BT-033 三轴圆盘绕线机
Controller operation manual

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简介 Intro

本说明书所述内容尽量详细及清晰。但由于控制器功用一直处升级状态，说明书无法做到与之同步，使用上如果有不明白的地方或说明书与实际操作不完全相同时，欢迎与我公司联系。

Contents described in this manual is detailed and clear as far as possible.But because the controller function keep upgrading all the time,this manual can not keep pace with the controller upgrading ,with any unclear places ,any puzzlement that the manual are not fully the same with the actual operation .welcome to contact us.

该系统具有以下主要特点：

Main features of the system as below:

一、 采用闭环控制方式，最大响应速度达 4000Kpps，使控制精度更高。

I、Use the closed-loop control method,the max response speed reach up to 4000Kpps,make the precision higher.

二、 系统硬件高度集成化，使故障率降到最低，稳定性大大提升。

II、The system hardware is highly integrated,make failure-rate to a minimum .to enhance the stability.

三、 客户可以通过控制器自带的 RS232 通信口或 USB 接口随时升级系统软件。最具亲和力的操作方式，易学易懂易用。

III、Customer can upgrade the system software at any time through the RS232 communication port or USB port in the controller ,it is a friendly operation system,easy to learn 、to know and to use.

四、 不用停机可以修改加工程式，可随时转动手轮调整机器速度。

IV、no need to stop the machine when modifying the processing program ,turn the hand-wheel at any time to adjust the machine speed.

五、 全面的安全设计：1 急停时切断伺服马达 Servo On 信号；2 马达过速系统提前报警；3 安全门保护设计；4 无料、断料停机保护；5 故障报警自动停机；6 线架随动。

V、Comprehensive safety design:1、when emergency stop，the signal of servo motor “Servo On”is cut off ;2、when motor running too quick,the system will pre-alarm;3、security door protection design.4、use up the wire,machine will stop automatically to protect itself .5、machine will stop when the faults alarm .6、wire holder is a servo system.

六、 比一般 PC 架构控制器具有更强的抗杂信号干扰（运转时）；每 0.01 秒之间之最高电压脉波为 3000 伏每微秒。

VI、With stronger resistance to mussy signals interference (when running)than normal PC structure controller,the highest voltage pulse can reach up to 3000V every 0.01 second.

七、 比一般 PC 架构控制器具有更好的抗振性（在频率 5HZ 时，最大 0.075 毫米）和具有更宽的环境温度适应能力性（运转时在 0 度--45 度，存放或搬运时在-20 度--45 度）.

VII、 With stronger vibration resistance(in the frequency of 5HZ,max 0.075 mm) than

normal PC structure controller;with broader environment and temperature adaptability (range 0~45 degree when in running,20~45 degree when in storage or carried)

八、 本系统确保100%原装台湾生产，品质超群。

VIII、This system was made in Taiwan China,it is a top-quality controller.

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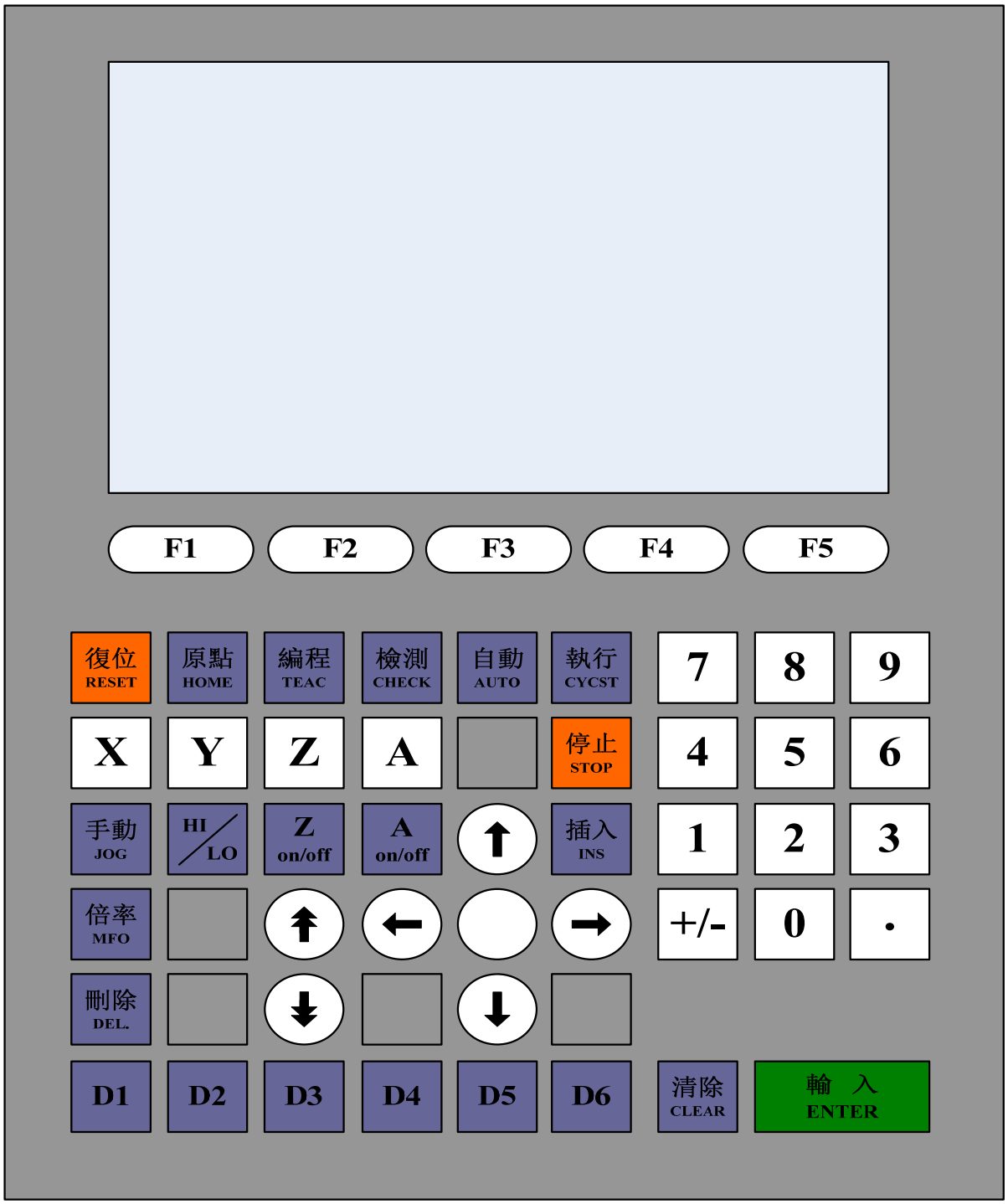
一、 按键说明Button Description



復位 RESET 在任何情况下按此鍵可将机械回复到主画面待机模式。

復位 RESET Press this button under any circumstances may reset the machine to home screen standby mode.

注解：

1 不管机器目前处于何种运行状态只要按“复位”键机器马上停机。

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2 不管电脑目前处于何种显示内容只要按“复位”键显示内容会回到主画面待机模式。

Note: 1. No matter what current running status the machine is in, if press “Reset” button, the machine will stop immediately.
2. No matter what current content displayed by the computer, if press “Reset” button, it will reset to home screen standby mode.

原點 HOME 此键为归零命令键，按此键并选择归零轴，如“原点”+“X”或“原点”+“Y”机器会按所选轴进行归零动作。也可按“原点”+“F1”功能键选择多轴同时归零。

原點 HOME This is the command button of zero setting. Press this button and select a axle.for example:HOME+X, the X axle is going to zero setting; HOME+Y, the Y axle is going to zero setting.etc Also you can set multi-axles to zero by pressing “ HOME+F1”,then choose the axles needed to do zero setting.

注解:

1 一般情况下只有在电脑上出现归零提示时才必须执行原点归零动作,在正常调机时不需要执行归零动作。
Usually ,only execute the zero setting when “zero setting” prompted by the computer.there is no need to execute zero setting when the machine is running normally.

2 同时归零时，先将 Z 轴提升到负极限处，再执行其它各轴归零动作，其它轴归零完成后 Z 轴再进行归零。
when multi-axles execute to zero setting,firstly,elevate Z axle to the minus limited position.secondly,execute the other axles to zero setting.third,execute the Z axle to zero setting.

3 在调好机后,如果目前位置不在零位,不管调机师傅是执行“检测” 动作还是“自动” 动作,电脑都会自动回到零位后才执行程序。
if position is not in the “zero ” when machinery debugging is finished.the computer will return back to the zero position firstly ,then start to execute the program order(no matter executing the “check”command or the “auto”command).

4 如果出现原点位置有异常变化,请检查接近开关是否正常。
Check whether the proximity switch is normal or not when found abnormal change in the home position.

編程 TEAC 在待机模式下按此键进入教导编程模式，在编程栏输入数值进行编程。有两种数值输入方式：1、直接按数字键设定需要的数值（数值会在编程栏的左下角显示），然后按“输入”键便可将数值输入到光标显示的位置，数值输入后，光标会自动向右移动一格。2、X Y 或 Z 键，光标自动跳到所选轴的位置，摇手轮到所需

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位置（会动态显示该轴的实际位置，被选轴会反白），按“输入”键可将实际数值存入电脑。例如：要编程凸轮轴 X 的实际角度，具体操作是：在教导编程模式下按“X”键后，光标自动跳到“X1”栏,摇手轮确定凸轮起始角度后，直接按“输入”键，凸轮起始角度将会被自动存入电脑，光标自动跳到结束角度“X2”栏。在机器自动执行状态下按此键，系统将从主画面切换到编程画面，但工作模式仍为自动，此时并不能对程式进行修改，必须按 F2 键将模式切换成“修改”才能在机器运转过程中修改正在使用的程式。

Press this button under the standby mode to enter teach program mode .input numerical values in programming bar to program.for numerical values input,there are 2 methods:

1、press the number keys directly (numbers are displayed in the lower left of editing bar),then press “enter”button to input the value in the current cursor position. When finished inputting,the cursor will move one grid towards right side.

2、press X/Y or Z button,the cursor will jump to the corresponding axle position.Turn hand wheel to the needed position.(screen display the actual axle position dynamically,the selected axle is inverse to white).then press “enter”button to input the numerical values into computer.

e.g. :To program the actual angle of the cam of X-axis.the specific operation step as:at first,press “X” button under teach program mode, the cursor will jump to “X1” column automatically,sencond, turn the hand wheel to confirm the starting and finished angle of cam, then press the “enter” button directly.After that, The starting and finished angle of cam will be stored automatically in the computer,cursor jump to “X2”column(finished angle) automatically.

press this button under the auto running state of machine,system will jump from the main screen to the programming screen.the working mode is still the auto mode.can not modify the program at this moment.in order to modify the using program at the stage of machine running , it must press“F2” button firstly to switch to the modify mode .

在待机或编程模式下按此键进入程式检测模式，再按“执行”键，XYZ 轴自动回到原点，回完原点后摇手轮进行手动检测或按“倍率”键进行点动检测；在自动执行模式下按此键，机器会马上停下进入程式检测模式，可以摇手轮进行手动检测或按“倍率”键进行点动检测。

press this button under standby or program mode to enter program check mode. Then

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press " CYCST " button , the X-axle, Y-axle, Z-axle return back to home automatically , after home finished, turn hand wheel to implement manual check or press “MFO” button to implement inching check ; press this button under auto mode the machinery will stop immediately and enter into the program check mode, turn hand wheel to implement manual check or press “MFO” button to implement inching check .

注解:

1 在“检测”模式下摇动手摇轮,机器会根据手轮旋转快慢调整速度，该速度与目前“自动”速度可能会相差很大,从而很难保证检测执行做出的产品与自动执行做出的产品一样。

2 在“检测”模式下用点动“倍率”键, 机器会以一固定低速度运行,此固定低速度也可能与目前“自动”速度可能会相差很大,从而很难保证检测执行做出的产品与自动执行做出的产品一样。

Note:

1、turn hand wheel under the “check” mode, machinery will adjust its speed according to the hand wheel turning. it will be a big discrepancy between this speed and the current “auto” speed . so it is difficult to ensure the products under check mode and auto mode are the same.

2、Use the inching “MFO” button under check mode. machinery will be running at a stable slow speed. it will be a big discrepancy between this stable slow speed and the current “auto” speed . so it is difficult to ensure the products under check mode and auto mode are the same.

程式编辑完按此键进入自动开机模式。

After programming, press this button to enter auto power on mode.

执行命令键，在自动模式下按此键确认开机；在测试模式下按此键将在归零后，进入等待测试状态；在编程修改下改完程式后后按此键，系统将在执行完修改前最后一个线圈后执行修改后的新程式。

This is the command button of running. Press this button under auto mode to startup; press it under test mode to return back to zero and then enter into waiting test status; press this button after modifying under program modification, system will execute the new program after executing the last coil of the old program .

停止命令键，在自动或检测模式下使用，机器在做完当前循环后停机进入待机模式。

This is the command button of stop and it can be used under auto mode

and **test** mode.machine will stop to enter standby mode when finished the current cycled action.

在待机模式下按此键进入手动模式，选择要转动的轴，摇动手摇轮便可使所选轴转动(每次只能转动一条轴，在自动执行状态下无效)。

Press this button under standby mode to enter jog mode and select the axle to be turned. turn the hand wheel to rotate this axle .(only turn a axle one time,It is invalid under automatic mode.)

手摇轮及点动快/慢速度转换键(只有两档速度)，在手动、测试模式下有效。

Press this button to speed up or slow down the hand wheel & inching (only 2 class speed),it is valid under **jog** and **test** mode.

在自动模式下按此键（主画面“倍率”格有小圆点亮），摇手轮可改变机器运行速度，正转加快、反转减慢。调整到所需速度后再按一次该键，关闭功能（主画面“倍率”格小圆点消失）。在检测模式下此键相当于“点动”键，按此可以点动检测程式。

press this button under **auto** mode(dot in “MFO” grid of home screen is bright) and turn hand wheel to change the running speed of the machine .turn clockwise to speed up and turn anti-clockwise to slow down. Press again the button after adjusting to the needed speed, close function(the dot in “MFO” grid of home screen disappear).it is equal to “HI/LO” button under check mode,press the button to check the program inching.

在教导编程模式下按此键，在光标所在行的下一行将空出一行空白程式，以供输入新的程式，在编程修改下是无效的。

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插入 INS press this button under teach program mode, there will be a blank line under the current cursor position. for inputting new program. It is invalid under programming modification.

删除 DEL. 在教导编程模式下，按此键可删除光标所在行的程式，在编程修改下是无效的。

删除 DEL. Under **teach program mode,** press this button to delete the full line program which cursor is in. It is invalid under **programming modification.**

清除 CLEAR 此键功能有两个：1、在主画面可清除输入错误的数值；2、在教导编程、编程修改模式中按此键加“输入”键可单节清除程式。

清除 CLEAR Function of this button includes: 1. Clear error numerical value in home screen. 2. Single step to delete program under **teaching programming** and **program modification** mode, It is valid through pressing this button and “enter” button.

Z on/off 该按键功能已取消。
Function of this button has been cancelled.

A on/off 该按键功能已取消。
Function of this button has been cancelled.

輸 入 ENTER 此按键的功能是输入数据，或配合“清除”键清除数据。

輸 入 ENTER the function of this button is to input numerical value, or help the “clear” button to delete data.

+/- 此按键的功能是输入数据的负值。例如要输入-5：按“5”键后再按此键即可。

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+/- the function of this button is to input the minus values. e.g., needed input”-5”, press “5” firstly and then press this button.

0 ~ 9 、 . 数字键和小数点键。

0 ~ 9 、 . Number keys and decimal button.

F1 ~ F5 五个功能键，与显示器最下一行的内容相对应。

F1 ~ F5 5 function buttons, it is correspond with the contents on the lowest line of display.

D1 ~ D6 六个汽缸键，在手动或检测模式下按某键一次可以打开对应的汽缸，再按一次则关闭汽缸。

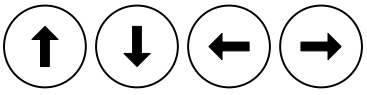
D1 ~ D6 6 cylinder buttons. for each of the button, press one time is to open the corresponding cylinder, press one more time is to close it under jog mode or check mode.

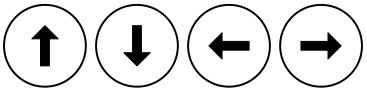
注解:

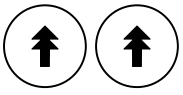
在 IO 画面且在手动或检测模式下，可通过数字键、小数点键及正负号键进行 D01~D12 汽缸输出控制。

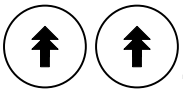
Note:

On the IO screen and the jog or check mode. control the output of D01~D12 cylinders by pressing number keys、decimal button and plus/minus button.

 此四个键是光标上、下、左、右移动键。

 These 4 buttons control the cursor moving “up、down、left、right”

 此两个键是查看程序快速翻页键。

 These 2 buttons are for page turning quickly to view program.

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二、 调机步骤Debugging step

A: 开机到待机主画面

Starting up to enter the standby Screens.

B: 归完原点后按“编程”按键到教导编程画面

press “TEAC”after home finished to enter the teach program screen.

C: 按“检测”按键到检测画面

press check button to enter check screen.

D: 按“自动”按键到自动开机画面

Press"AUTO"button to enter the “starting up automatically screen”.

E: 按“编程修改”功能按键到修改画面

Press “program modify”function button to the modify screen

F: 按“程式目录”功能按键到调用已有旧程式

Press “program directory”function button to invoke the existing program

G: 按“I/O 画面”功能按键看输入/输出监控

press“I/O screen”function buttons to view the input/output monitor.

H: 按“参数设定”功能按键到相关参数设定

Press “parameter setting”function button to the related setting parameter.

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A、 开机到待机主画面 Starting up to enter the standby Screens.

①内容说明:Content Description:

1. 程式编号：显示当前所用程式的编号。

   program number:Display the current using program NO..

2. X、Y、Z：动态显示三轴的实际位置。

   display the actual positon of the X/Y/Z axles dynamically.

3. 自动倍率：显示自动运行时的速度倍率，在自动模式下按“倍率”键并摇手轮可调节自动倍率值，调节范围为 1%－300%。（提示：在开动机器前请先查看此值,不宜以太高直接开机,正确的操作方法是先以较低倍率开机后再调高倍率。）

   magnification:display the speed ratio when running automatically.press the “MFO”button under auto mode,then turn the hand-wheel to control the ratio value .range 1%~300%.(caution:please check this ratio value before starting the machine,the value can not be too high.the correct operation is ,starting up the machine with a lower ration value,then turn up the value after starting machine.)

4. 剩余时间：显示机器以当前速度连续生产达到预设产量所需的时间。

   surplus time ： display the needed time to finish the target

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product(current speed/produce continually)

5. 工作模式：显示机器当前工作状态：原点、手动、自动、编程、修改、或待机。

   working mode:display the current status of machine: if it is in home/jog/auto/program/modify or standby.

6. 预设产量：按数字键和“输入”键可设定目标产量。

   target product:press number keys and “enter” button to set the target products.

7. 完成产量：动态显示已完成的产量，可按数字和“输入”键进行更改。

   finish output:display the finished product dynamically.press number keys and “enter” button to modify.

8. 堵线设定：设定堵线次数

   wire blockading setting:set the blockading times.

9. 堵线次数：实际堵线次数，每次程序结尾时该值加 1，当次数到达设定值后系统报警停机。

   wire blockading times,the actual blockading times.this value will plus 1 automatically when the end of program every time.system alarm when reaching the presetting value.

10. 平均产量：显示机器以当前速度生产的平均产量。

    average output:display the average output of the machine(running under current speed).

11. 程式目录：按 F1 键可进入程式目录画面，画面会显示目前程式编号/容量及全部储存的程式编号。

    Program list:press F1 button to enter the program list screen.

    the current program item/capacity and all the program items stored can be display.

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1 编写新程式：按数字键和“输入”键设定新程式编号，按“编程”键可进入编程画面。

1/edit new program:press the number keys and ENTER button to set the new program NO.,then press TEAC button to enter the program screen.

2 调用旧程式：按数字键输入一个程式库中已有的程式编号，按“输入”键后再按“编程”键。(先检查程式在目前刀位下是否安全,再按“检测”键摇手轮或点动键进行检测,确认安全后再按“自动”、“执行”)

2 invoke the existing program: press number keys to input a existing program NO. in program database,then press “enter” button ,at last ,press the “TEAC” button.(before operate ,please check whether the program which going to operate is safe or not,under the current position of the cutter in forming part .then press “check” button and turn the hand wheel or press “hi/lo” button to check,when confirm to be safe ,then press auto and execute.

3 删除旧程式：要删除程式则在读取旧程式编号后按 F2（对应程式删除功能），系统会提示“程式删除 请确认”，按 F1 确认删除，按 F2 则取消删除。

3、delete old programs，press F2 after selected a existing old program NO..System will prompt “program to be delete，please confirm”，press F1 to delete，press F2 to cancel.

4 复制程式：按 F3 键将当前程式内容复制至粘贴板中。

4、copy program，press F3 to copy current program content to the clipboard.

5 粘贴程式：按 F5 键将粘贴板中的程式内容复制至当前程式中，系统会提示“程式粘贴 请确认”，按 F4 确认粘贴，按 F5 则取消粘贴。

5 、paste program ： press F5 to paste the content from clipboard to current program.System will prompt “program to be paste，please confirm”，press F4 to paste，press F5 to cancel.

12. 排线编辑 按 F2 键进入排线编辑，可设定排线编辑指令中每层圈数、间距等相关参数。

wire arraying edit,press F2 button to enter,set the parameter such as :turns of every layer;space and so on.

13. I/O 画面 按 F3 键进入 I/O 画面，检查系统各个输入、输出点是否正常，有反白说明此点处有效。

I/O screen,press F3 button to enter I/O screen,check all the input/output port in system to see whether it is normal or not.it means the grid is valid when reverse to white.

14. 参数设定 按 F4 键进入参数设定画面，可设定系统运转内定速度、及设定 LCD 的节电时间。

parameter setting:press F4 button to enter the parameter setting screen,set the inner-confirmation speed of system running and the electricity saving time of LCD.

注解：

1 机器运行速度异常慢或异常快时，请检查内定速度设定是否正确（标准值 10000）

2 为延长 LCD 寿命可设定节电时间（屏保时间，可设定值 5--180 分钟）

Note:

1. when the machine runs slow or quick abnormally,please check inner-confirmation speed whether it is correct.(standard value is 10000)
2. Set the electricity saving time of LCD to extend its work life ,(screen protector time,setting range 5~180 minutes)

15. ENGLISH 中英文切换键 在参数设定画面，长按 F1 键（约 5 秒）进入英文画面。

ENGLISH:Chinese/English change button,on the parameter setting screen,long press F1 (around 5 seconds)to enter the English screen.

16. 堵线清零 清除堵线次数

zero of blockading wire :clear the blockading times.

②操作过程

需要归原点（具体怎样操行请参阅上章“按键说明”中的“原点”说明）。

Operation process

Need to return back to home.

For more details ,please refer to the home description in button description chapter

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B、 归完原点后按“编程”键到教导编程画面 “TEAC”after home finished to enter the teach program screen.

①内容说明:content description

状态栏 status bar

第 1 行显示：工作模式、预设产量、自动倍率。

Display in 1st line:working mode/target output/auto magnification

第 2 行显示：程式编号、完成产量

Display in 2th line:program item/finished output/

第 3 行显示：程式行数 N（运行时显示实际执行行数），X、Y、Z 轴实际位置（动态）。

Display in the 3rd line:program lines N(display the actual executing lines when running),display the actual position of X/Y/Z axles dynamically.

编程栏 editing bar

1. N=》 程式行号。

1. N=》 program line number

2. X1=》设定凸轮轴起始角度 X2=》结束角度值。

教导说明：在编程模式下，按 X 选中 X 轴，并移动光标到填充格“X1”或“X2”所在列，

转动手轮到目标位置后，按 輸 入 ENTER 录入 X 轴坐标。

2. X1=》setting the start angle of cam axle ;

X2=》setting the ended angle of cam axle ;

Teach description:under the TECA mode,press X button to select X axle ,then move the cursor to the column which the infilled grid X1 or X2 is in,turn the hand wheel to the target position ,then press enter to input the X axle coordinate.

3. Y1=》 设定卷线轴卷线圈数，以增量形式进给。

3.Y1=》setting the reeling turns,feed with incremental model.

4. Y2=》 设定卷线轴卷线角度，以增量形式进给。

4.Y2=》setting the reeling degree of winding axle,feed with incremental model

教导说明：按 Y 选中 Y 轴，并移动光标到填充格“Y2”列，转动手轮到目标位置后，按 輸 入 ENTER 录入 Y 轴坐标的增量。

Teach description:press Y button to select Y axle ,then move the cursor to the current column which the infilled grid Y2 is in,turn the hand wheel to the target position ,then press enter to input the increment of Y axle coordinate.

Y 轴坐标增量的计算公式：转动手轮后 Y 坐标 - 转动手轮前 Y 坐标。

Calculation formula of the increment of Y axle coordinate:Y coordinate after turning hand wheel - Y coordinate before turning hand wheel.

例：for example

假设转动手轮前，Y 的坐标是 1 圈 200°，转动手轮后 Y 的坐标是 3 圈 60°。

那么，Y 轴坐标的变化量 = 3 圈 60° - 1 圈 200° = 1 圈 220°。

即录入 Y1=1，Y2=220。

Assumption : before turning the hand wheel,Y axle is one turn &200° ,after turning the hand wheel,Y axle change to be 3 turns & 60° .the increment of Y =3 turns &60-one turn &200° =one turn &220° .

So input Y1=1,Y2=220

5. Z=》设定螺距轴距离，该轴以增量形式进给。

Set the distance of axial pitch,feed with incremental model.

教导说明：按 

选中 Z 轴，并移动光标到填充格“Z”列，转动手轮到目标位置后，按 

录入 Z 轴坐标的增量。

Teach description;press “Z” to select Z axle,then move the cursor to the infilled grid Z column .turn the hand wheel to the target position,press “enter” to input the increment of Z axle coordinate.

例：for example

假设转动手轮前，Z 的坐标是 12.34，转动手轮后 Z 的坐标是 56.78。

那么，Z 轴坐标的变化量 = 56.78 - 12.34 = 44.44。即录入 Z=44.44

Assumption: before turning the hand wheel.Z axle is 12.34,after turning the hand wheel,Z axle change to be 56.78.then ,the increment of Z axle=56.78-12.34=44.44. So input Z=44.44.

6. D=》电磁阀设定命令。

D=》solenoid valve setting order

注解：

如果使用辅助气缸，在 D 栏里输入电磁阀号码(1-12)，相应的电磁阀将会打开；要设定关闭电磁阀时，只要在所编辑的电磁阀号码(1-12)前加负号(-)即可。

Note:

If use the auxiliary cylinders.input the solenoid valve number(1~12) in D column to open the corresponding solenoid valve.to close the solenoid valve,add "-" symbol in the front of the editing solenoid valve number.

7. T=》设定延时，单位 0.1S。如设定值为 20，则表示延时 2S。

T=》to set time-delay,unit : millisecond. if set the value to be 20,it means delay 2 seconds.

8. Q=》设定输入点检测。如设定值为 11，表示该行指令下等待 I10（10 号输入点）ON 时，程序才接着执行。等待时间超过 4 秒后，系统报警提示"输入检测超时！"。

8. Q=》set the input checking point.e.g. ,when setting the value to be 11,it means under the current line order,program will not execute until the I11 was opened ,if the waiting time over 4 seconds,system alarm and prompt "input checking timeout".

9. F=》设定单步运行相对速度，默认值为 100，设定范围为 1-300。

F=》setting the relative speed of every step.default value is 100,setting range 1~300.

10. P=》设定自动排线功能是否开启，为 1 表示开启自动排线功能。开启后，系统会根据排线编辑画面中的数据进行自动排线。

10.P=》setting the wire arraying automatically on&off ." 1" means on;after turn on,system excuting as the inputted values.

11. J=》循环开始和结束命令，开始命令为"1"，结束命令为"9"。

11.J= 》execute circularly the start and end order." 1" means start;" 9" means end.

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12. L=》循环次数命令。在循环开始命令“1”后输入要循环的次数。J、L 命令必须同时使用。

L=》the circulation times.after the order L=1,need to input the target circulation times. The J and L must be used simultaneously.

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按“检测”键到检测画面press check button to enter check screen.

①内容说明：按“检测”按键模式切换成 检测

Content description:press “check” button to change to check mode.

②操作过程

检测模式下，按“启动”键，进行程式检测。此时可摇手轮进行手动检测或按“倍率”键作点动检测。执行检测功能时，线架不会跟随。

Press start button under the check mode to check the program. turn the hand wheel to check manually or press “MFO” button to check Inching. when executing this function, wire frame will not follow.

C、 按“自动”按键到自动开机画面Press"AUTO"button to enter the “starting up automatically screen”.

①内容说明：按“自动”按键模式切换成自动,再按“启动”按键后，机器按所编程序执行。

Content description,press"AUTO"button to change the mode to auto ,then press “start” button,machine executes as the newly edited program.

②操作过程

按“倍率”键摇手轮到所需要的生产速度。(使用方式请参照：按键说明)

按“单步执行”键可进入单步模式，此时按一下“启动”按键，系统只执行一行程式，等待下一次按键信号进入。

press"MFO"button and turn the hand wheel to the needed speed.(operation method please refer to :button description).

press “single-execute”button to enter single mode,at thistime ,press start button,system execute only one lineprogram,waiting the next button signal to enter.

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D、 按“编程修改”功能按键到修改画面（不用停机修改程式）Press “program modify” function button to the modify screen(no need to stop machine)

①内容说明：在机器自动运行中进入编辑修改，画面切换：修改

Content description:to enter modify screen under the machine running automatically.mode change to modify.

②操作过程

按“F2”键不停机直接将光标移动到要修改的位置输入要改的数据，按“输入”键进行修改；全部修改完成后按“执行”键，机器在做完上一个线圈后,执行修改后的程式，工作模式切换成“自动”。

Press F2 button(no stop machine) and then move the cursor to the target position ,then input the needed data,press enter button to modify.after modifying fully,press CYCST button,machine will execute the newest program when finishing the last coil.working mode convert to auto.

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E、 按“程式目录”功能按键到调用已有旧程式Press “program directory” function button to invoke the existing program

详细解释请参照调机步骤中 A 说明。

For more details ,please refer to the description A of adjusting steps.

F、 按“I/O画面”功能按键看输入/输出监控press“I/O screen”function buttons to view the input/output monitor.

详细解释请参照“按键说明”

for more details ,please refer to the “button description”.

G、 按“参数设定”功能按键到相关设定参数Press “parameter setting” function button to the related setting parameter.

1、用户参数 user parameter

在“待机”模式下按 F4 键（对应“参数设定”功能）进入参数设定画面，可设定系统运转内定速度及关闭 LCD 的节电时间。

Press F4 under the standby mode(corresponded with the “ parameter setting” function)to enter the parameter setting screen.here you can set the inner-confirmation speed of system running and the electricity saving time of closing LCD.

内定速度------是指机器在“自动倍率”为 100%时的速度。

inner-confirmation speed --the machine speed when the MFO=100.

节电时间------是指显示器黑屏保护的时间，可修改，范围 5—180 分；

electricity saving time--the time that monitor is black to protect itself,which can be modify,range from 5~180 min.

2、生产商参数（需要生产商密码才能进入，用户不能擅自改动！）

Supplier parameter(it need the password provided by supplier,users can not modify at will!)

一、**解析度分子**resolution of the molecule.

1. 旋转轴（凸轮轴和卷线轴均属旋转轴）：

rotation axis (cam axle and winding axle are included)

解析度分子＝旋转轴转动一周的角度＝360/该轴最小单位，凸轮轴最小单位为0.01度，因而凸轮轴解析度分子＝360/0.01＝36000；卷线轴的最小单位为0.1度，因而其解析度分子＝360/0.1=3600。

Resolution of the molecule=angles of the rotation axis rotating a round =360/the minimum unit of this axle.the minimum unit of cam axle is 0.01 degree,so the resolution of the molecule for cam axle =360/0.01＝36000;the minimum unit of winding axle is 0.1degree,so the resolution of the molecule for winding axle=360/0.1=3600.

2. 采用线轮形式的直线轴（送线轴）：

adopt the wire-wheel mode linear axle(wire sending axle)

解析度分子＝送线轮的周长＝圆周率×直径 （单位为：0.01mm）

resolution of the molecule=perimeter of wire sending wheel=pi digits*diameter(unit:0.01mm)

注意：设定值为整数格式，无小数点。

Attention:the setting value is a integer,without decimals.

例如：Y轴解析度分子＝3.14159×70×100＝21991

（21991只是一个理论计算值，由于实际生产中送线轮的周长有一定公差，因此调机时可按实际情况略作调整）

E.g. resolution of the molecule for Y axle=3.14159 × 70 × 100 ＝ 21991(21991 is just a theoretical value,there are tolerances in wire sending wheel perimeter under actual situation.so it need to adjust according to the actual situation when debugging machine.

3. 采用导螺杆形式的直线轴：

adopt linear axle of driving screw mode .

解析度分子＝导螺杆的螺距（单位为：0.01mm）

Resolution of the molecule=driving screw pitch(unit:0.01mm)

例如：假设导螺杆螺距为5mm，那么解析度分子＝5×100＝500

E.g. assumption driving screw pitch is 5mm,then the resolution of the molecule=5×100＝500

二、解析度分母Resolution of the denominator

解析度分母＝伺服马达编码器分辨率×信号倍率×齿数比（指伺服马达齿数与目标轴齿数之比）

Resolution of the denominator=resolution of the servo motor encoder *signal magnification*gear ratio(it refers to the ratio between servo motor gears and the target axle gears)

例如：X轴解析度分母＝2500×2×6=30000

Y轴解析度分母＝2500×2=5000

Z轴解析度分母＝2500×2=5000

For example:

X axle resolution of the denominator=2500×2×6=30000

Y axle resolution of the denominator＝2500×2=5000

Z axle resolution of the denominator＝2500×2=5000

说明：解析度分子、分母是依据机械轴向传动装置和伺服马达编码器分辨率、信号倍率来设定。**设定之后，请勿随意调整**。

Note:resolution of the molecule 、denominator are setting according to the mechanical axial transmission device and the resolution、signal ratio of servo motor encoder.not adjusting at will after setting.

三、信号倍率signal magnification

设定目标轴马达编码器回授信号之倍率，只能选用1、2、4 这三个数值中的任何一个。当选定为1时，控制器会把伺服马达的A、A-、B、B-四个信号当作1个信号处理；当选定为2时，控制器会把伺服马达的A、A-、B、B-四个信号当作2个信号处理；当选定为4时，控制器会把伺服马达的A、A-、B、B-四个信号当作4个信号处理。选4的话机台精度最高，但要求马达惯量较大，否则会引起机台抖动，并且噪声会相对较大。信号倍率通常默认选4，根据实际机台情况，如需调整，需将三条轴同时调整，并且各轴的解析度分母也需进行相应的调整。

only can choose one of the numbers within“1、2 、4” when setting the feedback signal magnification of the encoder in target axle motor .when select 1,controller will deal with the 4 signals of servo motor“A、A-、B、B-”as 1 signal.when select 2，controller will deal with the servo motor signals “A、A-、B、B-”as 2 signals.when select 4，controller will deal with the servo motor signals “A、A-、B、B-” as 4 signals. Under selection

of 4,the motor is most precise.but require the inertia biggest.or it will cause the machinery shaking and the noise is very big.normally,signal magnification is default to be 4.if needed to adjust,please adjust all the 3 axles simultaneously,as well as the resolution of the denomenator need to be adjust correspondingly.

四、马达方向motor direction

设定= 0，旋转方向是正向；

“0” refer to the clockwise direction

设定= 1，旋转方向是负向。

“1” refer to the anti-clockwise direction

机台设计，各厂不一。伺服马达装上之后，如果机台运行方向正好相反，则可以利用此项参数设定，把机台方向修正过来。

Machinery design from different manufacturers are not all the same .after assembling the servo motor.if the machinery running direction is reversed it can correct the direction by setting this parameter.

五、最高进给速度 The highest feeding speed

设定轴向最高进给速度，设定值为整数格式无小数点。

Set the highest feeding speed of axial.the setting value is a integer,without decimals.

1. 旋转轴：rotation axis.

最高进给速度＝伺服马达额定转速÷齿数比×360×0.95（单位为：度/分钟）。

（安全考量建议最大值）

Recommend max value

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例如：X轴最高进给速度＝3000÷6×360×0.95＝171000（最高限定值，实际设定时把它设为170000即可）

The highest feeding speed=the rated revolving speed of servo motor ÷ gear ratio×360×0.95（unit：degree/minute）

For example：The highest feeding speed of X axle=3000÷6×360×0.95＝171000（the highest limit ,set this value to be 170000 in actual setting）

2. 直线轴：linear axle.

最高进给速度＝伺服马达最高转速÷齿数比×周长（螺距）×0.95（单位为：毫米/分钟）

The highest feeding speed=the highest revolving speed of servo motor ÷gears ratio×perimeter（screw pitch）×0.95（unit：mm/min）

例如：Y轴最高进给速度＝1500÷2.5×219.91×0.95＝125348（最高限定值，实际设定时把它设为125000即可）

For example：The highest feeding speed of Y axle=1500÷2.5×219.91×0.95＝125348(the highest limit ,set this value to be 125000 in actual setting)

六、原点第一段速及原点GRID速度

The first stage speed and the GRID speed of home

HUST系列控制器，回机械原点的速率共分为三段（如图）。

HUST series controller,there are total 3 stage speeds of return back to machinery home(as below diagram)

第一段速率由参数<原点第一段速>依轴向分别设定。

The 1st stage speed is setting respectively by the parameter<The 1st stage speed of home>according to the axial direction.

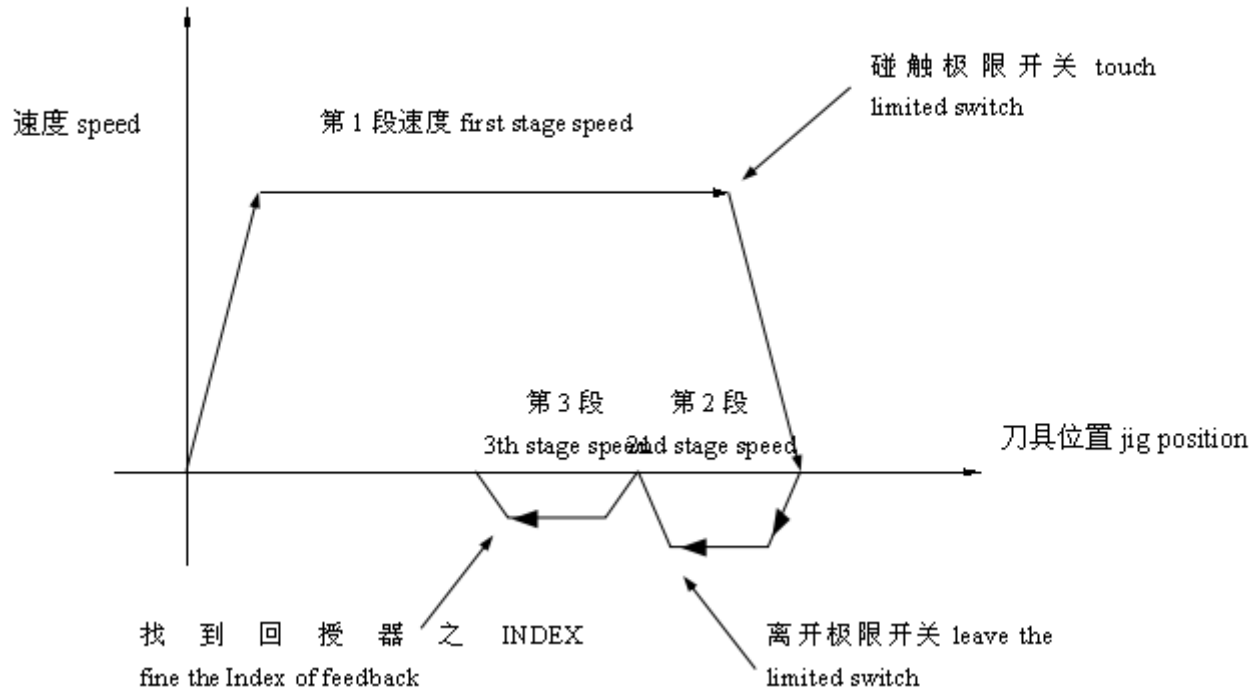
第二段在第一段降速为 0 时，自动设定为第一段速率的 1/4。

The 2nd stage speed will be setting to be the 1/4 of the 1st stage speed automatically when the 1st stage speed drop to be 0.

第三段寻找回授器零点（Grid）的速率由参数<原点GRID速度>设定。

The 3rd stage speed of finding feedback home (Grid) is setting by the parameter<home GRID speed

>



七、找原点方向 find the home direction

设定= 0，马达往坐标正方向回机械原点。

Set to be 0,motor return back to the mechanical home position towards the positive direction of coordinate.

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设定= 1， 马达往坐标负方向回机械原点。

Set to be 1,motor return back to the mechanical home position towards the negative direction of coordinate.

八、找GRID点方向 find the GRID point direction

设定= 0，表示马达回机械原点（HOME）时，第二段及第三段离开极限开关找零点（GRID）方向与第一段相反。

Set to be 0,indicate the direction in the 2nd and 3rd are reversed with 1st when motor return back to home.

设定= 256，表示马达回机械原点（HOME）时，第二段及第三段离开极限开关找零点（GRID）方向与第一段相同。

Set to be 256,indicate when motor returns back to the home position,the direction of leaving limited switch to find the GRID point are the same between the 2nd and 3rd stage and 1st stage.

九、原点偏移值 home deviant

设定目标轴机械原点偏移值，单位为：度（旋转轴）或毫米（直线轴）。当执行回机械原点动作时，马达在回到原机械原点后，按设定的偏移值进行偏移并停在新的机械原点，新机械原点坐标显示为“0”。偏移值可设定正、负值，正值表示向坐标正方向偏移，负值表示向坐标负方向偏移。

Setting the mechanical home deviant of target axle.unit:degree (rotation axis)or mm(linear axis).when executing the action of mechanical home returning ,motor will offset as per the setting deviant after returning back to the original mechanical home position then stop in the new mechanical home position.the new mechanical home coordinate

is showed to be 0. deviant can be setting to be positive value or negative value, positive value indicate offset towards to the positive direction of coordinate . negative value indicate offset towards to the negative direction of coordinate .

十、手动段速 jog stage speed

设定范围：0－100，表示手动状态下手摇轮转动一格所对应的轴向进给值，单位为：0.01度/格（旋转轴）或0.01毫米/格（直线轴）。低段默认值＝10，高段默认值＝30，通过按控制器上的 HI/LO 按键可以切换高/低段。

Setting range:0~100, indicate the axial feeding value corresponded to turning the hand wheel for one grid under the jog mode. unit : 0.01degree/grid (rotation axis) or 0.01mm/grid(linear axle). the low stage default value is 10 . high stage default value is 30, control the high/low stage speed by pressing the HI/LO button.

三、程式举例 Program Instance

举 例：Instance

N	X1	X2	Y1	Y2	Z	D	T	Q	F	P	J	L
1	50.0	120.0	1	50.0	2.00			3				
2	135.3	154.0		100.0	3.00	1						
3	160.0		2		-1.50	-1	20		80			
4	175.0	235.7	3	150.0	4.00					1		
5	257.1	289.5			3.00							

说 明：description

1、 检测输入点 I02 是 ON，如没有 4 秒后没有等到 I02 ON 信号，系统提示报警。I02 ON 后，以默认速度运行，凸轮从 50.0° 转至 120.0° 时,同步卷线 1 圈另 50º,提升轴增量进给 2.00。

Check input point I02 to see if it is on,if not received the I02 ON signal within 4 seconds,system prompt alarm.when I02 is ON, run at default speed,the cam turns from 50° to 120°, winding one turn and 50 °,the lift shaft is lifted 2 synchronously.

2、 以默认速度运行，凸轮定位至 135.3° 时，汽缸 D1（000）输出，凸轮从 135.3 ° 转至 154.0° 时，同步卷线 100º，提升轴增量进给 3.00。

If run at default speed，the cam turns to 135.3°,cylinder D1(000) output,the cam turns from 135.3° to 154° winding 100.0°,the lift shaft is lifted 3 synchronously.

3、 以默认速度的 80%运行，凸轮定位至 160.0，汽缸 D1（000）关闭，卷线 2 圈，提升轴增量进给-1.50 后，延时 2 秒。

If run at the 80% of default speed,the cam turns to 160° cylinder D1(000) closed,winding 2 turns,after the lift shaft is lifted -1.5 ,delay 2 seconds synchronously,

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4、 以默认速度运行，因 P＝1，凸轮从 175° 转至 235.7° 按照排线编辑中的参数进行排线。

If run at default speed ,because of the P=1,the cam turns from 175° to 235.7° ,wire arraying as the program order.

5、 以默认速度运行，凸轮从 257.1° 转至 289.5° 时，提升轴同步增量进给 3.00。

If run at default speed and the cam turns from 257.1° to 289.5° , the lift shaft is lifted 3 synchronously.

6、 程序段执行结束，系统自动执行各轴回零位动作。回零完成后，光标跳至第一行，循环执行程序。

Program complete executing.every alxes will auto-return back to zero and the cursor jump to the first line ,then start the next circulation program.

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四、系统状况提示 System Status Prompt

状况提示出现在控制器的右下方,有闪烁的一行字，提示操行者需要优先做的动作或需要优先处理的故障。有以下几个提示：

Status prompt appears in the bottom right of the controller and a line of words flicker. It prompts the movement to be operated in advance or the failure to be handled in advance by the operator. It includes the following prompts:

1、请先执行原点动作！（开机或出现系统报警后会出现此提示）

1、Pleased run home movement in advance! (The prompt will pop up after starting up or appearing system alarm)

2、Z 轴正或负向限位到达。（Z 轴到达限位开关位置时会出现此提示并停机）

2、reach the limited plus or minus position of Z axle.(this prompt will pop up and machine will stop when the Z axle reach the limited switch position)

3、线料用完请处理。（包括线料用完及断线均会出现此提示并停机）

3、Wiring material is used up, please handle it! (The prompt will pop up when the wiring material is used up or cut off and the machine will stop)

4、堵线，请处理。（堵线次数到达设定值时出现此提示并停机）

4、blocking wire ,please handle it! (The prompt will pop up when the wire blocking and reaches set value and the machine will stop)

5、安全门报警。(安全门打开时出现此提示并停机)

5、Safety door alarm(The prompt will pop up when open the safety door

and the machine will stop)

6、线架报警请处理。（线架报警会出现此提示并停机）

Coil holder alarm, please handle it! (The prompt will pop up when appears coil holder alarm and the machine will stop)

7、期满，请联络供应商！（系统到期时出现此提示并停机）cancel.

7、overdue ,Please contact supplier!(The prompt will pop up when system is overdue and the machine will stop).this cancel.

8、输入检测超时（程式执行过程中，编写输入点检测指令，输入点超过 4S 没有信号进入时出现此提示并等待输入点检测信号）

8.Input detection timeout(when executing program,edit input detection order,The prompt will pop up when there is no signal in input point over 4 seconds. and wait for the input detection signal)

9、伺服报警（伺服出现故障时出现此信号提示并停机）

9、servo alarm(The prompt will pop up when servo faults and the machine will stop)

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五、系统报警画面说明(报警时所跳出画面)System Alarm Screen Description (Screen pop up when alarm)

目前错误信息：显示目前错误信息代码(Error--XX)。

Current error message: Display current error message code (Error--XX).

代码说明栏： 列出 11 种常见报警代码和内容说明。

Code description column: List 11 common alarm codes and content description.

报警复位处理：按复位键即可从报警画面切换到主画面。(Error-22 除外：必须先将紧急停止按钮 EM-STOP 复位，才能将画面切换到主画面。)

Alarm reset handling: Press Reset button to switch from alarm screen to home screen. (Exclude Error-22: It is necessary to reset EM-STOP button in advance,and then the screen can be switched to home screen.)

特别提示：Special Remind

控制器出现系统报警后，操作人员应先记录报警代码，并对照报警说明采取相应的处理措施或与专业维修人员联系！

After appearing system alarm of the controller, the operator shall record alarm code in advance and adopts the corresponding treatment measures in accordance with the alarm description, or contacts with Professional maintenance personnel!

控制器出现系统报警后，控制器会自动提示需要做归零动作！

After appearing system alarm of the controller, the controller will automatically prompt the zero clearing movement!

报警的原因与处理

Reason and Handling of Alarm

Error-01 参数设定错误

Error parameter setting

原因：设定的内定速度过低或过高。

Reason: The default speed is setted too high or too low.

处理：进入参数画面修改内定速度。

Handling: Enter parameter screen to modify default speed.

Error-02 马达运转异常

Abnormal motor running

原因：电机或驱动器故障。

Reason: Motor or driver failure

处理：①检查电机有无过热。

②关掉总电源后，检查机械是否运转顺畅，若不顺畅，请先排除故障。

③用工具转动电机轴，转得动则表示驱动器未给电机信号，打开机器底座电

箱，查看驱动器右上角显示窗是否正常，正常为小光标有规律的跳动，显示不正常请与检修人员联系。

Handling: ① Check whether the motor is overheating.

② After turning off the power, check whether the running of the machine is smooth; if not, clear the faults firstly.

③ Use tool to turn motor shaft, if it can be turned, it indicates that the driver does not provide signal to motor. Open the base electronic box of the machine to check whether the display window in top right corner of the driver is in normal. It is normal that the small cursor skips regularly. If it is abnormal, please contact with maintainer.

Error-03 计数次数大于设定值

Counting times is more than set value

原因：预设的产量已完成。

Reason: The preset output has been finished.

处理：将光标移到完成产量清零即可。

Handling: Move cursor to finished output and implement zero clearing.

Error-05,06 控制器内部异常

Abnormal inner controller

原因：控制器内部程序出现故障。

Reason: Inner program of the controller goes wrong.

处理：重复按几次”复位”键后再关电源,如故障未解除请与供应商联系。

Handling: Turn off the power after repeatedly press “Reset” button for several times. If the fault cannot be cleared, please contact with the supplier.

Error-09 探针检测异常

Abnormal probe detection

原因：探针感应信号未输入给电脑，或探针接机壳的线未与机器导通。

Reason: Induced signal of the probe hasn’t been inputted to the computer, or the wire connected to machine shell not breakover with machine.

处理：调整探针的精度或检查探针感应线是否断开；检查探针接机壳的线是否与机器导通。

Handling: Adjust the precision of probe or check whether the probe induction line is cut off.check whether the wire connected to machine shell is breakover with machine.

Error-11 程式记忆错误

Error-11 program memory faults

原因：在电脑会自动找回丢失记忆的情况下,还出现此报警,是由于电池没电造成。

处理：更换一块给主板 CPU 供电的电池。

Reason: If the alarm appears under the condition of the computer can retrieve lost memory, it is caused by dead battery.

Handling: Change a battery to supply power to main board CPU.

Error-18 空档案或系统初始化

Empty file or system initialization

原因：由于误操作所产生的程序丢失或系统本身初始化。

Reason: Program lost or system initialization caused by incorrect operation.

处理：重复按几次“复位”键,等待两三分钟。再断电脑电源,然后再开电源, 电脑会自动找回丢失的程序。

Handling: Repeatedly press “Reset” button for several times and wait for two or three minutes. Turn off the power of the computer and then turn on, and the computer will automatically retrieve lost program.

Error-22 紧急停止,

EM-STOP emergency stop.

原因：急停开关断开或 I02 断开。

Reason: The emergency stop switch is cut off or I02 is cut off.

处理：解除急停或检查 I02,再按“复位”键。

Handling: remove emergency stop or check I02, and then press “Reset” button.

Error-30 电池没电 Dead battery

原因：给主板 CPU 供电的电池没电。

Reason: Dead battery to supply power to main board CPU.

处理：更换一块新的电池。

Handling: Change a new battery

Error-37 线架异常报警

Coil holder abnormal alarm

原因：线架乱线或线架故障。

Reason: Dislocation line of coil holder or coil holder faults.

处理：检查线架运转是否正常。

Handling: Check whether the coil holder is well-behaved.

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六、常见故障分析Analysis of Common Faults

出现异常状况时，请首先检查 I/O 板工作是否正常（即看各个灯是不是该亮的亮该灭的灭），然后看转接板的连线是否正确，再进一步排查是否有杂信号干扰。Abnormal appears,please check whether the I/O board is normal(to check all the lights if it is in normal status),then check the wiring of pinboard if it is normal,the last go any further to check if there are mussy signals intefere.

1 原点位置异常 Abnormal home position

①接近开关本身不正常工作②接近开关接线异常③感应物接触面太小④两个原点位太近⑤控制器内部参数不正确（包括原点速度参数设置太高、控制器解析度参数设置错误等）

①、Proximity switch is abnormal, ②、wire connection of proximity switch is abnormal; ③、the contact surface of inductor is too narrow; ④、two home positions are too close; ⑤、parameter in the controller is incorrect(the speed parameter of home is setting too high/resolution parameter in controller is incorrect).

2 按“复位”键马达会动

The motor is running when press “Reset” button

电机驱动器参数设定不正确。

Incorrect parameter setting of motor driver

3 开电脑马达会自动跑

The motor is automatically running when turn on computer.

控制器到驱动器的控制线焊接错误或马达到驱动器的编码器线焊接错误。

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Wrong welding of the control line from controller to driver or wrong welding of the encoder line from motor to driver

4 汽缸打不出 Abnormal cylinder

本系统是用 24V 汽缸,检查 O 板接线是否正常。

The system adopts 24V cylinder and check whether the connection of o board is normal.

5 倒线或者出线头 Reverse line or line stub

电机驱动器参数设定不正常。

Incorrect parameter setting of motor driver

6 检测与自动差别太大

Checking has greatly differences with the auto mode.

检测时没有使用手摇轮高档速度或点动高档速度。

Not use high gear speed of hand wheel or high gear speed of inching when check.

7 马达噪音太大 big noise of motor

电机驱动器参数设定不正常。

Incorrect parameter setting of motor driver

8 电脑主 IC 被拆下再装上后所产生的差异

Descrepancy caused by disassembling main IC of the computer and then assembling.

系统恢复到出厂值(烧录到 IC 里的数据)

The system is recovered to factory default (burn the data in IC)9

9 送线不准 Incorrect wire feeding

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线轮不标准,或机构有问题。

Wire wheel is not standard and the structure is abnormal.

10 机器在正常运行中出现“暂停”状态

有两种情况①当线料用完、I13 断开或断线时，会在电脑右下角出现“线料用完请处理”提示，并停机在“暂停” 状态。②当有外部杂信号干扰到 I13（即本来是常亮的 I13 号灯会出现有时亮有时灭就是有干扰）或者线架没有能够通过钢线与机器形成良好的回路（即有短暂的线架与机器没有导通现象），不会出现“线料用完请处理”提示，只是停机在“暂停” 状态。

10.pause status appear suddenly when the machine is running normally.

There are 2 cases,①、wire is used up /I13 break off,the prompt “wire used up,please handle”will pop up at the lower right corner screen ,and machine will stop in the pause status.②、outer mussy signals interfere the I13(I13 light bright all the time is normal.if the I13 light twinkling is abnormal), it also might be the wire frame can not form a good curcuit with machine throught the steel wire .(wire frame and the machine not breakover temporarily),there is no prompts,just lead to machine stop in the pause status.

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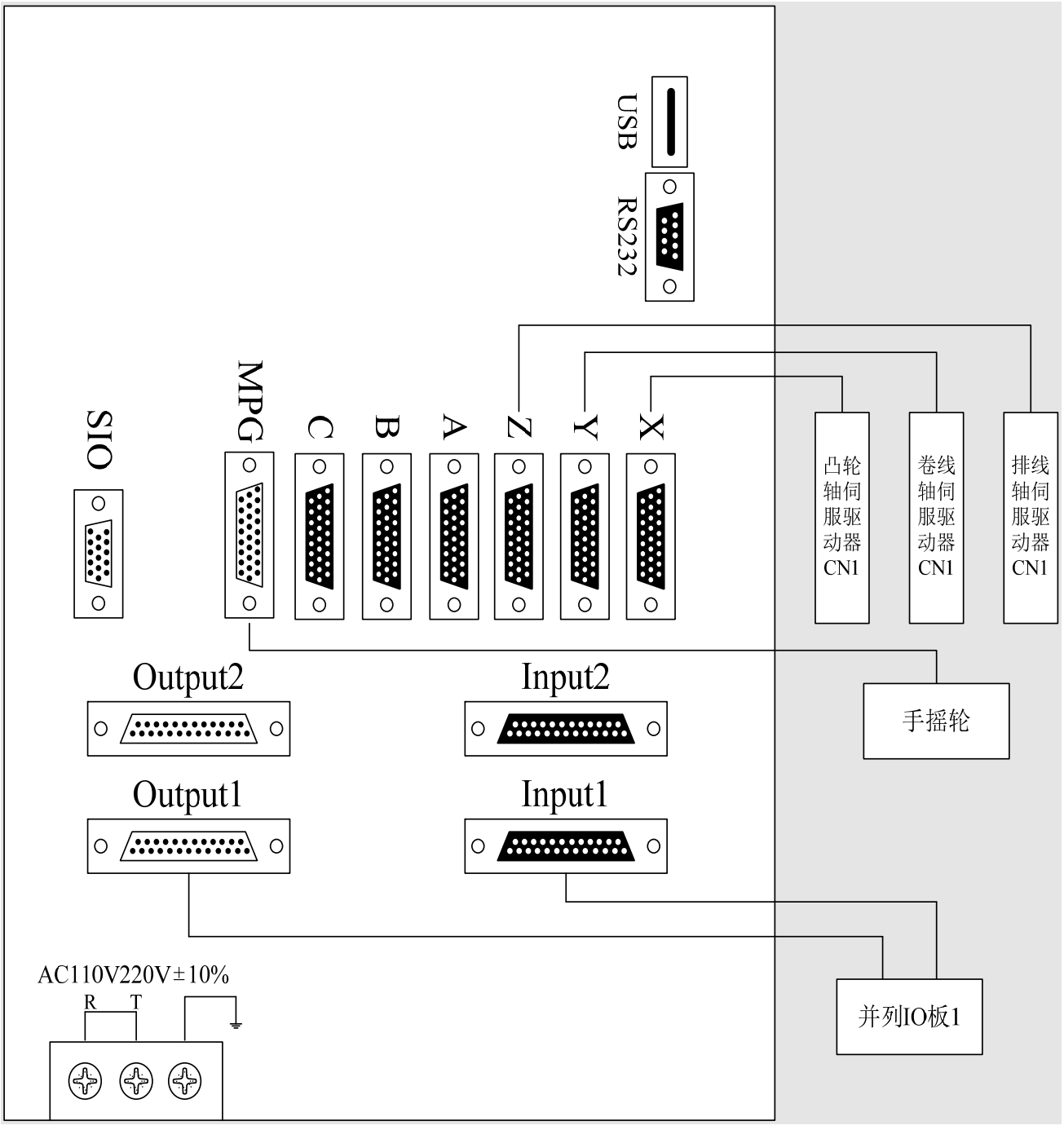
七、系统配线图System wiring diagram

（1）控制器插口位置示意图及控制器插线说明

controller socket location diagram and the wire plugging description.



控制器背面插口图

interface diagram for reverse side of controller

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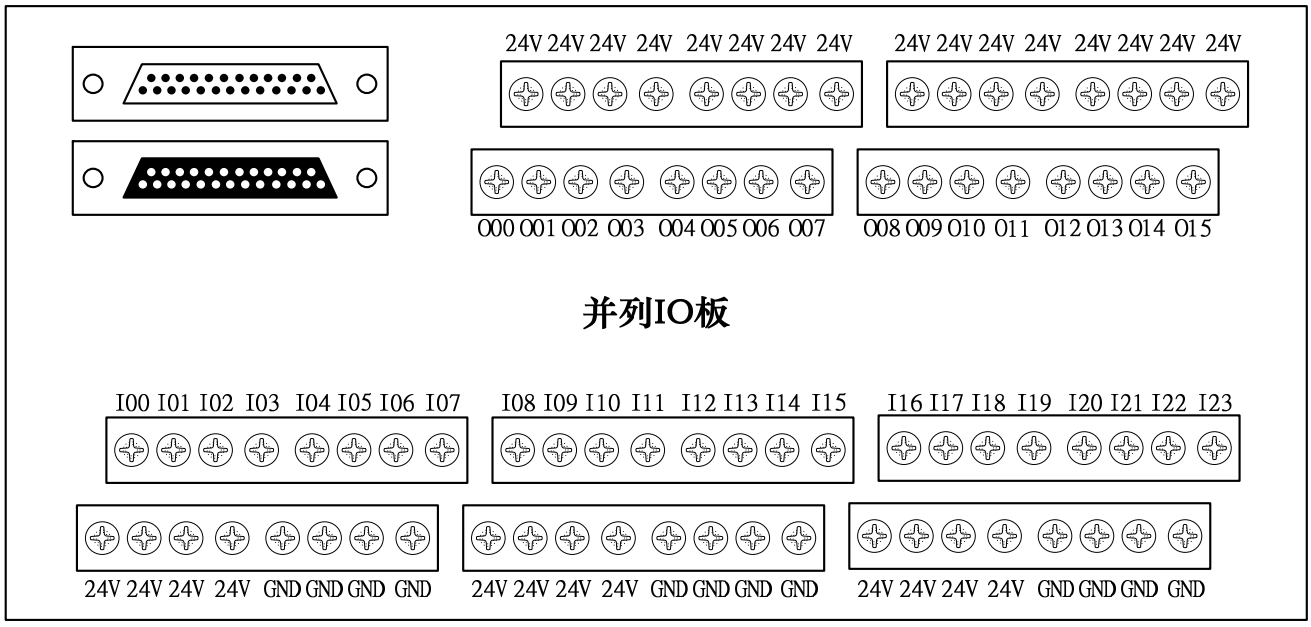
插口标示 port mark	插线型式 insert wire style	连接设备备 connecting device
X、Y、Z、A、B、C	26Pin 公 male——伺服驱动器端接口 port of servo drive terminal	轴向伺服驱动器 axial servo drive
MPG	26Pin 母 female——手摇轮接线端子 hand-wheel wire connecting terminal	手摇轮 hand-wheel
SIO	15Pin 母 female——15Pin 公 male	串列 IO 板 intanden IO board
Input1、Onput1	25Pin 公 male——25Pin 母 female 25Pin 母 female——25Pin 公 male	并列 IO 板 1 paratactic IO board 1
Input2、Output2	25Pin 公 male——25Pin 母 female 25Pin 母 female——25Pin 公	并列 IO 板 2 paratactic IO board 2
RS232	9Pin 公 male——9Pin 母 female	个人电脑（PC）
USB	标准 USB 接口 standard USB port	U 盘 USB drive
R/T	电源端子 power terminal	交流 110V~220V 电源 AC power

（2）IO 接线图 IO wiring diagram



接线说明：wire connecting description

（1）如上图 24V 和 GND 接直流 24V 电源，注意正负极不要弄错。该板上所有 24V

均是导通的，所有 GND 也均是导通的，使用时，需给其中任意 1 组提供 24V 直流电源。

As above picture:24V and GND connected to 24v DC power,be care do not mix the plus-n-minus .all the 24V on this IO board is connected,as well as the GND ,When using,please provide 24V DC power to any one combination of them.

（2）输入点为 0V 有效，请选用 NPN 型感应开关。

When input point to be 0V,it means effective.please choose the NPN inductive swithch.

（3）输出点导通时输出 0V。

Output point is connected,output value is 0V.

Y310N I/O 接线资料 wiring details

端子 24V 子 terminal		接直流电源+24V connect direct-current power			
端子 GND 子 terminal		接直流电源 0Vconnect direct-current power			
I000		I008	X 原点开关 X home switch	I016	Z 正限位 Z plus limit
I001	堵线 blocking wire	I009	Y 原点开关 Y home switch	I017	
I002	急停 emergency stop	I010	Z 原点开关 Z home switch	I018	Z 负限位 Z minus limit
I003		I011		I019	
I004		I012	线架报警 wire holder alarm	I020	
I005		I013	线料用完 Wiring material used up	I021	
I006		I014		I022	
I007		I015	安全保护 safety	I023	
O000	汽缸 cylinder D1				
O001	汽缸 cylinder D2	O006	汽缸 cylinder D7	O011	汽缸 cylinder D12
O002	汽缸 cylinder D3	O007	汽缸 cylinder D8	O012	线架启动 wire holder start
O003	汽缸 cylinder D4	O008	汽缸 cylinder D9	O013	系统报警 system alarm
O004	汽缸 cylinder D5	O009	汽缸 cylinder D10	O014	按键 button
O005	汽缸 cylinder D6	O010	汽缸 cylinder D11	O015	运行指示 running prompt

注：机械参数 MCM49<>1 时，Y 轴不需要外部感应开关，直接找电机原点。

机械参数 MCM49＝1 时，Y 轴需使用外部感应开关 I09。

Note:when machinery parameter MCM49<>1,Y axle no need the outer sensor switch ,find the motor home.

when machinery parameter MCM49<>1,Y axle need to use the outer sensor switch I09.

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（3）控制器与伺服接线图 controller and servo wiring diagram.

① 控制器－－驱动器接线图（速度控制）

Controller--driver wiring diagram(speed control)

注意：仅 A 轴使用

Note:just for the A axle use

B2 系列 series 44 Pin 公 male		控制器 controller 26 Pin 公 male	控制線（3M 以下）controlled wire(below 3M) 腳位名稱 pin-out description
22		1	A+
21		2	A—
25		3	B+
23		4	B—
13		5	Z+
24		6	Z—
20		7	VCMD
19		8	GND
28		23	伺服报警 servo alarm
9		24	伺服使能 servo ennable
11		25	24V
14/27		26	GND
不接 no connect	屏蔽线 shielded wire	外壳 shell	

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② 驱动器－－马达编码器接线图

Driver--wiring gram for motor encoder

B2 系列 9pin 公		军规接头 joint military	快速接头 quick couplings
4	兰 blue	A	1
5	棕 brown	B	4
8	绿 green	S	7
7，6	紫 purple	R	8
-	屏 蔽 线 shielded wire	L	9

③ 手摇轮－－控制器接线图 hand-wheel--wiring diagram for the controller

手摇轮 hand-wheel		控制器 controller MPG
端子号 terminal NO.		26 PIN 母 female
A		1
B		2
5V		9
0V		8

④ 伺服驱动器强电部分接线图

connecting diagram for heavy-current part of servo driver

驱动器 CNAdriver		用户供电系统 user power supply system
R		3 相 three-phase AC200-230V 50/60HZ
S		
T		
L1C	(与 R 短接) short connect with R	
L2C	(与 S 短接) short connect with S	

驱动器 driver		电机 motor	
端子号 terminal number	颜色 color	快速接头 quick couplings	军规接头 joint military
U	红 red	1	F
V	白 white	2	I
W	黑 black	3	B
E（接地）ground connection	绿 green	4	E

参数调整： parameter adjusting

P2-11 到 P2-17 全部设为 0

set all the P2-11 ~ P2-17 to be 0

P1-01 设为 02（电压控制）

Set the P1-01to be 02(voltage control)

P2-10 设为 101（控制伺服使能）

set the P2-10 to be 101(control the servo enable)

P2-22 设为 107（控制伺服报警）

set the P2-22 to be 107,(control the servo alarm)

P2-32 设为 1（自动调谐）

set the P2-32 to be 1(adjust automaticly)

P2-32 设为 0（手动调谐）注：自动调谐测试正常后需改设定为手动调谐！

Set the P2-32 to be 0(adjust manually).Note:when the testing of automatic adjustment is normal need to be change to the manual adjustment.

P2-31 设为 80（自动调谐刚性值）

Set P2-31 to be 80(adjust the rigid value automatically)

P2-04 为 KVP 值

set the P2-04 as KVP value.

P1-37 负载惯量比

set the P1-37 as load inertia ratio.

P2-06 为 KVI（速度积分补偿），

set the P2-06 as KVP(speed score compensation).

P2-08 当设为 10 时，此设置为恢复出厂值设置。

When the P2-08 is setting to be 10,it is a restore factory setting.

警告：电机 禁止 直接 接外部电源！！

Warning:motor is forbid to connect the outer supply power directly.