ZTW®
Technology Co.,Ltd.

SHARK Manual Instruction

Programmable brushless ESC

Thank you for purchasing ZTW Shark Brushless Electronic Speed Controller (ESC) for boat. ZTW Shark series ESC is a beginning level product line designed for boating. It features super smooth start up and throttle linearity, multiple protection, low cost and best performance at this level of product. This is not a toy., only for adult. Age under 14 should be supervised with adult. Please read this manual carefully before using this product for the sake of safety. ZTW Model have no control over the use, installation, application, or maintenance of these products, thus no liability shall be assumed nor accepted for any damages, losses of costs

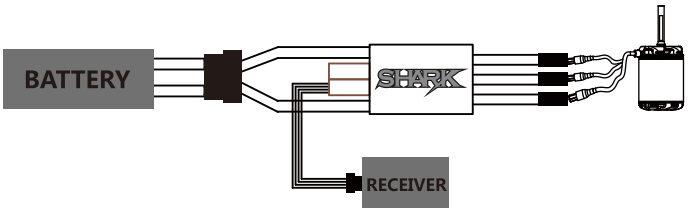
Important Warnings

▲ ZTW is not responsible for your use of this product, or any damage or injuries you may cause or sustain as a result of its usage.
▲ Always place safety as priority when you use the product
▲ An electric motor that is connection with battery pack and ESC may start unexpectedly and cause serious danger. Always treat them with enough respect.
▲ We recommend you to remove the propeller when you working on the plane that with power source connected.
▲ Observe all local laws when you fly a RC aircraft or other RC vehicles
▲ Never fly over others or near crowds.

Wires Connection:

The speed controller can be connected to the motor by soldering directly or with high quality connectors. Always use new connectors, which should be soldered carefully to the cables and insulated with heat shrink tube. The maximum length of the battery pack wires shall be within 6 inches.

- Solder controller to the motor wires.
- Solder appropriate connectors to the battery wires.
- Insulate all solder connectors with heat shrink tubes.
- Plug the “JR” connector into the receiver throttle channel.
- Controller Red and Black wires connects to battery pack Red and Black wires respectively.



Specifications:

Type	PN#Model	Cont.\Burst Current(A)	Batterycell NiXX\Nixx	Weight (g)	BEC Output	Size(mm) W'L'H	User Program
Shark 20A	9020101	20A\30A	5–12NC\2–4Nixx	38	5V/2A	43x25x12	Yes
Shark 30A	9030101	30A\40A	5–12NC\2–4Nixx	40	5V/2A	43x25x12	Yes
Shark 40A	9040101	40A\50A	5–12NC\2–4Nixx	67	5V/3A	52x27x16	Yes
Shark 50A	9050101	50A\60A	5–18NC\2–6Nixx	75	5.5V/5A	56x30x19	Yes
Shark 60A	9060101	60A\70A	5–18NC\2–6Nixx	71	5.5V/5A	56x30x19	Yes
Shark 70A	9070101	70A\80A	5–18NC\2–6Nixx	112	5.5V/5A	68x37x18	Yes
Shark 80A	9080101	80A\90A	5–18NC\2–6Nixx	118.5	5.5V/5A	68x37x18	Yes

Features:

- Super smooth and accurate throttle linearity.
- Safety thermal over-load protection.
- Auto throttle shut down in signal lose situation.
- Low Voltage Cut off.

Multiple Protection

1. Over-heat protection: When the temperature of ESC exceeds 110 deg C, the ESC will reduce the output power to allow it too cool.
2. Lost signal protection: The ESC will automatically cut power to the motor when it detects a lost of throttle signal for 2 seconds, then the motor will emit continuous beeping tone.

Mounting your ESC

1. Choose a location that has good airflow to offer best cooling to prevent overheating. DO NOT cover the side with the flat heat shield with hook and loop tape or any other material as this will greatly lower its effectiveness.
2. Mount the ESC with a combination of hook and loop tape or 2-sided foam tape.

THROTTLE CALIBRATION

1. Turn on your radio and keep the throttle stick to the top position.
2. Connect the battery pack to the ESC. Wait for about 2 seconds, the motor will beep for twice, then put the throttle in the minimum position, the motor will also beep, which indicates that your ESC has got the signal range of the throttle from your transmitter.
3. If you are using normal radio pull down the throttle stick to lowest position to confirm the range, if you are using gun type radio please release the trigger to neutral position to confirm the range.

Using the ESC

1. Turn on your radio and keep the throttle stick to the lowest position, if you are using gun type radio please keep the trigger at the neutral position.
2. Connect the battery pack to the ESC.

3. Motor emits two sets of audible tones in succession means the ESC is armed and ready to use. The first set of tone counting the cells of the battery the second set of means the status of the brake setting.

Entering the programming Mode

1. Turn on your radio and set the throttle stick to top positon (100%).
2. Plug the battery pack into your controller.
3. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.

Programmable Items

1. Brake

a. Turn on your radio and set the throttle stick to top positon (100%).
b. Plug the battery pack into your controller.
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.
d. When you hear _* _* _* _* means you are in the Brake menu, the default setup is OFF, if you want to turn on the brake pull the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.
e. The system will exit automatically and save the setting after finishing desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

2. Battery Type : NiCad/NiMH/LiPo

a. Turn on your radio and set the throttle stick to top positon (100%).
b. Plug the battery pack into your controller.
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.
d. When you hear ～ ～ ～ ～ means you are in the Battery Type menu, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.
e. The system will exit automatically and save the setting after finishing desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

3. Low Voltage Protection Threshold (Cutoff Threshold)

a. Turn on your radio and set the throttle stick to top positon (100%).
b. Plug the battery pack into your controller.
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.
d. When you hear *_ _* *_ _* *_ _* *_ _* means you are in the Low Voltage Protection Threshold menu, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

1) For Li-xx packs- number of cells are automatically calculated and requires no user input apart from defining the battery type. This ESC provides 3 setting options for the low voltage protection threshold ; Low (2.8V)/ Medium (3.0V)/ High (3.2V). For example : the voltage cutoff options for an 11.1V/ 3 cell Li-Po pack would be 8.4V (Low)/ 9.0V(Med)/ 9.6V(High).

2) For Ni-xx packs-low / medium / high cutoff voltages are 50%/60%/65% of the initial voltage of the battery pack.. For example: A fully charged 6 cell NiMh pack's voltage is 1.44V x 6=8.64V,when “LOW” cutoff voltage is set, the cutoff voltage is: 8.64V x 50%=4.3V and when “Medium” of “High” is set, the cutoff voltage is now 8.64V X 65%=5.61V.

4. Factory Setup Defaults:

a. Turn on your radio and set the throttle stick to top positon (100%).
b. Plug the battery pack into your controller.
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.
d. When you hear “— — — —“ means you are in the Factory Setup Defaults menu, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.
e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

Restore- Sets the ESC back to factory default settings;

Brake:	OFF
Battery type Detect:	LiPo with Automatic Cell
Low voltage Cutoff threshold:	Medium (3.0V/60%)
Timing Setup:	Automatic
Acceleration :	Soft Acceleration
Motor Rotation:	Forward
Frequency :	16KHz
Low Voltage Cutoff Type:	Reduce power

5. Timing Setup

a. Turn on your radio and set the throttle stick to top positon (100%).
b. Plug the battery pack into your controller.
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.
d. When you hear – – – – means you are in the Timing Setup menu, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

- **Automatic (7-30 deg)** – ESC automatically detect the best motor timing
- **Low (7-22 deg)** – Setting for most 2 pole motors.
- **High(22-30 deg)**-setting for motors with 6 or more poles.

Note: For the beginner we recommend automatic timing to achieve best performance. For the multiple poles motor we recommend high timing to gain best efficiency.

6.Acceleration

a. Turn on your radio and set the throttle stick to top positon (100%).
b. Plug the battery pack into your controller.
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.
d. When you here V V V V V V V V means you are in the Acceleration menu, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.
e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

- **Soft** –---- Recommend for the plane with driving gears or helis.
- **Normal**- Recommend for the plane with driving gears or helis.
- **Hard** – Recommend for direct driving system.

7. Motor Rotation: Forward/ Reverse

a. Turn on your radio and set the throttle stick to top positon (100%).
b. Plug the battery pack into your controller.
c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.
d. When you hear W W W W means you are in the Motor Rotation menu, the default setup is OFF, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.
e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

There are two way to change the motor rotation: a) by swapping any two motor wires b) by programming with program box or radio.

8. Switching Frequency

a. Turn on your radio and set the throttle stick to top positon (100%).

b. Plug the battery pack into your controller.

c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.

d.When you hear // // // // means you are in the Switching Frequency menu, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

- **8KHz** – In runner motor recommended.
- **16KHz** – out-runner motors recommended.

9. Low Voltage Cutoff Type

a. Turn on your radio and set the throttle stick to top positon (100%).

b. Plug the battery pack into your controller.

c. Wait for 2 seconds, you will hear 4 groups of two sets of fast beeps, after this you will hear four single beeps to indicate you have successfully entered the programming mode.

d. When you hear _¯_¯_¯_¯ means you are in the Low Voltage Cutoff Type menu, please choose your desired value by pulling the throttle stick to the lowest position. if you are using gun type radio please keep the trigger at the neutral position.

e. The system will exit automatically and save the setting after finishing the desired item. You only can setup one item at a time, if you want to program another item you need unplug the battery and power on the ESC again.

- **Reduce Power** – Lower the power output.
- **Hard Cutoff** – Immediately shut down the power once the voltage reaches the preset value.

Programming Tone Reference Table

Programmable Item/Tones	Option
Throttle Calibration	
(Within the first 4 Sec) •• •• •• ••	
1 Brake	
_* _* _* _*	Brake On/Off
2 Battery type	
~ ~ ~ ~	NiCad
~~ ~~ ~~ ~~	Lipo
3 Low Voltage Cutoff Threshold	
* * * * * * * *	Low2.8v/50%
* ** ** * * *	Medium3.0v/60%
* ** ** ** *	High3.2v/65%
4 Restore Factory Setup Defaults	
— — — —	Restore
5 Timing Setup	
- - - -	Automatic(7-30°)
-- -- -- --	Low(7-22°)
--- --- --- ---	High(22-30°)
6 Acceleration	
V V V V V V V V	Soft
V V V V	Normal
V V V V V V V V V V V V	Hard
* * * *	
** ** ** **	
*** *** *** ***	
7 Motor Rotation	
W W W W	Forward/Reverse
8 Switching Frequency	
// // // //	8KHz
\\ \\ \\ \\	16KHz
9 Low Voltage Cutoff Type	
_ _ _ _	Reduce Power
— — — —	Hard Cut Off

Note: Item 7 is valid only tones.

Frequently Asked Questions

Q: Motor does n't work, but there are audible tones signal the number of cells after powering up ESC

Possible cause: The ESC throttle calibration has not set up.

Possible Solution: Set up the ESC throttle calibration

Q: Motor does n't work and no audible tone emitted after connecting the battery. Servos are not working either.

Possible cause:

1. Poor/loose Connection between battery Pack and ESC.
2. No power
3. Poor soldered connections (dry joints)
4. Wrong battery cable polarity
5. ESC throttle cable connected to receiver in the reverse polarity

Possible Solution: Check all the connections make sure you are doing it right.

Q: Motor does not work but servos do

Possible Cause:

1. Poor / loose connection between ESC and motor
2. Burnt motor coils
3. The battery pack voltage exceeds the acceptable range.
4. Throttle stick is not at the lowest position
5. The ESC throttle calibration has not set up

Q: Motor does not work but beeps like in the programming mode

Possible Cause: Reversed throttle channel caused the ESC to enter the programming mode.

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