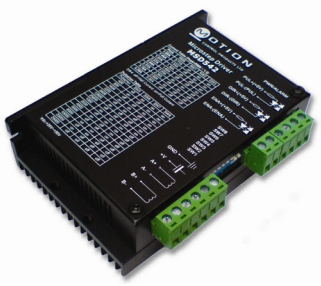
MSD542-V2.0 Microstepping Drive

Introduction

The M542-V2.0 is a high performance microstepping drive based on pure-sinusoidal current control technology. Having the benefits from the above technology and the self-adjustment technology (self-adjust current control parameters) on the drive, the driven motors can run with less noise, lower heat and smoother movement plus having better performances at higher speed than most of the drives in the markets. It is suitable for driving 2-phase and 4-phase hybrid stepping motors.



Features

- Supply voltage up to +50VDC and Output current up to 4.2A
- Self-adjustment technology and Pure-sinusoidal current control technology
- Pulse input frequency up to 300 KHz
- TTL compatible and optically isolated input
- Automatic idle-current reduction
- 15 selectable resolutions, up to 25,600 steps/rev
- Suitable for 2-phase and 4-phase motors
- Support PUL/DIR and CW/CCW modes
- Short-voltage, over-voltage, over-current and over temperature protection

Applications

It is suitable for a wide range of stepping motors sized NEMA 17 to NEMA34 and can be used in various machines and systems, such as X-Y tables, labelling machines, laser cutters, engraving machines and pick-place devices. It is particularly useful for the applications where low vibration, high speed and high precision are desired.

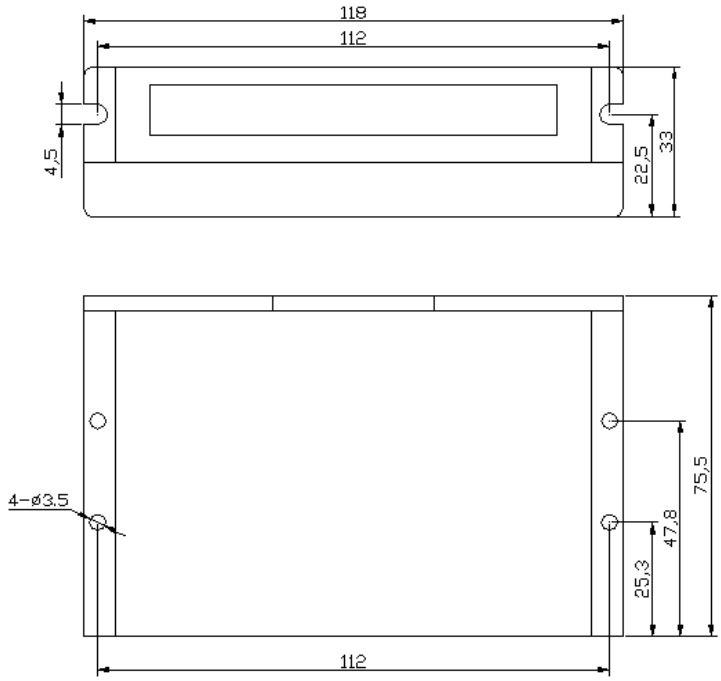
Electronic Specification *(Tj = 25ºC/77ºF)*

Parameters	MSD542-V2.0			
	Unit	Min	Typical	Max
Output Current	Amps	1.0	-	4.2
Supply voltage (DC)	VDC	+20	+36	+50
Logic signal current	mA	7	10	16
Pulse input frequency	KHz	0	-	300
Isolation resistance	MΩ	500	-	-

Operating Environment and Other Specifications

Cooling	Natural Cooling or Forced cooling	
Operating Environment	*Environment*	Avoid dust, oil fog and corrosive gases
	Ambient Temperature	0ºC ~ 50ºC
	Humidity	40%RH－90%RH
	Operational Temperature	70 ºC Max.
	Vibration	5.9m/s^2 Max
Storage Temperature	-20ºC ~ 65ºC	
Weight	Approx. 280g (10oz)	

Mechanical Specifications (in mm, 1 inch = 25.4 mm)



**** Recommend to use side mounting for better heat dissipation

Pin Assignment and Description

The MSD542-V2.0 stepper drive has two connectors, connector P1 for control signals connections, and connector P2 for power and motor connections. The following tables are brief descriptions of the two connectors on MSD542-V2.0 stepper drive. For more details, please refer to our **MSD542-V2.0 Stepper Drive Manual Version 1.0**

Connector P1 configurations

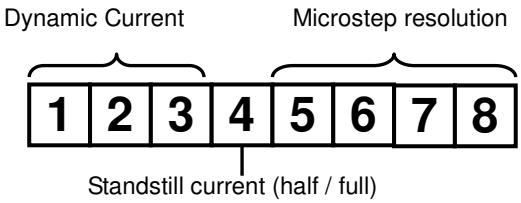
Signal	Functions
PUL+	**Pulse signal**: In single pulse (pulse/direction) mode, this input represents pulse signal, each rising or falling edge active (set by inside jumper J1); 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. In double pulse mode (pulse/pulse), this input represents clockwise (CW) pulse, active at high level or low level (set by inside jumper J1, J2). For reliable response, pulse width should be longer than 1.5μs. Series connect resistors for current-limiting when +12V or +24V used. The same as DIR and ENA signals.
PUL-	
DIR+	**Direction signal:** In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation; in double-pulse mode (set by inside jumper J3), this signal is counter-clock (CCW) pulse, active at high level or low level (set by inside jumper J1, J2). For reliable motion response, DIR signal should be ahead of PUL signal by 5μs at least. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW. Please note that rotation direction is also related to motor-drive wiring match. Exchanging the connection of two wires for a coil to the drive will reverse motion direction.
DIR-	
ENA+	**Enable signal**: This signal is used for enabling/disabling the drive. High level (NPN control signal, PNP and Differential control signals are on the contrary, namely Low level for enabling.) for enabling the drive and low level for disabling the drive. Usually left **UNCONNECTED (ENABLED)**.
ENA-	

Connector P2 Configurations

Signal	Functions
GND	Power ground
+V	DC power supply, +20VDC ~ +50VDC, including voltage fluctuation and EMF voltage.
A+, A-	Motor Phase A
B+, B-	Motor Phase B

Setting Drive Output Current and Microstep Resolution

This drive uses an 8-bit DIP switch to set microstep resolution and motor operating current, as shown below:



Microstep Resolution Selection

Microstep resolution is set by SW5, SW6, SW7 and SW8 of the DIP switch as shown in the following table:

Microsteps / Full step	MicroSteps/rev. (for 1.8°motor)	SW5	SW6	SW7	SW8
2	**400**	OFF	ON	ON	ON
4	**800**	ON	OFF	ON	ON
8	**1600**	OFF	OFF	ON	ON
16	**3200**	ON	ON	OFF	ON
32	**6400**	OFF	ON	OFF	ON
64	**12800**	ON	OFF	OFF	ON
128	**25600**	OFF	OFF	OFF	ON
5	**1000**	ON	ON	ON	OFF
10	**2000**	OFF	ON	ON	OFF
20	**4000**	ON	OFF	ON	OFF
25	**5000**	OFF	OFF	ON	OFF
40	**8000**	ON	ON	OFF	OFF
50	**10000**	OFF	ON	OFF	OFF
100	**20000**	ON	OFF	OFF	OFF
125	**25000**	OFF	OFF	OFF	OFF

Current Setting

The first three bits (SW1, SW2 and SW3) of the DIP switch are used to set the dynamic current. Select a setting closest to your motor's required current.

Dynamic Current Setting:

Peak Current	RMS Current	SW1	SW2	SW3
1.00A	**0.71A**	ON	ON	ON
1.46A	**1.04A**	OFF	ON	ON
1.91A	**1.36A**	ON	OFF	ON
2.37A	**1.69A**	OFF	OFF	ON
2.84A	**2.03A**	ON	ON	OFF
3.31A	**2.36A**	OFF	ON	OFF
3.76A	**2.69A**	ON	OFF	OFF
4.20A	**3.00A**	OFF	OFF	OFF

Notes: Due to motor inductance, the actual current in the coil may be smaller than the dynamic current setting, particularly under high speed condition.

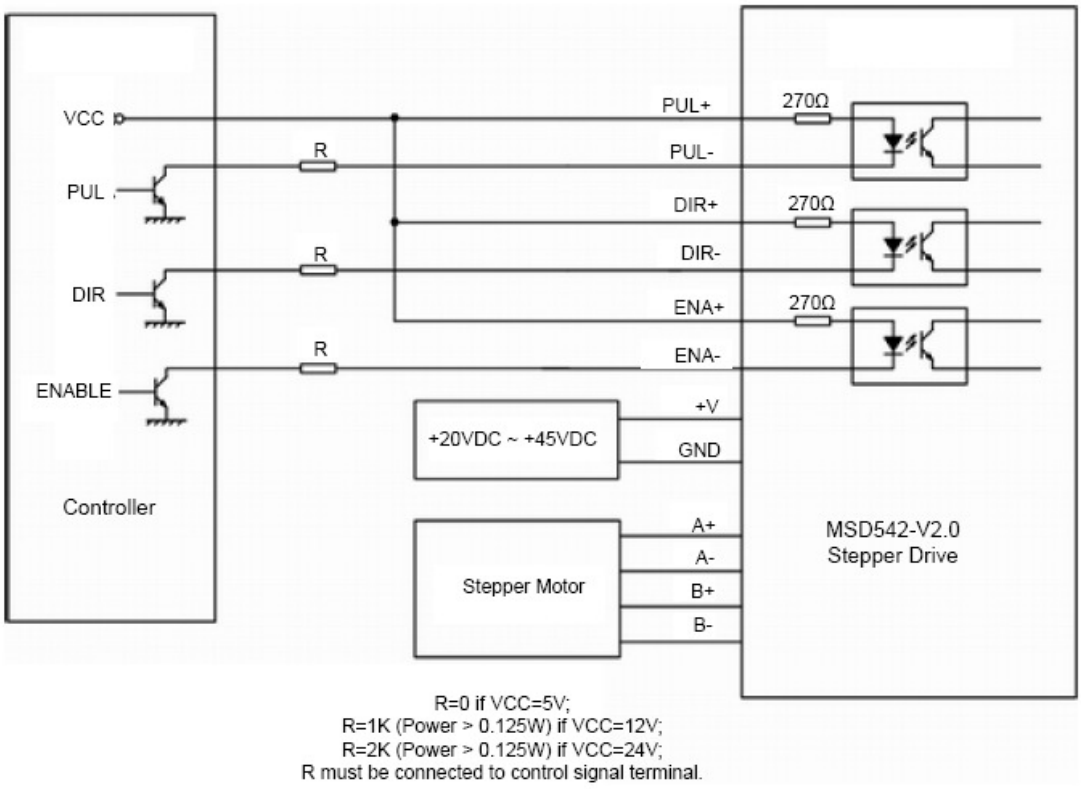
Standstill Current

SW4 is used for standstill current setting. **OFF** means the standstill current is set to be half of the selected dynamic current and **ON** means standstill current is set to be the same as the selected dynamic current.

The standstill current of MSD542-V2.0 will be automatically reduced to 60% of the selected dynamic current setting one second after the last pulse. Theoretically, this will reduce motor heating to 36% (due to $P=I^2 * R$) of the original value. If the application needs a different standstill current, please contact Motion Control Products Ltd for more advice.

Typical Connections

A complete stepper system should include stepper motor, stepper drive, power supply and controller (pulse generator). The following figure is the typical connections of MSD542-V2.0 stepper drive.



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