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Technical specifications of EV charging and battery swap infrastructure power supply system

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Technical specifications of EV charging and battery swap infrastructure power supply system

1 Scope

This Standard specifies the Construction principles, power requirements, power quality, energy metering, power supply monitoring, safety requirements and identification for EV charging and battery swap infrastructure power supply system.

This Standard is applicable to the design and construction of power-supply system of electric vehicle charging station and battery swap station. Centralized AC charging piles can be implemented with reference to this Standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 13955, *Installation and operation of residual current operated protective devices*

GB/T 29316, *Power quality requirements for electric vehicle charging/battery swap infrastructure*

GB/T 29317, *Terminology of electric vehicle charging/battery swap infrastructure*

GB 50052, *Code for Design Electric Power Supply Systems*

GB 50053, *Code for Design of 20kV & Under Electric Substation*

GB/T 50065, *Code for Earthing Design of AC Electrical Installations*

GB 50229, *Code for design of fire protection for fossil fuel power plants and substations*

DL/T 448, *Technical administrative code of electric energy metering*

DL/T 620, *Guide Rule for Wildfire Risk Forecasting Technique in Overhead*

- a) when the distribution capacity is greater than or equal to 100kVA, it is recommended to use 10kV (20kV) power supply mode, and the power supply directly meets N-1 requirements;
- b) when the power distribution capacity is less than 100kVA, the low-voltage power supply mode is adopted.

5.2.2 Radiated power supply shall be used for chargers, battery box swap equipment, monitoring systems, and other important electrical equipment.

5.3 Selection of transformer

5.3.1 When two transformers are installed, the capacity of each transformer is not directly less than 70% of the total load of the charging station/battery swap station.

5.3.2 Transformers installed indoors shall not be oil-immersed transformers.

5.3.3 Distribution transformer windings shall use Dyn11 connection.

5.4 Electrical design

5.4.1 The design of the power distribution room shall meet the requirements of GB 50053.

5.4.2 The wiring method of the 10kV side busbar of the power supply system shall adopt single busbar or single busbar segmentation wiring.

5.4.3 Charging and battery swap equipment shall not share the same 0.38kV outlet with other equipment in the station.

5.4.4 10kV side entry switch shall use circuit breaker or load switch. When using a circuit breaker, it shall configure the microcomputer protection.

5.4.5 The system with 10kV dual power supply can be configured with automatic backup power supply and shall have blocking function.

5.5 Grounding method

5.5.1 The setting of the grounding device of the power-supply system shall meet the requirements of GB/T 50065.

5.5.2 0.38kV side grounding form shall use TN-S.

5.5.3 Electrical equipment in the charging station / battery swap station shall be reliably grounded.

5.6 Equipment layout

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