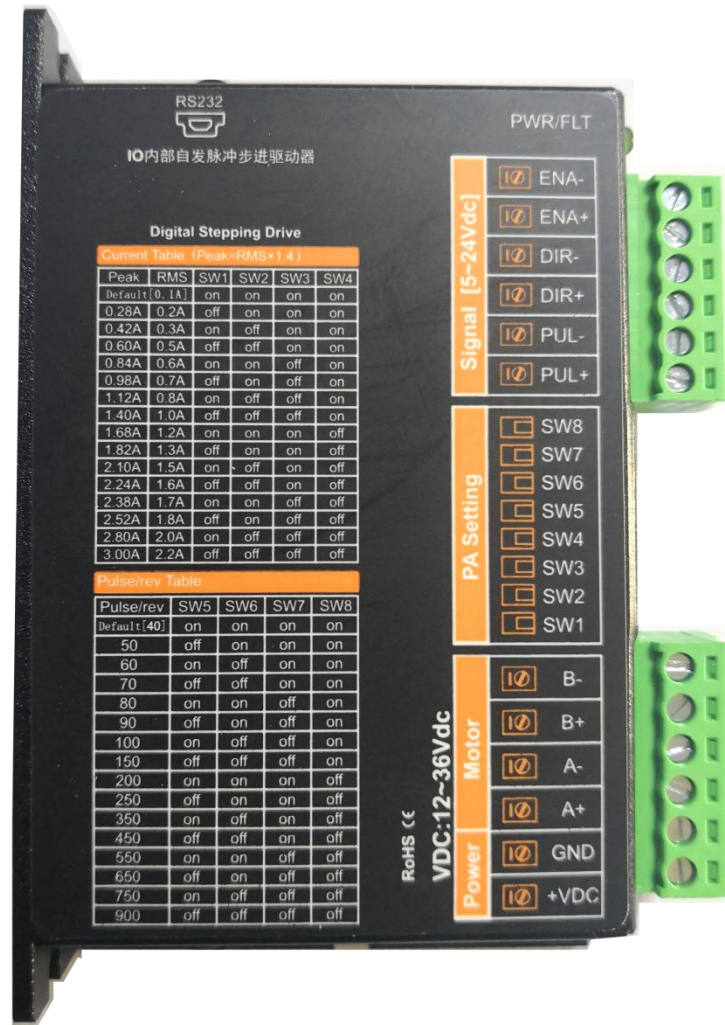


DM430-IO

内部自发脉冲数字式两相步进驱动器使用手册

Digital two-phase stepping driver with internal spontaneous pulse User's Manual



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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:



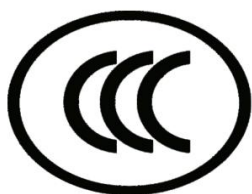
注意：提醒您注意文字中的要点。



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

DM430-I0 是公司推出的内部自发脉冲数字式步进电机驱动器，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。用户可以设置 1~850RPM 内的任意速度值以及额定电流内的任意电流值，能够满足大多数场合的应用需要。由于采用内置微细分技术，即使在低速的条件下，也能够达到非常平稳的效果，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。

DM430-I0 is a self-propelled pulse digital stepper motor driver introduced by the company. It adopts the latest 32-bit DSP digital processing technology. The driver control algorithm adopts the advanced variable current technology and the advanced frequency conversion technology. The driver generates little heat, the Motor vibrates little and runs smoothly. USERS can set 1~850RPM within the arbitrary subdivision speed and rated current within the arbitrary current value, to meet the needs of most applications. Due to the use of built-in micro-subdivision technology, even in the low-speed conditions, but also can achieve a very smooth effect, low, 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

- 低振动噪声

Built-in high subdivision

- 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 4, 6, 8 线两相步进电机

Can drive 4, 6, 8-wire two-phase stepping motor

- 光隔离差分信号输入

Optically isolated differential signal input

- 电压范围直流 12-32Vdc

Voltage Range DC 12-32VDC

- 电流设定方便，可在 0.1-3.0A 之间任意选择

The current setting is convenient and can be selected between 0.1-3.0 A

- 速度设定范围为 1-850RPM，其它速度可定制

sub-set range 1-850RPM, higher sub-customizable

- 具有过压、欠压、过流等保护功能

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

- 具有内部自发脉冲 I0 控制

INTERNAL PULSE I0 control

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：锂电设备、3C 电子设备、雕刻机、打标机、切割机、激光照排、雕刻机，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 automation equipment and instruments, such as: lithium battery equipment, 3C electronic equipment, engraving machine, marking machine, cutting machine, laser phototypesetting, engraving machine, plotter, CNC machine tool, automatic assembly equipment, etc. It is especially effective in applications where users expect small noise and high speed.

2 性能指标/Performance Index

2.1 电气特性/Electrical characteristics

说明 Explanation	DM430-I0			
	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	0.1	-	3.0	A
电源电压 Power Supply Voltage	12	24	32	Vdc
逻辑输入电流 Logic input current	6	10	16	mA
逻辑输入电压 Logical input voltage	5	5	24	Vdc
脉冲高电平宽度 Pulse high width	1.5	-	-	US
绝缘电阻 Insulation Resistance	100	-	-	MΩ

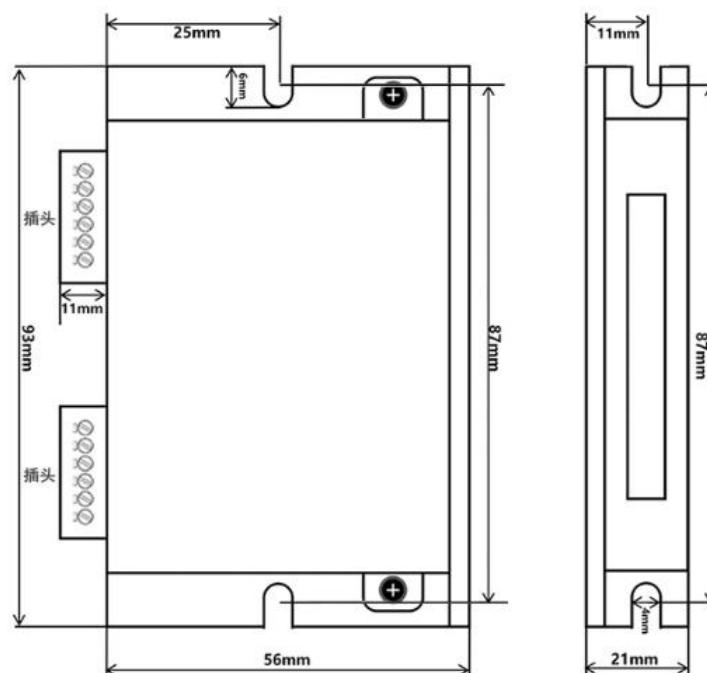
2.2 使用环境/Use environment

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 ² 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		0.2KG

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。

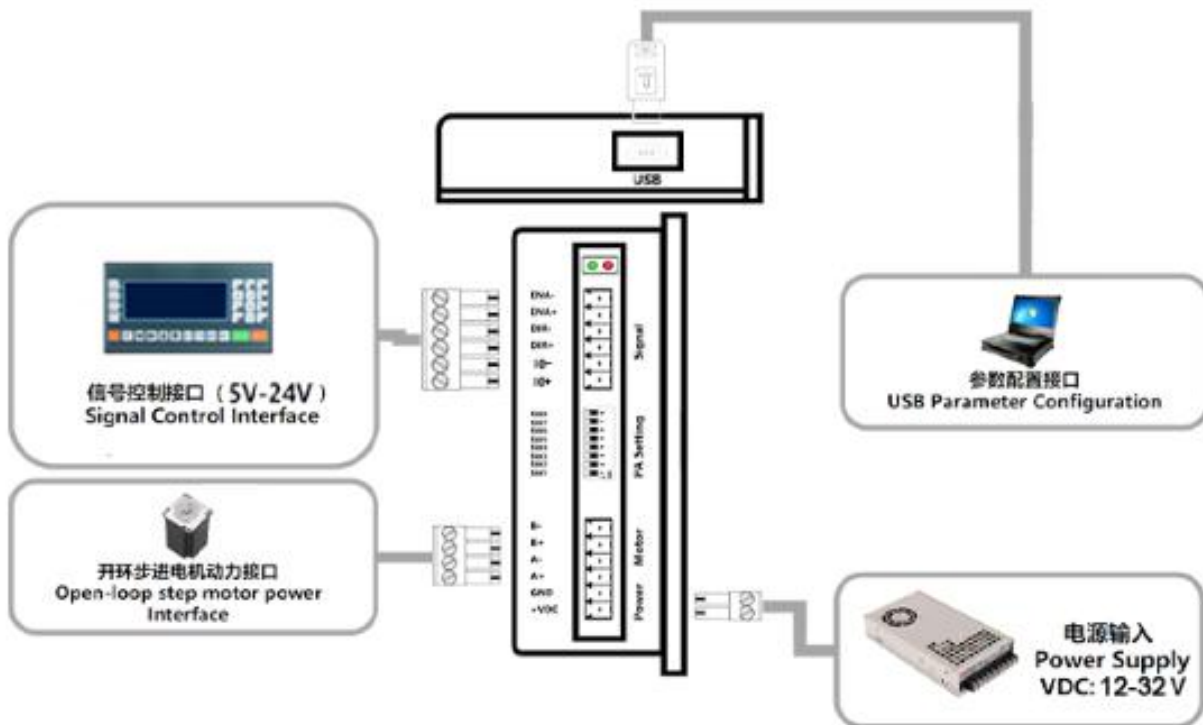
Install the drive with vertical side mounting so that the heat dissipating teeth form a strong air convection.

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/Schematic diagram of wiring




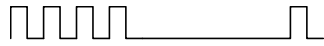
4.2 端口定义/Port Definition

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		过流故障 ($I_{\text{峰值}} \geq 6A$) Overcurrent fault ($I_{\text{peak}} \geq 6A$)
2	2		过压故障 ($V_{\text{dc}} \geq 32V$) Overvoltage fault ($V_{\text{dc}} \geq 32V$)

3	3		无定义 No definition
4	4		电机开路或接触不良故障 Motor open circuit or the poor contact failure

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

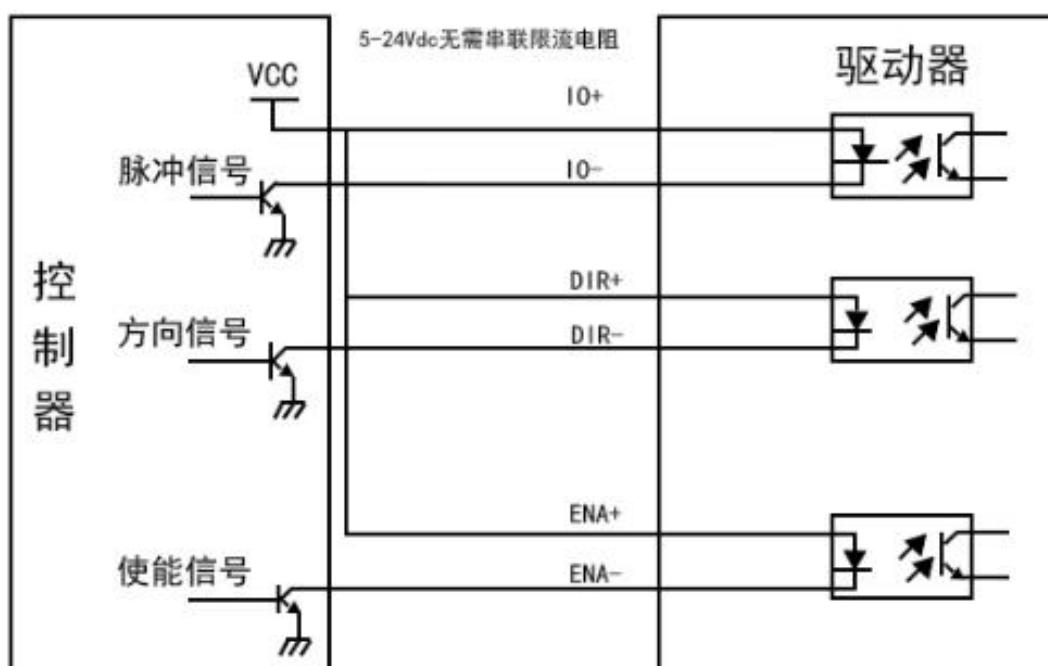
控制信号接口

Control Signal interface

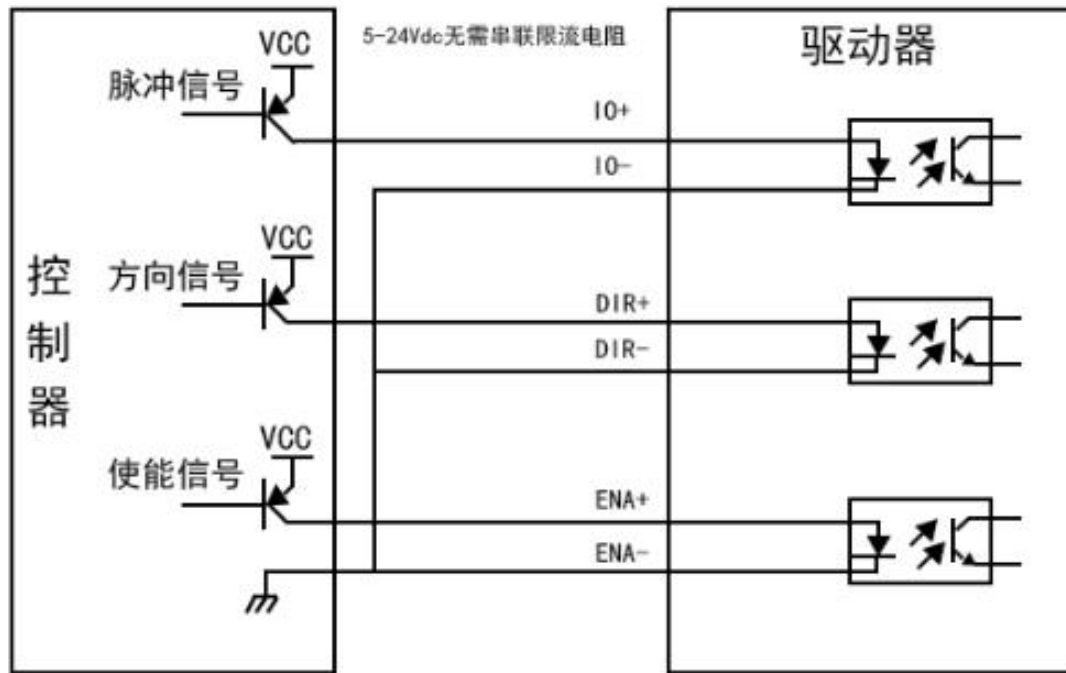
接口名称 Interface name	功能 Features	说明 Explanation
IO+/PUL+	IO 控制信号 (停/启) Io Control Signal (stop/start)	兼容 5V-24V 电平信号 Compatible 5V - 24V level signal
IO-/ PUL-		
DIR+	方向正输入端 Directional Positive Input	
DIR-	方向负输入端 Directional negative input	
ENA+	使能正输入端 Enable Positive Input	
ENA-	使能负输入端 Enable negative input	

控制信号接口电路

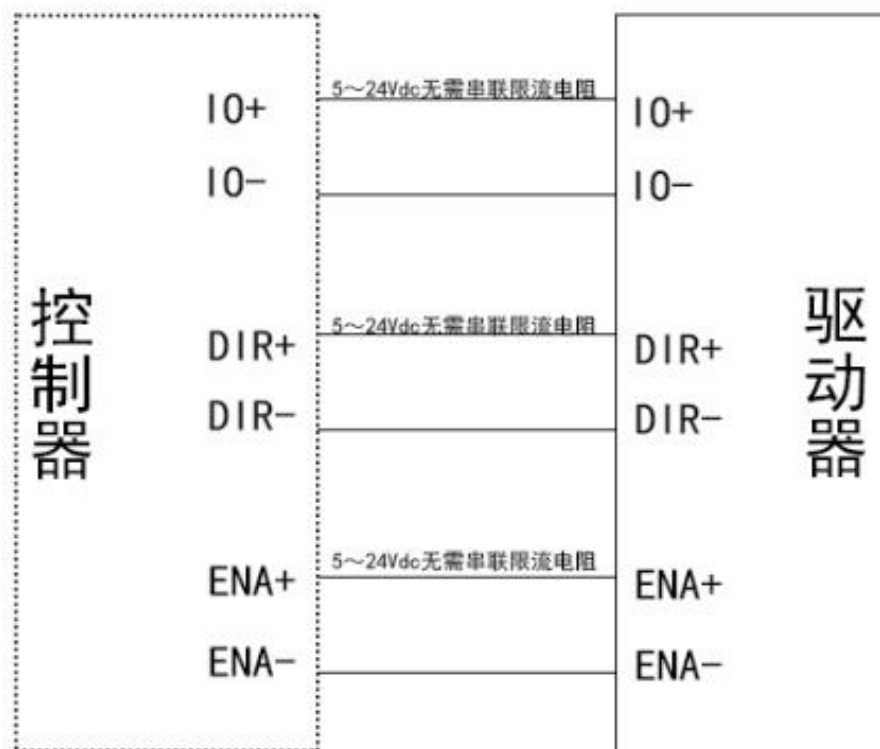
A control signal interface circuit



共阳极接法



共阴极接法



差分

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 supply negative electrode
+VDC	直流电源正极，供电电压范围：直流 12-32Vdc，推荐 24Vdc 工作。 DC power supply positive, supply voltage range: DC 12-32Vdc, recommended 24Vdc operation.
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内都可以正常工作，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
0.14A	0.1A	on	on	on
0.28A	0.2A	off	on	on
0.42A	0.3A	on	off	on
0.60A	0.5A	off	off	on
0.84A	0.6A	on	on	off
0.98A	0.7A	off	on	off
1.12A	0.8A	on	off	off
1.40A	1.0A	off	off	off
1.68A	1.2A	on	on	on
1.82A	1.3A	off	on	on
2.10A	1.5A	on	off	on
2.24A	1.6A	off	off	on
2.38A	1.7A	on	on	off
2.52A	1.8A	off	on	off
2.80A	2.0A	on	off	off
3.00A	2.2A	off	off	off

SW4 为半流功能，当 SW4=off 时，为半流设定，当 SW4=on 时，电流静止状态为全流锁轴

SW4 is a half-current function, when SW4 = off, for half-current settings, when SW4 = on, current static state for full-current lock axis

注：如上电流为标准产品 DM430-I0 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 0.1-3.0A 之间的任意值。

Note: If the current is standard product DM430-I0 current, other current can be derived according to customer demand, can set the current range between 0.1-3.0 a arbitrary value.

5.2 速度设定/Subdivision setting

RPM	SW5	SW6	SW7	SW8
Default[40]	on	on	on	on
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：如上速度为标准产品 DM430-I0 的速度，其它速度可以根据客户需求派生，能设定的速度范围为 1~850RPM 之间的任意值。

Note: The above subdivides into the standard product TD430-I0 subdivides, other subdivides may according to the customer demand derivation, can set subdivides the scope between 200-51200 any value.

5.3 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.