

CIRCULAR FOC ESC 60A

MAD
COMPONENTS

6~14S Electronic Speed Controller manual (V1.0)

⚠ Disclaimer

Thank you for choosing this product. Please carefully read this manual before using this product. Using this product will indicate you're agreed with the all items in this manual. Please strictly follow these items during usage. We'll not commit any responsibility including but not limited to indirect loss or joint responsibility caused by improper usage, private modification and other faults. The maximum compensation will be not more than the cost of product itself.

⚠ Attention

This part has strong power. High speed running propellers have certain safety risk. User must be older than 18 years and have relative professional knowledge.

Before usage, please carefully check if all the components are in good conditions.

ESC Protection Mechanism

- **Fast motor acceleration and deceleration response.**

When the electrical speed controller receives a large throttle change in flight control, the maximum limiting current can be reached within 10ms, effectively improving the response speed.

- **Optimized heat dissipation design.**

The power device adopts double-sided heat dissipation process, which can effectively reduce the thermal resistance between the shell, and the measured maximum temperature of the internal device is only 15C higher than the surface temperature of the shell. The device life is greatly improved under full load operation condition.

- **Perfect hardware self-check procedures.**

It can effectively detect internal hardware circuit defects (mainly introduced by the manufacturing process), power-on selftest can ensure that the electrical control is not sick, effectively reduce the risk of failure; If any abnormality is found during operation, it can be indicated by indicator light or software interface.

- **Integrated comprehensive protection functions.**

Reliable blocking protection can guarantee the protection of motor and ESC itself after abnormal explosion; Short circuit protection can guarantee the burning fault caused by short circuit of motor line; Input PWM throttle identification protection, can prevent the introduction of interference during maintenance of misoperation.

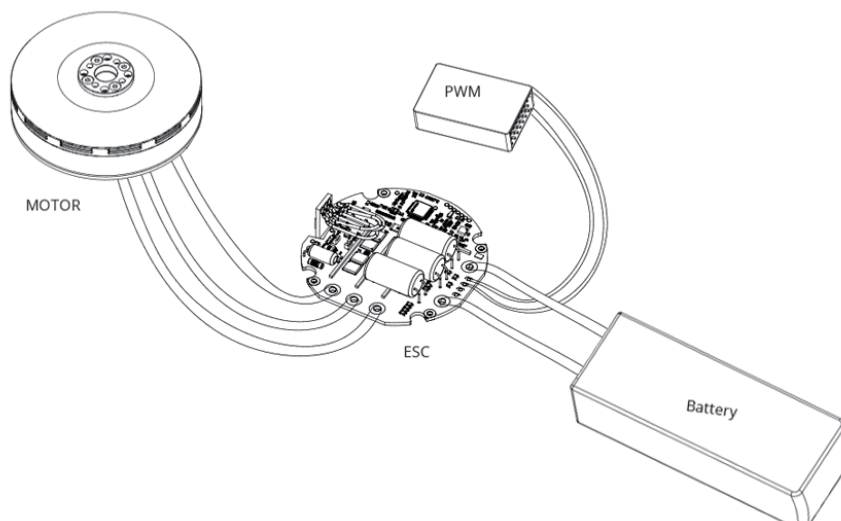
- **Electric modularization design.**

Electric and motor, power line, signal line, lamp board line are completely separated, only need a screwdriver can be easily removed, quick repair.

- **CAN communication interface.**

Provides firmware updates, in conjunction with the electrically tuned communication box to record data individually, or communicate with the flight control. Improve the black box data record of the entire system to improve the accuracy of fault locating after sales.

ESC Connection



ESC Parameter

Name	CIRCULAR FOC 60A	Communication port	CAN
Support battery	6-14S LiPo	Digital communication throttle	support
Maximum operating voltage	60.9V	Maximum peak current	30A
PWM input level	3.3V/5V	Maximum continuous current	120A
PWM compatible frequency	50 – 500HZ	Waterproof grade	Covering with three proof paint
PWM working pulse width	1100– 1920uS	Ambient temperature	-40~45°C
Motor idle speed	427rpm	Indicator function	Driving motor voice
The maximum speed	6800rpm	size	Ø70.7*68.9*14.8

Hot-swappable power cable (supported by customize versions) Bright red and green

Trouble Shooting

LED Indicator/Sound

The motor does not turn after the aircraft is unlocked, but only after the throttle is raised.

When the plane is powered on, connect the remote control and the motor turns

When the power-on self-test fails, the motor "beeps" every 1.5 seconds, and the indicator light flashes yellow briefly.

When the power-on self-test fails, the motor "beeps" every 0.5 seconds, and the indicator light flashes yellow briefly.

The motor does not sound. The indicator light flashes yellow 4 times every 1.5 seconds: "short – short – short-long".

The motor does not sound. The indicator light flashes yellow 4 times every 1.5 seconds: "long – short – long-short".

The motor does not sound. The indicator light flashes yellow 4 times every 1.5 seconds: other flashing methods.

The power-on self-test is normal, the motor does not turn after unlocking, and the indicator light is yellow for 0.5 seconds -- the motor does not sound when the indicator light is off for 0.5 seconds.

The power-on self-test is normal, the motor does not turn during operation, indicator light: 0.5 seconds yellow light -- 0.5 seconds off, the motor does not sound

The power-on self-test is normal, the motor does not start or stops midway, indicator light: 1 second yellow light -- 1 second off, the motor does not sound

The indicator light flashes alternately red and green during operation.

The indicator light flashes yellow every 0.2 seconds during operation.

Cause Collection

Flight control or remote control output unlocked idle throttle value less than 1100uS.

The remote control is set to lock the throttle over 1100uS, or close to 1100uS

The throttle PWM signal is missing or the identification throttle PWM range is incorrect.

Detects high throttle when get power and enters protected state

If the power-on self-test fails, the motor line loop may be disconnected.

The power-on self-test fails, and the power supply voltage is abnormal

The power-on self-test fails, and the electrical hardware is abnormal.

Motor startup failure, blocking protection occurred during startup

The motor is blocked and entered the protection state.

Short circuit or overcurrent protection occurs, and the device enters the protection state.

The PWM throttle signal is missing.

The ESC detects that the temperature is too high

Solution

Set the idle throttle value of the flight control or remote control to be greater than 1100uS. 1160uS-1180uS is recommended

The remote control needs to set the lock throttle less than or equal to 1050uS.

Ensure that the throttle signal cable is properly connected, and check whether the signal cable is damaged.

Make sure that the electric self-test passes before lifting the throttle.

Open the ESC cover and check whether the three motor wires are well welded.

Check whether the battery voltage is normal. Check whether the power cable is properly connected

Record the LED flashing mode video, contact MAD after-sales service; Replace the ESC and test again.

Power on and off again and restart the power supply. If it reappears, check whether the motor is damaged.

Check whether the machine is blocked because of blasting, check whether the motor is smooth by hand.

Disassemble the electric adjusting cover and check whether the motor line is damaged and whether the copper terminal of the motor line is loose.

Make an emergency landing and check whether the PWM signal line is well connected and whether the signal line is damaged halfway.

After the aircraft lands and stops, check whether the temperature of the ESC shell is too high. If the temperature is too high, check whether the screws of the five wiring position of the ESC are loose.