

ICS 43.040.99

CCS T 35



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

**GB/T 29772-2024**

Replacing GB/T 29772-2013

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**General requirements for electric vehicle battery swap stations**

电动汽车电池更换站通用技术要求

**Issued on: December 31, 2024**

**Implemented on: July 1, 2025**

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**Issued by: State Administration for Market Regulation;  
Standardization Administration of the PRC**

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### 1 Scope

GB/T 29772-2024 sets the general requirements for electric vehicle battery swap stations, the physical installation that its companion GB/T 45098 governs the service of. A swap station is an unusual building: it handles several tonnes of live high voltage batteries a day with a robot, it charges dozens of packs at once, and it does so on a forecourt with the public a few metres away. The standard covers the composition and classification of the station, the siting and layout requirements, the requirements on the swap equipment and on the battery storage and charging system, the electrical supply and distribution, the protection and earthing, the monitoring and control system and the data it exchanges, the

fire protection and the requirements arising from the thermal runaway of a stored pack, the ventilation and the environmental requirements, the safety protection for personnel and vehicles, and the marking and the operating documentation. The 2024 edition replaces GB/T 29772-2013, written when swapping was an experiment. For a station builder, an operator or a planning authority in China, this is the governing text.

This Document specifies the overall requirements, classification, site selection, power supply and distribution system, charging and battery swap system, monitoring system, lanes and parking spaces, civil engineering, safety and fire protection, and markings and signs of electric vehicle battery swap stations. This Document applies to the design, construction and use of electric vehicle battery swap stations.

## 2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in 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) is applicable to this Document. GB 2893 Safety colors

GB 2894 Safety signs and guideline for the use

GB/T 14549 Quality of Electric Energy Supply - Harmonics in Public Supply Network

GB/T 17467 High-voltage/low-voltage prefabricated substation

GB/T 18487 (all parts) Electric vehicle conductive charging system

GB/T 19596 Terminology of electric vehicles

GB/T 29317-2021 Terminology of electric vehicle charging/battery swap infrastructure

GB/T 32879 General technical requirements for battery box connectors for replacement of electric vehicles

GB/T 32895 General technical requirements for battery box connectors for replacement of electric vehicles

GB/T 33341 General requirements for swapping battery pack rack of electric vehicle

## 3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 19596, GB/T 29317-2021 and the following apply.

3.1 Battery swap station A place that provides battery swap services for electric vehicles.

3.2 Safe handling area An area that can effectively handle thermal runaway batteries to

prevent risks to personnel and equipment.

3.3 Bi-direction charger A special device that is connected between the power battery box and the power grid (or load), and is fixedly connected to the power grid (or load) to achieve two-way energy conversion and transmission.

3.4 SBS charger Special charging equipment for charging power battery boxes in battery swap stations.

3.5 Station-grid interaction The process through communication, control and energy management technologies, the battery swap station participates in auxiliary services such as modulating peak and filling valley, demand response, and frequency regulation according to the needs of the power grid; thereby realizing of two-way information interaction and energy exchange with the power grid.

## 4 General Requirements

4.1 The design of battery swap stations shall be combined with the development level of battery swap technology, application scenarios, planning, environmental conditions, land, fire protection and building conditions;

4.2 The overall planning of the battery swap station area shall be planned in a coordinated manner according to the construction scale and functional layout. The service capacity and construction scale of the battery swap station shall leave a margin based on the service demand forecast.

4.3 The battery swap station shall include. SBS swap equipment, SBS storage equipment, vehicle guidance system, monitoring system, driving lane, safety protection facilities; it may include.

4.4 The battery swap station can have the function of charging electric vehicles.

4.5 The general layout of the battery swap station should follow the principles of reasonable process layout, clear functional zoning, convenient transportation and land saving.

4.6 The design of the battery swap station should fully consider the safety of battery replacement, charging, storage, transportation and other operations; and have monitoring and emergency response capabilities.

4.7 The layout of the battery swap station shall facilitate the entry and exit of electric vehicles and the operation of SBS swap equipment.

4.8 The battery swap station shall take effective measures to ensure the safety of operators, drivers, equipment in the station, vehicles and SBS.

4.9 The battery swap station should have the capability of station-grid interaction. When the load rate of the distribution grid is high and the acceptance capacity is tight; it should have

the functions of participating in the peak modulation of the power grid and demand response.

## 5 Classification

5.1 Battery swap stations can be divided into the following three types according to the types of vehicles they serve.

5.2 Battery swap stations can be divided into Class-A, Class-B and Class-C according to the charging and swapping functions.

## 6 Site Selection

6.1 The site selection of battery swap stations shall be comprehensively considered based on urban and rural construction planning, road traffic planning, power grid planning and expected surrounding battery swap service needs. It should select places where battery swap demand is relatively concentrated and transportation is convenient.

6.2 Battery swap stations should make full use of nearby power supply, transportation, fire protection, water supply and drainage, flood control and drainage and other public facilities; and reasonably layout and coordinate the station area, power supply in and out line corridors, water supply and drainage facilities, flood control and drainage facilities, in and out station roads, etc.

6.3 Battery swap stations should be close to public roads or internal transportation roads in the work area.

6.4 The site selection area of the battery swap station should be able to set up a driving lane or parking space.

6.5 The site selection of the battery swap station shall meet the requirements of fire safety, be away from flammable and explosive dangerous sources; and shall not be located directly above or below places with explosive dangerous environments.

6.6 Battery swap stations should not be located in dusty or corrosive gas places. If it is impossible to stay away, they should not be located on the leeward side of the prevailing wind direction of the pollution source.

6.7 Battery swap stations shall not be located in places with severe vibration.

6.8 Battery swap stations shall not be located in low-lying areas or places prone to water accumulation.

6.9 The minimum vertical distance between the battery swap station located under the overhead line and the overhead line conductor shall meet the requirements of

12.0.9 in GB 50061-2010.