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Safety specifications for electric motorcycles and electric mopeds

电动摩托车和电动轻便摩托车安全要求

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Safety specifications for electric motorcycles and electric mopeds

1 Scope

This Standard specifies the general requirements, electrical safety requirements, operational safety requirements, requirements for markings and warnings, and test methods for the safety of pure electric motorcycles and pure electric mopeds.

This Standard applies to pure electric motorcycles and pure electric mopeds (except for special instructions, hereinafter referred to as "electric motorcycles").

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 4208-2017, Degrees of protection provided by enclosure (IP code)

GB/T 5359.1, Term for motorcycles and mopeds - Part 1: Types of vehicles

GB 7258, Technical specifications for safety of power-driven vehicles operating on roads

GB 15365, Symbols for controls - Indicators and tell tales for motorcycles and mopeds

GB/T 18384.1-2015, Electrically propelled road vehicles - Safety specifications - Part 1: on-board rechargeable energy storage system (REESS)

GB/T 18384.3-2015, Electrically propelled road vehicles - Safety specifications - Part 3: Protection of persons against electric shock

GB/T 19596, Terminology of electric vehicles

GB/T 24157, Test methods of range and indication for the state of charge for electric motorcycles and electric mopeds

4.2.2.7 The cables in the grade-B voltage circuit and the sheath in the circuit (which can be the cable protection tube) shall be distinguished by orange, except for the inside of the shell or behind the barrier.

4.2.2.8 The insulation resistance of grade-B circuits shall be greater than 1 000 Ω/V; the insulation resistance measurement method is carried out in accordance with 5.2.

4.2.2.9 For electric motorcycles that are equipped with an on-board charger, a withstand voltage test shall be carried out between the input terminal of the on-board charger and the electric platform. After the test, the insulation resistance between the input terminal of the on-board charger and the electric platform shall meet the requirements of 4.2.2.8.

4.2.2.10 After various waterproof tests that are carried out in accordance with 5.4, immediately measure the insulation resistance of the circuit according to 5.2 (the electric motorcycle is still wet); the insulation resistance value shall be greater than 500 Ω/V; after standing for 24 h, the second test shall be greater than 1 000 Ω/V.

4.2.2.11 The protection level of the barrier/shell shall at least meet the requirements of IPXXB in GB/T 4208-2017:

a) The protection level of the barrier/shell in the passenger cabin and luggage compartment shall at least meet the requirements of IPXXD in GB/T 4208-2017;

b) For connectors that can be disconnected without tools and have a grade-B voltage when they are not connected, they shall at least meet the requirements of IPXXB in GB/T 4208-2017 under disconnection status.

4.2.2.12 A grade-B voltage circuit that has a fault can be protected by power failure. The circuit to cut off the power supply shall meet one of the following requirements within the time that is specified by the vehicle manufacturer:

-- The AC circuit shall drop below 30 V (a.c.) (rms); the DC circuit shall drop below 60 V (d.c.);

-- The total energy that is stored in the circuit shall be less than 0.2 J.

4.2.3 Electric shock protection of exposed conductive parts

4.2.3.1 The exposed conductive parts of grade-A voltage are not required by this Standard.

4.2.3.2 All exposed conductive parts are connected to maintain potential equalization. The connection method can be:

4.3.1.3 If the electric motorcycle is started with a mechanically unlocked key, the key shall not be removed when the driving system is running or when the electric motorcycle is in "driving mode".

4.3.2 Driving and stopping

4.3.2.1 The electric motorcycle shall remind the driver that the electric motorcycle can start driving through the "operation preparation" symbol in GB 15365.

4.3.2.2 When the driver leaves, if the driving system is still in the "driving mode", or when the electric motorcycle can be in the "driving mode" with only one operation, an obvious acoustic or optical signal shall be used to remind the driver or it shall be automatically switched to the "non-driving mode".

4.3.2.3 The electric motorcycle shall be equipped with a remaining battery indicator and a warning device that meets the requirements of GB/T 24157.

4.3.2.4 When the low power of the power battery affects the driving of the electric motorcycle, an obvious sound or light signal device shall be used to indicate; at this time, the remaining power shall meet the following requirements:

a) The electric motorcycle can drive at least 3 km at a speed of not less than 15 km/h through its own driving system;

b) If the power battery is used as the direct power source of the auxiliary circuit, its minimum remaining power shall meet the luminous intensity of the lighting and light signal devices that is specified in GB 7258.

4.3.2.5 If the electric motorcycle is equipped with a power limiting device that is activated to protect the REESS (rechargeable energy storage system) or the driving system, when the power limit or reduction reaches below the set value, an obvious signal shall be used to notify the motorcycle users.

4.3.2.6 The driving direction of the electric motorcycle can only be switched when its speed is 0.

4.4 Requirements for markings and warnings

4.4.1 The protective cover of the power battery and the easily accessible grade-B voltage components shall be marked with the markings that are specified in Figure 2 in an easy-to-see position; the markings shall be clear and firm.

Figure 4 -- Nozzle structure size

5.4.3 Wading test

The electric motorcycle travels 500 m in a pool whose depth is 10 cm at a speed of 20 km/h. If the length of the pool is less than 500 m, it can go back and forth; but the total time (including the time outside the pool) shall be less than 10 min.

5.4.4 End of test

After the various waterproof tests, conduct an insulation resistance test, which shall meet the requirements of 4.2.2.9.

5.5 Potential equalization test

Use a current of more than 0.2 A to pass through any two exposed conductive parts for at least 5 s; measure the voltage drop. The resistance value that is calculated from the current and voltage drop shall not exceed 0.1 Ω.

Note 1: When measuring, pay attention to avoid measuring the contact resistance and wire resistance between the contact of the test tool and the exposed conductive parts; otherwise, it will affect the test results.

Note 2: For conductive parts with a coating on the surface, the coating can be destroyed before testing.

Note 3: The parts that are connected by metal welding are considered to belong to the same conductive part in this test.

5.6 Remaining battery warning test

5.6.1 The test conditions shall meet the requirements for test conditions in GB/T 24157.

5.6.2 The test is carried out according to the following steps:

a) Before the start of the test, ensure that the remaining power of the vehicle is above the warning value.

b) Discharge: on the road or chassis dynamometer, discharge the vehicle to the remaining battery warning value.

c) On the road or chassis dynamometer, turn on the dipped headlight all the way to make the vehicle drive at a constant speed of 15 km/h ± 1 km/h until any of the following conditions is met:

-- The mileage reaches 3 km;

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