

## OMH61系列单轴操纵杆 OMH61 series single axis joystick



前后操作 front and back operate

弹簧回位 阻力定位 中心机械档位  
spring return friction position center mechanical stall

单轴操纵杆主要用于工程车、电动车的控制，仪表盘安装方式，采用不锈钢及铝合金材料，弹簧自动回位结构，采用进口高精度霍尔式传感器，全温度范围线性校正，IP66防护等级，较平滑的操作手感，人体工学机械设计。

Single-axis joystick is mainly used for engineering vehicles, electric car control, instrument panel installation, use of stainless steel and aluminum alloy materials, spring automatic return structure, use imported high-precision Hall-type sensor, the whole temperature range linear correction, IP66 protection class, smoother operation feel, ergonomic mechanical design.

### 产品特点：product feature

材料：铝合金、不锈钢

Material: aluminum alloy, stainless steel

定位方式：弹簧自动复位/摩擦阻力定位

Positioning method: spring automatic reset / frictional resistance positioning

操作角度： $\pm 34^\circ$ （总角度68度）

Operating angle:  $\pm 34^\circ$  (total angle of 68 degrees)

传感器：霍尔传感器

Sensor: Hall-type sensor

线性度：小于1%

Linearity: less than 1%

信号输出：模拟电压0-5V,RS422,RX232,CAN,USB, PWM功率驱动

Signal output: analog voltage 0-5V, RS422, RX232, CAN, USB, PWM power drive

方向开关：前+后

Direction switch: front + back

供电：DC5V/12-29V/48V/80V可选

Power supply: DC5V / 12-29V / 48V / 80V optional



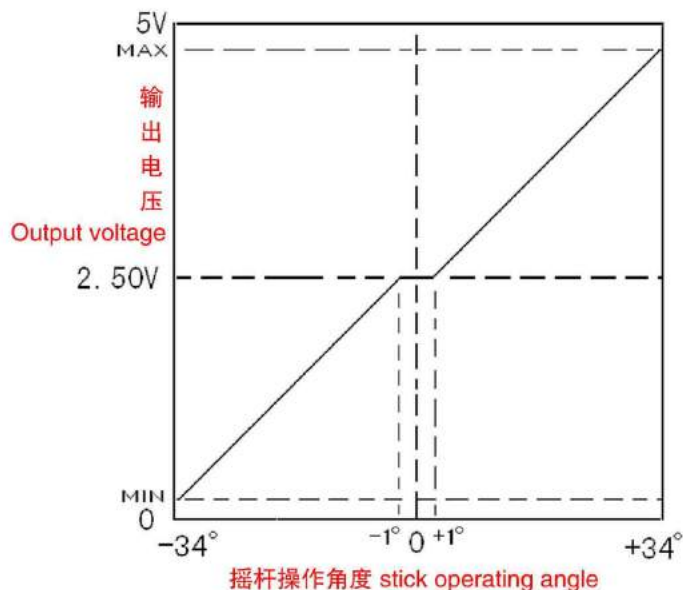
操作寿命: 1000万次; 重复定位精度: 小于0.8%。  
Operating life: 10 million times; repeat positioning accuracy: less than 0.8%.  
温度: -40度~+70度  
Temperature: -40 degrees to +70 degrees  
工作温度: -40℃~+70℃  
Operating temperature: -40 °C ~ + 70 °C  
保存温度: -50℃~+80℃  
Storage temperature: -50 °C ~ + 80 °C  
防护等级: 面板以部分IP67  
Protection class: panel with part IP67  
底座尺寸: 71.21(L)x71.21 (W)x58.45(H)mm;  
Base size: 71.21 (L) x71.21 (W) x58.45 (H) mm;

### 电气参数: Electrical parameters:

最低工作电压: 4.2V (5V供电时)、10V (12-28V供电时)  
Minimum operating voltage: 4.2V (5V power supply), 10V (12-28V power supply)  
最高输入电压: 36V (12-28V供电时)、5.5V (5V供电时)  
Maximum input voltage: 36V (12-28V power supply), 5.5V (5V power supply)  
工作电流: 小于12ma (5V供电, 模拟电压信号输出)  
Operating current: less than 12ma (5V power supply, analog voltage signal output)  
按钮开关容量: 1A/24V  
Push button switch capacity: 1A / 24V  
限位开关容量: 1A/24V  
Limited button switch capacity: 1A / 24V  
模拟电压信号输出负载: 大于1KΩ  
Analog voltage signal output load: greater than 1KΩ  
模拟电压信号输出中心电压: 2.50V 或50Vdd  
Analog voltage signal output center voltage: 2.50V or 50Vdd  
模拟电压输出信号: 0V ~ 5V / 0.3V ~ 4.7V / 0.5V ~ 4.5V / 1V ~ 4V  
Analog voltage output signal: 0V ~ 5V / 0.3V ~ 4.7V / 0.5V ~ 4.5V / 1V ~ 4V

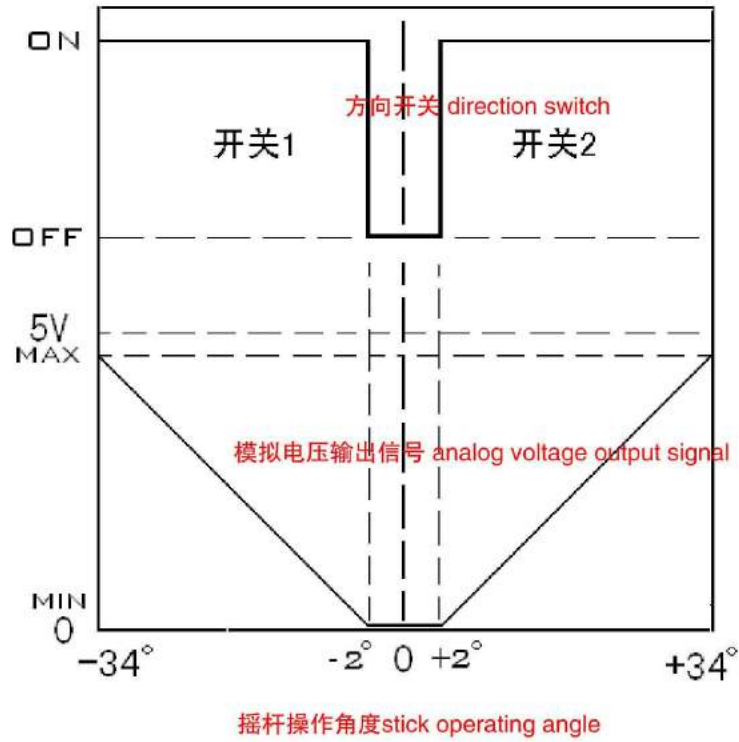
### 弹簧自动回位-模拟电压信号-直线式输出 (输出曲1):

Spring automatic return - analog voltage signal - linear output (output curve 1):



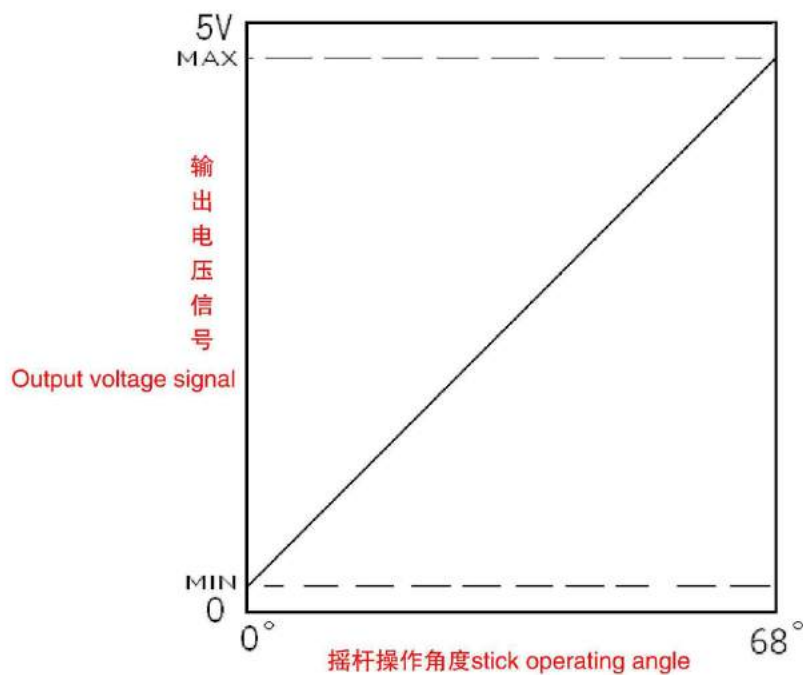
中心定位-模拟电压信号V形信号输出 (输出曲2) :

Center positioning - Analog voltage signal V-shaped signal output (output curve 2):



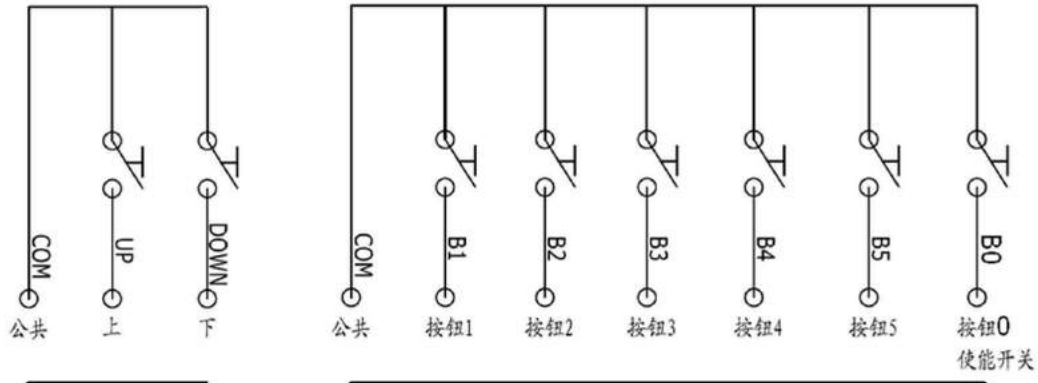
摩擦阻力定位-模拟电压信号线性信号输出 (输出曲3) :

Friction Resistance Positioning - Analog Voltage Signal Linear Signal Output (Output curve 3)



操纵杆方向开关及按钮开关原理图:

Joystick direction switch and push button switch Schematic:



方向开关direction switch

按钮开关及使能开关Button switch and enable switch

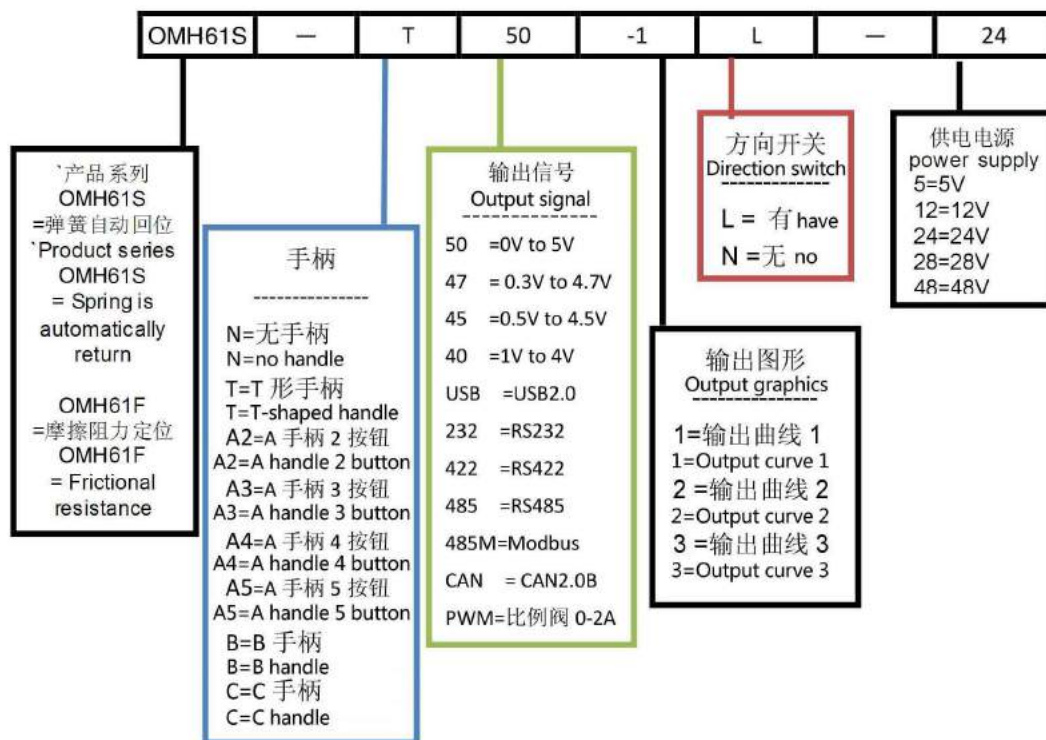
方向开关技术参数: Directional switch technical parameters

- ◆ 开关方式: 常开switch mode: normally open
- ◆ 启动角度: 大于2° Start angle: greater than 2°
- ◆ 触点电流: 1A/24V Contactor current: 1A / 24V

按钮开关及使能开关: Button switch and enable switch

- ◆ 开关方式: 复位按钮 (常开) Switch mode: reset button (normally open)
- ◆ 触点电流: 1A/24V Contactor current: 1A / 24V

产品型号参数选择Product model parameter selection

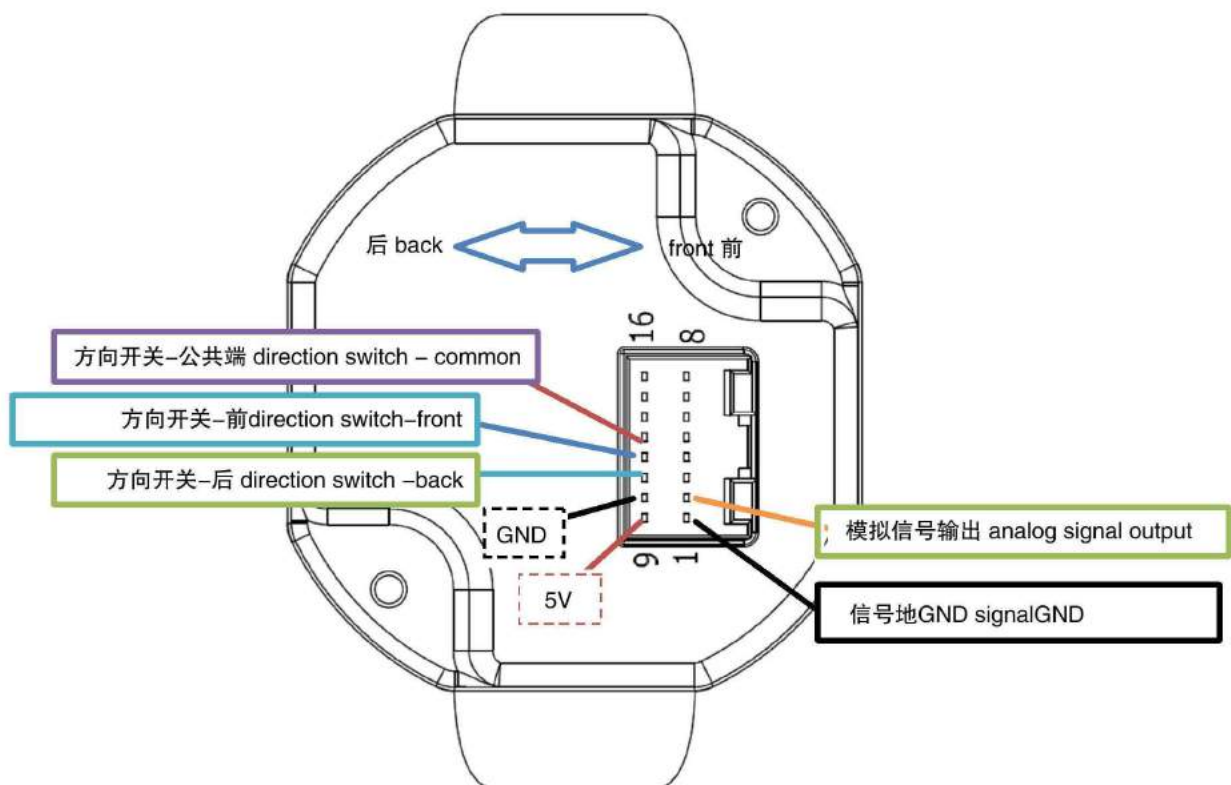


- RS232,RS422 通信协议请与工厂索取RS232, RS422 communication protocol, please contact the factory
- CAN 通信通信, 波特率、支持标准帧 ID、扩展帧 ID 及远程帧, 协议可定制  
CAN communication, baud rate, support standard frame ID, extended frame ID and remote frame, customized protocol
- PWM 电流输出用于控制比例阀, 电流的电大最小值可设置  
PWM current output is used to control the proportional valve, the minimum current electric current can be set

手柄选择 handle option

<p>单轴多按钮 single axis multi button</p> <p>A 手柄 A handle</p> <p>A2=面板 2 按钮 panel 2 button A3=面板 3 按钮 panel 3 button A4=面板 4 按钮 panel 4 button A5=面板 5 按钮 panel 5 button</p>	<p>单轴1按钮 single axis 1 button</p> <p>B 手柄 B handle</p> <p>铝合金材料 aluminum alloy material 1 按钮 1 button</p>	<p>2轴 手柄可旋转 2 axis handle can rotary</p> <p>C 手柄 C handle</p> <p>铝合金材料 aluminum alloy material 手柄可转动 handle can rotary ±135 度 135 degree rotary 旋转阻力定位 resistance position</p>	<p>单轴 single axis</p> <p>T 手柄 T handle</p> <p>铝合金材料 aluminum alloy material</p>
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模拟电压信号输出: Analog voltage signal output:





模拟电压信号输出: Analog voltage signal output:

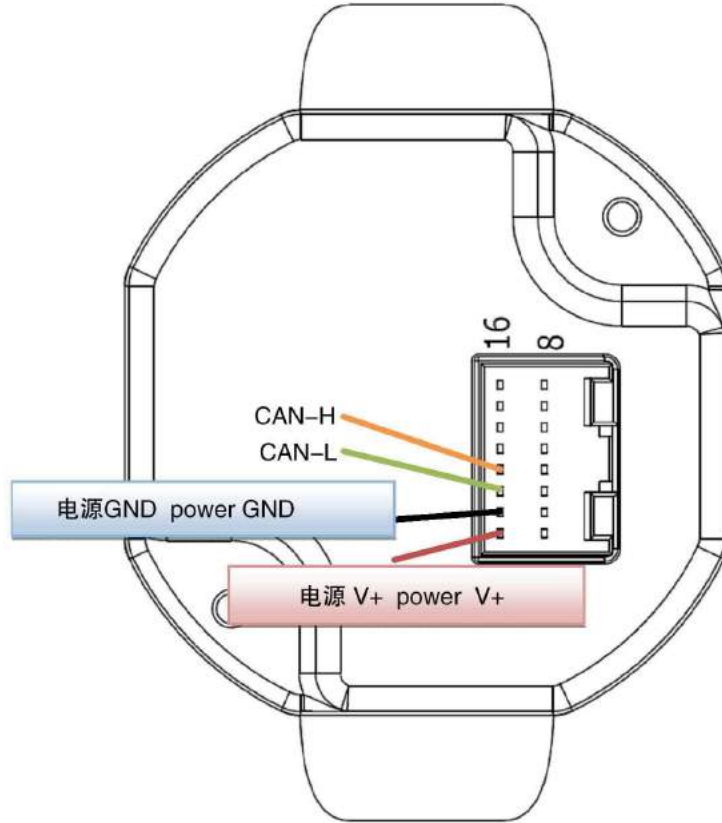
引脚pin	符号symbol	颜色color	功能说明function description
1	GND	—	信号-地GND signalGND
2	OUT-Y	—	模拟信号输出Y(前后) Analog signal output Y (front and back)
3	GND	—	信号-地GND signalGND
4	OUT-X	—	模拟信号输出X(左右) Analog signal output X (left and right)
5	COM2	—	按钮开关-公共端COM Pushbutton Switches – Common COM
6	B0	—	板机开关 ( 使能开关 ) Board switch (enable switch)
7	B1	—	按钮1 Button 1
8	B2	—	按钮2 Button 2
9	V+	—	电源输入正极, 5V或12-29V Power input positive, 5V or 12-29V
10	GND	—	电源输入负极, GND电源地Power input negative, GND power ground
11	N-SW	—	方向后-开关Direction back- switch
12	P-SW	—	方向前-开关Directionfront – switch
13	COM1	—	方向开关-公共端COM Direction switch – common COM
14	B5	—	按钮5 Button 5
15	B4	—	按钮4 Button 4
16	B3	—	按钮3 Button 3

CAN总线信号输出: CAN bus signal output:

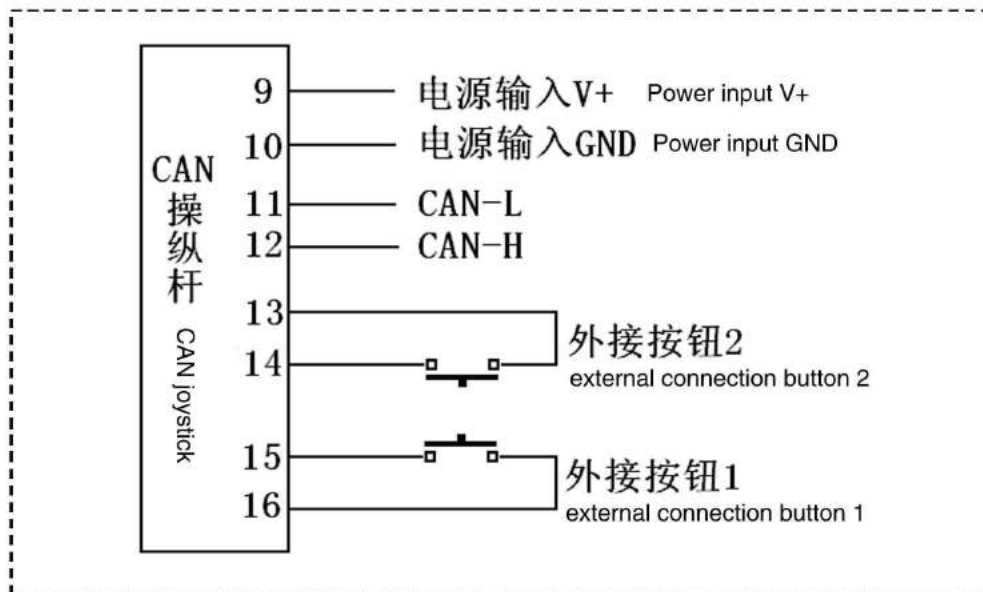
引脚pin	符号symbol	颜色color	功能说明function description
1	+5V output	—	OUTPUT +5V电压输出+5V ( 最大100mA ) OUTPUT + 5V voltage output + 5V (maximum 100mA)
2	GND	—	地GND
3	232-RXD	—	RS232接收 RS232 receive
4	232-TXD	—	RS232发送 RS232 send
5	422-RX-	—	RS422接收负 ( RX- ) RS422 receives negative (RX-)
6	422-RX+	—	RS422接收正 ( RX+ ) RS422 receives positive (RX +)
7	422-TX+	—	RS422发送正 ( TX+ ) RS422 sends positive (TX +)
8	422-TX-	—	RS422发送负 ( TX- ) RS422 sends negative (TX-)
9	Power V+	—	电源输入正极, 5V或 12-29V Power input positive, 5V or 12-29V
10	Power GND	—	电源输入负极, GND电源地Power input negative, GND power ground
11	CAN-L	—	CAN通讯CAN-L CAN communication CAN-L
12	CAN-H	—	CAN通讯CAN-H CAN communication CAN-H
13	GND	—	地GND
14	Input2	—	输入2 ( 外部连接按钮2 ) Input 2 (external connection button 2)
15	Input1	—	输入1 ( 外部连接按钮1 ) Input 1 (external connection button 1)
16	GND	—	地GND

- RS422用于内部参数的设置, 或定制的功能  
RS422 is used for internal parameter setting, or custom function

CAN连接器引脚图CAN connector pin diagram



CAN通信操纵杆接线图：CAN communication joystick wiring diagram



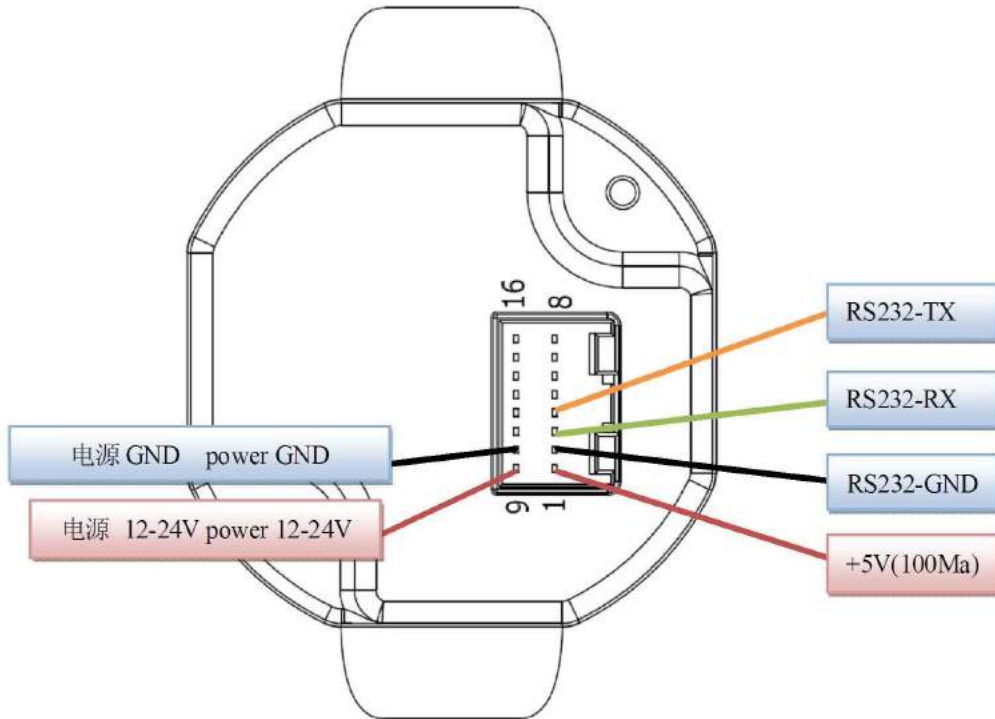
输出引线：Output Lead:

引线长度40CM，带连进口原装的接口 Lead length 40CM, with imported original device

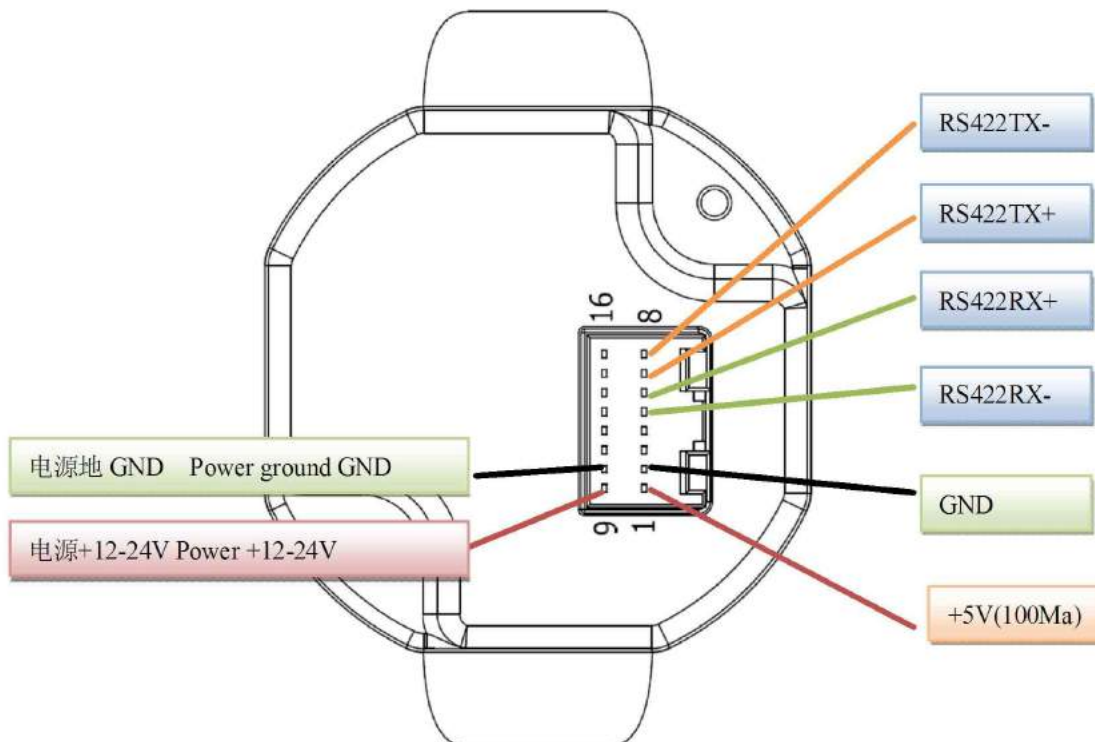
### RS232/RS422通信的连接及通信协议

RS232 / RS422 communication connection and communication protocol

RS232连接器引脚图：RS232 connector Pin diagram:



RS422连接器引脚图：RS422 connector Pin diagram





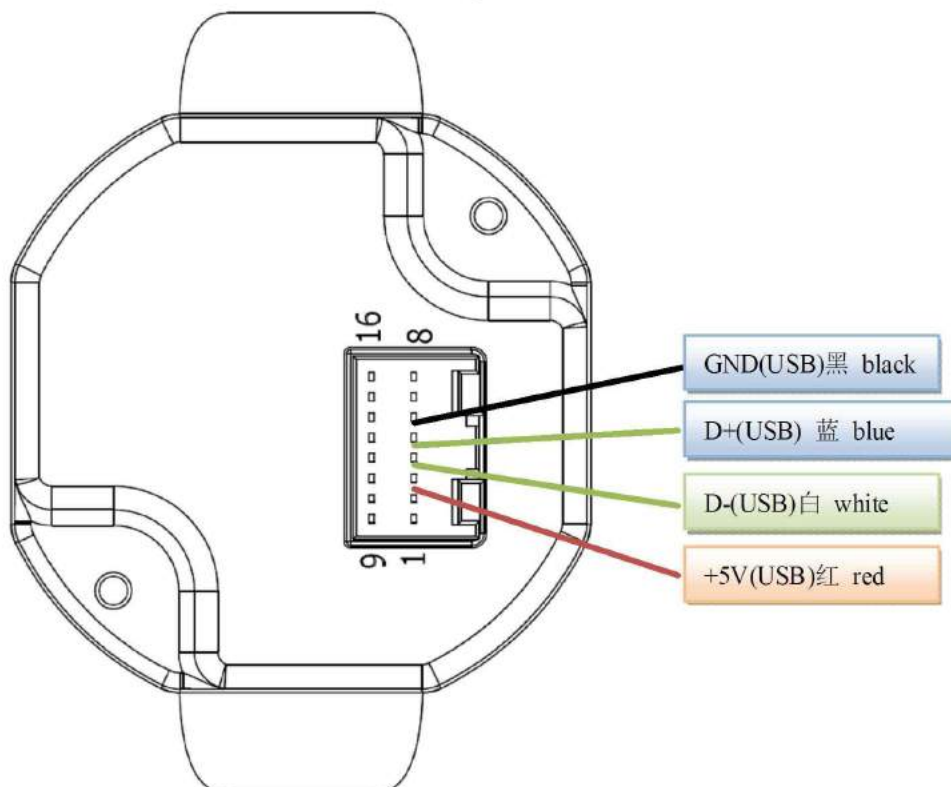
1.USB接口的相关连接线: USB connection cable:

引脚pin	符号symbol	颜色color	功能说明function description
1	USB +5V	红	USB通信+5V USB communication + 5V
2	D-	白	USB通信 数据- USB communication data -
3	D+	蓝	USB通信数据+ USB communication data +
4	GND	黑	USB通信地GND USB communication ground GND
5	Button IN9	-	输入9 (外部连接按钮9) Input 9 (external connection button 9)
6	Button IN8	-	输入8 (外部连接按钮8) Input 8 (external connection button 8)
7	Button IN7	-	输入7 (外部连接按钮7) Input 7 (external connection button 7)
8	GND	-	外部按钮输入公共地GND External button input Common ground GND
9	GND	-	外部按钮输入公共地GND External button input Common ground GND
10	Button IN6	-	输入6 (外部连接按钮6) Input 6 (external connection button 6)
11	Button IN5	-	输入5 (外部连接按钮5) Input 5 (external connection button 5)
12	Button IN4	-	输入4 (外部连接按钮4) Input 4 (external connection button 4)
13	Button IN3	-	输入3 (外部连接按钮3) Input 3 (external connection button 3)
14	Button IN2	-	输入2 (外部连接按钮2) Input 2 (external connection button 2)
15	Button IN1	-	输入1 (外部连接按钮1) Input 1 (external connection button 1)
16	GND	-	外部按钮输入公共地GND

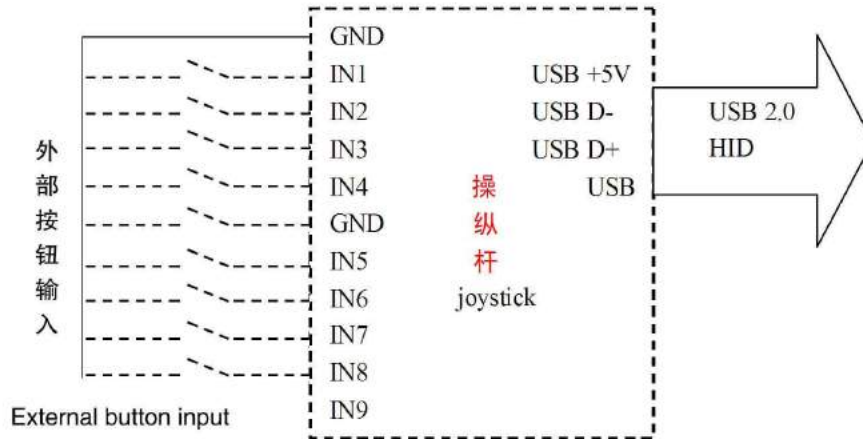
注: 外部按钮输入: 按钮一端接“GND”, 另一端接“Button IN1-9”

Note: External button input: button one end "GND", the other end of the "Button IN1-9"

2.USB连接器引脚图: USB connector pin diagram



### 3.外部按钮开关输入接线图External button switch input wiring diagram



### 4.USB通信协议：USB 2.0 HID人机介面协议标准

USB communication protocol: USB 2.0 HID man-machine interface protocol standard

支持微软操作系统，免驱动；支持directX 库

相关例程网上查 “joystick directx input”

Support for Microsoft operating system, free drive; support directX library

Related routines online check "joystick directx input"

## 比例阀控制-PWM 信号输出 PROPORTIONAL VALVE CONTROL-PWM SIGNAL OUTPUT

1. 直接驱动电磁阀的线圈，不用放大器； Direct drive solenoid valve coil, no amplifier;
2. 4 路线性电流输出（参数可选），可驱动 4 路线圈（2 个油缸正反向控制）；  
4 way linear current output (optional parameters), can drive 4 way coil (2 pcs positive and negative cylinder control);
3. DC24V 供电； DC24V power supply
4. 最多 4 路模拟电流信号输出： 0.20~0.64A，线性输出（PWM 原理）  
MAX 4 way analog current signal output: 0.20 ~ 0.64A, linear output (PWM principle)
5. 非线性电流曲线：曲线的斜率参数可修改  
Non-linear current curve: The slope parameter of the curve can be modified

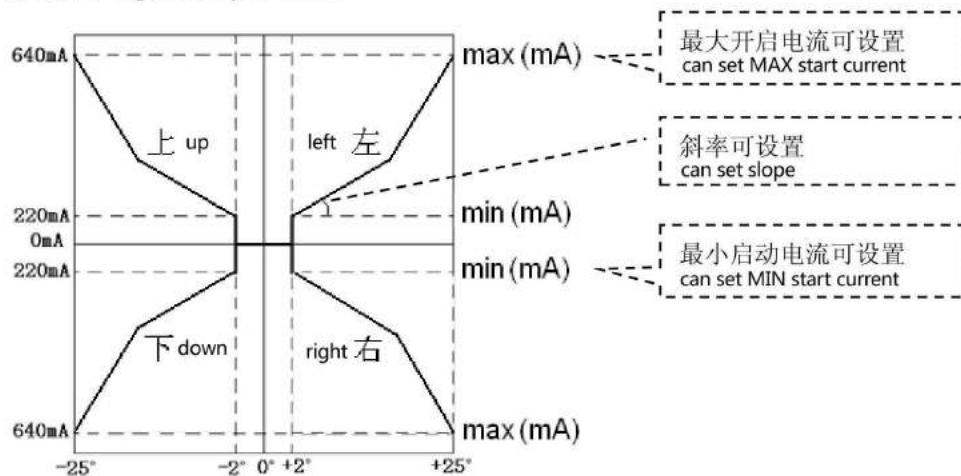
### PWM 输出端子接线表： PWM output terminal wiring graph：

引脚Pin	符号Symbol	颜色Color	功能说明	Function Description
1	+5V Out	红 red	5V 输出，供测试器用	5V output for tester
2	GND	白 white	GND(地)	GND(ground)
3	RS485-(B)	蓝 blue	RS485 通信-	RS485 communication -
4	RS485+(A)	黑 black	RS485 通信+	RS485 communication +
5	B2		按钮开关端子 2，（外部输入 2 适用于定制）	button switch terminal 2(external input 2 for customization)
6	B1		按钮开关端子 1，（外部输入 1 适用于定制）	button switch terminal 1(external input 1 for customization)
7	SW		继电器开关输出端 1（常开）	Relay switch output 1 (normally open)
8	SW		继电器开关输出端 2（常开）	Relay switch output 2 (normally open)
9	Power 24V+		电源输入 24V+	power input 24V+
10	Power GND		电源输入 GND	power input GND
11	GND		GND（内部与 10 脚相连接）	GND Internal connection with 10 feet
12	DC24V Out		DC24V 输出（24V 电源输出-接线圈）	DC24V Output (24V power output - coil)
13	Out1		PWM 输出 1 接阀门-前线圈	PWM Output 1 connected to the valve - the front coil
14	Out2		PWM 输出 2 接阀门-后线圈	PWM Output 2 connected to the valve - the back coil
15	Out3		PWM 输出 3 左线圈（备用）	PWM Output 3 left coil (spare)
16	Out4		PWM 输出 4 右线圈（备用）	PWM Output 4 right coil (spare)

注：外部按钮输入：按钮一端接“GND”，另一端接“Button IN1-9”

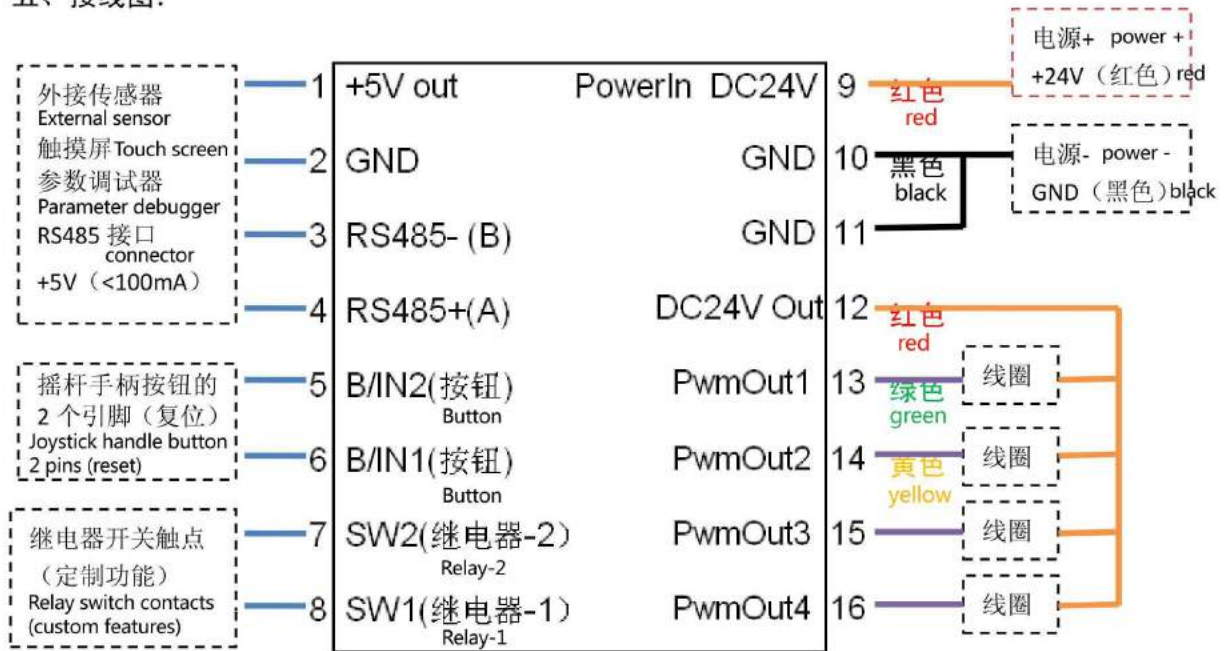
Note: External button input: one end of the button connected to "GND", the other end "Button IN1-9"

### 四、信号输出曲线图 Signal output curve



模拟电流与操纵杆角度曲线图  
Analog current and joystick angle curve

五、接线图:

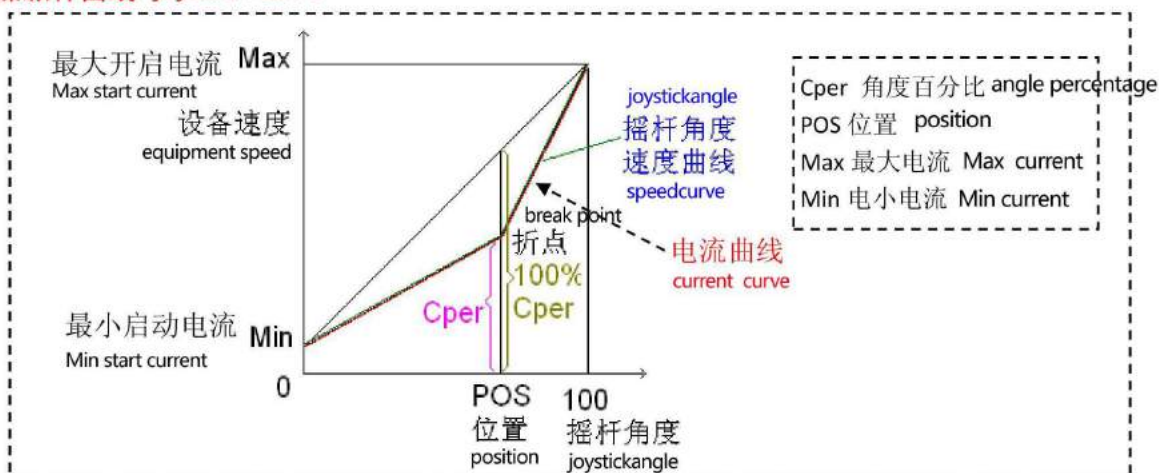


操纵杆 joystick

注意: note:

- ✧ 操纵杆供电需在电源供电的正极串接1个5A的保险丝  
Joystick power supply must be in the positive power supply connected to a 5A fuse
- ✧ 操纵杆内部有1继电器开关, 厂家可编程, 这个功能需定货时注明, 并给出要求。  
There is a relay switch in internal of joystick, programmable factory, identify the function and gives the requirement when ordering
- ✧ 手柄按钮: 如果手柄没有按钮, 则是空脚, 按钮的2个引脚直接连接到连接器;  
Handle button: If the handle has no button, it is empty, and the 2 pins of the button connect directly to the connector
- ✧ RS485 注要用于手柄的参数设置, 显示屏, 传感器等的接口, 只持用户定制的功能;  
RS485 mainly used for the parameters of the handle settings, display, sensors and other interface, only user-defined functions;
- ✧ PwmOut1 线圈上(前), PwmOut2 线圈下(后)  
PwmOut1 On the coil (front), PwmOut2 Under the coil (back)
- ✧ PwmOut3 线圈左(备用), PwmOut4 线圈右(备用), 支持用户定制的功能  
PwmOut3 Coil left (spare), PwmOut4 Coil right (spare), Support user-customized functions

操纵杆曲线 joystick curve





出厂参数:

1. 线圈内阻 27.2Ω
2. 0.1%以下阀门开启电流 230MA
3. 100%开启电流 680MA
4. 摇杆斜率: 低段角度=70%, 位置=50%
5. 加速度: 30ms
6. 减速度: 25ms
7. 中心死区=±90

Factory parameters:

1. Coil internal resistor 27.2Ω
2. Below 0.1% valve opening current 230MA
3. 100% open current 680MA
4. Joystick slope: low angle =70%, position =50%
5. Acceleration : 30ms
6. Deceleration : 25ms
7. Central dead zone =±90

上述参数需要“专用的调试器”通过 RS485 接口才可以设置上述的参数, 具体请与厂家联系?

The above parameters require a "special debugger" through the RS485 interface to set these parameters .  
detail info please contact the manufacturer.



## CANopen 通信协议 CAN open communication protocol

波特率: 250K 可更改 (通过 RS232 接口进行更改)  
Baud rate: 250K can be changed (change through the RS232 interface)

### 一、开机发送 bootup 1.yistart sending bootup

数据帧 data frame  
COB-ID=0x700+ID  
DLC=1  
DATA=0X00

### 二、操纵杆发送数据格式: 2.joystick sends the data format:

PDO1 摇杆参数 joystick parameter

数据帧 data frame  
COB-ID=0x180+ID  
DLC=8  
DATA=

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
方向状态 direction status	Y 轴角度低位 Y-axis angle low position	Y 轴角度高位 Y-axis angle high position	0x00	0x00	0x00	0x00	按钮状态 button status

低位在前, 高位在后 lower position at front ,the high position at back

Byte2,Byte1= 0x0000-0x7a00

是指从中心的开始的 refers to the beginning of the center

摇杆在中心时 (停止) 角度值=0x0000 the joystick at the center (stop), angle is =0x0000

摇杆最大角度时 角度值=0x07a0 the joystick at the MAX angle, angle is =0x07a0

Byte0 方向状态

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
			下 down	上 up			

1 有效, 0 无效 在中位 (停止位置) Bit4,Bit3=00

1 valid, 0 invalid In the middle position (stop position)

Byte7 按钮状态 Button status

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Input1 外部输入 1 External input 1	板机开 关 Trigger switch	按钮 6 或 Input1 外部输入 1 button 6 or Input1 External input 1	按钮 5 button 5	按钮 4 button 4	按钮 3 button 3	按钮 2 button 2	按钮 1 button 1

1=按下按钮, 0=放开按钮 1 = press the button, 0 = release button

外部输入按钮 IN1,IN2;一端连接 IN1 或 IN2,一端连接 GND

External input button IN1, IN2; oneterminal connect IN1 or IN2, one terminal connect to GND

定时自动发送数据的刷新率是通过 RS232 进行设置, 最小 20ms

The data refresh rate is timing automatically set by RS232, the minimum 20ms

### 三、主从的查询模式指令 (只有在“主从查询”模式中有效) 支持远程帧的查询指令

3. The master-slave query mode instructions (only in the "master-slave query" mode is valid.  
Support remote frame query instruction

当接收到远程帧 ID=280+ID (主设备→操纵杆)

When receiving a remote frame ID = 280 + ID (Master → Joystick)

COB-ID=280+ID DLC=0

操纵杆接收此远程帧就发送一帧数据 PDO1

The joystick receives this remote frame and sends a frame of data PDO1



## 通信操纵杆参数设置 Communication joystick parameter setting

版本: Ver: 改 17. 11. 20 Version: Ver: Changed 17.11.20

用户可能对操纵杆的通信参数进行设置和修改 (包括 CAN, RS232, RS422);  
User may want to set and modify the communication parameters of the joystick (including CAN, RS232, RS422);

上述所有的“参数修改”只能通过操纵杆的 RS422 接口或 RS232 接口进行, 包括 CAN 参数。  
All of the above "parameter changes" can only be done via the joystick's RS422 or RS232 interface, including CAN parameters

PC→操纵杆 (RS422 或 RS232) 上位机 (串口助手软件) 向操纵杆发送指令。

(串口助手软件没有, 可向我公司技术人员索要)

PC → joystick (RS422 or RS232) host computer (serial assistant software) sends instructions to the joystick.  
(If no Serial assistant software, ask it from company)

上位机 PC 如果没有 RS232 (DB9 9 针的连接器) 在有一个 USB 转 RS232 的转换器 (标准的转换器, 不是 TTL 电平的转换器)。

If PC don't have RS232(DB9 9pin connector) need have USB exchange ES232 converter (standard converter ,not TTL level converter)

操纵杆上的 RS422 或 RS232 通信接口, 出厂默认的波特率 9600. 8. 1. N  
RS422 or RS232 communication interface on the joystick, default baud rate is 9600.8.1.N

### 一、基本指令: one、standard instruction:

#### 1、ACK 确认 (操纵杆-PC) 1. ACK confirmation (Joystick-PC)

AA 55 AF

表明操纵杆成功接收到地址设置指令, 并执行完成。

Indicates that the joystick successfully received the address setting instruction and executed it.

#### 2、设置操纵杆 ID 地址; 2. Set joystick ID address;

ID 是指 RS232/RS422 通信协议中的 ID, 或 CANopen 协议中的 ID (PC→操纵杆)

ID mean the ID in the RS232 / RS422 communication protocol or the ID in the CANopen protocol (PC-> joystick)

0xaf 0x0d 00 00 00 Add 0xf5

头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail
0xaf	0x0d	00	00	00	00	0xf5

Add=0x01~0x7F 地址 address 1-127

Add=0x00 无效 invalid

例如: e.g.

设置 1 号地址 Set address number 1 af 0d 00 00 00 01 f5 (HEX)

设置 2 号地址 Set address number 2 af 0d 00 00 00 02 f5 (HEX)

操纵杆收到此指令, 执行后, 回复 ACK

Joystick receive this command, after execution, reply ACK

#### 3、复位操纵杆 (PC→操纵杆) 3. Reset the joystick (PC-> joystick)

0xaf 0x15 00 00 00 Add 0xf5

头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail
0xaf	0x15	00	00	00	00	0xf5

Add=0x01~0x7f 地址要与操纵杆的地址一样才能复位  
address must be the same as the joystick address to reset

Add=0x00 复位所有地址的操纵杆, 任何地址都被复位 reset all joystick address, any address is reset

Add 范围不在 0-0x7f 无效 Add range is not 0-0x7f invalid

例如: e.g.

复位所有地址操纵杆: reset all joystick address : af 15 00 00 00 00 f5 (HEX)

复位 1 号地址操纵杆: reset No1 joystick address : af 15 00 00 00 01 f5 (HEX)

复位 2 号地址操纵杆: reset No2 joystick address : af 15 00 00 00 02 f5 (HEX)



3、设置操纵杆的中心点(用于校正中心点位置) (PC->操纵杆)

3. set the joystick center (for more positive center position) (PC-> joystick)

出厂时, 已经设置好, 可忽略此指令 It has been set when shipped from the factory, can ignore this instruction

PC 与操纵杆的 RS422 端口相连接, 波特率 9600 PC and joystick RS422 port connected to the baud rate 9600

0xaf 0x09 00 00 00 00 0xf5

头 命令 数据 1 数据 2 数据 3 数据 4 尾  
Head Command Data 1 Data 2 Data 3 Data 4 Tail

向操纵杆发送些数据, 重新设置操纵杆的停止位置(中心点)

Send some data to the joystick, reset the joystick stop position (center point)

例如: af 09 00 00 00 00 f5 (HEX) e.g.:af 09 00 00 00 00 f5 (HEX)

4、通信端口选择: (PC->操纵杆) 4. Communication terminal selection: (PC-> joystick)

操纵杆通信端口 RS232, RS422, CAN 选其一; (出厂已经帮客户设置好了)

Joystick communication terminal RS232, RS422, CAN choose one; (factory has set up)

0xaf 0x05 XX 00 00 00 0xf5

头 命令 数据 1 数据 2 数据 3 数据 4 尾  
Head Command Data 1 Data 2 Data 3 Data 4 Tail

XX=00 CAN 通信; communication

XX=01 RS232 通信 communication

XX=02 RS422 通信 communication

例如: af 05 01 00 00 00 f5 (HEX) RS232 通信 communication

e.g.: af 05 02 00 00 00 f5 (HEX) RS422 通信 communication

af 05 00 00 00 00 f5 (HEX) CAN 通信 communication

5、刷新率设置 (PC->操纵杆) 5. Refresh rate setting (PC-> joystick)

刷新率=发送数据的帧间隔时间, 比如设置 20ms (每 20MS 向主机发送一帧数据)

Refresh rate = interval of sending data frame, such as setting 20ms (every 20MS to send a frame of data to the host)

0xaf 0x11 00 00 00 Ref 0xf5

头 命令 数据 1 数据 2 数据 3 数据 4 尾  
Head Command Data 1 Data 2 Data 3 Data 4 Tail

Ref =0x0A~0x64 (10-100)ms, 单位是“毫秒” The unit is "millisecond"

出厂默认: 20ms Factory default: 20ms

设置此参数后, 复位或重启生效 After setting this parameter, reset or Restart effective

例如: 设置操纵杆发送数据的刷新率 20MS (每 20MS 发送一帧数据, 1 秒发 50 次)

For example: set the joystick sending data refresh rate of 20MS (every 20MS to send a data frame, 50 times a second)

设置 set 20MS af 11 00 00 00 14 f5 (HEX)

设置 set 50MS af 11 00 00 00 32 f5 (HEX)

操纵杆收到此指令→回复 ACK→复位操纵杆 Joystick received this command → Reply ACK → reset joystick

注意: 波特率较低, 相应的帧间隔时间就要长些 Note: The lower the baud rate, the longer the frame interval will be

出厂默认: 刷新率 20ms (CAN 波特率 250K, RS232 和 RS422 波特率 9600)

Factory default: refresh rate 20ms (CAN baud rate 250K, RS232 and RS422 baud rate 9600)

6、通信模式 (主从查询, 定时自动发送, 包括 CAN 和 RS232/422 通信) (PC->操纵杆)

6. communication mode (master-slave query, send automatically timing, including CAN and RS232 / 422 communication) (PC-> joystick)

主从查询: 操纵杆是从设备, 只有收到主机的查询指令, 才回送数据给主机。

Master-slave query: joystick is from the device, only to receive the host's query command, can send data back to the host.

定时自动发送: 操纵杆开机就向主机发送数据, 发送速率参考“刷新率设置”

Automatically timing send: send data to the host when joystick start, the sending rate refer to "refresh rate setting"

此参数操纵杆永永储存 (出厂已经帮客户设置好了) joystick store parameter forever (factory has set up)

0xaf 0x08 00 00 00 Mode 0xf5

头 命令 数据 1 数据 2 数据 3 数据 4 尾  
Head Command Data 1 Data 2 Data 3 Data 4 Tail

Mode=00 定时发送 Send regularly

Mode=01 主从查询 master-slave query

例如: (PC->操纵杆) For example: (PC-> joystick)

定时发送模式 Timing send mode af 08 00 00 00 00 f5 (HEX)

主从查询模式 Master-slave query mode af 08 00 00 00 01 f5 (HEX)

设置成功后操纵杆返回 ACK (AA 55 AF) (操纵杆->PC)

After setting the joystick to return ACK (AA 55 AF) (joystick -> PC)





## 二、RS232 和 RS422 的通信参数设置 Two.RS232 / RS422 communication parameter setting

### 7、设置 RS232 和 RS422 波特率 (PC->操纵杆) Setting RS232 and RS422 baud rate (PC-> joystick)

RS232 和 RS422 波特率一样,设置同时有效 RS232 and RS422 baud rate are same, the setting is valid at the same time

0xaf	0x0b	00	00	00	Baud	0xf5
头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail
	Baud=0X00	波特率 baud rate =9600				
	Baud=0X01	波特率 baud rate =19200				
	Baud=0X02	波特率 baud rate =57600				
	Baud=0X03	波特率 baud rate =115200				

例如: e.g.

设置 setting 9600 af 0b 00 00 00 00 f5 (HEX)

设置 setting 19200 af 0b 00 00 00 01 f5 (HEX)

设置 setting 57600 af 0b 00 00 00 02 f5 (HEX)

设置 setting 115200 af 0b 00 00 00 03 f5 (HEX)

操纵杆收到此指令, 执行后, 回复 ACK Joystick receive this command, after execution, reply ACK

### 8、查巡操纵杆位置 (PC->操纵杆) 8. Check patrol joystick position (PC-> joystick) check patrol joystick position (PC-> joystick)

只有当“主从查询”的能信模式时, 这个指令才有效

This command is valid only when in the master-slave query mode

没有查询指令时操纵杆无任何数据输出, 查一次操纵杆回一次。

Joystick don't have any data output when no query command, check the joystick back once

0xaf	0x07	00	00	00	Addr	0xf5
头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

◆ Addr=0x01-0x7f 当地址正确时, 回送 When the address is correct, send back

◆ 操纵杆收到这个数据就回送当前的位置, 查一次操纵杆回一次, 不查不发数据

Joystick will be sent back to the current location when receive this data, check the joystick back once, no check no send data

例如 RS232 通信时查询: For example, RS232 communication query:

(PC->操纵杆)(PC-> joystick) af 07 00 00 00 01 f5 (HEX)

(操纵杆->PC)(joystick->PC) FF 01 08 00 08 00 00 19

操纵杆收到这个数据就回送当前的位置 Joystick will be sent back to the current location when receive this data

## 三、CAN 通信的参数设置: communication parameter setting:

CAN 的参数设置也要通过 RS232 或 RS422 端口;

CAN parameter settings have to pass RS232 or RS422 port;

### 9、CAN 端口波特率: (PC->操纵杆) 9. CAN port baud rate: (PC-> joystick)

0xaf	0x06	XX	00	00	00	0xf5
头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

XX=00 125K

XX=01 250K (默认) default

XX=02 500K

XX=03 1000K

例如: af 06 00 00 00 00 f5 (HEX) CAN 波特率 baud rate =125K

e.g. af 06 01 00 00 00 f5 (HEX) CAN 波特率 baud rate =250K (默认)

af 06 02 00 00 00 f5 (HEX) CAN 波特率 baud rate =500K

af 06 03 00 00 00 f5 (HEX) CAN 波特率 baud rate =1000K



10、CAN 协议设置: (PC->操纵杆) 10、CAN protocol settings: (PC-> joystick)

0xaf	0x0a	00	00	00	SS	0xf5
头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

SS=00 普通协议 ID=发送节点 ID (见(11)操纵杆发送节点 ID 设置)  
 SS = 00 Normal Protocol ID = Transmit Node ID (see (11) Joystick Transmit Node ID Setting)  
 SS=01 CANopen 协议 ID=180+ID (见(2)设置操纵杆 ID 地址)  
 SS = 01 CANopen Protocol ID = 180 + ID (see (2) Setting Joystick ID Address)  
 出厂已经帮客户设置好了 factory has set up

例如: af 0a 00 00 00 00 f5 (HEX) 普通协议 Normal Protocol  
 e.g. af 0a 00 00 00 01 f5 (HEX) CANopen 协议 Protocol

11、操纵杆“发送节点 ID”设置: (PC->操纵杆) 11、Joystick "Send node ID" setting: (PC-> joystick)

只适用于“普通协议”, CANopen 协议用不到这个指令  
 Only applicable to "normal agreement", CANopen protocol can not use this instruction

0xaf	0x01	D1	D2	D3	D4	0xf5
头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

D1. 7=0 扩展帧 29 位 extended frame 29 bits  
 D1. 7=1 标准帧 11 位 standard frame 11 bits

- 29 位扩展帧: 数据范围 0X0-0X0FFFFFFF, 数据 D1-D4 对应“结点标识码”  
 29 extended frame: data range 0X0-0X0FFFFFFF, data D1-D4 corresponding to "node identification code"

例如: 设置发送结点标识码-扩展帧“0X00F0F101”  
 For example: Set sending node identification code - Extension frame "0X00F0F101"  
 af 01 00 f0 f1 01 f5 (HEX)

- 11 位标准帧: 数据范围 0X000-0X3FF, 数据 D3-D4 对应“结点标识码”  
 11 standard frames: data range 0X000-0X3FF, data D3-D4 corresponds to "node identification code"

例如: 设置发送结点标识码-标准帧“0X181”  
 For example: Set sending node identification code - Standard frame "0X181"  
 af 01 80 00 01 81 f5 (HEX)

12、操纵杆“接收节点 ID”设置: (PC->操纵杆) 12, joystick "receive node ID" settings: (PC-> joystick)

只适用于“普通协议”, CANopen 协议用不到这个指令  
 Only applicable to "normal agreement", CANopen protocol can not use this instruction

0xaf	0x02	D1	D2	D3	D4	0xf5
头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

D1. 7=0 扩展帧 29 位 extended frame 29 bits  
 D1. 7=1 标准帧 11 位 standard frame 11 bits

- 29 位扩展帧: 数据范围 0X0-0X0FFFFFFF, 数据 D1-D4 对应“结点标识码”  
 29 extended frame: data range 0X0-0X0FFFFFFF, data D1-D4 corresponding to "node identification code"

例如: 设置接收结点标识码-扩展帧“0X00F0F101”  
 For example: Set receive node identification code - Extension frame "0X00F0F101"  
 af 02 00 f0 f1 01 f5 (HEX)

- 11 位标准帧: 数据范围 0X000-0X3FF, 数据 D3-D4 对应“结点标识码”  
 11 standard frames: data range 0X000-0X3FF, data D3-D4 corresponds to "node identification code"

例如: 设置接收结点标识码-标准帧“0X1E1”  
 For example: Set receive node identification code - Standard frame "0X1E1"  
 af 02 80 00 01 E1 f5 (HEX)

13、操纵杆“屏蔽节点 ID”设置: (PC->操纵杆) 13、Joystick Shield Node ID setting: (PC-> Joystick)

0xaf	0x03	D1	D2	D3	D4	0xf5
头	命令	数据 1	数据 2	数据 3	数据 4	尾
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

D1. 7=0 扩展帧 29 位 extended frame 29 bits  
 D1. 7=1 标准帧 11 位 standard frame 11 bits

- 29 位扩展帧: 数据范围 0X0-0X0FFFFFFF, 数据 D1-D4 对应“结点标识码”  
 29 extended frame: data range 0X0-0X0FFFFFFF, data D1-D4 corresponding to "node identification code"

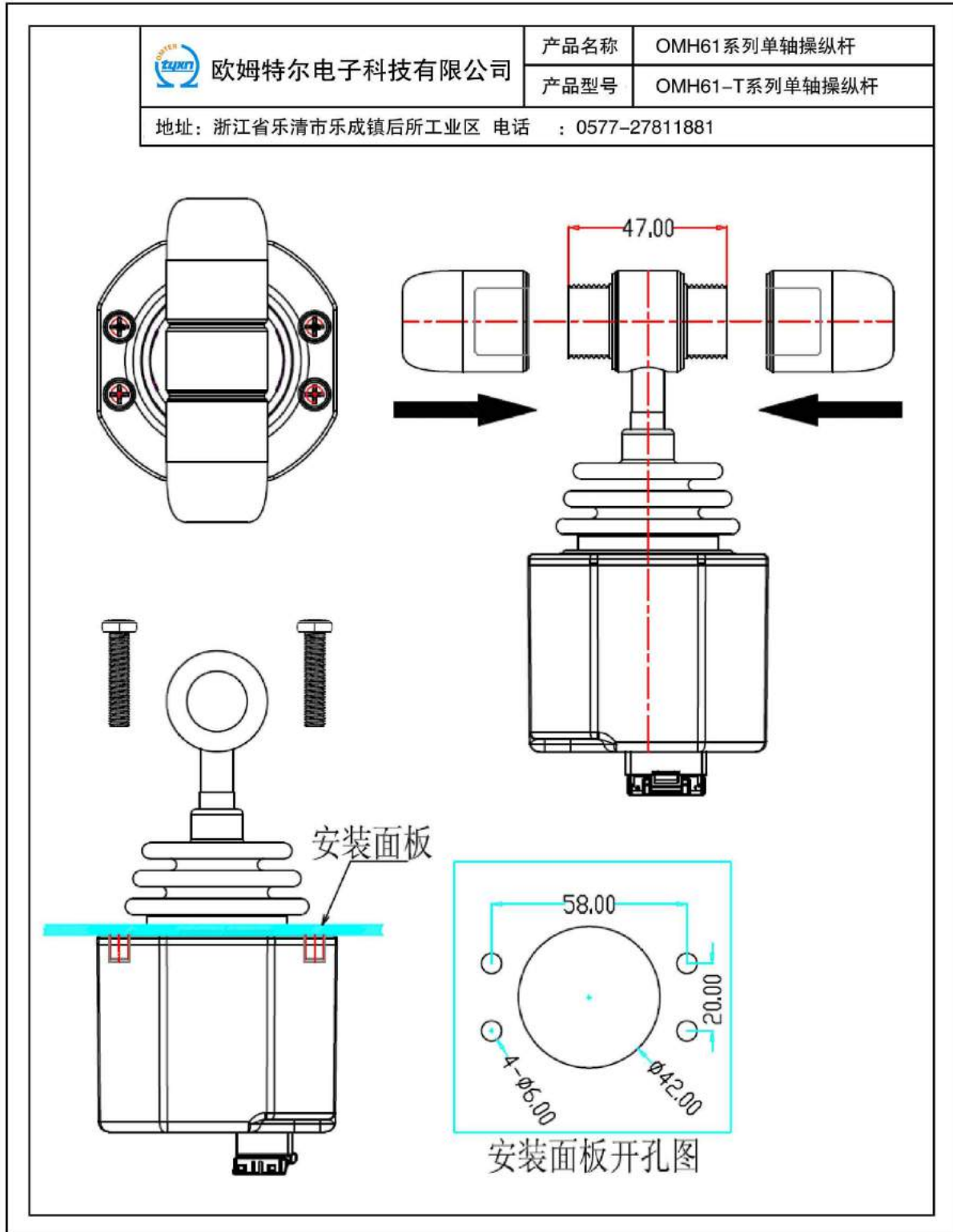
例如: 设置屏蔽结点标识码-扩展帧“0X00002201”  
 For example: Set shield node identification code - Extension frame "0X00002201"  
 af 03 00 00 22 01 f5 (HEX)

- 11 位标准帧: 数据范围 0X000-0X3FF, 数据 D3-D4 对应“结点标识码”  
 11 standard frames: data range 0X000-0X3FF, data D3-D4 corresponds to "node identification code"

例如: 设置屏蔽结点标识码-标准帧“0X122”  
 For example: Set shield node identification code - Standard frame "0X122"  
 af 03 80 00 01 22 f5 (HEX)



安装结构图: Installation diagram:



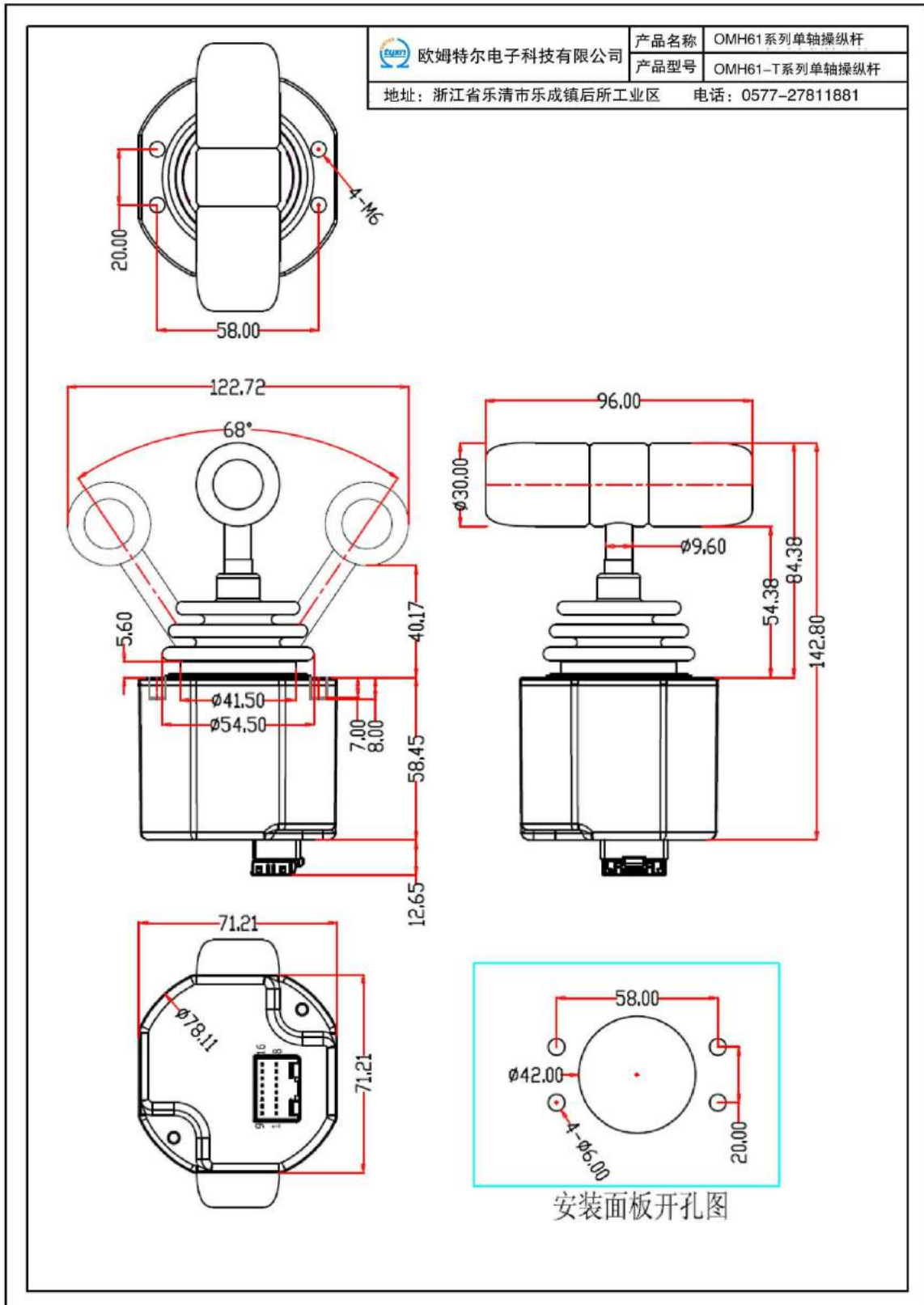
1. 先把手柄两侧的手柄帽拧下来 Remove the handle cap on both sides of the handle
2. 把操纵杆从下面穿过面板, 并按装好 take the joystick through the panel from below and install it
3. 装好2个手柄帽, 如需防脱需在安装之前在手柄帽上打螺丝胶水。  
Install the 2 handle caps, if need to prevent off ,make the handle cap on the screw glue before the installation.



产品尺寸图: Product Dimension:

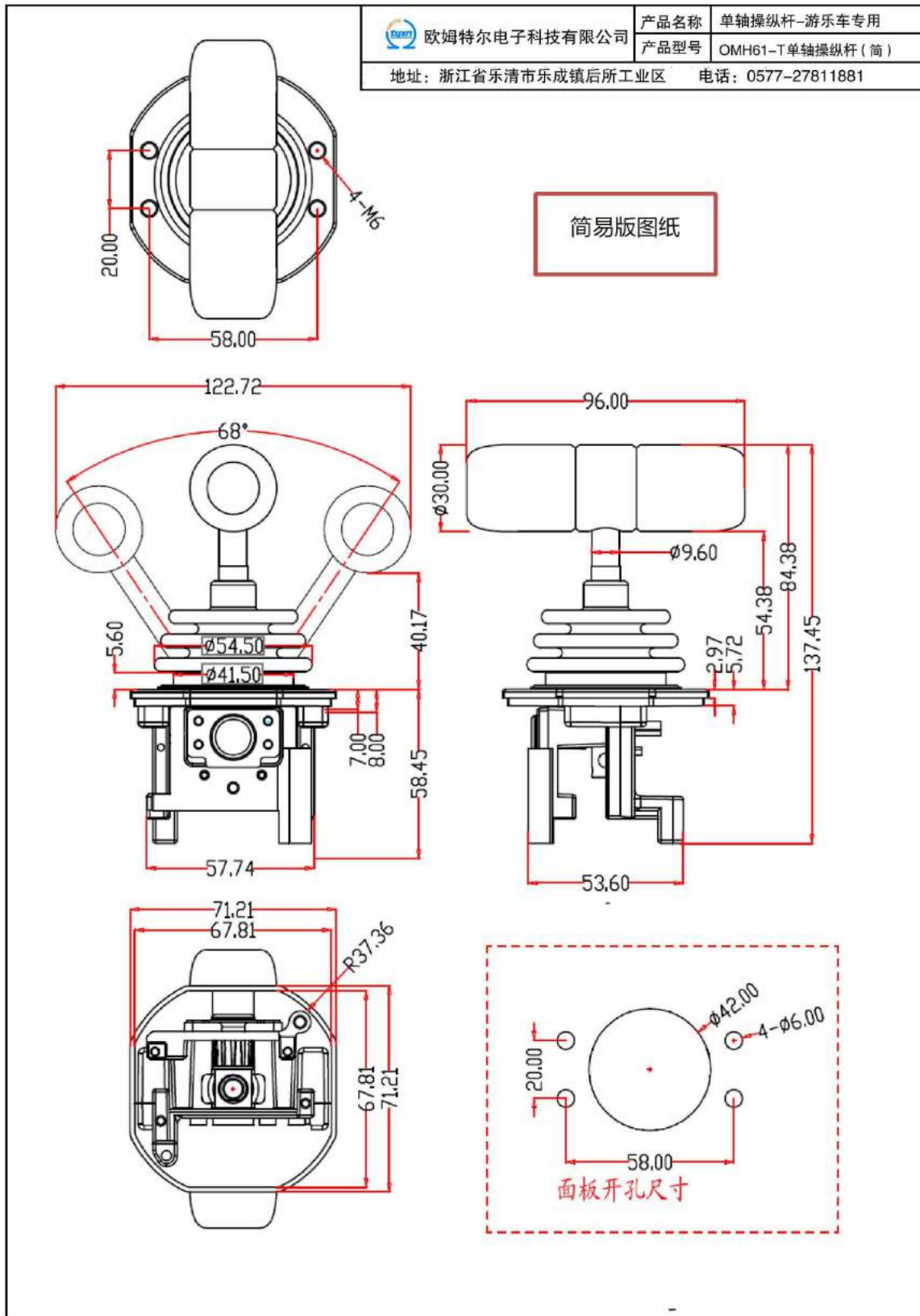
OMH61系列操纵杆 T形手柄操纵杆CAD图

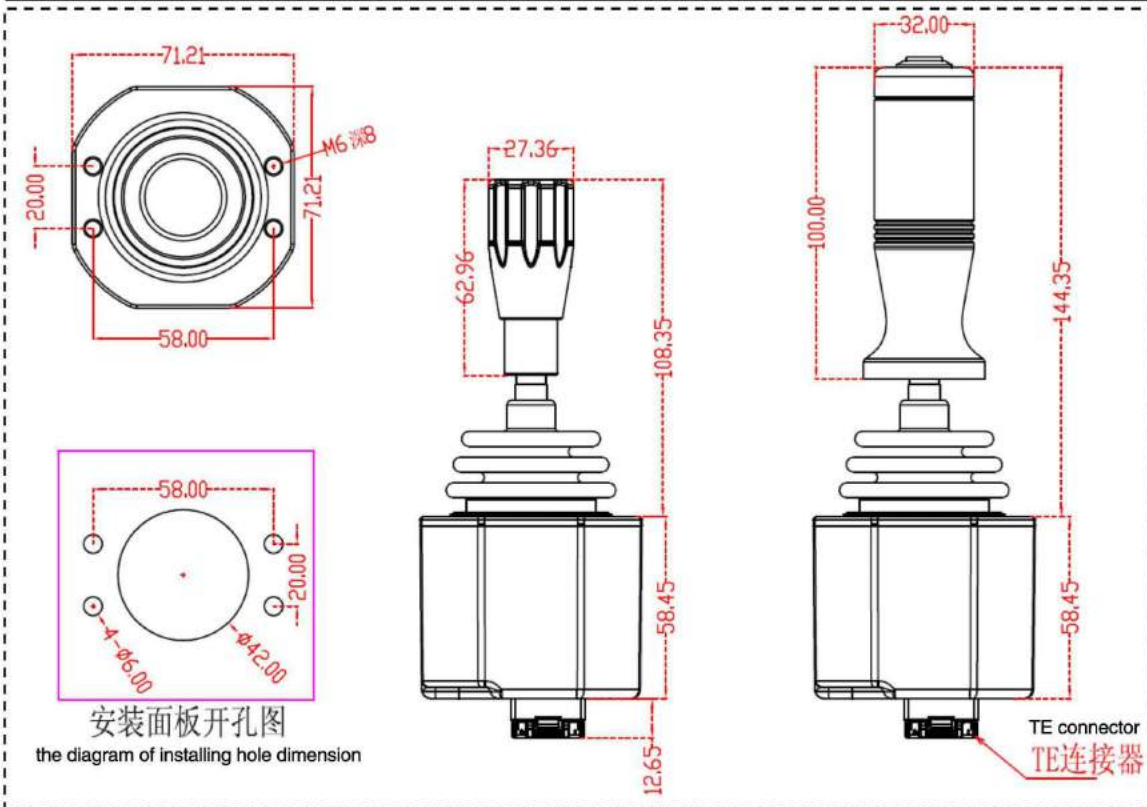
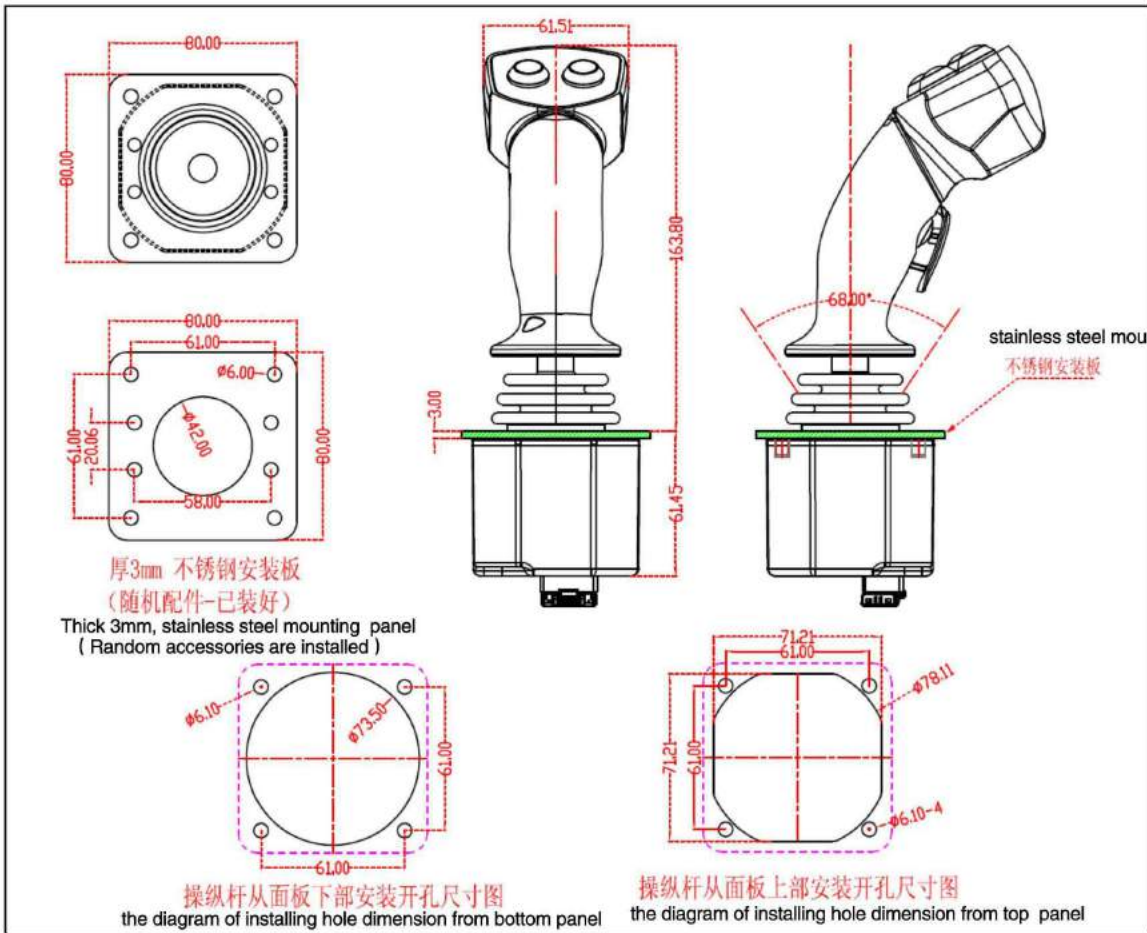
OMH61 series joystick T-handle handle lever CAD drawing





OMH61系列操纵杆 T形手柄操纵杆 (简易版) CAD图  
OMH61 Series Joystick T-handle lever (simple) CAD drawing





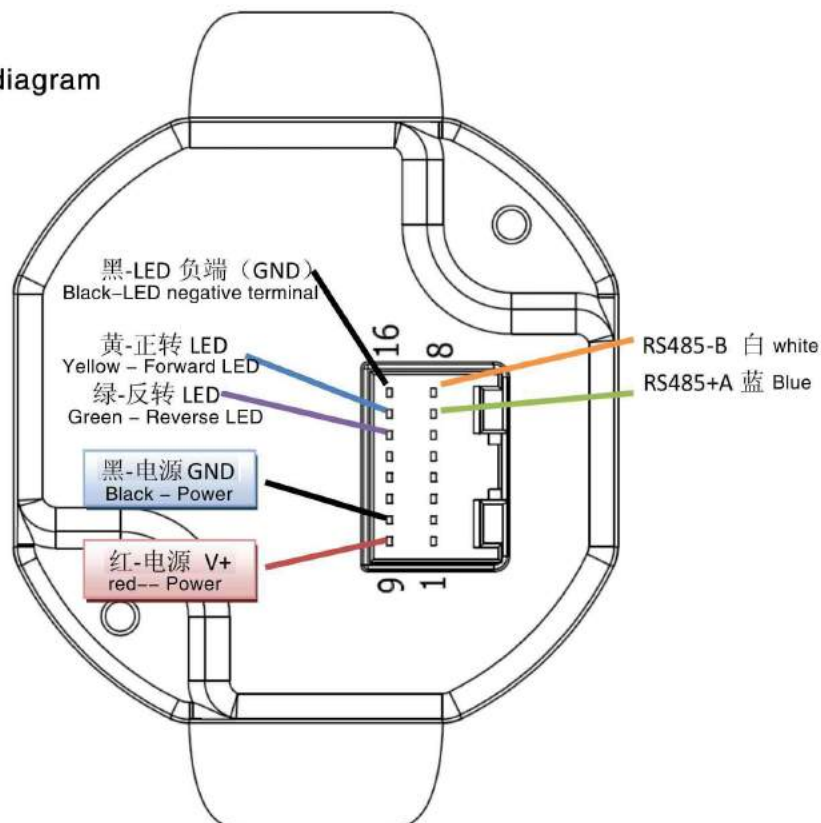
## 案例一： Case number one:

### OMH61 台达变频器控制 OMH61 Delta inverter control

- 操纵杆直接与台达的变频器连接(不需要 PLC)  
Joystick connect directly with Delta's inverters (no need PLC)
- RS485 通信, MODBUS 协议  
RS485 communication, MODBUS agreement
- 可控制电机的正转、反转、停止、速度  
Can control the motor forward, reverse, stop, speed
- 摇杆的斜率参数可设置  
Joystick slope parameters can be set
- 启动频率, 最高频率参数可设置  
Can set Start frequency, the highest frequency parameters
- 操纵杆供电: 台达变频器供电: DC10V  
Joystick power supply: Delta inverter power supply DC10V
- 有正转, 反转 LED 指示灯  
Forward, reverse LED indicator



### 连接器引脚图 Connector pin diagram



开机设置: 01 06 21 01 05 00 D1 66 设置由 RS485 控制  
Start up setting: 01 06 21 01 05 00 D1 66 The setting is controlled by RS485

可设置如下参数 Can set following parameters

- 起步的电机频率 Starting motor frequency
- 最高的电机频率 The highest motor frequency
- 摇杆斜率 (Cpre, Pos), 2 个参数, 是位置的百分比 0-100  
Joystick slope (Cpre, Pos), 2 parameters, is the percentage of the position 0-100  
主要的目的是让低速度时, 摇杆的行程长一点, 高速时行程短一些。  
The main purpose is to make the distance of the joystick longer when the speed is lower, and the distance is shorter at high speed.  
低速度时, 我们关心的是位置, 高速时, 不关心位置。  
At low speed, we are concerned about the location, high speed, do not care about the location.



通信总线信号输出: Communication bus signal output

引脚Pin	符号Symbol	颜色Color	功能说明	Function Description
1	+5V output		OUTPUT +5V 电压输出+5V(最大 100mA)	Voltage Output + 5V (Max 100mA)
2	GND		地 GND	Ground GND
3	232-RXD		RS232 接收	RS232 receive
4	232-TXD		RS232 发送	RS232 send
5	422-RX-		RS422 接收负 (RX-)	RS422 receive negative ( RX- )
6	422-RX+		RS422 接收正 (RX+)	RS422 receive positive ( RX+ )
7	422-TX+	蓝 blue	RS422 发送正 (TX+) RS485-A	RS422 send positive ( TX+ ) RS485-A
8	422-TX-	白 white	RS422 发送负 (TX-) TS485-B	RS422 send negative ( TX- ) TS485-B
9	Power V+	黑 black	电源输入正极, 5V 或 12-29V	Power input positive 5V or 12-29V
10	Power GND	红 red	电源输入负极, GND 电源地	Power input egative GND Power ground
11	CAN-L		CAN 通讯 CAN-L	CAN communication CAN-L
12	CAN-H		CAN 通讯 CAN-H	CAN communication CAN-H
13	GND		地 GND	Ground GND
14	Input2	绿 green	反转指示灯(内有 1K 电阻)连接LED	Feverse LED (1K resistor included) Connect the LED
15	Input1	黄 yellow	正转指示灯(内有 1K 电阻)连接LED	Forward LED (1K resistor included) Connect the LED
16	GND	黑 black	地 GND	Ground GND

台达 M 系列变频器 Delta M series inverter  
 MODBUS RTU 协议 MODBUS RTU protocol  
 RS485 接口 9600, N, 8, 2 RS485 interface 9600 , N,8,2  
 设备 ID=0X01 Equipment ID=0X01

开机设置: 01 06 21 01 05 00 D1 66 设置由 RS485 控制  
 Start up setting : 01 06 21 01 05 00 D1 66 The setting is controlled by RS485

控制指令发送方式: Control instruction sending method:  
 当摇杆的位置改变时, 40ms 发送一次指令。  
 When the joystick position changes, 40ms send a command.  
 当摇杆的位置没有改变时, 200MS 发送一次指令。  
 When the position of the joystick has not changed, the 200MS sends an instruction.

例如: E.g:  
 正转: Forward : 01 10 20 00 00 02 04 00 12 4E 11 3F C7  
 停止 Stop 01 10 20 00 00 02 04 00 01 00 00 3B AE  
 反转: Reverse: 01 10 20 00 00 02 04 00 22 24 94 D0 CB



## 操纵杆控制台达 M 系列变频器 Joystick control DeltaM series inverter

为了对电机的可靠平稳的控制，使其具有良好的操控性能，需要对操纵杆的输出线性进行调整，对电机的启动的最低频率、电机的运行最高速度进行调试，这些参数是需要现场调试。

In order to control the motor reliably and smoothly, make it have good control performance, it is necessary to adjust the output of the joystick linearly, debug the lowest frequency of the motor and the maximum speed of the motor running, and these parameters need to be debugged on site.

下面的参数就是对控制参数进行设置：The following parameters are set for the control parameters:

### 操纵杆参数设置格式：Joystick parameter setting format:

#### 一、主要参数：

- 操纵杆角度级数:向前+100级,向后-42级
- 最大值=0-40000 (400HZ)
- 最小值=0-4000
- 最大值>最小值

#### 一. the main parameters:

- Joystick angle series: forward +100 level, backward -42 level
- MAX=0-40000 ( 400HZ )
- MIN=0-4000
- MAX>MIN

#### 二、数据格式 (PC→操纵杆)：

#### 二、Data format (PC → joystick)

	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9
	头 head	命令 instruction	最小值 Min 0-40000		最大值 Max 0-40000		折点斜率比值 Break point slope ratio 0-100	折点水平位置 Vertically horizontal position 0-100	校验和 Checksum
功能 function	FF	CMD	MinH	MinL	MaxH	MaxL	Cper	Pos	CH
前-正转 front- forwad		01							
后-反转 After- reversed		02							

CH = Byte2+ Byte3+ Byte4+ Byte5+ Byte6+ Byte7+ Byte8 和的低位字节 And the low byte

Min 最小值

max 最大值

Cper 低段斜率/角度百分比 (0-100) Low slope / angle percentage

Pos 折点在摇杆角度占的百分比 (0-100) Break point in the rjoystick angle of the percentage

出厂设置 Factory settings

最小值 min=500 (5.00HZ)

最大值 max=40000 (400.00HZ)

低段斜率/角度百分比 Low slope / angle percentage cper=70 (70%)

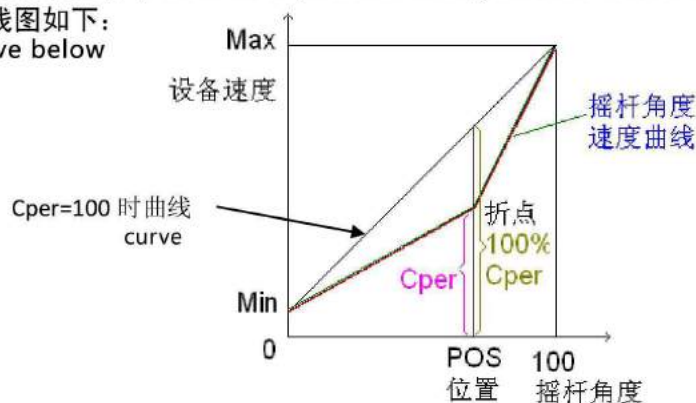
摇杆角度折点百分比 joystick angle turning point percentage pos=60 (60%)

正转参数设置指令：Forward parameter setting instructions : FF 01 01 F4 9c 40 46 3c 54

反转参数设置指令：Reverse the parameter setting instructions :FF 02 01 F4 9c 40 46 3c 55

#### 三、曲线图如下：

curve below



摇杆曲线折点：通过 Cper 和 POS 来设置折点的位置。这与操作手感有关系，可让低速度时摇杆的行程稍长一点。

Joystick Curve Breaks: Set the breakpoint position though Cper and POS. This is related to the operating feel, allowing the joystick stroke can be slightly longer at low speeds

#### 四、查询当前摇杆的设置参数

check current joystick setting parameters

查询 (PC→操纵杆) check PC → joystick									
功能	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9
查询数据 check data	0xFF	10	01=正 positive 02=反 negative	00	00	00	00	00	CH
回复 (操纵杆→PC) reply joystick →PC									
功能	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8	Byte9
回复 reply	F5	01=正 positive 02=反 negative		XX	XX	XX	KL	KH	

CH=CMD+MinH+MinL+MaxH+MaxL+Cper+POS 相加和的低位字节 The sum of the low byte

例如正转参数查询 For example, forward parameter check

查询 (PC→操纵杆): check PC → joystick : FF 10 01 00 00 00 00 00 00 11

回复 (操纵杆→PC): reply joystick →PC: F5 01 01 F4 9C 40 46 3C 54

例如反转参数查询 For example, reverse the parameter check

查询 (PC→操纵杆): check PC → joystick : FF 10 02 00 00 00 00 00 12

回复 (操纵杆→PC): reply joystick →PC: F5 02 01 F4 9C 40 46 3C 55

#### 五、设置摇杆停止位置 (0 参考点): Set joystick stop position (0 reference point)

af 09 00 00 00 00 f5

- 先把摇杆放置到档位上,此位置电机是停止的  
Put the joystick to the gear, the motor in this position is stopped
- 向操纵杆发送上述指令  
Send the above command to the joystick

