

## D56 Micro-stepping Driver

### Introduction

The D56 is a high performance micro stepping driver using pure-sinusoidal current control technology. It is particularly suitable for the applications desired with extremely low noise and low heating, compared with micro stepping drivers which apply pseudo-sinusoidal current control technology. Because pseudo-sinusoidal current control technology may make the output current to be a distorted sine wave or generates larger current ripple, and both of them may cause the motor working in a higher noise, bigger vibration and higher temperature condition. If the motor works in that condition for a long time, that may decrease motor torque, accelerate motor aging and short motor's operating life. However the pseudo-sine precise current control technology applied by the D56 can solve above problems very well and therefore the D56 can make stepper motors very similar to servo motor performances.

### Features

- Pure-sinusoidal precise current control technology
- Extremely low motor noise
- Both driver and motor are low heating
- High performance, low cost
- Supply voltage up to +50VDC
- Peak current up to 5.6A (4.0A RMS)
- Optically isolated differential inputs
- Pulse frequency up to 400 KHz
- Automatic idle-current reduction
- 15 selectable resolutions in decimal and binary
- Suitable for 2-phase and 4-phase motors
- DIP switch current setting with 8 different values
- Over-voltage and short-circuit protection
- Small size

### Applications

Suitable for a wide range of stepping motors, from NEMA size 17 to 42  
Applications XYZ tables, labeling machines, laser cutters, engraving machines, pick-place devices

### Specifications

|                              |  |
|------------------------------|--|
| <b>Output current</b>        | 1.4 ~ 5.6 AMP  |
| <b>Supply voltage (DC)</b>   | Min 20, Typical 36 , max 50 VDC  |
| <b>Pulse input frequency</b> | 0 ~ 400 KHz  |
| <b>Isolation resistance</b>  | Min 500 MΩ   |
| <b>Cooling</b>               | Natural Cooling or Forced cooling  |
| <b>Operating Environment</b> | Environment Avoid dust, oil fog and corrosive gases<br>Ambient Temperature 0 °C – 50°C<br>Humidity 40%RH – 90%RH<br>Operating Temperature 70 Max °C<br>Vibration 5.9m/s <sup>2</sup> Max |
| <b>Storage Temperature</b>   | 20 °C – 65°C   |
| <b>Weight</b>                | Approximate weight 280 g (9.9 oz)  |

## Control Signal Connector P1 pins

| Pin Function      | Details  |
|-------------------|--|
| <b>PUL+ (+5V)</b> | Pulse signal: This input represents pulse signal, active at each rising edge 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. For reliable response, pulse width should be longer than 1.2ms. Series connect resistors for current-limiting when +12V or +24V used.  |
| <b>PUL- (PUL)</b> |  |
| <b>DIR+ (+5V)</b> | Direction signal: HIGH/LOW level signal, correlative to motor rotation direction. For reliable response, DIR must be ahead of PUL by 5ms at least.4-5V when DIR- HIGH, 0-0.5V when DIR-LOW. Please note that motor rotation direction also depends upon the connection of the motor windings, exchange any motor phase can reverse motor rotation direction. |
| <b>DIR- (DIR)</b> |  |
| <b>ENA+ (+5V)</b> | Enable signal: This signal is used for enabling/disabling the driver. High level (NPN control signal, PNP and Differential control signals are on the contrary, namely Low level for enabling.) for enabling the driver and low level for disabling the driver. Usually left UNCONNECTED (ENABLED).  |
| <b>ENA- (ENA)</b> |  |

## Power connector P2 pins

| Pin Function   | Details  |
|----------------|--|
| <b>GND</b>     | DC power ground  |
| <b>+V</b>      | DC power supply, +20VDC ~ +50VDC, Including voltage fluctuation and EMF voltage. |
| <b>Phase A</b> | Motor coil A (leads A+ and A-)   |
| <b>Phase B</b> | Motor coil B (leads B+ and B-)   |

## Micro-step Division/Resolution Selection

Micro-step resolution set by SW5, SW6, SW7 & SW8 of the DIP switch

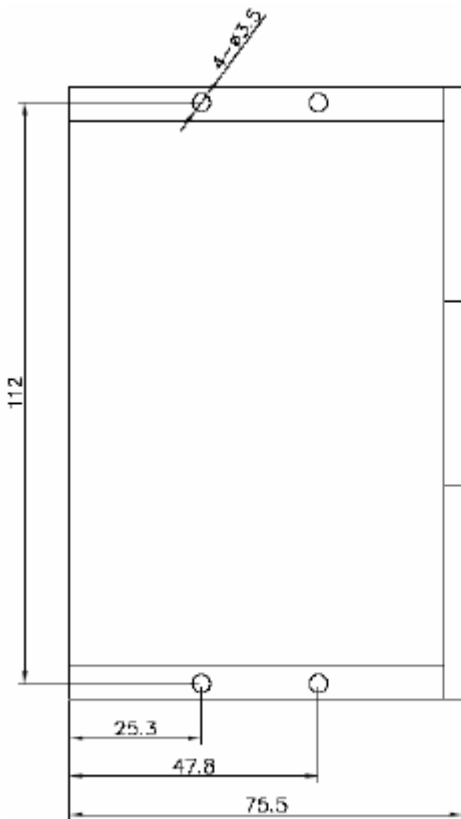
| Micro step | U steps/rev.( 1.8°/rev) | SW5 | SW6 | SW7 | SW8 |
|------------|-------------------------|-----|-----|-----|-----|
| 2          | 400                     | OFF | ON  | ON  | ON  |
| 4          | 800                     | ON  | OFF | ON  | ON  |
| 8          | 1600                    | 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 selection

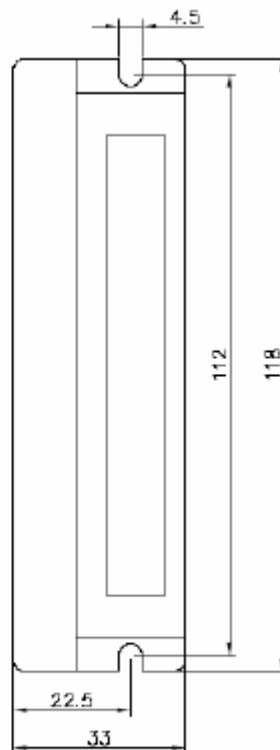
SW4 Standstill current set off to half current  
Current set by SW1, SW2 & SW3 of the DIP switch

| Peak Current (A) | RMS (A) | SW1 | SW2 | SW3 |
|------------------|---------|-----|-----|-----|
| 1.4              | 1.0     | OFF | OFF | OFF |
| 2.1              | 1.5     | ON  | OFF | OFF |
| 2.7              | 1.9     | OFF | ON  | OFF |
| 3.2              | 2.3     | ON  | ON  | OFF |
| 3.8              | 2.7     | OFF | OFF | ON  |
| 4.3              | 3.1     | ON  | OFF | ON  |
| 4.9              | 3.5     | OFF | ON  | ON  |
| 5.6              | 4.0     | ON  | ON  | ON  |

## Mechanical Dimension

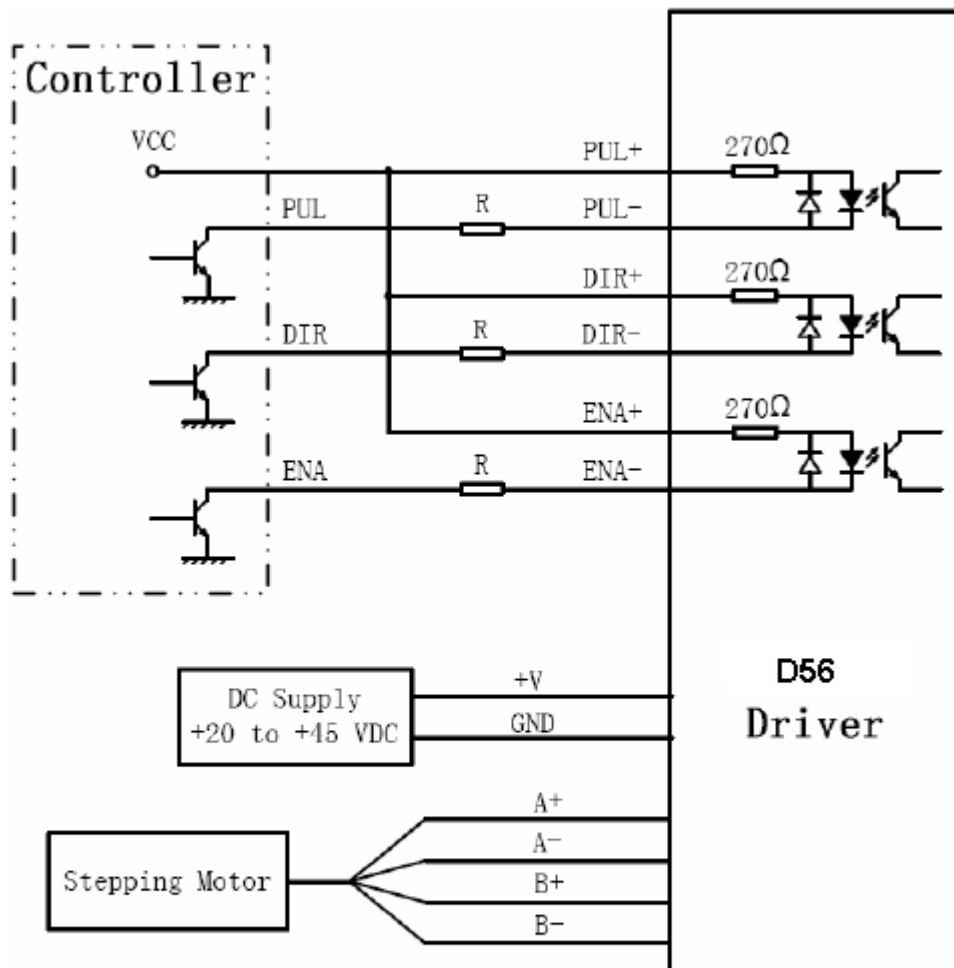


Front View



Side View

# Connection diagram



R=0 if VCC=5V;  
R=1K(Power>0.125W) if VCC=12V;  
R=2K(Power>0.125W) if VCC=24V;  
R must be connected to control signal terminal.

WWW

AKCA