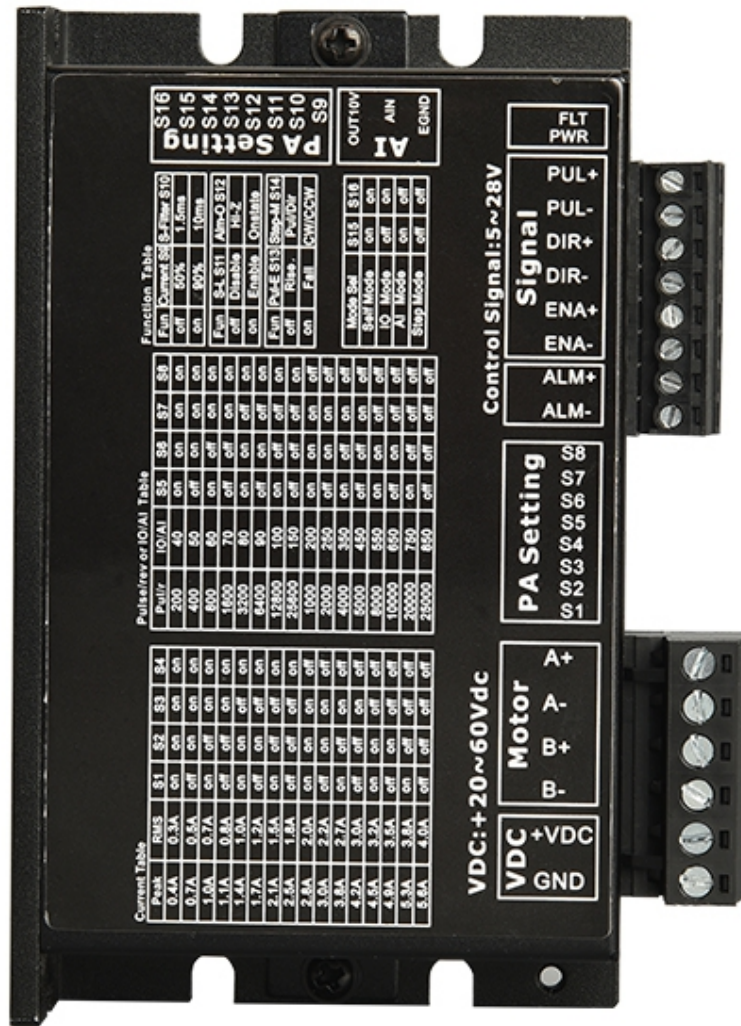


# SS556

多功能开环步进驱动器使用手册

MULTIFUNCTION OPEN-LOOP STEP MOTOR DRIVE User's Manual



摩川技术(深圳) 有限公司

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## 前言/Foreword

感谢您使用本公司开环步进驱动器。

Thank you for using our open step drive.

在使用本产品前，请务必仔细阅读本手册，了解必要的安全信息、注意事项以及操作方法等。错误的操作可能引发极其严重的后果。

Before using this product, please read this manual carefully to understand the necessary safety information, precautions, and operation methods. Incorrect operation can have extremely serious consequences.

本产品的设计和制造不具备保护人身安全免受机械系统威胁的能力，请用户在机械系统设计和制造过程中考虑安全防护措施，防止因不当的操作或产品异常造成事故。

This product is designed and manufactured without the ability to protect personal safety from mechanical system threats. Users are advised to consider safety precautions during mechanical system design and manufacturing to prevent accidents caused by improper operation or product abnormalities.

由于产品的改进，手册内容可能变更，恕不另行通知。用户对产品的任何改装我公司将不承担任何责任。阅读时，请注意手册中的以下标示：

Due to product improvements, the contents of this manual are subject to change without notice. Our company will not be responsible for any modification of the product by the user.

When reading, please pay attention to the following signs in the manual:



注意：提醒您注意文字中的要点。



小心：表示错误的操作可能导致人身伤害和设备损坏。

本产品经过国家强制 3C 认证，CE 认证，ROHS 认证

This product has passed the national mandatory 3C certification, CE certification, ROHS certification



## 1 概述/Overview

### 1.1 产品介绍/Product Introduction

SS556 是我公司推出的多功能型驱动器，采用最新 32 位 DSP 数字处理技术，驱动器控制算法采用先进的变电流技术和先进的变频技术，驱动器发热小，电机振动小，运行平稳。用户通过拨码可以设置任意电流值，细分值，I0 控制最高速度值和模拟量最高速度值，能够满足大多数场合的应用需要。该驱动器可以驱动两相开环步进电机和三相开环步进电机。由于采用内置微细分技术，即使在低细分的条件下，也能够达到高细分的效果，低中高速运行都很平稳，噪音超小。驱动器内部集成了参数上电自动整定功能，能够针对不同电机自动生成最优运行参数，最大限度发挥电机的性能。

SS556 is a multi-functional driver introduced by our company, using the latest 32-bit DSP digital processing technology, drive control algorithm using advanced variable current technology and advanced frequency conversion technology, the driver heat small, motor vibration small, smooth operation. User can set any current value, subdivision value, I0 control maximum speed value and analog maximum speed value by dialing code, which can meet the application needs of most occasions. The driver can drive two-phase open-loop stepper motor and three-phase open-loop stepper motor. Due to the use of built-in micro-subdivision technology, even in the conditions of low subdivision, but also can achieve high subdivision effect, low, medium and high-speed operation is very smooth, ultra-low noise. The auto-tuning function is integrated in the driver, which can automatically generate the optimal operating parameters for different motors and maximize the performance of the motors.

### 1.2 特性/Characteristics

- 全新 32 位 DSP 技术

New 32 Bit DSP Technology

- 可以通过拨码设置为脉冲控制，I0 自发脉冲控制，0-10V 模拟量调速控制

Dial code can be set to pulse control, I0 spontaneous pulse control, 0-10V analog speed control

- 可以通过拨码选择上升沿或下降沿，单脉冲或双脉冲

You can dial to select up or down edge, single or double pulse

- 可以通过拨码选择低滤波时间（高响应）或高滤波时间（低振动）

Low filtering time (high response) or high filtering time (low vibration) can be selected by dialing

- 1 路 0-10V 模拟量输入

1-way 0-10V analog input

- 参数上电自动匹配电机功能

Automatic parameter power-on setting function

- 变电流控制使电机发热大为降低

Variable current control greatly reduces the heat generation of the motor.

- 静止时电流自动减半

Automatic halving of current at rest

- 可驱动多种规格步进电机，例如 28, 42, 57, 60, 86

Can drive a variety of stepping motor specifications, such as 28, 42, 57, 60, 86

- 3 路光隔离信号输入，其中 2 路为高速光耦隔离

Three optical isolation signal inputs, two of which are high-speed optocoupler isolation

- 1 路报警输出，光电隔离 OC 射极输出

1 way alarm output, photoelectric isolation OC emitter output

● 电流设定方便，可在 0.4-5.6A 之间任意选择

The current setting is convenient and can be selected between 0.4-5.6 A

● 具有过压、欠压、过流等保护功能

It has the protection functions of overvoltage, undervoltage and overcurrent.

## 1.3 应用领域/Application areas

适合各种中小型自动化设备和仪器，例如：AGV，速通门，雕刻机、打标机、切割机、激光照排、绘图仪、数控机床、自动装配设备等。在用户期望小噪声、高速度的设备中应用效果特佳。

Suitable for all kinds of small and medium-sized automatic equipment and instruments, such as AGV, speed door, engraving machine, marking machine, cutting machine, laser phototypesetting, plotter, CNC machine tools, automatic assembly equipment, etc. . It works especially well on devices that users expect to have low noise and high speed.

## 2 性能指标/Performance Index

### 2.1 电气特性/Electrical characteristics

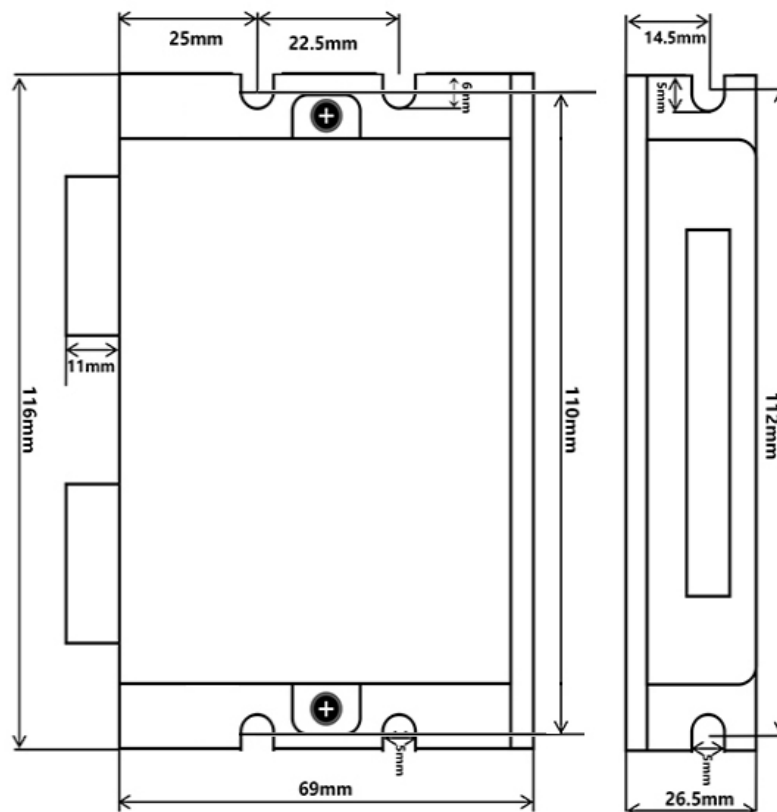
说明 Explanation	SS556			
	最小值 Minimum Value	典型值 Typical Value	最大值 Maximal Value	单位 Unit
连续输出电流 Continuous output current	0.4	-	5.6	A
电源电压（直流） Power Supply Voltage (DC)	20	36	60	Vdc
控制信号输入电流 Control signal input current	6	10	16	mA
控制信号接口电平 Control signal interface level	5	5	24	Vdc
OC 输出上拉电压 OC output pull-up voltage	5	-	24	Vdc
IO/AI 控制最高速 Insulation Resistance	-		850	PRM
模拟电压输入 Analog voltage input	0		10	Vdc
绝缘电阻 Insulation Resistance	100			MΩ

## 2.2 使用环境/Use environment

冷却方式 Cooling Mode		自然冷却或强制风冷 Natural Cooling or forced air cooling
使用环境 Service Environment	场合 Occasion	不能放在其它发热的设备旁，要避免粉尘、油雾、腐蚀性气体，湿度太大及强振动场所，禁止有可燃气体和导电灰尘。 Can not be placed next to other heating equipment, to avoid dust, oil mist, corrosive gases, humidity is too large and strong vibration sites, prohibited combustible gases and conductive dust.
	温度 Temperature	-10℃ ~ +50℃
	湿度 Humidity	40 ~ 90%RH
	振动 Vibration	5.9m/s <sup>2</sup> MAX
保存温度 Storage temperature		-20℃~60℃
使用海拔 Use Elevation		1000 米以下 Below 1000 meters
重量 Weight		0.3KG

## 3 安装/Installation

### 3.1 安装尺寸/Mounting dimensions



### 3.2 安装方法/Installation method

驱动器的可靠工作温度通常在 60℃ 以内，电机工作温度为 80℃ 以内。

The reliable operating temperature of the driver is usually within 60℃, and the motor operating temperature is within 80℃.

建议使用时选择自动半流方式，马达停止时电流自动减一半，以减少电机和驱动器的发热。

It is recommended to use the automatic semi-flow mode when using the motor. When the motor stops, the current is automatically reduced by half to reduce the heat of the motor and the drive.

安装驱动器时请采用竖着侧面安装，使散热齿形成较强的空气对流。

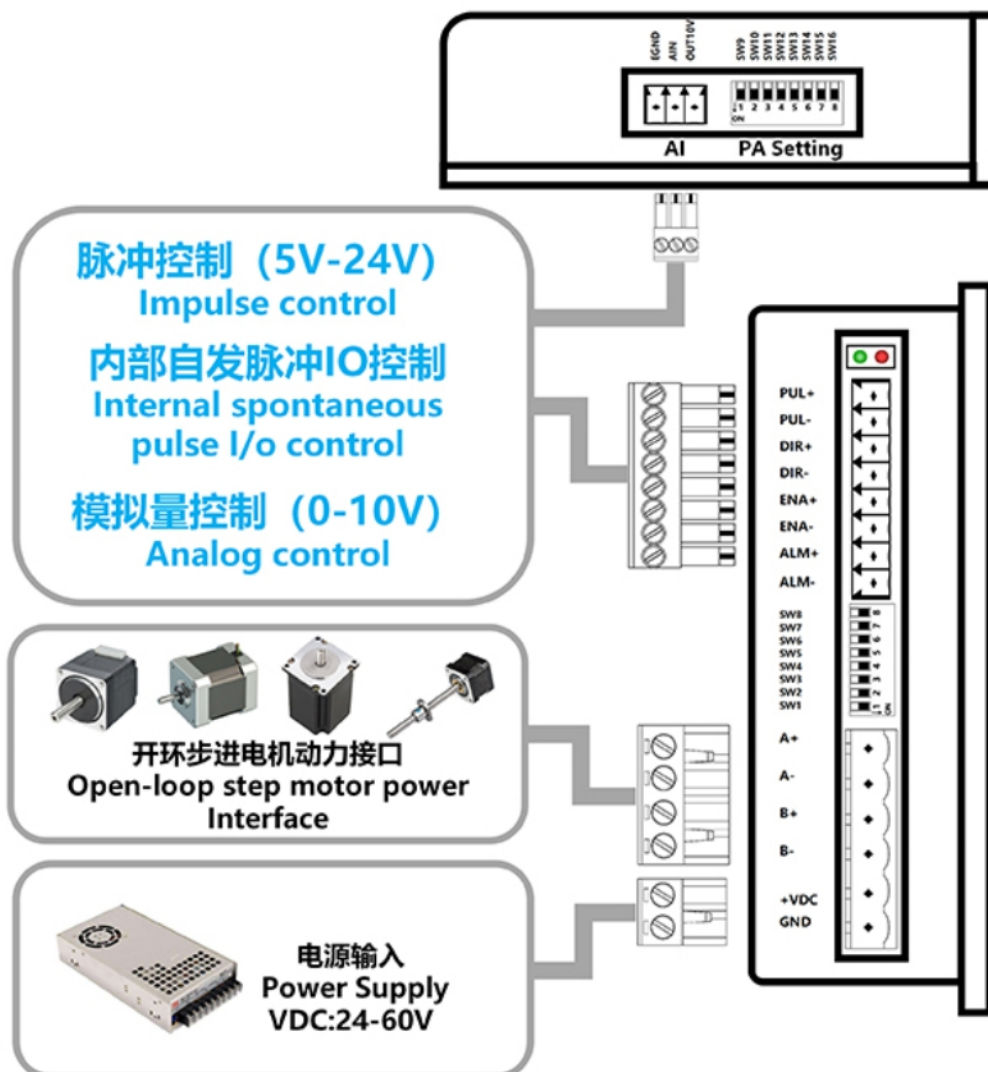
Install the drive with vertical side mounting so that the heat dissipating teeth form a strong air convection.

必要时机内靠近驱动器处安装风扇，强制散热，保证驱动器在可靠工作温度范围内工作。

Install a fan near the drive when necessary to force heat dissipation to ensure that the drive works within a reliable operating temperature range.

## 4 驱动器端口与接线/Driver ports and wiring

### 4.1 接线示意图/Wiring Diagram


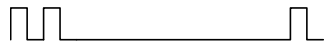
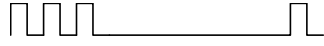
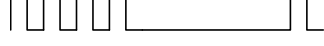


## 4.2 端口定义/Port Definition

### 4.2.1 LED 灯状态指示/Lamp status indication

绿色 LED 为电源指示灯，当驱动器接通电源时，该 LED 常亮；当驱动器切断电源时，该 LED 熄灭。红色 LED 为故障指示灯，当出现故障时，该指示灯以 3 秒钟为周期循环闪烁；当故障被用户清除时，红色 LED 常灭。红色 LED 在 3 秒钟内闪烁次数代表不同的故障信息，具体关系如下表所示。

LED power indicator is green, when the drive power, the LED is lit; when the drive power is cut off, the LED is off. Fault indicator red LED, when a failure occurs, the indicator is blinking cycle to cycle 3 seconds; the user when the fault is cleared, the red LED is off. Red LED flashing number within 3 seconds represent different fault information, the specific relationship shown in the following table.

序号 No.	闪烁次数 The number of flashes	红色 LED 闪烁波形 Red LED flashes waveform	故障说明 Description of the problem
1	1		过流或相间短路故障 Overcurrent or interphase short circuit fault
2	2		过压故障 Overvoltage fault
3	3		欠压报警 Under-voltage alarm
4	9		缺相报警 Phase absence-voltage alarm

### 4.2.2 控制信号输入端口/Control Signal Input Port

控制信号接口

Control Signal interface

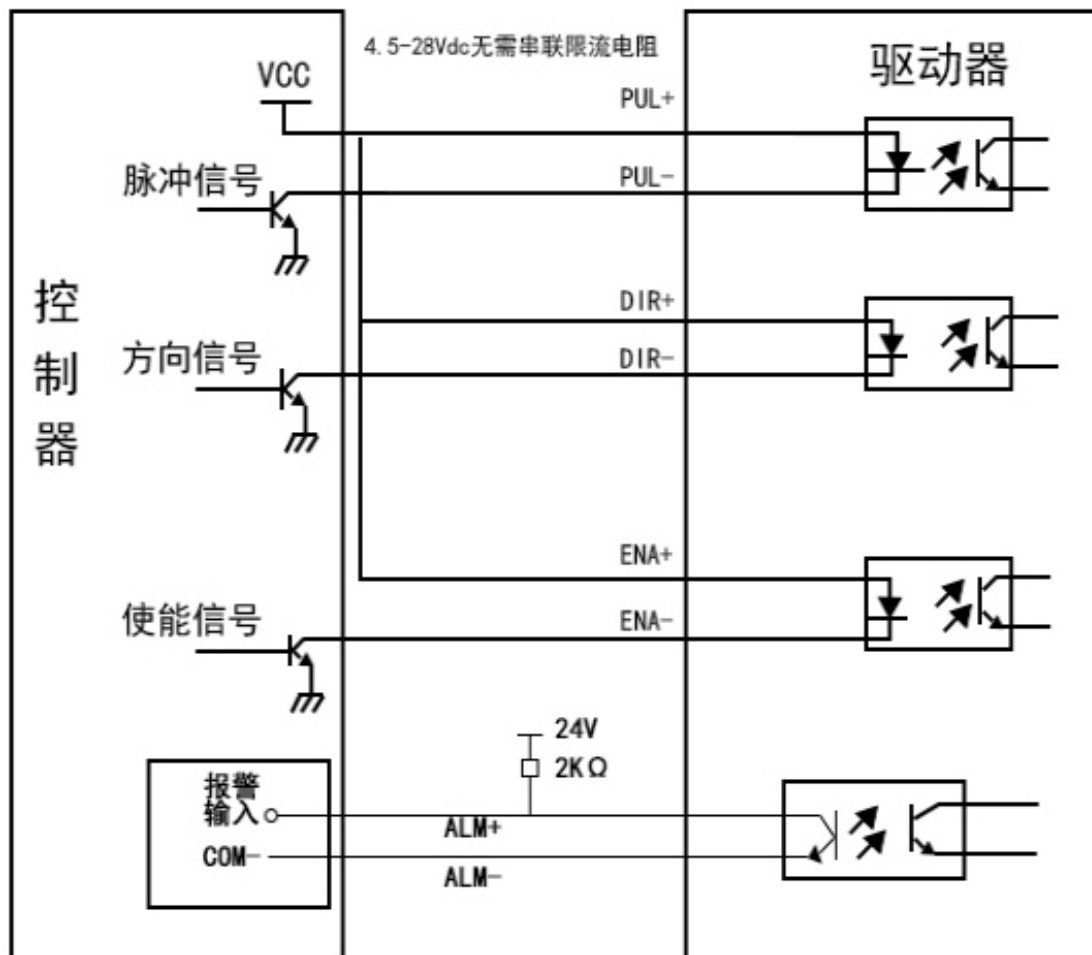
名称 Name	功能 Function
PUL+	高速信号或 I/O 控制信号: 脉冲上升沿有效; PUL 高电平时 5~24Vdc, 低电平时 0~0.5V。为了可靠响应脉冲信号, 脉冲宽度应大于 1.5 μs, 一般限位用。 High speed signal or I/O control signal: Pulse Rising Edge is effective; PUL high level 5 ~ 24VDC, low level 0 ~ 0.5V. In order to respond to the pulse signal reliably, the pulse width should be greater than 1.5 s, generally used for limiting.
PUL-	
DIR+	高速信号或 I/O 控制信号: 脉冲上升沿有效; DIR 高电平时 5~24Vdc, 低电平时 0~0.5V。为了可靠响应脉冲信号, 脉冲宽度应大于 1.5 μs, 一般限位用。 High speed signal or I/O control signal: Pulse Rising Edge is effective; Dir high level 5 -24VDC, low level 0 ~ 0.5V. In order to respond to the pulse signal reliably, the pulse width should be greater than 1.5 s, generally used for limiting.
DIR-	



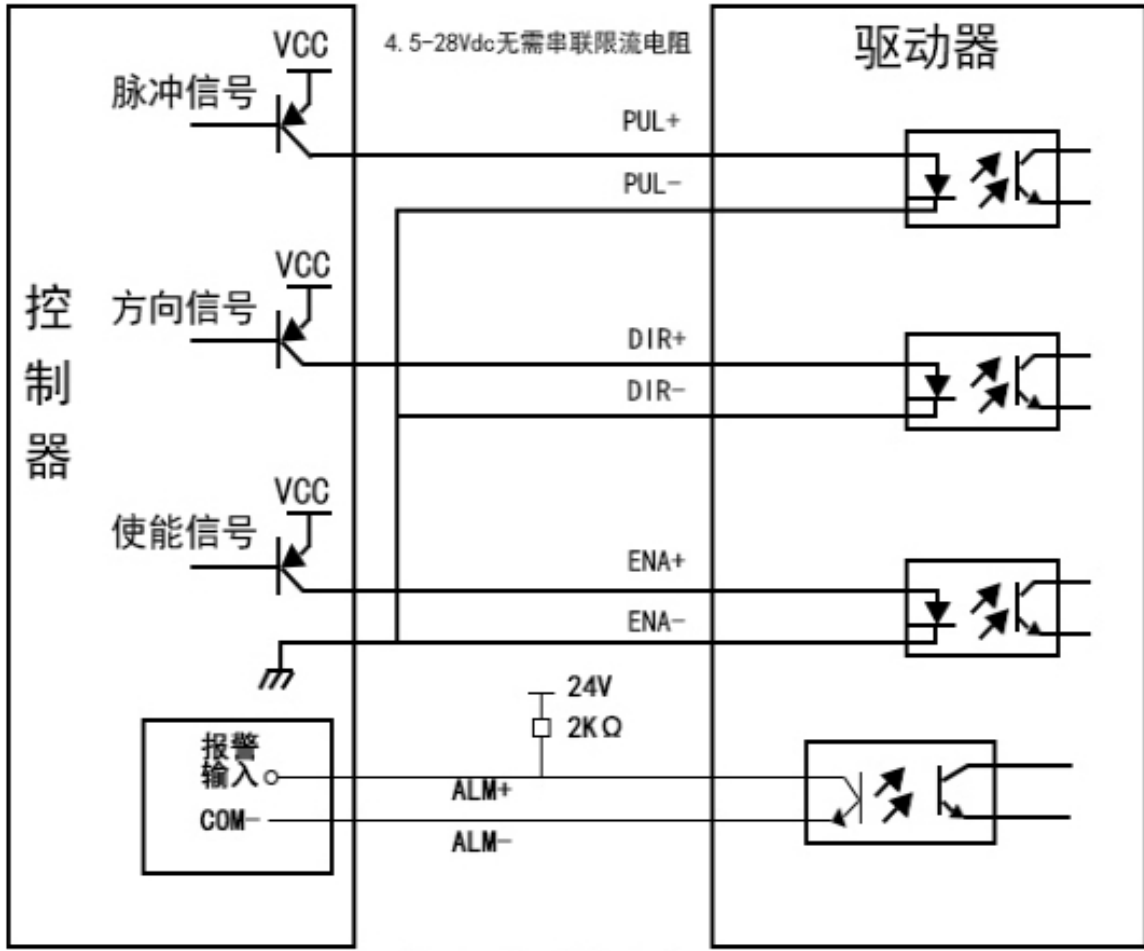
ENA+	低速信号或 I/O 控制信号：脉冲上升沿有效；ENA 高电平时 4.5~28Vdc，低电平时 0~0.5V。为了可靠响应脉冲信号，脉冲宽度应大于 1.5 μs，一般回零用。
ENA-	Low speed signal or I/O control signal: The rising edge of the pulse is effective; 4.5 - 28 VDC at high level, 0 - 0.5 V at low level. In order to respond to the pulse signal reliably, the pulse width should be greater than 1.5 s, which is usually used for zero.
ALM+	报警输出，OC 射极光电隔离输出，最高接上拉电压 28Vdc，上拉电阻 2K，输出电流 50mA，输出方式可通过拨码选择常开输出或常闭输出
ALM-	Alarm output, OC-shooting photoelectricity isolation output, the highest pull-up voltage 28VDC, pull-up resistance 2K, output current 50mA, output mode can be selected by dialing normally open output or normally closed output

## 控制信号接口电路

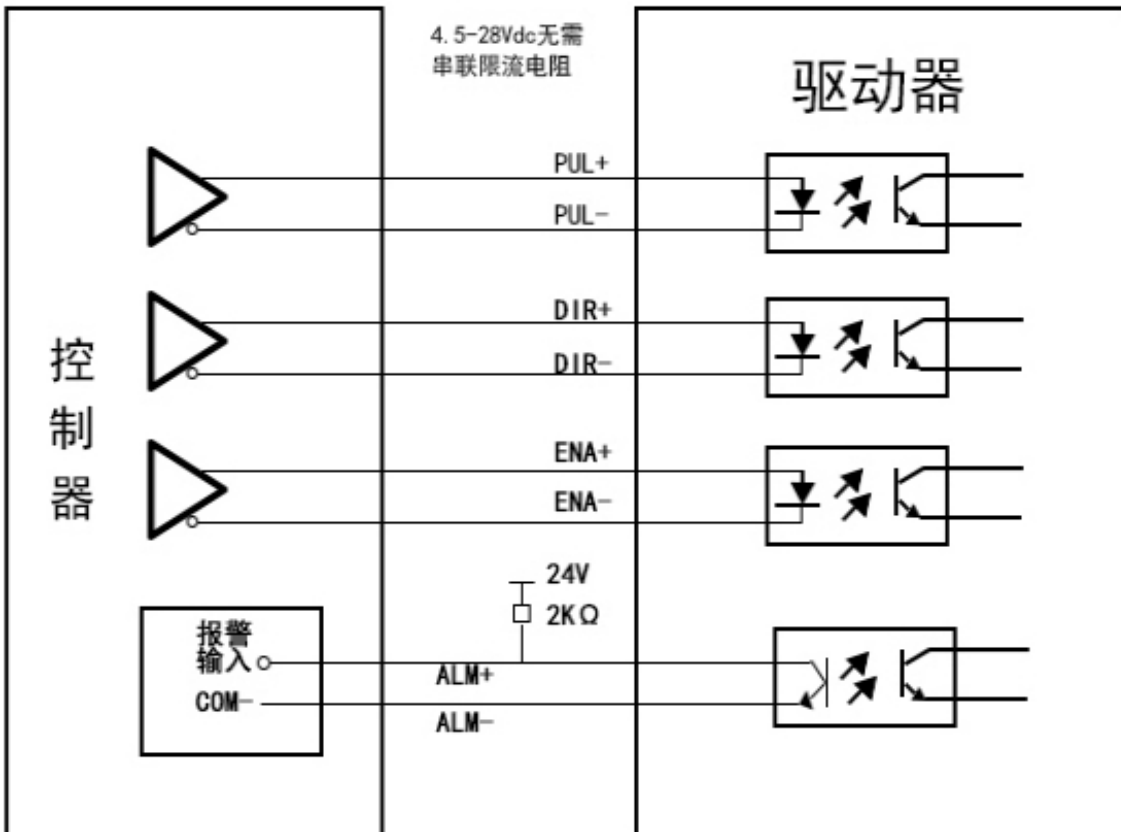
A control signal interface circuit



共阳极接法



共阴极接法



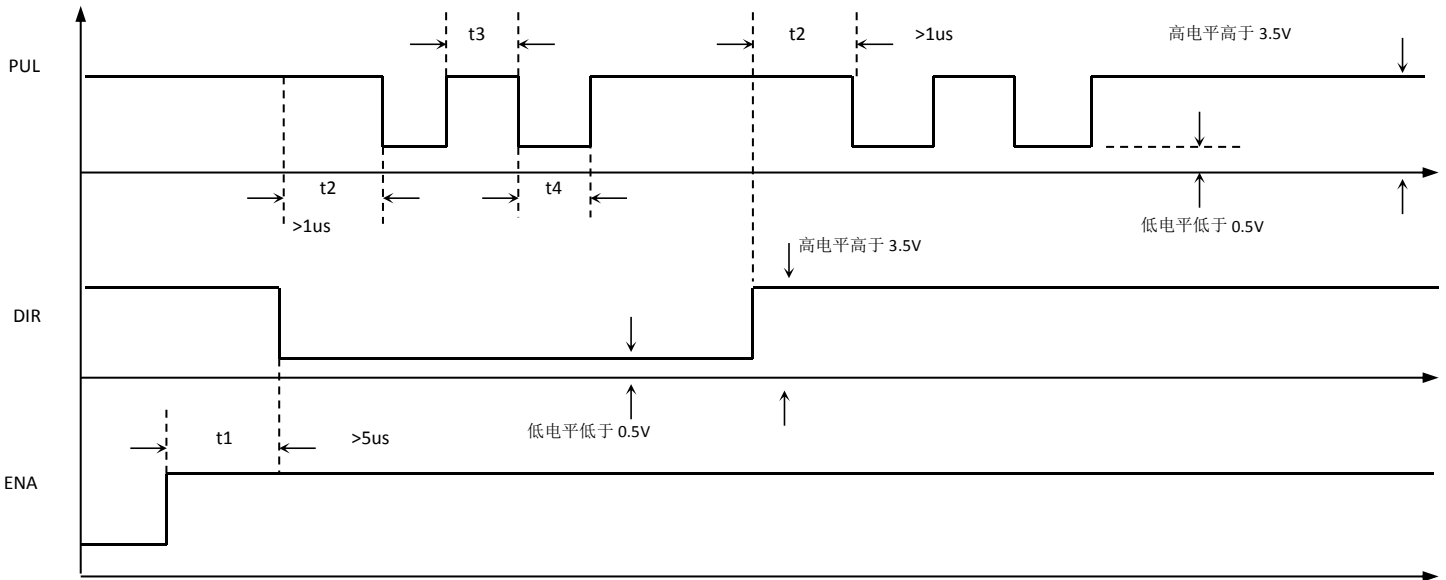
差分方式控制信号接口接线图

## 控制信号时序图

A control signal timing in FIG.

为了避免一些误动作和偏差，PUL-、DIR-和 ENA-应满足一定要求，如下图所示：

In order to avoid malfunctions and deviations, PUL-, DIR- ENA- should meet certain requirements, and, as shown below:



### 注释/Comment:

t1: ENA (使能信号) 应提前 DIR 至少  $5\mu s$ ，确定为高。一般情况下建议悬空即可；

t1: ENA (enable signal) DIR should advance at least  $5\mu s$ , determined to be high. In general recommendations can be suspended;

t2: DIR 至少提前 PUL 下降沿  $1\mu s$  确定其状态高或低；

t2: DIR PUL falling  $1\mu s$  determined in advance of at least a high or low state;

t3: 脉冲宽度至少不小于  $1.5\mu s$ ；

t3: at least a pulse width of not less than  $1.5\mu s$ ;

t4: 低电平宽度不小于  $1.5\mu s$ 。

t4: low level width not less than  $1.5\mu s$ .

## 4.2.3 模拟量控制接口/Analog control interface

名称 Name	功能 Features
OUT-10V	提供直流电压 10V 输出，电流 50mA。 Supply DC VOLTAGE 10V output, current 50mA.
AIN	模拟量 0-10V 调速输入接口。 ANALOG INPUT INTERFACE OF 0-10V speed regulation.
EGND	10V 参考端负极 10V Reference Terminal Negative

## 4.2.3 电源及电机输出端口/Output ports of power supply and motor

### 供电与电机动力接口

Power supply and motor power interfac

接口名称 Interface name	功能 Features
GND	直流电源地 DC power source
+VDC	直流电源正极，供电电压范围：直流 20-60Vdc，推荐 24Vdc 或 36Vdc 工作。 DC Power Supply Positive Pole, supply voltage range: DC 20 -60VDC, recommended 24VDC or 36VDC work.
A+	步进电机 A+相绕组接口 Stepping motor A + phase winding interface
A-	步进电机 A-相绕组接口 Stepping motor A-phase winding interface
B+	步进电机 B+相绕组接口 Stepping motor B + phase winding interface
B-	步进电机 B-相绕组接口 Stepping motor B-phase winding interface

电源电压在规定范围之间都可以正常工作，驱动器最好采用非稳压型直流电源供电，也可以采用变压器降压+桥式整流+电容滤波。但注意应使整流后电压纹波峰值不超过其规定的最大电压。建议用户使用低于最大电压的直流电压供电，避免电网波动超过驱动器电压工作范围。

The power supply voltage can work normally between the specified ranges. The driver is preferably powered by an unregulated DC power supply, or a transformer buck + bridge rectifier + capacitor filter. Note, however, that the peak voltage ripple after rectification should not exceed its specified maximum voltage. It is recommended that the user supply power with a DC voltage lower than the maximum voltage to prevent the grid from fluctuating beyond the operating range of the driver voltage.

如果使用稳压型开关电源供电，应注意开关电源的输出电流范围需设成最大。

If using a regulated switching power supply, be aware that the output current range of the switching power supply must be set to maximum.

请注意：

Please note:

接线时要注意电源正负极切勿反接；

When wiring, pay attention to the positive and negative poles of the power supply, do not reverse connection;

最好用非稳压型电源；

It is better to use an unstable power supply;

采用非稳压电源时，电源电流输出能力应大于驱动器设定电流的 60%即可；

The output capacity of the power supply current should be greater than 60% of the set current of the driver when an unstable power supply is used;

采用稳压开关电源时，电源的输出电流应大于或等于驱动器的工作电流；

When a regulated switching power supply is adopted, the output current of the power supply shall be greater than or equal to the working current of the driver;

为降低成本，两三个驱动器可共用一个电源，但应保证电源功率足够大。

To reduce costs, two or three drives can share a power supply, but the power supply should be large enough.

## 5 拨码定义/Dial definition

### 5.1 电流设定/The current setting

Peak	RMS	SW1	SW2	SW3	SW4
0.4A	0.3A	on	on	on	on
0.7A	0.5A	off	on	on	on
1.0A	0.7A	on	off	on	on
1.1A	0.8A	off	off	on	on
1.4A	1.0A	on	on	off	on
1.7A	1.2A	off	on	off	on
2.1A	1.5A	on	off	off	on
2.5A	1.8A	off	off	off	on
2.8A	2.0 A	on	on	on	off
3.0A	2.2A	off	on	on	off
3.8A	2.7A	on	off	on	off
4.2A	3.0A	off	off	on	off
4.5A	3.2A	on	on	off	off
4.9A	3.5A	off	on	off	off
5.3A	3.8A	on	off	off	off
5.6A	4.0A	off	off	off	off

注：如上电流为标准产品 SS556 电流，其它电流可以根据客户需求派生，能设定的电流范围为 0.3-5.6A 之间的任意值。

Note: If the current is standard product SS556 current, other current can be derived according to customer demand, can set the current range between 0.3-5.6 a arbitrary value.

### 5.2 细分设定/Subdivision setting

拨码设定细分和自发脉冲速度

Dialing sets the speed of subdivision and spontaneous pulses

细分设定

Pul/r	S5	S6	S7	S8	说明
200	on	on	on	on	当 SW5、SW6、SW7、SW8 都为 on 时，驱动器细分采用驱动器内部默认细分，可以派生为客户想要的任何细分值。
400	off	on	on	on	
800	on	off	on	on	
1600	off	off	on	on	
3200	on	on	off	on	
6400	off	on	off	on	
12800	on	off	off	on	

25600	off	off	off	on
1000	on	on	on	off
2000	off	on	on	off
4000	on	off	on	off
5000	off	off	on	off
8000	on	on	off	off
10000	off	on	off	off
20000	on	off	off	off
25000	off	off	off	off

IO/AI 速度设定 (内部自发脉冲或 0-10V 模拟量调速控制设定)

转/分 [RPM]	S5	S6	S7	S8	速度段说明
40	on	on	on	on	当 SW5、SW6、SW7、SW8 都为 on 时，驱动器速度段采用驱动器内部默认速度：可以派生为客户想要的任何速度档。
50	off	on	on	on	
60	on	off	on	on	
70	off	off	on	on	
80	on	on	off	on	
90	off	on	off	on	
100	on	off	off	on	
150	off	off	off	on	
200	on	on	on	off	
250	off	on	on	off	
350	on	off	on	off	
450	off	off	on	off	
550	on	on	off	off	
650	off	on	off	off	
750	on	off	off	off	
850	off	off	off	off	

注：1, 如上细分为标准产品 SS556 细分，其它细分可以根据客户需求派生，能设定的细分范围为 200-51200 之间的任意值，细分表请参考【Pulse/rev】这一栏细分表。

2, 当驱动器通过拨码 SW15 和 SW16 设置为 I0 控制自发脉冲或模拟量调速控制模式后，对应的速度请参考【IO/AI (RPM)】这一栏速度表。

Note: 1, as subdivided into standard product SS556 subdivisions, other subdivisions can be derived according to customer needs, can be set to subdivide between 200-51200 arbitrary value, subdivide table please refer to [ Pulse/rev ] this column subdivide table.

2, when the drive is set to I0 control by dialing SW15 and SW16, or analog control mode, the corresponding speed please refer to [ IO/AI (RPM) ] this column speedometer.

## 5.3 功能设置/Function setting

### 静态电流设置/Static current setting

Current	SW9
90%	on
50%	off

滤波时间设置/Filter time setting

Filter Sel	SW10
1.5ms	off
10ms	on

使能锁轴状态/Enable-lock condition

Shaft state	SW11
Disable (使能后电机不锁轴)	off
Enable (使能后电机锁轴)	on

报警输出状态/Alarm output status

Alm-o state	SW12
HI-Z (报警输出高组态导通)	off
Onstate (报警输出低组态导通)	on

脉冲接收状态/Pulse receiving state

PUL-E	SW13
Rise (上升沿)	off
Fall (下降沿)	on

驱动控制模式/Drive control mode

Step-M	SW14
Pul/Dir (脉冲+方向)	off
CW/CCW(双脉冲)	on

驱动模式设置/Drive mode setting

Drive mode	SW15	SW16	Remark
Self Mode	on	on	自测模式 Self-test mode
I0 Mode	off	on	I0 输入控制模式 Io input control mode
AI Mode	on	off	模拟量控制模式 Analog control mode

Step Mode	off	off	脉冲控制模式 Pulse control mode
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### 5.4 参数自整定功能/Parameter self-tuning function

驱动器为开环步进驱动时，驱动器能上电自动匹配电机参数。注意此时不能输入脉冲，方向信号也不应变化，使能信号不能接入。

When the driver is open-loop step-by-step drive, the driver can power up to match the motor parameters automatically. Note that at this time can not input pulse, direction signal should not change, so that the signal can not access.

## 6 保修及售后服务 /Warranty and after-sales service

请保留好包装箱以便运输、储存或需要退回本公司维修时使用。一年保修期：

Please keep the packing box for transportation, storage or need to return to the company for maintenance. One year warranty period:

来自本驱动器使用一年内因为产品自身的原因造成的损坏，负责保修。

From the use of this drive within one year because of the product itself caused by the damage, responsible for the warranty.

不在保修之列：/Not covered by warranty:

不恰当的接线、电源电压和用户外围配置造成的损坏。/Damage caused by improper wiring, power supply voltage and user peripheral configuration.

无本公司书面授权条件下，用户擅自对产品进行更改。/Without the written authorization of the company, users make changes to the products without authorization.

超出电气和环境的要求使用。/Use beyond electrical and environmental requirements.

驱动器序列编号被撕下或无法辨认。/The drive serial number has been torn off or is unreadable.

外壳被明显破坏。/The outer shell was visibly damaged.

不可抗拒的灾害。/An irresistible disaster.

添加微信或者拨打电话



(+86) 18926788846

Email: Tech@TQKTEC.COM

您拨打电话之前，请先记录以下信息：

Before you call, please record the following information:

故障现象/Fault phenomenon

产品型号和序列号/Product model and serial number

安装日期或者生产日期/Installation date or production date



