

Bipolar Stepper Motor Controller

ESMC-01



Description

Easy to use stepper motor controller.  
 Bipolar output works with 4,6 and 8 lead hybrid stepper motors.  
 Adjustable speed control.  
 Programmable number of steps clockwise and anti-clockwise.  
 DIP switch mode selection.  
 Operating voltage: 7.5V to 20V DC.  
 Ideal for robotic control and automation uses.  
 Over-temperature protection.  
 3.5mm mounting holes  
 Small size: H=40, W=59, D=22 mm

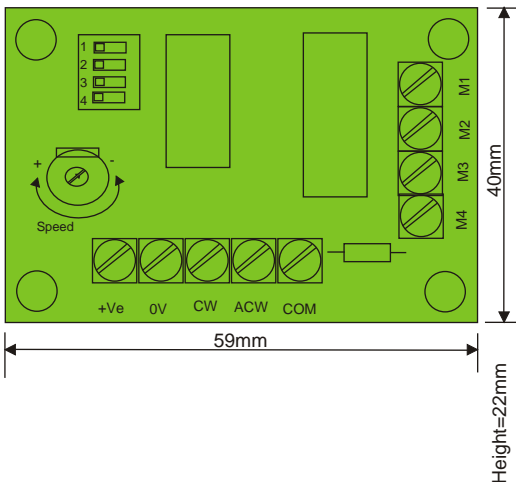
Specification

Max motor current	600mA *
Step frequency min	84Hz
Step frequency max	1.8KHz
Operating voltage	7.5V to 20V DC*

\*See datasheet for L293D for more information  
[www.st.com/stonline/books/pdf/docs/1330.pdf](http://www.st.com/stonline/books/pdf/docs/1330.pdf)

Connections

Pin	Description
+V	Positive supply voltage input
0V	Supply input GND
CW	Clockwise input control
ACW	Anti-clockwise input control
COM	Switch input common. (0V)
M1	Motor coil A1
M2	Motor coil A2
M3	Motor coil B1
M4	Motor coil B2



Overview

The ESMC-01 operates in 2 main modes;

Mode1.

Simple pushbutton. In this mode, the controller turns the motor clockwise or anti-clockwise in response to the trigger inputs.

Mode 2.

Programmed operation. In this mode, the controller turns the motor clockwise or anti-clockwise by a pre-programmed amount of steps.

In each mode, the step frequency has an adjustable clock of approximately 84Hz to 1.8KHz  
 In pushbutton mode, you can select single step or continuous operation.

In no overshoot mode (DIP 3 ON) the motor will not step beyond the limits for programmed operation while in mode 2. Single step applies to programming and mode 1 only.

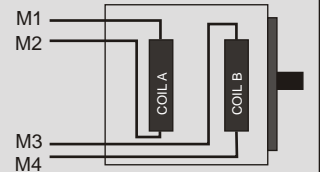
DIP switch settings

- switch 1 = set up the number of steps (ON = set up)
- switch 2 = manual or programmed operation (ON = programmed)
- switch 3 = no overshoot mode (ON = no overshoot)
- switch 4 = single step mode (ON= single step)

The DIP switches must be set before powering up the PCB for the modes to operate.

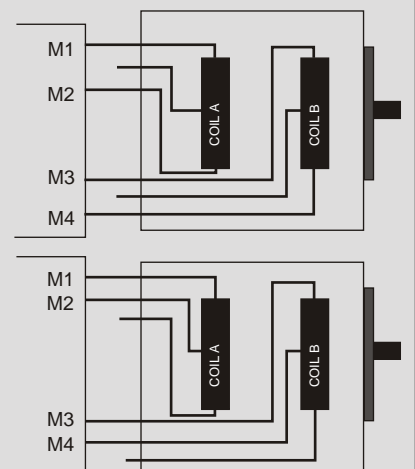
Connecting a 4 wire stepper motor

Follow the diagram on the right to see how to connect the two coils of a 4 wire stepper motor to the motor outputs of the PCB.  
 To find out which wires are coils A and B, simply measure the resistance between the wires. You will find that there is a low resistance between the ends of each coil.



Connecting a 6 wire stepper motor

A 6 wire stepper motor can be connected using the wires from either end of the coil as shown above right, or by using the connection from the centre of the coils as shown below right.  
 Connecting to the centre of the coils will mean you are connecting through a lower resistance.



## Programming method

Programming of the module allows you to set the number of steps following a trigger while in programmed operation, (mode 2).

Program the number of steps as follows;

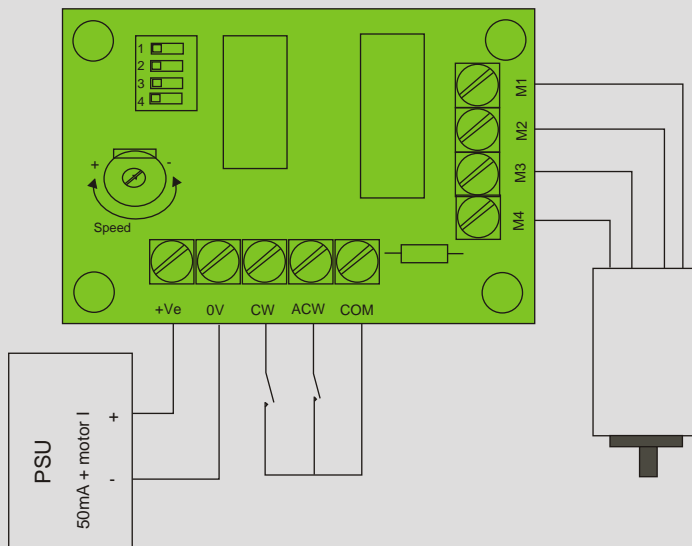
- 1) Switch off power to the PCB
- 2) Set DIP switch 1 and 2 to ON (right)
- 3) Power up the PCB
- 4) Press the CW switch input and hold down to see the motor turn clockwise, you can release the switch and re-press until the motor reaches the required position
- 5) When the motor has rotated the to the position needed, release the switch.
- 6) You can now program the number of steps anti-clockwise in the same way, or do not press the ACW switch for the PCB to automatically select the same number of steps for anti-clockwise as clockwise.
- 7) When you have programmed the required number of steps, switch DIP switch 1 to the OFF position (LEFT) to store the settings into memory. They will remain in memory after removal of power but can be reprogrammed as many times as required.

When programming the number of steps, the motor will step at 1/5 of its normal speed to allow for more precise programming. Place DIP switch 4 into the ON position before programming to allow programming in single step mode where you have to release the switch after each step to allow precise programming of the number of steps.

## Pushbutton operation

To select pushbutton mode, place all DIP switches in the OFF position. (all switches left)

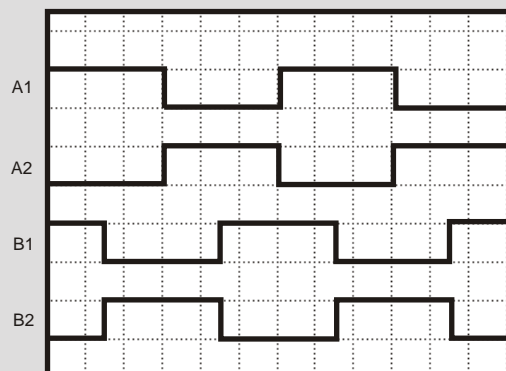
In this mode, the motor simply turns continuously clockwise or anti-clockwise in response to the switch inputs. If the single step (DIP switch 4) switch is set to ON, then the motor will only turn a single step with each switch press.



The diagram on the left shows the PCB connected to a 4 wire motor with normally open switches connected for clockwise and anti-clockwise movement.

The DIP switches are all set to OFF which means that the PCB acts as a simple pushbutton motor controller.

## Output waveform



Shown on the left is an approximation of the 4 bridge outputs to the motor through 8 complete steps.