

E2000 STANDARD

Tuned Propulsion System

User Manual V1.2

2016.04



Disclaimer

Thank you for purchasing the E2000 Standard Tuned Propulsion System (hereinafter referred to as "product"). Read this disclaimer carefully before using this product. By using this product, you hereby agree to this disclaimer and signify that you have read it fully. Please install and use this product in strict accordance with the User Manual. SZ DJI Technology Co., Ltd. and its affiliated companies assume no liability for damage(s) or injuries incurred directly or indirectly from using, installing or refitting this product improperly, including but not limited to using non-designated accessories. Ensure that your ESC firmware is up-to-date and is compatible with the motor you will attach it to. Otherwise, you will be responsible for all resulting consequences caused by your own actions. This device complies with part 15 of the FCC Rules.

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Warning

When powered on, the motors and propellers will rotate very quickly and can cause serious damage or injuries. Always be vigilant and make safety your top priority.

1. The allowable voltage of the E2000 Standard can reach 52.2 V. Be sure to use it in strict accordance with the related safety rules.
2. Always attempt to fly your aircraft in areas free of people, animals, power lines, and other obstacles.
3. DO NOT approach or touch the motors or propellers when the unit is powered on.
4. Ensure that there are no open circuits or short circuits when soldering the ESC cables.
5. Before takeoff, ensure that the propellers and motors are installed correctly and the propellers are unfolded.
6. Ensure that all parts of the aircraft are in good condition. DO NOT fly with worn or damaged parts.
7. Ensure that all parts are firmly in place and all screws are tight before each flight.
8. Only use compatible, authorized DJI parts.

Legends



Important



Hints and Tips

If you encounter any problems or if you have any questions, please contact a DJI authorized dealer or DJI Support.

DJI Support Website:
www.dji.com/support



About

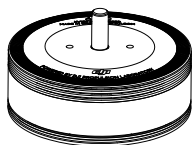
The E2000 Standard Tuned Propulsion System is a multirotor propulsion system designed for multirotor aircrafts with a payload of 1.8 - 2.5 kg/rotor. Its airtight structure keeps out liquid and foreign objects, protecting the inner parts of the motor against dust and liquid corrosion, and making it ideal for industrial applications and professional photography in rugged environments.

The brand new 6010 motor uses a centrifugal fan to enhance performance while maintaining compactness. Air vents located along the sides and elevated base of the motor ensure that air flows through the structure efficiently for maximum heat dissipation. Reinforced blades and the perfect aerodynamic design give the Z-Blade 21-inch foldable propellers ultra-high strength and rigidity.

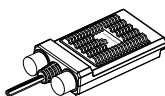
The 1240S Smart ESC uses a sinusoidal drive powered by advanced algorithms to allow for a responsive motor drive with precise control. Like most DJI products, the ESC firmware can be updated, ensuring that the E2000 Standard is constantly refined.

1. Parts

The Foldable Propellers (screws included), Motor (screws included), ESC and Updater can be purchased separately on the DJI Online Store.



6010 Motor



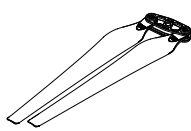
1240S ESC



Updater



2170 Foldable Propeller
(Clockwise)



2170 Foldable Propeller
(Counterclockwise)



Propeller Blade Screws (M4x13.3 Hex)
Propeller Cover Screws (M3x9 Hex)
Motor Screws (M3x8)

2. Gain Value Settings

The E2000 Standard ESC features a sinusoidal drive, replacing the traditional square-wave drive, to offer improved performance during rotor acceleration and deceleration.

To achieve the same sensitivity as square-wave-driven ESCs, the gain values must be reduced according to your flight control system and airframe. The table below shows typical gain values when using the E2000 Standard with a DJI A2 flight control system, a six-rotor frame with a diagonal distance of 1100 mm, and at a takeoff weight of 14 kg:

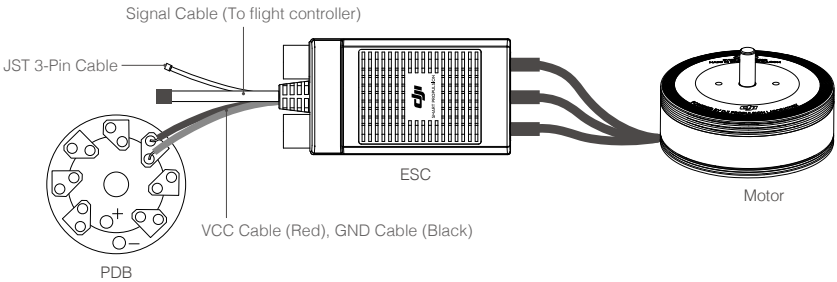
Basic Gain			Attitude Gain		
Pitch	Roll	Yaw	Pitch	Roll	Vertical
130%	130%	100%	150%	150%	100%

3. Connecting the ESCs

Tools Required: Power distribution board (PDB)*, electric soldering iron and soldering tin

* Use a PDB which has sufficient trace spacing and current capacity, according to the number of ESCs and the battery voltage.

- 1) Solder the ESC's black GND cable and red VCC cable to the pads on the PDB as shown.
- 2) Connect the signal cable to your flight controller. The signal cable's orange wire transmits the control signal; the brown wire is for GND.
- 3) Connect the motor to the ESC. Test the motors and ensure that the rotation direction of each motor is correct. You can reverse the rotation direction by swapping the positions of any two cables. Mark the motor rotation directions with the motor stickers if needed.
- 4) The JST 3-pin cable is used to update the ESC firmware. Arrange the cable properly so that it will not interfere with other on-board devices.



Be sure to solder the cables onto the pads according to the specifications of your PDB.

The PDB in the figure uses its outer pads for the black GND cables, and the inner pads for the red VCC cables. Cut the cables to length. The cables should not be too long as to bunch up near the solder points.



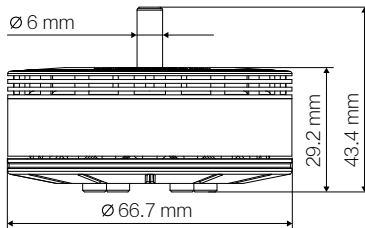
Ensure that there are no open circuits or short circuits when soldering the ESC cables.

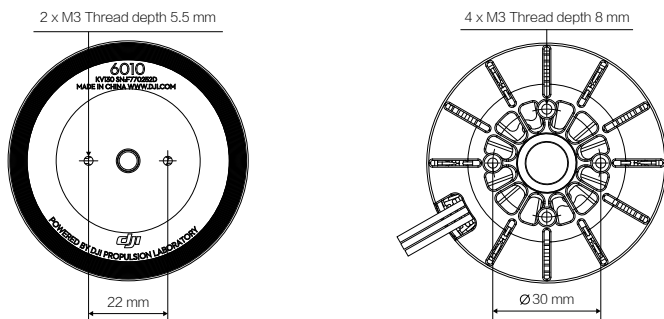


It is recommended that you solder a power connector on the PDB for the battery.

4. Mounting the Motors

The dimensions and thread sizes of the motor are illustrated below. Ensure they are compatible with your frame arms before mounting the motors.



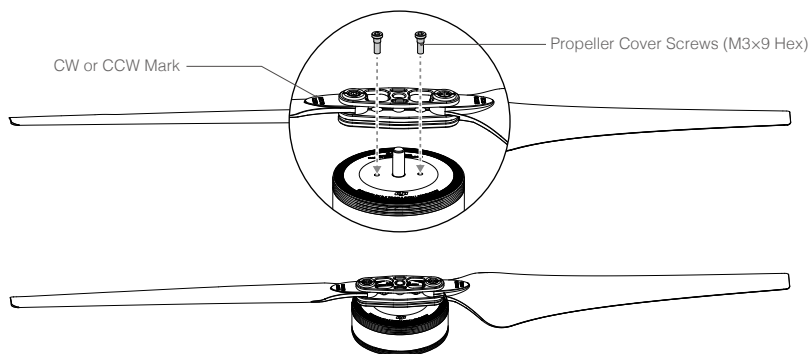


- Use a suitable motor mounting plate and airframe that can withstand the large thrust delivered by the E2000 Propulsion System.
- Choose the appropriate screw length and screw size according to the depth of the assembly hole and thickness of the motor mounting plate. Using screws that are too long or too large may damage the motor.
- When mounting or removing the motors, be careful to prevent foreign articles from entering the base ventilation holes.

5. Assembling the Propellers

Tools Required: M3 hex key, threadlocker

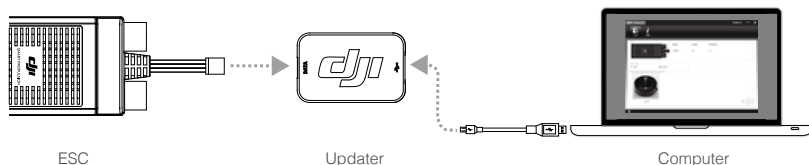
- 1) Pair the propellers marked CW with the clockwise rotating motors; pair the propellers marked CCW with the counterclockwise rotating motors.
- 2) Apply threadlocker to the two screw holes on the motor.
- 3) Mount the propeller onto the motor, and use two propeller cover screws (M3x9 hex) to secure the propeller.



Ensure the screw is secured tightly for the threadlocker to be effective.

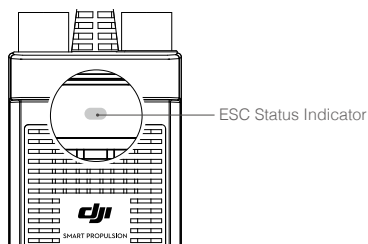
6. Using the DJI ESC Assistant

The DJI ESC Assistant is used to update the ESC firmware and configure the propulsion system. Be sure to remove the propellers before using the ESC Assistant.



Before using the Updater, unplug any other serial devices that are connected to your computer, then follow the instructions below:



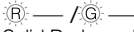






- 1) Download and install the DJI ESC Assistant from the official DJI website. (<http://www.dji.com/product/e2000/info#downloads>).
- 2) Connect the Updater to the ESC with a JST 3-pin cable; connect it to your computer with a Micro USB cable.
- 3) Connect a 12S LiPo battery to the ESC to supply power to the system. Do not disconnect the ESC from the computer or power supply until the configuration is complete.
- 4) Launch the DJI ESC Assistant. Observe the indicators at the bottom of the window. When a connection is established, the Connection Status Indicator (left) will glow solid green and the Data Exchange Indicator (right) will blink blue.
- 5) Click the 'View' tab. In the 'ESC' section, check the current firmware version and ensure the installed firmware is up-to-date. If it is not, click the hyperlink and follow the prompts to update it.
- 6) In the 'LED Color' section, you can customize the colors of the ESC Status Indicators.



- Ensure the ESC firmware is up-to-date and is compatible with the motor you are installing. Refer to the description on the back of the ESC for the minimum firmware version.
- If the ESC is not recognized by the DJI ESC Assistant (the Data Exchange Indicator remains inactive blue), check if there is more than one FTDI device connected such as another DJI Updater, an FTDI USB adapter or development board (e.g. a BeagleBone, Raspberry or Arduino board). Unplug the other FTDI devices, restart the DJI ESC Assistant and ESC, and try again.

7. ESC Blinking Patterns and Beeping Sounds

You can instantly tell the ESC's status by observing the LED indicator and emitted sounds.

LED Indicator	Sound	Description
 Blinking Yellow and Green alternately	None	Motor is connecting.
 Breathing Red or breathing Green	♪1356	System ready.
 Solid Red or solid Green	None	Motor started normally.
 Blinking Red and Yellow alternately	None	Self-test failed.
	Double Beep	Abnormal input voltage.
	Triple Beep	Motor parameters and ESC firmware data do not match.
 Blinking Yellow rapidly	Single Beep	Starting input signal is not at minimum. Check the settings of your flight controller, receiver and remote controller.
 Blinking Yellow slowly	Slow Beep	No signal input.
 Solid Yellow	None	Motors are rotating at full throttle.
 Blinking Red rapidly	None	Motor stalled and ESC locked. Land your aircraft immediately, stop the motors, and power it off. Then check if the motors are damaged.
 x2 Blinks Red twice	None	ESC high temperature (above 100°C). Land your aircraft immediately and power it off. Wait for the ESC to cool down to room temperature.

8. Specifications

Max Thrust	5100 g/rotor (50 V, Sea Level)
Recommended Battery	12S LiPo
Recommended Takeoff Weight	1800 - 2500 g/rotor (Sea Level)
Operating Temperature	-10° to 50° C
ESC	
Max Allowable Voltage	52.2 V
Max Allowable Current (Continuous)	25 A
Max Peak Current (< 3 sec)	40 A

PWM Input Signal Level	3.3 V / 5 V Compatible
Operating Pulse Width	1120 to 1920 μ s
Signal Frequency	30 Hz to 450 Hz
Battery	12S LiPo
Dimensions	85 mm \times 44 mm \times 18 mm
Cable Length	750 mm
Weight (Without Cables)	55 g
Weight (With Cables)	90 g
Motor	
Stator Size	60 \times 10 mm
KV	130 rpm/V
Weight	230 g
Propeller	
Diameter \times Thread Pitch	21 \times 7 inch (533 \times 178 mm)
Weight (Single Propeller)	58 g

9. Performance and Parameters

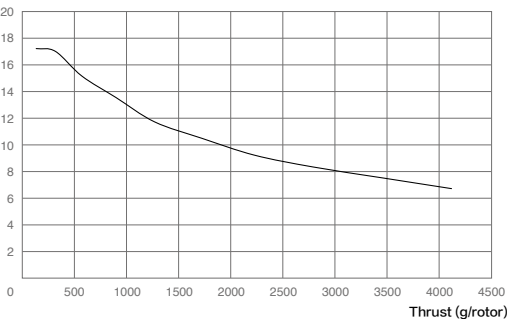
Use the data below to facilitate the proper use of the propulsion system.



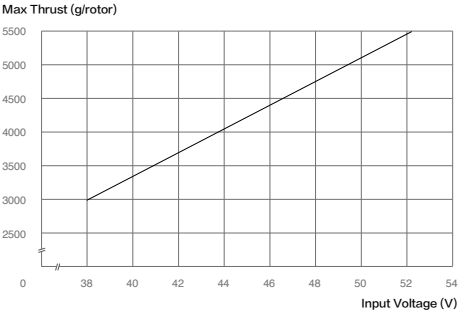
- A payload less than half of the maximum thrust is recommended for optimal performance.
- DO NOT overload the system. A payload more then 2/3 of the maximum thrust will severely compromise safety and performance.

E2000 Propulsion System Performance

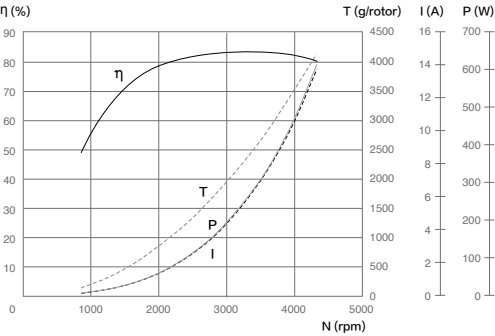
Power Loading (g/W)



The data above was measured with an input voltage of 44.4 V, at room temperature and sea level. The thrust was adjusted by the throttle.



The data above was measured at full throttle, at room temperature and sea level.

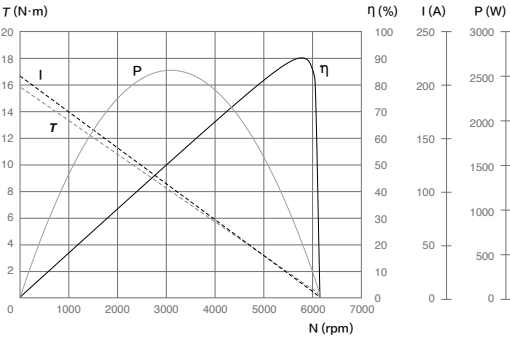


η – Electrical Efficiency, T – Thrust, I – Current, P – Input Power, N – Rotational Speed

The data above was measured with an input voltage of 44.4 V, at room temperature and sea level. The rotational speed was adjusted by the throttle.

6010 Motor Performance

Performance Diagram



T – Torque, η – Efficiency, I – Current, P – Output Power, N – Rotational Speed

The data above was measured with an input voltage of 44.4 V and 100% duty cycle, at room temperature and sea level. The rotational speed was adjusted by the payload torque.

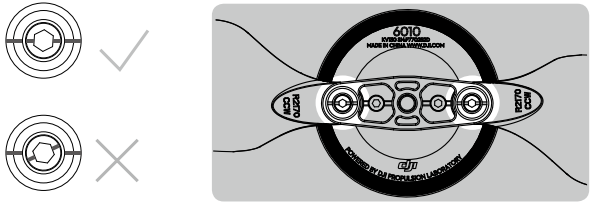
Characteristic Parameters

Speed Constant	130 rpm/V
Back-Electromotive Force Constant	0.0734 V·s/rad
Mechanical Time Constant	200 ms
Motor Rotor Inertia	70 kg·mm ²
Total Rotor Inertia (Propeller Included)	700 kg·mm ²
Torque Constant	0.076 N·m/A
Line-to-Line Inductance	0.224 mH
Line-to-Line Resistance	230 mΩ
Thermal Constant	600 s

10. FAQ

How do I check if the propellers are secure and will not fly off?

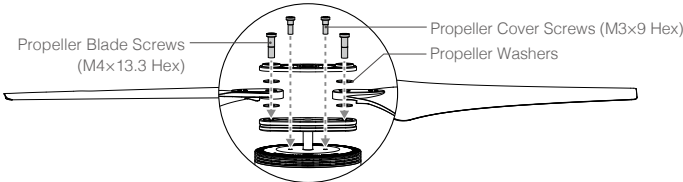
Make sure you check the marks on the screws and cover on the propeller before each flight. If the propeller is loose, the marks will not line up, indicating that the screws should be tightened.



If the two propeller blade screws are swapped or other screws are used, the marks may not be accurate.

How do I replace the propeller blades or propeller covers if they are damaged?

- 1) Prepare two propeller blade screws (M4×13.3 hex), two propeller cover screws (M3×9 hex), and four propeller washers.
- 2) Apply threadlocker to the two screw holes on the motor and the propeller cover.
- 3) Assemble the propeller and tighten with two propeller blade screws (M4×13.3 hex) so that the blades can fold smoothly. Mount the propeller onto the motor and use two propeller cover screws (M3×9 hex) to secure the propeller.



Ensure the screw is secured tightly for the threadlocker to be effective.

This content is subject to change.

Download the latest version from
<http://www.dji.com/product/e2000>



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