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**General Requirements for Swapping
Battery Pack Connector of Electric Vehicle**

电动汽车更换用电池箱连接器通用技术要求

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard is proposed by and under the jurisdiction of China Electricity Council.

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General Requirements for Swapping Battery Pack Connector of Electric Vehicle

1 Scope

This Standard specifies the rated values, technical requirements, test methods, inspection rules, as well as the requirements for marks, package, transportation and storage of swapping battery pack connector (hereinafter referred to as “connector”) of electric vehicle.

This Standard is applicable for the design, production and usage of the swapping battering pack connector of electric vehicle.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB 4208-2008 Degrees of Protection Provided By Enclosure (IP Code)

GB/T 11918.1-2014 Plugs, Socket-Outlet and Couplers for Industrial Purposes - Part 1: General Requirements

GB/T 19596 Terminology of Electric Vehicles

GB/T 20234.1-2015 Connection Set for Conductive Charging of Electric Vehicles - Part 1: General Requirements

QC/T 413-2002 Basic Technical Requirements for Automotive Electric Equipment

ISO 16750-3:2012 Road Vehicles – Environmental Conditions and Testing for Electrical and Electronic Equipment – Part 3: Mechanical Loads

3 Terms and Definitions

The following terms and definitions stipulated in GB/T 11918.1-2014, GB/T 19596,

- b) After the correct connection of coupler plug, socket-outlet and cable, the danger of unexpected contact between the terminals on different poles, between terminal and metal components shall not occur;
- c) If bolt is taken for connection, then the anti-loose measure shall be adopted;
- d) If the motor circuit adopts cold extrusion crimping, the crimping quality shall be ensured, and conduct the tin filling treatment.

5.4 Guide floating requirements

5.4.1 The coupler shall be equipped with alignment input function, when coupling, it can automatically correct the position deviation; and ensure the accurate connecting. The guide mechanism can correct the angular deviation no less than 1° . The axis vertical direction of guide mechanism can correct the position deviation no less than 5mm.

5.4.2 The coupler is equipped with floating following mechanism; when the coupler plug disconnects from the socket-outlet, the socket-let that deviates in the running direction of the plug shall be put back automatically, and return to its original position.

5.4.3 The floating following mechanism, in the axial horizontal direction, can follow the position deviation no less than 5mm.

5.4.4 The floating following mechanism, in the axial vertical direction, can follow the position deviation no less than 5mm.

5.5 Inserting and pulling-out force

The inserting and pulling-out force during the coupling and disconnecting of the coupler shall be no greater than 400N.

5.6 Protection against electric shock

The protection against electric shock of coupler shall meet the requirements of Chapter 9 in GB/T 11918.1-2014.

NOTE: signal and grounding terminal shall not be regarded as the live parts.

5.7 Grounding measures

The grounding protection of the coupler shall meet the requirements of Chapter 10 in GB/T 11918.1-2014.

5.8 Terminals

The terminals of coupler shall meet the requirements of Chapter 11 in GB/T 11918.1-2014.

free from burrs, flashes, and the like sharp edges; the position of grounding contacts or neutral contacts can't be changed; it is equipped with the structure that ensure to prevent the incorrect coupling; the design of insulation gasket, partition board, and the like parts shall ensure their non-removable or prevent their incorrect positions; ensure the coupler is clearly labeled, the coupler shall be checked without lack of accessories as per the diagram provided by the manufacturer.

6.3 Guide floating requirements

The guide floating of coupler shall meet the following requirements:

- a) Install the coupler on the special device, it shall be run as required during the insertion cycle period. Such special device can adjust the displacement of coupler plug and socket-outlet; namely, the transverse axial and vertical axis can realize the offset no less than 5mm; the angular deviation in vertical axial direction shall be no less than 1°; during the test period, the push-on and push-off speed of coupler plug is 50mm/min; it can simulate the operating conditions to randomly and automatically adjust the offset position between the plug and socket-outlet.
- b) After the plug and socket-outlet are disconnected, the floating mechanism of coupler can fully return to the original position.

6.4 Inserting and pulling-out force

The coupler shall be installed in the device which can display the pulling force and pushing force, so that the coupler plug can be tested at the inserting and pulling-out speed of 50mm/min; the measurement shall be conducted after 30 times of inserting and pulling-out cycle.

6.5 Protection against the electric shock

The verification of protection against electric shock shall be performed as per the Chapter 9 in GB/T 11918.1-2014; IP code mark shall be defined as per the GB 4208-2008. After disconnecting the coupler plug from the socket-outlet, it shall be tested as per the IP2X corresponding test method.

6.6 Grounding measures

6.6.1 The grounding measure test shall be performed as per the Chapter 10 in GB/T 11918.1-2014; after the coupler plug and socket-outlet are matched, the grounding contact shall have the protective layer to prevent the mechanical damage.

6.6.2 The test of short-term resistance to high current shall conform to the following provisions:

- a) Simulate the actual using state; install the coupler plug, socket-outlet.

The limit short-circuit current withstand test shall be performed as per Chapter 29 in GB/T 11918.1-2014.

6.18 Age-resistance of rubber and thermoplastic materials

The age-resistance of rubber and thermoplastic materials test shall be performed as per Chapter 13 in GB/T 11918.1-2014.

6.19 Heat-resistance, flame-resistance and electric tracking resistance

The heat-resistance, flame-resistance, and electric tracking resistance test shall be performed as per Chapter 27 in GB/T 11918.1-2014.

6.20 Corrosion and antirust

The corrosion and antirust test shall be performed as per Chapter 28 in GB/T 11918.1-2014.

6.21 Temperature performance resistance

The temperature performance resistance test shall be performed as per 4.10 in QC/T 413-2002.

6.22 Temperature/damp-heat combined cycle

The temperature/damp-heat combined cycle test shall be performed as per 4.11 in QC/T 413-2002.

6.23 Salt-fog test

The salt-fog test shall be performed as per 4.13 in QC/T 413-2002; salt-fog resistance continuous test time shall be 96h.

7 Inspection Rules

7.1 Product test classification

The product test can be divided into type test and exit-factory test.

7.2 Type test

In case one of the following situations, the manufacturer shall conduct the type test:

- a) The trial stereotypes identification for the new and old products transferring to other factories to produce;
- b) After the formal production, if there are great changes for the structure,

- d) Manufacturing date of product;
- e) Product number and serial number;
- f) Terminal's electrical mark symbol.

8.2 Package

The package box of the coupler shall meet the following requirements:

- a) The package of coupler shall meet the moisture-proof and anti-vibration requirements;
- b) The package box shall contain the documents accompanied the product;
- c) Packing list (refer to package for multiple products);
- d) Product certificate;
- e) Instruction manual of product.

8.3 Transportation

During the transporting period, the product shall not be subject severe collision, insolation and rain. During the loading and unloading period, the product shall be handled gently, it is strictly prohibited to throw and press tightly.

8.4 Storage

The product shall be stored in the place where it is dry, ventilated, clean, and containing no acid, other corrosive and explosive substances. The product shall be kept no less than 2m from the heat source, neither it shall be pressed tightly. During the storing period, the product shall not be subject to rain, insolation, condensation and frost.

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