shell.

5.3.3.2 The voltage class B circuit setting requirements for the onboard part of the vehicle power supply circuit are as follows:

5.3.3.3 After the preparation is completed, apply the test voltage specified in

5.3.4 between the live parts of the voltage class B circuit of the equipment under test that are connected to each other and the electric chassis.

5.3.4 Test voltage

5.3.5 Withstand voltage of DC part of voltage class A If double insulation and/or reinforced insulation is applied between the AC or DC part of voltage class B and the DC part of voltage class A, a test voltage of

5.4 Surge current test

5.4.1 General requirements The surge current compliance shall be checked according to the following test requirements.

5.4.2.3 The current shall be measured continuously during the test.

5.4.2.4 The peak voltage of the power supply shall be measured.

5.4.2.5 If the power supply cannot provide the rated voltage of the equipment under test, the measurement can be carried out at any voltage within the rated voltage range and the result is obtained based on the corresponding calculation.

5.4.2.6 If measurements are repeated, sufficient time shall be allowed between consecutive measurements to ensure that the capacitance of the equipment under test is discharged.

5.4.2.7 When the power supply system impedance is not greater than 150 m Ω , the surge current limit requirements of event 1 and event 2 shall be met.

5.5 Contact current test The contact current test shall be carried out in accordance with the provisions of

13.6 of GB/T 43332-2023.