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FUYU
福誉科技

FMDT240A52NOM
驱动器

使用指南手册版本: V 2.0

FUYU TECHNOLOGY CO.,LTD

FMDT240A52NOM 是根据市场需求以及发展趋势而成功研发的一款新型的步进驱动器，采用全新32位电机控制专用DSP 芯片， 从而使得电机运行更平稳，不易丢步。接收输入信号脉冲，方向和使能输入。当使用内部位置时，脉冲和方向接口可用于传感器信号输入。将电机的发热程度和振动幅度降至最低，从而更好地提高了机械运转的加工速度和精度。工作电压为AC200V-AC240V，适配电流5.2A以下的高压3相步进电机。

电流设置

驱动器工作电流由拨码开关SW1~SW4设定，运行电流为工作有效输出电流。峰值电流=运行电流×1.4

运行电流(A)	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2
峰值电流(A)	3.1	3.4	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.6	5.9	6.2	6.4	6.7	7.0	7.3
SW1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
SW2	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
SW3	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW4	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON

细分设置和I/O模式设置

细分设置和I/O模式设置由拨码开关SW10控制。 当SW10=OFF时，则为细分设置模式；当SW10=ON时，则为I/O模式。其中细分和速度由拨码开关SW5~SW8设定，共16档。

细分数(puls/r)	400	500	600	800	1000	1200	2000	3000	4000	5000	6000	10000	20000	30000	60000	80000
细分数(puls/r)	10	20	30	50	60	80	100	150	200	250	300	400	500	600	700	800
SW5	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SW6	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW7	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW8	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF

SW9	ON	双脉冲模式：PU为正向步进脉冲信号，DR为反向步进脉冲信号
	OFF	单脉冲模式：PU为步进脉冲信号，DR为方向控制信号
SW10	ON	接受I/O输入信号
	OFF	接受外部脉冲信号
SW-PU	PU	OFF:最大差分输入频率200kpps 最小脉冲宽度2.5us。
SW-DR	DR	ON:最大差分输入频率100kpps 最小脉冲宽度5us。

使用环境及参数

冷却方式		自然风冷却或强制冷却
使用环境	介质环境	无腐蚀性气体或尘埃等，不可再含有放射性物质，磁场以及真空等特殊环境中使用。
	温度	0--- +50℃
	湿度	85%以下(无结露)
保存温度		-20℃--80℃
重 量		约830克
外形尺寸		178×68×108.5mm3

1.电机与驱动的常见连线

U 红
W 绿
V 黄

2.驱动与控制器的常见接线

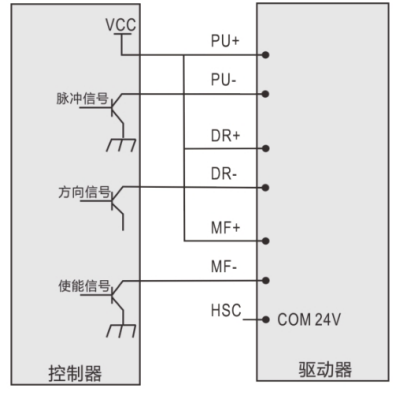
即 PU+ 和 DR+ 都接信号电源正极

PU- 接 脉冲信号

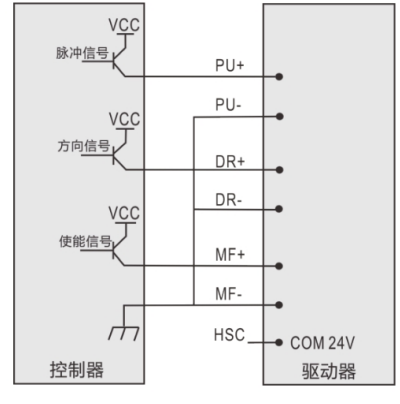
DR- 接 方向信号

用户应根据自己的控制器选择合适的接口

5V信号接法

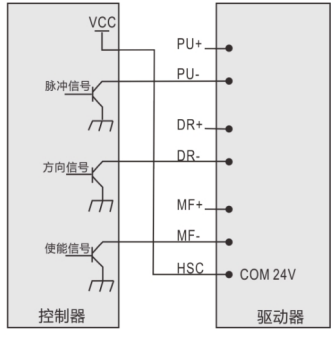


共阳接法

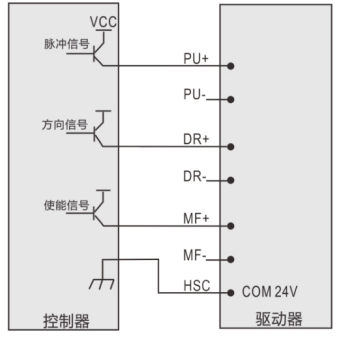


共阴接法

24V信号接法



共阳接法

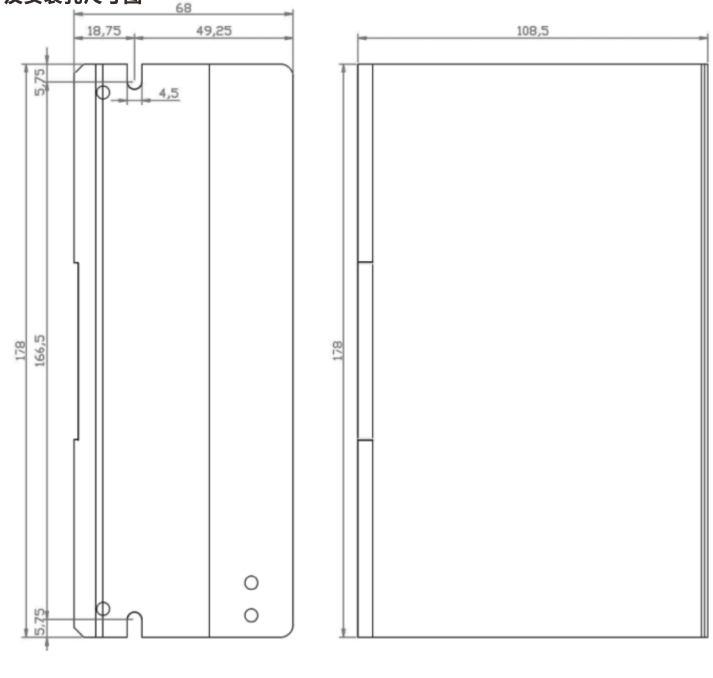


共阴接法

驱动器出现故障后，驱动器处于脱机状态，并显示相应故障代码，请查阅故障表排除故障。
故障发生后需给驱动器重新上电，驱动器方可正常运行。

故障符号	故障名称	故障内容	故障处理
01（红灯常亮）	过流报警	驱动器工作电流超过限定值	1.检查电机线是否接错。2.检查电机是否损坏。3.电机与驱动器不匹配。4.更换驱动器。
02（红灯闪2下交替）	过压报警	电源电压过高	1.检查供电电源。2.电机负载过大。3.更换驱动器
03（红灯闪3下交替）	过热报警	驱动器温度过高热保护	1.降低驱动器温度。2．更换驱动器。

驱动器尺寸及安装孔尺寸图



三．常见问题解答

1. 为什么我用控制器控制时，发现电机的方向控制不了？

答：把D9 置off，是单脉冲的控制模式。即PU 端回路发送脉冲信号，DR 端回路发送持续的低电平（或不接）；则电机正转；

PU 端回路发送脉冲信号，DR 端回路发送持续的高电平；则电机反转

若是控制程序是双脉冲模式，则将 D9 置on;

PU 端回路发送脉冲信号，DR 端回路不发送信号（或不接）；则电机正 转；

DR 端回路发送脉冲信号，DR 端回路不发送信号（或不接）；则电机反 转；

2. 细分数含义是什么？设置多少范围才好？

答：细分数含义是驱使电机转一圈所需要的脉冲数。细分数越大其实精度越难控制。普通的开环步进电机实际是无法分辨这个精度的。高的细分只能保证运行平滑，减少振动和噪音。如果对平稳性和精度要求不高，但对转速要求很高的话。建议用中低细分确保每秒发出的脉冲数能满足速度需要。且在实际使用时，如果转速很低情况下，应该选高细分，确保平滑，减少振动和噪音。

3. 驱动器上的使能端口 MF+ MF- 要接吗？

答：应根据自己的需求，可不接，使能端一旦接通，驱动器停止工作，电机处于释放状态。常应用于想要手动调节或操作电机的场合。

4. 输入信号光电隔离正端要接限流电阻吗？

答：24V 的电压请接 24V 接口，若是其它电压，接到 5V 接口时， 高于5V 时需要外接 2K 的限流电阻。

5. 细分驱动器的细分数是否能代表精度？

答：步进电机的细分技术实质上是一种电子阻尼技术（请参考有关文 献），其主要目的是减弱或

消除步进电机的低频振动，提高电机的运转 精度只是细分技术的一个附带功能。比如对于步进角为1.8度的两相混 合式步进电机，如果细分驱动器的细分数设置为 4 ，那么电机的运转分 辨率为每个脉冲0.45度，电机的精度能否达到或接近0.45度，还取决于 细分驱动器的细分电流控制精度等其它因素。不同厂家的细分驱动器精 度可能差别很大；其实细分数越大精度越难控制。

(TWO)More parameters of driver and other illustrations are as follows:

FMDT240A52NOM is a new type of stepper driver successfully developed according to market demand and development trends. It uses a new 32-bit dedicated DSP chip for motor control, which makes the motor run more smoothly and is not easy to lose steps. Receive input signal pulses, directions, and enable inputs. When using internal positions, the pulse and direction interfaces can be used for sensor signal input. The heating degree and vibration amplitude of the motor are minimized, thereby better improving the processing speed and accuracy of mechanical operation. The working voltage is AC200V-AC240V, and the suitable current is below 5.2A for high-voltage 3-phase stepper motors.

current setting

The operating current of the driver is set by the dial switches SW1 to SW4, and the operating current is the working effective output current. Peak current=operating current × one point four

Running current	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2
Peak current	3.1	3.4	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.6	5.9	6.2	6.4	6.7	7.0	7.3
SW1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
SW2	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
SW3	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW4	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON

Subdivision setting and I/O mode setting

The subdivision setting and I/O mode setting are controlled by the dial switch SW10. When SW10=OFF, it is the subdivision setting mode; When SW10=ON, it is in I/O mode. The subdivision and speed are set by the dial switches SW5 to SW8, with a total of 16 gears.

puls/r	400	500	600	800	1000	1200	2000	3000	4000	5000	6000	10000	20000	30000	60000	80000
puls/r	10	20	30	50	60	80	100	150	200	250	300	400	500	600	700	800
SW5	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SW6	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW7	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW8	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF

SW9	ON	Double pulse mode: PU is a forward step pulse signal, DR is a reverse step pulse signal
	OFF	Single pulse mode: PU is a stepping pulse signal, DR is a direction control signal
SW10	ON	Accept I/O input signal
		Accept external pulse signal
SW-PU	PU	OFF: Maximum differential input frequency 200kpps The minimum pulse width is 2.5us.
SW-DR	DR	ON: Maximum differential input frequency 100kpps The minimum pulse width is 5us.

Operating environment and parameters

Cooling method		Natural wind cooling or forced cooling
Usage environment	Media environment	It is free of corrosive gases or dust, and cannot be used in special environments such as radioactive substances, magnetic fields, and vacuum.
	temperature	0--- +50℃
	humidity	Below 85% (no condensation)
Storage temperature		-20℃--80℃
Weight		830g
Overall dimensions		178×68×108.5mm3

1. Related using instructions

a) The normal connection between motor and driver

U RED

W GREEN

V YELLOW

b) The normal connection between driver and controller

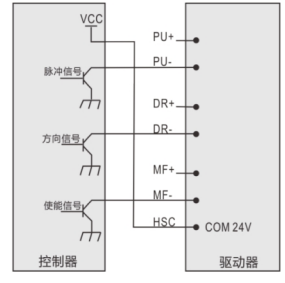
PU+ and DR+ for positive signal power ; PU- for pulse signal ; DR- for direction signal

And user should select suitable connection port according to controller

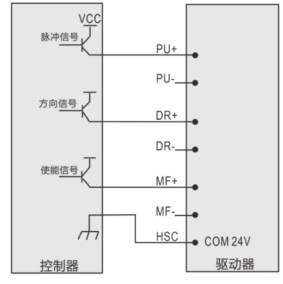
After a drive failure occurs, the drive is offline and the corresponding fault code is displayed. Please refer to the fault table to troubleshoot. After a fault occurs, it is necessary to power up the drive again before the drive can operate normally.

fault symbol	fault name	Fault action content	Troubleshooting method
01 (red light always on)	Overcurrent alarm	The operating current of the driver exceeds the limit value	1. Check whether the motor wires are connected incorrectly. 2. Check the motor for damage. 3. The motor does not match the driver. 4. Replace the driver.
02 (red light flashes 2 times alternately)	Overvoltage alarm	Power supply voltage is too high	1. Check the power supply. 2. The motor load is too large. 3. Replace the driver.
03 (red light flashes 3 times alternately)	overheating alarm	Driver temperature is too high, thermal protection	1. Lower the drive temperature. 2. Replace the driver.

5V signal connection

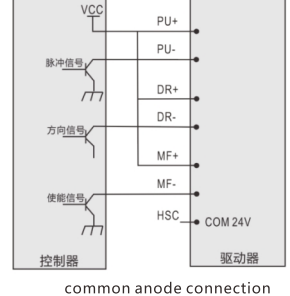


common anode connection

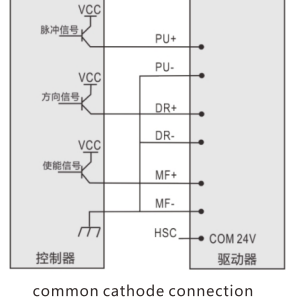


common cathode connection

24V signal connection

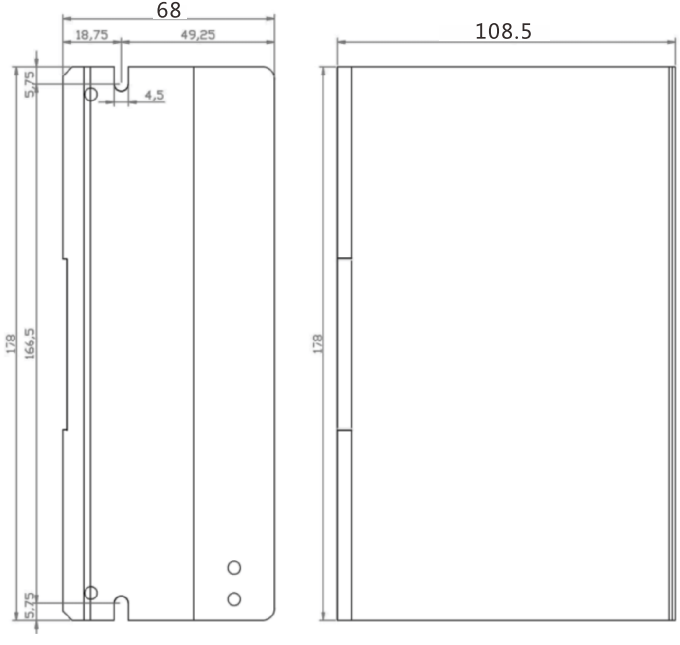


common anode connection



common cathode connection

The size pictures of driver and mounting holes



Three. Normal common troubleshooting

1. Why did I find that the direction of the motor could not be controlled when I used the controller?

Answer: A: Set D9 off, which is a single-pulse control mode. That is, the PU terminal sends a pulse signal, and the DR terminal sends a continuous low level (or not); the motor rotates forward;

The PU terminal sends a pulse signal, and the DR terminal sends a continuous high level. If the motor is reversed, if the control program is in double pulse mode, set D9 on;

The PU end loop sends a pulse signal, and the DR end loop does not send a signal (or not); the motor rotates forward;

The DR side loop sends a pulse signal, and the DR side loop does not send a signal (or not); the motor reverses;

2. What is the meaning of the breakdown number? How many ranges do I need to set?

Answer: The number of segments means the number of pulses required to drive the motor to make one revolution. When the motor is actually used, if there is a high requirement on the rotational speed and the requirement for accuracy and stability is not high, it is not necessary to select a high subdivision. In actual use, if the rotational speed is very low, large subdivisions should be selected to ensure smoothness and reduce vibration and noise.) The accuracy of the motor can meet the requirements also depends on the subdivision driver subdivision current control accuracy and other factors. The precision of subdivision drivers from different manufacturers may vary greatly; the higher the subdivision number, the more difficult it is to control.

3. Should I connect the enable port MF+ MF- on the drive?

Answer: According to their own needs, they can be disconnected. Once the enabler is connected, the driver will stop working and the motor will be released. It can be applied to situations where manual operation or adjustment of the motor is desired.

4. Is the input signal opt isolated positive terminal connected to the current limiting resistor?

Answer: The input pulse signal level is +5V or +24V. When the control signal is +12V, the +5V control terminal needs to be connected. In addition, 5PU+ and 5DR+ are connected in series with 510 resistors, and 5MF+ is connected in series with 820 resistors.

5.Is the subdivision of the subdivision drive representative of accuracy?

Answer: Stepping motor subdivision technology is essentially an electronic damping technology (please refer to related papers). Its main purpose is to reduce or eliminate the low frequency vibration of stepper motors, and to improve the running accuracy of the motor is just an additional function of the subdivision technology. For example, for a two-phase hybrid stepping motor with a step angle of 1.8 degrees, if the subdivision of the subdivision driver is set to 4, then the operating resolution of the motor is 0.45 degrees per pulse, and the accuracy of the motor can reach or approach 0.45 degrees, also depends on subdivision driver subdivision current control accuracy and other factors. The subdivision drive accuracy of different manufacturers may vary greatly; the higher the subdivision number, the more difficult it is to control.