MAXYOND | Advanced Drone & Marine Power Systems

5-12S 120A Brushless ESC

Product Instruction Manual



MAXYOND

Advanced Drone & Marine Power Systems

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CATALOG

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1. Product Safety Precautions & Operating Guidelines

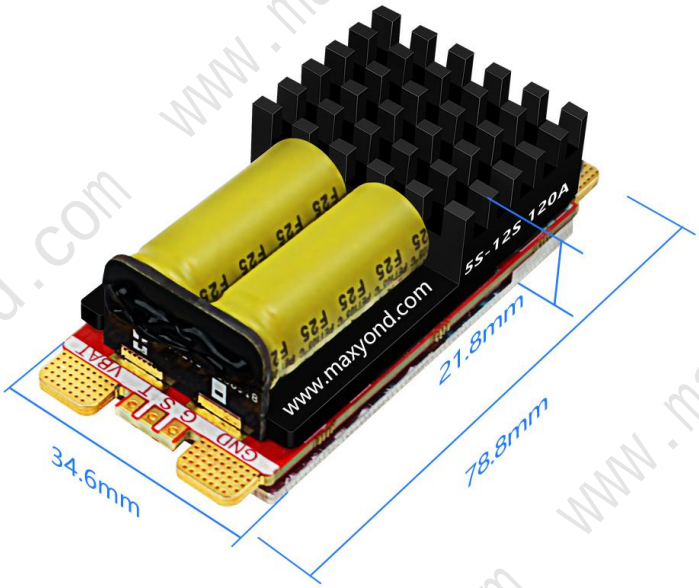
Thank you for purchasing our product. Electronic Speed Controllers (ESCs) involve certain operational risks. Please use this product carefully and only under safe operating conditions. By purchasing this product, you acknowledge the risks described below and voluntarily accept the associated responsibilities. We shall not be liable for any loss, damage, or personal injury resulting from improper use of the product or failure to observe applicable safety precautions.

⚠ **WARNING: Failure to follow the requirements below may result in fire, aircraft crashes, or personal injury, including injuries caused by rotating components. Verify that all connections and settings are correct before operation. If you have no experience with soldering or RC model systems, do not attempt installation or operation without proper guidance. Please watch the official instructional videos or contact customer support before proceeding.**

- **Never Short-Circuit or Reverse the Polarity:** Reversing the battery power leads (red/black) or short-circuiting the motor phase wires may instantly generate excessive heat, sparks, or fire. We shall not be liable for any resulting loss or damage, including damage to the aircraft, battery, or other components.
- **Throttle Range Calibration:** If your equipment communicates with the ESC using a **PWM signal**, throttle range calibration must be performed to prevent abnormal control response.
- **Power System Matching:** Ensure that the ESC's continuous current rating exceeds the motor's peak current draw. A safety margin of at least **20%** is recommended. Prolonged operation at full load may trigger thermal protection or cause permanent ESC damage.
- **Capacitor Safety Warning:** Some high-voltage ESCs are equipped with exposed capacitors. Ensure that adequate protection against impact is provided during installation. Puncturing or crushing a capacitor may result in electrolyte leakage, explosion, or fire.
- **Cooling Requirements:** The ESC's rated continuous current is based on testing under **open-frame conditions, forced airflow, and an ambient temperature of 25°C**. If the ESC is installed inside an enclosed compartment or on an aircraft arm with insufficient airflow, damage caused by inadequate cooling or thermal breakdown is not covered under warranty.
- Before using this ESC, please carefully read the manuals for all related power system components and the aircraft. Ensure that the power system is properly matched to prevent motor overload and possible ESC damage.
- After installing the ESC in the aircraft, ensure that all wires and electrical connections are properly insulated before operating the aircraft. A short circuit may permanently damage the ESC. Carefully check all connections. If soldering is required on the ESC's input or output wires or connectors, please use soldering equipment with sufficient power to ensure secure and reliable solder joints. Poor connections may result in loss of control, equipment damage, or other unpredictable conditions.
- **Do Not Allow the Motor to Stall:** Do not allow the motor to become stalled during operation, as this may damage both the ESC and the motor. If the motor stalls for any reason, immediately reduce the throttle to zero or disconnect the battery.
- Do not place the ESC in high- temperature environments, nor operate or continue using it when it becomes excessively hot due to self- heating. High temperatures may trigger the ESC thermal protection, and in severe cases, will damage the ESC permanently.
- **Disconnect the Battery After Use:** Always disconnect the battery from the ESC after operation. If the battery remains connected, the ESC may unintentionally drive the motor, creating an unpredictable safety hazard. Leaving the battery connected for an extended period may also completely discharge the battery, potentially causing battery or ESC malfunction.

2. Product Specifications

Product Model	5~12S 120A ESC
Input Voltage	5~12S（17~50.4V Lipo）
Continuous Current (Adequate cooling required)	120A
Peak Current (10S; adequate cooling required)	150A
Dimensions	78.8*34.6*21.8mm
Weight	93g±5g
BEC Output	NO
Mounting Hole Spacing & Diameter	NO
Firmware Version	AM32_MAXKGO_F421_2.20.hex
Water Resistance	Only for preventing minor water splashes
Firmware Update	Supports online updates
Operating Ambient Temperature	−10°C to 60°C
Telemetry Output	Input current *(sampling ratio: 1:50),*input voltage, ESC temperature,and motor RPM
Supported Protocols	DShot,PWM,OneShot,MultiShot *(DShot300 is recommended for drones)*
Protection Features	Low-voltage protection, over-temperature protection, motor stall protection, step-loss protection, and overcurrent protection
Applications	RC model cars,Model aircraft,Model ships,Underwater biomimetic robots,Combat robots,DIY products driven by non-sensory brushless motors,etc.



Product Dimension Diagram

3. Wiring Diagram

Power Input(B+: Battery Positive Input,B−: Battery Negative Input)

Motor Connections(The three wires can be connected in any order. To reverse the motor's rotation, simply swap any two wires..)

Signal Connections：

G: GND — Ground.

S: Signal Input — Responsible for receiving control signals such as PWM, DShot and OneShot from flight controller or receiver.

TX: Telemetry data feedback interface — Responsible for outputting data such as ESC temperature, motor speed, input voltage and input current.

Important Notes

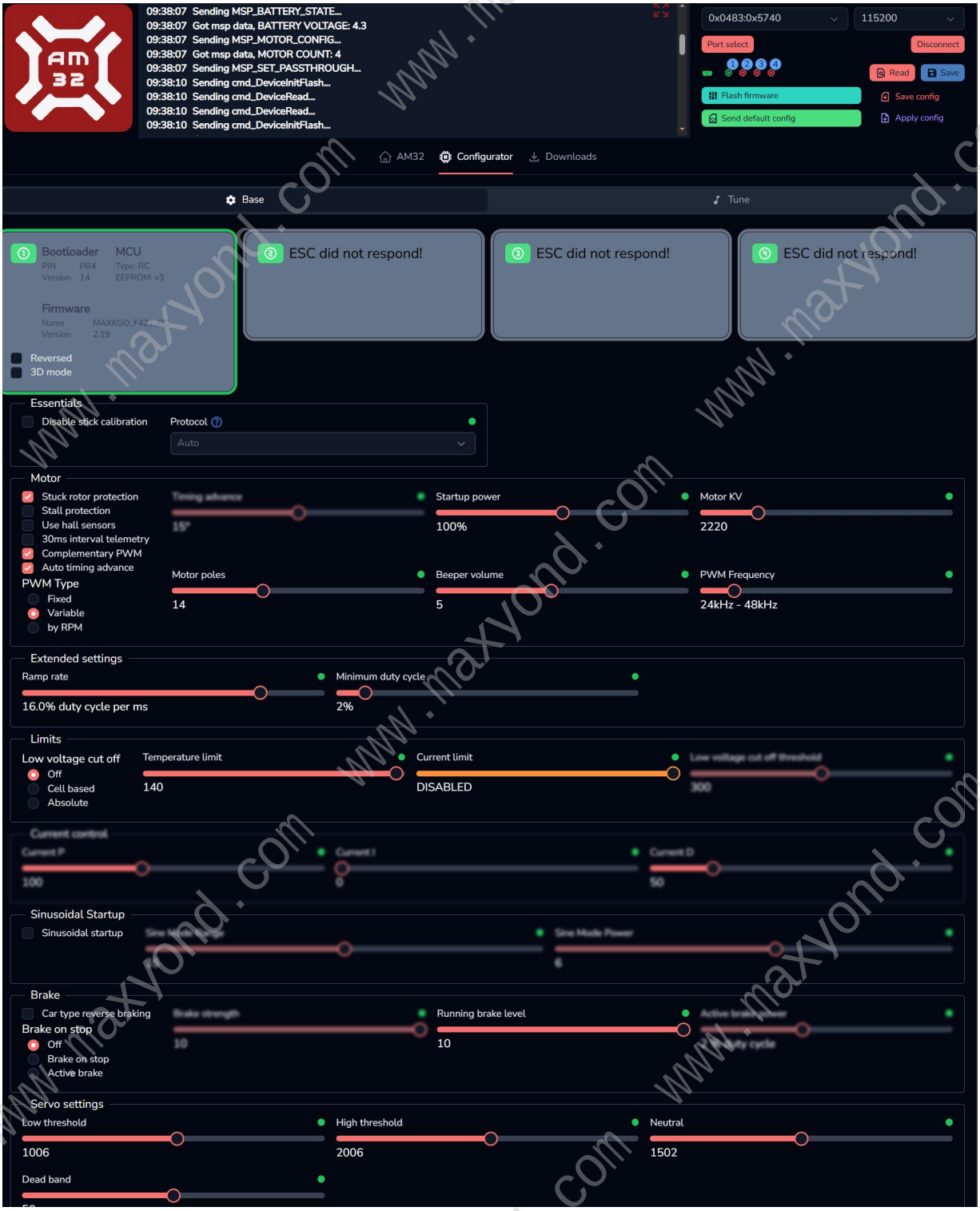
- For basic normal ESC operation, only the GND and S (Signal) connections are required. Solder GND and S to the corresponding ground and control terminals on the control device, such as a flight controller (FC), receiver, or power distribution board (PDB).



Wiring Diagram

4. ESC Configuration and Firmware Updates

4.1. This product is supplied with the factory default settings.



4.2. Feature Descriptions

Reminder: Remember to click “Save Settings”after configuring the parameters.

Function	Remarks
Reverse Rotation	Changes motor rotation direction. Can also be changed by swapping any two wires in the UVW phase sequence.
Complementary PWM	Conditions for dual- speed control. Keep enabled unless special requirements apply. It improves motor efficiency, reduces motor noise and electromagnetic interference, and supports motor forward- reverse operation.
Variable-frequencyc PWM	The PWM driving frequency increases synchronously as the commutation frequency rises. This ensures a consistent total number of PWM pulses within each commutation cycle, delivering theoretically "absolute linearity". Once Variable- frequency PWM is enabled, the PWM frequency slider below will be automatically hidden.
Bidirectional Operation(fwd/rv)	Allows motor forward/reverse rotation. If Bidirectional Operation is unchecked, the motor can only rotate in one direction. Throttle values above the midpoint result in forward rotation, and values below the midpoint result in reverse rotation.
Stuck Rotor Protection	
Brake On Stop	Drag brake function. Applies braking when throttle is at zero while powered on. This setting has no effect if there is no throttle neutral point.
Failsafe	Reduces speed and stops the vehicle upon loss of remote control signal.
Sinusoidal Startup	The core highlight of AM32 ESCs. Enables motor smooth start-up and low-speed torque compensation, similar to the FOC function of the Hobbywing Xerun Axe ESC. Highly recommended for outrunner crawler.
30 ms Telemetry	Keep disabled unless special needs arise.
Use Hall Sensors	For sensored brushless motors. Keep disabled unless special needs arise.
Timing Advance	Default value of 15 is suitable for most cases. Adjust it for special motors. (Higher timing can reduces motor 'desync' events and increase motor output power at a slight efficiency cost. The timing- advance setting is similar to an internal-combustion engine's throttle: a higher timing means advanced ignition. For brushless motor, this translates to higher RPM and greater thrust, but increased power consumption and risk of motor burnout. A lower timing advance means lower power but better efficiency.)
Motor KV	Set to the closest practical value. Together with motor poles, determines the threshold values for low-speed power-off protectio nand high-speed stall protection. (Motor no-load RPM rises per 1V voltage. Low KV = high torque; High KV = low torque.)
Motor Poles	Number of magnetic magnets on the rotor. In AM32, KV together with pole count determines the trigger threshold s for "low RPM" and "high RPM." AM32 will automatically activate low-RPM power protection or high-RPM stall protection when below or above these thresholds. Accurate KV value is hard to obtain, Use the KV value that provided by manufacturer is sufficient for most applications.
Start-up Power	Default works for most cases. Increase for heavy loads. (The maximum power is allowed at motor start-up. Actual power depends on throttle input/battery voltage. Default 100% ≈ 3S battery.)

PWM frequency	Unit: kHz. Not adjustable when Variable-frequency PWM is enabled. In AM32, this refers to the number of MOSFET switching operations per second. New-generation 32-bit ESCs support higher PWM frequencies. A higher PWM frequency can improves motor efficiency, reduce power consumption and provide smoother throttle feel.
Beep Volume	Motor beep volume.
Stopped Brake Level	Drag brake strength.
Sine Startup Range	Determines the throttle level at which ESC exits open-loop sine startup and switches to closed-loop operation. (Forced permanent open- loop is available for special use; thermal management is required.)
Sine Mode Power	Power applied to the motor during open-loop sine startup. Adjust thsi setting with caution. Higher values generate significant heat ; performance varies bbetween motors. Tune upwards starting from low values. (Higher power delivers greater torque in sine-mode but heavier ESC heat- generation.)
Running Brake Level	Braking strength applied while the motor is still spinning.
Low Threshold	Throttle lower limit
High Threshold	Throttle limit
Servo Neutral	Throttle neutral position
Servo Dead Band	Matches transmitter stick dead- zone; also acts as mid- point dead band in bidirectional mode
Low Voltage Cut Off	Battery over-discharge protection; cuts power when voltage drops below the set value. (Input undervoltage protection, esc will automatically detects LiPo cell count; cuts output when average cell voltage falls below this value, e.g., 300 = 3.00V, 350 = 3.50V.)
Temperature Limit Celsius	Over-temperature protection(°C). (Reduces output power temperature exceeds this threshold. The temperature sensor is built inside the MCU. For better hardware-protection performance, it is recommended to set this value as low as 70°).
Current Limit Amps	Over-current protection. Since most ESCs don't have current sensors, keep this setting disabled by default.
Car / Basher-Style Braking: double-tap- to-reverse function, overrides user settings	First reverse throttle input = brake; second reverse throttle input = reverse. Enabling this mode overrides the sinusoidal startup settings.

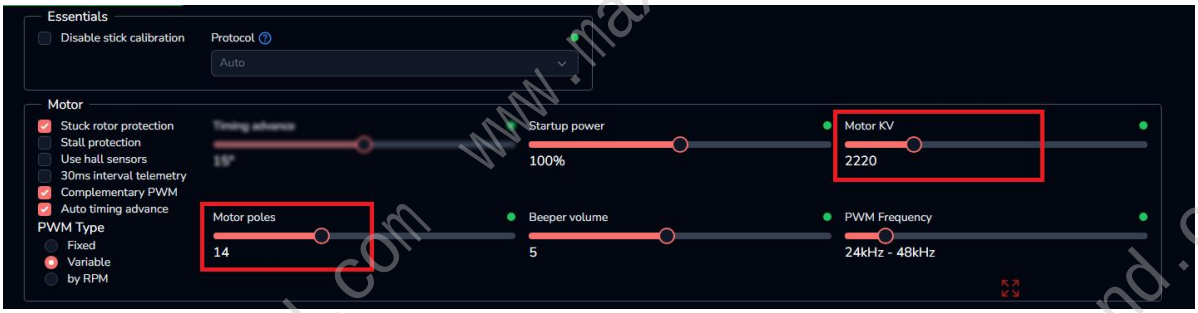
4.3. Important Notes

- This ESC supports parameter configuration and firmware updates using both the offline Config Tool and the web-based AM32 configurator (AM32.ca). For users with a flight controller running the open-source Betaflight firmware, the web-based configurator is recommended for ESC configuration and firmware updates.

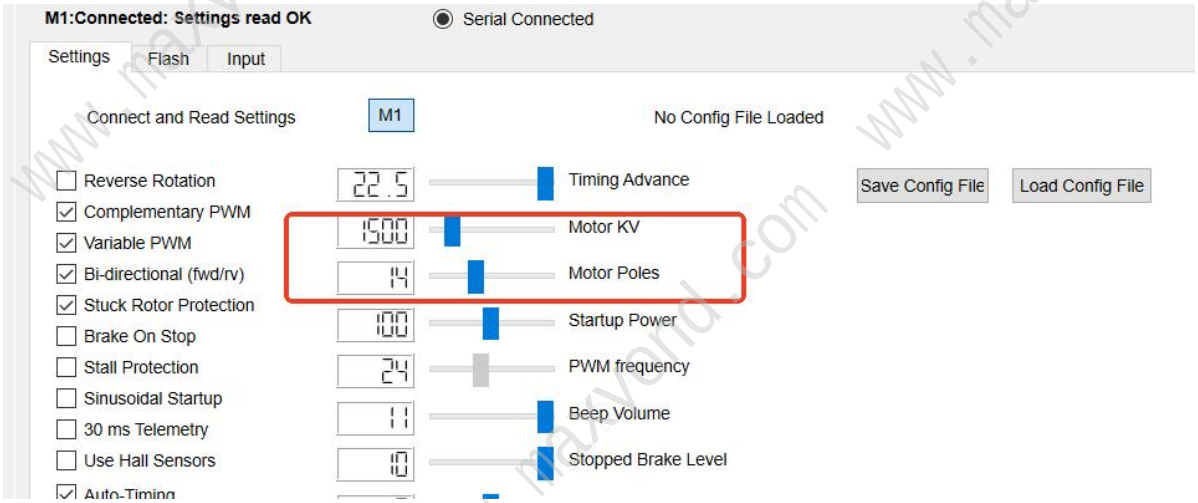
- When using an AM32 USB Configurator, flashing firmware through the web-based AM32 configurator (AM32.ca) may cause the flashing process to freeze after reaching 100%. Please use the offline version of the Config Tool for firmware flashing instead.

- To update to the latest firmware, please use the web-based configurator to load the firmware directly from the online firmware repository. A compatible flight controller is required for this method. If you do not have a flight controller, it is recommended that you first download the appropriate firmware version from the AM32 GitHub repository, then use the AM32 USB Configurator together with the offline Config Tool to perform the firmware update.（GitHub - am32-firmware/AM32）
- Please confirm your ESC model and firmware version before firmware update. Flashing incorrect firmware may cause boot failure or MOSFET burnout during operation

- Upon receiving the product, first configure the ESC parameters according to the motor's KV value and number of magnetic poles. If the exact KV value is not available, please set the ESC KV value 0-100 KV higher than the motor's actual KV value. For example, if the motor's actual KV value is 2200 KV, the ESC KV value can be set between 2200 and 2300 KV, as shown below.



Web Version



Offline Version

4.4. Participate in the firmware update demonstration

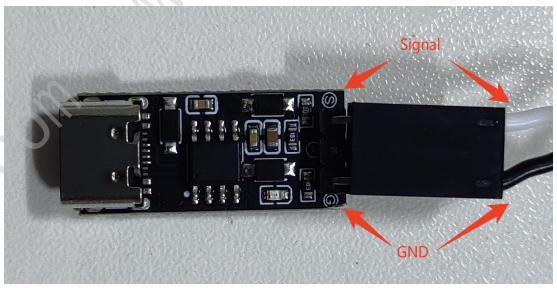
The following instructions demonstrate how to use the AM32 ESC Configurator for parameter configuration and firmware updates:

Required Equipment

- USB data cable
- Benchtop power supply or compatible battery
- AM32 ESC Configurator
- Offline Config Tool or the web-based configurator



AM32 ESC Configurator



USB ESC Configurator Wiring Diagram

Note: At this stage, the AM32 ESC Configurator only needs to be connected to the ESC via the S (Signal) and G (GND) terminals.

4.4.1. Parameter Configuration Procedure

Step 1

After correctly connecting all the components described above, power on the system and open the offline Config Tool.

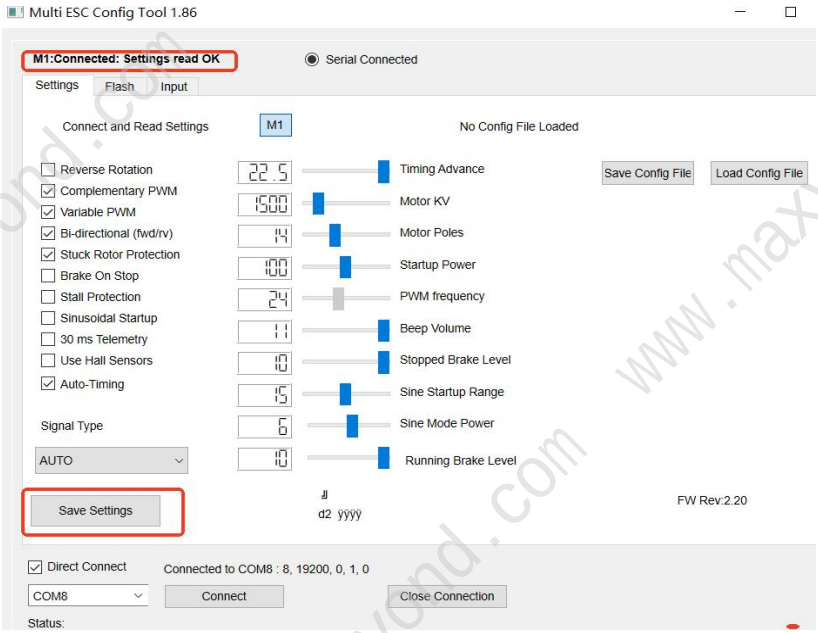
Select “**Direct Connec**”, click **“Select Por**” to choose the appropriate COM port. Then click “**Connec**t” to establish the connection, as shown below.



Step 2

Click “**M1**”.Once the connection has been successfully established, the screen shown below will appear.

Adjust the desired parameters as needed, then click “**Save Settings**” to save your changes. Click “**Close Connection**” to disconnect from the ESC.



4.4.2. Firmware Update

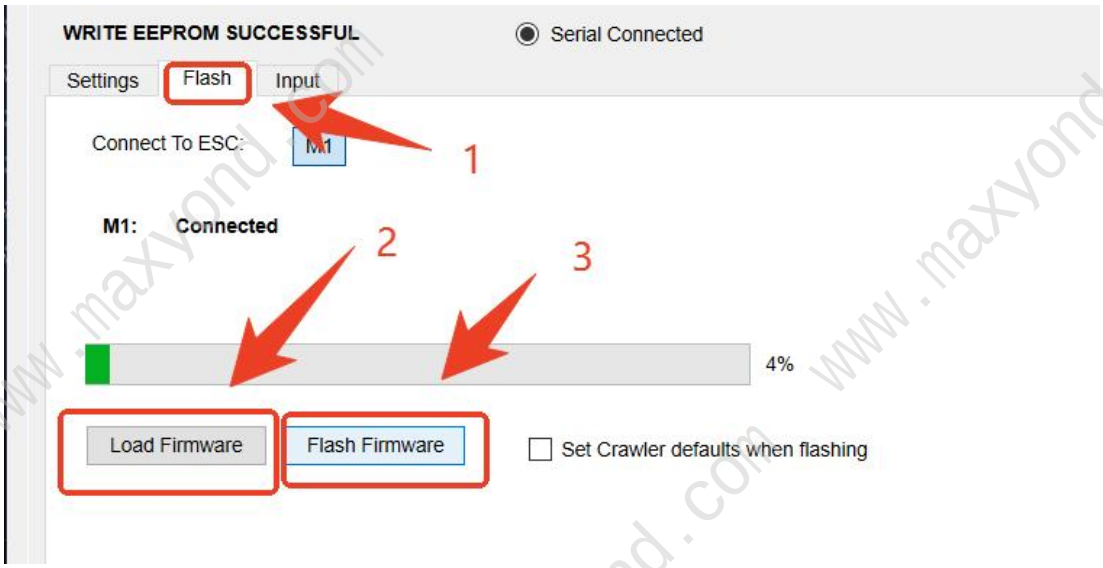
Step 1

Follow the same procedure as described in Parameter Configuration – Step 1 to connect the configurator.

Step 2

Select **“Flash”**, then click **“M1”** . Click **“Load Firmware”** to select the appropriate firmware file, then click **“Flash Firmware”** to begin the update.

Wait for 1-2 minutes for the flashing process to complete, as shown below.





After flashing the firmware,if web configurator displays yellow warning **“FRESH EEPROM”,** simply close the web page, disconnect the ESC from the configurator and remove its power supply. Then reconnect the ESC and restore power. Normal operation should resume.

5. ESC Throttle Range Calibration

Important Notes

- If your system communicates with the ESC via PWM signals, throttle range calibration must be performed to ensure that the ESC's threshold matches the throttle travel of the transmitter. Gerenally, manual calibration is typically required for ESCs used in RC cars, boats, fixed-wing aircraft, and helicopters. However, if you are using a flight controller with a digital protocol such as DShot. For example, in an FPV drone, the flight controller automatically handles throttle range matching. In this case, manual calibration is not required.

- The battery used to power the ESC must be within the ESC's specified input voltage range.

⚠ **Always remove the propellers before performing throttle calibration to prevent accidental injury or damage.**

Calibration Procedure

1. Push the throttle stick of the transmitter or control device to the maximum position.
2. Keep the throttle unchanged, then power on the ESC by connecting the battery.
3. When the motor emits the 'de~beep' confirmation tone, it indicates completion of maximum- throttle calibration. If no confirmation tone is heard, please wait approximately 3 seconds for max- throttle calibration.
4. After calibrating maximum throttle, quickly pull the throttle to minimum position within 3 seconds. Wait for the two rapid beepsto confirm minimum- throttle calibration. If no confirmation tone is heard, wait approximately 3 seconds for min- throttle calibration.
5. Calibration is complete. Power-cycle the ESC for normal operation.

6. Warranty Policy

If you encounter product-related issues caused by non-human damage within 60 days of receiving your goods,please contact us for support and provide your order number,a photo of the package shipping label,product photos,and relevant videos.If our inspection confirms the fault stems from non-human damage, we will resend a new unit.

Please note that human-induced damage is not covered under this warranty,including but not limited to improper usage,incorrect parameter adjustment, and failed firmware updates.

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For technical support, firmware compatibility confirmation, and product service, please contact MAXYOND through the support channels listed on the official website.