Ztw
Brushless Controls

Zone Top Way

BEAST 1:10 SCALE

USER MANUAL

Entry Level **&** *SCT PRO*

V01

Thank you for purchasing the ZTW Brushless Electronic Speed Controller (ESC). The ZTW 1:10 Scale BEAST Series ESC is specifically designed for operating 4 Pole Sensorless brushless motors. This is a high quality and high performance ESC which can be used for 1:8 scale truck and buggies. Beast series ESC are well designed and tested and fine-tuned by the experienced driver proven to be a reliable quality ESC. On top of this, we make it more resistant to water. Not splash, it's real waterproof. You can run your vehicles through the morning dew, down the muddy road, across the soggy snow or just about anywhere else you'd be interested in running. In order to operate this ESC properly please read this manual thoroughly before use. ZTW 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:

- Enhanced throttle response, excellent acceleration, strong brakes and throttle linearity.
- Using LED program card to make adjustments.

- Multiple protection features: Low voltage cut-off protection, over-heat protection and throttle signal loss protection.
- Compatible with most of brushless motor.

BEAST Series 1:10 ESC Specifications:

Model	Beast SL 45A	Beast SL 60A	Beast SL 80A	Beast SL 120A
PN#Model	4104520	4106021	4108021	4112021
Cont.Current	45A	60A	80A	120A
Burst Current	260A	380A	570A	760A
Resistance	0.0010ohm	0.0007ohm	0.0003ohm	0.0003ohm
Suitable Car	1:10 on-road and off-road cars/trucks,SCT		1:10 scale short course,on and off road racer	
Motor Type	4 Pole Sensorless brushless motor			
Suitable Brushless Motor	4P SL 3650B 2Y 4350KV	4P SL 3650B 2Y 4350KV	4P SL 3660 3.5D 3000KV	4P SL 3660 2.5D 4200KV
Battery cell	2-3S Lipo/5-10S Cell Nixx(NiMH/NiCd)	2-4S Lipo/5-12S Cell Nixx(NiMH/NiCd)		
BEC Output	6V/2A	6V/3A	6V/3A	6V/3A
Dimension(without fan)	45*32*37mm	52*38*36mm	52*38*36mm	52*38*36mm
Weight(g)	90g	107g	107g	107g

Begin to Use The New ESC:

Please attend to each connections and make sure each assignment is correct.

① Signal wire ⑤ Yellow motor wire B

② Switch wire ⑥ Blue motor wire A

③ Orange motor wire C ⑦ Power wire(-)

④ Power wire(+) ⑧ Capacitor wire

① Signal wire ⑤ Blue motor wire A

② Switch wire ⑥ Orange motor wire C

③ Power wire(+) ⑦ Yellow motor wire B

④ Power wire(-)

Sensorless Mode

When using a Sensoreless Brushless motor, the Blue motor wire A , Yellow motor wire B and Orange motor wire C of the ESC can be connected with the motor wires freely. If the motor runs in the opposite direction, please swap any two wire connections.

Connection to the Receiver

Black wire   RX-
Red wire   RX+6.0V
White wire   RX-Signal

LED Indication

* When ESC are connected with the battery pack, the ESC can automatically identify the motor type via indicated LEDs.

Function	LED	LED Status
Low voltage of the battery	Red LED	Blinking
Over-heat of the ESC and motor(95℃)	Blue LED	Blinking
Sensorless motor	Blue LED	ON

Throttle Range Calibration

1. Turn on the transmitter, then connect ESC with the battery packs and set the direction of the throttle channel to REV; set the EPA/ATV value of the throttle channel to 100%.

2. Press and hold the "Set" button and switch on the ESC, release the button when the Blue LED turn solid. Pull the throttle trigger to full position, Red LED light will flashes and motor beeps once. when system confirms the position.

3. Push the throttle trigger to full Brake position, Blue LED light will flashes and motor beeps twice when system confirms the position.

4. Now trigger goes back to neutral position, both of the Red LED and Blue LED blink and motor beeps three times when system confirms the position.

5. Turn off the ESC power switch to save the settings.

6. Turn the ESC back on. You are ready to use the ESC now.

Programmable Item and Default Settings

Programmable Items	Programmable Value								
	1	2	3	4	5	6	7	8	9
Cut-off Voltage	2.6V/cell	2.8V/cell	3.0V/cell	3.2V/cell	3.4V/cell	NO-cut off			

Running Mode	Forward w/o Reverse	Forward with pause then Reverse	Forward /Reverse						
Motor timing	Very Low	Low	Normal	High	Very High				
Initial Acceleration	Low	Medium	High	Very High					
Throttle percent Reverse	20%	30%	40%	50%	60%	70%	80%	90%	100%
Throttle Limit	0%	20%	30%	40%	50%	60%	70%	80%	90%
Percentage Braking	10%	20%	30%	40%	50%	60%	70%	80%	100%
Percentage Drag Brake	0%	4%	8%	12%	15%	20%	25%	30%	
Motor Rotation	Normal	Reverse							
Neutral Range	2%	3%	4%	5%	6%	10%			

Note: Items above Colored are default settings

1. Cutoff Voltage

● **Automatically detect the number of the cells**

According to the type of your batteries , set up the type of the batteries and Low Voltage Cutoff Threshold via PC software or program card. The ESC can detect the Voltage of the battery anytime and will lower the output power once the Voltage of the battery is lower than the preset Low Voltage Cutoff Threshold.

● When using **NiMH or NiCd batteries** you do not need to set a cutoff voltage to protect the batteries. If you are using more than 6-cell NiMH or NiCd batteries, you must adjust the cutoff voltage, for example if you are using an 8-cell pack of NiMH batteries you would use a cutoff of 5.6V volts (8 x 0.7V = 5.6V). When the voltage of the batteries packs is within 8.4~12.6V, the ESC will automatically identify 3S LiPos. When the voltage of the batteries packs is less than 8.4V, the ESC will automatically identify 2S LiPos. When the voltage of the batteries packs is within 8.4~16.8V, the ESC will automatically identify 2~4S LiPos. When the voltage of the batteries packs is within 21~25.2V, the ESC will automatically identify 5-6S LiPos.

● **Customized Voltage Cutoff** (for NiMH or NiCd Batteries) you can select a starting cutoff voltage of 4, 5, 6, 9 or 12 volts. Then using the up/down to the right of the voltage you can increase the voltage stepping up 0.1V between the selectable settings.

* When using any **Lithium batteries,** they must not be discharged to less than 3.0V per cell.

2. Running Mode

● **Forward w/o Reverse**

This is a Race setting - Reverse is disabled.

You will find in racing, most tracks will not allow racing with reverse enabled.

● **Forward with pause then Reverse: (DEFAULT)**

General bashing around (FUN) or racing if reverse is allowed for the event. The Electronic Speed Controller requires 2 seconds of continuous neutral from the transmitter prior to allowing reverse to operate.

Note: There is automatic protection within the ZTW ESC. Only after you have stopped and returned the trigger to neutral will reverse become available. If while traveling in reverse, pull the trigger to go forward. This is to help prevent serious damage to the drive train.

● **Forward / Reverse**

If the option is actived, the RC car could go forward and backward, but couldn`t brake.

ESC – reverse operation

Should you get into a situation that requires reverse, after you have applied any brakes you may have needed, return the throttle trigger to the neutral position. Wait a moment or two and then push the trigger forward for reverse.

3. Motor Timing

This option affects the power band and efficiency (run time) of an electric motor. The default is

"Normal" and is a good starting point to deliver power and provide good run time.

● **Very Low** Provides maximum efficiency with less power. Higher timing produces significantly more power but at the expense of efficiency (less run time) and typically the motor will generate more heat. Each brushless motor will respond to timing differently. Good for running around on paved, or harder surfaces, and racing with high KV rated or low-turn motors.

● **Low** Provides power for running through soft surfaces, having fun and longer run time.

● **Normal (Default)** Good mix of power and efficiency using any motor

● **High** More power than efficiency so run time will reduce, and you should be monitoring motor heat. The higher KV or lower turn motors will generate heat quickly using this setting. A safe high temperature range is 165F to 180F (74° - 82° Celsius), going higher may damage your motor.

● **Very high** This is maximum power and must be used with **caution**.

Note : Any motor has the potential to over-heat in this setting. Frequently check the motor temperature and make sure you're not operating higher than 165° and 180° Fahrenheit (74° - 82° Celsius), which may damage your motor, or damage your Electronic Speed Controller (ESC).

4. Initial Acceleration

Use this to limit the initial power that is sent to the motor when starting from a complete stop. Using the low option, the vehicle will launch very slowly and provide the longest run times. When using the HIGH choice, you will have wheel-spinning acceleration at the cost of run time.

This is also very tough on the batteries as the amperage draw can be very high. If your vehicle cuts out, hesitates or loses radio control, you should consider setting this at a lower value.

● **Low** Using this option will provide longer run times and is easiest on the batteries. It is a good choice for beginners.

● **Medium** Medium requires more from your batteries, and is good for low traction surfaces.

● **High** This option will provide full acceleration and requires stout batteries to supply the load required in this setting.

● **Very high** This option will provide full acceleration and requires stout batteries to supply the load required in this setting.

5. Throttle Percent Reverse

Use this to limit the power available using reverse throttle. The lower the percent or level the less speed will be available in reverse.

20%, 30%,40%,50%,60%(Default),70%,80%,90%,100%

6. Throttle Limit

Use this to limit the power available using forward throttle.

The lower the percent the less forward throttle speed will be available.

0%(Default), 20%,30%,40%,50%,60%,70%,80%,90%

7. Percentage Braking

Gives you the ability to have full control over the amount of brake your vehicle will have.

10%,20%,30%,40%,50%(Default),60%,70%,80%,100%

8. Percentage Drag Brake

0%(Default) 4%,8%,12%,15%,20%,25%,30%

The drag brake function provides the driver a set percentage of brake when you have the transmitter resting in neutral. This will create the "feel" of a brushed motor.

Drag brake are used in racing to slow a vehicle as you let off approaching a corner versus the driver having to push the brake at every corner.

Try working with this to get a sense of how you might use this for your track.

If you are running on a high traction track with tight corners, a stronger setting should work best.

If you are running in an open area, you will find a smaller percentage will result in better control.

If you are running in dusty or slippery surfaces, you will more than likely want to use the lowest option.

9. Motor Rotation

Normal (default), Reverse

10. Neutral Range

 This setting adjusts the amount of "Deadband" off neutral on the throttle trigger. This is in Milli-Seconds (MS) and is the amount of neutral when you pull the trigger.

The smaller the value the less "Deadband" or movement is required off-center for the ESC to begin throttle functions.

Using a higher value for this setting will provide a wider Deadband.
2%,3%, 4% (Default) , 5%,6% ,10%

LED Program card

1. The ZTW Program card with LED display is easy to use and convenient to carry. All of the programmable functions are shown on the program card.

2. Turn on the ESC. Remove the Signal wire and plug it into the top-socket on the Program card , wait for 2 seconds until the LED is ON.

The first programmable function will be shown, if an error occurs, please reconnect them.

3. If ESC is not connected with the batteries, the Program card should be connected with other power supply, the range of power supply is within 5.0-6.3V.

4. Press the button "Menu" on the Program card and circularly select each programmable function. At that time the number of the programmable function will be displayed on the left of the LED, the current value will be displayed on the right side. Then press the button Value to change the value and press the button OK to confirm. At the same time the Red indicating LEDs of both program card and the ESC blink. Turn off the ESC, the modified settings will be saved in the ESC's memory.

5. Press the button Reset to restore the default settings.

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