Microstepping Driver

MSD980/MSD940 Microstepping Driver

Features

- High performance, low cost
- Supply voltage to +90VDC, current to 7.8A for MSD980; 3.9A for MSD940.
- Inaudible 20khz chopping frequency
- TTL compatible and optically isolated input signals
- Automatic idle-current reduction
- Mixed-decay current control for less motor heating
- 14selectable resolutions in decimal and binary
- Microstep resolutions up to 51,200 steps/rev
- Suitable for 4,6,8 lead motors
- CW/CCW mode available
- Over-current, over-voltage and short-circuit protection

1. Introduction

MSD980/ MSD940 are high performance microstepping drivers based on the most advanced technology in the world today. They are suitable for driving any 2-phase and 4-phase hybrid step motors. By using advanced bipolar constant-current chopping technique, they can output more speed and power from the same motor, compared with traditional technologies such as L/R drivers. Its 3-state current control technology allows coil current to be well controlled, with relatively small current ripple and results in less motor heating.

2. ***Applications***

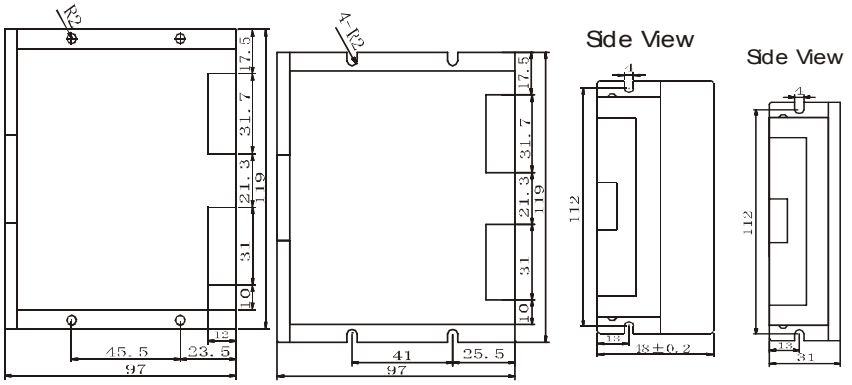
Suitable for a wide range of stepping motors of size Nema 34 and 43, and usable for various kinds of machines, such as X-Y tables, labeling machines, laser cutters, engraving machines, and pick-place devices, particularly useful in applications with low vibration, high speed and high precision requirements.

3. Electrical and Mechanical Specifications

3.1 Electric Specifications (Tj = 25)

Parameters	MSD980/MSD940			
	Min.	Typical	Max.	Unit
Peak Output Current	2.8,/1.4	-	7.8,/3.9	Amps
Supply voltage	+24	+68	+90	VDC
Logic signal current	7	10	16	mA
Pulse input frequency	0	-	300	Khz
Isolation resistance	500			MΩ

3.2 Mechanical Dimensions (unit = mm, 1 inch = 25.4 mm)



MSD980 vertical view MSD940 vertical view MSD980 (with heatsink) MSD940 (without heatsink)

4. Driver Connectors, P1 and P2

Control Signal Connector P1-pins

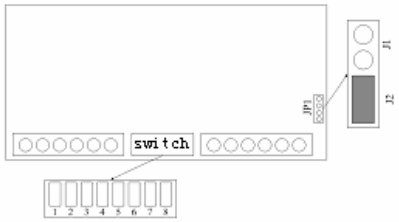
Pin No.	Signal	Functions
1	Pul+(+5V)	Pulse signal: in single pulse(PUL/DIR) mode, this input represents pulse signal, effective for each upward – rising edge; in double pulse mode (CW/CCW) this input represents clockwise(CW)pulse. For reliable response, pulse width should be longer than 3μs.
2	Pul-(pulse)	
3	Dir+(+5V)	Direction signal: in PUL/DIR mode, this signal has low/high voltage levels, representing two directions of motor rotation; in CW/CCW mode (set by inside jumper JPI), this signal is counter-clock (CCW) pulse, effective on each rising edge. For reliable motion response, direction signal should be sent to driver 5μs before the first pulse of a motion direction reversal.
4	Dir-(Dir)	
5	Ena+(+5V)	Enable signal: this signal is used for enable/disable, high level for enabling driver and low level for disabling driver. Usually left unconnected(enabled).
6	Ena- (Ena)	

Remark *: PUL/DIR is the default mode, under-cover jumper JP1 can be used to switch to CW/CCW double-pulse mode.*

Selecting CW/CCW and PUL/DIR Mode

There is a Jumper JP1 inside the driver specifically for the purpose of selecting pulse signal mode.

1. *JP1 open collector mode is PUL/DIR mode, which is the default factory setting;*
2. *J1 open collector and J2 short circuit mode is CW/CCW mode; as following diagram:*



Power connector P2 pins

Pin No.	Signal	Functions
1	Gnd	DC power ground
2	+V	DC power supply, +18VDC - +80VDC, Including voltage fluctuation and EMF voltage.
3, 4	Phase A	Motor coil A (leads A+ and A-)
5, 6	Phase B	Motor coil B (leads B+ and B-)

Remark*: Please note motion direction is also related to motor-driver wiring match. Exchanging the connection of two wires for a coil to the driver will reverse motion direction. (for example, reconnecting motor A+ to driver A- and motor A- to driver A+ will invert motion direction).*

5. Setting Driver Output Current and Microstep Resolution

5.1Current Setting

The first three bits (SW1, 2, 3) of the DIP switch are used to set the current during motion (dynamic current), while SW4 is used to select standstill current.

MSD940/MSD980 DIP Setting for current during motion:

Current for MSD940	Current for MSD980	**SW1**	**SW2**	**SW3**
1.4A	2.8A	ON	ON	ON
1.8A	3.5A	OFF	ON	ON
2.1A	4.2A	ON	OFF	ON
2.5A	4.9A	OFF	OFF	ON
2.9A	5.7A	ON	ON	OFF
3.2A	6.4A	OFF	ON	OFF
3.5A	7.0A	ON	OFF	OFF
3.9A	7.8A	OFF	OFF	OFF

Noted that due to motor inductance the actual current in the coil may be smaller the dynamic current settings, particularly at higher speeds.

5.2Microstep Resolution Selection

Microstep resolution is set by SW5, 6, 7, 8 of the DIP switch as shown in the following table:

Microstep	Step/rev.(for 1.8°/motor)	**SW5**	**SW6**	**SW7**	**SW8**
2	400	ON	ON	ON	ON
4	800	ON	OFF	ON	ON
8	1600	ON	ON	OFF	ON
16	3200	ON	OFF	OFF	ON
32	6400	ON	ON	ON	OFF
64	12800	ON	OFF	ON	OFF
128	25600	ON	ON	OFF	OFF
256	51200	ON	OFF	OFF	OFF

5	1000	OFF	ON	ON	ON
10	2000	OFF	OFF	ON	ON
25	5000	OFF	ON	OFF	ON
50	10000	OFF	OFF	OFF	ON
125	25000	OFF	ON	ON	OFF
250	50000	OFF	OFF	ON	OFF

6. Typical Wiring Diagram