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

GB/T 18488.2-2015

**[Replaced by GB/T 18488-2024] Drive motor system for electric
vehicles -- Part 2: Test methods
(English Translation)**

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1 Scope

This Part of GB/T 18488 specifies the instruments and meters, test preparation and each test method used for the test of drive motor system for electric vehicles.

This Part is applicable to the drive motor system for electric vehicles, drive motor and drive motor controller. The vehicle motor only having power generation function and its controller may implement this Part by reference.

2 Normative References

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

GB 755-2008 Rotating Electrical Machines - Rating and Performance

GB/T 2423.1-2008 Environmental Testing - Part 2.Test Methods - Tests A.

Cold

GB/T 2423.2-2008 Environmental Testing - Part 2.Test Methods - Tests B. Dry

Heat

GB/T 2423.10-2008 Environmental Testing for Electric and Electronic Products

- Part 2.Tests Methods - Test Fc. Vibration (Sinusoidal)

GB/T 2423.17-2008 Environmental Testing for Electric and Electronic Products

- Part 2. Test Method - Test Ka. Salt Mist

GB/T 2900.25 Electrotechnical Terminology - Rotating Electrical
Machines

GB/T 2900.33 Electrotechnical Terminology - Power Electronics

GB/T 3859.1-2013 Semiconductor Converters - General Requirements and
Line Commutated Converters - Part 1-1. Specification of
Basic Requirements

3 Terms and Definitions

The terms and definitions defined in GB/T 2900.25, GB/T 2900.33, GB/T 19596 and GB/T 18488.1 are applicable to this document.

4.1 Test environment conditions

Unless otherwise specified, all the tests shall be carried out under the following conditions.

- a) Temperature. 18°C~28°C;
- b) Relative humidity. 45%~75%;
- c) Atmospheric pressure. 86 kPa~106 kPa;
- d) Altitude. not exceeding 1,000 m; if it exceeds 1,000 m, it shall be in accordance with the relevant requirements of GB 755-2008.

4.2.1 Accuracy of instrument

The accuracy or error of instrument shall not be inferior to the requirements specified in Table 1, and shall meet the accuracy requirement of actually measured parameter;

especially, the instrument and meter for measurement of electrical parameter shall be able to meet the accuracy and waveform requirements for the measurement of corresponding DC parameter and AC parameter.

4.2.2 Measurement requirements

- a) If measuring current with shunt, the resistance of measuring line shall be selected according to the adopted measuring instrument.
- b) During the measurement, the reading of each instrument shall be read at the same time.

4.3 Test power supply

4.3.1

In the test process, the test power supply shall be provided by DC power supply, or be jointly provided by DC power supply and other energy storage (energy consumption) equipment; when the DC working voltage of test power supply is not greater than 250 V, the voltage stabilization error shall not be greater than ± 2.5 V; when the DC working voltage of test power supply is greater than 250 V, the voltage stabilization error shall not exceed $\pm 1\%$ of the DC working voltage of the tested drive motor system.

4.3.2

The test power supply shall be able to meet the power requirement of the tested drive motor system, and be able to work under the corresponding working voltage state.

5.1 Appearance

It shall mainly be inspected visually; for the technical parameters having explicit strength requirement, such as the joint strength of fastener, the necessary tools like torque wrench shall be adopted.

5.2 Overall and installation dimensions

According to the requirements for overall and installation dimensions of tested motor system, and the size range - the vernier caliper, spiral micrometer, mater ruler and other measuring instruments meeting the measurement accuracy requirements shall be selected for measurement.

5.3 Mass

The mass of drive motor and drive motor controller shall be measured with weighing apparatus meeting the measurement accuracy requirements; the measuring error of weighing apparatus shall not exceed $\pm 2\%$ of the nominal mass of the tested sample.

5.4 Mechanical strength of drive motor controller housing

During the test, the weights of corresponding pressure shall be applied slowly in 3 directions of drive motor controller housing respectively according to the requirements of 5.2.4 in GB/T 18488.1-2015, in which, the contact area of weights and drive motor controller housing shall not be less than 5 cmx5 cm at least, to inspect whether the housing has obvious plastic deformation.

5.5 Cooling circuit sealing property of liquid cooling system

5.5.1

For this test, the cooling circuit of drive motor and drive motor controller should be measured independently after being separated.

5.5.2

Before the test, it is not allowed to apply the coating which may prevent seepage on the surface of drive motor or drive motor controller, however, it is allowed to conduct the chemical preservation treatment without sealing function.

5.5.3

The medium used for test may be fluid or gas; the liquid medium may be the water containing antirust agent, kerosene or the non-corrosive liquid with viscosity not higher than water; and the gas medium may be air, nitrogen or inert gas.

5.5.4 The accuracy of the measuring instrument used for measuring the test medium

pressure shall not be lower than Grade 1.5; and the measuring range shall be 1.5~3 times of the test pressure.

5.5.5 During the test, the temperature of test medium shall be consistent with that of test environment and shall remain stable; one end of the cooling circuit of the tested sample shall be blocked; however, the deformation affecting the sealing property cannot be generated; the test medium shall be filled into circuit; and the applied medium pressure shall be measured with pressure instrument. When the liquid medium is used for test, the air in cooling circuit cavity shall be emptied. Then, the test pressure specified in 5.2.5 of GB/T 18488.1-2015 shall be added gradually, and this pressure shall be maintained at least 15 min.

5.5.6 In the process of pressure maintenance, the indicated value of pressure

instrument shall not decrease; in this period, visible seepage shall not pass through the shell wall of tested sample and any fixed joint. If the test medium is fluid, visible liquid drop or wet surface shall be avoided.

5.6 Cold state DC resistance of drive motor stator winding

The cold state DC resistance of drive motor stator winding should be measured under the actual cold state; the environment temperature value during the measurement shall be recorded.