HB-02 Birdroni Electronics Handbook

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About this Document

This document contains a list of electronics required for the HB-02 Birdroni watercraft.

Links of the electronics that I recommend are provided. The links of the electronics in this documentary the ones that come provided if you order them directly from me from this link. Alternatively, if you want to choose your own electronics then please use this document as a guide and ensure what you purchase is suitable and that the electronics are compatible with one another.

This document includes an Electronics Guide, where the functions of each electronic component are explained. If you're ever unsure about anything please refer to the electronics guide.

PLEASE NOTE THAT THE ELECTRONICS ARE NOT INCLUDED IN THE KIT UNLESS OTHERWISE STATED.

Electronics Guide

Battery – 3S or 4S LiPo

This is the power source for electronics components. Lithium Polymer or LiPo batteries are available with various discharge ratings, capacities, and numbers of cells. You can find these parameters from the name of the batteries, for example **40C3S-2600:**

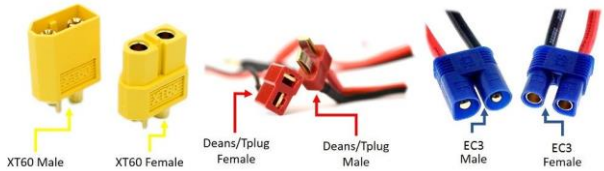
40C = Discharge rating, this quantifies how fast the battery can be discharged safely and without harming the battery. The higher the c-rating the more power the battery can deliver.

3S = 3, Number of Cells in series, 3S = 11.1 Volts (each cell has 3.7V so 3.7 x 3 = 11.1V),

2600 = Capacity in mAh. determines how long your battery lasts (Higher Capacity = Longer Runtime)

N.B: A battery with a larger capacity and the same number of cells does NOT provide more power. Number of cells determines the power, capacity determines the run time.

Different batteries have different connectors, ensure you purchase batteries with the same connectors as your ESC. These are some examples of common connectors available:



Alternatively you could purchase a set of adapters meaning you can connect batteries and ESC's with differing connectors.

Never fully discharge your LiPo batteries otherwise you will not be able to re-charge them. They charge using CC/CV, or **C**onstant **C**urrent / **C**onstant **V**oltage. Please read this guide for more information on charging and safety precautions.

EDF – 50mm EDF

This is the powertrain for the HB-02 Birdroni. It is an electric jet, containing a motor which spins a ducted impellor at very high rpm (revolutions per minute), while drawing in air from the front, accelerating it and projecting it out of the back. This creates thrust which propels the HB-02. EDFs also produce an impressive jet engine-like sound!

ESC (Electronic Speed Controller) – ESC with BEC

The Electronic Speed Controller (or ESC) distributes power from the battery to electrical components, in the case of the HB-02 it transmits power to the EDF and the servo motor.

It does this by converting the PWM (Pulse Width Modulation) signal from the receiver, and driving the EDF motor by providing the appropriate level of electrical power.

What is BEC and why should you get an ESC with BEC?

BEC (Battery Elimination circuit) is a voltage regulator which converts the LiPo battery voltage to a lower voltage, usually 5V. An ESC with Integrated BEC prevents the need for separate batteries to power the 5V electronic devices (servo and receiver).

Receiver and Transmitter

The receiver takes input from your transmitter, and sends them to the ESC to tell it where to send power. Each electronic component is linked to its own channel, which represents one input from the transmitter. For example, the throttle is usually linked to channel 3, which is where the ESC is plugged in. Steering will normally be connected to channel 1, which is where the servo is plugged in.

You must bind your transmitter to your receiver, follow the instructions of your transmitter's manufacturer.

Servo Motor – 9g

9g servo motors are small motors with integrated circuitry. These are used to actuate control surfaces in RC vehicles, in terms of the HB-02 the servo is used to move the rudder.

List of Electronics required for the HB-02 Birdroni

3S Setup

3S SETUP –All of the electronics listed (excluding the Transmitter, Receiver and servo) are only suitable for a 3s setup not 4s. It is recommended to run the HB-02 on a 3S LiPo battery setup.
Links to options are included, it is your responsibility to ensure that the electronics you choose are compatible with each other.

Battery – 3S LiPo

Not Included

- Ensure you select a battery with the same type of connector as your ESC. Otherwise you can purchase connector adapters to use your given battery with your ESC.
- Maximum size of battery that can fit into the HB-02 is 70x35x28mm. Ensure you do not exceed this.

3S: PPL- 40C3S-1300 http://www.4-max.co.uk/lipos.htm

EDF – 50mm EDF

Not Included

- Ensure your EDF is supplied with a brushless motor.
- EDFs are designed to run on a certain battery size, ensure you choose an EDF which is designed to run on 3S LiPo batteries.
- Ensure you purchase an EDF without a lip, or with a removable lip.
- The 4 Max EDF is recommended

4 Max: FMS 50mm EDF (3S LiPo) http://www.4-max.co.uk/edf-fms-50mm-3S.html

ESC (Electronic Speed Controller) – ESC with BEC

Not Included

- Ensure you select an ECS with a Battery Elimination circuit (BEC) so no extra batteries for low voltage components are needed
- Make sure to get and ESC which is capable of handling at least 25% extra capacity than what your motor draws, as it is bad for ESC to be on its operational limit. *If your motor draws 30A then choose an ESC with at least 37.5A, the closest common ESC capacity is 40A so choose that one*.
- It is recommended to use a 40A ESC for a 3S battery
- Since this is a boat, it is recommended to choose a waterproof ESC or to waterproof it yourself.

40 A: 4M-ESC40A http://www.4-max.co.uk/esc.htm

Transmitter and Receiver

Not Included

- Most transmitters come with a receiver, in this case this is not necessary to purchase another receiver. If the transmitter you chose does not include a receiver, ensure the receiver you choose is compatible with your transmitter.

Transmitter and Receiver Transmitter and Receiver Link

Servo Motor – 9g

Included

- The 9g servo motor comes included in both the HB-02 parts kit and the pre assembled kit.

Alternative Options

All of the electronics included as option are only suitable for a 3s setup not 4s. It is recommended to run the HB-02 on a 3S lipo battery setup.

If you wish to run on a 4S keep the following points in mind in addition to the guidance on the previous pages. Some possible options of electronics for a 4S setup are listed below.

Battery – 4S LiPo

- Maximum size of battery that can fit into the HB-02 is 70x35x28mm. Ensure you do not exceed this.
- Ensure your battery, ESC and EDF are all compatible.

EDF – 50mm EDF

- EDFs are designed to run on a certain battery size, ensure you choose an EDF which is designed to run on the battery you chose.

4 Max: FMS 50mm EDF (3S LiPo) http://www.4-max.co.uk/edf-fms-50mm-3S.html

ESC (Electronic Speed Controller) – ESC with BEC

- Make sure to get and ESC which is capable of handling at least 25% extra capacity than what your motor draws, as it is bad for ESC to be on its operational limit. *If your motor draws 30A then choose an ESC with at least 37.5A, the closest common ESC capacity is 40A so choose that one*.
- It is recommended to use a 50A ESC for a 4S battery
- Since this is a boat, it is recommended to choose a waterproof ESC or to waterproof it yourself. You can see this video for guidance

50 A: 4M-ESC50A http://www.4-max.co.uk/esc.htm