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PEOPLE'S REPUBLIC OF CHINA**

GB/T 42711-2023

**Wireless power supply in mechanical parking system -
Technical requirement and testing specification**

机械式停车设备无线供电技术要求及试验规范

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1 Scope

GB/T 42711-2023 sets the technical requirements and test specification for wireless power supply in mechanical parking systems. A mechanical car park moves its pallets continuously, and running power to a moving platform through cables and trailing festoons is the part that wears out and the part that has to be maintained inside a structure people cannot easily enter. Inductive transfer removes the contact, at the cost of introducing an air-gap power link into a steel structure with cars and occasionally people in it. The standard sets the general rules covering the system structure, the power level classification, the conditions of use and the power requirements, the technical requirements on system safety, performance and functions and the communication protocol, and then the test preparation, the test methods and the inspection rules. It took effect on 1 March 2024.

This document specifies general principles, technical requirements, test preparation, test methods and inspection rules for wireless power supply in mechanical parking system. This document applies to the design, development and testing of wireless power supply equipment for DC charging and AC charging vehicles in mechanical parking system.

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/T 4208-2017, Degrees of protection provided by enclosure (IP code)

GB/T 14048.2-2020, Low-voltage switchgear and control gear -- Part 2: Circuit-breakers

GB/T 16916.1-2014, Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB) -- Part 1: General rules

GB/T 19596-2017, Terminology of electric vehicles

GB/T 22794-2017, Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses

GB/T 26476-2021, Mechanical parking system -- Vocabulary

GB/T 38775.1-2020, Electric vehicle wireless power transfer -- Part 1: General requirements

GB/T 38775.2-2020, Electric vehicle wireless power transfer -- Part 2: Communication protocols between on-board charger and wireless power transfer equipment

GB/T 38775.3-2020, Electric vehicle wireless power transfer -- Part 3: Specific requirements

GB/T 38775.4-2020, Electric vehicle wireless power transfer -- Part 4: Limits and test

methods of electromagnetic environment

GB/T 38775.5-2021, Electric vehicle wireless power transfer -- Part 5: Electromagnetic compatibility requirements and test methods

GB/T 38775.6-2021, Electric vehicle wireless power transfer -- Part 6: Interoperability requirements and testing -- Ground side

GB 50057-2010, Code for design protection of structures against lightning

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 19596- 2017, GB/T 38775.1-2020, GB/T 38775.3-2020, GB/T26476-2021 as well as the followings apply.

3.1 wireless power transfer; WPT A power supply mode that uses invisible soft media in space (such as electric fields, magnetic fields, microwaves, etc.) to transfer electrical energy from the power source to electrical equipment. NOTE: Wireless power transfer technology can also be called Contactless Power Transfer technology (CPT). [Source: GB/T 38775.1-2020, 3.3]

3.2 mechanical parking system Mechanical equipment used to access and store vehicles. NOTE: Also known as mechanical parking equipment.

3.3 wireless power supply The AC or DC power grid (power supply) is transmitted from the grid side to the parking equipment through wireless power transfer technology.

3.4 primary power components A power conversion unit that converts electrical energy from the grid into electrical energy required by primary equipment.

3.5 secondary power components A power conversion unit that converts the electric energy picked up by the secondary coil into the electric energy required for vehicle charging.

3.6 mechanical air gap The shortest distance between the upper surface of the primary equipment and the surface of the secondary equipment. [Source: GB/T 38775.1-2020, 3.10, modified]

3.7 system efficiency The efficiency of power transfer from the AC (or DC) power input to the electric vehicle battery or on-board equipment. [Source: GB/T 38775.3-2020, 3.8]

4 Abbreviations

The following abbreviations apply to this document. MF-WPS: Wireless Power Supply Through Magnetic Field PE: Protective Earthing conductor

5 General rules

5.1 System structure The wireless power supply system includes input-side equipment and

output-side equipment. The input-side equipment at least includes primary power components, primary equipment, primary control units, and primary communication units. The output-side equipment at least includes secondary power components, secondary equipment, secondary control units, and secondary communication units. The schematic diagram of the wireless power supply system is shown in Figure 1. The wireless power supply system can be arranged in any parking space in the mechanical parking system. The output-side equipment of the wireless power supply system is installed on the vehicle carrier board.

6.1 System security requirements

6.1.1 Electric shock protection The electric shock protection requirements of wireless power supply systems shall meet the requirements of

10.2 in GB/T 38775.1-2020.

6.1.2 Protection level The protection level of the wireless power supply system shall at least meet IP54.

6.1.3 Dielectric strength requirements The insulation resistance of the wireless power supply system shall meet the requirements of

10.2.3 in GB/T 38775.1-2020. The dielectric strength of the wireless power supply system shall meet the requirements of

10.2.4.1 in GB/T 38775.1-2020. The impulse withstand voltage of the wireless power supply system shall meet the requirements of

10.2.4.2 in GB/T 38775.1-2020.

6.1.4 Lightning protection The installation and selection of surge protectors shall be based on the installation location of the power supply equipment and meet the requirements of

6.4 in GB 50057- 2010. When the wireless power supply system must take lightning protection measures, a surge protection equipment shall be installed between the conductor and PE.

6.1.5 Switching equipment and breaking capacity The switching equipment and breaking capacity of the wireless power supply system shall meet the requirements of

11.2 in GB/T 38775.1-2020.

6.1.6 Exception protection The wireless power supply system shall have exception protection function. The specific requirements are as follows: - It shall have over-voltage protection, under-voltage alarm, over-current protection, no-load protection, and short-circuit protection functions. The overcurrent protection and short-circuit protection functions shall meet the requirements of