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

**GB/T 45098-2024**

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**Technical requirements for the battery swap service of  
commercial battery electric vehicles**

营运纯电动汽车换电服务技术要求

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## Table of Contents

- 1 Scope
- 2 Normative References
- 3 Terms and Definitions
- 4 General Requirements
- 4.2 Battery Swap Compatibility
- 5 Functional and Configuration Requirements
- 5.1 Functional Requirements
- 6 Service Process and Service Requirements
- 6.1 Before Battery Swapping
- 6.2 During Battery Swapping

### 1 Scope

GB/T 45098-2024 sets the technical requirements for battery swapping of commercial electric vehicles: taxis, ride-hailing fleets, buses and heavy trucks, where the vehicle earns money only while it is moving and a forty-minute charge is a cost that a three-minute swap removes. China is the only country where swapping has reached scale, and this standard governs the service rather than the hardware. It covers the requirements on the swap station and its operation, on the vehicle and battery interface and the identification and authentication between them, on the process of the swap itself including the safety interlocks and the verification before release, on the condition and the state of health of the batteries in circulation and how they are tracked, on the charging of the batteries in the station, on the data exchanged between vehicle, station and platform, on the service records and the traceability of each battery, and on the emergency handling. For a fleet operator, a station builder or a vehicle maker in China, this is the service specification.

This document specifies the overall requirements, functional and configuration requirements, service process and requirements, and service guarantees for battery swap service of commercial pure electric vehicles. This document applies to the battery swap service of pure electric vehicles that are carry out commercial road passenger and freight transport activities and have the function of battery swap.

### 2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date,

only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB 1589 Limits of Dimensions, Axle Load and Masses for Motor Vehicles, Trailers and Combination Vehicles

GB/T 4208-2017 Degrees of Protection Provided by Enclosure (IP code)

GB/T 19596 Terminology of Electric Vehicles

GB/T 29317 Terminology of Electric Vehicle Charging / battery Swap Infrastructure

GB/T 29772 General Requirements of Electric Vehicle Battery Swap Station

QC/T 1201 (all parts) Compatibility of On-board Battery Swap System for Battery Electric Commercial Vehicles

QC/T 1204 (all parts) Compatibility of On-board Battery Swap System for Battery Electric Passenger Vehicles

### 3 Terms and Definitions

The terms and definitions defined in GB/T 19596, GB/T 29317, QC/T 1201 (all parts) and QC/T 1204 (all parts), and the following are applicable to this document.

3.1 battery swap station A place that provides battery swap service for electric vehicles.  
[source: GB/T 29317-2021, 3.1.2.1]

3.2 organization of battery swap service An organization that is equipped with the facilities and equipment required for battery swap of pure electric vehicles and provides battery swap service. NOTE: it includes road transport enterprises or third-party battery swap service enterprises with the capability of battery swap service.

### 4 General Requirements

4.1 Planning and Site Selection of Battery Swap Stations The planning and site selection of battery swap stations follow the following principles:

- a) The planning and site selection of battery swap stations of commercial pure electric vehicles should comprehensively consider factors, such as: operation scenarios, transportation demands, urban construction planning, road traffic planning, power grid planning, land planning and environmental protection, etc.;
- b) The site selection, construction, power supply system, charging and battery swap system of battery swap stations of commercial pure electric vehicles shall comply with the relevant requirements of GB/T 29772;

c) The site selection of battery swap stations along highways, at ports and transport operation sites shall be combined with the routes of cargo loading and unloading operations and transshipment to reduce the redundant driving distance caused by battery swapping;

d) The operation shall not have any impact on the surrounding environment. The environmental noise of the battery swap stations should comply with

4.2 of GB 12348-2008;

e) Under the premise of ensuring safety, battery swap stations should utilize surrounding areas like public parking lots;

f) The battery swap stations shall not affect the road traffic safety and efficiency in the area or section;

g) The battery swap stations should not be located in low-lying areas or places prone to water accumulation. When it is impossible to avoid it, water supply and drainage facilities and flood prevention and drainage facilities shall be installed in accordance with the requirements of 5.2.4f).

## 4.2 Battery Swap Compatibility

4.2.1 For commercial pure electric vehicles with compatibility and interchangeability, the same or compatible matching solutions should be adopted in the software and hardware interaction interface between the battery swap system and the vehicle. The interchangeability of the on-board battery swap system of rear-mounted commercial pure electric trucks should comply with the relevant requirements of QC/T 1201 (all parts), and the interchangeability of the on-board battery swap system of pure electric passenger vehicles should comply with the relevant requirements of QC/T 1204 (all parts).

4.2.2 The interchangeability of battery swap stations should comply with GB/T 32879 and GB/T 33341 and be compatible with two or more brands and two or more vehicle models for battery swapping.

4.2.3 After battery swapping, the vehicle's overall dimensions and mass shall comply with the requirements of GB 1589.

4.3 Ground Bearing Capacity The ground of the battery swap stations shall have a bearing capacity that can support the static and dynamic loads generated by the commercial pure electric vehicles and battery swap equipment during operation.

## 5.1 Functional Requirements

5.1.1 The duration of a single battery swap for a battery swap station to swap battery for commercial pure electric city taxis (including online booking taxis) shall not exceed 4 minutes, and the duration of a single battery swap for other commercial pure electric vehicles shall not exceed 6 minutes. The duration of a single battery swap for other

commercial pure electric vehicles at highway service areas should not exceed 5 minutes.  
NOTE: the duration of a single battery swap refers to the time from when the vehicle is in place to when the battery swap is completed.

5.1.2 The number of battery storage spaces configured for the initial construction of a battery swap station shall be no less than 3, and it is advisable to have the function of expanding the battery storage spaces.

5.1.3 The battery swap station shall have the function of identifying and screening the battery status. The swapped battery shall be fault-free, and the state of charge (SOC) of the power battery shall generally not be less than 80% of the full charge.

5.1.4 The battery swap system equipped at the battery swap station shall have manual operation and one-button emergency stop functions. swap efficiency, transportation demands and operating routes. In addition, it shall be able to carry out network scheduling of the commercial battery swap vehicles and power batteries.

5.2.4 In addition to satisfying the relevant requirements of 5.2.1 ~ 5.2.3, the battery swap stations within the port shall also meet the following requirements:

- a) The battery swap stations can withstand an operational wind resistance level of 8 and a main body wind resistance level of 12;
- b) The battery swap stations use a solid foundation and anchoring system;
- c) The battery swap stations use corrosion-resistant metal materials or perform special surface treatment on metal components;
- d) The waterproof level of key components of the battery swap stations meets the IP54 requirement in GB/T 4208-2017;
- e) The main structures and components of the battery swap stations are made of moisture-proof materials and sealing technology, and the equipment and components can normally operate in a high humidity environment;
- f) The battery swap stations are equipped with a reasonable water drainage system. Drainage ditches, rainwater collectors, drainage pumps and other devices are set up in accordance with the surrounding terrain and climatic conditions, and waterproof pads or waterproof grooves are set up under the equipment.

5.2.5 In addition to satisfying the relevant requirements of 5.2.1 ~ 5.2.3, the battery swap stations in mining areas and transportation stations shall also meet the following requirements:

- a) The battery swap stations shall use materials, such as: metal or plastic with smooth surface that are not easy to absorb flying dust and easy to clean;
- b) The air intake and ventilation system of the battery swap stations should be equipped