

User Manual of 3A UBEC Doc 2.0

3 Amp Switch-Mode UBEC

1. Why do you need UBEC?

The UBEC is a switch-mode DC regulator separated from ESC (ESC---Electronic Speed Controller for brushless/brushed motor), it will take high-voltage (5.5V-23V) power from your battery pack and convert it to a consistent safe voltage for your receiver, gyro and servos.

If you are using a speed controller with a built-in BEC, it will very likely have only a limited ability to supply power to your receiver and servos without overheating. If you have a relatively high-voltage battery pack or have heavy servo load, you should consult the ESC specifications to determine what the stated recommendations or limitations are. In general, if you are using a 4S lithium battery pack, or more than a 12 cells Nickel based battery pack, you should consider using an UBEC. In such a case, the built-in BEC of ESC can support only 2 servos, so it is not suitable for RC helicopter and big aircraft.

2. Specification:

2.1. **Output:** 5V/3A and 6V/3A switchable

2.2. **Ripple:** <50mVp-p(@2A/12V)

2.3. **Input:** 5.5V-23V (2-5S lithium battery pack, 5-15 cells NiMH / NiCd battery pack)

2.4. **Size:** 41.6mm*16.6mm*7.0mm (length*width*height)

2.5. **Weight:** 11g

3. Features:

3.1. The UBEC is an advanced switching regulator with over-current and over-heat protection function, and the switching frequency is 300KHz. The max efficiency of this chip is 92%

3.2. The small size and the light weight make it very convenient to use.

3.3. The comparison of linear BEC and switch-mode BEC: When using a lithium battery pack more than 3S, a switch-mode BEC has much higher efficiency than linear BEC.

- ◆ For a traditional linear BEC, For example, a 4S lithium battery pack has a typical voltage of 14.8V, in order to let BEC output 5V/1A, the current flow into the BEC is at least 1A, so the power on BEC is $14.8V * 1A = 14.8W$. But the useful output power is only $5V * 1A = 5W$, so the efficiency of the linear mode BEC is just $5W / 14.8W = 33.8\%$, the redundant power $14.8W - 5W = 9.8W$ changes to heat, which makes the BEC very hot.
- ◆ For a switch-mode BEC in the above case, in order to let BEC output 5V/1A, the current flow into BEC is only 0.38A (actual test data), so the power on BEC is $14.8V * 0.38A = 5.6W$, and the efficiency of BEC is $5W / 5.6W = 89.3\%$.

3.4. Don't worry about the polarity of battery pack. If the polarity is not correct, the UBEC can't work, but it will not be destroyed. What you need to do is just swap the battery pack polarity.

3.5. A shield covers almost all the electronic components on PCB, and a ferrite ring is attached with the output wires to decrease the electromagnetic interference.

3.6. If the UBEC is supplied with a switch, it allows the power to the RC components (receiver, servos, etc) to be controlled via this switch. Please note that the "ON" & "OFF" state of the switch are logically

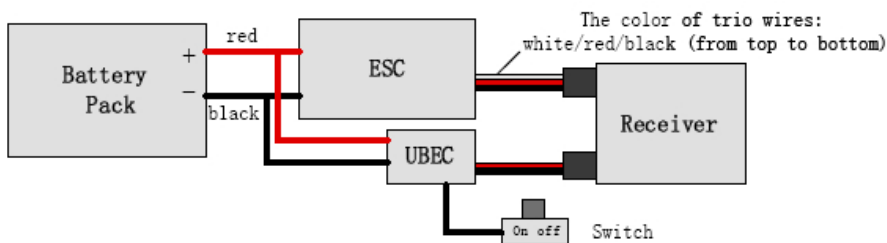
reversed with the output state of the UBEC. When the switch is "ON" (switch closed), the UBEC output is shutdown, when the switch is "OFF" (switch opened), the UBEC output is normal. This feature allows the switch to be cut away if it is not needed (saving weight) which allows power to RC components to be controlled in the usual way by connecting and disconnecting the main battery pack. (The switch is optional)

4. How to use UBEC?

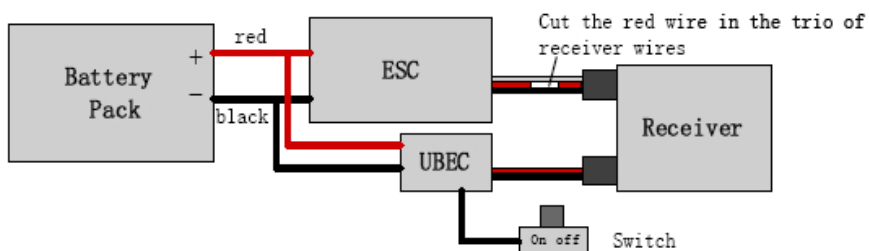
4.1. **Important hint: Switch mode UBEC may cause some electromagnetic interference to receiver, Please install the UBEC with a distance at least 5cm away from the receiver.**

4.2. When ESC HAS NOT built-in BEC function

No change is needed for ESC, just connect the input cables of UBEC with the battery, and plug the UBEC's output cable (connector) into one spare channel of receiver.



4.3. **When ESC HAS built-in BEC function** You must disable the BEC function of ESC, i.e. you must cut the red wire in the trio of receiver wires. Simply use a pair of wire cutters to remove a short section of the red wire near the receiver connector, and insulate the cut wire with a bit of electrical tape.



Suggestion: Take the red cable out of the BEC connector, and insulate it with a bit of electrical tape for further usage.