

# MSD2282 Microstepping Drive

## Introduction

The MSD2282 is a high performance and low noise microstepping drive based on pure-sinusoidal current control technology. It is suitable to drive 2-phase and 4-phase hybrid stepper motors. By using advanced bipolar constant-current chopping techniques, the MSD2282 can output more torque than most other stepper drives at high speed. The microstep capability allows stepper motors to run more smoothly with less vibration and lower noise. Its pure-sinusoidal current control technology allows coil current to be controlled with relatively small current ripple, therefore lower motor noise and less motor heating are achieved. In addition, MSD2282 stepper drive has a built-in EMI filter which can make it more reliable for the most of the applications.



## Feature

- High quality, cost-effective
- Low motor & drive heating
- Supply voltage up to 220VAC (310VDC)
- Output current up to 8.2A (5.86 ARMS)
- TTL compatible and opto-isolated inputs
- Automatic idle-current reduction
- Input frequency up to 200KHz
- 15 microstep resolutions selectable
- DIP switch microstep & current settings
- Support PUL/DIR & CW/CCW modes

## Applications

The drive is suitable for medium and large automation machines and equipment, such as engraving machines, labelling machines, cutting machines, laser phototypesetting systems, plotting instruments, CNC machines, pick-place devices, etc. It is particularly useful for the applications where low vibration, high speed and high precision are required.

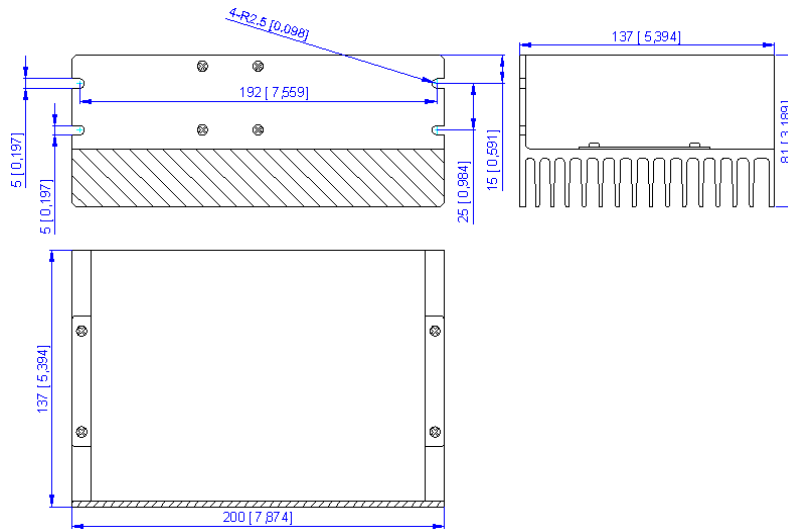
## Electrical Specification (Tj = 25°C/77°F)

Parameters	MSD2282			
	Unit	Min	Typical	Max
Output Current	Amps	0.7 (0.5RMS)	-	8.2 (5.86 RMS)
Supply voltage	VAC (VDC)	90 (125)	180 (250)	220 (310)
Logic signal current	mA	7	10	16
Pulse input frequency	KHz	0	-	200
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	0°C ~ 50°C
	Humidity	40%RH – 90%RH
	Operational Temperature	70 °C Max.
	Vibration	5.9m/s <sup>2</sup> Max
Storage Temperature	-20°C ~ 65°C	
Weight	Approx. 1.4kg (49.38 oz)	

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



**Pin Assignment and Description**

The MSD2282 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 MSD2282 stepper drive. For more details, please refer to **MSD2282 Stepper Drive Manual Version 2.0**

**Connector P1 configurations**

Pin Function	Details
PUL + (+5V)	<b>Pulse signal:</b> In single pulse (pulse/direction) mode, this input represents pulse signal, active at each rising edge; 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. For reliable response, pulse width should be longer than 1.2µs. Series connect resistors for current-limiting when +12V or +24V is used.
PUL- (PUL)	
DIR+ (+5V)	<b>Direction signal:</b> 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), this signal is counter-clock (CCW) pulse, active for high level. For reliable motion response, the DIR signal should be ahead of PUL signal by at least 5µs. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW. Please note that motion direction is also related to motor-drive wiring match. Exchanging the connection of two wires for a coil to the drive will reverse the motion direction.
DIR- (DIR)	
ENA+ (+5V)	<b>Enable signal:</b> This signal is used for enabling/disabling the drive. High level (NPN control signal, PNP and Differential Control Signals are namely Low level for enabling.) for enabling the drive and low level for disabling the drive. Usually left <b>UNCONNECTED (ENABLED)</b> .
ENA- (ENA)	
FAULT+	<b>Fault signal positive:</b> FAULT+ is an opto-coupler output from open-collector circuit. Its maximum permitted input voltage is 30VDC and the maximum output current is 20mA. It generally can be serial connected to PLC input terminal.
FAULT-	Fault signal negative.

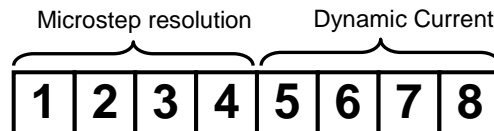
**Connector P2 Configurations**

Signal	Functions
AC	AC power supply inputs. Recommend using isolation transformers with theoretical output voltage of 90 - 220 VAC, leaving room for power fluctuations and back-EMF.

A+, A-	Motor Phase A
B+, B-	Motor Phase B
PE	Ground terminal. It is recommended to connect this port to the ground for safety.

## Setting Drive Output Current and Microstep Resolution

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



### Microstep Resolution Selection

Microstep resolution is set by SW1, SW2, SW3 and SW4 of the DIP switch as shown in the following table:

Microstep	Microsteps/rev. (for 1.8°motor)	SW1	SW2	SW3	SW4
2	400	ON	ON	ON	ON
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 last four bits (SW5, SW6, SW7 and SW8) 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	SW5	SW6	SW7	SW8
0.7A	0.5A	OFF	OFF	OFF	OFF
1.2A	0.86A	OFF	OFF	OFF	ON
1.72A	1.23A	OFF	OFF	ON	OFF
2.20A	1.57A	OFF	OFF	ON	ON
2.75A	1.96A	OFF	ON	OFF	OFF
3.28A	2.34A	OFF	ON	OFF	ON

3.75A	2.68A	OFF	ON	ON	OFF
4.22A	3.01A	OFF	ON	ON	ON
4.72A	3.37A	ON	OFF	OFF	OFF
5.20A	3.72A	ON	OFF	OFF	ON
5.78A	4.13A	ON	OFF	ON	OFF
6.24A	4.46A	ON	OFF	ON	ON
6.78A	4.84A	ON	ON	OFF	OFF
7.31A	5.22A	ON	ON	OFF	ON
7.81A	5.58A	ON	ON	ON	OFF
8.2A	5.68A	ON	ON	ON	ON

**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**

The MSD2282 has automatic idle-current reduction function. The standstill current will be automatically reduced to 60% of the selected dynamic current setting 0.2 second after the last pulse. Theoretically, this will reduce motor heating to 36% (due to  $P=I^2 \cdot R$ ) 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 MSD2282 stepper drive.

