QC

AUTOMOBILE INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 43.020

CCS T 40

QC/T 1201.1-2023

Compatibility of on-board battery swap system for battery electric commercial vehicles - Part 1: Battery swap coupler

纯电动商用车车载换电系统互换性 第 1 部分：换电电气接口

Issued on: December 20, 2023 **Implemented on: December 20, 2023**

Issued by: Ministry of Industry and Information Technology of the PRC

Compatibility of on-board battery swap system for battery electric commercial vehicles - Part 1: Battery swap coupler

1 Scope

This document specifies the basic requirements, signal definitions, contact coupling sequence, connection interface, terminal arrangement, size parameters of the electrical interface of the on-board battery swapping system for pure electric commercial vehicles with back-type battery swapping.

This document is applicable to N_2 and N_3 pure electric vehicles with overall battery swapping of back-type battery systems. Other forms of battery swapping vehicles can make reference to it.

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 applies to this document; for undated references, the latest version (including all amendments) applies to this document.

GB/T 19596 Terminology of electric vehicles

GB/T 37133-2018 Technical specifications of high duty cables and connectors for electric vehicles

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

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

Battery swap

The process of quickly replacing the power battery system to replenish the power of an electric vehicle through special devices or manual assistance.

Note: The time required for a complete battery swap process generally does not exceed 5

charging CAN and power CAN; the diagnostic CAN can be expanded according to needs.

4.8 The battery swap electrical interface shall have a connection status feedback signal and a power terminal temperature detection signal.

4.9 The battery swap electrical interface shall have a guide structure, to ensure that it can be connected accurately and reliably.

4.10 The battery swap locking mechanism shall have a locking status feedback signal. The locking mechanism shall have at least two status feedbacks, namely, the locking state and the loose state, meanwhile the low level is the loose state. If there are multiple locking mechanisms in the battery swap mechanism, their locking states shall be detected separately, to ensure the safety of the battery swap vehicle.

4.11 The battery swap controller is responsible for detecting the state of the locking mechanism and feedback on the power CAN bus, so that the vehicle controller or the battery swap station control system can read the state.

4.12 The battery swap electrical interface should reserve 1 high-voltage power supply, for power distribution of the battery cooling unit.

4.13 The low-voltage signals in the battery swap electrical interface should reserve activation signals for the water cooling unit.

4.14 The low-voltage signals in the battery swap electrical interface shall reserve expandable pins, to facilitate their compatibility and scalability.

4.15 The performance of the battery swapping electrical connector shall meet the requirements of Chapters 5 ~ 7 of GB/T 37133-2018.

4.16 The battery swapping electrical connector shall have a floating mechanism and be installed at the vehicle end.

4.17 The floating amount of the battery swapping electrical connector's floating mechanism shall not be less than ±8 mm in the X and Y directions; it shall not be less than ±5 mm in the Z direction.

4.18 The tilting and guiding capacity of the battery swapping electrical connector's floating mechanism shall not be less than 3°.

5 Definition of the electrical interface of the battery swapping system

5.1 Definition of electrical interface signals

5.1.1 General requirements

5.1.1.1 The battery swapping electrical connection shall be able to meet the interactive signals of the driving electrical connection and the charging electrical connection. The physical connection can adopt a single battery swapping connector (same port for charging and discharging) or a dual battery swapping connector (different ports for charging and discharging).

5.1.1.2 For the battery swapping system with a single battery swapping connector, all low-voltage signals for driving discharge and charging shall be distributed on the two groups of low-voltage terminals A and B respectively; they shall be relatively independent.

5.1.1.3 For the battery swapping system with a dual battery swapping connector, all high-voltage power signals and low-voltage signals for driving discharge shall be arranged in one connector; all high-voltage power signals and low-voltage signals for vehicle charging/in-station charging shall be arranged in another connector.

5.1.1.4 Regardless of the battery swapping system with a single battery swapping connector or a dual battery swapping connector, all low-voltage signals related to driving discharge shall be arranged on the A group terminals of the battery swapping connector, all low-voltage signals related to charging shall be arranged on the B group terminals of the battery swapping connector.

5.1.2 Definition of single battery swap connector signal

The battery swap system of the single battery swap connector adopts the same charging and discharging port; shares the high-voltage power terminal. Measures shall be taken in the battery swap battery system, to enable it to have the ability to cut off the circuit in both directions with load, to meet the safety of the battery swap system.

The layout position of the battery swap connector in the vehicle with a single battery swap connector shall meet the requirements of QC/T 1201.3. The electrical signal and terminal arrangement of the battery swap connector shall meet the requirements of Table 1.

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------