

Kinco

步进电机驱动器（两相双极微步型）

2M412



感谢您选用Kinco步进电机驱动器！
为了保障您的安全，请在使用产品前仔细阅读以下内容：

安全事项：

※请保留这份说明书，以备使用前需要时可以参考！

※请了解以下志的含义：

警告： 如果不按照说明书的指导可能导致人身体的严重伤害！

注意： 如果不按照说明书的指导可能导致产品的损坏，或者导致人身体的伤害！

警告：

1. 把此驱动器应用于直接涉及人身安全的机械设备（核动力控制、医疗设备、卡车、火车、飞机、娱乐和安全防护设备等等）时，请务必安装故障防范的安全设备，避免出现可能发生的人体伤害。
2. 驱动器的安装、连接、调试、控制和维护必须由专业的人员执行！
3. 当安装驱动器时必须有良好的接地，系统的接地电缆的截面积不得小于1.25平方毫米。
4. 请在安装驱动器之前预先考虑系统在电源故障情况下的安全措施，否则由于电源故障的情况下，造成电机保持扭矩的丧失，可能导致人身体的伤害！
5. 该驱动器不适合直接暴露在户外环境中安装，需要安装在符合工业防护规范的电气柜中，请注意不要在有易燃易爆气体，有腐蚀性的气体，有大量水蒸气和有剧烈震动的场合安装本驱动器，否则易引起火灾或造成设备的损坏。
6. 请不要在驱动器电源切断后30秒内触摸驱动器的外壳或者连接端子，残余的电流可能造成电击。
7. 不要把手指或者其他任何物体放入驱动器中，通电时有可能造成电击或设备的损坏。
8. 请不要擅自拆开或者改造该驱动器，如果您有技术方面的疑问需要了解，请联系我们，否则我们不负责处理由此造成的设备的损坏。
9. 请在调整设定开关的时候使用带绝缘手柄的工具，否则有可能造成电击。

注意：

1. 请不要在设备运转的情况下移动、安装或者维修该驱动器。
2. 请务必遵照驱动器参数说明中规定的输入电压提供供电的电源，并且电源线的导体部分的应该不小于AWG 18 (0.75平方毫米)。
3. 请在给驱动器通电前仔细检查所有的接线是否正确无误。

4. 请在连接电源的电路安装电源开关，以备需要时可以及时切断电源。
5. 当发生电源的故障时请尽快切断驱动器的供电电路上的电源开关，否则当电源故障突然恢复时，可能由于设备突然的运转造成人身伤害。
6. 请在检查完控制信号的连接无误后再接通驱动器的供电电源。
7. 请务必在系统中安装紧急停止开关，以保证在设备运转出现紧急情况时可以及时切断供电电源。
8. 请不要在电机保持一个垂直的负载的情况下，接通驱动器的FREE信号输入，否则可能导致负载坠落造成人身伤害！
9. 如果需要在电源切断的情况下保持一个垂直的负载，请务必安装必要的安全保障设备，比如刹车器等等。
10. 系统的机械部分发生故障时，请及时切断驱动器的电源。
11. 在驱动器进行耐压和绝缘测试的时候，请不要接触驱动器的连接端子，否则可能造成电击。
12. 请仔细阅读驱动器参数说明中的规定，不按照规定的使用情况都可能造成驱动器的损坏。
13. 请不要使用水性或者油性的清洁剂清洁驱动器，否则容易造成驱动器的损坏。
14. 在废弃驱动器的时候，请按照工业废弃物的准来处理，以免造成环境的污染。

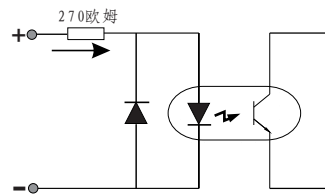
特点：

- 供电电压最大可达直流 40V。
- 采用双极型恒流驱动方式，最大驱动电流可达每相1.2A，可驱动相电流小于1.2A的任何两相双极型混合式步进电机。
- 对于电机的驱动输出相电流可通过DIP开关调整，以配合不同规格的电机。
- 具有DIP开关可设定电机静态锁紧状态下的自动半流功能，可以大大降低电机的发热。
- 采用专用驱动控制芯片，具有最高可达256/200的细分功能，细分可以通过DIP开关设定，保证提供最好的运行平稳性能。
- 控制信号的输入电路采用光耦器件隔离，降低外部电气噪声干扰的影响。

规格参数：

供电电压	直流 12V ~ 40V
输出相电流	0.2A ~ 1.2A
控制信号输入电流	6 ~ 20mA
冷却方式	自然风冷
使用环境要求	避免有大量金属粉尘、油雾或腐蚀性气体
使用环境温度	-10℃ ~ +45℃
使用环境湿度	85% 非冷凝
重量	0.13Kg

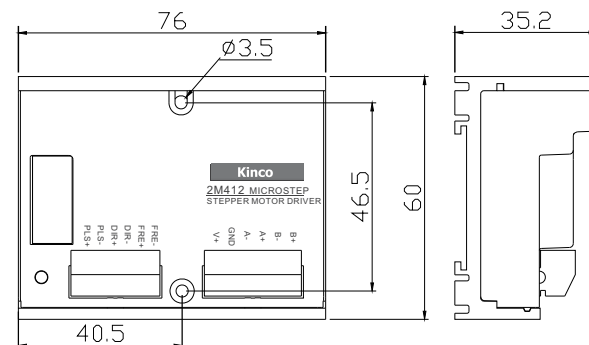
控制信号输入电路：



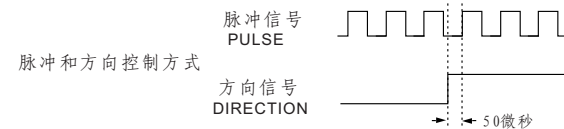
本驱动器的所有控制信号的输入电路中都采用了可靠的光耦元件进行隔离，可以减少外部电气噪声对于本驱动器的干扰；在输入电路中有串连一个270欧姆的限流电阻，所有的控制信号输入端口可直接采用5V电压的控制信号控制，当采用更高电压的外部控制信号时，请务必在外部串连合适的限流电阻！

机械尺寸：

单位（毫米）



控制信号说明：

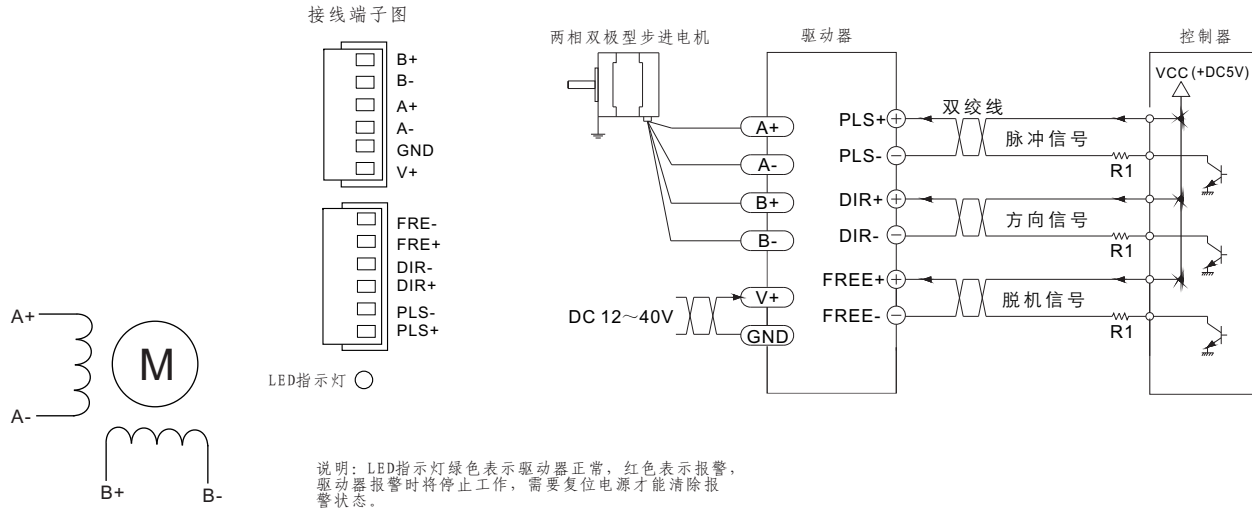


本驱动器只能工作在脉冲和方向控制方式；当输入脉冲信号时，电机将按照初始的方向旋转（初始方向和电机的接线有关，互换两相可以改变电机初始运行方向），当改变方向信号的电平时，电机就会按初始方向的反方向旋转。



当驱动器工作在脉冲和方向控制方式时，DIR控制信号输入端口是方向信号的输入端口，外加电平变化可以控制电机运转方向。为保证可靠的响应，方向信号应至少先于脉冲信号至少50μS建立。

■ 典型接线图：



两相双极型步进电机绕组图



注意当控制器的控制信号的电压为5V时，连接线路中的R1电阻均为0欧姆；当控制器的控制信号的电压为24V时，为保证控制信号的电流符合驱动器的要求，在连接线路中的R1电阻为2K欧姆。



驱动器上的FREE接口为脱机控制信号输入端口，当控制信号回路接通时，驱动器会立即切断输出的相电流，步进电机此时处于自由的状态。

■ DIP开关功能说明：



在驱动器的顶部有一个红色的八位DIP功能设定开关，可以用来设定驱动器的工作方式和工作参数，使用前请务必仔细阅读参考！注意更改拨码开关的设定之前请先切断电源！

DIP开关的正视图如下：



开关序号	ON功能	OFF功能	特别说明
DIP1~DIP4	细分设置用	细分设置用	
DIP5	静态电流半流	静态电流全流	
DIP6~DIP8	输出电流设置用	输出电流设置用	

细分设定表如下：

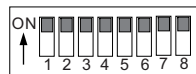
			DIP1为ON	DIP1为OFF
DIP2	DIP3	DIP4	细分	细分
ON	ON	ON	无效	2
OFF	ON	ON	4	4
ON	OFF	ON	8	5
OFF	OFF	ON	16	10
ON	ON	OFF	32	25
OFF	ON	OFF	64	50
ON	OFF	OFF	128	100
OFF	OFF	OFF	256	200

■ 电流调整说明：



在驱动器的顶部的那个红色的八位DIP功能设定开关，也可以用来设定驱动器的输出相电流，使用前请务必仔细阅读参考！

DIP开关的正视图如下：



输出相电流设定表如下：

DIP6	DIP7	DIP8	输出电流
OFF	OFF	OFF	0.20A
OFF	OFF	ON	0.35A
OFF	ON	OFF	0.50A
OFF	ON	ON	0.65A
ON	OFF	OFF	0.80A
ON	OFF	ON	0.90A
ON	ON	OFF	1.00A
ON	ON	ON	1.20A

■ 使用注意事项：

1. 供电电源注意事项：

● 驱动器的供电电源的直流电压必须保持稳定，且不得超过最大电压值。用户需要根据所使用电源的纹波参数指标，保证电源的电压不超过最大电压值，否则有可能造成驱动器的损坏！

2. 信号输入注意事项：

● 当驱动器使用脉冲和方向控制方式时，在改变方向时必须注意电机运转的方向信号需要至少先于脉冲信号50微秒接通。

3. 系统接线注意事项：

● 注意控制信号输入线必须采用双绞线（导体截面积不小于0.2平方毫米），而且控制器到驱动器之间的控制信号线的长度最好不要超过2米。

● 注意电机的连接线由于需要承受较大的电流，建议使用导体截面积不小于0.5平方毫米的线缆，如果必要时须要根据电流选用更粗的线缆。

● 注意控制信号线必须与电源线分开至少10厘米的距离，如有屏蔽的隔离措施，也必须分开接地，以避免电源线的电气噪声对控制信号造成干扰。

4. 安装注意事项：

● 安装时请将驱动器的散热器的表面贴紧安装盘柜的金属表面，以有利驱动器的散热。

● 请保证本驱动器安装环境的通风顺畅，这样可以提高驱动器的散热器的散热效率，可以保证驱动器长期正常的工作。

5. DIP开关设定注意事项：

● 有些系列的驱动器提供了自测功能，在给系统加电时，请务必确认驱动器的自测功能的DIP开关设定为OFF，以免电机再上电后突然发生转动，而造成设备或者人身的伤害！在驱动器正常工作之前也需要将自测功能的DIP开关设定为OFF状态。

● 请注意调整驱动器的输出相电流设定开关或可调电阻，步进电机不能长时间超过设计的额定电流工作，如果设定的输出电流过大，则可能造成电机的烧毁；但如果设定的电流小于电机的额定相电流，电机可能不能正常的工作。

6. 安装环境的要求：

● 请注意本驱动器的设计只保证适应工业室内环境的应用，请保证不要直接将本驱动器安装在直接的室外环境中使用，在室外环境使用时，必须搭配符合工业防护要求的电气柜安装，否则容易导致驱动器的损坏！

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Kinco

Stepping Motor Driver (2-phase bipolar microstepping driver)

2M412



Thank you for choosing the Kinco Stepping Motor Driver!
To ensure your safety, please read the information as follows:

■ Safety:

✳ Please keep the manual for your reference when needed!

✳ Please know the following symbols:

Warn: It will injure body if not follow the manual to operate!

Notice: It will damage product or injure body if not follow the manual to operate!

Warn:

- When applying the driver to the machines related to the safety of the body (e.g. Nuclear power control, medical machine, truck, train, plane, amusement and safety devices), please install the fault-proof safety devices to avoid injuring body.
- The installation, connection, debugging, control and maintenance for the driver should carry on by the professional!
- It should be well grounded when installing the driver and the cross sectional area of conductor of earth lead should not less than 1.25 mm².
- Please pre-consider precaution when the power fails before installation. Or else it will lose holding torque and may cause the injury of body!
- The driver is not suitable to install in outdoor. It needs to install in the electrical cabinet according to the Industrial Protection Standard. Note that don't install in the following location: e.g. flammable gas, caustic gas, much vapour and strong shaking which will cause fire or machine damaged.
- Don't touch the enclosure or linking terminal of the driver in 30secs after shutting power off, the remnant current may cause electric shock.
- Don't put anything into the driver. It may cause electric shock or damage the machine.
- Don't unfold or regenerate the driver. If you have any question about technology, please contact us, or else we will be not responsible for the damage of the machine.
- Please use the tools with isolated handle when debugging switch, or else it will cause electric shock.

Notice:

- Don't move, install or maintain the driver when operating.

- Please provide power supply according to the driver parameters in manual, and the cross sectional area of conductor power cable must be not less than AWG 18(0.75mm²).
- Please check all connections before supplying power.
- Please install switch on the circuit linking to power supply that you can cut off power supply in time when needed.
- Please shut down the power as soon as possible when it fails, or else the sudden operation may injure body when the power is free from trouble accidentally.
- Please connect the power of the driver after checking the control signal.
- Should install the emergency stop switch to shut the power off when emergency happened.
- Don't input the FREE signal when the motor loads vertically, or else the falling of the load will injure body.
- If it is needed to keep a vertical load when the power is shut down, the necessary safety device (e.g. brake) should be installed.
- Please shut down the power when the mechanical part of system fails.
- Don't touch the terminal of the driver when doing withstand voltage and isolation test, or else it will cause electric shock.
- Please read the parameters of the manual carefully, or it will cause the damage of the driver if operated illegally.
- Don't use the watery or oily detergent to clean the driver, or else it will damage the driver.
- When abandon the driver, please according to the industrial spoilage treatment standard in order not to pollute the environment.

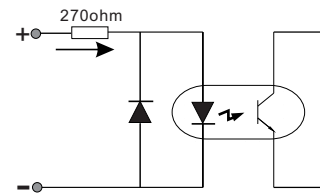
■ Highlight:

- The max voltage of power supply is up to DC40V.
- Bipolar constant-current drive. The max current is up to 1.2A per phase, so it can drive any two-phase Hybrid stepping motor below 1.2A.
- Can adjust the value of output phase current by DIP switch so as to drive different stepping motors.
- Keeping automatic semi-flow under condition of static locking of motor, so it can reduce heat from motor drastically.
- The max subdivision set by DIP switch is up to 256/200, provide the best performance of operation.
- Employ optocoupler devices to isolate on input circuit of control signal in order to reduce electrical noise.

■ Specification:

Supply power	DC 18V ~ 40V
Output Phase-current	0.2A ~ 1.2A
Input Current of Control Signal	6 ~ 20mA
Cooling mode	naturally air cooling
Environment	avoid massive metal powder, oil mist or erosive gas
Temperature	-10°C ~ +45°C
Humidity	<85%
Weight	0.13Kg

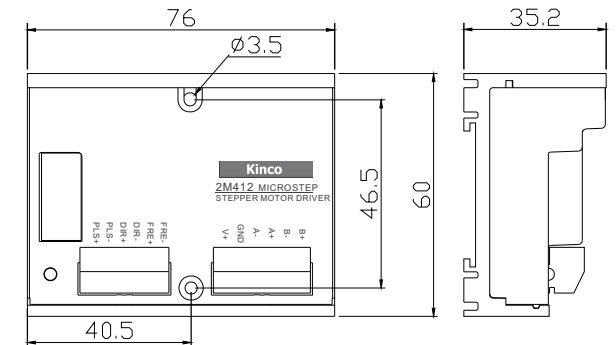
■ Input circuit of control signal:



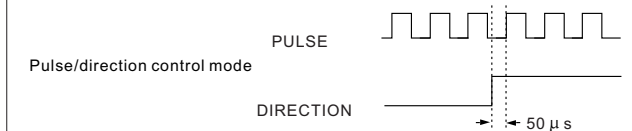
In this driver, all control signals are isolated with reliable optocoupler, so it can reduce the external electrical interference. Resistor of 270ohm on input circuit is used to limit input current. All control signals can connect to the 5V directly. When using control signal with higher voltage, please connect appropriate resistor to limit the current.

■ Mechanical Dimensions:

unit (mm)



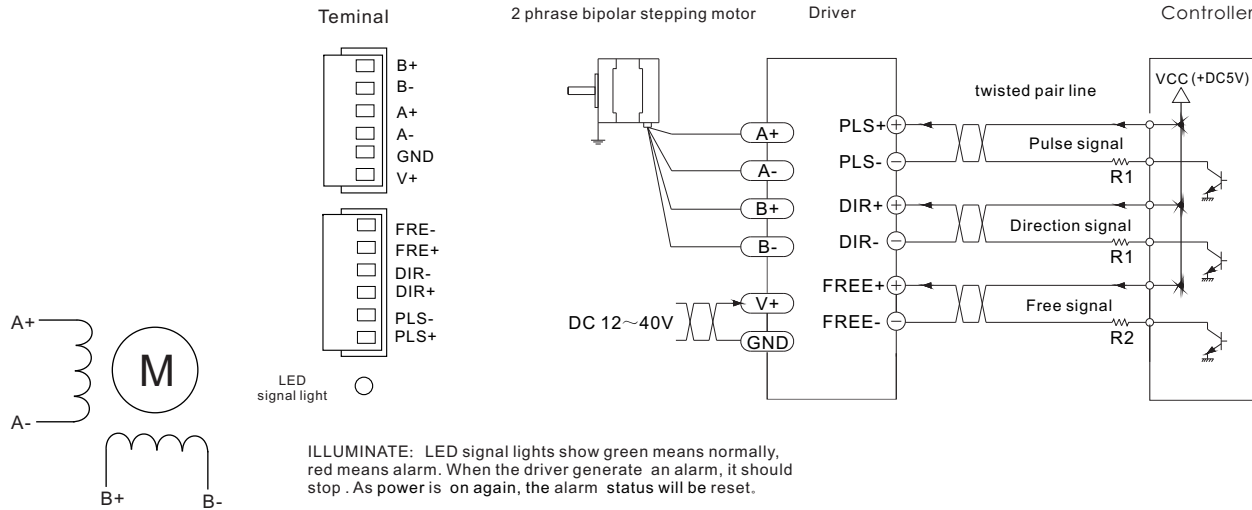
■ Control Signal Description:



The driver can run only in pulse and direction mode. When inputted pulse signal, stepping motor can revolve according to the initial direction (the initial direction is related to the motor wiring). Exchange two phases can change the initial revolution of the motor. When change the signal's level, the motor will reverse.

When the driver run in the pulse/direction control mode, input port of Dir control signal is input port of direction signal. The change of level can control rotation of motor. To ensure the reliable response, Dir signal must be set before the pulse signal at least 50 μs;

■ Representative wiring diagram:



2-phase bipolar stepping motor winding diagram



When the control signal of controller is 5V, resistor R1 and R2 on linking circuit (see the above wiring diagram) are 0 ohm; when control signal of controller is 24V, R1 is 2K ohm and R2 is 8K ohm in order to ensure current of control signal to conform the requirement of driver.



Free interface is the input port of off-line control signal, When circuit of control signal is connected, driver will shut down the phase-current of output right away, and stepping motor is free then.

■ DIP switch's function:



On the top of driver, there is a red 8-bit DIP function switch, which can be used to set run mode and parameters of driver. Please read the manual carefully before use and shut off the power before adjusting the Dip switch.

The front view of DIP switch:



DIP No.	ON	OFF
DIP1~DIP4	Setting subdivision	Setting subdivision
DIP5	Static current semi-current	Static current full-current
DIP6~DIP8	Setting output current	Setting output current

Subdivision Setting Table is as follow:

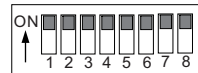
DIP2	DIP3	DIP4	DIP1 is ON	DIP1 is OFF
ON	ON	ON	N/A	2
OFF	ON	ON	4	4
ON	OFF	ON	8	5
OFF	OFF	ON	16	10
ON	ON	OFF	32	25
OFF	ON	OFF	64	50
ON	OFF	OFF	128	100
OFF	OFF	OFF	256	200

■ Adjustment of current description:



On the top of the driver, there is an eight red Dip switch that can also use to set the driver's current; Please read the reference carefully before use.

The front view of DIP switch:



Output phase-current setting table:

DIP6	DIP7	DIP8	output current
OFF	OFF	OFF	0.20A
OFF	OFF	ON	0.35A
OFF	ON	OFF	0.50A
OFF	ON	ON	0.65A
ON	OFF	OFF	0.80A
ON	OFF	ON	0.90A
ON	ON	OFF	1.00A
ON	ON	ON	1.20A

■ Notice for user:

1. POWER SUPPLY:

The DC voltage supplied to driver must be stable, and can not be great than the max. The clients use ripple parameter index of power supply when needed, and make sure the peak voltage must be less than the max, or else driver will be damaged.

2. INPUT SIGNAL:

When using the P/D mode, if you want to change revolution direction of the motor, Dir signal must be set at least 50 us before the pulse signal;

3. CONNECTION OF SYSTEM:

The control signal must use the twisted pair line to transmit, and the cross sectional area of conductor of wire is not smaller than 0.2m², and the wire's length cannot be longer than 2m.

The wire connecting to motor must to withstand a high current. We suggest to use the conductor which cross section area is larger than 0.5m², if necessary, you can choose more thicker wire according to the actual current.

Keep the distance between control signal wire and power wire more than 10cm, even using the shield isolated mode, the driver also must ground separately so that electrical noise from wire of power supply can not interfere control signal.

4. INSTALLATION

Please cling the driver's radiator surface to the metal board in the electrical cabinet to facilitate heat dissipation of driver.

Please keep ventilative to make the driver work continuously for longer time.

5. ATTENTION OF DIP SWITCH:

Some series of driver have been provided the self-test function before power is on, Please make sure the DIP switch for self-test function is shut off to avoid motor running suddenly and damage the equipment or injure personnel! Before the driver work normally, the Dip switch of the self-test function must be off.

Please adjust the output phase-current by DIP switch, stepping motor can not run continually at over-current for a long time. If the output current is too high, the motor will be damaged, and if the output current is too small, the motor cannot run normally.

6. INSTALLATION ENVIRONMENT

The driver can only use in indoor industrial environment. Please don't install the driver outdoor directly, when using outdoor, the driver should be installed in the electrical cabinet conformed to the industry protection requirement, otherwise the driver will be damaged easily!

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