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

GB/T 18487.5-2024

**Electric vehicle conductive charging system - Part 5: DC
charging system for use with GB/T 20234.3**

电动汽车传导充电系统 第5部分：用于GB/T 20234.3的直流充电系统

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Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 Directives for Standardization - Part

1.Rules for the Structure and Drafting of Standardizing Documents. This is Part 5 of GB/T 18487 Electric Vehicle Conductive Charging System. GB/T 18487 has issued the following parts.

---Electric Vehicle Conductive Charging System - Part

1.General Requirements;

---Electric Vehicle Conductive Charging System - Part 2: EMC Requirements for Off- board Electric Vehicle Supply Equipment;

---Electric Vehicle Conductive Charging System A.C./D.C. Electric Vehicle Charging Station;

---Electric Vehicle Conductive Charging System - Part 5: DC Charging System for GB/T 20234.3. Please be noted that certain content of this document may involve patents. The institution issuing this document does not undertake the responsibility of identifying these patents. This document was proposed by Ministry of Industry and Information Technology of the People's Republic of China. This document shall be under the jurisdiction of National Technical Committee of Auto Standardization (SAC/TC 114). The drafting organizations of this document. China Automotive Technology and Research Center Co., Ltd.; BYD Auto Industry Co., Ltd.; Huawei Digital Power Technologies Co., Ltd.; Beiqi FOTON Motor Co., Ltd.; GAC AION New Energy Automobile Co., Ltd.; Guangzhou Xiaopeng Motors Technology Co., Ltd.; NIO Automotive Technology (Anhui) Co., Ltd.; Deepal Automotive Technology Co., Ltd.; Shenzhen Chedian Network Co., Ltd.; China Automotive Research New Energy Vehicle Inspection Center (Tianjin) Co., Ltd.; Contemporary Amperex Technology Co., Ltd.; TELD New Energy Co., Ltd.; Yutong Bus Co., Ltd.; LINCHR New Energy Technology Co., Ltd.; Tianjin Pinggao E-devices Technology Co., Ltd.; Hefei GOTION High-tech Power Energy Co., Ltd.; Hangzhou Zhonhen Electric Co., Ltd.; Tesla (Shanghai) Co., Ltd.; SERES Group Co., Ltd.; Beijing CHJ Automotive Co., Ltd.; Dongfeng Motor Group Co., Ltd.; Zhejiang ZEEKR Intelligent Technology Co., Ltd.; CATARC Automotive Research and Inspection Center (Guangzhou) Co., Ltd.; Hunan Jingneng New Energy Technology Co., Ltd.; Xiaomi Auto Technology Co., Ltd.; Shenzhen Oucheng Electric Co., Ltd.; Keda Intelligent (Hefei) Technology Co., Ltd.; VREMT E-mobility Technology (Ningbo) Co., Ltd.; CVC Testing Technology Co., Ltd.; GWM Group Co., Ltd.; Hozon New Energy Auto Co., Ltd.; Phoenix (China) Investment Co., Ltd.; SAIC GM Wuling Automobile Co., Ltd.; Chongqing Changan Auto Co., Ltd.; Anhui JAC Auto Group Co., Ltd.; Mercedes Benz (China) Investment Co., Ltd.; Nanjing Kangni New Energy Auto Parts Co., Ltd. The main drafters of this document. Ling Heping, Xu Xiao, Li Chuan, Yi Liqiong, Shao Changhong, Zheng Tianlei, Liu Jianjian, Wang Fang, Li Jin, Shi Jianyong, Lin Quanxi, Zhao Ying, Liu Shaohui, Gong Huijiao, Liu Qingrong, Liu Min, Song Deru, Lan Haibo, Qiu Peng, Jiang Cuina, Sun Maojian, Wang Zhiheng, Wang Kai, Li Xiao, Qiu Shijun, Cheng Hao, Wang Tao, Cheng Dong, Hu Daman, Fang Lingshan, Wu Heng, Lv Guowei, Sun Zhanyu, Ye Xu, Guo Yinfei, Fan Pengfei, Liu Yuxiang, Zhang Haiyun, Xie Na, Feng Bin, Wang Jiaojiao, Luo Yunjun, Li Yang, Wang Bing, Ren Yong, Shi Laifeng, Li Yue, Li Changluo, Zhang Chi, Feng Xinlei, Fang Yuying, Li Yan, Jiang Dianshuang, Zhang Xiang, Shao Jie, Zhang Honglei, Zhou Xiaojun.

1 Scope

GB/T 18487.5-2024 specifies the DC charging system that works with the GB/T 20234.3 connector, the DC fast charging interface used on every electric vehicle sold in China. It is the counterpart of CCS and CHAdeMO in the other large markets, and this part is where the behaviour of the system, rather than the shape of the plug, is defined: the architecture of the charging system and the roles of the vehicle and the supply equipment, the control

pilot and the communication between them, the sequence from connection through insulation test, handshake, parameter exchange and charging to normal and abnormal termination, the requirements on the DC supply and its protection, the insulation monitoring and the residual current protection, the safety requirements including protection against electric shock and the interlocks that prevent a live disconnection, and the requirements for high power and for liquid-cooled charging. For a charger maker, a vehicle manufacturer or a charging network operator in China, this is the governing text.

This document specifies the general requirements, control guidance circuit, charging control process and charging connection control sequence of electric vehicle DC charging systems used for the DC charging couplers in GB/T 20234.3, as well as other requirements for the charging system, such as. insulation monitoring device, additional protective measures and power outage protection, etc. This document is applicable to the DC charging system composed of electric vehicles (which may be referred to as "vehicles") and off-board conductive chargers (which may be referred to as "off-board chargers" or "chargers") whose digital communication protocols comply with GB/T 27930.2. This document is applicable to off-board conductive chargers using an isolated system, the rated voltage on the power supply grid side does not exceed AC 1,000 V or DC 1,500 V, and the maximum operating voltage on the vehicle side does not exceed DC 1,500 V. NOTE 1.the recommended DC operating voltage range at the vehicle coupler for off-board conductive chargers in non-restricted places is 200 V ~ 1,000 V. This document is applicable to DC charging system whose charging power supply circuit is Class B voltage. The DC charging system whose charging power supply circuit is Class A voltage may take it as a reference. NOTE 2.for the definition of voltage class, see GB 18384. NOTE 3.when the DC charging system specified in this document is used in other fields, such as. electric industrial vehicles and electric construction machinery, etc., the charging system usually requires additional requirements, for example, re-evaluating important features of the charging system, such as. short-circuit protection, Y capacitance, insulation resistance and insulation monitoring device, etc.

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/T 13870.1-2022 Effects of Current on Human Beings and Livestock - Part

3 Terms and Definitions

The terms and definitions defined in GB/T 18487.1-2023, GB/T 19596, GB/T 20234.1-2023

and GB/T 29317 are applicable to this document.

4 Classification

The DC power supply equipment shall comply with the classification-related requirements in Chapter 4 of GB/T 18487.1-2023.

5.1 Usage Conditions of Charge Mode

5.1.1 Mode 4 is used when an electric vehicle is connected to DC power supply equipment. It applies to DC power supply equipment that is permanently connected to the power supply grid, or DC power supply equipment that is connected to the power supply grid through a standard plug cable assembly or through an AC charging coupler.

5.2 Functions Provided by Mode 4

5.2.1 In addition to the functional requirements in 5.2.2 ~ 5.2.6, the confirmation of the correct connection between the electric vehicle and the power supply equipment, the power supply control function, and the real-time adjustment function of the available load current of the electric vehicle power supply equipment shall respectively comply with the relevant requirements for Mode 4 DC charging system in

5.2 of GB/T 18487.1-2023.

5.2.2 The DC power supply equipment shall carry out continuity monitoring of the protective earthing conductor between the electric vehicle and the DC power supply equipment. Continuous monitoring of the continuity of the protective earthing conductor shall comply with the requirements of A.3.10.3.2.1.

5.2.5 The vehicle may have a vehicle power supply circuit voltage adaptive switching function. If the vehicle has the function of adaptive switching of the vehicle power supply circuit voltage, then, it shall comply with the requirements of A.5.12.

5.2.6 Electric vehicles may discharge to the power grid through charging and discharging equipment. If the charging system has the function of discharging to the power grid, then, it shall comply with the relevant requirements of Appendix A.

6 Communication

Digital communication shall be adopted between electric vehicles and DC power supply equipment. The communication protocol shall comply with the provisions of GB/T 27930.2.

7 Protection against Electric Shock

7.1 In addition to the requirements of 7.2 ~ 7.5, the general requirements for protection against electric shock, basic protection, fault protection, stored energy,