

# DC Speed Controller

## Series III

Thank you for purchasing the Series III Motion Dynamics DC Motor Speed Controller. We hope your controller will give you many years of reliable and trouble free operation!

In the following pages you will find information on how to set up and use your new controller. This documentation covers the 25A and 50A versions for both the PCB and Case Models.

The controller is available with a few options. These options are:

**Current limit (25 Amp or 50 Amp)** This option lets you choose what the maximum continuous current limit of the controller will be. If you choose the 25A model, then the maximum continuous current you can draw from the unit is 25 Amps, Or, if you select the 50A model, you can draw a maximum current of 50A continuous. The 25A model can peak at 50A and the 50A model can peak at 100A for very brief periods of time.

**Hall Effect** This option gives you an external connector that will allow you to hook up a hall effect device to control the motor speed. Hall effect devices typically include motorbike style throttles, Thumb throttles and foot throttles. The output from a Hall Effect device differs in voltage from a standard potentiometer, which means that if you were to plug a hall effect device into a potentiometer socket you may not have a full range of control! For example, you may only see a full range from 5% to 60% speed variation!

The controller can work with voltages between 11V to 55V (Absolute upper maximum voltage) and can power DC Brushed motors from 12V to 48V

### Setting up and Using your new controller!

The controller should be setup when you receive it for whatever configuration selected when you ordered, but if you want to play with it, here are the options. The Potentiometer supplied with this controller is a 10K Linear Potentiometer (in case you ever need to replace it) If you didn't select the Hall Effect option selected when you ordered your controller, then jumpers **J1** and **J3** will not be available to you.

### The connections are straight forward:

Connect your Battery Positive, Negative and hook up your motor.

### Control: Hall Effect or Potentiometer (J1)

If you have a hall effect model, you will need to set the jumper on J1 to pins 1 and 2.

If you have a potentiometer, you will need to set J1 to pins 2 and 3

This selects which control method you can use. You can select to use either one, but you cannot use both at the same time. If you wanted to be technical and use both, then you could put a switch to select between one or the other. A DPST switch will be ideal for this (ON/ON)

### Soft Start Settings (J2)

For a slow soft start connect the jumper J2 to pins 1 and 2

For a slower soft start connect the jumper J2 to pins 2-3

To turn soft start off, remove this jumper completely. Default setting for J2 is pins 1 and 2)

Again, If you wanted to be technical and use both, then you could put a switch to select between one or the other. A DP3T switch will be ideal for this (ON-OFF-ON).

### Hall Effect Setting (J3)

This jumper is setup for the Hall Effect foot throttle (J3-2 to J3-1). It has a different voltage than a standard hall effect throttle and if you try and use it on a standard hall effect connector you will soon work out that while it works, you can never get full speed. Most hall effect throttles on the market will need the jumper between the centre pin and the H side of the jumper (J3-2 to J3-3)

**P1** - this trim pot will adjust the Hall Effect Throttle Start Position.

**P2** - This is the Start position adjustment for the Potentiometer.

**P3** - This is the Low voltage cutout. This is suitable for protecting expensive lithium batteries from being drained too much,

**P4**- This is the frequency adjust. The controller has a frequency range of 1300hz to 10kHz. Simply adjust this in either direction while the motor is running at a low RPM to the point where the motor is making the least amount of noise (i.e. whining)

If you are using a standard Hall Effect throttle, select J3 jumper positions J3-1 to J3-2.

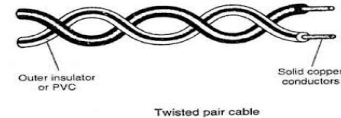
If you are using a foot throttle (Specifically the metal one we sell), select J3 jumper positions J3-2 to J3-3

**Power Switch** - While there are 3 connections to the board, only 2 of the three are used. They are labelled 1-2-3 on the diagram and show a switch there. On the external power switch, the connection closest to the PCB's edge (marked as 1 on the PCB) is not used, but you must link 2 and 3 together to turn the power on, this is what the switch (supplied) is used for.. On the internal power switch (INT Power) Jumper (also labelled 1,2 and 3) 1 is unused, and 2 and 3 need to be linked to provide turn power to the controller on.

**It is extremely important that you keep both the battery wire length (and more importantly) the motor wire lengths as short as possible (anything more than 30cm to the motor is too much!).** This is because the high voltage spikes from the motor are sent back into the controller where they are clamped and a smaller voltages are sent back to the motor to burn off as excess! If the wires are too long, then instead of the voltages decreasing like they are supposed to, instead the spikes compound and get bigger and bigger and eventually, the voltage spikes that your motor is feeding BACK into the controller overwhelm the 400v diodes that are meant to be there to protect it, and that's it! you blow your controller!

If you need long wires to your motor, then its vital you either put a snubber OR a freewheeling diode as close to the motor coil as possible.

For any lengths of wire either from the battery or from the controller to the motor, ALWAYS twist the wiring (as shown) to reduce the inductance built up over the lengths of wire. If you find a motor is sluggish to start, stop or is slow to respond, add a capacitor (0.1uf 250V-450V) straight across the motor positive and negative terminals. This will help reduce the spikes and induction from the motor. If you have to have long wires, then always increase the battery leads rather than the motor leads!



For the LV (Low Voltage) adjustment:

To set this up, run the battery down to the point where you feel it is at its lowest you are prepared to go, then adjust the trimpot anti-clockwise until the controller output shuts down. Now in the future when your battery reaches this point the controller will automatically shut down.

To open the case model to access the adjustments and settings (see the image on the next below) unscrew the top 4 screws on the case ends. The lid will then be removable. It lifts from the top edges.

You can see how the lid removes from the case version below. You will need a Philips head screwdriver.



**Some additional ordering information!**

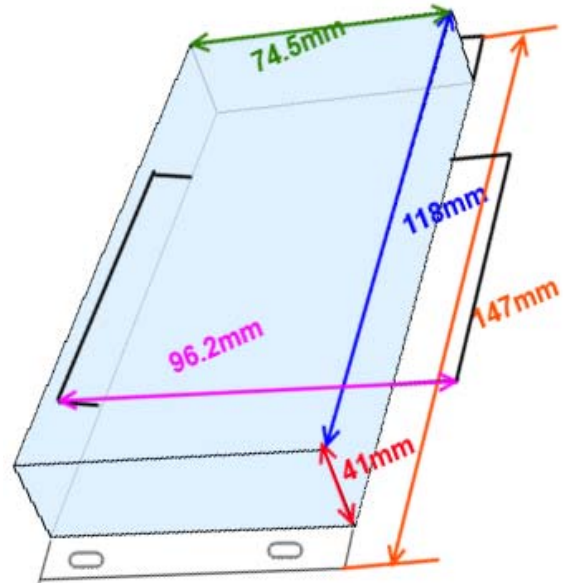
When you order your controller, if you have selected to have the hall effect option but don't order a hall effect throttle because you have your own, the controller will be supplied with and setup for a potentiometer.

That means when you receive the controller, if you have your own hall effect you will need to manually setup the jumpers for the hall effect throttle settings!

If you forget to select the hall effect option, your controller will NOT work with a hall effect throttle and will only ever work as a potentiometer controller!

The controller can only "see" one controller at a time, not both! So if you have the jumper set to throttle, it will see all hall effect throttles! If you have it set to Potentiometer, it will only work with a potentiometer!

# Case Dimensions



# Controller Jumpers & Connections

