

# ZTW AL-Series Brushless ESC User Manual V02

**Thank you for purchasing ZTW AL-Series Brushless electronic Speed Controller (ESC). We strongly suggest that you read this manual carefully before using it.**

**ZTW AL-Series ESC allows you to program all functions to fit your specific needs, which makes it very efficient and user friendly:**

1. Brake Setting
2. Battery Type(LiPo or NiCd/NiMh)
3. Low Voltage Cutoff Setting
4. Factory Default Setup Restore
5. Timing Settings (to enhance ESC efficiency and smoothness)
6. Soft Acceleration Start Ups (for delicate gearbox and helicopter applications)
7. Governor Mode (for helicopter applications)
8. Motor Rotation(clockwise\counterclockwise)
9. Switching Frequency
10. Low Voltage **Cut-off** Type (power reduction or immediate shutdown)

## **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.



## **POWERING UP THE ESC FOR THE FIRST TIME AND SETTING THE AUTOMATIC THROTTLE CALIBRATION**

The ZTW ESC features Automatic Throttle Calibration to attain the smoothest throttle response and resolution throughout the entire throttle range of your transmitter. This step is done once to allow the ESC to “learn and memorize” your Transmitter’s throttle output signals and only repeated if you change your transmitter.

1. Switch your Transmitter ON and set the throttle stick to its maximum position.
2. Connect the battery pack , **receiver and motor** 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.

**The throttle calibration is set and your ESC is ready to use.**

## **ENTERING THE PROGRAMMING MODE**

1. Switch your Transmitter **ON** and set the throttle to its **maximum** position.
2. Connect the battery pack to the ESC.
3. Wait until you hear two short beeps (**•• ••**) confirming that the ESC has now entered the programming mode.

4. If the throttle stick is left in the **maximum** position beyond 5 seconds, the ESC will begin the sequence from one function and its associated setting options to another. (Please refer to the table below to cross reference the functions with the audible tones).
5. When the desired tone for the function and setting option is reached, move the throttle stick down to its **minimum** position. ESC will emit two beeps (\*\*) confirming the new setting has been stored.
6. The ESC only allows the setting of one function at a time.  
**Therefore should you require making changes to other function, disconnect the battery pack and wait 5 seconds to reconnect the battery and repeat the above steps.**

### **Programming Mode Audible Tones**

Programming Mode Audible Tones	ESC Functions
<b>Throttle Calibration</b>	
(within the first 4 Sec ) ●● ●● ●● ●●	
1	<b>Brake</b>
_ * _ * _ * _ *	Brake On /Off
2	<b>Battery type</b>
~ ~ ~ ~	NiCad
~~ ~~ ~~ ~~	LiPo
3	<b>Low Voltage Cut-off Threshold</b>
* _ * _ * _ * _ * _ * _ *	Low (2.8V/50%)
* _ * _ * _ * _ * _ * _ *	Medium (3.0V/60%)
* _ * _ * _ * _ * _ * _ *	High (3.2V/65%)
4	<b>Restore Factory Setup Defaults</b>
- - - - -	Restore
5	<b>Timing Setup</b>
- - - - -	Automatic (7°-30°)
-- -- -- --	Low (7°-22°)
--- --- --- ---	High (22°-30°)
6	<b>Soft Acceleration Start Ups</b>
∨∨ ∨∨ ∨∨ ∨∨	Very Soft
∨ ∨ ∨ ∨	Soft Acceleration
∨∨∨ ∨∨∨ ∨∨∨ ∨∨∨	Start Acceleration
7	<b>Governor Mode</b>
_ * _ * _ * _ *	Rpm off
_ ** _ ** _ ** _ **	Heli first range
_ *** _ *** _ *** _ ***	Heli second range
8	<b>Motor Rotation</b>
W W W W	Forward/ Reverse
9	<b>Switching Frequency</b>
// // // //	8kHz
\\ \\ \\ \\	16kHz
10	<b>Low Voltage Cutoff Type</b>
- - - - -	Reduce Power
- - - - -	Hard Cut Off

### **Trouble Shooting**

<b>Trouble</b>	<b>Possible Reason</b>	<b>Solution</b>
Motor doesn't work, there`s no audible tones while servos work properly after powering up ESC.	The ESC throttle calibration has not been set up.	Set up the ESC throttle calibration.
Motor doesn't work and no audible tone emitted after connecting the battery. Servos are not working either.	Poor/loose Connection between battery Pack and ESC.	Clean connector terminals or replace connector.
	No power	Replace with a freshly charged

		battery pack
	Poor soldered connections (dry joints)	Re-solder the cable connections
	Wrong battery cable polarity	Check and verify cable polarity
	ESC throttle cable connected to receiver in the reverse polarity	Check the ESC cable connected to the ESC to ensure the connectors are in the correct polarity.
	Faulty ESC	Replace ESC
Motor doesn't work and no audible tone emitted after connecting the battery BUT servos are working. Or Motor doesn't work after powering up the ESC. An alert tone with single beeping tones followed by a short pause (* * * *) is emitted.	Poor / loose connection between ESC and motor	Clean connector terminals or replace connectors
	Burnt motor coils	Replace motor
	Poor soldered connections(dry joints)	Re-solder the cable connections
	The battery pack voltage exceeds the acceptable range.	Replace with a freshly charged battery pack Check battery pack voltage
Motor doesn't work after powering up the ESC. An alert tone with continuous beeping tones (***) is emitted.	The throttle stick is not in the minimum position at power up.	Move the throttle stick to the minimum position.
Motor doesn't work after powering up the ESC.ESC emits two audible tones followed by short beeps (●●●●●)	Reversed throttle channel caused the ESC to enter the programming mode.	Enter the servo reverse menu on your transmitter and reverse the throttle channel. Note: For Futaba radios set the throttle channel to Reverse.
Motor runs in reverse rotation	Wrong cables polarity between the ESC and the motor.	Swap any two of the three cable connections between the ESC and the Motor or access the Motor Rotation function via the ESC programming mode and change the pre-set parameters.
Motor stops running in flight.	Lost throttle signal	Check proper operation of the radio equipment. Check the placement of the ESC and the Receiver and check the route of the receiver's aerial and ESC cables to ensure there is adequate separation to prevent RF interference. Install a ferrite ring on the ESC's throttle cable.

	Battery Pack voltage has reached the Low Voltage Protection threshold.	Land the model immediately and replace the battery pack.
	Possible bad cable connection	Check and verify the integrity of the cable connections
Motor restarts abnormally ESC Overheats	Possible RF Interference at the flying field.	The normal operation of the ESC may be susceptible to surrounding RF interference. Restart the ESC to resume normal operation on the ground to verify recurrence. If the problem persists, test the operation of the ESC at a different flying field.
	Inadequate Ventilation	Relocate the ESC to allow better ventilation
	Servos drawing too much current and over loading the ESC.	Use servos that are adequately sized for the ESC. The maximum BEC current drawn should be within the BEC limits.
	Over sized motor or prop	Reduce Prop size or resize the motor

**Warranty Terms:**

1. Warranty Duration: 6 months (Offer the repairs for free excluding the damages caused by man)
2. The Shipping Cost will be undertaken by both parties during the warranty duration.(If the products are damaged when to be received, the shipping cost will be undertaken by us)
3. The repair time is normally within 7 days after receiving the defective products.



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