

FST-T-IO 驱动器使用手册

FST-T-IO driver user manual



★此型号通过CE和UL认证

目录

一、手册功能 Manual function	3
二、注意事项 Attention notes	3
三、环境要求 Environmental Requirements	3
四、名词解释 Definition of terms	3
① 直流无刷电机 Brush-less DC Motor	3
② 霍尔传感器 Hall sensor	3
③ LED	4
④ PNP/NPN	4
⑤ 速度开环/闭环 Speed open-loop/closed-loop	4
五、驱动器主要参数 Main parameter of Driver	4
六、主要功能 Main functions	5
七、驱动卡硬件功能说明 Driver Card Hardware Specifications	5
1. 电源端口 Power Port	6
2. 8Pin 电辊筒接口 8Pin Motor Drum Power Interface	6
3. I/O 功能定义 I/O Functional Definition	6
4. 功能配置 8 位拨码开关设定 Function configuration via 8-position DIP switch settings	8
5. 状态指示灯 LED Status	9
八、接线 Wiring	10
1、PNP 模式控制接线图 PNP Mode Control Wiring Diagram	10
2、NPN 模式控制接线图 PNP Mode Control Wiring Diagram	10
九、外形尺寸、安装孔位 External dimensions, mounting hole positions	11
1、外形尺寸 External dimensions	11
2、安装孔尺寸 Mounting hole dimensions	11



一、手册功能 Manual function

- ★ 该手册用于帮助客户快速完成对法思特电动辊筒驱动器 FST-T-IO 的快速安装，设定和使用。
This manual is designed to assist customers in the rapid installation, configuration, and operation of the Fast Motor Drive Roller(MDR) Driver FST-T-IO.

二、注意事项 Attention notes

- ★ 不要在爆炸性环境、可燃性气体环境、腐蚀性环境、接触水的场所、可燃物旁边使用。以免发生爆炸、受伤、火等事件。
Do not use in explosive atmospheres, flammable gas environments, corrosive conditions, locations exposed to water, or near combustible materials. This prevents incidents such as explosions, injury, or fire.
- ★ 进行设置、连接、运行、操作、检查、故障诊断作业时，一定是要具备合适资格的人员施行
All installation, connection, operation, inspection, and fault diagnosis tasks must be performed by suitably qualified personnel.
- ★ 请不要在通电状态下进行移动、设置、连接、检查等作业。作业时，一定要切断电源后再作业。
Never move, install, connect, or inspect equipment while it is powered on. Always disconnect the power supply before undertaking any work.
- ★ 供电线径要大于 1 平方线。需要加延长线使用需要咨询技术人员，延长线过长或周围干扰源多都会影响正常使用。
The power supply cable cross-section must exceed 1 square millimetre. Consult technical personnel before using extension cables, as excessive length or numerous surrounding interference sources may impair normal operation.

三、环境要求 Environmental Requirements

- ★ 室内（没有直射阳光、雨水、水滴、没有结露及腐蚀性气体的场所）
Indoor locations (free from direct sunlight, rain, water droplets, condensation, and corrosive gases)

四、名词解释 Definition of terms

① 直流无刷电机 Brush-less DC Motor

电机由永磁转子和绕有线圈的定子组成，这种电机具有结构简单、可靠性高、稳定性好、效率高、适应性强等优点，因此得到了广泛的应用。

Comprising a permanent magnet rotor and a stator wound with coils, this motor offers advantages including simple construction, high reliability, excellent stability, high efficiency, and strong adaptability. Consequently, it has found widespread application.

② 霍尔传感器 Hall sensor

由于无刷电机取消了碳刷，因此电机自身不能运行，需要依靠外部的驱动卡运行，霍尔传感器就是安装在电机内部用来向驱动卡反馈位置信号的器件。

As brush-less motors eliminate carbon brushes, they cannot operate independently and require an external driver card for operation. The Hall sensor is a device installed within the motor to provide position feedback signals to the driver card.

③ LED

发光二极管，用来指示驱动系统的状态。

Light-emitting diode, used to indicate the status of the drive system. Light-emitting diode, used to indicate the status of the drive system.

④ PNP/NPN

有效控制信号的逻辑电平：NPN 表示低电平有效，即接 DC-有效；PNP 表示高电平有效，即接 DC+有效。

Effective control signal logic levels: NPN denotes active-low logic, i.e. connected to DC- is active; PNP denotes active-high logic, i.e. connected to DC+ is active.

⑤ 速度开环/闭环 Speed open-loop/closed-loop

1) 速度开环：滚筒转速随负载加大而降低

Speed open-loop: Drum rotational speed decreases as load increases.

2) 速度闭环：滚筒额定功率以内时，滚筒转速不随负载变化而变化。

Speed closed-loop: Within the drum's rated power capacity, rotational speed remains constant regardless of load variation.

五、驱动器主要参数 Main parameter of Driver

项目 Item	规格 Specification
驱动器型号 Driver Model	FST-T-IO
额定输入电压 Rated input voltage	24V(±10%)
额定运行电流 Rated operate current	2.5A(电辊筒功率≤60W) 2.5A(Drum motor power≤60W) 4.2A(电辊筒功率 80~100W) 4.2A(Drum motor power:20-100W)
启动输出电流 Start-up output current	5A(电辊筒功率≤60W) 5A(Drum motor power≤60W) 9A(电辊筒功率 80~100W) 9A(Drum motor power:20-100W)
驱动器尺寸 Driver dimensions	长度 115*宽度 52mm Length 115* width 52mm
驱动器通讯方式 Driver communication method	I/O
使用环境温度 Operating ambient temperature	-20°C~40°C
使用环境湿度 Operating ambient humidity	75% 以下(无结露) Below 75% (no condensation)
电机接口 Motor interface	XH-8pin(白 white)

六、主要功能 Main functions

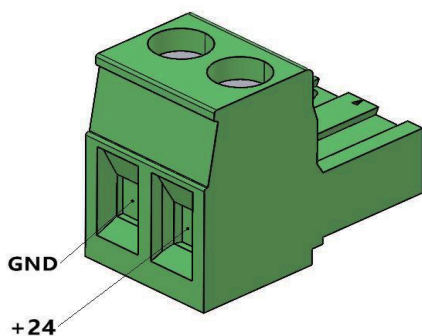
- ★ 支持双向光耦隔离不需要手动切换 PNP\NPN 模式
Supports bidirectional optocoupler isolation without requiring manual switching between PNP /NPN modes
- ★ 16 档速度速度设置 16-speed settings
- ★ 4 档加/减速时间设置 4-stage acceleration/deceleration time settings
- ★ 3 档 I/O 信号速度切换 3-stage I/O signal speed switching
- ★ 故障信号输出 Fault signal output
- ★ 8pin 电辊筒接口 8-pin motorized roller interface
- ★ 最大支持电动辊筒功率 100W Maximum supported motorized roller power:100W

七、驱动卡硬件功能说明 Driver Card Hardware Specifications



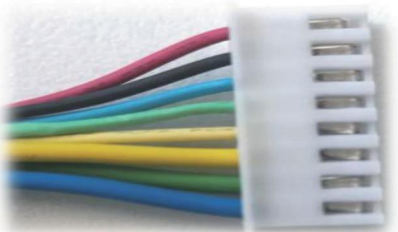
位置 Position	功能描述 Function description
1	电源接线端子 Power supply terminal block
2	8Pin 电辊筒接口 (匹配 50、60 系列电辊筒) 8-pin motor drum interface (compatible with 50 and 60 series motor drum)
3	I/O 接线端子 I/O terminal block
4	8 位功能拨码开关 8-position DIP switch
5	LED 状态指示灯 LED status indicator

1. 电源端口 Power Port



序号 No.	端口 1 Port 1	端口 2 Port 2	备注 Remarks
1	-GND	+24V	供电线径 $\geq 1\text{mm}^2$, 开关电源 $\geq 240\text{W}$, 24V($\pm 10\%$)
2	负极电源线接口 Negative terminal power cable connector	正极电源线接口 Positive terminal power cable connector	Power supply cable diameter $\geq 1\text{mm}^2$, switching power supply $\geq 240\text{W}$, 24V ($\pm 10\%$)

2. 8Pin 电辊筒接口 8Pin Motor Drum Power Interface



3. I/O 功能定义 I/O Functional Definition

编号 No.	名称 Name	描述 Description
1	SPEED A	速度信号输出 (详见 7.接线) Speed signal output (see Port 7. Wiring for details)
2	SPEED B	
3	ERR A	故障信号输出 (详见 7.接线) Fault signal output (see Section 7. Wiring for details)
4	ERR B	
5	FR	反转运行 (需要 RUNA 或 RUNB 必须至少有一个被触发) Reverse operation (requires at least one of RUNA or RUNB to be triggered)
6	RUN A	电辊筒正转运行。多段速切换, 详见 IO 多段速设定表 Setting Table for details
7	RUN B	
8	COM	PNP 输入输出信号方式: 接 0V NPN 输入输出信号方式: 接 24V PNP input/output signal mode: Grounded to 0V NPN input/output signal mode: Powered by 24V

1) IO 多段速设定表 Multi-Speed Setting Description

RUN A	RUN B	描述 Description
1	0	电辊筒以 100%的拨码设定速度运行 The motor drum operates at 100% of the dip switch-set speed.
1	1	电辊筒以 75%的拨码设定速度运行 The motor drum operates at 75% of the dip switch-set speed.
0	1	电辊筒以 50%的拨码设定速度运行 The motor drum operates at 50% of the dip switch-set speed.
0	0	电辊筒不运行 The motor drum is not operating.

2) 方向切换设定表 Direction Switching Configuration description

RUN A	RUN B	F/R	描述 Description
1	0	0	电辊筒以 100%的拨码设定速度运行-正转 The motor drum operates at 100% of the dip switch-set speed.-Forward rotation
1	1	0	电辊筒以 75%的拨码设定速度运行-正转 The motor drum operates at 75% of the dip switch-set speed.-Forward rotation
0	1	0	电辊筒以 50%的拨码设定速度运行-正转 The motor drum operates at 50% of the dip switch-set speed.-Forward rotation
1	0	1	电辊筒以 100%的拨码设定速度运行-反转 The motor drum operates at 100% of the dip switch-set speed.-Reverse rotation
1	1	1	电辊筒以 75%的拨码设定速度运行-反转 The motor drum operates at 75% of the dip switch-set speed.-Reverse rotation
0	1	1	电辊筒以 50%的拨码设定速度运行-反转 The motor drum operates at 50% of the dip switch-set speed.-Reverse rotation
0	0	1	停止运行 Stop operating
0	0	0	停止运行 Stop operating

注: F/R 需要配合 RUN 信号同时使用, RUN A 或 RUN B 必须至少有一个被触发。

Note: F/R requires simultaneous use with the RUN signal; either RUN A or RUN B must be triggered.

3) 故障输出口设定表 Fault output configuration description

模式 Model	ERR_A	ERR_B	描述 Description
PNP	接 PLC 的 X、I 点 Connect to PLC X and I points	+24V	ERR_A 正常输出 0V, 报警时输出 +24V ERR_A: Normal output 0V; alarm output +24V
NPN	接 PLC 的 X、I 点 Connect to PLC X and I points	0V(GND)	ERR_A 正常输出 +24V, 报警时输出 0V ERR_A: Normal output +24V; alarm output 0V

4) 速度输出口设定表 Speed output configuration description

模式 Model	SPEED_A	SPEED_B	描述 Description
PNP	接 PLC 的 X、I 点 Connect to PLC X and I points	+24V	SPEED_A 输出频率 SPEED_A Output Frequency 速度计算方法: 电机转速 (RPM) = (输出频率 (Hz) × 60) ÷ 电机极对数) Speed Calculation Method: Motor Speed (RPM) = (Output Frequency (Hz) × 60) ÷ Number of Motor Pole Pairs
NPN	接 PLC 的 X、I 点 Connect to PLC X and I points	0V(GND)	



4. 功能配置 8 位拨码开关设定 Function configuration via 8-position DIP switch settings

名称 Name	功能 Function
SW1-4	16 档调速拨码, 详见速度拨码设定表 16-speed selector switch, refer to the speed selector settings table.
SW5	默认运行方向切换 Default running direction switch.
SW6-7	加/减速时间拨码, 详见加/减速时间拨码设定表 Acceleration/Deceleration Time Dip Switch Settings Table
SW8	预留拨码, 此型号无此功能, 拨码设置无效 Reserved DIP switch settings; this model lacks this functionality, and DIP switch configurations are ineffective.

1) 速度拨码设定表 Speed DIP Switch Setting Table

拨码值 DIP switch setting	SW1	SW2	SW3	SW4	100%速度 (speed) RUN A	75%速度(speed) RUNA+RUNB	50%速度 (speed) RUNB
1	OFF	OFF	OFF	OFF	16%	12%	8%
2	OFF	OFF	OFF	ON	18%	13%	9%
3	OFF	OFF	ON	OFF	20%	15%	10%
4	OFF	OFF	ON	ON	22%	17%	11%
5	OFF	ON	OFF	OFF	27%	20%	13%
6	OFF	ON	OFF	ON	31%	23%	16%
7	OFF	ON	ON	OFF	36%	27%	18%
8	OFF	ON	ON	ON	40%	30%	20%
9	ON	OFF	OFF	OFF	44%	33%	22%
10	ON	OFF	OFF	ON	51%	38%	26%
11	ON	OFF	ON	OFF	58%	43%	29%
12	ON	OFF	ON	ON	64%	48%	32%
13	ON	ON	OFF	OFF	71%	53%	36%
14	ON	ON	OFF	ON	80%	60%	40%
15	ON	ON	ON	OFF	89%	67%	44%
16	ON	ON	ON	ON	100%	75%	50%

注: 电动辊筒速度代码为 100%速度, 如 FST-D50-500-18-T-P-N-24-C1-X1-T-60, 速度代码 18 就代表此款辊筒 100%速度约为 18m/min.

再看 RUN A、RUN B 的状态确定多段速档位, 比如 RUN A、RUN B 同时给信号, 那就是按 75%那列的速度数据。

再结合拨码状态, 比如此时拨码状态是 SW1 ON、SW2 OFF、SW3 ON、SW4 OFF, 那参照速度拨码设置表此时对应的拨码值是 11, 那这款电辊筒此时的速度大概为 43%*18=7.7m/min。

Note: The speed code for motor drum denotes 100% speed. For example, in the model FST-D50-500-18-T-P-N-24-C1-X1-T-60, the speed code 18 indicates that this roller's 100% speed is approximately 18m/min.

Next, determine the multi-speed gear position based on the RUN A and RUN B statuses. For instance, if both RUN A and RUN B signals are present simultaneously, the speed data from the 75% column applies.

Combine this with the DIP switch settings. For instance, if the current DIP switch configuration is SW1 ON, SW2 OFF, SW3 ON, SW4 OFF, then according to the speed DIP switch setting table, the corresponding DIP switch value is 11.

Consequently, the approximate speed of this motor drum at this moment would be 43% × 18 = 7.7 m/ min.

2) 加/减速时间拨码设定表 Acceleration/Deceleration Time Dip Switch Setting Table

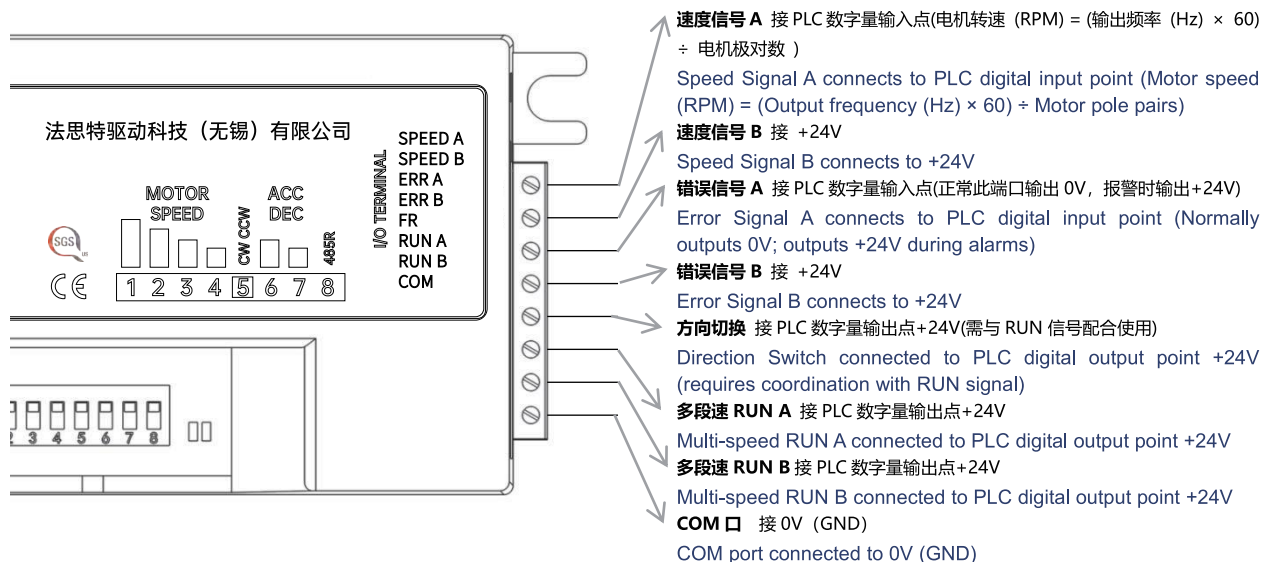
加/减速时间 (ms) Acceleration/Deceleration Time	SW6	SW7
1000	OFF	OFF
700	OFF	ON
300	ON	OFF
150	ON	ON

5. 状态指示灯 LED Status

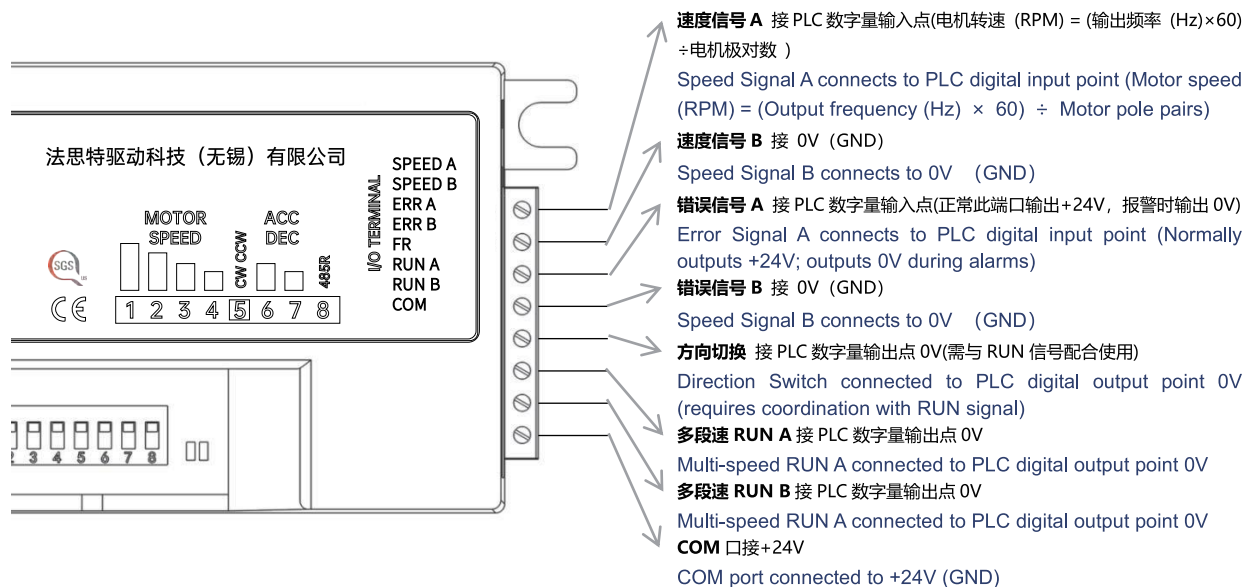
灯状态 Light Status	描述 Description	备注 Remarks
绿灯闪烁 Green light flashing	待机 Standby	
绿灯常亮 Green light steady	电机运行 Motor operation	
红灯闪烁 1 次 Red light flashes once	超速 Over speed	实际转速超出设定转速 Actual rotational speed exceeds set rotational speed
红灯闪烁 2 次 Red light flashes twice	过压 Over voltage	检查供电电压、泄放电阻 Check supply voltage and discharge resistor
红灯闪烁 3 次 Red light flashes three times	MOS 管过流 MOSFET over current	运行时候电流偏大。检查工况，是否超载、堵转等情况 Excessive current during operation. Inspect operating conditions for overload, stalled rotation, etc.
红灯闪烁 4 次 Red light flashes four times	过流 Over current	检测电源和接线 Test power supply and wiring
红灯闪烁 5 次 Red light flashes five times	欠压 Under voltage	检测电源和接线 Test power supply and wiring
红灯闪烁 6 次 Red light flashes six times	霍尔故障 Hall sensor fault	检查电机线是否有破损 Inspect motor cables for damage
红灯闪烁 7 次 Red light flashes seven times	堵转 Stalled rotation	辊筒已经停止。检查辊筒是否卡住 Rollers have stopped. Check for roller jamming
红灯闪烁 8 次 Red light flashes eight times	过温 Over temperature	检查负载是否超负荷、是否卡住 Verify load is not overloaded or jammed

八、接线 Wiring

1、PNP 模式控制接线图 PNP Mode Control Wiring Diagram



2、NPN 模式控制接线图 PNP Mode Control Wiring Diagram

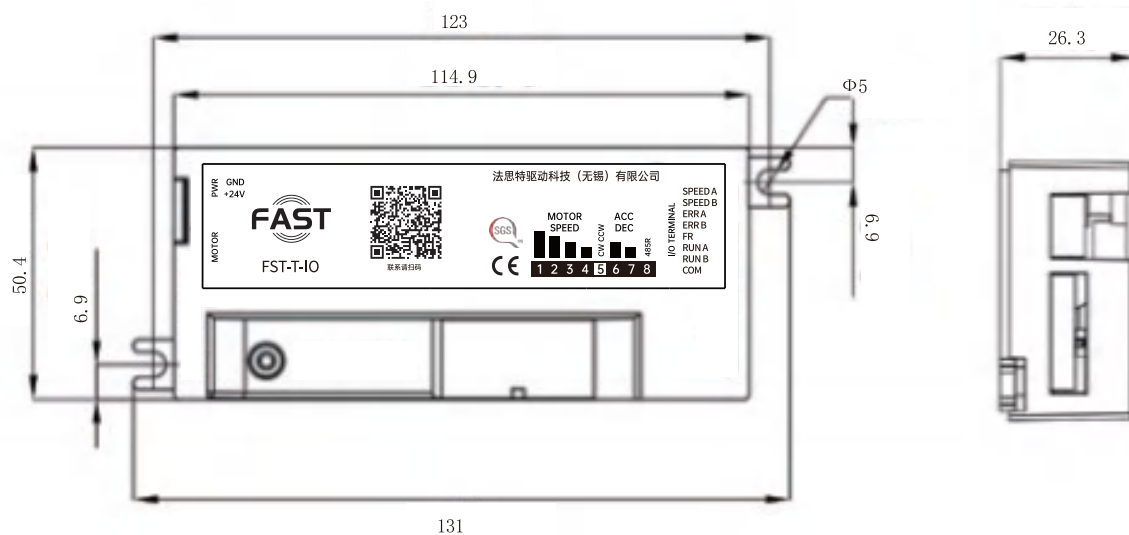


注：PLC 供电和驱动器供电分开供电时，须将两个电源的-V 端互联，避免电势差造成信号干扰。

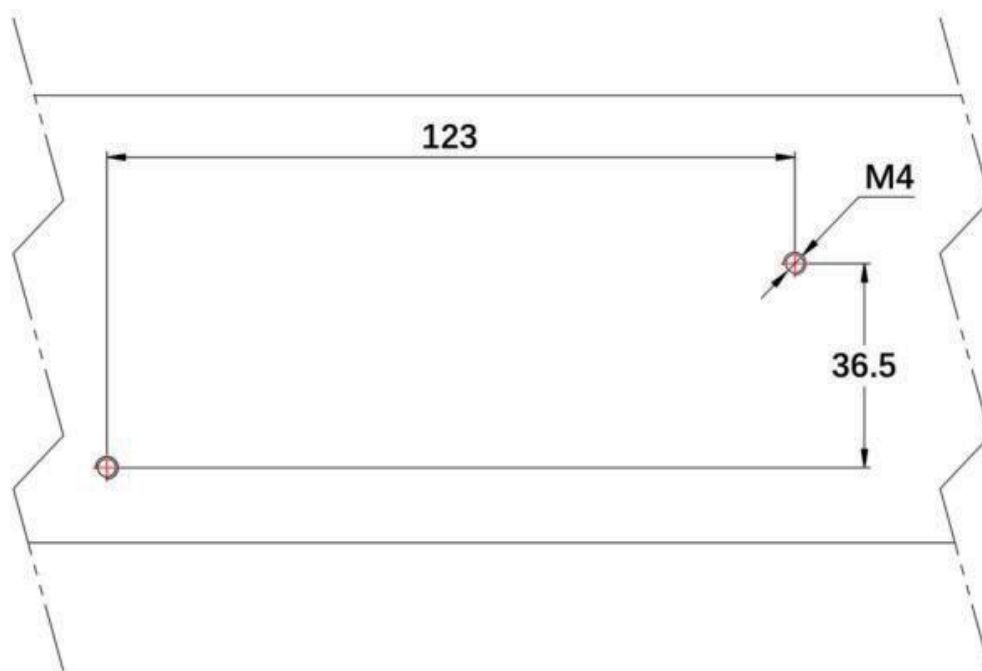
Note: When the PLC power supply and drive power supply are supplied separately, the negative terminals of both power supplies must be interconnected to prevent signal interference caused by potential differences.

九、外形尺寸、安装孔位 External dimensions, mounting hole positions

1、外形尺寸 External dimensions



2、安装孔尺寸 Mounting hole dimensions





法思特-替代外挂电机的大负载输送电辊筒品牌

FAST-The brand of heavy-load drum motor that replace the traditional external motor



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