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

GB/T 39567-2020

**General specification for brushless servo motor systems for
multi-rotor unmanned aircraft**

多旋翼无人机用无刷伺服电动机系统通用规范

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1:1-2009: This standard was proposed by China Electrical Equipment Industry Association: This standard is under the jurisdiction of the National Micromotor Standardization Technical Committee (SAC/TC2): Drafting organizations of this standard: Shenzhen DJI Innovation Technology Co., Ltd., Xi'an Micromotor Research Institute, Chengdu Precision Motor Factory, Shenzhen Zhengde Smart Control Co., Ltd., Dongguan Weichuang Power Technology Co., Ltd., Shandong Depuda Motor Co., Ltd., Nanjing Jinqi New Energy Power Research Institute Co., Ltd., Zhejiang Julong Automation Equipment Co., Ltd., Nanjing Gaoqi Electric Co., Ltd., Southeast University, Jiangsu Yunneng Electric Research Institute Co., Ltd., Xiamen Laikesheng Intelligent Technology Co., Ltd., Shenyang University of Technology, Zhejiang Rujing Technology Co., Ltd., Foshan Fengxu Technology Limited company: The main drafters of this standard: Tao Ye, Qiu Jianda, Guo Qiaobin, Peng Shengjun, Li Hao, Chen Weijie, Jia Jia, Long Biao, Wang Fujie, Cao Shenghua, Chen Zhaoming, Xu Rongfeng, Jin Long, Yang Yang, Wei Jianzhong, Lin Xingle, Xie Wenlin, Chen Lixiang, Wang Guangjian, Zhang Hongzhao: Brushless Servo Motor System for Multi-rotor UAV General specification

1 Scope

China's national general specification for the brushless servo motor systems of multi-rotor unmanned aircraft. It specifies the terms and definitions, the communication interface and operating regime, and the technical requirements and test methods. A multi-rotor drone has no swashplate and no control surfaces: it stays in the air and manoeuvres entirely by varying the speed of its rotors, which means the motor and its controller are the flight control actuators. That places demands on them that no other motor application makes. The response has to be fast enough to close a stabilisation loop that would otherwise diverge in

a fraction of a second - a multi-rotor is inherently unstable and flies only because the controller corrects continuously. The power density has to be high because every gram is carried. And a failure is not a degraded mode: losing one motor on a quadcopter means losing the aircraft, which is why the specification treats these as flight-critical items.

This standard specifies the communication interface and working system, technical requirements, test methods, and inspection of the brushless servo motor system for multi-rotor drones: Inspection rules and delivery preparation: This standard applies to brushless servo motor systems for multi-rotor drones (hereinafter referred to as "servo systems") and the permanent magnet brushless systems that constitute the system Servo motor (hereinafter referred to as "motor"), brushless servo motor driver (hereinafter referred to as "drive") design, manufacturing, inspection and acceptance:

2 Normative references

The following documents are indispensable for the application of this document: For dated reference documents, only the dated version applies to this article Pieces: For undated references, the latest version (including all amendments) applies to this document:

GB/T 755 Rotating motor rating and performance

GB/T 2423:1-2008 Environmental testing of electric and electronic products Part 2: Test method Test A: Low temperature

GB/T 2423:2-2008 Environmental testing of electric and electronic products Part 2: Test method Test B: High temperature GB/T 2423:

3 Environmental Test Part 2: Test Method Test Cab: Constant Damp Heat Test GB/T 2423:

10 Environmental Test Part 2: Test Method Test Fc: Vibration (Sine) GB/T 2423:

17 Environmental testing of electrical and electronic products Part 2: Test method Test Ka: Salt spray GB/T 2423:

21 Environmental testing of electrical and electronic products Part 2: Test methods Test M: Low air pressure

GB/T 2423:22-2012 Environmental Test Part 2: Test Method Test N: Temperature Change

GB/T 2828:1-2012 Sampling inspection procedures by attributes Part 1: Batch inspection sampling plan retrieved by acceptance quality limit (AQL)

GB/T 4208 Shell protection grade (IP code)

GB/T 9254-2008 Information Technology Equipment Radio Disturbance Limits and Measurement Methods

GB/T 16422:3-2014 Plastic laboratory light source exposure test method Part 3: Fluorescent ultraviolet lamp

GB/T 17618 Information Technology Equipment Immunity Limits and Measurement Methods

3 Terms and definitions

The following terms and definitions apply to this document: 3:

1 Brushless servo motor system brushless servomotor system The brushless servo motor is used as the actuator, so that the position, speed and torque of the object can follow the target value of the input control signal (or give Fixed value) automatic control system with arbitrary changes: 3:

2 Brushless servomotor Used in motion control systems, and output parameters such as position, speed, acceleration or torque are controllable permanent magnet brushless motors: