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AUTOMOBILE INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

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QC/T 1201.3-2023

**Compatibility of on-board swappable battery system for
battery electric commercial vehicles - Part 3: Battery swap
mechanism**

纯电动商用车车载换电系统互换性 第3部分：换电机构

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

The document is Part 3 of the QC/T 1201 "Compatibility of on-board swappable battery system for battery electric commercial vehicles" series of standards: Battery swap mechanism. The other parts are as follows:

- Part 1: Battery swapping electrical interface;
- Part 2: Battery swap cooling interface;
- Part 4: Swappable battery systems;
- Part 5: Communication between vehicle and battery system.

Please note that some of the contents of this document may involve patents. The issuing agency of this document does not assume the responsibility for identifying patents.

This document was proposed by AND shall be under the jurisdiction of the National Technical Committee for Automobile Standardization (SAC/TC 114).

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The main drafters of this document: Li Liguang, Zheng Tianlei, Liu Tao, Shao Changhong, Cao Dongdong, Ding Xikun, Li Hongjian, Zhou Zhanfu, Du Xiaopeng, Xu Xiao, Li Yang, Wang Sai, Zhao Penghui, Li Wei, Li Xin, Zhao Wei, Guo Fenggang, Liu Wei, Sun Songwei, Guo Peng, Wang Xin, Wang Guolin, Zhou Qiang, Guo Shengjun, Zhang Jianping, Xi Shihong, Zheng Yunfei.

Introduction

Battery swapping is one of the important ways to replenish energy for pure electric commercial vehicles. QC/T 1201 Compatibility of on-board swappable battery system for battery electric commercial vehicles series of standards aims to standardize the interchangeability of on-board swappable battery systems for pure electric commercial vehicles, thereby achieving interchangeability between vehicles, swappable battery systems and battery swap stations. This series of standards is intended to consist of 5 parts:

- Part 1: Battery swap coupler. The purpose is to standardize the electrical interface of the swappable battery system, including the basic requirements for battery swap electrical connections, signal definitions, contact coupling sequence, connection interface, terminal arrangement, dimensional parameters.
- Part 2: Battery swap cooling interface. The purpose is to standardize the battery swap cooling interface, including the basic performance requirements of the cooling interface, the structure and dimensions of the cooling interface assembly, the battery end, the vehicle end.
- Part 3: Power swapping mechanism. The purpose is to standardize the mechanical interface forms and dimensions such as the gripping interface, bearing surface, guide positioning, locking, etc. of the battery swap battery system, as well as the installation position of the electrical interface and cooling interface, to ensure the gripping performance, guide positioning capability, locking capability of the battery swap battery system, thereby achieving the interchangeability of the swappable battery system in terms of structural form.
- Part 4: Swappable battery systems. The purpose is to standardize the swappable battery system, including the general requirements, structure, and size of the swappable battery system.
- Part 5: Communication between vehicles and battery systems. The purpose is to achieve barrier-free communication between vehicles from different manufacturers and batteries from different manufacturers after swapping, by specifying high-voltage architecture, power-on and power-off logic, interactive signals.

Compatibility of on-board swappable battery system for battery electric commercial vehicles - Part 3: Battery swap mechanism

1 Scope

This document specifies the interchangeability requirements for battery swapping mechanisms in the on-board swappable battery system of pure electric commercial vehicles with cab-back battery swap.

This document is applicable to categories N₂ and N₃ pure electric vehicles with overall battery swapping in the cab-back swappable battery system; other forms of battery swapping vehicles can make reference to this document.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in the text. Among them, for dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 1804 General tolerances - Tolerances for linear and angular dimensions without individual tolerance indications

GB/T 19596 Terminology of electric vehicles

GB/T 19804 Welding - General tolerances for welded constructions - Dimensions for lengths and angles - Shape and position

GB/T 40032-2021 Safety requirements of battery swap for electric vehicles

QC/T 1201.1-2023 Interchangeability of on-board swappable battery systems for pure electric commercial vehicles - Part 1: Battery swapping electrical interface

QC/T 1201.2-2023 Interchangeability of on-board swappable battery systems for pure electric commercial vehicles - Part 2: Battery swap cooling interface

3 Terms and definitions

The terms and definitions defined in GB/T 19596, as well as the following terms and

definitions, apply to this document.

3.1

Swappable battery system

During the battery swapping process, the power battery system that is replaced as a whole, which generally includes: power storage battery, battery management system, battery bracket, battery swapping electrical interface and battery swapping mechanical interface, etc.; it can be charged and discharged in the off-board state.

3.2

On-board battery swap base

A device installed on a pure electric commercial vehicle, to connect the vehicle to the swappable battery system and realize the replacement and locking of the swappable battery system.

3.3

Batteryswap mechanism

A mechanical device used to combine and separate the swappable battery system and the vehicle.

Note: It may have functions such as guiding, positioning, limiting, holding, tightening, and locking. [Source: GB/T 40032-2021, 3.4, modified].

3.4

Batteryswap connector

A connecting device used to connect the swappable battery system and the vehicle, to transmit electrical energy, electrical signals, communication data, thermal energy media.

Note: It generally includes an electrical interface; it may also include a cooling interface for transmitting a cooling medium, as well as a mechanical interface for tightening and locking.

[Source: GB/T 40032-2021, 3.3, modified].

3.5

Cab-backbattery swap

A method to realize vehicle energy supply by replacing the battery system installed behind the cab as a whole.

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Contact: Wayne Zheng, Sales@ChineseStandard.net

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