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TURNIGY Plush-32 Series ESC Programming Card User Manual

TURNIGY.
power systems

**Plush-32 Series ESC Programming Card
User Manual**

Contents

INTRODUCTION:

Thank you for purchasing Plush-32 ESC product!
Brush-less power systems can be very dangerous. Any improper use may cause personal injury and damage to the product and related devices. We strongly recommend you read through this user manual before use.
Because we have no control over the use, installation, or maintenance of this product, no liability may be assumed for any damage or losses resulting from the use of the product. We do not assume responsibility for any losses caused by unauthorized modifications to our product. For the latest specifications, please visit the website: **www.hobbyking.com**

PRODUCT FEATURES:

1. 32-bit ARM MCU, small size, lightweight, and fast response.

2. High resolution, smooth and sensitive throttle linearity. Throttle signal loss protection is achieved.

3. Compared with other conventional ESCs, synchronous rectification, regenerative braking, and more energy
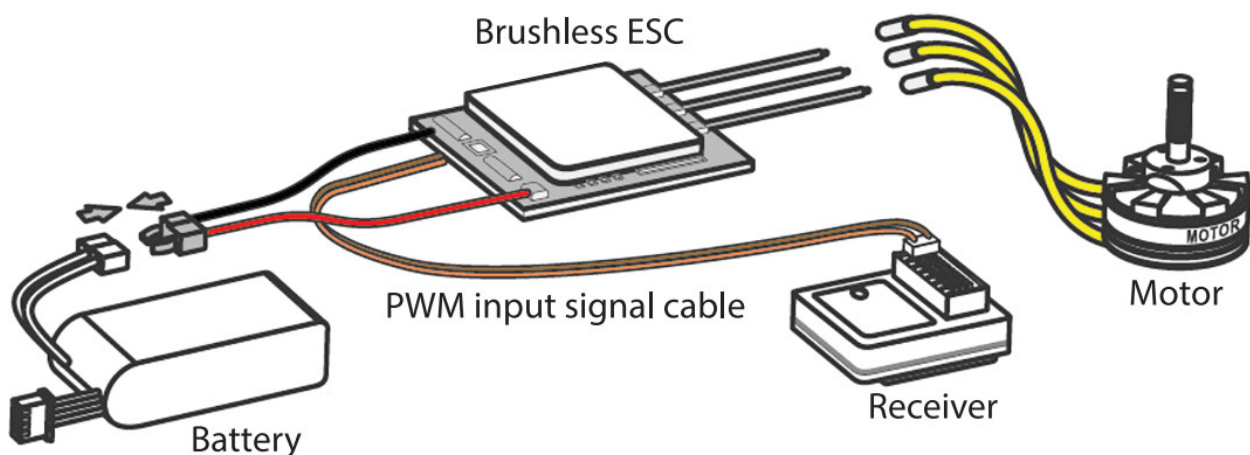
saving.

4. Automatically detect the input signal. The throttle valve can be used to set up to be compatible with different controllers.

5. Good compatibility with motors, suitable for most motors on the market.

6. Easy to program with prog-card, designed for fixed-wing, software with completely independent intellectual property rights, can be continuously upgraded.

SPECIFICATION:

1. Support 6A-150A, 2-8S (Please check ESC sticker to verify the specified cells and power, more high voltage model to be added).

2. PWM output frequency range is 8-32KHz. Different PWM frequencies can be set by a programming card.

3. The regular throttle range is 900us-2400us.

4. Max RPM: 300,000 (2poles), 100.000 (6poles), 50,000 (12poles).

5. Customized settings can be done with prog-card and controller (Brake/Non-Brake).

6. 60A and above supports adjustable temperature protection.

7. It supports the setting of the direction of motor rotation by prog-card.

CONNECTION DIAGRAM:

OPERATION:

1. **Throttle Calibration:**
   Please set the throttle range when you first time to use the ESC.
   Step 1: Power on the controller and move the throttle stick to the highest position.
   Step 2. Power on the ESC, motor beeps "♪♪", means high position throttle is set.
   Step 3. Move the throttle stick to the lowest position, motor beeps "♪♪" means the low position is set, then another "♪♪ "" as confirmation that throttle is set ok and ready to go.

2. **Setting (Brake ON/Brake OFF) by the controller**
   Set the throttle stick at middle-> Power on ESC->A sequence beeps and then follow with single and repeat DD- "♪" - "♪" - "♪", means now it's in controller brake setting procedure -> move the throttle stick to Max throttle position (means Brake is ON), or move the throttle stick to Min throttle position (means Brake is OFF)-

>a sequence beeps means setting ok and followed 2 beeps ♪♪ "means ESC is ready to go.

3. **Normal start procedure:**

Power on the controller and set the throttle stick to the Min throttle position (if higher than1800us, it will get into throttle calibration).

Connect ESC as connection diagram, power on ESC, ESC will automatically detect the battery cells and using beeps to indicate the cells number. For example, using a 4s battery, beeps will be: "♪♪♪♪". Then 2 beeps "♪♪ means ESC is ready.

DETAILS SETTINGS WITH PROGRAMMING CARD

CUTOFF MODE / BATT.TYPE	OFF	SLOW DOWN	CUT OFF	LiHv	LiPo	NiMh	
CUTOFF VOLTAGE	2.9	3	3.1	3.2	3.3	3.4	3.5
LITHIUM CELLS	2	3	4	5	6	7	8
LITHIUM CELLS	9	10	11	12	13	14	AUTO
PROTECT TEMPERATURE	OFF	90℃	100℃	110℃	120℃	130℃	140℃
ADVANCED TIMING	0°	6°	12°	18°	24°	30°	AUTO
BRAKE STRENGTH / MOTO DIRECTION	OFF	25%	50%	75%	100%	Normal	Reversed
STARTUP POWER	10%	20%	25%	30%	35%	40%	45%
AUTO ROTATION RESTART TIME	OFF	10S	15S	20S	30S	40S	60S
MOTO TYPE	NORMAL	DISC TYPE	EDF				
BEC VOLTAGE	5.0V	5.5V	6.0V	7.4V	8.0V	(Adjustable only for 150A)	
SPOOLUP ACC.	L1	L2	L3	L4	L5	L6	L7
PWM FREQ	8K	12K	16K	24K	32K		
BEACON DELAY	OFF	1MIN	2MIN	3MIN	4MIN	5MIN	10MIN

Safety points:

Due to the brushless power system is powerful, improper use may cause personal injury and device damage. Please strictly follow the instructions to
operate.

1. Please don't operate for a long time with the battery under voltage. It will reduce the battery usage life and ESC working efficiency.

2. Please don't operate long time when the ESC is over-temperature, otherwise, it will damage the MOS FET

easily.

3. Please don't let ESC overvoltage for a long time, otherwise will short the usage life of ESC.
4. Always keep all the things away from the propeller when working on a power system with the battery connected.
5. Please pay attention to the motor. Don't operate continually when the motor was blocked. Otherwise, it will reduce the useful life of the motor and ESC.
6. Always use ESC in a safe situation.
7. Broken ESC can't be used.
8. ESC can only be powered by batteries, DO NOT connect ESC to AC power directly!

ATTENTIONS:

1. If the motor rotation direction is wrong, you can exchange any two of the three motor cables to correct it.
2. Pay attention to the polarity, wrong polarity connection will cause ESC and motor damage!
3. If a noise occurred during accelerating, please increase the timing angle. If no work until the increased timing angle to 30, means the motor is overloaded, please change to use a smaller propeller or lower the voltage or change to a better motor.

   If the motor stops rotating and you heard twice beeps, the voltage is under the set value. Please change the cut-off voltage to 2.9V or 3.0V. If not working, maybe the battery is over-discharged or the motor wires are too thin, too long or the connector is out of order.
4. Please leave some space between the brake point and start-up point for the stick to move.
5. Timing setup:

   In-runner motor: 0 ~12°

   Out-runner motor: 18 -30°

   Always set the timing as the motor manufacturer recommends!

FAULT ANALYSIS BEEPS:

The motor will beep accordingly when ESC happened with the below conditions, warning beeps will be cleared after restarting ESC.

1. beep repeat: Under-voltage identification.
2. beeps repeat Temperature rise warning.
3. beeps repeat: Receiver signals failed.
4. beeps repeat: means startup failed.

REVISION HISTORY:

- Rev1.0.0: Initial revision
- Rev1.0.3: 60A and above add temperature protection
- Rev1.1.0. Added more adjustable specifications. Motor type, Spoolup acceleration. PWM freq. and Beacon delay to get better performance and experience Added more adjustable specifications: Motor type, Spoolup acceler ation, PWM freq. and Beacon delay to get better performance and experience.

Documents / Resources

TURNIGY Plush-32 Series ESC Programming Card [pdf] User Manual
Plush-32 Series, ESC Programming Card, Plush-32 Series ESC Programming Card