Shenzhen FVT Electronics Co., Ltd.

FVT Sensored/Sensorless Brushless Speed Controller for Multirotor helicopter

Thank you for your purchasing the FVT Brushless Electronic Speed Controller (ESC). The FVT electronic speed controller is specifically designed for operating Sensored/Sensorless brushless motors. High power systems for RC model can be very dangerous and we strongly suggest that you read this manual carefully. FVT Model have no control over the correct use, installation, application or maintenance of these products, thus no liability shall be assumed nor accepted for any damages, losses of costs resulting from the use of this item. Any claims arising from the operating, failure or malfunction etc. will be denied. We assume no liability for personal injury, property damage or consequential damages resulting from our product or our workmanship. As far as is legally permitted, the obligation for compensation is limited to the invoice amount of product in question.

Features:

- All firmware and components are purchased from renowned makers.
- Multiple motor timing choices, so compatible with most brushless motor in the market.
- Compatible with fixed-wing and helicopter.
- If the position of the throttle stick is inadequate when power on, the motor will not start and emit " Beep-beep-" continuous warnings.
- Multiple protection features: Over-heat protection and throttle signal loss protection, low voltage cut-off protection.
- Throttle range setting and multiple accelerations start up choices.
- Software can be updated by using our USB link software with connection to PC.

FVT Sensorless brushless ESC general information

I. Function introduction

1. **Motor Timing** – Low/Medium/High Default is Medium.

   1) **Low** – Setting for most out-runner motors.

   2) **Medium** – Default value, setting for 6 or more poles.

   3) **High** – Setting for further more poles.

   We recommend the Low timing setting for 2 pole motors and Medium timing for 6 or more (general out runner) poles. For higher pole motor, High timing can be set. Some motors require different timing setups therefore we suggest you to follow the manufacturer recommended setup.

   Note: Run your motor on the ground first after making any changes to your motor timing!

2. **Switching Frequency –** 12KHz/16KHz Default is 12KHz

   1) Most motors can use 12KHz as PWM frequency.

   2) For the more pole and high RPM motors, 16KHz PWM frequency will make motor runs more smoothly, however, it will increase the usage of ESC's switch and heat.

3. **Acceleration Starts up –** Very soft/Soft Acceleration/Start Acceleration Default is Soft

 • **Very Soft –** Provides initial slow 1.5 sec ramp-up from start to full rpm.

 • **Soft Acceleration –** Provides initial slow 1 sec ramp-up from start to full rpm.

 • **Start Acceleration –** Provides quick acceleration starts up with quick response.

4. **Motor Rotation –** Forward/Reverse Default is Forward

   In most cases motor rotation is usually reversed by swapping two motor wires. However, in cases where the motor cables have been directly soldered the ESC cables, motor rotation can be reversed by changing the value of setting on the ESC.

II Setting the Automatic Throttle Calibration

1. Switch your Transmitter ON and set the throttle stick to its top position, connect the battery pack to the ESC. Wait for about 2 seconds, the motor will emit "Beep-beep-"voice.

2. Put the throttle stick to its bottom position, the motor will also beep a special tone, which indicates that your ESC has got the signal range of the throttle from your transmitter.

3. Wait for 1 second, the system will enter the Battery cells confirmation program.

Note: When use this ESC for the first time or change other controllers, in order to let your ESC fit with the controller's throttle range, please re-setting throttle calibration.

The throttle is now calibrated and your ESC is ready for operation.

III Secondary menu programming setup

1. Switch your Transmitter ON, connect the battery pack to the ESC, the motor will emits 4 beeps in succession confirming that the ESC has now entered the programming mode.

2. After entering the programming mode, the ESC will begin to emit the following 4 kinds of audible tones in sequence from one function and its associated setting options to another repeatedly:
   A. "Beep-" emits, indicate entering into " Motor Timing" program;
   B. "Beep-Beep-" emits, indicate entering into "Frequency Choice" program;
   C. "Beep-Beep-Beep-" emits, indicate entering into "Starts up Acceleration" program;
   D. "Beep-Beep-Beep-Beep-" emits, indicate entering into "Motor Rotation" program;

3. When the desired tone for the function and setting option is reached, move the throttle stick down to its bottom position. ESC will emit special tones confirming the function setting program has been entered.

4. Motor will beep repeatedly, when the desired tone for certain function is reached (see the following table), move the throttle stick to its top position, which means the certain value have been confirmed and stored. (When you don't want to set

other value, just disconnect the battery pack to quit the program setup mode; If want to continue setup, just keep on waiting, the motor will return automatically to the above step, then you can choose the value you want to set again as step 4 indicates).

Voices / Programmable Items	"Beep-" 1 Short	"Beep-beep-" 2 Short	"Beep-Beep-Beep-" 3 Short
Motor Timing	Low	Medium	High
Frequency Choice	12KHz	16KHz	
Starts up Acceleration	Very Soft	Soft	Accelerate
Motor Rotation	Forward	Reverse	

IV. Example of program setting up: (Need to change the Starts up Acceleration to the 3rd choice of "Accelerate"):

1. Enter program mode setting: Switch on Transmitter, move the throttle stick to its top position, connect ESC to motor/battery pack, wait until motor emits "Beep-beep-beep-beep-" audible tone, which indicating ESC enter the program mode;

2. Select programmable item: Motor starts to beep, when you hear the tones of "Beep-beep-beep-" of 3 shorts, move the throttle stick to the bottom position, which means you have selected starts up Acceleration mode setting.

3. Set item value: Motor starts to beep, when you hear 3 shorts of "Beep-beep-beep-" for which will repeat for 4 times, during any one of these 4 times, move throttle stick to the top position, then a special tone emits, means the value is set and saved for "Accelerate" in Starts up Acceleration mode.

4. Exit Program Mode: After step 3 finish, just disconnect the battery pack and exit.