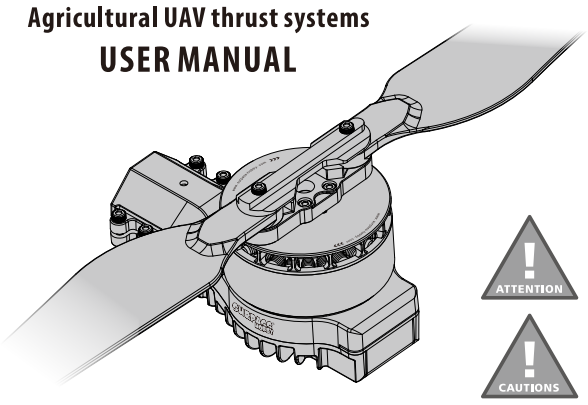
BAT S6218
Agricultural UAV thrust systems
USER MANUAL



DECLARATION

Thank you for purchasing Surpasshobby product, this is a powerful RC hobby product rather than a toy. It must be operated with care and common sense of safety. Any wrong operation may cause personal injury or damage the product. This product does not allow children to use it without the direct supervision of an adult. Before installation and use, please read and follow the operating procedures specified in this manual. We do not assume any liability arising from the use of this product, including but not limited to compensation for incidental or indirect loss; at the same time, we do not assume any liability arising from unauthorized modifications to the product.

Product Introduction

S6 Brushless Power System is a high-performance power solution specifically designed for agricultural spraying applications. Its core features and advantages are as follows:

Load and Thrust Capacity: Designed to support 3.5-6.0 kg per rotor payload requirements, with a maximum thrust of 12.3 kg per rotor, providing powerful support for agricultural operations.

Arm Compatibility: Precisely matched to 30mm diameter carbon fiber arms, ensuring easy installation, reliable fit, and broad compatibility with mainstream agricultural UAV structures.

Environmental Durability: Rated at IPX6 waterproof level, capable of withstanding rain and pesticide corrosion. It also provides strong resistance to salt spray, high temperatures, dust, mud, and sand, with excellent impact resistance, ensuring reliable performance in complex agricultural environments.

Precision Control and Stable Flight: Features an optimized FOC (Field-Oriented Control) ESC - PMSM (Permanent Magnet Synchronous Motor) system algorithm, supporting PWM/DSHOT throttle and CAN throttle dual modes, significantly enhancing flight stability and control precision.

Comprehensive Safety Protection: Equipped with multiple built-in safety mechanisms, including power-on self-check, abnormal voltage protection, over current protection, and stall protection, effectively reducing power system failure risks and ensuring operational safety.

Efficient Data Communication: Supports CAN communication protocol, enabling real-time data transmission for accurate monitoring and debugging of system performance.

Product Features

Performance Advantages: The FOC ESC is strictly matched to motor parameters, delivering high efficiency, low noise, energy regeneration, and smooth throttle linearity.

Interference Resistance Design: PWM/DSHOT throttle signals use magnetic isolation input to effectively block electromagnetic interference paths, preventing external signal disturbances from affecting throttle signal stability.

Signal Compatibility: Compatible with PWM/DSHOT throttle signals at refresh rates from 50 to 500 Hz , supporting a wide range of flight control systems.

Data Monitoring: Utilizes CAN communication to provide real-time monitoring of throttle input/output, motor speed, bus current, bus voltage, ESC temperature, and ESC status.

Firmware Upgrade: Supports ESC firmware upgrades via CAN bus for easy functionality updates and optimizations.

Product Specifications

S6218 Specifications

Voltage（Battery）Range: 12~14S(Lipo)
Recommend Take-off Weight: 3.5kg~6kg(48V,Sea Level)
Max Thrust: 12.3kg(48V,Sea Level)
Total Weight(props/cables included): 840g
Powertrain Arm Tube Outer Diameter: 30mm
Operating Temperature: (-20°C~50°C)
Ingress Protection: IPX6
Power Cable: 14#900mm
Signal Cable: 1100mm

ESC

Voltage Range: 8~12S
Max Current: 80A(3s)
Sustained Current: 20A
PWM/DSHOT Level: 3.3/5V
PWM Pulse Width: 1050~1950μs
PWM Frequency: 50~500Hz
DSHOT Numerical value: 147~1947
DSHOT Frequency: 150/300/600
Communication method: CAN(500kbps)

MOTOR

KV: 130KV
Shaft Diameter: Ø8mm
Stator: Ø62x18mm
Beanings: Imported Waterproof Bearings
Slot: 24N28P
Motor Dimension: Ø68.8x67.2
Interphase Resistance: 50.16mΩ
No-load Current(7.4V): 0.65A
Max Current: 55.4A
Max Power: 2535W

Propeller

Diameter x Pitch: 24x8.0 inch
Blade Material: Carbon Plastic
Weight (INC. adapter): 118G

Safety Precautions

Safe Operating Environment: Keep away from crowds, power lines, buildings, and other obstacles. Strictly comply with local aviation safety regulations and avoid unauthorized operations.

Mechanical Safety Protection: Stay clear of high-speed rotating propellers and motors to prevent injuries. Before each operation, check that the propellers, motors, and cables are intact. If any component is damaged, contact after-sales service for replacement-never operate with faulty parts.

Installation and Connection Check: Before flight, ensure all fastening parts (screws, clamps, etc.) are secure, and confirm the motors are mounted horizontally. This power system is only compatible with round arms of 30 mm diameter-do not install on incompatible arm sizes.

Cleaning and Maintenance: After each operation, clean the motors directly with water to remove pesticide residues, dust, or other impurities, ensuring long-term reliability and extended service life.

Critical Notes Before Use

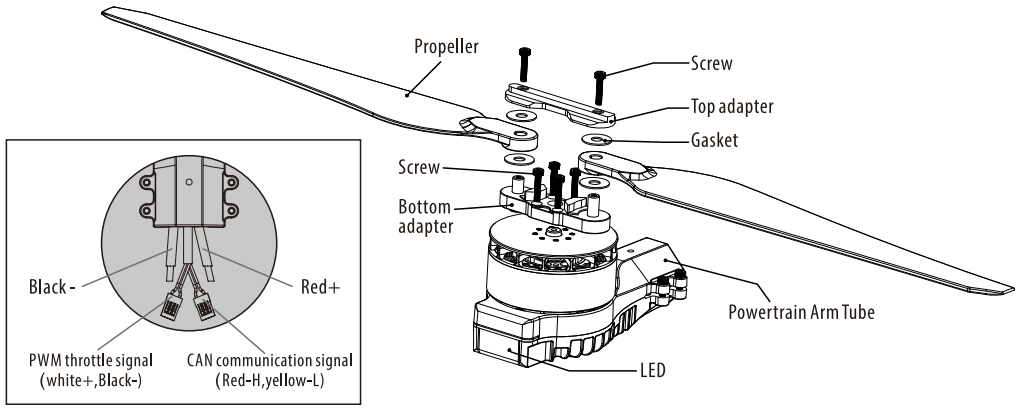
1. This ESC adopts FOC drive technology and must be precisely matched with motor parameters to ensure normal operation.
2. The firmware is unique and non-interchangeable-one program is only compatible with a specific motor and propeller combination. For new setups, please contact the manufacturer to obtain a matching program.
3. The ESC is designed to work with its dedicated power kit. Self-replacement of propellers is not recommended. Improper propeller pairing may trigger ESC protection mechanisms, leading to abnormal operation.

Connection & Soldering Guidelines

1. Ensure Proper Insulation: Before connecting the ESC to any components, make sure all contact points are well insulated. A short circuit may cause irreversible damage to the ESC.
2. Secure All Connections: Carefully check all connections to ensure they are firm and reliable. Loose or poor contacts may lead to control failure, system malfunction, or even hardware damage.
3. Soldering Requirements: If soldering is needed for the ESC's input or output wires, use a high-quality soldering iron with sufficient power. All solder joints must be strong and clean to avoid performance issues or unstable operation.

Power System Installation

- **Unpack and take out the integrated power system and propeller assembly. As shown in the figure below, use four fixing screws to secure the propeller assembly onto the integrated power system. Then, install the unit onto the UAV frame according to the motors rotation direction.**
- **Wiring Instructions:**
  Black and White Twisted Wires: PWM throttle signal (White: PWM+, Black: PWM—)
  Red and Yellow Twisted Wires: CAN communication signal (Red: CAN-H, Yellow: CAN-L)



Note: The FOC ESC features braking effect and back-EMF (reverse voltage). Do not test or operate the ESC with power supplies that cannot absorb back-EMF, as this may cause damage to both the ESC and the power source.

Operating Environment Requirements

Do not allow the external ambient temperature of the ESC to exceed 55°C. Excessive heat can not only damage the ESC but may also harm the motor, potentially leading to flight failure or serious accidents.

CAN Function Usage Instructions

1. This ESC supports CAN functionality. When using CAN on the same aircraft, each ESC must have a unique ESC ID and throttle channel. Identical IDs or channels will cause multiple ESCs to be recognized as the same device, disrupting normal operation.
2. The ESC does not include a CAN termination resistor by default. Termination resistors should be properly installed and matched during the full system assembly.

Protection Features Description

1) Over-Temperature Protection: When the ESC temperature exceeds 100°C, output power is gradually limited. Between 100°C and 115°C, power output is reduced from 100% to 20%. If the temperature exceeds 120°C, the ESC will immediately shut down. The fault status will automatically clear once the temperature drops to a safe level.

2) Under-Voltage Protection: If the input voltage drops below 28V, the ESC will begin to limit output power. When the voltage falls below 20V, the ESC will immediately shut down. The fault state will automatically clear once the voltage returns to a normal level.

3) Over-Current Protection: If the instantaneous current exceeds 300A, the ESC will shut down within 10 microseconds, entering an over-current protection state. The fault can be cleared by returning the throttle signal to the zero position.

4) Stall Protection: If the ESC detects a motor stall (e.g., abnormal noise or sudden stop), it will cut off output after 2 seconds and attempt to restart the motor. If the restart fails three times, the ESC will enter stall protection mode and stop further restart attempts. The fault can be cleared by returning the throttle signal to the zero position.

5) Throttle Signal Loss Protection: If the ESC detects a loss of throttle signal, it will immediately shut off output to prevent further damage from a spinning propeller. Normal operation will resume automatically once the signal is restored.

Warning Tone Description

Beep Sound	Description	Fault Symptoms	Solution
Continuous"beep beep beep…"sound	Throttle not returned to zero or throttle signal lost	Motor fails to start	Ensure the throttle is set to zero and inspect the throttle communication cable for proper connection.

LED Status Indicators

Flashing of LED	Meaning	Solution
Short flash x1	DC Overvoltage	Replace with a battery below 70V
Short flash x2	DC Undervoltage	Replace with a battery above 20V
Short flash x3	Output Overcurrent	Check motor and phase wire connections. If the issue persists, return for factory service.
Short flash x4	Throttle Signal Loss	Check throttle signal connection.
Long flash x1 +Short flash x1	Throttle Not at Zero	Adjust throttle stick to the zero position.
Long flash x1 + Short flash x2	MOS Overtemperature Protection	Wait until the power system cools down.
Long flash x1 + Short flash x3	MOS Overtemperature Warning	Wait until the power system cools down.
Long flash x1 + Short flash x4	Motor Stalled	Check for foreign objects in the motor. Set throttle to zero and restart.
Long flash x2	Undervoltage Warning	Replace with a battery above 28V
Long flash x2 + Short flash x1	Overvoltage Warning	Replace with a battery below 60V
Long flash x3 + Short flash x1	Phase A Amplifier Error	Re-power the system
Long flash x3 + Short flash x2	Phase B Amplifier Error	Re-power the system
Long flash x3 + Short flash x3	Phase C Amplifier Error	Re-power the system

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