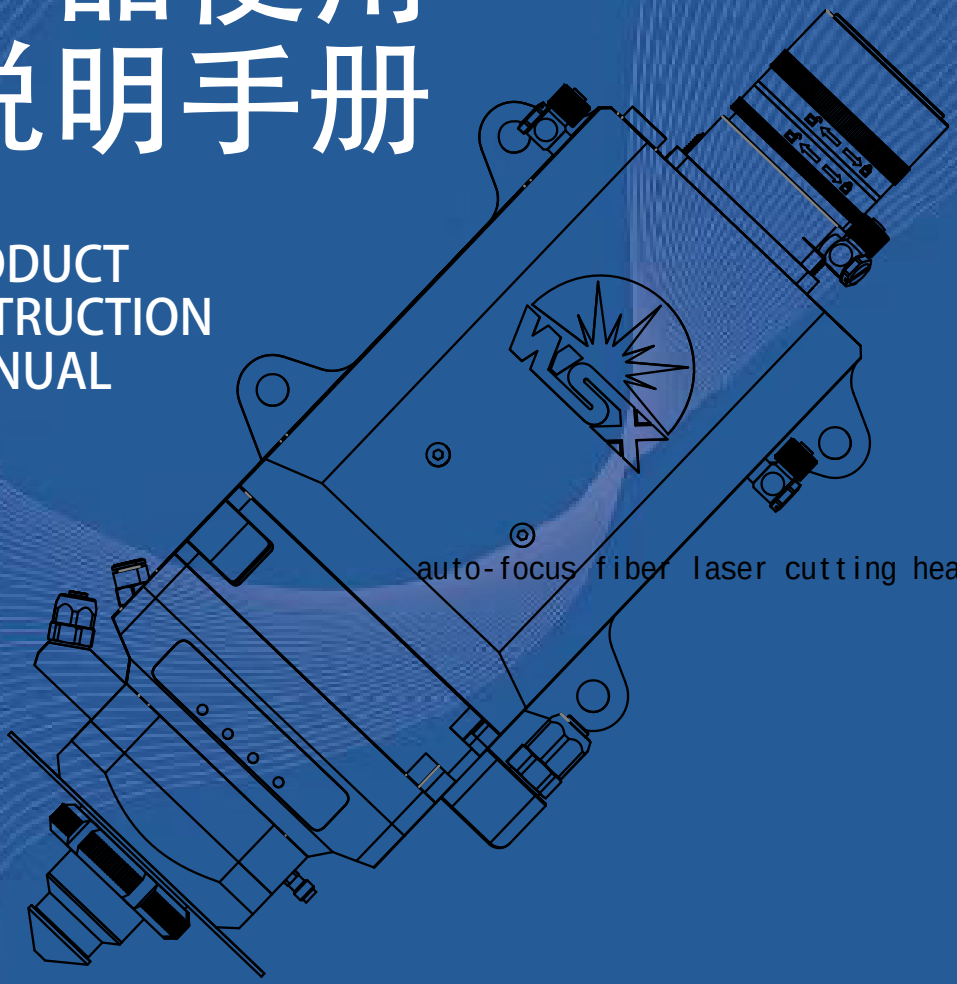
咨询热线: 400-836-8816

产品使用说明手册

PRODUCT INSTRUCTION MANUAL



NC210
Auto-focus Fiber Laser Cutting Head

Shenzhen Worthing Technology Co., Ltd.
www.wsxlaser.com

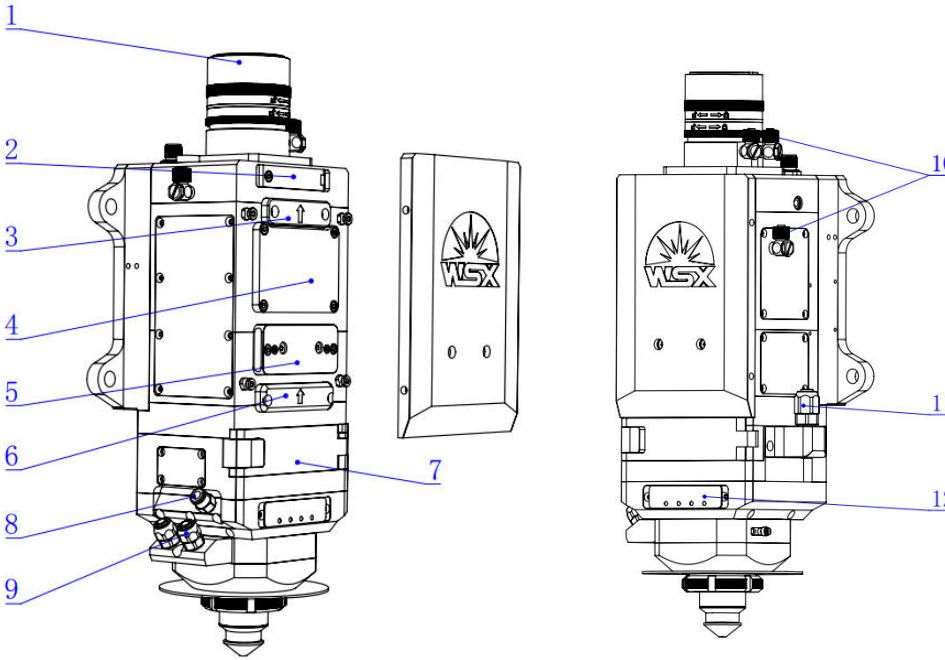
说明书变更履历

序号	修改时间	版本

目录

1.Product Description

1.1 Product Views



1.Fiber optic connector 2.Upper protective lens
3.Upper protective lens 2 4.Collimation module
5.Focusing center module 6.Lower protective lens 2
7.Lower protective lens 8.Side blowing connector
9.Sensor water-cooled connector
10.Fiber optic and cutting head water-cooled connector
11.Cutting gas connector 12.Indicator module

Note: To avoid damage during storage and transport:
1. The cutting head should be stored in the proper temperature and humidity;
2. Avoid vibration and shock;
3. Do not put the cutting head in or near magnetic fields (such as permanent magnets or strong alternating fields).

1.2 Technical Parameters

Model: NC210

Max working power: ≤ 20kw

Laser wavelength: 1070 ± 30nm

Fiber types: QBH, QD, LOE 3.0, LOE 3.2, QD-F, etc.

Collimation focal length:100mm

Focusing focal length: 200mm

Focusing adjustment range: ± 40mm

Centering adjustment range: ± 1.5mm

Cutting gas connector: φ12, ≤ 2.5Mpa

Cooling gas connector: φ6, ≤ 0.6Mpa

Cooling water connector: φ8, Max pressure 0.5Mpa

Working temperature: 3℃ ~ +55℃

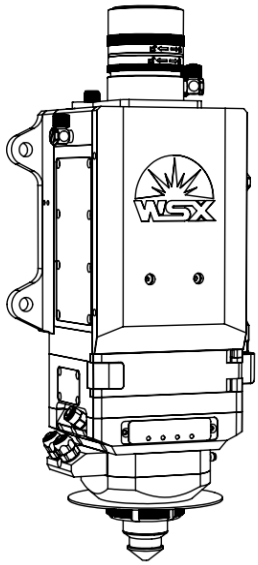
Storage temperature: -20℃ ~ +55℃

Weight:10.3kg (Q+ connector)

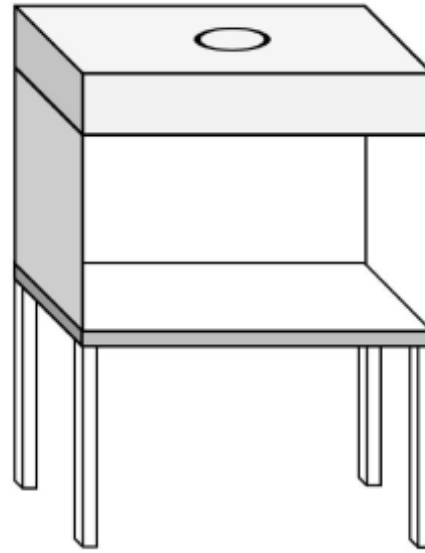
2.Cutting Head Installation

2.1 Preparation

To prevent dust or dirt from entering the cutting head, refer to the following way to install the cutting head:
Preparation:
A.Cutting head;
B.Clean bench (clean bench type: vertical purification; clean class: ISO 5, 100; average wind speed: ≥ 0.4m/s);
C.Cleaning kit: strong flashlight, anhydrous ethanol (or IPA), dust-free cleaning swab, dust-free cloth, compressed air dusting can

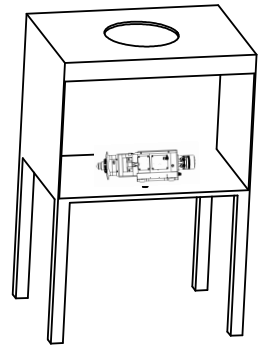


Cutting head



Clean bench

2.2 Specific Operating Procedures



A.Check the cleanliness of the equipment (dust particle counter to check the cleanliness) and make sure the FFU purification unit is within the validity period (measure the average wind speed in the working area, when the wind speed cannot reach 0.3m/s, the FFU purification unit must be replaced);

B.Checking that the switches are operating properly and that the fans are operating properly;

C.It is strictly forbidden to place unnecessary items in the clean bench to ensure that the clean air flow is not disturbed;

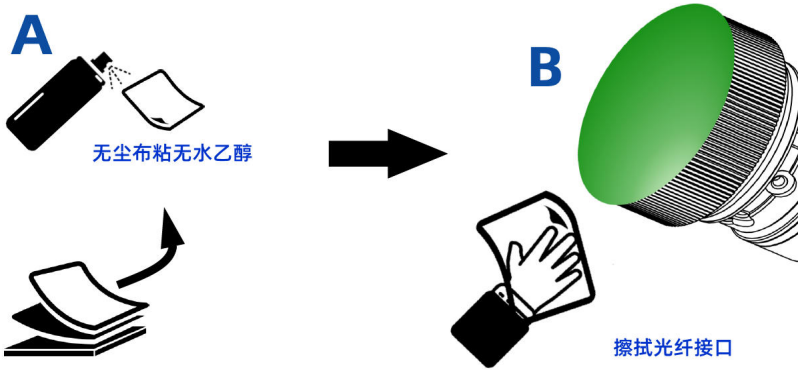
D.For the newly installed or long-term unused clean bench, please use a clean cloth with anhydrous ethanol to wipe clean before use.

Power on and use:
A.Turn on the power and pull the clean bench glass sliding door to the bottom position (leaving a gap of about 10 cm);
B.Turn on the fan, it is recommended to purify and clean about 30 minutes in advance;
C.After normal operation, turn on the clean bench lighting power.

Note:
Only trained professionals are allowed to operate it.
Operators who do not follow safe work practices may pose a risk to personnel or finances.
To ensure the proper operation of the laser unit in the working environment and the safety of the operator, the relevant operating instructions must be followed and implemented.

2.3 Clean the Fiber Optic Connector

Clean the fiber optic connector with a dust free cloth and anhydrous ethanol.

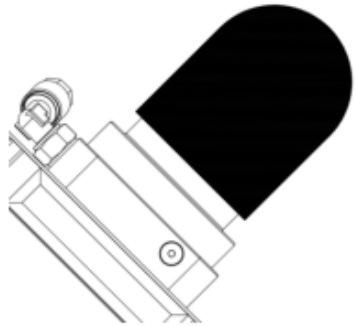


2.4 Checking the Laser Fiber Endface

Remove the laser fiber protection cap, use a strong flashlight to inrradiate the fiber endface whether it is polluted. If it is clean, insert it directly; if not clean, user needs to use a cotton swab sticky anhydrous ethnol or IPA cleaning.

2.5 Remove the Protection Cap

Remove the protection cap from the fiber connector.



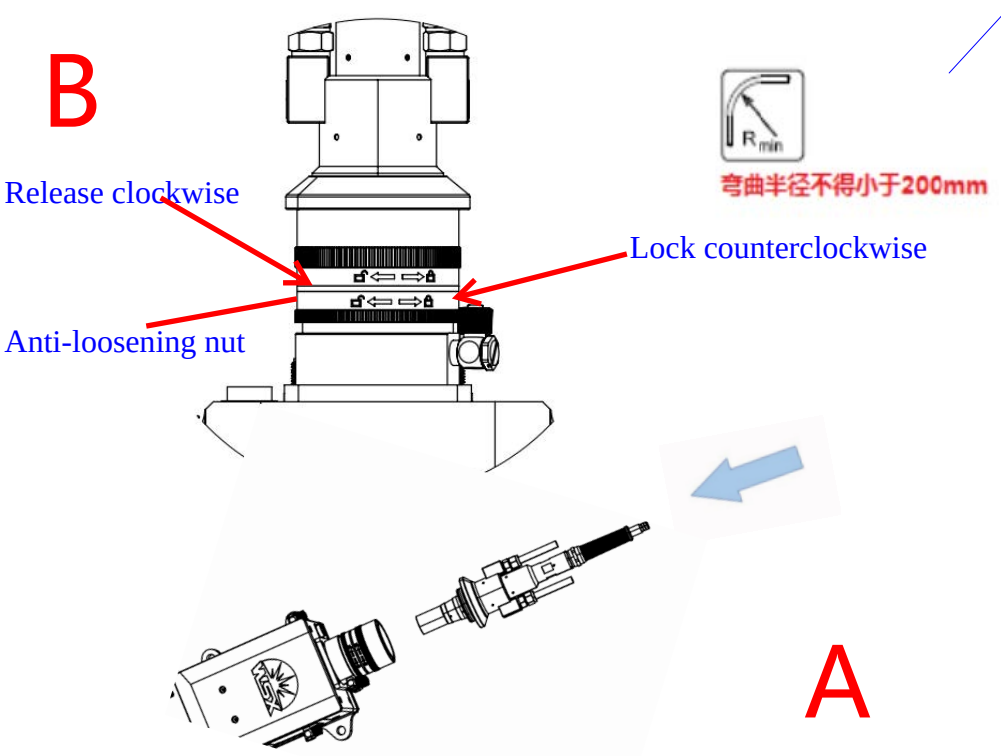
2.6 Fiber Connection (Q+)

Note：▶Fiber insertion and removal should be on a clean work bench;

▶Before inserting the optical fiber, it is necessary to check whether the fiber end face and QD interface are polluted;

▶Insert horizontally;

▶After inserting the fiber, wrap white tape around the gap between the fiber and the cutting head interface.



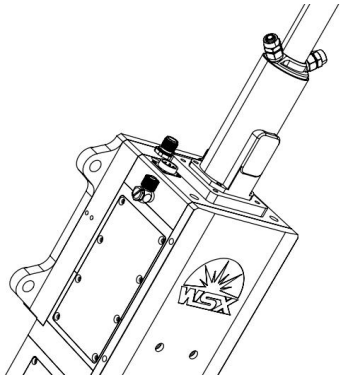
1.Remove the protective film/cover from the fiber optic socket.
2.Insert the fiber optic plug (aligned) into the unlocked fiber optic socket (sealing cap in the lowest position), noting that the pin of the fiber optic rod must be aligned with the Q+ fiber optic connector slot.
3.Turn the locking ring of the Q+ fiber optic connector counterclockwise to lock the fiber optic rod.
4.Tighten the anti-loosening nut counterclockwise to prevent the fiber optic rod from loosening.
5.Wrap 3-4 layers of threaded adhesive around the fiber and connector to strengthen the seal.

2.7 LOE3.2 Fiber Connection

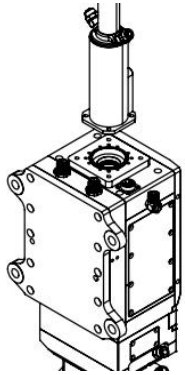
Note: ▶Fiber insertion and removal should be on a clean work bench;

▶Before inserting the optical fiber, check whether the fiber end face and LOE interface is polluted.

▶Insert horizontally.



B

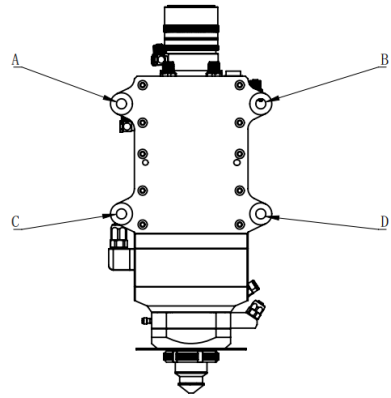


A

1.Remove the protective film/cover from the fiber optic socket.
2.Install the fiber optic plug on the fiber optic socket (see picture B for details).
Note: Before installation, the slot of the fiber optic plug must be aligned with the locating pin of the socket (see Picture A for details)
3. Secure it with screws with spring washers for locking (see Picture B for details).

2.8.Mounting the Cutting Head on the Back Plate

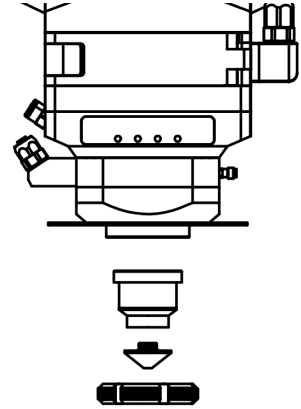
Mount the cutting head to the Z-axis backplate of the machine with the four screws A, B, C and D. When securing the cutting head to the machine, make sure that the cutting head is locked in place without wobbling.

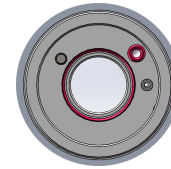


3.2.Install the Ceramic Ring and Nozzle

Install the ceramic ring and lock it in place, then install the nozzle.

Tighten the nozzle on the ceramic ring by hand and use a wrench to tighten the ceramic locking ring.

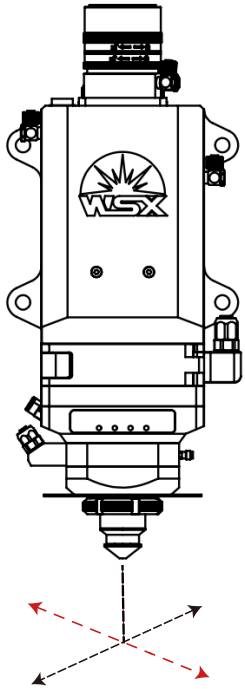


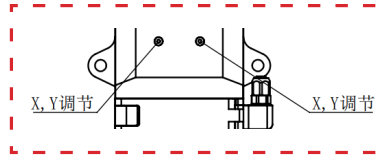


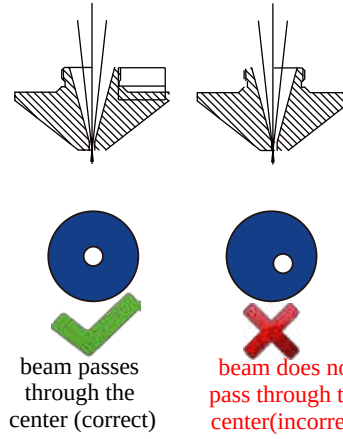
3. Use and Maintenance of the Cutting Head

3.1 Coaxial Adjustment

1. Adjust the X/Y screw by allen wrench and make the beam pass through the center of nozzle;
2. The cutting effect is perfect when the beam pass through the center of nozzle;
3. If the beam does not pass through the center of nozzle, it may cause the beam could not be emitted out or bad cutting effect and so on.







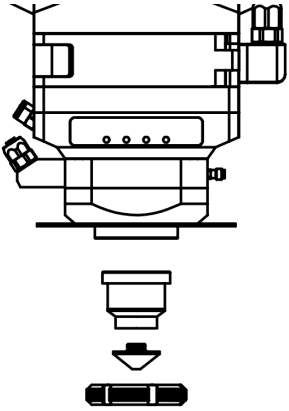
beam passes through the center (correct)

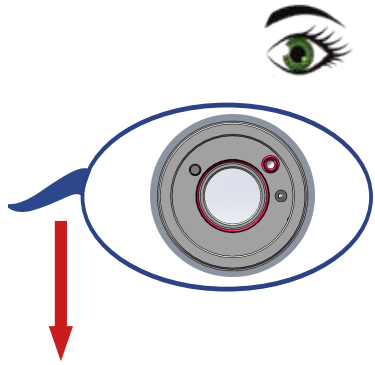
beam does not pass through the center(incorrect)

Methods of testing whether the beam pass through the center of nozzle：

1. Paste the transparent tape on the outlet of the nozzle (prefer to a new or undeformed nozzle);
2. Set the power of laser machine to 50W(take 500W for example,adjust the short burst power for 10%);
3. Take off the transparent tape after the beam has been emited for 1 － 2 seconds;
4. Face the tape to light source and observe the round mark of nozzle on the tape and burning spot of laser passing through the tape.
5. If they are concentric, the testing result is good, but if not, please keep adjusting.

3.2 Ceramic Ring and Nozzle Replacement

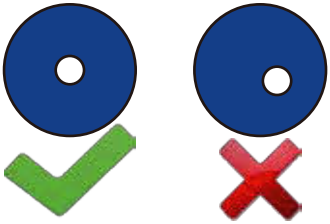




电源

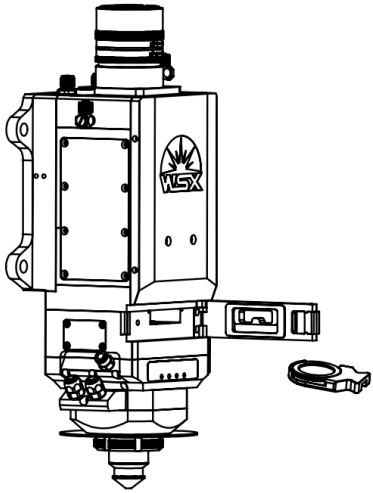
冷却气体

切割气体



center checking

3.3 Lower Protective Lens Replacement



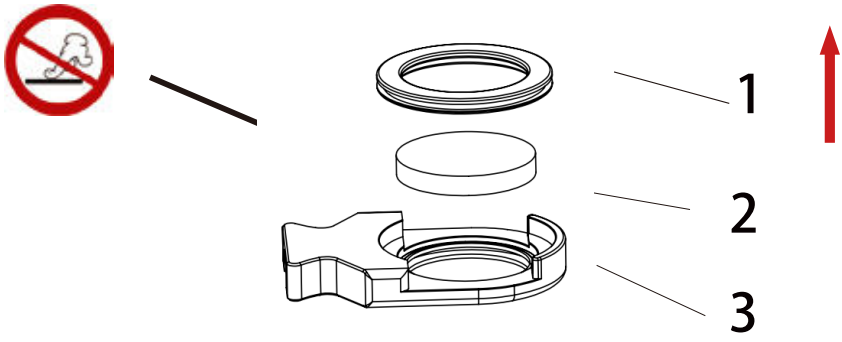
Disassembling method: press the snap of the dust cover, the dust cover pops out and then take out the drawer

电源

冷却气体

切割气体

Pay attention to dust prevention: wear dustproof gloves and finger cots when removing and installing lenses, which needs to be done in a clean place. (When replacing lenses in the field operation, you can seal the window with tape to prevent dust from entering the interior and causing contamination.)



1、Gland 2、Protective Lens 3、Lens Holder

Disassembly: Extract the gland upwards in the direction of the arrow. Do not use wrenches, pliers or other tools, as they may damage the parts.

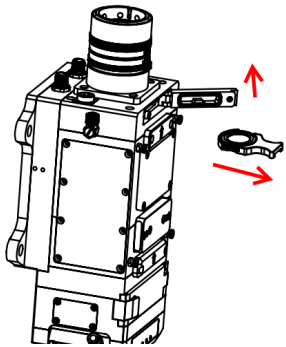
3.4 Upper Protective Lens Replacement

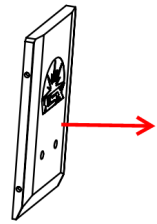
注意掉落

电源

冷却气体

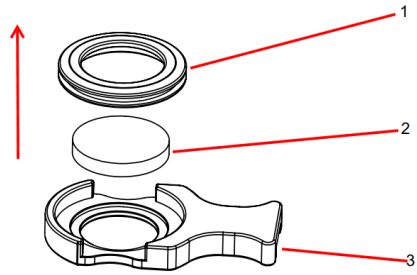
切割气体





Disassembly: Remove the cover, pull out the drawer horizontally and remove the gland

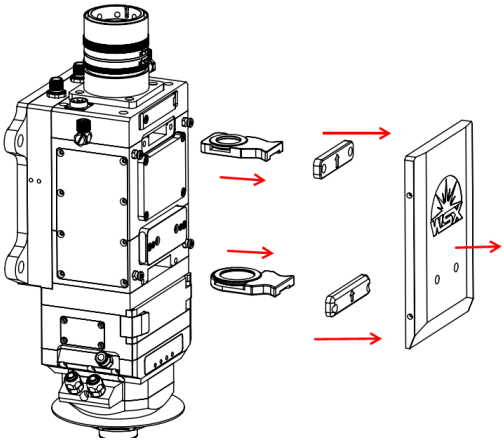
Pay attention to dust prevention: wear dustproof gloves and finger cots when removing and installing lenses, which needs to be done in a clean place. (When replacing lenses in the field operation, you can seal the window with tape to prevent dust from entering the interior and causing contamination.)



1、Gland 2、Protective Lens 3、Lens Holder

Disassembly: Extract the gland upwards in the direction of the arrow. Do not use wrenches, pliers or other tools, as they may damage the parts.

3.5 Upper Protective Lens 2 & Focus Protective Lens Replacement



电源

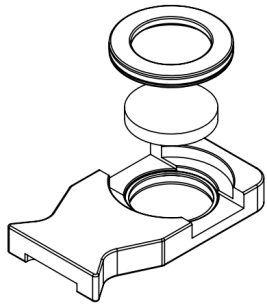
Requires operation on a clean bench

冷却气体

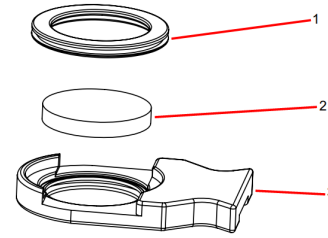
切割气体

Disassembly: Remove the cover, then loosen the anti-release screws on the dust cover and pull out the drawer protection mirror horizontally.

注意掉落



上二保护镜

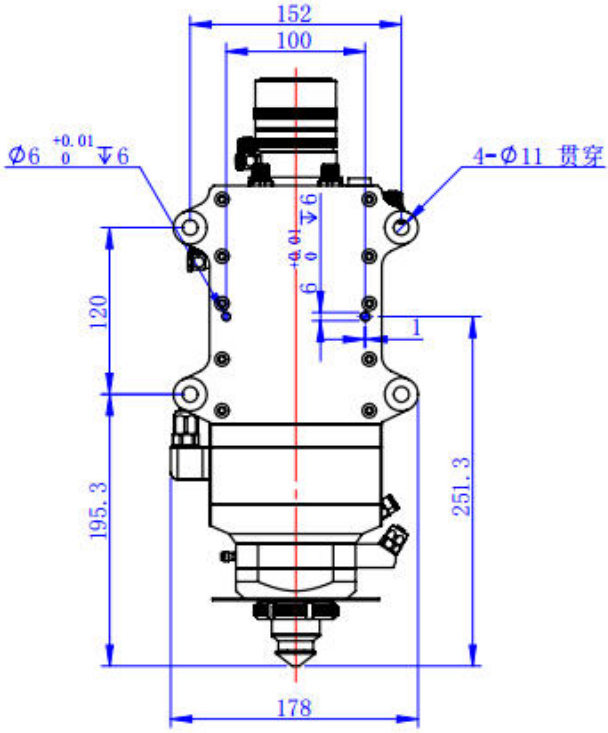


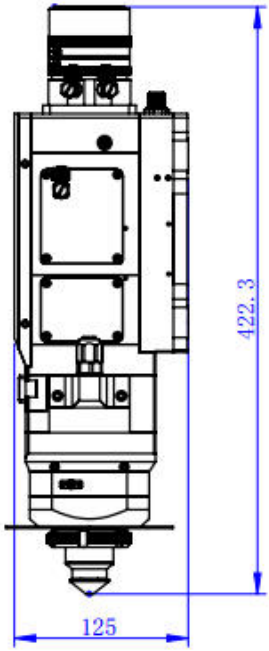
下二保护镜（聚焦保护镜）

1、Gland 2、Protective Lens 3、Lens Holder

Disassembly: Extract the gland upwards in the direction of the arrow. Do not use wrenches, pliers or other tools, as they may damage the parts.

4. Mounting Dimensions





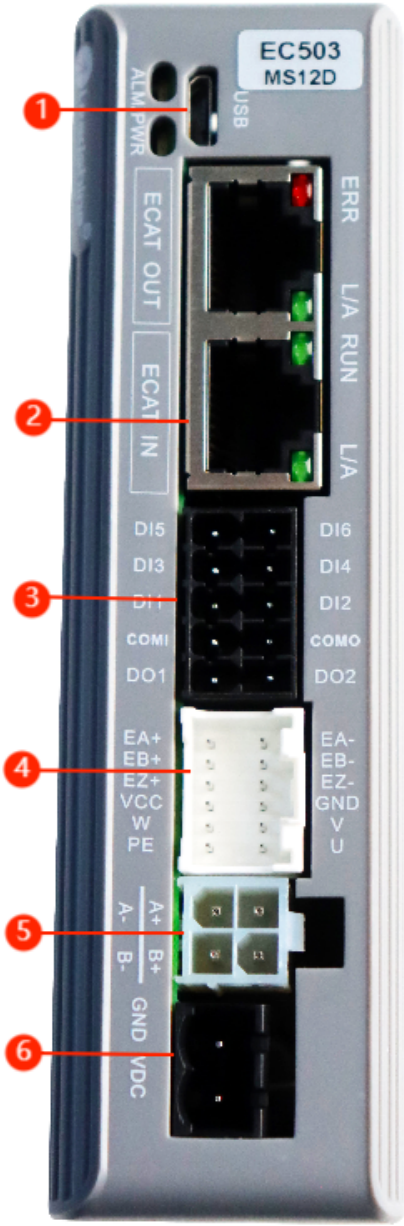
5. Electricity

5.1 Pulse Driver Wiring Instructions

No.	Item	Description	Note
1	Subdivision	SW2、SW5:ON	Others: OFF
2	Voltage selection	5V	
3	Pulse control port	PUL+/PUL-、DIR+/DIR- ALM/COM	The rest: reserved
4	Encoder port	EB+/EB-、EA+/EA-、 VCC/EGND	Wiring with wire markers
5	Power line port	A+/A-、B+/B-	Wiring with wire markers
6	Input power port	Vdc to 24V、GND to 0V	Input power DC24V

Note:The driver iron housing must be connected to ground terminal PE.

5.2 Bus Drive Wiring Instructions



No.	Item	Description
1	Debugging Interface and Alarm Indicator	Connecting a computer to debug the drive
2	Ethere CAT Communication Port	Connecting a host or previous slave device
3	Pulse IO Port	IO control signal input and output (Wired according to actual use)
4	Encoder Port	Communication port with motor encoder
5	Motor Phase Sequence Port	A+, A-, B+, B- to the motor
6	Power Port	1. Input power supply is DC24V (VDC connects to 24V, GND connects to 0V,)

Note:
1. The input power supply for this driver is a DC24V (direct current) power supply.
2. The driver is for bus use only.
3. The driver's iron enclosure must be connected to the PE end of the ground wire.

5.3 Monitor Wiring Instructions

Marks	Description	Note
24V	DC power supply (DC24V) positive terminal	
0V	DC power supply (DC24V) negative terminal	
PE	Ground terminal	
PE Ground	Ground terminal	
GND-S	DC power supply (DC24V) negative terminal	
Alarm Output	Alarm signal	24V output in alarm
Alarm Input	Detected signal	

5.4 Motor and Limit Switch Fault Detection Instructions

Motor Measurement Process:

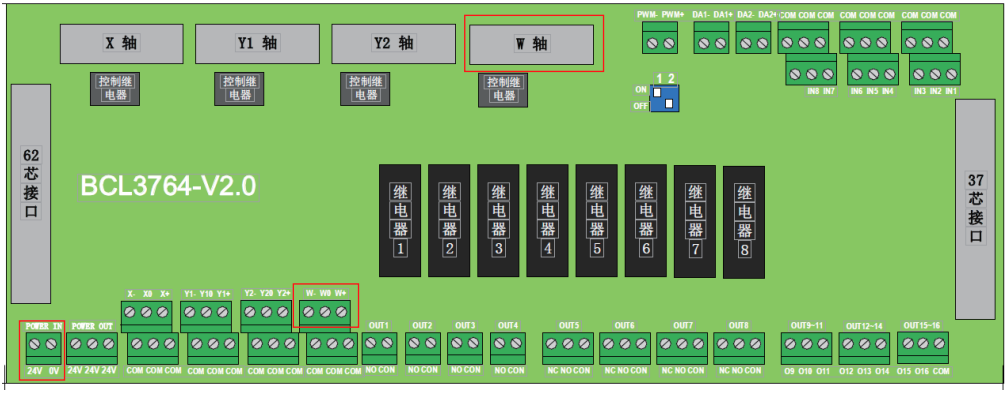
1. Instrument: multimeter.
2. The multimeter should be adjusted to the resistance 200Ω or beep on and off gear.
3. Measurement of motor U, V, W is recommended to take in the cutting head of the aviation plug.
4. Motor A + / A -, B + / B -, each two-phase resistance of about 2.2 Ω, on and off gear beeping sound for the motor is normal. If the resistance is 0Ω, or infinity is abnormal for the motor.
5. Motor A + / A -, B + / B - any one phase are not with PE or shell conduction, if there is an abnormal motor.

Limit switch measurement process.

1. Instrument: multimeter.
2. No special needs, limit switch is NPN type limit switch.
3. It is recommended that the focus in the 0 position for detection.
4. Connect 24V and 0V to DC24V power supply, W+ and W- are not connected.
5. Use the multimeter pen to measure 24V, and the black pen to measure W+ or W-. The output voltage is 24V when the focus is in the 0 position, and the output voltage is 0V when the focus is in the positive limit position or negative limit position.

6.Cypcut System Configuration

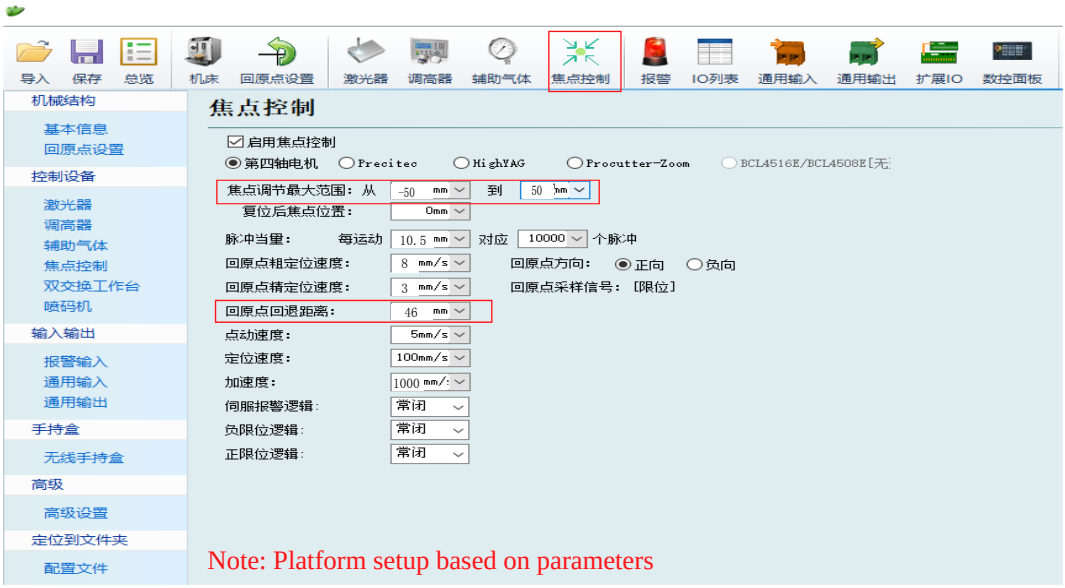
6.1 Wiring instructions for the Cypcut system



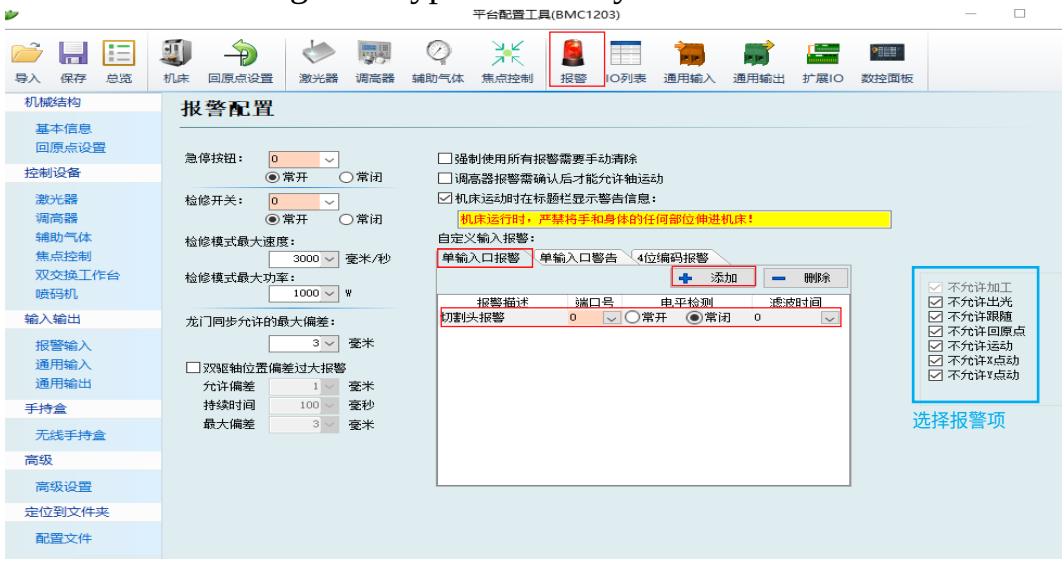
Note:

1. Pulse control line is connected to the W-axis port of the control card.
2. 24V, 0V, W+, W- Connect to the corresponding port of the control card.

6.2 Parameters of Cypcut Pulse System



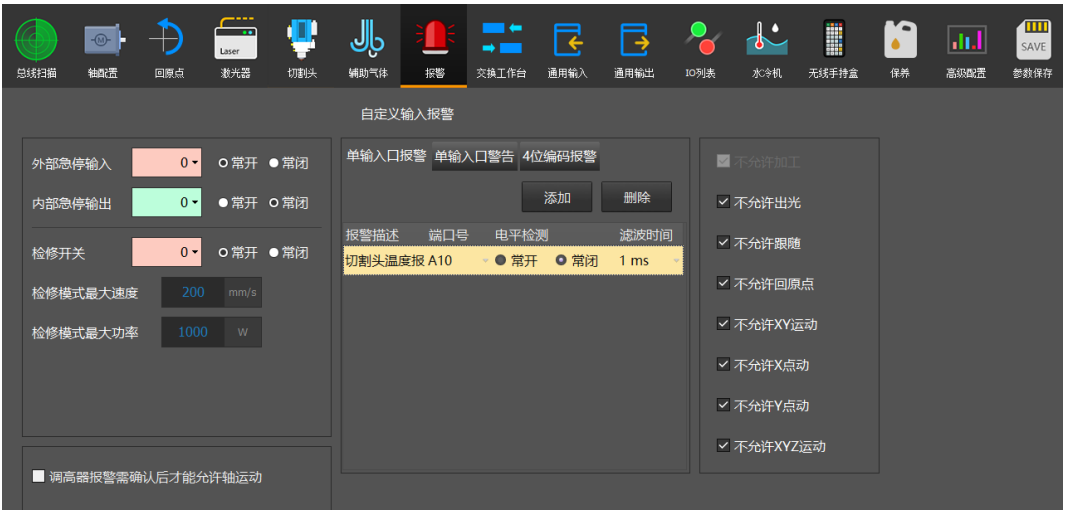
6.3 Alarm Settings for Cypcut Pulse System



Operation Procedure: Click Alarm>Single Input Port Alarm>Add>Enter Alarm Description>Select Corresponding Port>Select High/Low Level>Save

6.4 Parameterization of the Cypcut Bus System

6.5 Alarm Settings for the Cypcut System



Operation Procedure: Click Alarm>Single Input Port Alarm>Add>Enter Alarm Description> Select Corresponding Port>Select High/Low Level>Save

7.Weihong System Configuration

7.1 Wiring instructions for Weihong systems

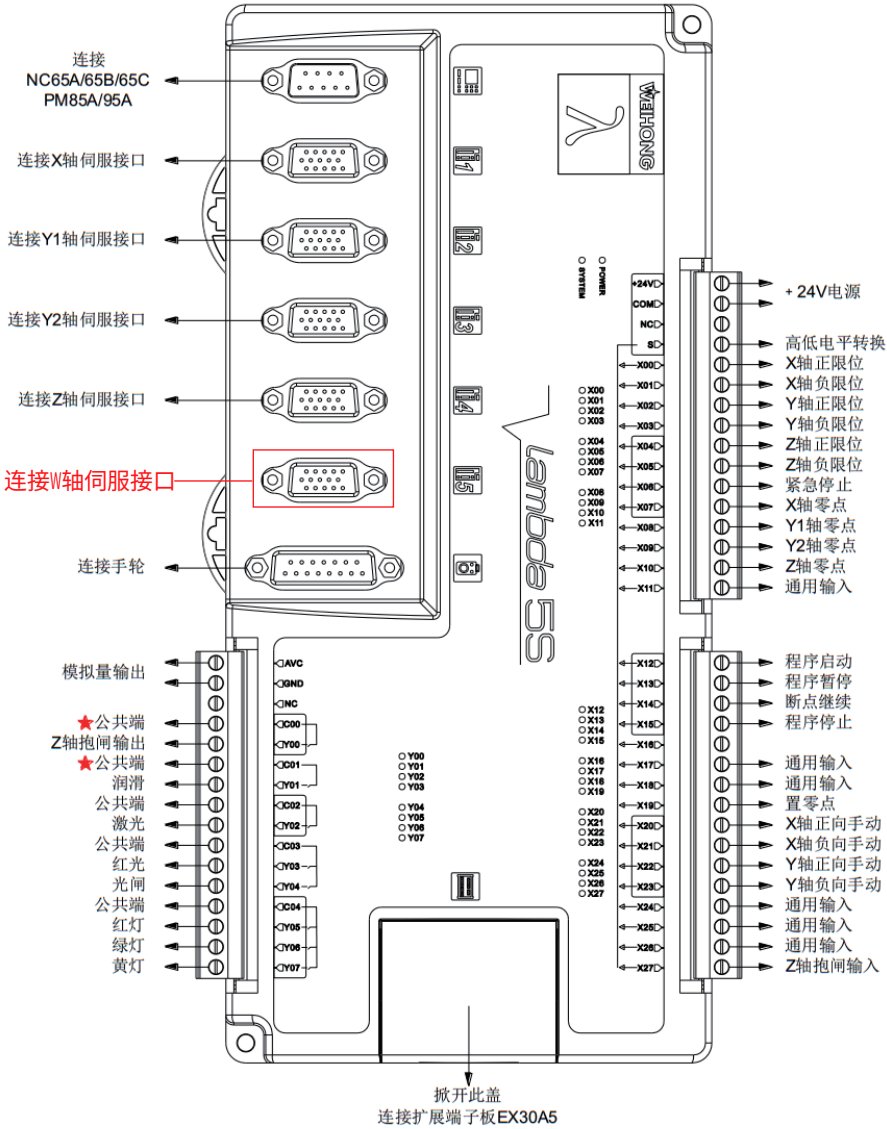


图 4-1 激光切割系统（双 Y）中朗达控制器接线示意图

7.2 Wiring Instructions for Weihong System Height Control Board

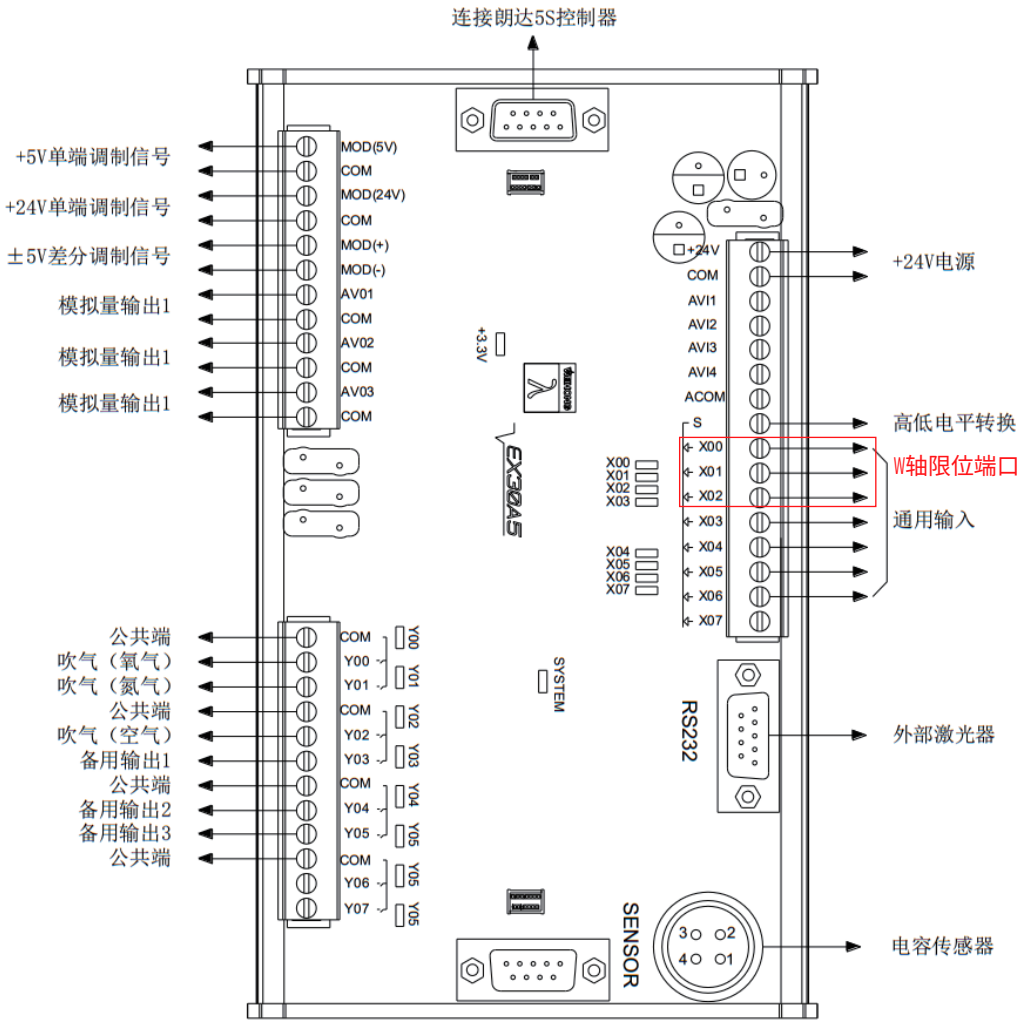
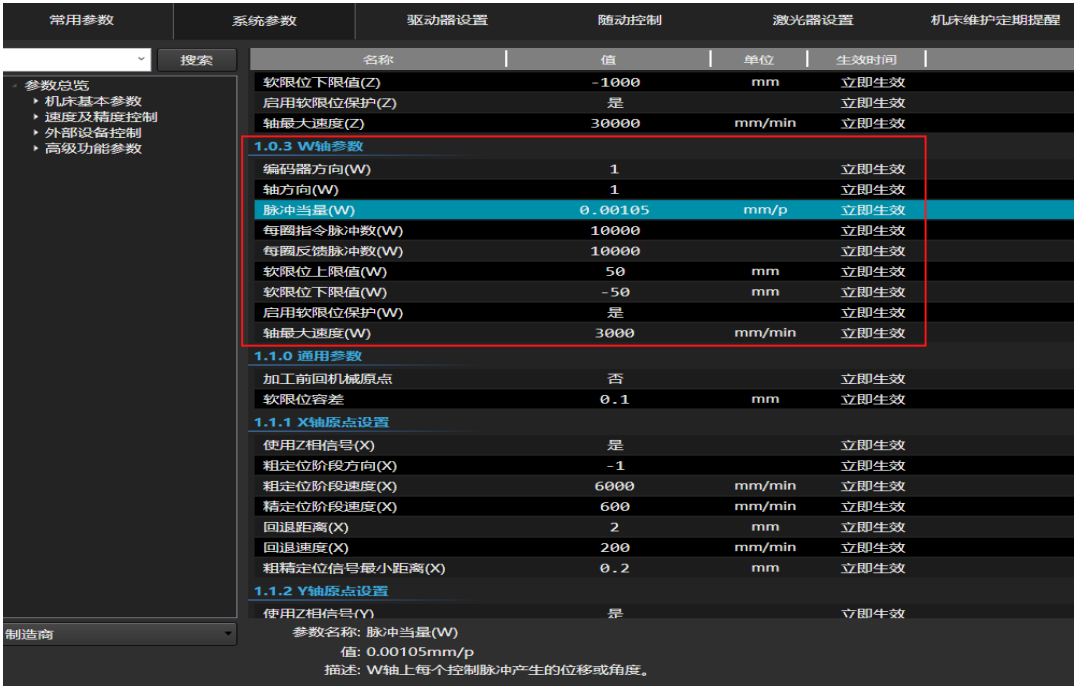


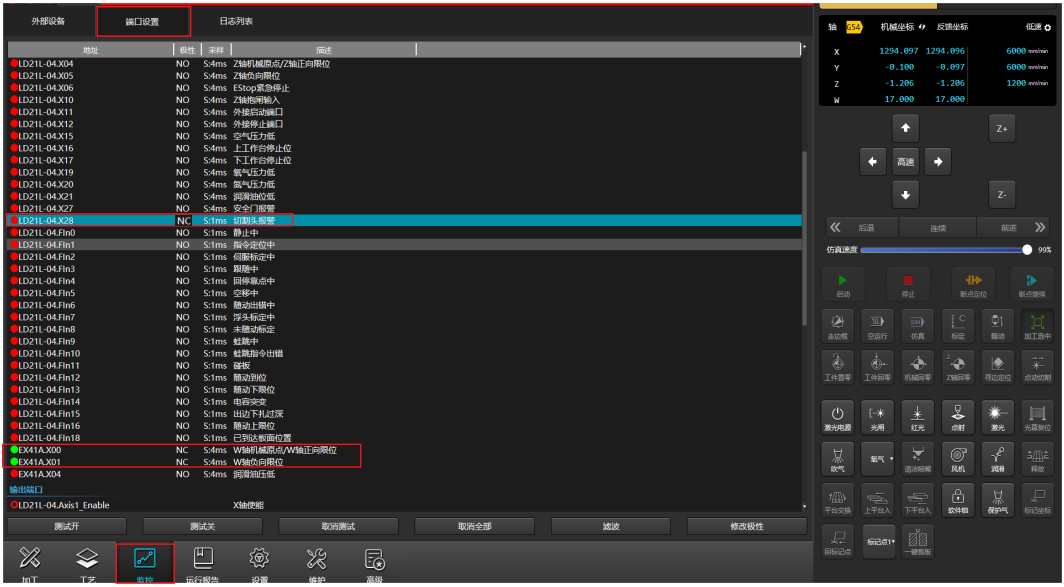
图 4-2 激光切割系统中扩展端子板 EX30A5 接线示意图

Note: 24V, 0V, connect to DC24V power port, W+ connect to X00,W- connect to X01 port.

7.3 Weihong Pulse System Parameter Configuration

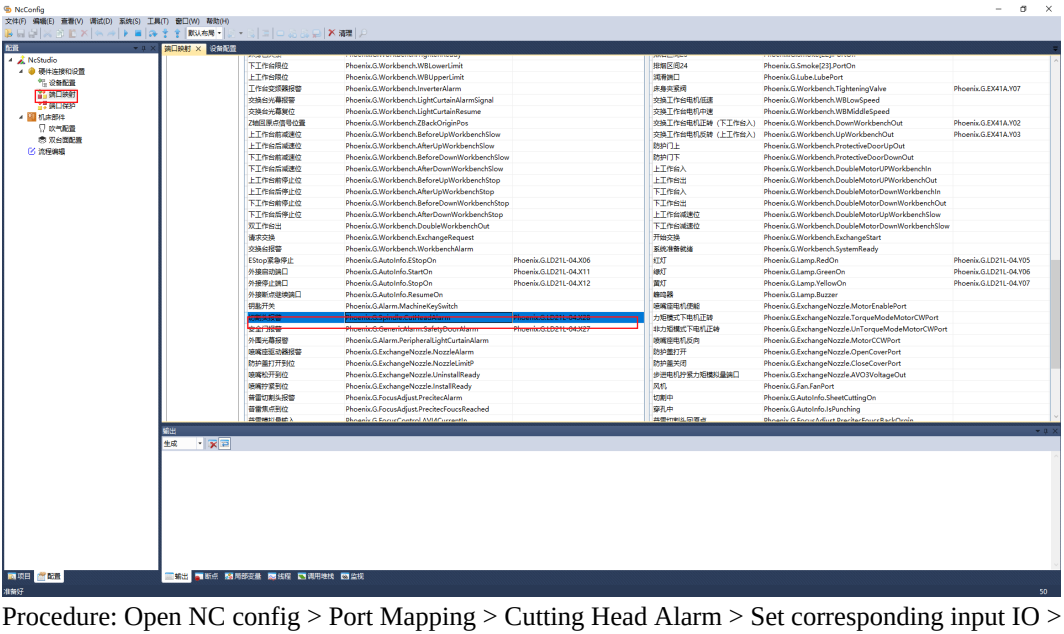


7.4 Weihong System Polarity Modification (same settings as bus system)



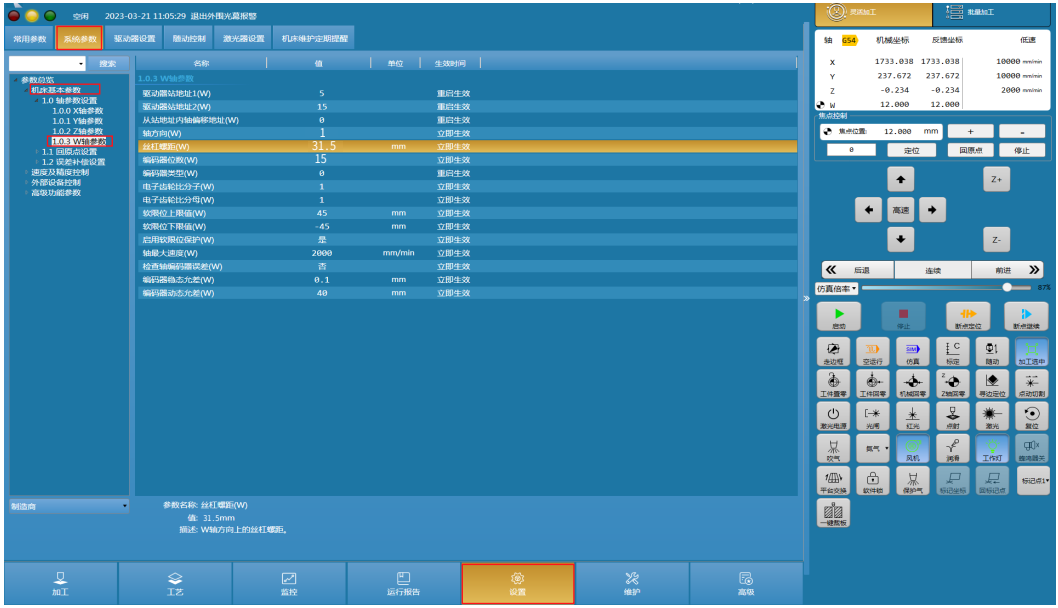
Operation Procedure: Click Monitor > Port Settings > Check whether the polarity is the same or not.

7.5 Alarm Output Settings for Weihong Systems (same settings as for bus systems)

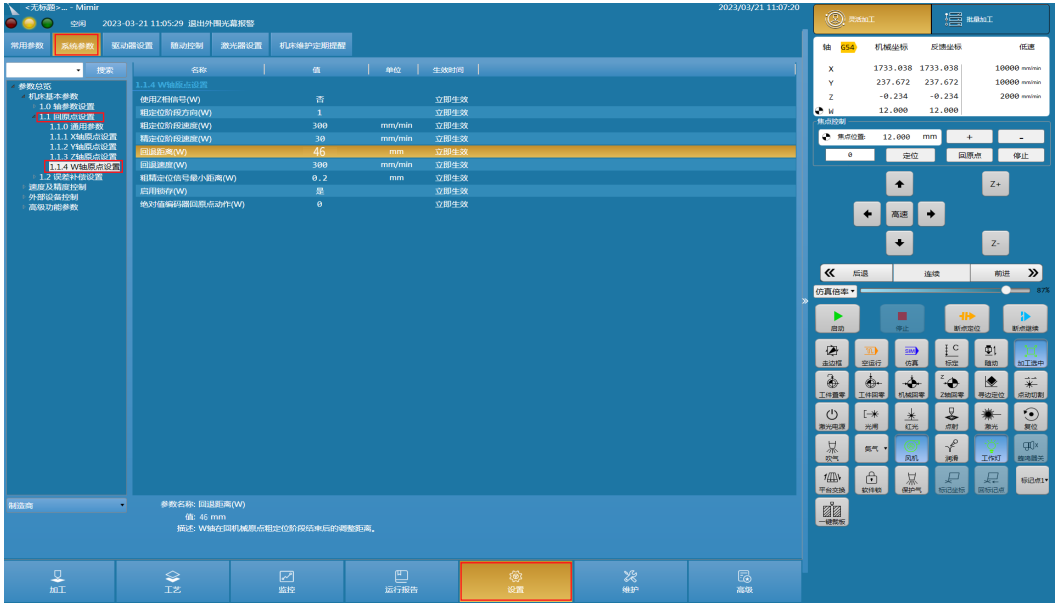


Procedure: Open NC config > Port Mapping > Cutting Head Alarm > Set corresponding input IO > Save

7.6 Weihong Bus System Parameter Configuration

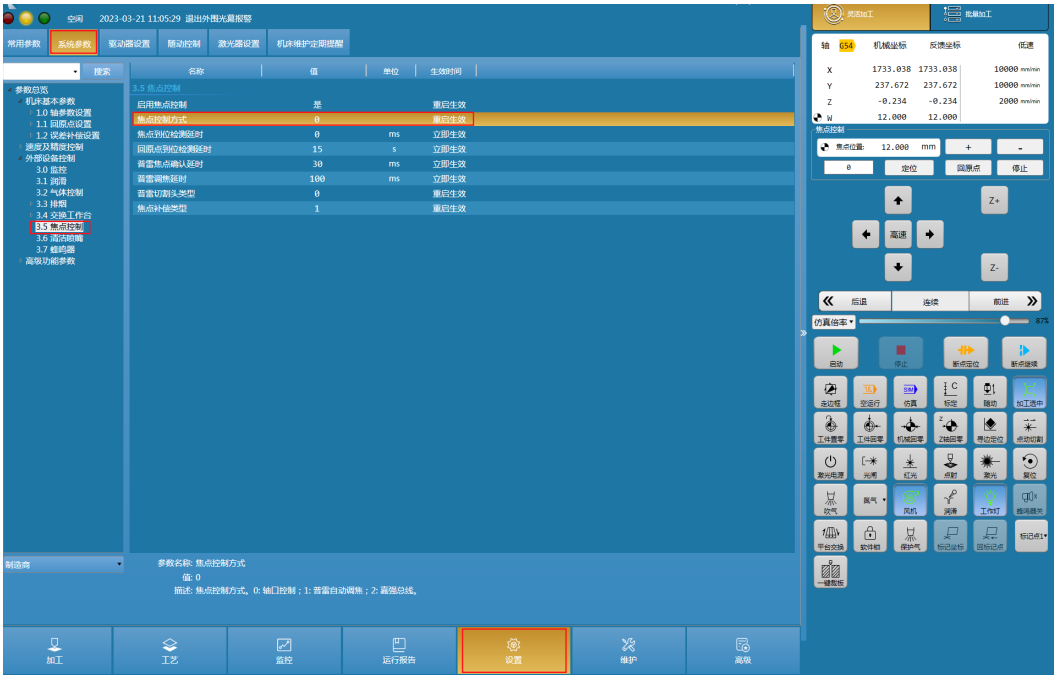


Procedure: Setup > System Parameters > 1.0 Axis Parameter Settings > 1.03 W Axis Parameters > Screw Pitch



Operation Procedure: Setup > System Parameters > 1.1 Return Origin Setting > 1.14 W-axis OriginSetting

7.7 Weihong System Focus Control Options



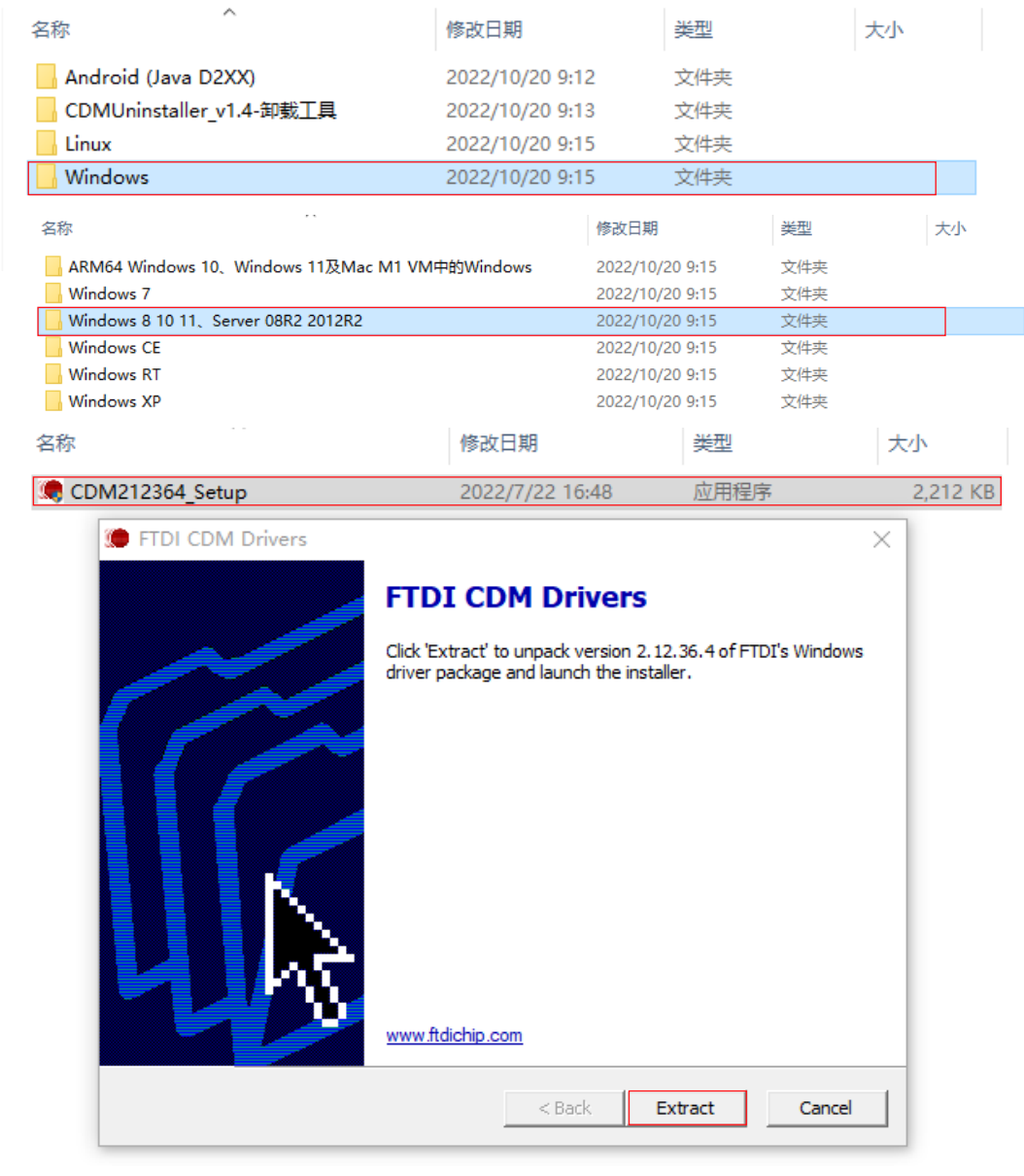
Procedure: Setup > System Parameters > 3.5 Focus Control > Focus Control Method > Select 0

8.Greenlink RS485 Driver Installation Process

8.1 Installation Process 1

操作流程：点击电脑属性 > 系统类型 > 版本 > 安装串口驱动选择与电脑对应的文件安装

8.2 Installation Process 2

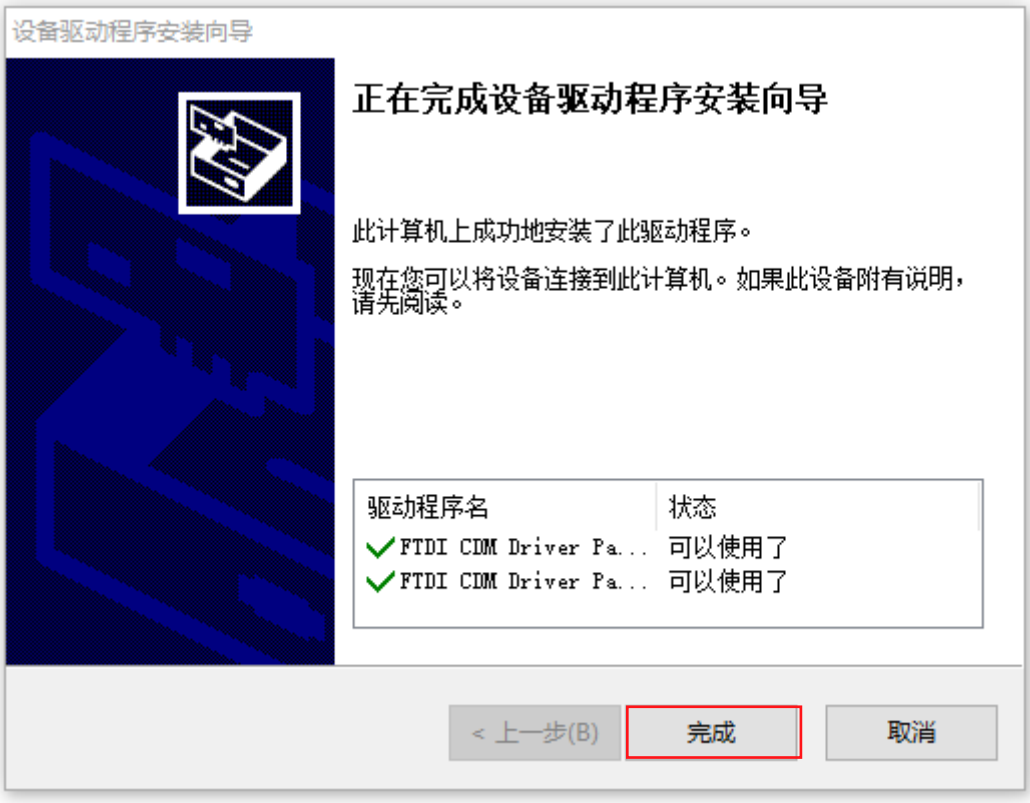


Procedure: Open the serial line FT231XS chip driver file > Windows > Windows 8 10 11 > > CDM212364_Setup > Extract

8.3 Installation Process 3

Operation Procedure：Click next page > I accept this agreement > Next page

8.4 Installation Process 4



Procedure: Click Finish

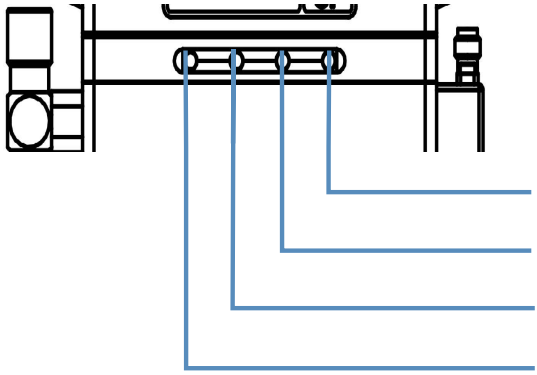
Note:1. Click Computer Properties > Device Manager > Check whether the port is marked with an exclamation mark, no exclamation mark means the installation is successful. 2.The driver installation package can be downloaded from the official Greenlink website.

9. Monitoring Instructions

9.1 Monitoring Software Installation Process

Operation Procedure: Open NC210 monitoring tool (V1.2.0) file > NC210 > Enter monitoring interface

9.2 Status Display Lamp Description



Lamp 1: Protective lens/Humidity

Lamp 2: Collimating/focusing lens temperature

Lamp 3: Cutting gas/cavity pressure

Lamp 4: Operating status

9.3 Cutting Head Monitoring Interface

Operation Procedure: Select the corresponding serial port number > Start monitoring > Successful connection interface with temperature display

9.4 Monitoring Parameter Settings

Operation Procedure: Threshold Setting > Enter Password (666666) > OK

9.5 Monitoring Parameter Settings

Procedure: Modify temperature parameters > Setup

10.Pulse Type Drive Alarm Code

Number of ALM blinks	Name	Solution
1	Overcurrent protection	1. Connect the motor winding with the drive, restart the drive, if there is no alarm, check the motor and motor power line for any abnormality. 2. Disconnect the motor winding from the drive, restart the drive, if the country is still alarmed, the drive is damaged.
2	Overvoltage protection	1. Restart the drive. 2. If the alarm persists after restarting the drive, check that the power supply is not too high.
3	Op amp error	1. Restart the drive. 2. Reboot the drive, if the alarm persists, the drive has a hardware failure.
4	Shaft lock error	Check for disconnected motor power wires.
5	Storage error	Use the RS232 debug port to connect to the host computer, restore the drive to the factory settings, if the alarm still exists, the drive hardware failure.
6	Motor parameters Self-tuning error	1. Restart the drive. 2. If the alarm persists after restarting the drive, set the dial code SW6 to on.
7	Excessive follow error	1. Check whether the "motor resolution" in the parameter list is set incorrectly. 2. Check the wiring between the motor and the driver to see if the phase sequence is wrong (motor A+\A-, B+\B- must correspond to the driver terminal A+\A-, B+\B-).
Wrong direction of motor rotation	Wrong motor direction setting	The dial code SW5 status is set incorrectly.
the motor does not rotate	No pulse signal	Check the pulse signal wire for accuracy.
Motor rotates in one direction only	Incorrect pulse mode selection	Check that the SW7 pulse mode is set correctly.
	No directional signals	Check that the direction signal wires are connected correctly.
Green light is not on	Unpowered	Check that the drive power supply is properly connected.

11.总线型驱动报警代码

ALM闪烁次数	名称	解决措施
1	过流保护	1.确保驱动器输出线未短路，确保电机未损坏。 2.调整电机的接线顺序。 3.更换新的驱动器。
2	过压保护	1.减小VDC/GND端子上供电电压。 2.降低加速度，减速度。
3	指令脉冲 增量过大	检查参数细分是否正确。
4	锁轴错误	1.确保电机输出A+，A-,B+,B-端子接线正确。 2.确保电机线没有断线。 3.确保编码器电源电压正常，确保编码器线缆完好，确保编码器地线接触良好。
5	自整定错误	检查电机丝杆结构是否卡顿。
6	位置超差	1.重启驱动器。 2.重启驱动器报警依然存在，检查电机动力线是否短路。 3.拔出电机动力线，重启驱动，报警依然存在，驱动损坏。
7	编码器 断线检测	确保编码器线正确连接，接点无虚焊，错位，短路。
8	急停报警	确保输入信号接线正确。
9	正负限位报警	1.电机的编码器分辨率不对，导致电机不能运行。 2.电机的动力线接错。 3.电机出力不够，适当的增大驱动器电流。 4.若增大了电流还是不行，可排查下机械结构是否存在堵及电机选型过小导致。
10	指令超速故障	检查故障是否出现在回零完成后；检查是否使用的从站回零模式。
11	堵转报警	检查电机丝杆结构是否有卡顿。
12	拉铃错误报警	1.电机的编码器分辨率不对，导致电机不能运行。 2.电机的动力线接错。 3.电机出力不够，适当的增大驱动器电流。 4.若增大了电流还是不行，可排查下机械结构是否存在堵及电机选型过小导致。
13	电流过载报警	增大驱动器输出峰值电流值Pr4.22或0x2056的bit6置为0，可屏蔽。
常亮	硬件中断保护	确认网络连接及主站ESM转换次序。

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