Brushless ESC's User Manual

DECLARATION

Thanks for purchasing JP 150A High Voltage Series Brushless Electronic Speed Controller (ESC). High power system for RC model can be very dangerous, so please read this manual carefully. In that we have no control over the use, installation, application, or maintenance of our products, no liability shall be assumed nor accepted for any damages, losses of costs resulting from the use of the product. Any claims arising from the operating, failure of malfunctioning 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 the product in question.

Important Warnings:

▲JP 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.

▲Observe all local laws when you use a RC aircraft or other RC vehicles

▲Never use 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.

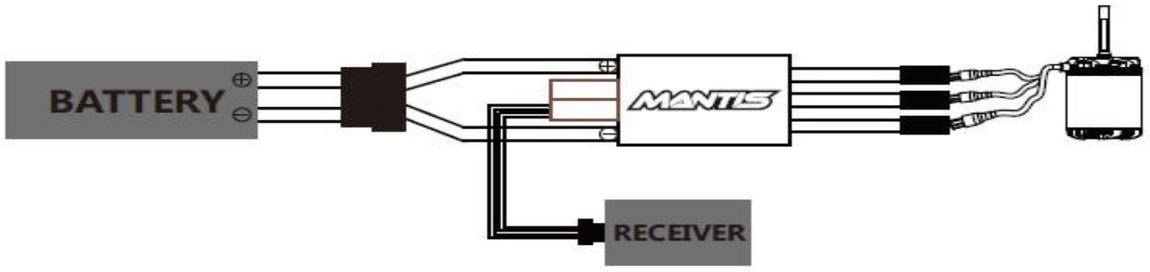
● Solder controller to the motor wires.

● Solder appropriate connectors to the battery wires.

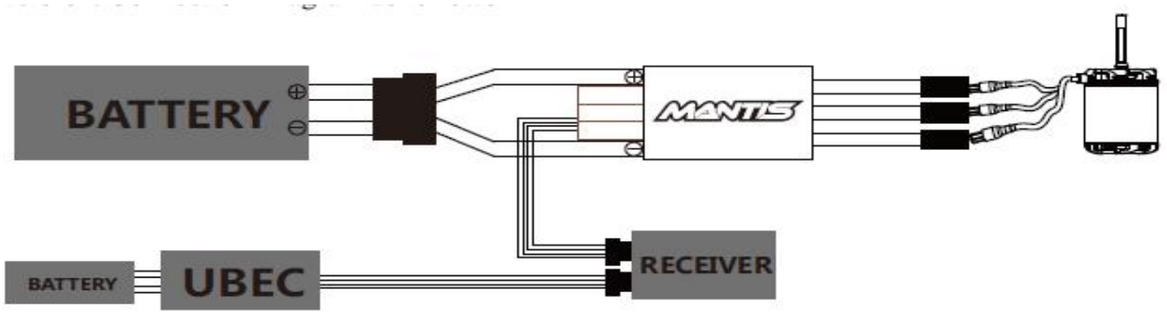
● Insulate all solder connectors with heat shrink tubes.

● Plug the "JR" connector into the receiver throttle channel.

● Controller Red and Black wires connects to battery pack Red and Black wires respectively.



You need extra appropriate battery to offer power supply for the receiver for HV OPTO version. Connection Diagram as follows.



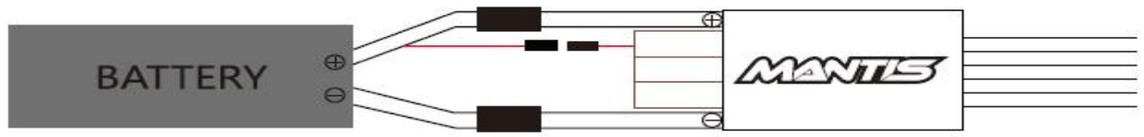
Connecting your Anti-spark Circuit:

1. Solder an extra wire to the positive wire (Red) of the battery for sake of best use of the circuit

2. Connect the extra wire with our anti-spark wire from the ESC before you plug your battery into your ESC

3. Plug your batter into the ESC connector, you will find the spark is completely eliminated

4. Do unplug the anti-spark wire before you take further steps.



Specifications:

Type	PN#Model	Cont\Burst Current(A)	Battery cell NiXX\Lipo	Weight (g)	BEC Output	Size(mm) W*L*H	User Program
Mantis 6A BEC	2006101	6A\8A	5-10NC\2-3Lipo	6	5V/1A	14x21x7	Yes
Mantis 12A BEC	2012101	12A\16A	5-12NC\2-4Lipo	10	5V/1A	22x23x8	Yes
Mantis 25A BEC	2025101	25A\35A	5-12NC\2-4Lipo	19	5V/2A	29x28x9	Yes
Mantis 35A BEC	2035101	35A\45A	5-12NC\2-4Lipo	31	5V/3A	29x38x10	Yes
Mantis 45A SBEC 5A	2045201	45A\65A	5-18NC\2-6Lipo	47	5.0V,5.5V,6.0V adjustable/5A	31x57x12	Yes
Mantis 65A SBEC 5A	2065201	65A\85A	5-18NC\2-6Lipo	50	5.0V,5.5V,6.0V adjustable/5A	31x57x12	Yes
Mantis 85A OPTO	2085301	85A\100A	5-18NC\2-6Lipo	47		35x47x11	Yes
Mantis 85A SBEC 5A	2085201	85A\100A	5-18NC\2-6Lipo	57	5.0V,5.5V,6.0V adjustable/5A	35x47x15	Yes
Mantis 125A SBEC 5A	2125211	125A\150A	5-18NC\2-6Lipo	145	5.0V,5.5V,6.0V adjustable/5A	48x80x21	Yes
Mantis 155A SBEC 5A	2155211	155A\200A	5-18NC\2-6Lipo	147	5.0V,5.5V,6.0V adjustable/5A	48x80x21	Yes
Mantis 90A OPTO HV	2090411	90A\100A	18-38NC\6-12Lipo	128		48x80x21	Yes
Mantis 120A OPTO HV	2120411	120A\150A	18-38NC\6-12Lipo	142		48x80x21	Yes
Mantis 150A OPTO HV	2150401	150A\180A	18-38NC\6-12Lipo	142		48x80x21	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

◆ Governor Mode

◆ Strong BEC Output

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 air ow to offer best cooling to prevent overheating. DO NOT cover the side with the at 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 at the to position (100%). 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.

Using the ESC

1. Turn on your radio and keep the throttle stick at the lowest 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 position (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 position (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 one short beep “Beep” means you are in the Brake menu, the default setup is OFF, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

Note:

Brake Off- Sets the propeller to freewheel when the throttle stick is at the minimum position.

Soft Brake-Sets the propeller to the 30% of the brake when the throttle stick is at the minimum position (Recommended for folding props).

Mid Brake-Sets the propeller to the 60% of the brake when the throttle stick is at the minimum position (Recommended for folding props).

Hard Brake-Sets the propeller to the 100% of the brake when the throttle stick is at the minimum position (Recommended for folding props).

2. Battery Type : NiCad/NiMH/LiPo

1. Turn on your radio and set the throttle stick to top position (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
4. When you hear two short beeps “Beep-Beep” means you are in the Battery Type menu, please choose your desired value by pulling the throttle stick to the lowest position.
5. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

3. Low Voltage Protection Threshold (Cutoff Threshold):

a. Turn on your radio and set the throttle stick to top position (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 three short beeps “Beep-Beep-Beep” means you are in the Low Voltage Protection Threshold menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one. If you do not want to change other settings, unplug the power to exit.

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 position (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 four short beeps “Beep-Beep-Beep-Beep” means you are in the Factory Setup Defaults menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

Restore- Sets the ESC back to factory default settings:

Brake Type： Brake Off

Battery Type： LiPo with Automatic Cell detective

Cut Off Voltage Threshold： 3.0V/60%

Motor Timing： Auto

SBEC Voltage Output 5.0V

Governor Mode ： RPM OFF

Motor Rotation ： Forward

Start Up Strength： 30%

Low Voltage Cut Off Type： Reduce Power

5. Timing Setup

a. Turn on your radio and set the throttle stick to top position (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 one long beep “Beep-----” means you are in the Timing Setup menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

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. SBEC Voltage Output

a. Turn on your radio and set the throttle stick to top position (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 one long beep and 1 short beep “Beep----Beep” means you are in the SBEC Voltage Output menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

Option 1 : 5.0V

Option 1 : 5.5V

Option 1 : 6.0V

Note: This feature is only valid for the ESCs with BEC 5A output (45A SBEC-155A SBEC).

7. Governor Mode (Heli)

a. Turn on your radio and set the throttle stick to top position (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 one long beep and 2 short beeps " Beep-----Beep-Beep" means you are in the Governor Mode menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

1) OFF

2) **Soft Start** :

Soft Start 1: 8-second delay from start to full rpm;

Soft Start 2: 18-second delay from start to full rpm;

Note: If the throttle is cut off after starting less 3 Seconds, then the next start will be as normal start. If the throttle is cut off after starting more than 3 Seconds, the next start will be as soft start.

Governor Mode 1 : There will be a 23-second delay from start to full rpm;If lower the throttle to the 80% position of the full throttle or lower than 80% position, the RPM would be definitely changed , the lost RPM will be detected and compensated automatically by the ESC that makes sure to keep the RPM at the same speed. (Note: This function is only for Low KV motor)

Governor Mode 2 : There will be a 23-second delay from start to full rpm;If lower the throttle to the 80% position of the full throttle or lower than 80% position, the RPM would be definitely changed , the lost RPM will be detected and compensated automatically by the ESC that makes sure to keep the RPM at the same speed. (Note: This function is only for High KV motor)

Note:

1: If the throttle is cut off after starting less 3 Seconds, then the next start will be as normal start. If the throttle is cut off after starting more than 3 Seconds, the next start will be as soft start.

2: Once the Governor Mode is enabled, the ESC's Brake and Low Voltage Cutoff Type settings will automatically be resettled to Brake Off and Reduce Power respectively, regardless of what settings they were previously set.

3: Lower 50,000 turns is considered as Low KV motor, 100,000-200,000 turns is considered as High KV motor.

Formula : Pole's qty of motor x KV value x Voltage= Motor turns

For example: we test a 8 pole motor 1040KV with 6S Lipo, its turns will be 8x1040KVx25v=208,000 turns, so you can choose Governor Mode 2.

8. Motor Rotation: Forward/ Reverse:

a. Turn on your radio and set the throttle stick to top position (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 one long beep and 3 short beeps "Beep-----Beep-Beep-Beep" means you are in the Motor Rotation menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit. There are two way to change the motor rotation:

a) by swapping any two motor wires

b) by programming with program box or radio.

9. Start Up Strength:

a. Turn on your radio and set the throttle stick to top position (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 1 long beep and four short beeps " Beep----- Beep- Beep- Beep- Beep" means you are in the Start Up Strength menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

Low(10%-15%-20%) low start up current

Mid (25%-30%-35%) start up current

High(40%-45%-50%) high start up current

10. Low Voltage Cutoff Type

a. Turn on your radio and set the throttle stick to top position (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 two long beep" Beep----- Beep-----" means you are in the Low Voltage Cutoff Type menu, please choose your desired value by pulling the throttle stick to the lowest position.

e. The system will automatically enter into next setting item when you finish one . If you do not want to change other settings, unplug the power to exit.

Reduce Power – Lower the power output

Hard Cutoff – Immediately shut down the power once the voltage reaches the preset value

THE TONES WILL BE HEARD IN SEQUENCE AS FOLLOWS:

1 Beep- Brake Type (1 short tone)

2 Beep-Beep- Battery Type (2 short tone)

3 Beep-Beep-Beep- Cut Off Voltage Threshold (3 short tone)

4 Beep-Beep-Beep-Beep- Restore Factory Setup Defaults (4 short tone)

5 Beep----- Motor Timing (1 long tone)

6 Beep-----Beep- SBEC Voltage Output (1 long tone 1 short tone)

7 Beep-----Beep- Beep- Governor Mode (1 long tone 2 short tone)

8 Beep-----Beep- Beep- Beep- Motor Rotation (1 long tone 3 short tone)

9 Beep-----Beep- Beep- Beep- Beep- Start Up Strength(1 long tone 4 short tone)

10 Beep----- Beep----- Low Voltage Cut Off Type (2 long tone)

Note :One long tone "Beep-----"is equal to five short tone "Beep-".

Programming Tone Reference Table

Tone of value / Prog.Item	BEEP-	BEEP-BEEP-	BEEP-BEEP-BEEP-	BEEP-BEEP-BEEP-BEEP-	BEEP-----	BEEP-----BEEP-	BEEP-----BEEP-BEEP-	BEEP-----BEEP-BEEP-BEEP-	BEEP-----BEEP-BEEP-BEEP-BEEP-
Brake Type	Brake OFF	Soft Brake	Mid Brake	Hard Brake					
Battery Type	NiCd/NiMH	Lipo	LiFe						
Cut Off Voltage Threshold	2.8V/50%	3.0V/60%	3.2V/65%	No Protection					
Restore Factory Setup Defaults	Restore								
Motor Timing	Auto	2°	8°	15°	22°	30			
SBEC Voltage Output	5.0V	5.5V	6.0V						
Governor Mode	RPM OFF	1stSoft	2nd Soft Start	Governor Mode 1	Governor Mode 2				
Motor Rotation	Forward	Reverse							
Start Up Strength	10%	15%	20%	25%	30%	35%	40%	45%	50%
Low Voltage Cut Off Type	Reduce Power	Cut Off Power							

Note: *Highlighted value are default settings.*

Frequently Asked Questions

Q: Motor doesn'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 doesn'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 battery pack voltage exceeds the acceptable range.

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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