

# **Single AXIS CNC Stepping Step Motor Driver User's Guide**

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**NOTES:**

**Product Version       :   Ver 1.0**

**Document Version     :   Ver 1.0**

## Chapter1. Overview and Main Feature

### 1-1. Gallery



Figure 1

The microstepping motor driver is integrated a professional high-performance CNC microstepping driver chip. The number of micro step is flexible for users. It's capable of designing control functions into driver according to user's requirements upon open microcomputer system, and minimum control system can be achieved. This driver is suitable for 2-phase or 4-phase hybrid step motor. It can drive motor operating in high-precision, low-vibrancy, low-yawp, and smooth station.

## Overview and Main Feature

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### 1-2. Main Feature

- Working voltage should be not more than 32VDC
- Operation frequency is more than 35 kHz.
- Max driver current is 1A/phase.
- It can drive 2-phase or 4-phase hybrid step motor.
- Late-model bipolar constant current chopper.
- Optoelectronic isolation signal input.
- Resolution adjustable by switches: Full Step, 1/2, 1/5, 1/10, 1/20, 1/40;
- Physical dimension: 79.3mm×59.5mm×18.9mm
- Weight: 0.22kg/7.76ounce

### 1-3. Electric Characteristics

- Input voltage: +15V~+32V, +20V (TYP).
- Adjustable step motor current via switches: 0.2A, 0.4A, 0.6A, 0.8A, 1.0A.
- Logic signal input current: 10mA-25mA.
- Pulse pull down time > 5us.

### 1-4. Operation Parameter

- Cooling: Cooling by radiation and auxiliary fan.
- Operation Condition: away from dust and causticity gas.
- Working temperature: 0 ~50°C.
- Humidity: 40~89% RH.

## Chapter2. Detailed Description

### 2-1. Port Definition

- +COM: The common pin of power supply to the optoelectronic isolator. Its typical value is +5V.
- CP: Clock pulse input. Input data on falling edge of pulse.
- DIR: Direction control signal. This input controls the direction of the motor. The direction of motor is upon is lain on level of voltage.
- FREE: Enabled port of driver. When a high or float high level is sampled on FREE, motor will ramp up to the selected speed. When this input is pulled low, no more constrains are placed on motor, and it is get into free state.
- A+, A-: A phase of motor.
- B+, B-: B phase of motor.
- 40V, GND: DC power supply (+15V~+40V).

### 2-2. Microstep and Motor Current

#### Microstep Switched by K1, K2 and K3:

Microstep multiple	K1	K2	K3
2	ON	ON	ON
5	ON	ON	OFF
10	ON	OFF	ON
20	ON	OFF	OFF
40	OFF	ON	ON

#### Current Switched by K4, K5 and K6

Current Value	K4	K5
0.3A	ON	ON
0.6A	OFF	ON
0.8A	ON	OFF
1.0A	OFF	OFF

K6=OFF Half current

K6=ON Full current

## Detailed Description

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### 2-3. Physical Dimension

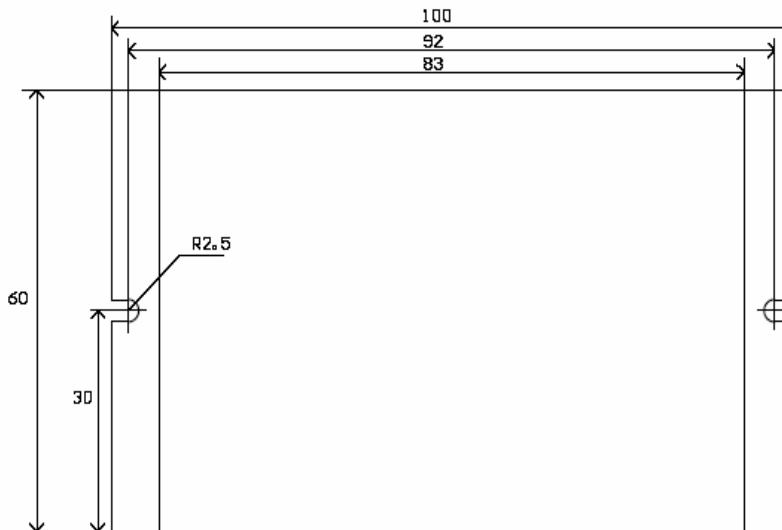


Figure 2

### 2-4. Power Supply

This driver will operate normally from a single power supply voltage of +15 to +40VDC. Its power can be supplied by destabilized voltage supply or the power supply system consisted by stepping down transformer, bridge rectifier and capacitance filter. The capacitance should be more than 220 $\mu$ F. Note that Ripple Noise after rectifier should be not more than 45V. Recommended DC power supply is 30-40V, which can avoid exceeding driver working voltage because of power line waving.

If stabilized switch voltage supply has been used, make sure that its output current should be set more than 4A.

**Please Note:**

1. Destabilized voltage supply had better be used.
2. If destabilized switch voltage supply has been used, its output current should be more than 60% of driver's rating current. If stabilized switch voltage supply has been used, its output current should be more than driver's rating current.
3. In order to reduce cost, two to three drives can use one power supply. But its power rating and output current rating should be enlarged, and heat sinks should be required.

**Quiescent current**

Quiescent current: When clock pulse stops and delays for 1s, motor current will reduce by half to decrease heat.

2-5. Input Interface circuit Input Interface circuit

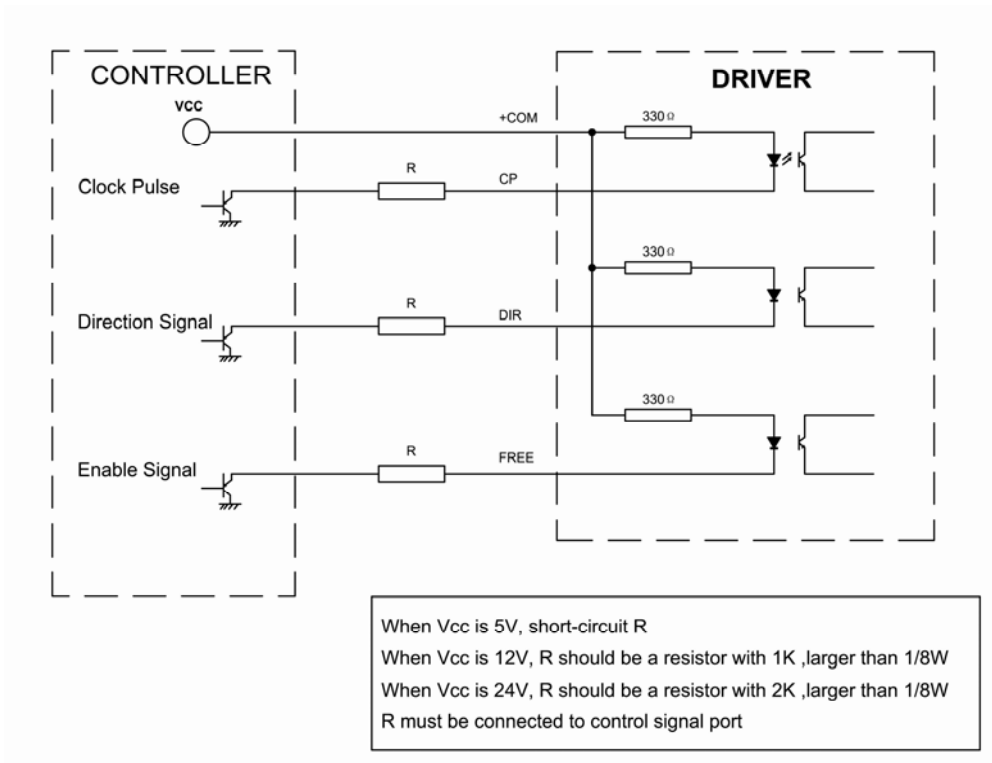


Figure 3



## Chapter3.Connection & Operation

### 3-1. Motor Connection

This driver can drive 4-wire, 6-wire and 8-wire 2-phase or 4-phase motor whose all phase current is below 1A. The following figures detail the connection of 4-wire, 6-wire and 8-wire step motor

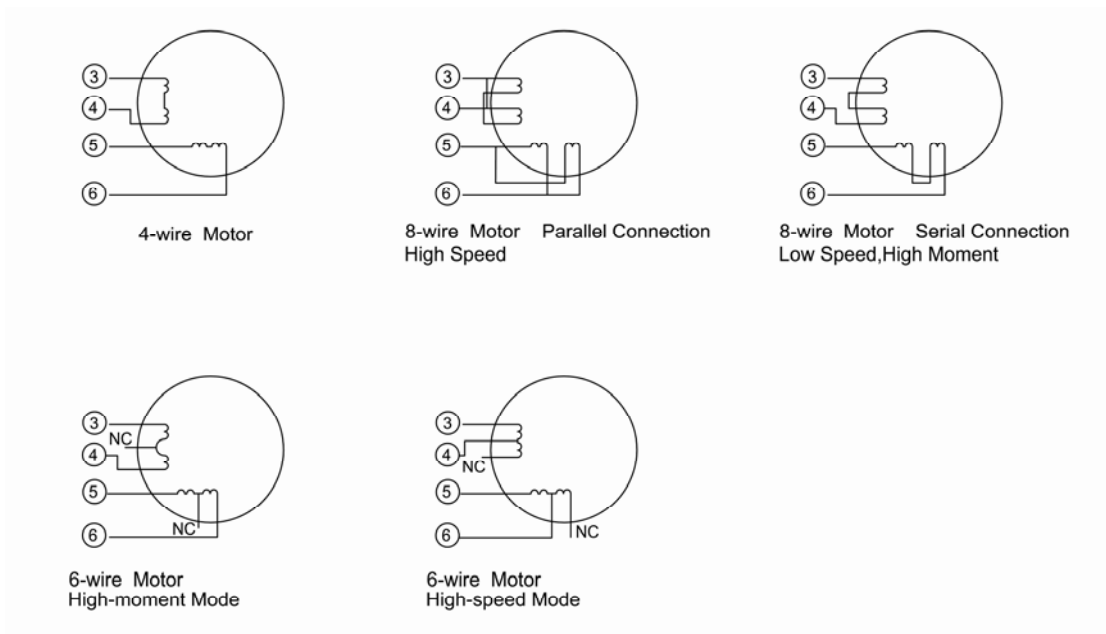


Figure 4

### 3-2. Motor-Driver Match

This driver can drive 2-phase and 4-phase motor. In order to obtain satisfied driving effect, supply voltage and current output should be set suitably. Voltage effects performance of motor. Current setting provides torque output of motor.

#### Supply Voltage Setting

Generally, the higher voltage is supplied, the higher high-speed torque motor has. It can avoid losing step too. On another hand, too high voltage maybe damage driver, and its low-speed oscillation is getting distinct.

### Current Output Setting

As to the same motor, the higher current is set, the higher torque motor produces. But driver and motor produce too much heat. Generally, current output rating is set to the value that can keep motor working warmly without superheat.

- 4-wire and 6-wire motor in high-speed mode: The current output should be not more than motor current rating.
- 6-wire motor in high-moment mode: The current output should be set to 70% of motor current rating.
- 8-wire motor of serial connection: The current output should be set to 70% of motor current rating.
- 8-wire motor of parallel connection: The current output should be 1.4 times as large as motor current rating.

### Note:

Please let motor operate for 15 to 30 mins at first. If motor is becoming hot too much, please reduce value of current output setting. If torque output of motor is not enough after reducing the current output, please improve condition of heat sink to ensure motor and its driver against burn.

### 3-3. Connection of Driver

A workable step motor control system consists of step motor, driver, DC and controller (pulse clock source). A typical system is shown as follow.

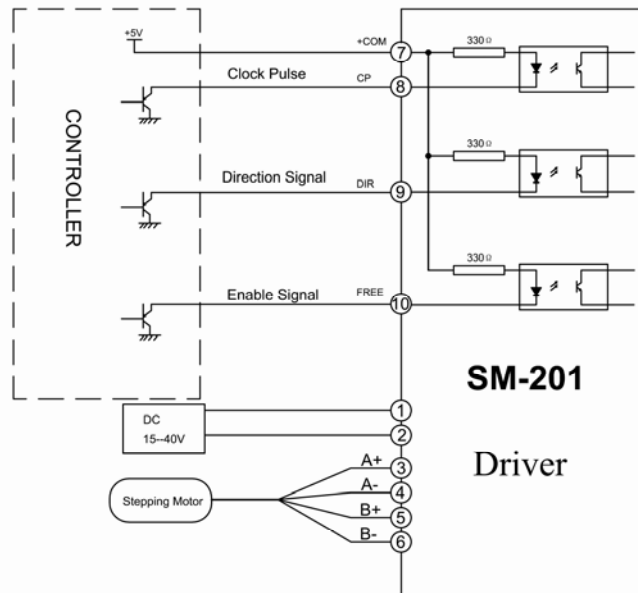


Figure 5

## **Chapter4. Contact Us**

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**Sure Electronics Co., Ltd.**

Floor 4, A zone,

Qinhuai Technology Innovation center,

NO.105-2, DaMing Road,

Nanjing,

China

Tel: +86-25-66606340

+8613601408832

(English service, from GMT1-10AM, only for technical questions)

Email: [support@sure-electronics.net](mailto:support@sure-electronics.net)

Website: [www.sure-electronics.net](http://www.sure-electronics.net)

[www.sure-electronics.com](http://www.sure-electronics.com)