

BRUSHLESS SENSORLESS SPEED CONTROLLER INSTRUCTIONS

Dear Customer, thank-you for choosing Mtroniks.

Your advanced speed controller is the result of a two year intensive development program. Every aspect of the design has been considered and your controller has been very carefully assembled and tested using state of the art manufacturing techniques in the UK.

Brushless motors offer incredible power and efficiency together with low weight and small size. To get the best from your power system carefully read and understand these instructions.

When setting the ESC to run your motor you will need to understand the different settings offered by your controller in order to get the best out of your new power system. In this way your Mtroniks controller gives you the ability to use virtually any suitable sized motor.

GETTING STARTED

We recommend the use of good quality, gold plated connectors which should be carefully soldered to the cables. Do not use Tamiya style connectors for the battery, these are only suitable for 10amps maximum and can become intermittent - not good in high power models. Use Mtroniks (or similar) gold plugs and tubes for the battery.

Plug the JR connector into the throttle channel on your receiver. Be sure to check the correct polarity of the wires in the socket and if necessary swap them round.

BEC (Battery Elimination Circuit)

The BEC in your controller is a 3amp circuit. **If you use an external receiver battery you need to cut the RED wire** in the JR lead between the Speed controller and the receiver.

INSTALLING IN YOUR MODEL

Attach your motor to the motor mount in your model with suitable screws, the screws should be long enough to screw into the motor chassis about 3mm to 4mm...no longer, otherwise its possible for the screw to impact the internal wires inside your motor and cause damage. Find a suitable place inside your model for your speed controller, ideally this will be close to the motor and main battery, avoid long wires, they create electrical noise and can result in all sorts of problems from poor starting to interference.

With the ESC in position solder one black wire to the NEGATIVE BATTERY post on the ESC and solder one red wire to the BATTERY POSITIVE post on the ESC, attach your preferred battery connector to these wires. Solder the supplied capacitor (if not already done for you) across the battery posts, the leg on the capacitor with a coloured stripe adjacent to it must be soldered to the NEGATIVE BATTERY post.

Solder the three remaining wires to the three motor posts, these are not colour sensitive and can be soldered on in any order.

Before you connect the main battery be sure that the wheels can't touch you or anything else.

We recommend that the initial testing and setting up of the system is done without a pinion attached but **DO NOT APPLY FULL THROTTLE** without the drive train connected, this may over rev. the motor. Switch your transmitter on and check that the throttle settings are 100% (computer radios). Switch on your Speed controller by connecting the battery. The controller will beep when the power is applied and then start flashing the green light. This means the controller is looking for the full throttle position. Push the throttle to full power. After about 2 seconds the green light goes out and the red starts flashing. The controller is now looking for the low throttle position. Pull the throttle stick all the way back, as before the red light will flash for 2 seconds and then the motor will beep. This is the arming beep. The controller has stored the throttle endpoints and the motor will start when the throttle is pushed forwards. If the motor is going the wrong way for your model just swap any TWO of the motor wires over, this will reverse the motor direction.

So to recap - and as soon as the green light starts to flash, push the throttle on your transmitter up to full power and back to zero again, when the red light flashes pull all the way back and return to neutral. Now wait for the beep and you're ready to go!

After you have done this once you don't need to do it again. If you switch on the controller and do not move the throttle stick then the controller will wait 2 seconds, beep and use the previous value of the stick travel.

If the controller produces 3 decending beeps this means that it did not see enough movement between the high and low throttle positions. You need to ensure your transmitter is set to 100% on the throttle channel. If this is the case then you need to operate the servo reverse on your transmitter, then switch everything off and try again.

Test the throttle action through a few starts and check everything works and there are no glitches.

ADVANCED SETUP OPTIONS

Your Mtroniks Controller has a number of programmable set-up options that are described graphically on the attached sheet. To enter the advanced set-up mode you need to go through an end point set-up. Switch on, push to full throttle and wait for the green light to stop flashing. When the red light starts flashing quickly pull the throttle stick right back and then before the red light has stopped flashing push to full throttle again and leave it there. There will be a small pause of about 3 seconds and then the controller will then be flashing it's green LED once..... to indicate function 1 , green setting. If you wanted the red setting (referring to the table) then you would pull back to minimum until the red LED was flashing once. To accept the setting move the throttle to the mid point and wait for the beep. Either the red or the green light will then flash twice indicating the current setting of the second option. When the throttle stick is at minimum or full throttle the controller will wait for ever flashing the number of the option being set on the appropriate light.

Leaving the stick at mid point "loads" whatever was set previously, so if you only want to change one parameter then just leave the stick mid point until you get to the one you want to change, change that one, then leave the stick mid point to keep the rest of the settings unchanged and you're done. There are 7 options to set. After setting the seventh option the motor will beep twice and then beep again. Disconnect the battery, count to 10 and reapply and the new settings will take effect

SETTABLE OPTIONS

Low Voltage Cut

These options are set using Option Numbers 1 and 2. Your controller also has a receiver priority circuit. Your controller will limit the power to the motor when the battery voltage drops below a specified level. There are 4 options for the cut-off voltage.

Option 1 = red	Option 2 = red	LV cut = Auto (x0.625 power on V)
Option 1 = green	Option 2 = red	LV cut = 6V LiPo
Option 1 = red	Option 2 = green	LV cut = 9V LiPo
Option 1 = green	Option 2 = green	LV cut = 12V LiPo

Maximum Brake setting

Option numbers 3 and 4 control the maximum amount of braking power available. This feature enables you to choose between 4 possible maximum levels, 25%, 50%, 75% AND 100%. Under some conditions full brakes can seem a bit too heavy handed, this option allows you to reduce the amount of braking power you get at full brake travel. ***This option is only available if the brakes are set to be on! (See option number 7)***

Option 3 = red	Option 4 = red	25% of maximum
Option 3 = green	Option 4 = red	50% of maximum
Option 3 = red	Option 4 = green	75% of maximum
Option 3 = green	Option 4 = green	100% of maximum (Full brakes)

Acceleration

Option numbers 5 and 6 choose one of 4 possible acceleration rates. This can be useful to control the amount of torque the bike has during hard acceleration. If you have a high voltage battery pack you would want slower acceleration to limit the amount of current taken. In general choose an acceleration level that gives a good response without motor "screaming" or the motor stopping due to over current.

Option 5 = red	Option 6 = red	very slow
Option 5 = green	Option 6 = red	slow
Option 5 = red	Option 6 = green	fast
Option 5 = green	Option 6 = green	very fast

Brake Setting

Option 7 turns the braking function on or off.

Option 7 = red	Brakes off (so no adjustment available)
Option 7 = green	Brakes on

Example

For example if you wanted to run NiCAD/NiMH cells, 50% maximum brakes, fast acceleration and brakes on, you would need the following option settings

1 flash	red
2 flashes	red
3 flashes	green
4 flashes	red
5 flashes	red
6 flashes	green
7 flashes	green

OTHER FEATURES

Current limit trip feature

Your controller has an over current trip, if your motor becomes stiff or jammed after start-up and at high power then the current to the motor is cut. This trip level is set at approximately 20% over the maximum current of the Controller. This feature can save battery and/or controller damage under these conditions.

Over Temperature cut-out

The controller is fitted with an over temperature cut out system which operates at 90 centigrade. Motor power is cut if this temperature is exceeded.

ALWAYS test your model at typical settings to make sure your controller is not getting too hot.

FIXES... Most thermal problems arise when driving for extended periods with large motors and part throttle.

Mtroniks offer a simply installed power booster diode pack, which you can install to your controller and this will solve overheating problems in almost all cases.

When things go wrong

Your controller is constructed to a very high standard, problems are rare and normally caused by external factors such as poor wiring, damaged motors, incorrect connections etc. You can help reduce the possibility of incorrect connections by taking time and care during readying your model for use and by regularly checking all connections are properly cleaned and insulated.

WARNINGS

You risk destroying your controller if you:

- 1/ Connect more battery cells than the maximum number specified.
- 2/ Reverse the connections from the battery to your controller.
- 3/ Short the motor wires together when the battery is connected.
- 4/ Make bad connections to the motor or battery.
- 5/ Overload the BEC circuit with higher currents than specified or exceed it's maximum power rating.
- 6/ Allow metal shards or filings to short the controller.
- 7/ Disconnect the battery while the motor is running or turning.

SAFETY

- 1/ ALWAYS disconnect the battery from your controller when you are not using it.
- 2/ ALWAYS be prepared for the wheels on your model to turn unexpectedly. These electronic motors create serious power and can cause serious injury. You have been warned. Take care and NEVER allow children to use this equipment.

Thank-you for taking the time to read these instructions and we hope that you enjoy using your new Mtroniks Brushless controller.