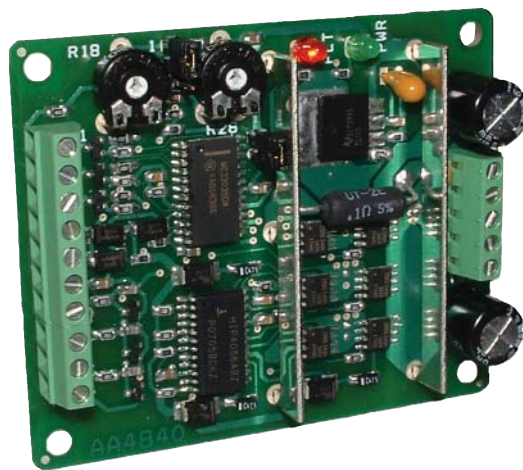


# MDC050-050051 Series 50V, 5A Brushless Controller

## User's Guide



**ANAHEIM AUTOMATION**

4985 E. Landon Drive Anaheim, CA 92807  
e-mail: [info@anaheimautomation.com](mailto:info@anaheimautomation.com)

(714) 992-6990 fax: (714) 992-0471  
website: [www.anaheimautomation.com](http://www.anaheimautomation.com)

## MDC050-050051 Driver Features

- Open Loop Operation
- 1.5V to 4V External Voltage Speed Control
- 5V/10KHz External PWM Speed Control
- 2-Quadrant Operation
- Hall Sensor Feedback
- Short Circuit Protection
- Maximum Current Limit at 5.0 Amps (peak)
- Run/Stop, Freewheel and Direction Input
- TTL-CMOS Compatible Inputs
- Compact Size
- Screw Type Terminal Block

## General Description

The MDC050-050051 driver is designed to drive DC Brushless motors at currents of up to 5A (peak) and 50V. The driver operates in the basic open loop configuration with either 60° or 120° DC Brushless motors. The driver is protected against over current (cycle-by-cycle), hall sensor error and under voltage. When an error occurs, a fault light is turned on to notify the user. Included on the driver is an internal potentiometer to control the maximum phase current allowed into the motor and an internal potentiometer to control the speed of the motor. An optional external voltage (1.5-4VDC) or external 5V/10KHz PWM signal can be used to control the speed as well. The direction of the motor can be preset by the direction control input. Other inputs to the drive include a run/stop and a motor freewheel input. The freewheel input overrides all other inputs into the driver.

## Fault Protection

A cycle-by-cycle over current protection is provided when the motor current level exceeding the current limit set by adjusting R28 is produced. When the over current protection is activated, the controller shuts off the outputs to the motor. The maximum current set by R28 is a 5A per phase.

## Suggested Power Supplies

Part #	Description
PSAM24V2.7A	DC Power Supply 24VDC at 2.7 Amps
PSAM48V1.3A	DC Power Supply 48VDC at 1.3 Amps

## Specifications

### Control Inputs: (TB1, Pins 1-3)

TTL-CMOS Compatible

Logic "0" = 0-0.8VDC

Logic "1" = OPEN

All Three inputs (run/stop, freewheel, and direction) are pulled up through 10k Ohm resistors.

### Direction Control: (TB1, Pin 1)

Logic "1" (open) - Clockwise

Logic "0" - Counterclockwise

### Freewheel: (TB1, Pin 2)

Logic "1" (open) - Motor is Enabled

Logic "0" - Motor is de-energized and will coast to a stop

### Run/Stop: (TB1, Pin 3)

Logic "1" (open) - Motor will not run

Logic "0" - Motor will run and will accelerate according to speed setting

### Vcontrol: (TB1, Pin 4)

To control the speed of the motor with an external DC voltage, a voltage from 1.5VDC-4VDC, must be applied with reference to AGND (TB1, Pin 5). Or, to control the speed of the motor with an external 5V/10KHz PWM signal, a duty cycle from 30% - 90%, must be applied with reference to AGND (TB1, Pin 5).

Care must be taken not to exceed 6V on this pin.

### Output Current Rating:

5.0 amperes per phase maximum operating peak current, set by R28

2.5 amperes per phase maximum operating continuous current

### Power Requirements: (TB2, Pins 4 and 5)

20VDC (min) - 50VDC (max)

### Operating Temperature:

0° - 70°C

### Heating Considerations:

The temperature of the driver transistors should never be allowed to rise above 70° Celsius. If necessary, air should be blown across the driver to maintain suitable temperatures.

## **Freewheel**

The motor freewheel feature allows the de-energized of the motor phases. A high (open) input at this input causes the motor to run at the given speed, while a low at this input causes the motor to coast to a stop.

## **Motor Run/Stop**

The motor run/stop feature allows the stopping of a motor by shorting out the bottom drives of the three phases. A low at this input allows the motor to run, while a high (open) input does not allow motor operation and if operating causes rapid deceleration.

## **Speed Adjust Setting**

There are three ways to set the speed on this DC Brushless Motor Driver.

1. One is to use an external voltage by setting JP2 to position 2-3. If a voltage is used to control the speed of the motor, the 1.5V to 4V voltage can be tied on Vcontrol (TB1 - pin 4) with respect to AGND (TB1- Pin 5).
2. Another is to use external 5V/10Khz signal by setting JP2 to position 2-3. If a voltage is used to control the speed of the motor, the 30% to 90% duty cycle can be tied on Vcontrol (TB1- pin 4) with respect to AGND (TB1 - pin 5).
3. Another is to use the internal potentiometer, R18, by setting JP2 to position 1-2.

The maximum voltage amplitude that can be place on Vcontrol (TB1 - Pin 4) 6V. A voltage exceeding 6V will cause damage to the driver.

## Terminal Block and Jumper Descriptions

Pin #	Description
1	Direction Freewheel
2	Freewheel
3	Run/Stop
4	Vcontrol
5	GND
6	Hall Power
7	Hall A
8	Hall B
9	Hall C
10	Hall GND

TB1: Control Inputs and Motor Halls

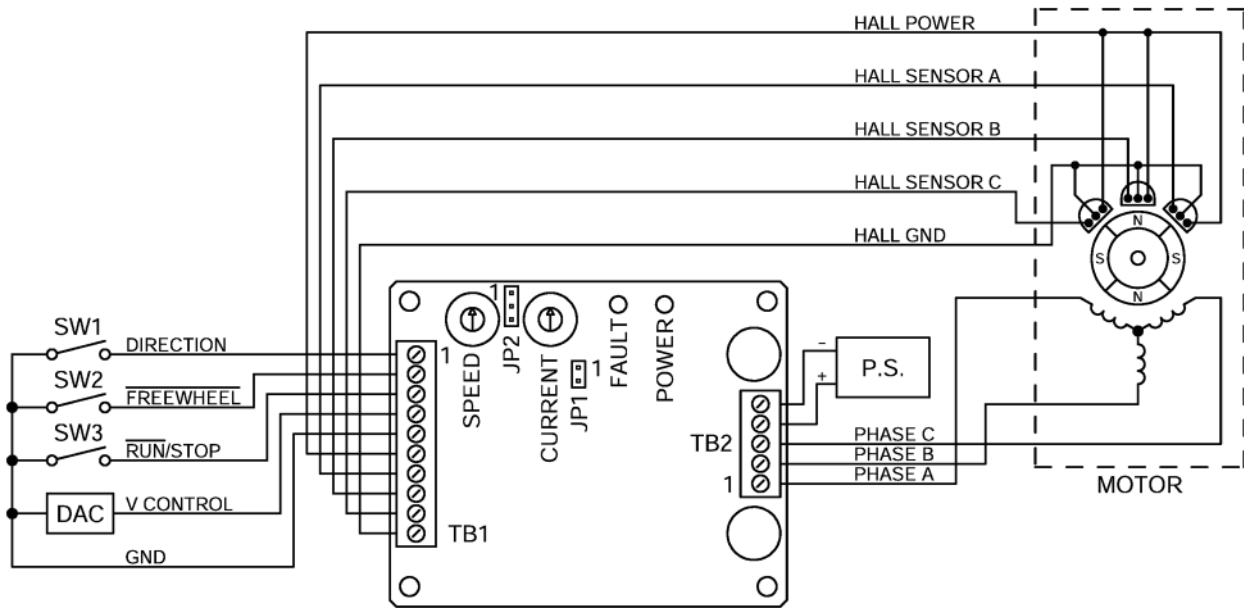
Pin #	Description
1	Phase A
2	Phase B
3	Phase C
4	VIN
5	GND

TB2: Power In and Motor Phases

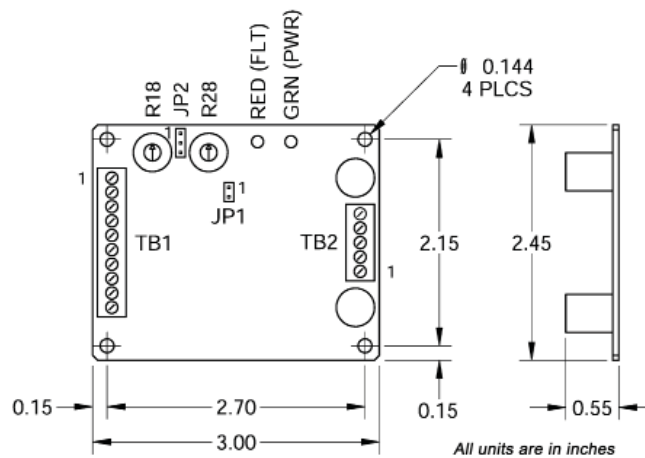
Function	JP1	JP2
60° Hall Sensor Spacing	Open	---
120° Hall Sensor Spacing	1-2	---
Internal Speed Control (R13)	---	1-2
External Speed Control (Vcontrol)	---	2-3

JP1 and JP2: Functions and Settings

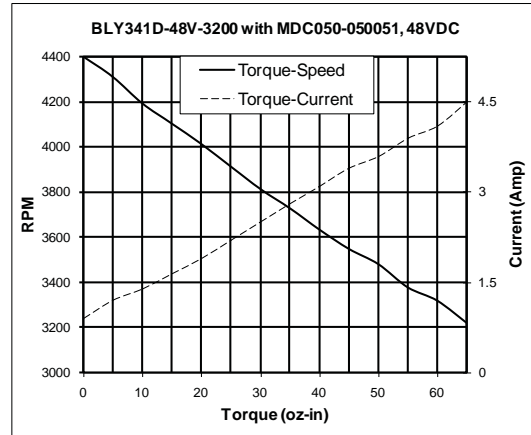
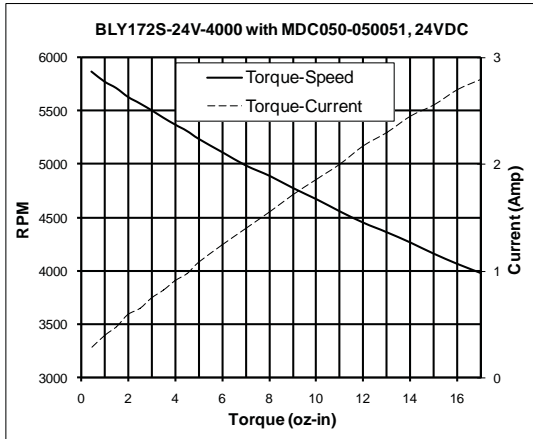
## Typical Wiring Diagram



## Dimensions



## Torque Speed Curves



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### TECHNICAL SUPPORT

If you should require technical support or if you have problems using any of the equipment covered by this manual, please read the manual completely to see if it will answer the questions you have. If you need assistance beyond what this manual can provide, contact your Local Distributor where you purchased the unit, or contact the factory direct.

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