GH15B User Manual V4.0

Product Description

Shenzhen Ospri Intelligent Technology Co., LTD

Foreword

Dear Users:

Welcome to use the GH15B fiber laser intelligent focusing cutting head products produced by Shenzhen Ospri Intelligent Technology Co., LTD. We are honored to have your confidence in our products.

In order to make you have an overall view of the product, convenient for your use, we specifically provide the user manual for you, including product characteristics, structural feature, technical feature, direction for use, maintenance, etc. It's an essential guide when you use this product.

Please read the user manual carefully before use. I'm sure it will be helpful for you to use this product. In addition, if you have any questions during use, please contact us, and we will serve you wholeheartedly.

Declaration:

In order to ensure your safety and the product works normally, please read the guide book carefully before using.

Contents

Chapter 4 Product Debugging

Chapter 5 Product Maintenance

Chapter 1 Overview

1.1 Product Parameter

① Product parameters, as shown in Table 1.0.

Name	Fiber Laser Cutting Head
Model	GH15B
Interface Type	QBH, QD, Q+, LOE/QF-D
Wavelength	1080±10nm
Rated Power	≤15KW
Focus Length	200mm/250mm/300mm
Collimation Length	100mm
Nozzle	Various models and specifications
Focusing range	-39mm~+30mm
Centering range	±1.5mm
Focusing speed	200mm/s
Gas Pressure	≤3Mpa
Weight	7KG

Table 1.0

1.2 Cautions

① Please wear specialized laser safety goggles to ensure human safety when the cutting head is used in coordination with laser cutting machine

② Precautions and standard operations should be taken to prevent burning of cutting head and laser nozzle due to the deviation of laser beam from central axis.

③ Keep the cutting head clean to prevent coolant, condensate or other foreign matter from entering sensor parts; otherwise, it may cause sensor failure.

④ When processing products with laser, use protective devices to prevent the laser beam from causing injury to human body.

Chapter 2 Structural Features

2.1 Brief Description of Product Structure

Brief description of product structure, as shown in Figure 1.0.

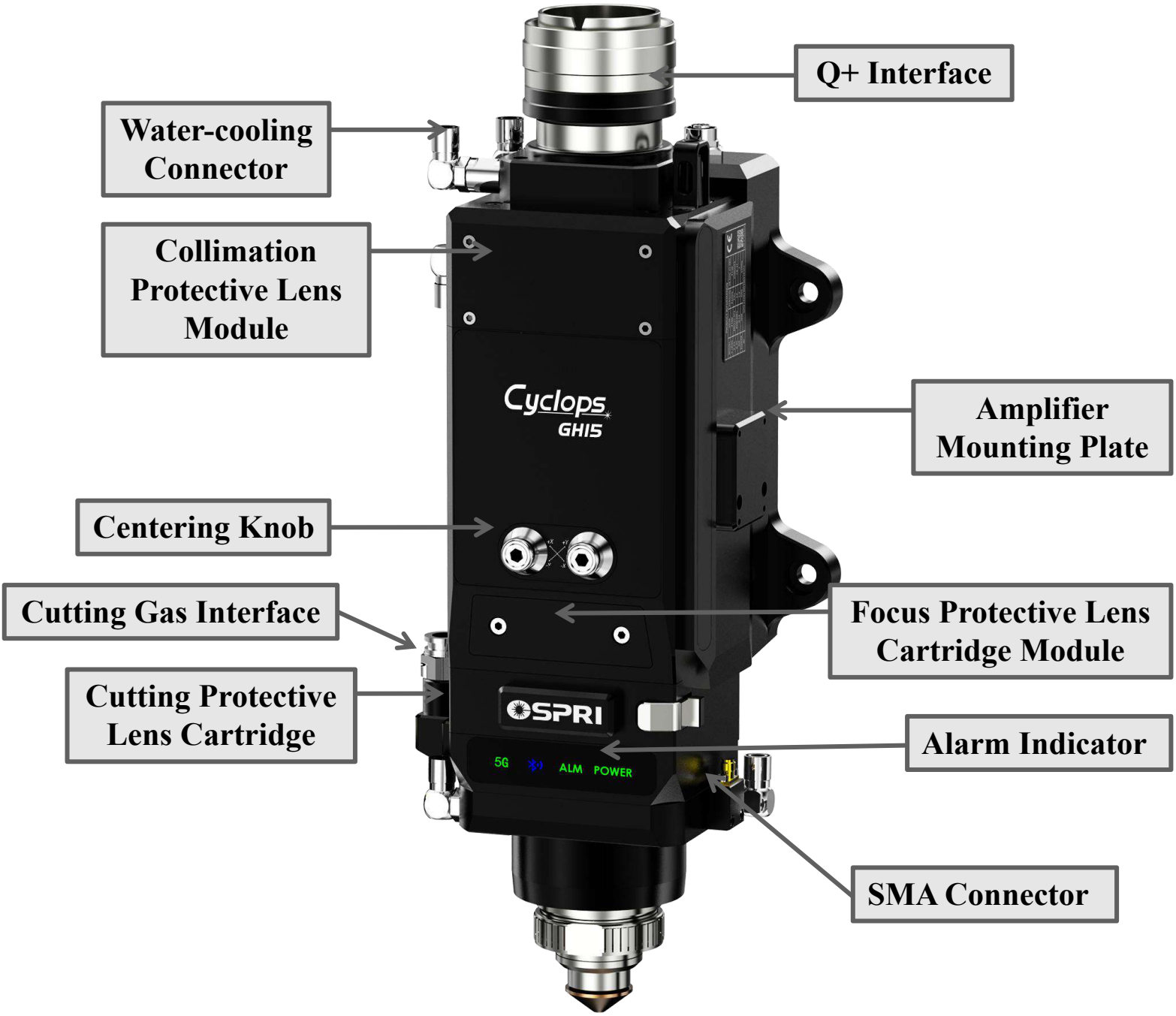


Figure 1.0

2.2 Brief Description of Product Parts

1. Q+ Interface: Connect the laser to the cutting head.

2. Collimation Protective Lens Module: When inserting and removing the fiber head, prevent dust from entering the cutting head to protect the collimator

fiber laser tip.

3. Centering Knob: Adjust the optical path center to ensure the laser beam passes through the center of the nozzle.

4. Cutting Protective Lens Cartridge Module: Seal the cutting gas and protect the focus lens.

5. Water Cooling Connector: Mainly cool the components of the cutting head.

6. SMA Connector: Connect an external amplifier.

7. Focusing Protective Lens Cartridge Module: Protect the module of the focus lens and prevent dust from contaminating the focus lens directly.

8. Cutting Gas Interface: 10mm tube connection for cutting gas input during cutting.

9. Alarm Light: Alarm for collimating lens, focus lens, and protective lens temperature; protective lens in place alarm; cutting head air leak alarm.

10. Cooling Gas Inlet: 6mm tube connection for ceramic ring cooling.

11. Amplifier Mounting Plate: Adapter plate for mounting an external amplifier.

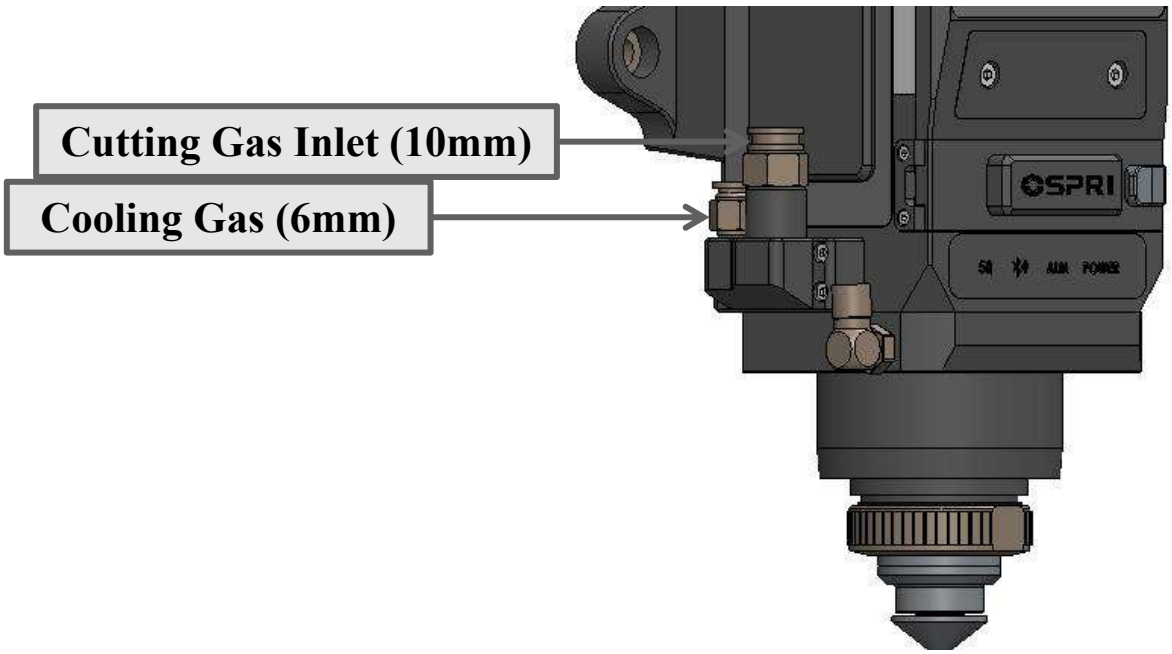
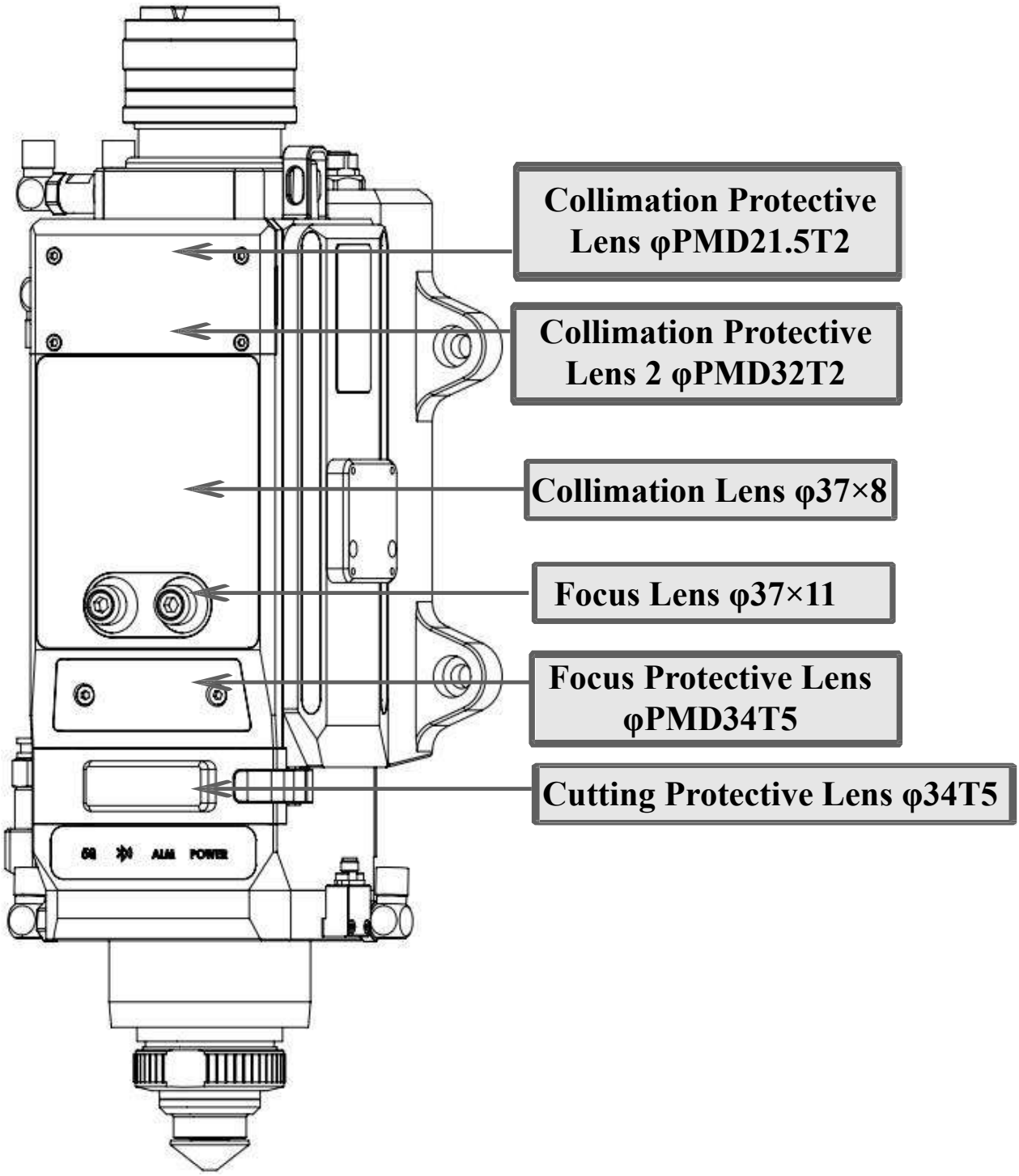


Figure 1.1

2.3 Brief Description of Product Parts (Lens Size)



Chapter 3 Product Installation

3.1 Cutting Head Installation

Cutting head installation dimensions (collimation F100/Focus F200) as shown in Figure 1.2.

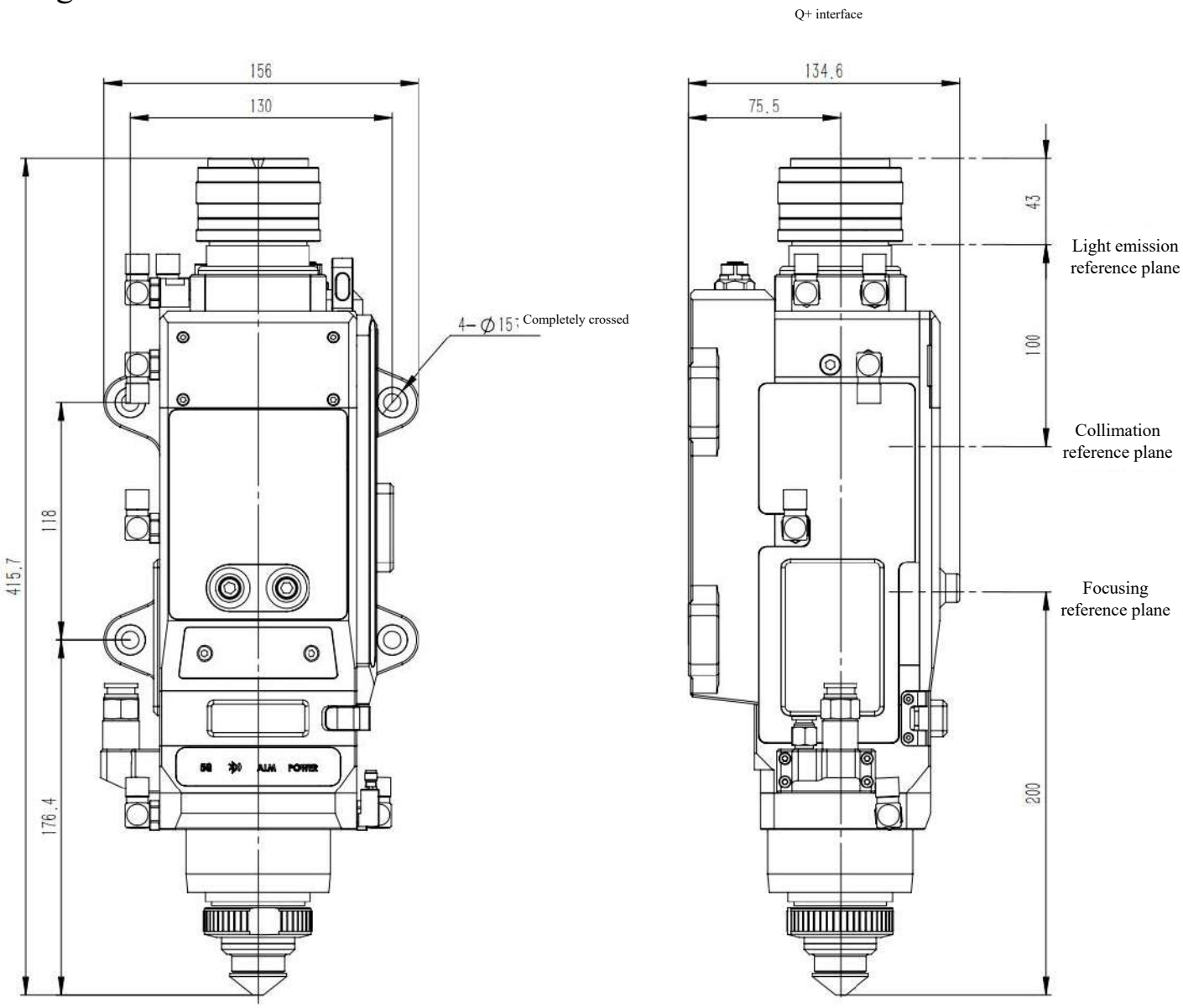


Figure 1.2

3.2 Cutting Head Connection

3.2.1 Cooling Water Connection

① Used for cutting head cooling, one inlet and one outlet for the cooling pipeline, as shown in Figure 1.3.

Figure 1.3

3.2.2 Auxiliary Gas Pipeline.

① The inlet is connected to 10mm gas hose, as shown in the Figure 1.4, and is used to connect cutting gas, with inlet
pressure <3.0 Mpa.
Common gas: Oxygen, nitrogen and compressed air.

② The inlet is connected to a 6mm gas pipe, as shown in Figure 1.4, and is used to connect cooling gas, input
pressure <0.6 Mpa.
Common Gas: Compressed air.

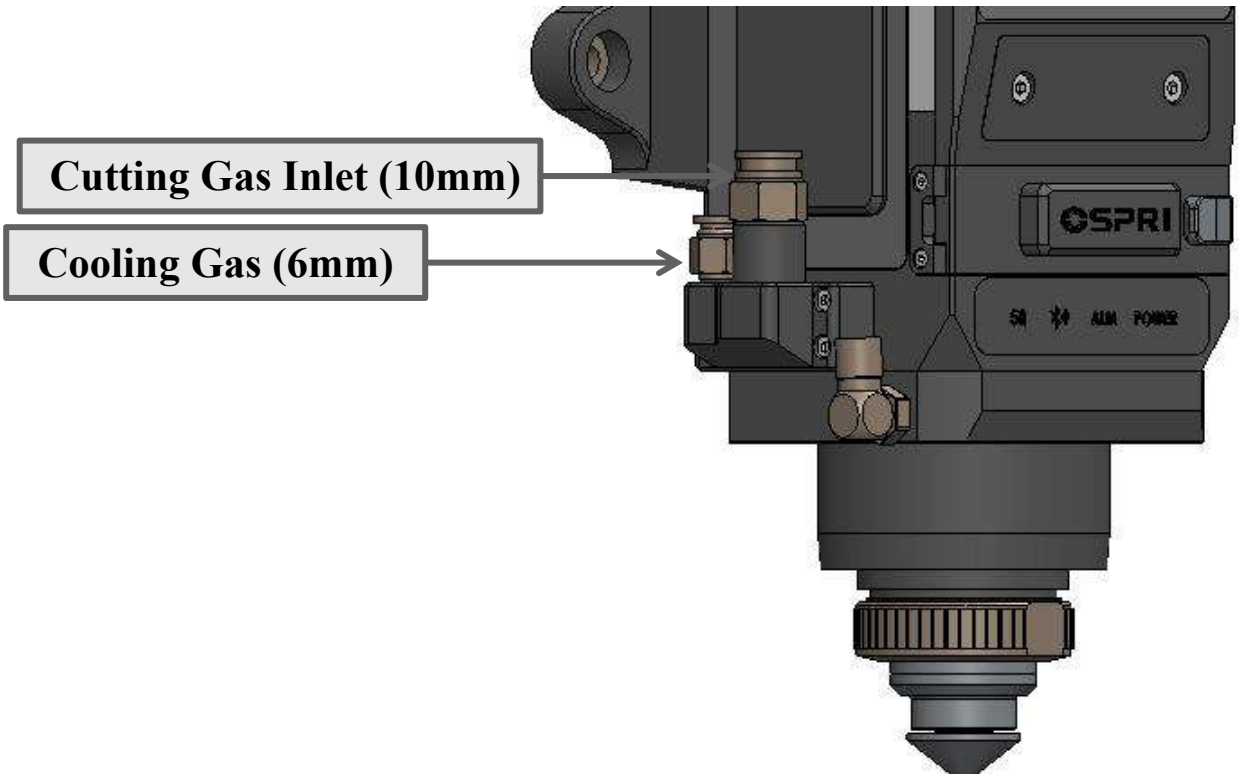


Figure 1.4

Attention: The gas entering the gas connection must be filtered and dried, otherwise it will contaminate the protective lens and cause damage to it.

3.3 Wiring Definitions and Requirements

3.3.1 Aviation Plug Interfaces.

① When inserting and removing the aviation plug, cut off the power; otherwise, the motor may be burnt out. When connecting the power line and the signal

line, pay attention to the notch position to avoid damage to the pin, as shown in Figure 1.5.

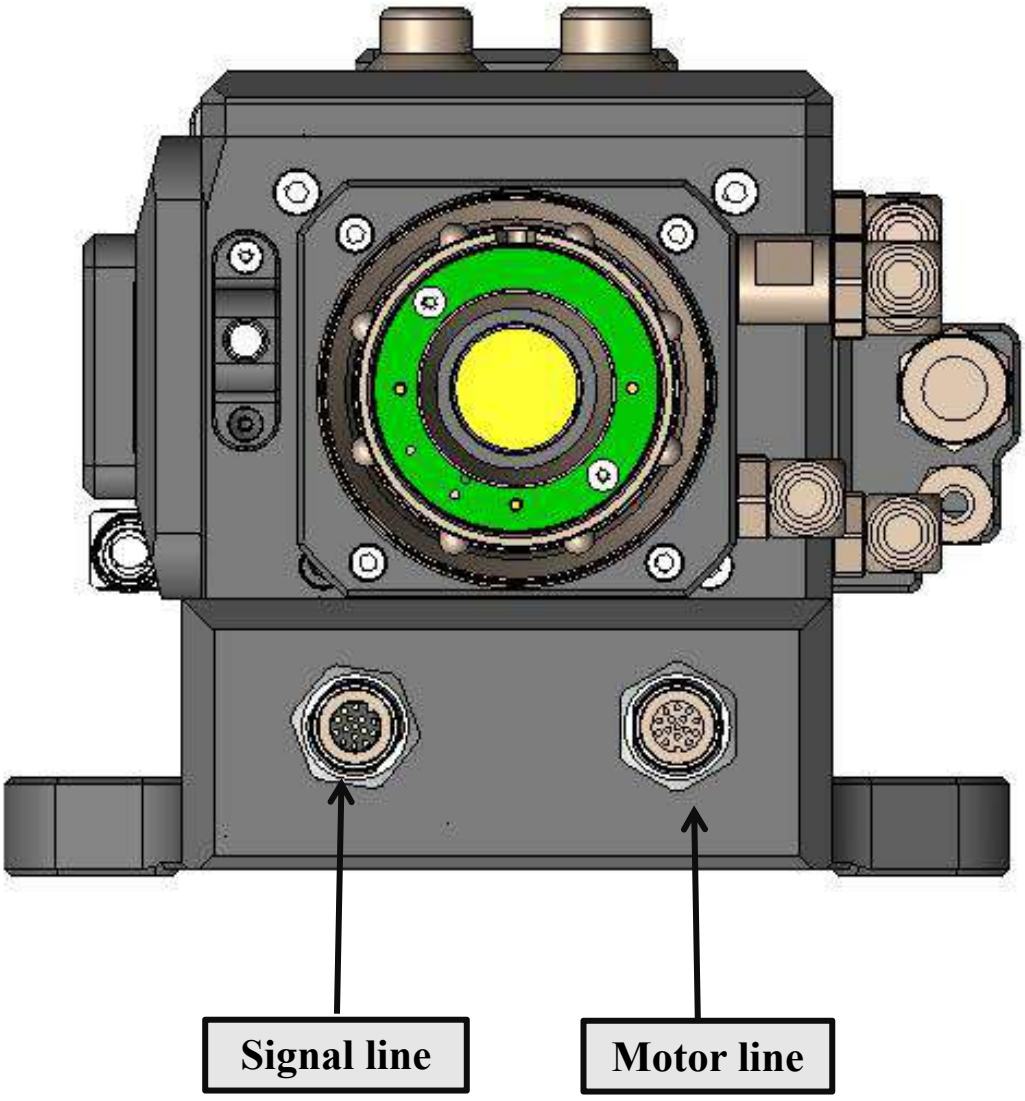
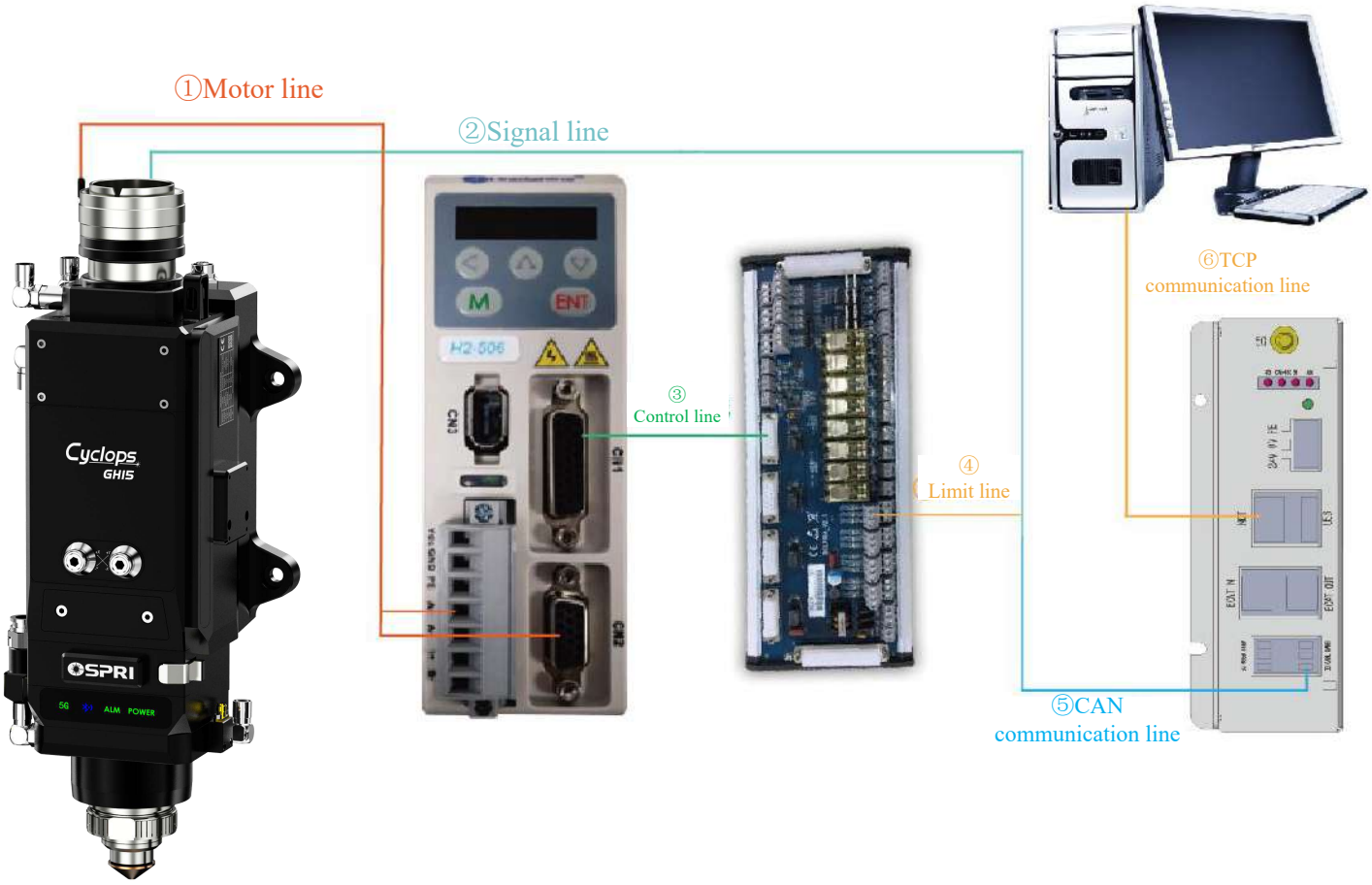


Figure 1.5

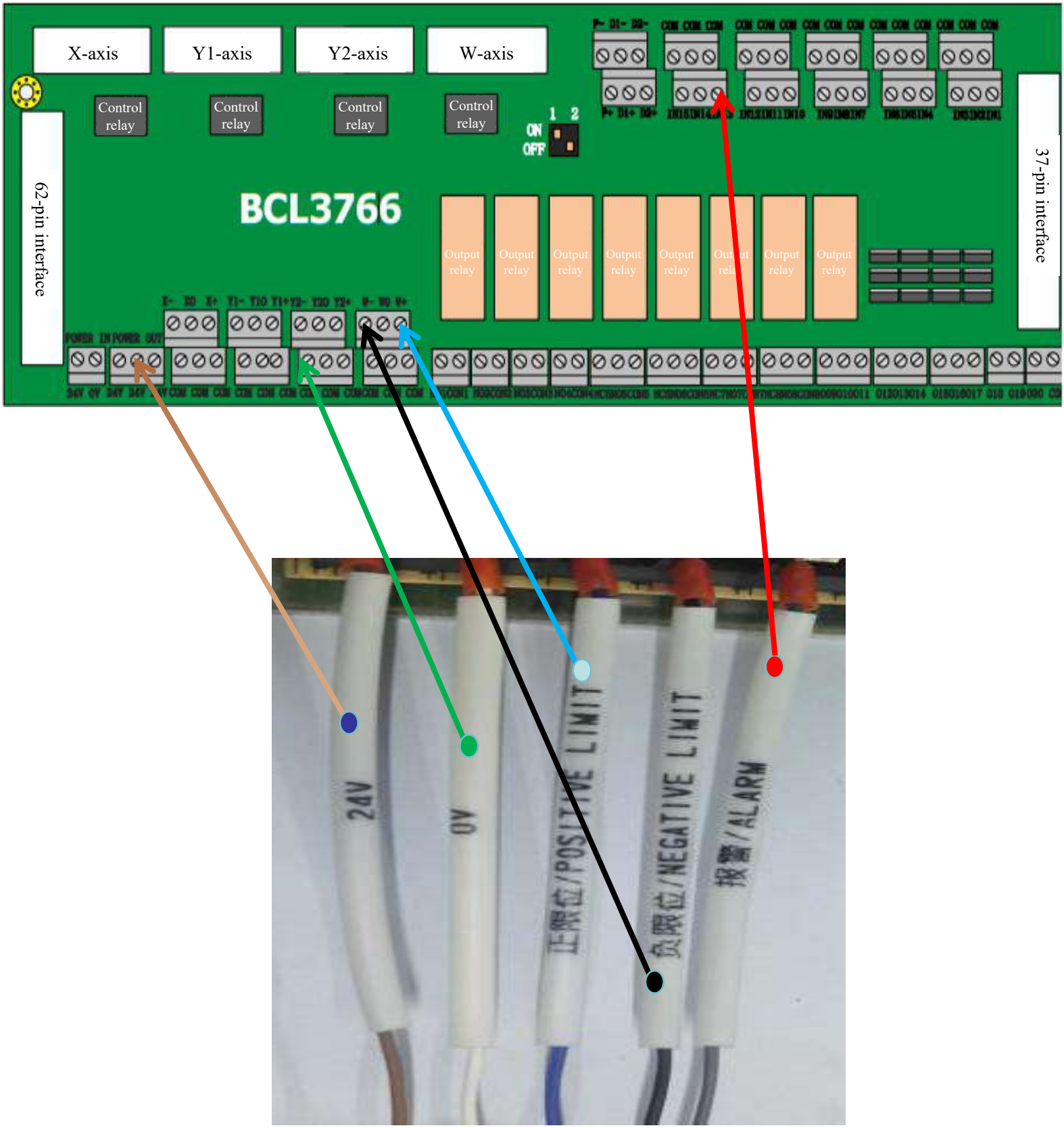
3.3.2 Overview of Pulse Wiring (Cypcut)



3.3.3 Servo Drive Power Connections (DC24V)

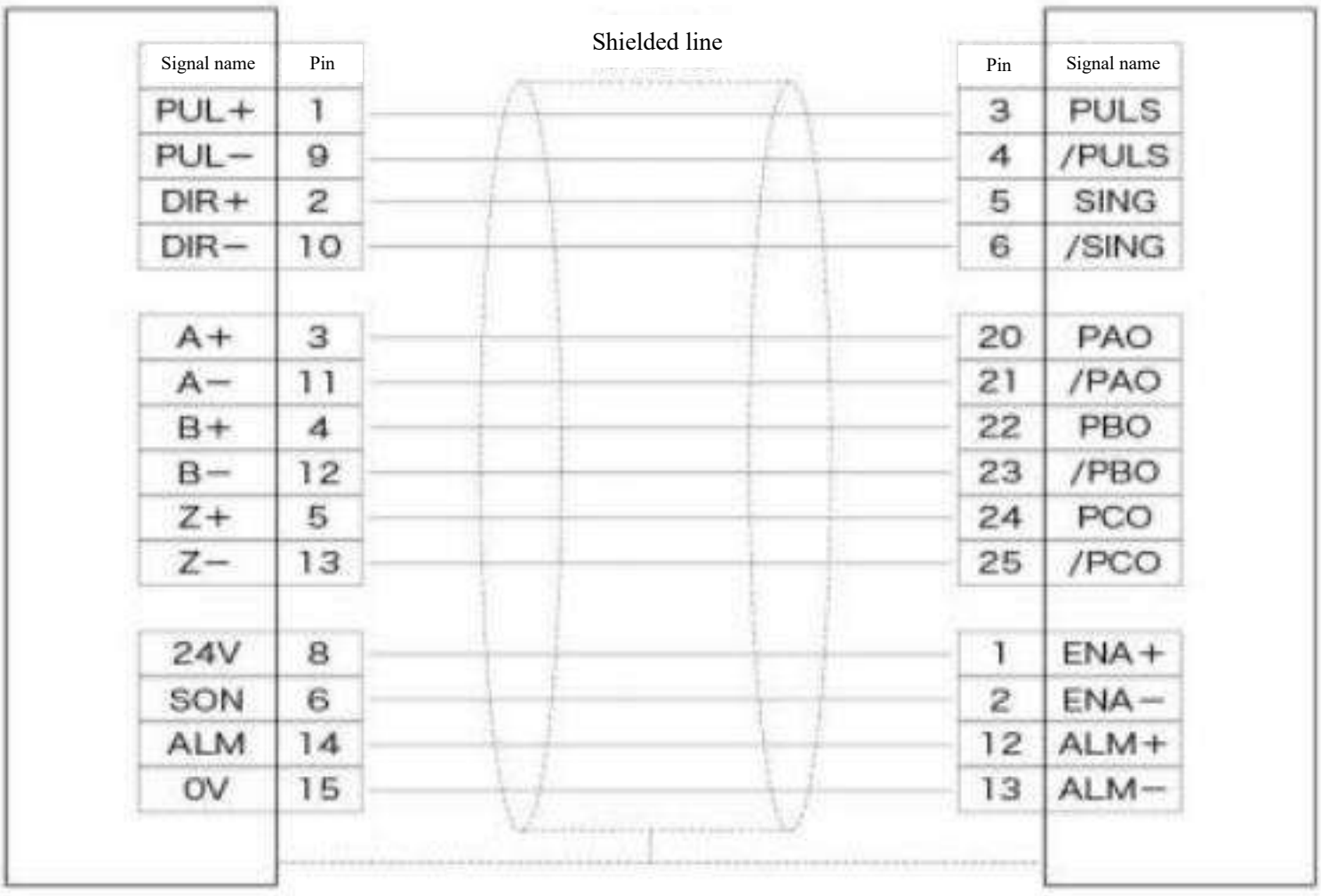
3.4 FSCUT2000C System Wiring (Example: BCL3766)

3.4.1 Board I/O Wiring



Limit switches and alarm signals are both NPN outputs; the alarm signal must be connected to the system. If damage to the cutting head occurs due to an unconnected alarm signal, the customer is fully responsible.

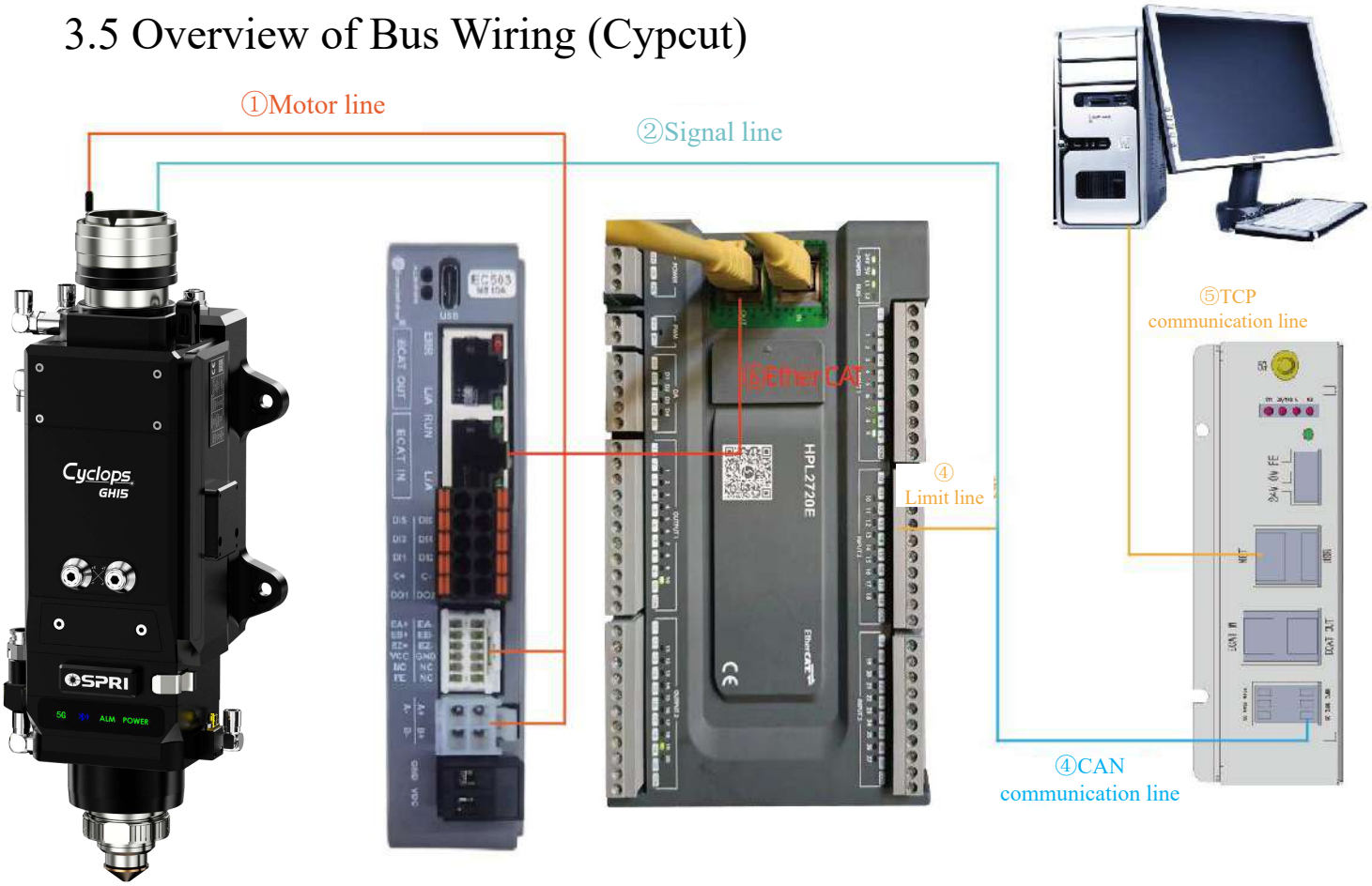
3.4.2 Cypcut Open Loop Card I/O Wiring



3.4.3 Driver Parameters

Parameter Index	Parameter Value	Parameter Content
PR007	10000	Pulses per revolution
PR008	4000	Resolution
PR015	0	Enable level
PR019	1	Motor direction
PR020	1	Bandwidth selection
PR042	6	Motor type

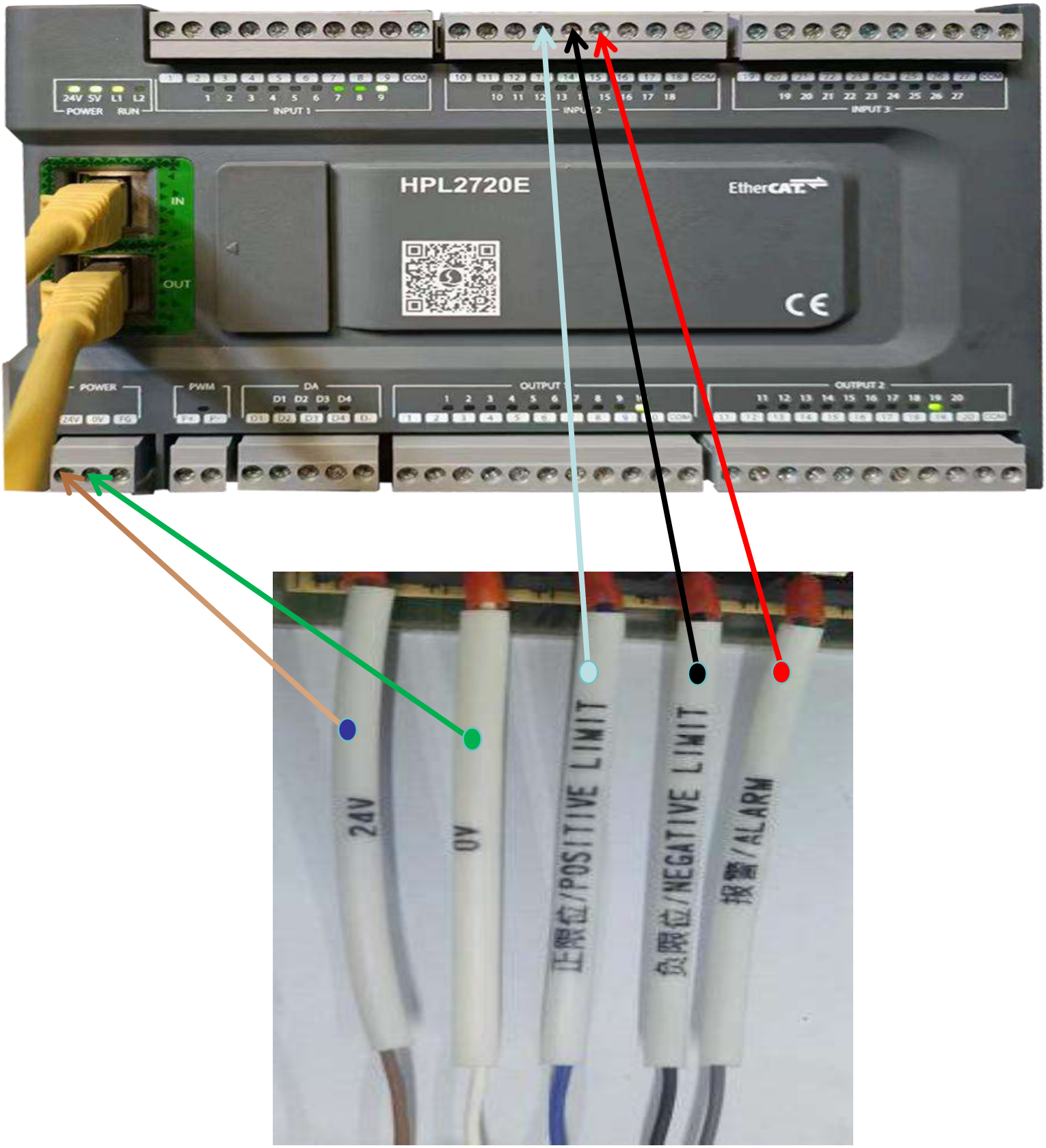
3.5 Overview of Bus Wiring (Cypcut)



3.5.1 Servo Driver Power Connection (DC24V)

3.6 FSCUT8000 System Wiring (Example: HPL2720E)

3.6.1 Board I/O Wiring (Example: HPL2720E)



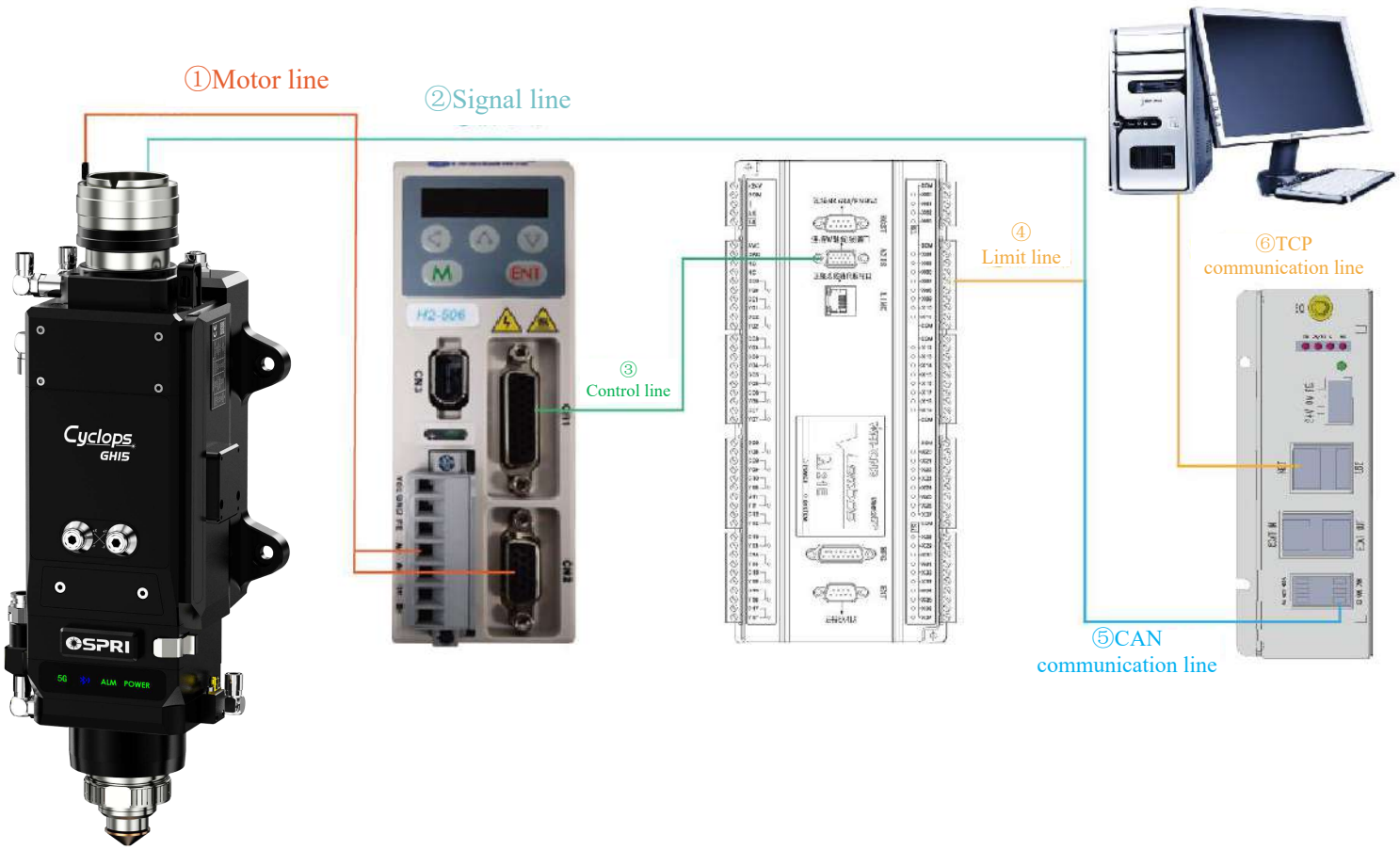
Limit switches and alarm signals are both NPN outputs; the alarm signal must be connected to the system. If damage to the cutting head occurs due to an unconnected alarm signal, the customer is fully responsible.

3.6.2 Driver Parameters

Parameter Index	Parameter Value	Parameter Content
PA000	10000	Pulses per revolution
PA003	0	Rotation direction
PA411	81	Servo alarm logic (normally closed)
PR438	0	Slave source

Note: Electronic gear ratio numerator: 8192;
Electronic gear ratio denominator: 10000;
Encoder resolution: 13 bits;

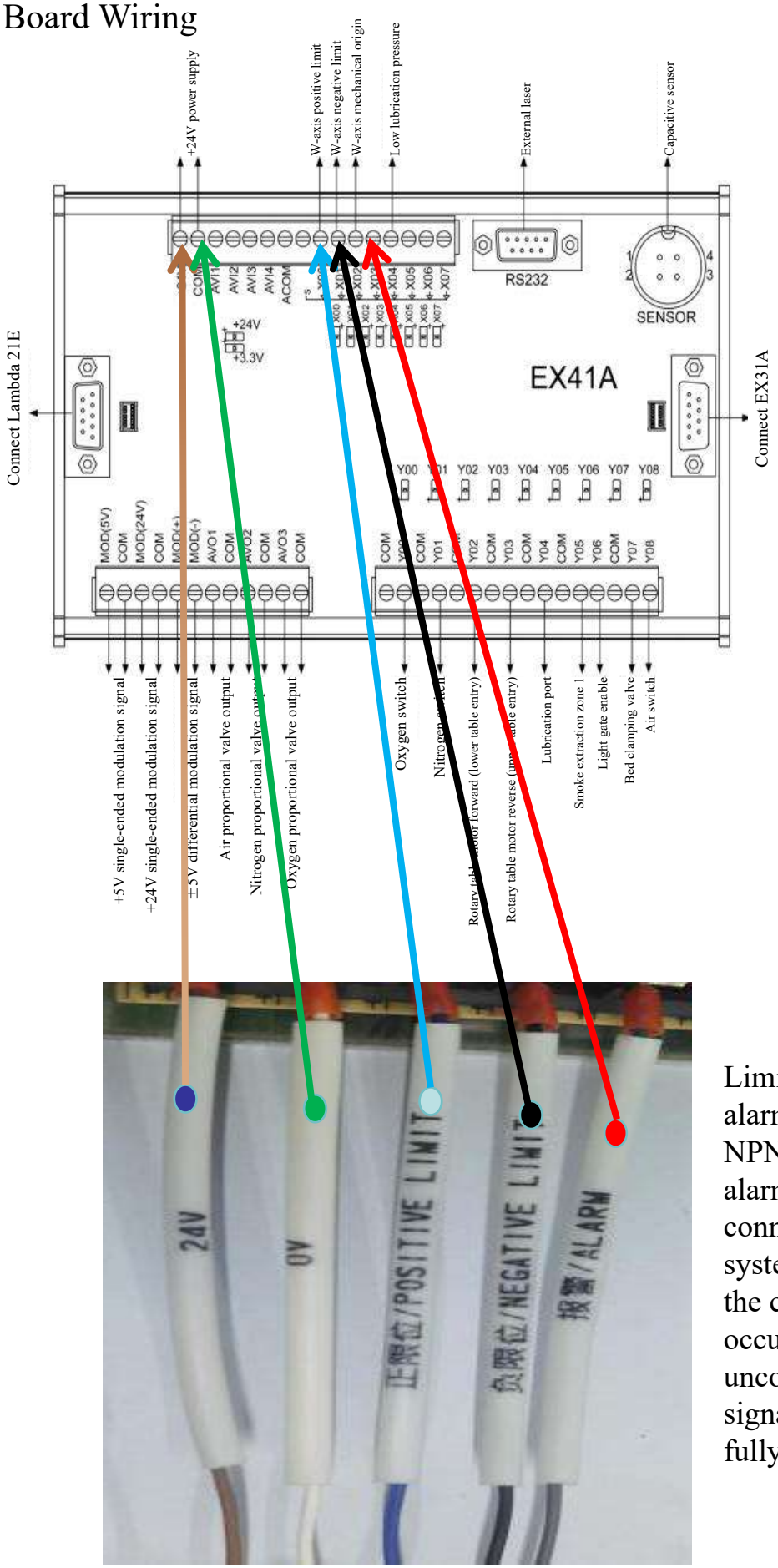
3.7 Overview of Open Loop Wiring (Weihong)



3.7.1 Servo Driver Power Connection (DC24V)

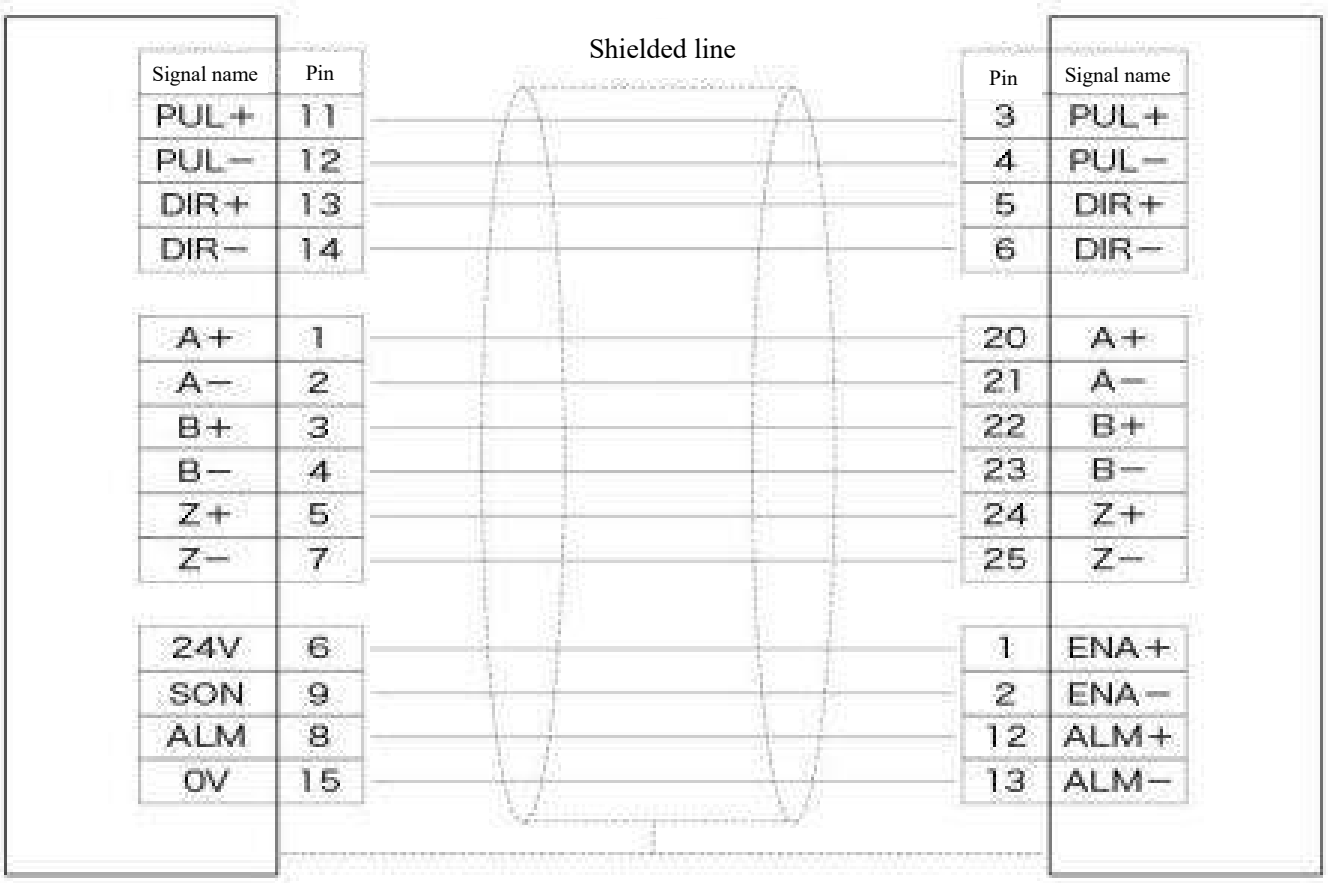
3.8 LS6000M Non-Bus System Wiring (Example: EX41A)

3.8.1 Board Wiring



Limit switches and alarm signals are both NPN outputs; the alarm signal must be connected to the system. If damage to the cutting head occurs due to an unconnected alarm signal, the customer is fully responsible.

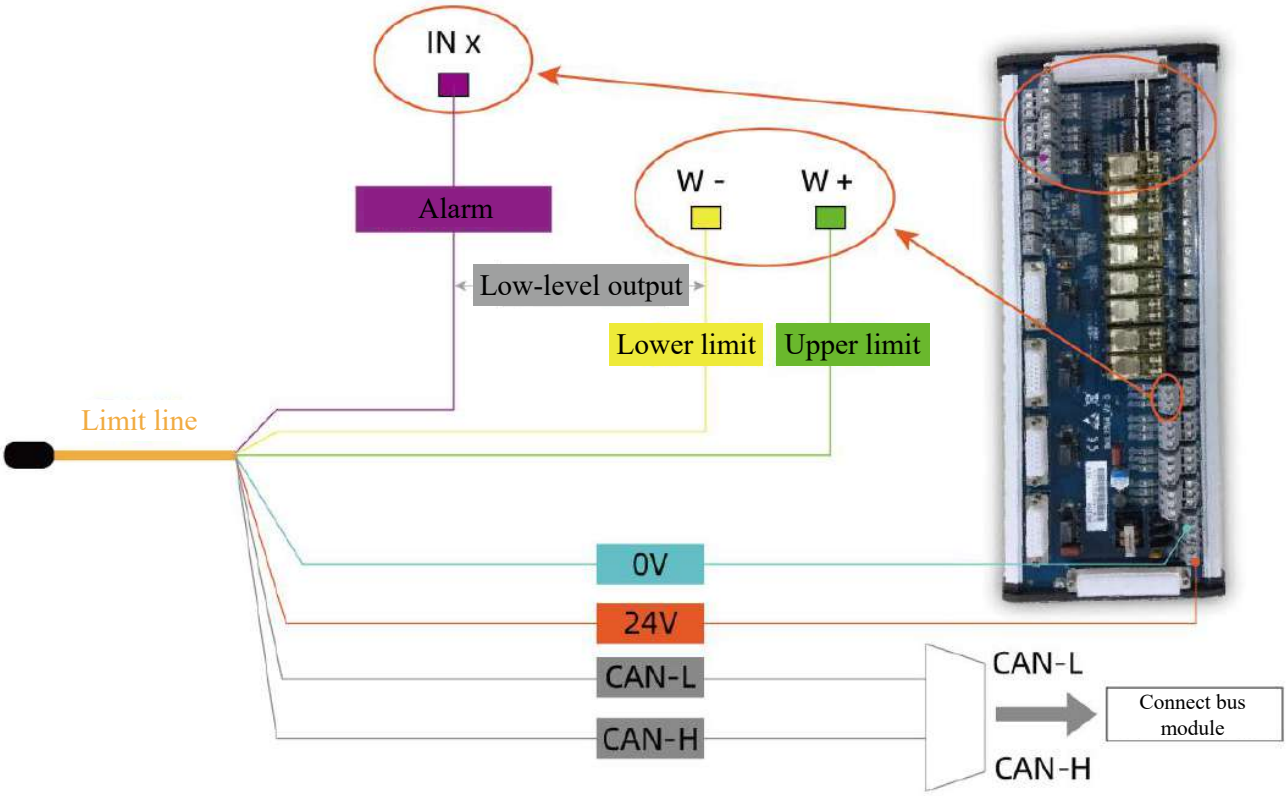
3.8.2 Weihong Open Loop Card I/O Wiring



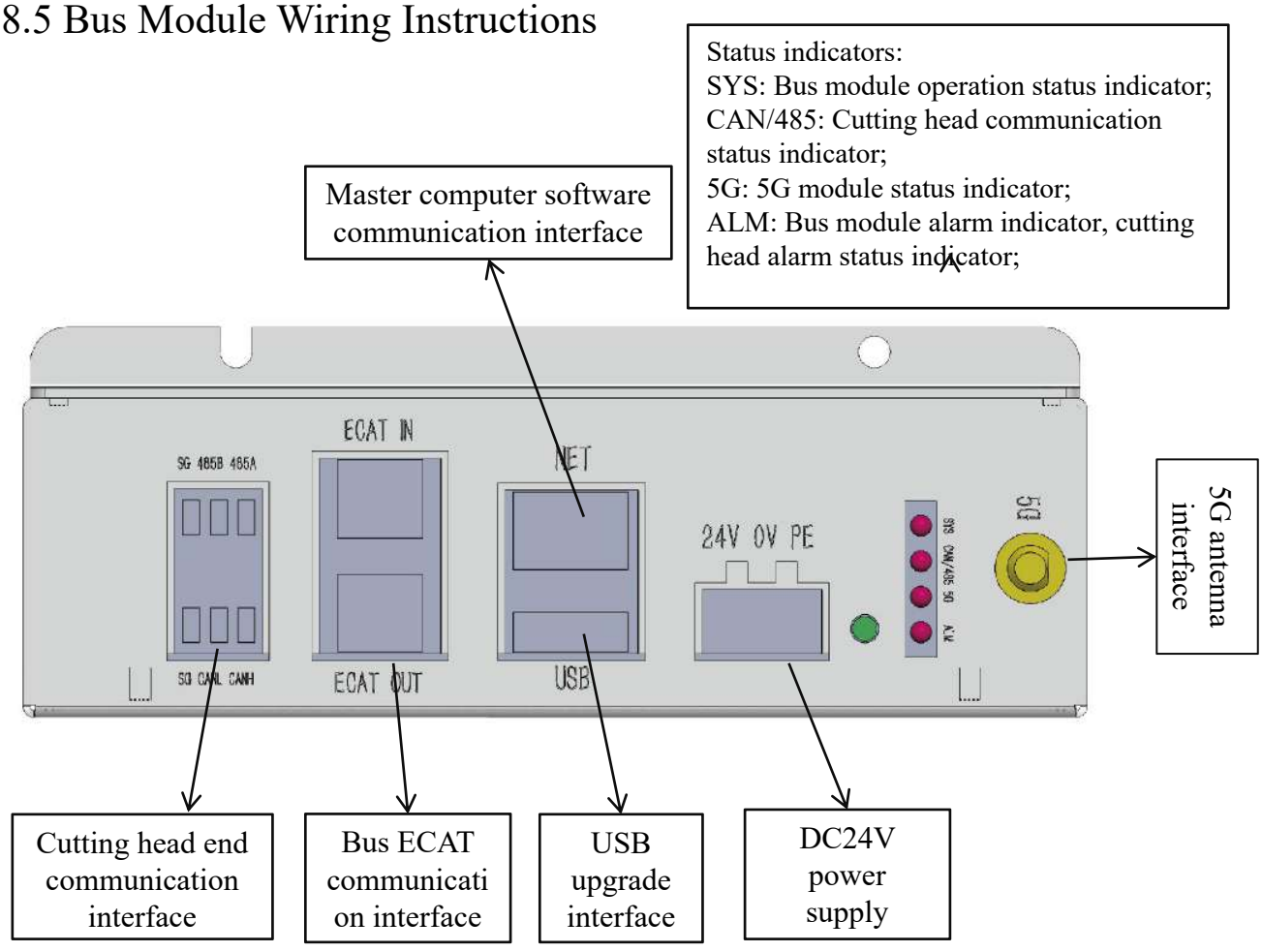
3.8.3 Driver Parameters

Parameter Index	Parameter Value	Parameter Content
PR007	10000	Pulses per revolution
PR008	4000	Resolution
PR015	0	Enable level
PR019	1	Motor direction
PR020	1	Bandwidth selection
PR042	6	Motor type

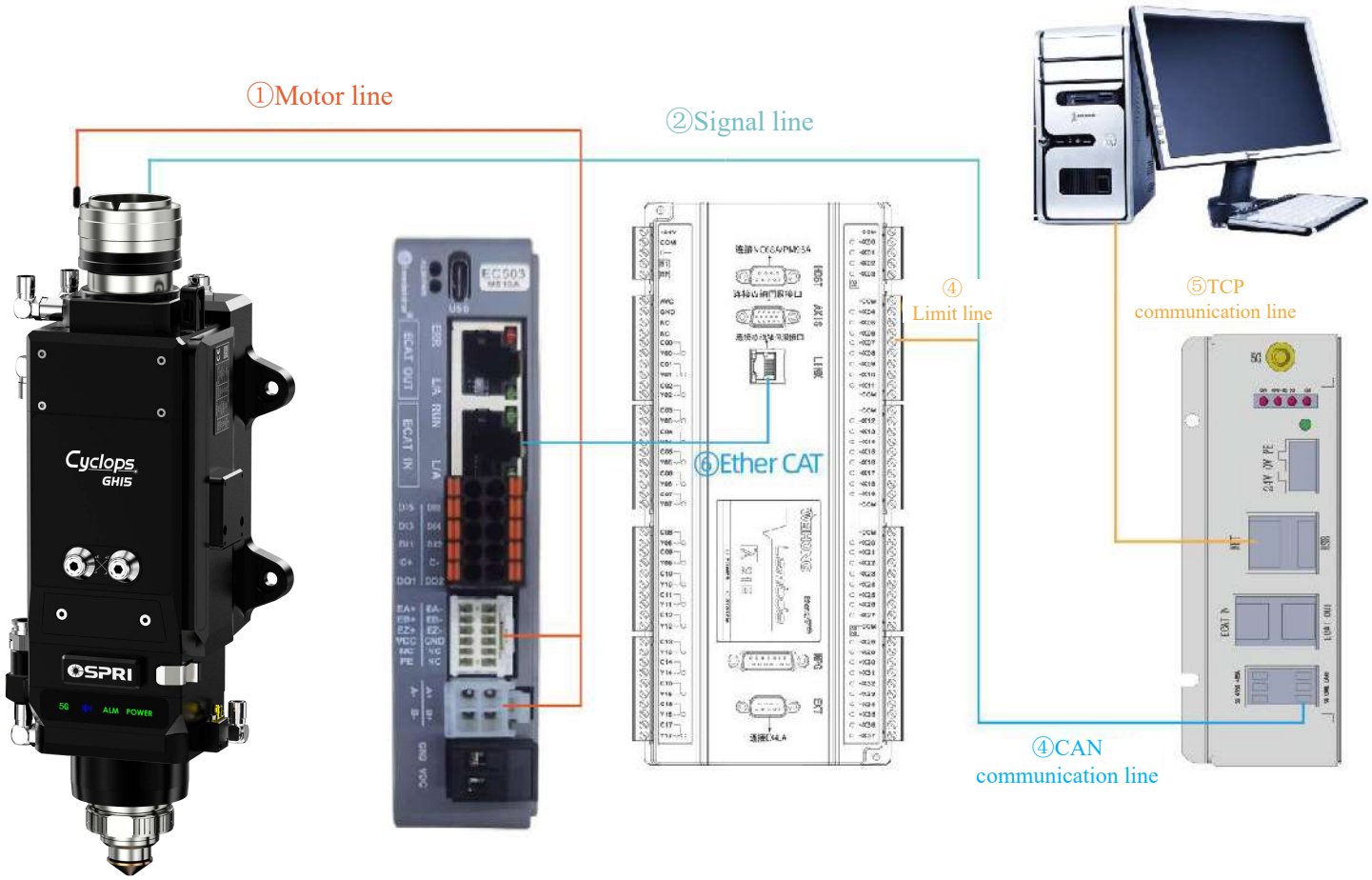
3.8.4 Signal Line Wiring



3.8.5 Bus Module Wiring Instructions



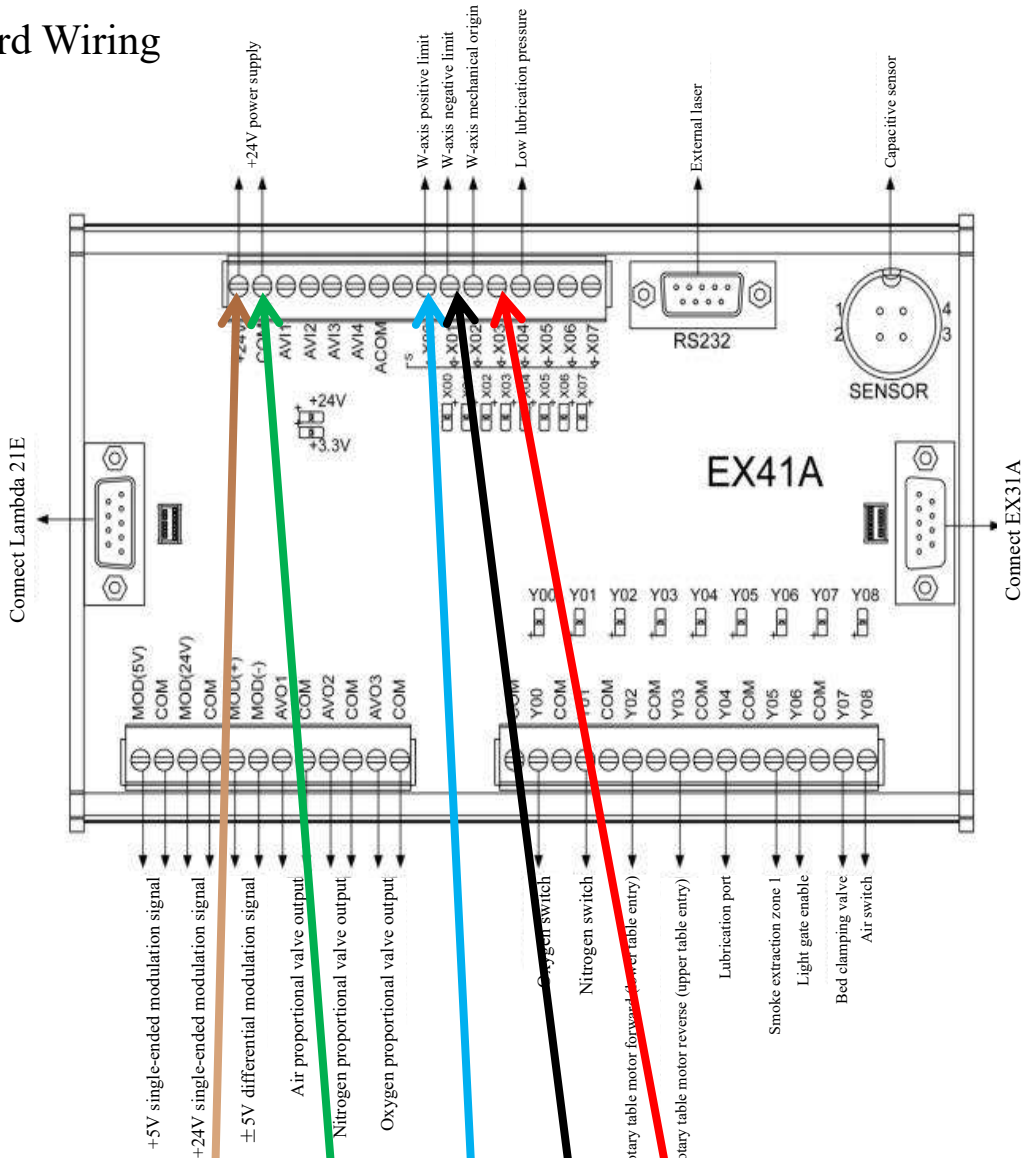
3.9 Overview of Bus Wiring (Weihong)



3.9.1 Servo Driver Power Connection (DC24V)

3.10 LS6000M Bus System Wiring (Example: EX41A)

3.10.1 Board Wiring



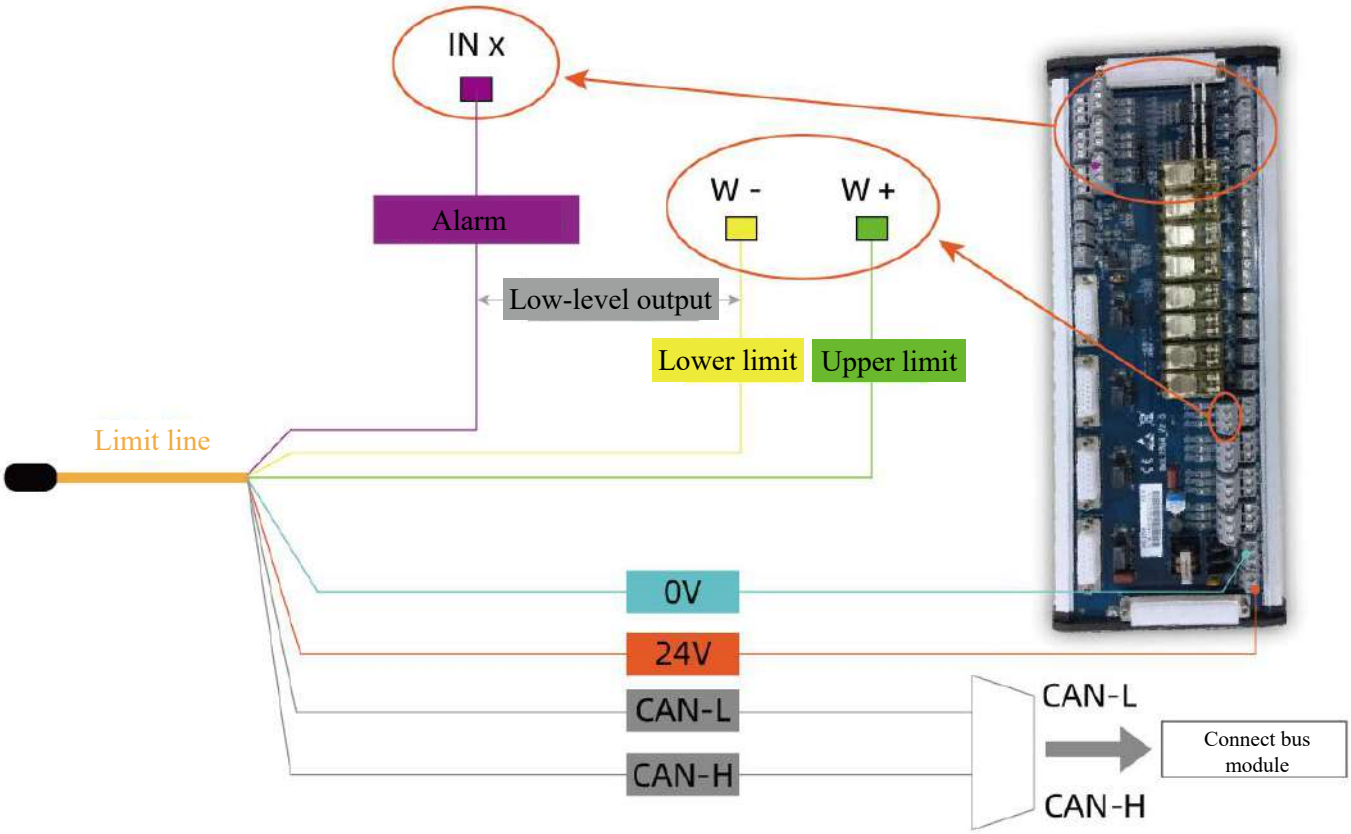
Limit switches and alarm signals are both NPN outputs; the alarm signal must be connected to the system. If damage to the cutting head occurs due to an unconnected alarm signal, the customer is fully responsible.

3.10.2 Driver Parameters

Parameter Index	Parameter Value	Parameter Content
PA000	10000	Pulses per revolution
PA003	0	Rotation direction
PA411	81	Servo alarm logic (normally closed)
PR438	0	Slave source

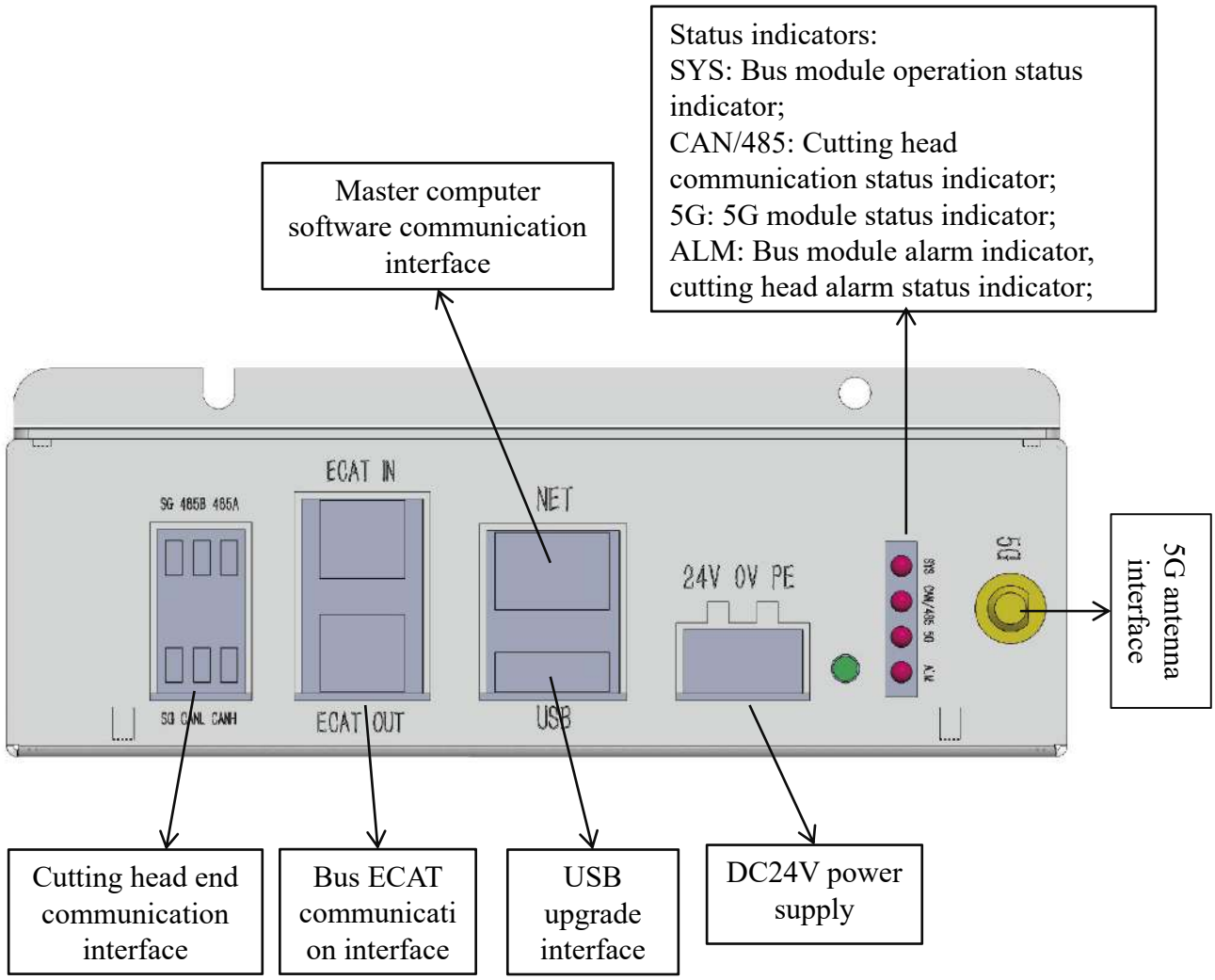
Note: Electronic gear ratio numerator: 8192;
Electronic gear ratio denominator: 10000;
Encoder resolution: 13 bits;

3.10.3 Signal Line Wiring



3.10.4 Toggle Switch Status

3.10.5 Bus Module Wiring Instructions



3.11 Q+ Fiber Laser Head Installation

① Place the cutting head horizontally, remove the dust cover, and peel off the dust sticker; as shown in Figure 2.1.

Figure 2.1

② Align the Q+ output head with the corresponding pin slot. As shown in Figure 2.2:

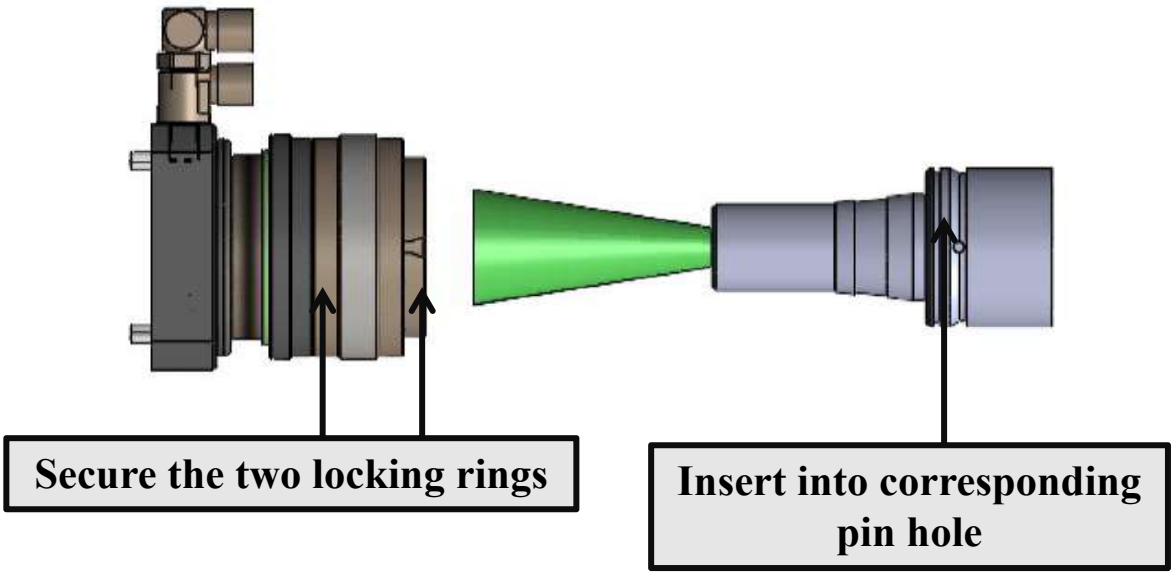


Figure 2.2

Attention: In case the fiber head is with original dust-proof gasket, users can choose whether install dust-proof cover or not according to the actual condition.

Chapter 4 Product Debugging

4.1 Focusing Instructions (Example: FSCUT2000C (Pulse System))

Focus Reset - After powering up the machine, the fourth axis should reset first to bring the focus to the zero position. Below is the cutting head platform parameter configuration for collimation 100/focus 200:

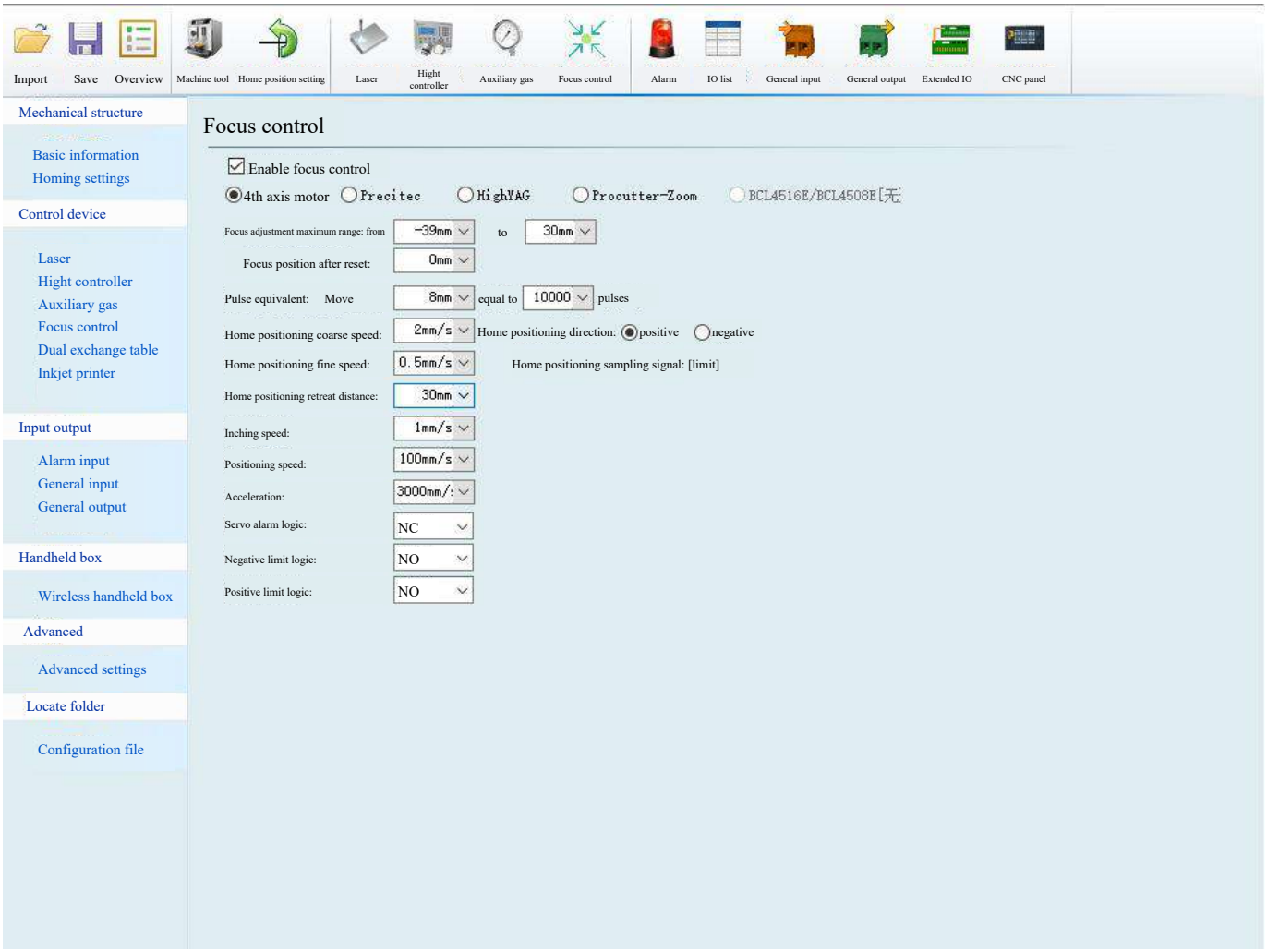


Figure 2.3

① Open the software configuration platform, set the focus retraction distance to 30mm (can be slightly adjusted according to the actual conditions), to align the collimation focus at the zero scale position (as shown in Cypcut, Figure 2.3).

Attention: The retraction distance can be slightly adjusted according to the actual cutting focus.

4.1.1 GH15/20/30B Cypcut Platform Configuration

100 collimation, 200 focus:

Maximum focus adjustment range:	-39mm to 30mm;
Pulse equivalent:	every 8mm movement corresponds to 10,000 pulses;
Return to home direction:	Forward;
Retraction distance:	30mm;
Limit logic:	Normally open;

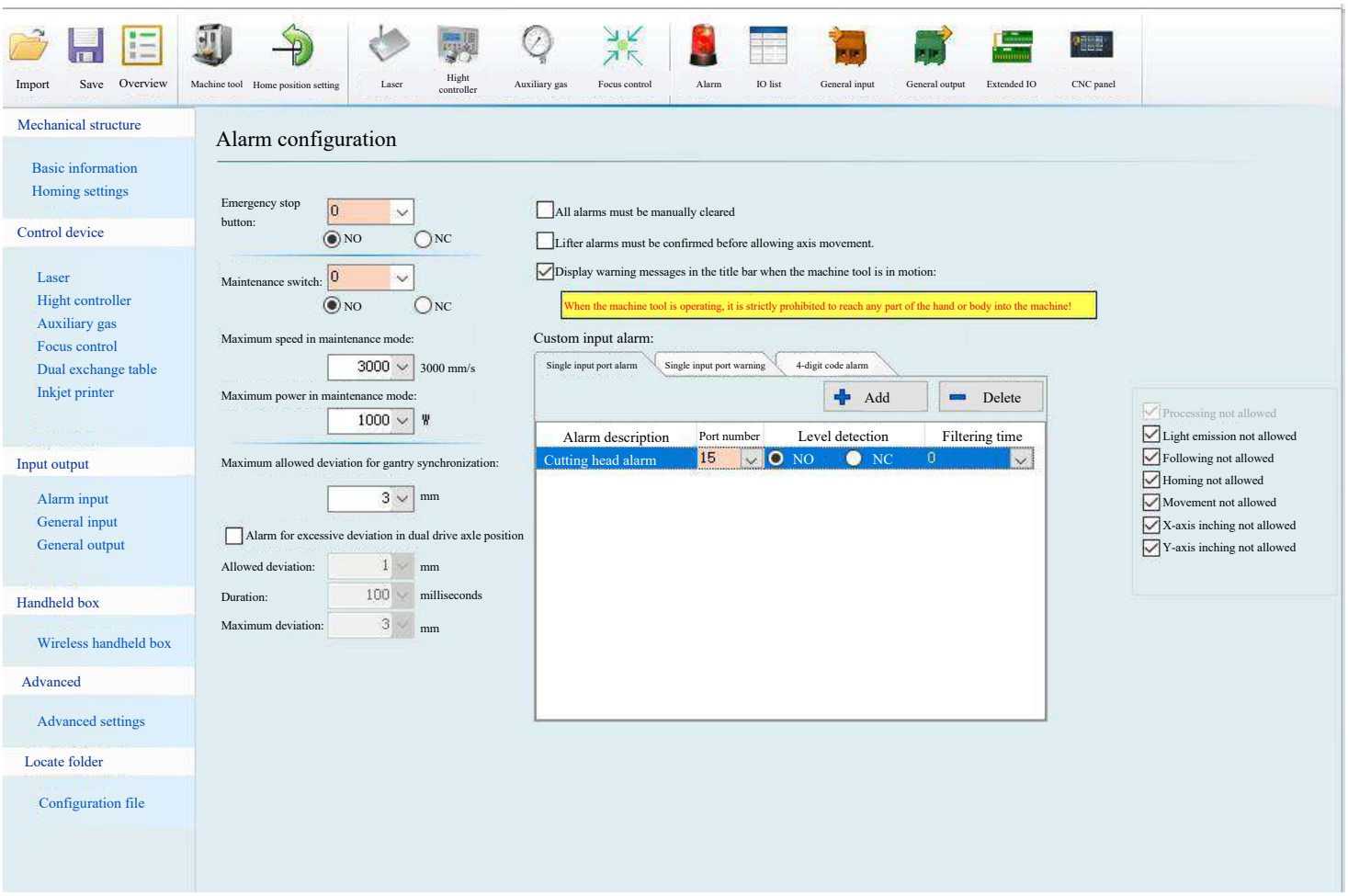
100 collimation, 250 focus:

Maximum focus adjustment range:	-60mm to 50mm;
Pulse equivalent:	Every 12.5mm movement corresponds to 10,000 pulses;
Return to home direction:	Forward;
Retraction distance:	50mm;
Limit logic:	Normally open;

100 collimation, 300 focus:

Maximum focus adjustment range:	-85mm to 70mm
Pulse equivalent:	Every 18mm movement corresponds to 10,000 pulses;
Return to home direction:	Forward;
Retraction distance:	70mm;
Limit logic:	Normally open;

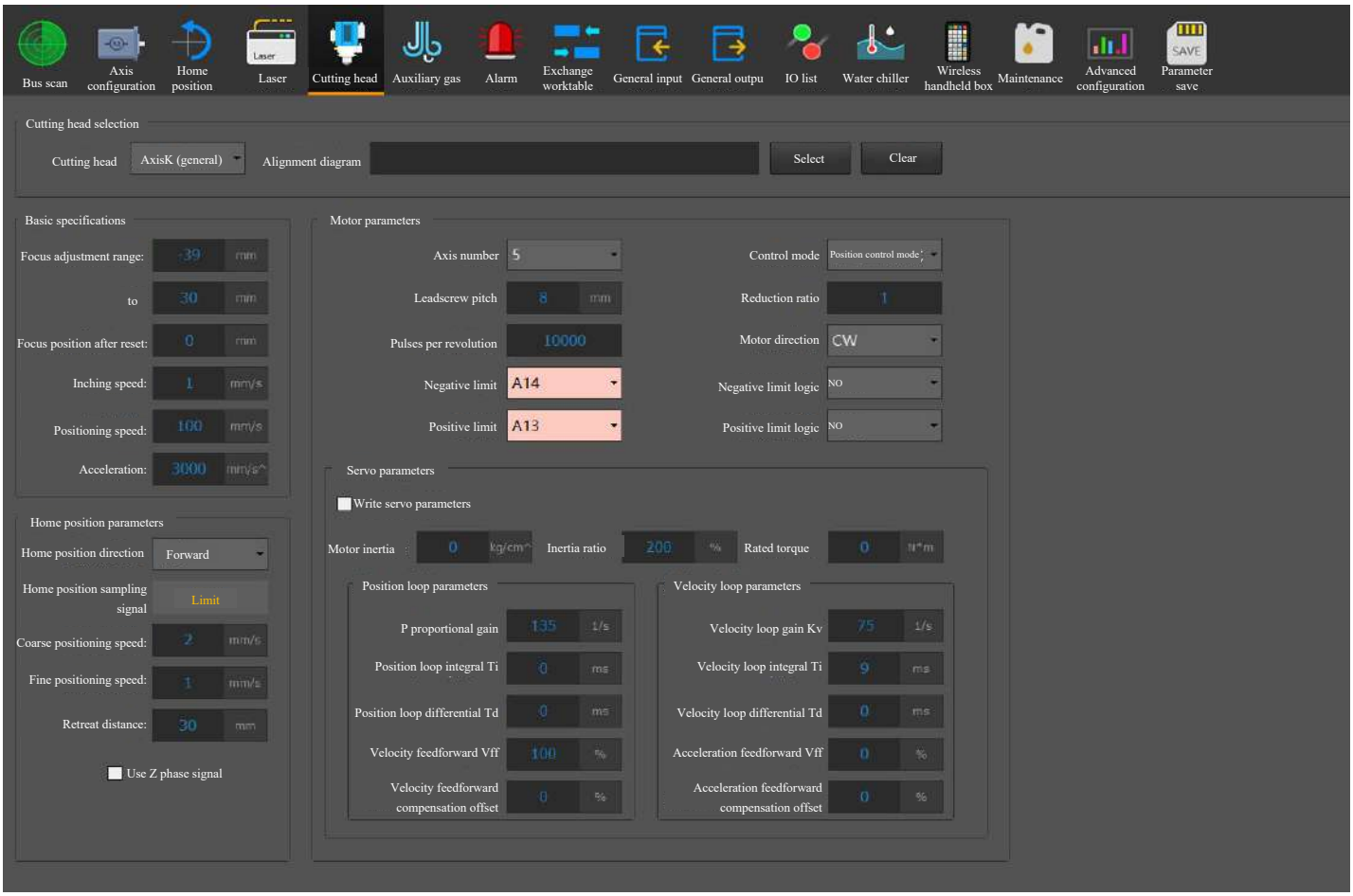
4.1.2 Alarm Signal Configuration



Set input port IN15 as the cutting head alarm signal, logic normally open, IO customized to whatever port is connected to the corresponding input port.

4.2 FSCUT8000 System Configuration (Bus System)

4.2.1 Focus Control Configuration and Limit Configuration



GH15/20/30B Cypcut Platform Configuration

100 collimation, 200 focus:

Maximum focus adjustment range:	-39mm to 30mm;
Lead screw pitch:	8mm;
Pulses per revolution:	10,000;
Positive limit:	A13;
Negative limit:	A14;
Limit logic:	Normally open;
Return to home direction:	Forward;
Retraction distance:	30mm;

GH15/20/30B Cypcut Platform Configuration

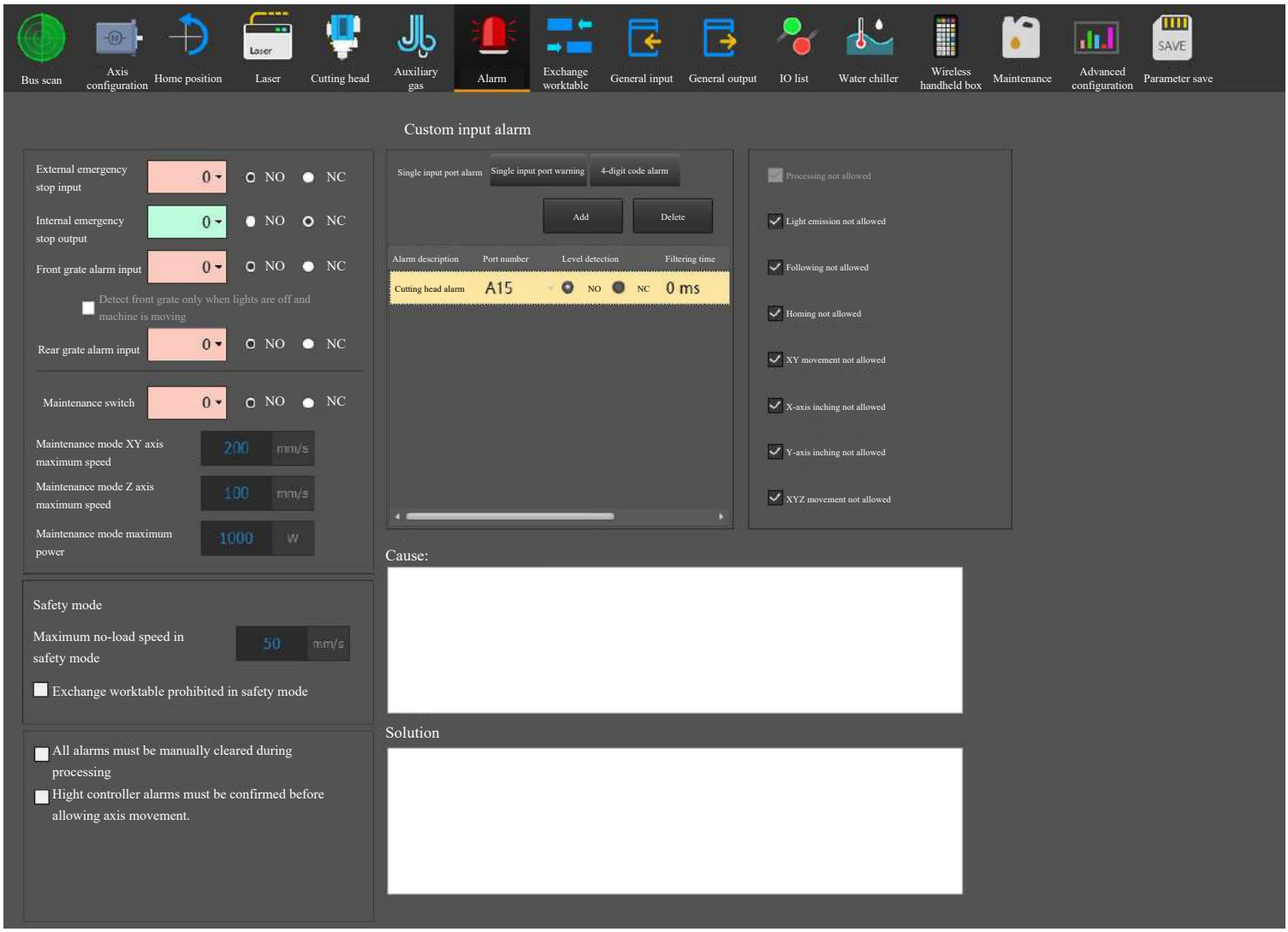
100 collimation, 250 focus:

Maximum focus adjustment range:	-60mm to 50mm;
Lead screw pitch:	13mm;
Pulses per revolution:	10,000;
Positive limit:	A13;
Negative limit:	A14;
Limit logic:	Normally open;
Return to home direction:	Forward;
Retraction distance:	50mm;

100 collimation, 300 focus:

Maximum focus adjustment range:	-85mm to 70mm
Lead screw pitch:	18mm;
Pulses per revolution:	10,000;
Positive limit:	A13;
Negative limit:	A14;
Limit logic:	Normally open;
Return to home direction:	Forward;
Retraction distance:	70mm;

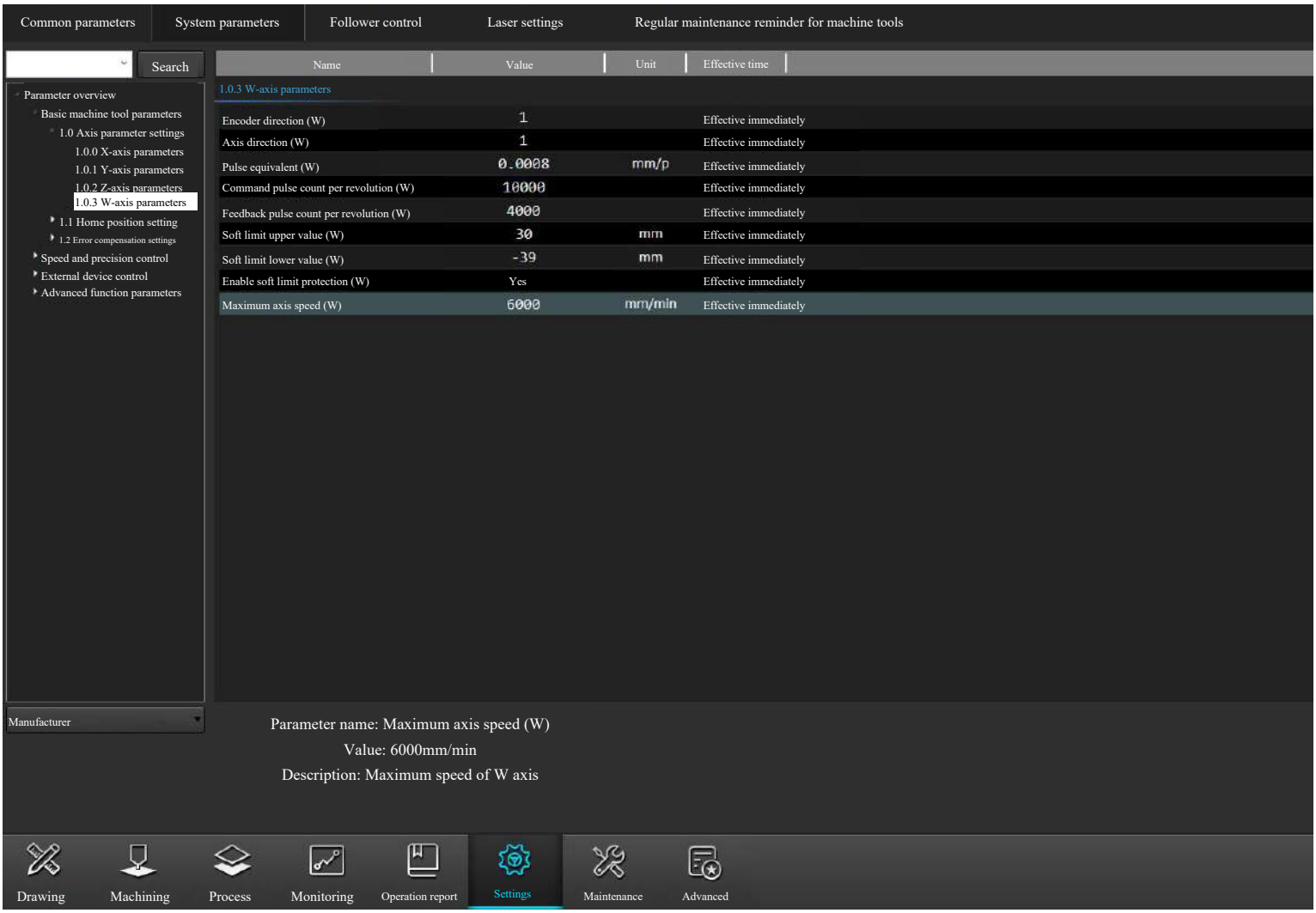
4.2.2 Alarm Signal Configuration



Set input port IN15 as the cutting head alarm signal, logic normally open, IO customized to whatever port is connected to the corresponding input port.

4.3 LS6000M Non-Bus System Configuration

4.3.1 W-Axis Parameter Configuration



GH15/20/30B Weihong Platform Configuration

100 collimation, 200 focus:

Encoder Direction:	1;
Axis direction:	1;
Pulse equivalent:	0.0008;
Pulses per revolution:	10,000;
Feedback pulses per revolution:	4000;
Retraction distance:	30;
Upper limit of soft limits:	30;
Lower limit of soft limits:	-39;
Soft limit protection enabled:	Yes;
Maximum axis speed:	6000mm/s;

GH15/20/30B Weihong Platform Configuration

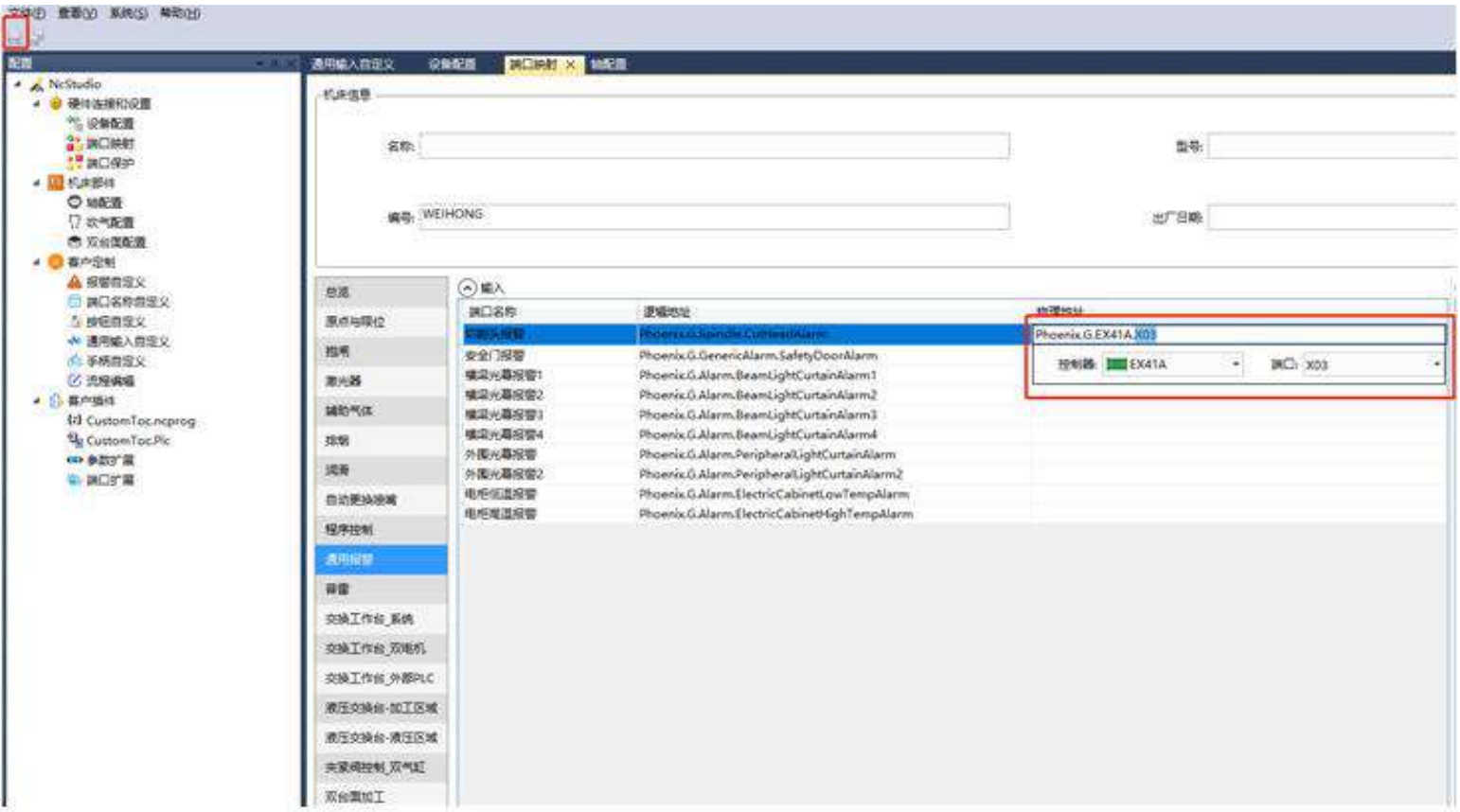
100 collimation, 250 focus:

Encoder Direction:	1;
Axis direction:	1;
Pulse equivalent:	0.00125;
Pulses per revolution:	10,000;
Feedback pulses per revolution:	4000;
Retraction distance:	50;
Upper limit of soft limits:	50;
Lower limit of soft limits:	-60;
Soft limit protection enabled:	Yes;
Maximum axis speed:	6000mm/s;

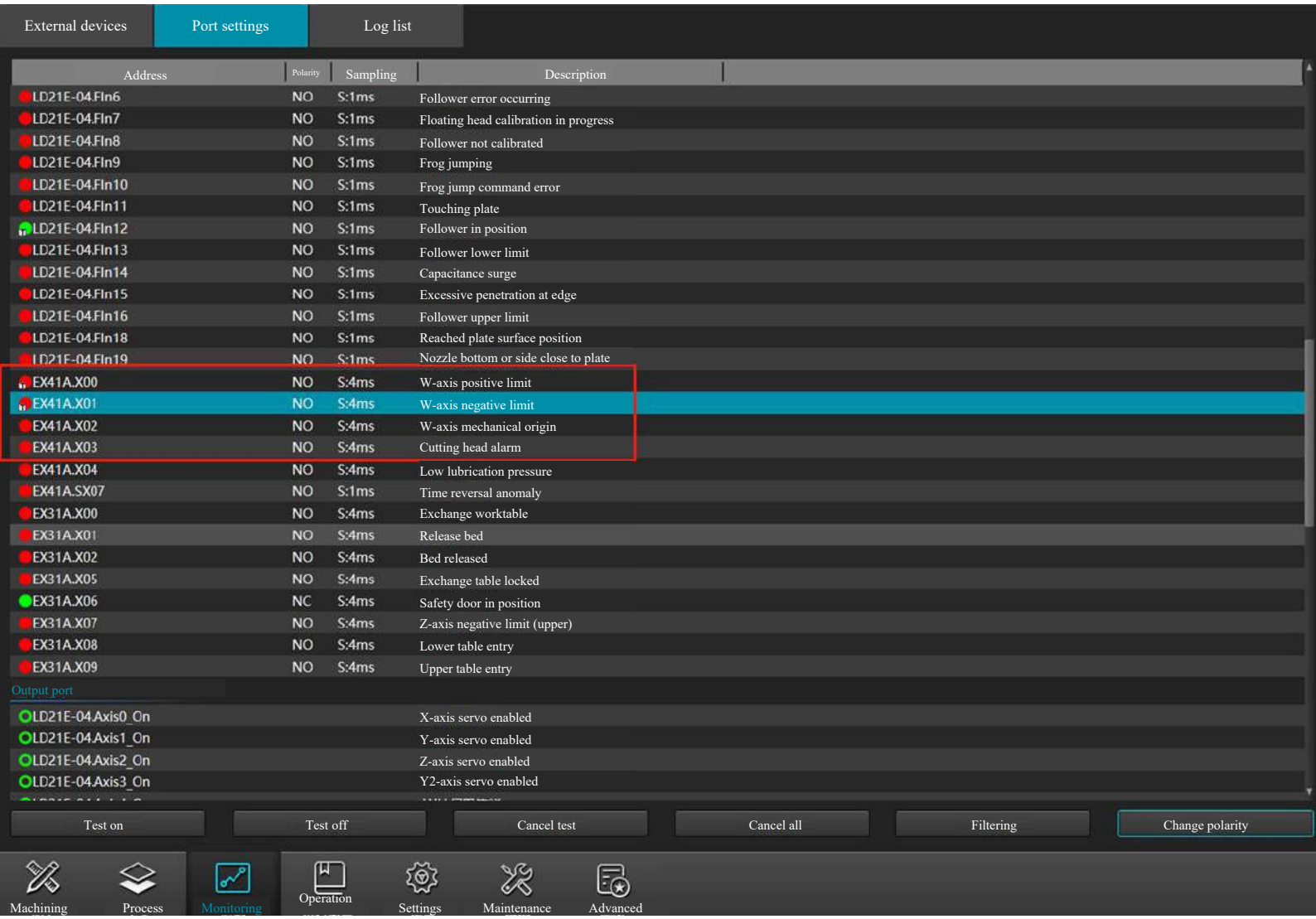
100 collimation, 300 focus:

Encoder Direction:	1;
Axis direction:	1;
Pulse equivalent:	0.0018;
Pulses per revolution:	10,000;
Feedback pulses per revolution:	4000;
Retraction distance:	70;
Upper limit of soft limits:	70;
Lower limit of soft limits:	-85;
Soft limit protection enabled:	Yes;
Maximum axis speed:	6000mm/s;

4.3.2 W-Axis Alarm Signal Association



Universal alarm bar, select cutting head alarm, associate address. Select controller, for example EX41A, choose port X03, customize IO to whichever port and connect to the corresponding input port.



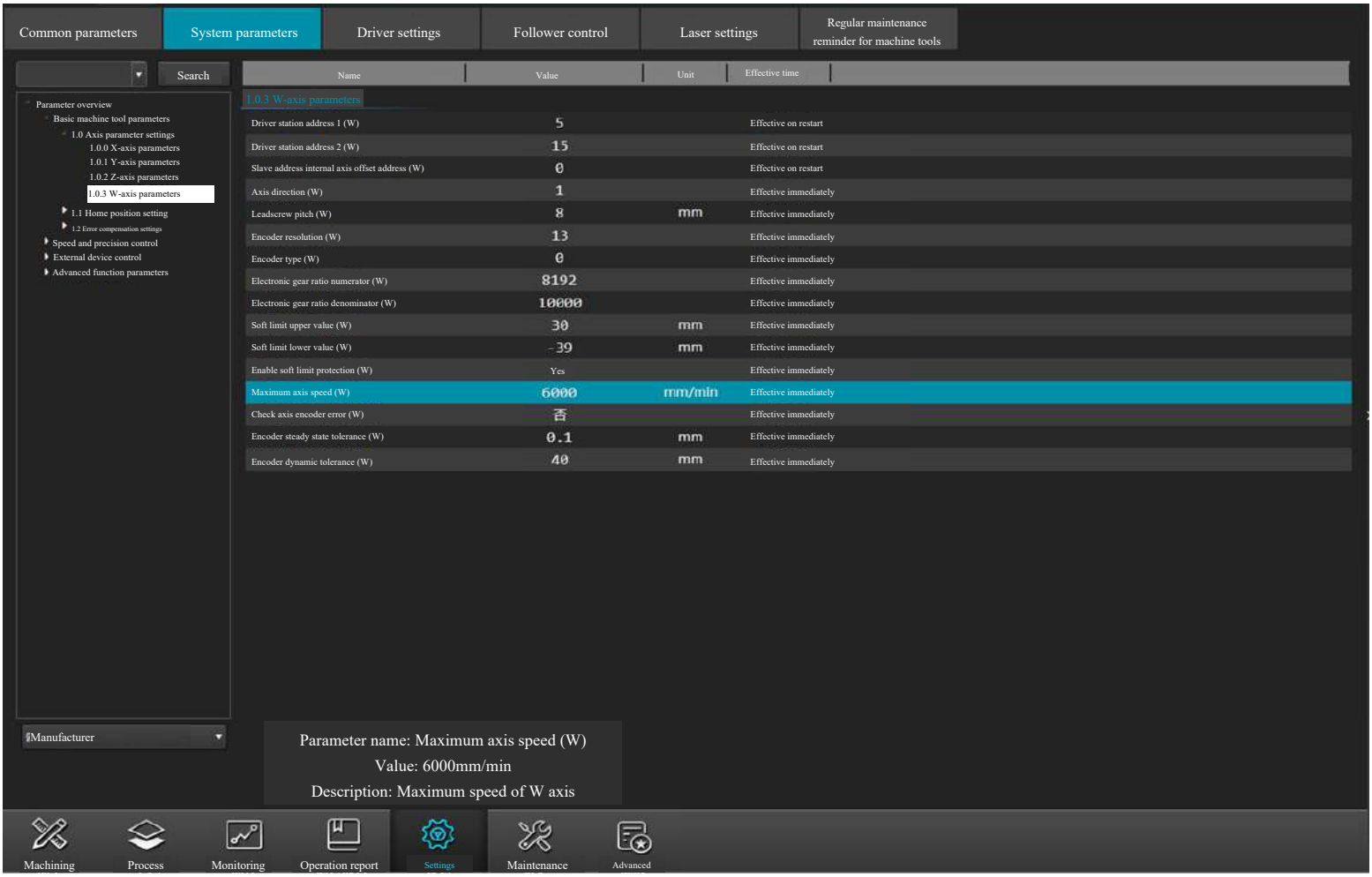
EX41A.X00 NO (normally open) W-Axis Positive Limit

EX41A.X01 NO (normally open) W-Axis Negative Limit

EX41A.X03 NO (normally open) Cutting Head Alarm

4.4 LS6000M Bus System Configuration

4.4.1 W-Axis Parameter Configuration



GH15/20/30B Weihong Platform Configuration

100 collimation, 200 focus:

Driver slave address 1 (W):	5;
Driver slave address 2 (W):	15;
Axis direction:	1;
Lead screw pitch:	8;
Encoder resolution:	13 bits;
Encoder type:	0;
Electronic gear ratio numerator (W):	8192;
Electronic gear ratio denominator (W):	10,000;;
Retraction distance:	30;
Upper limit of soft limits (W):	30;
Lower limit of soft limits (W):	-39;
Soft limit protection enabled (W):	Yes;
Maximum axis speed (W):	6000mm/min;

GH15/20/30B Weihong Platform Configuration

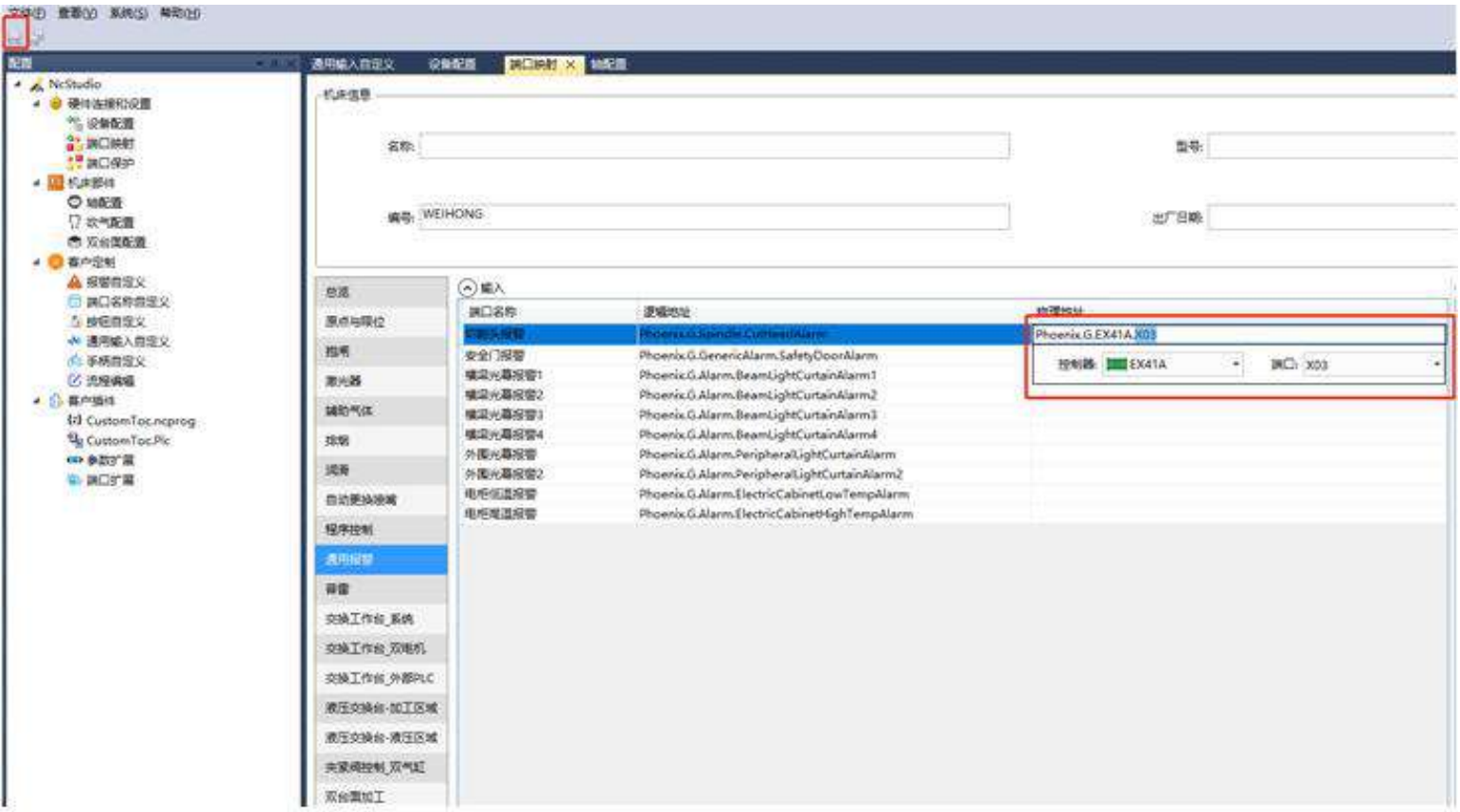
100 collimation, 250 focus:

Driver slave address 1 (W):	5;
Driver slave address 2 (W):	15;
Axis direction:	1;
Lead screw pitch:	12.5;
Encoder resolution:	13 bits;
Encoder type:	0;
Electronic gear ratio numerator (W):	8192;
Electronic gear ratio denominator (W):	10,000;;
Retraction distance:	50;
Upper limit of soft limits (W):	50;
Lower limit of soft limits (W):	-60;
Soft limit protection enabled (W):	Yes;
Maximum axis speed (W):	6000mm/min;

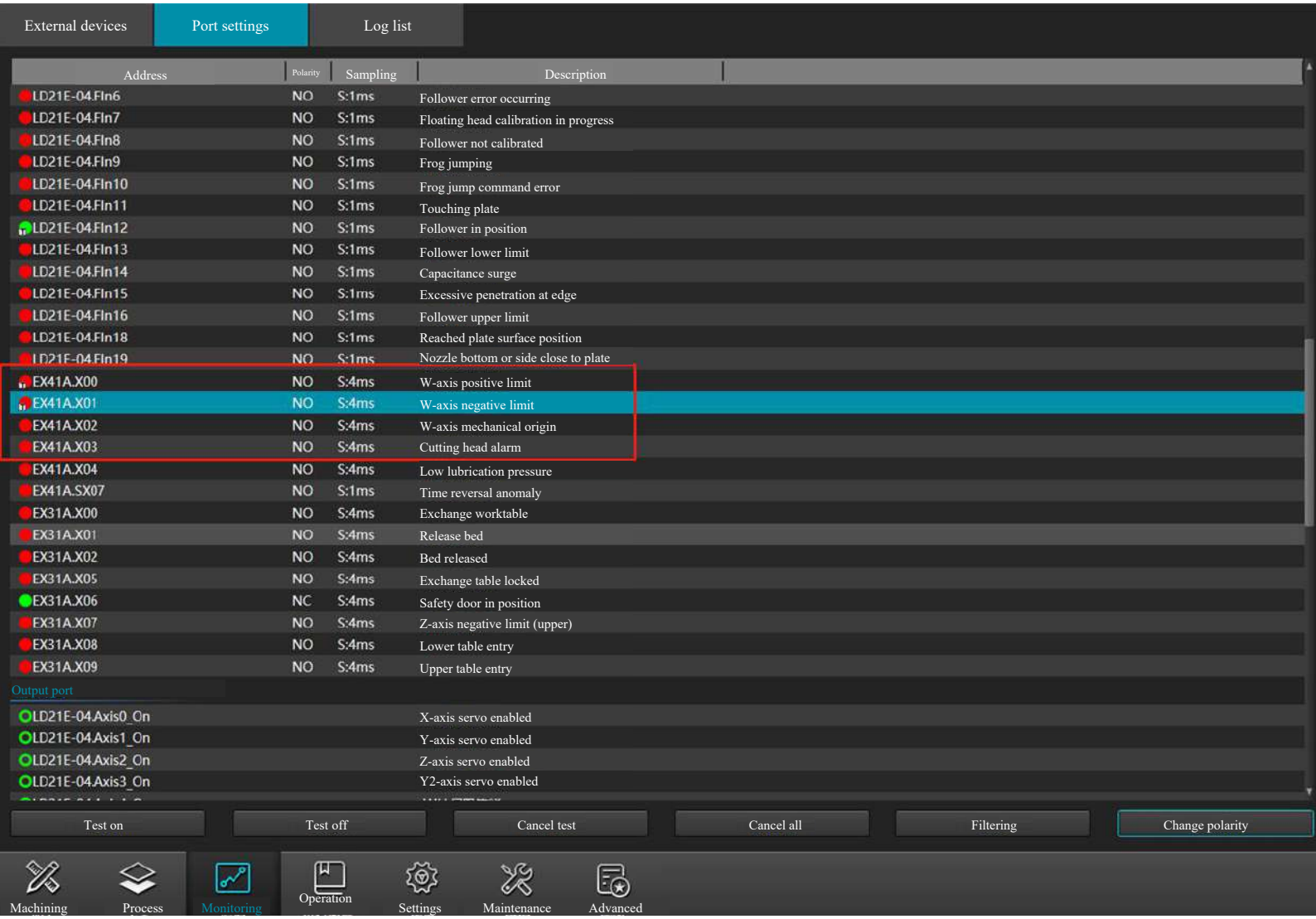
100 collimation, 300 focus:

Driver slave address 1 (W):	5;
Driver slave address 2 (W):	15;
Axis direction:	1;
Lead screw pitch:	18;
Encoder resolution:	13 bits;
Encoder type:	0;
Electronic gear ratio numerator (W):	8192;
Electronic gear ratio denominator (W):	10,000;;
Retraction distance:	70;
Upper limit of soft limits (W):	70;
Lower limit of soft limits (W):	-85;
Soft limit protection enabled (W):	Yes;
Maximum axis speed (W):	6000mm/min;

4.4.2 W-Axis Alarm Signal Association



Universal alarm bar, select cutting head alarm, associate address. Select controller, for example EX41A, choose port X03, customize IO to whichever port and connect to the corresponding input port.



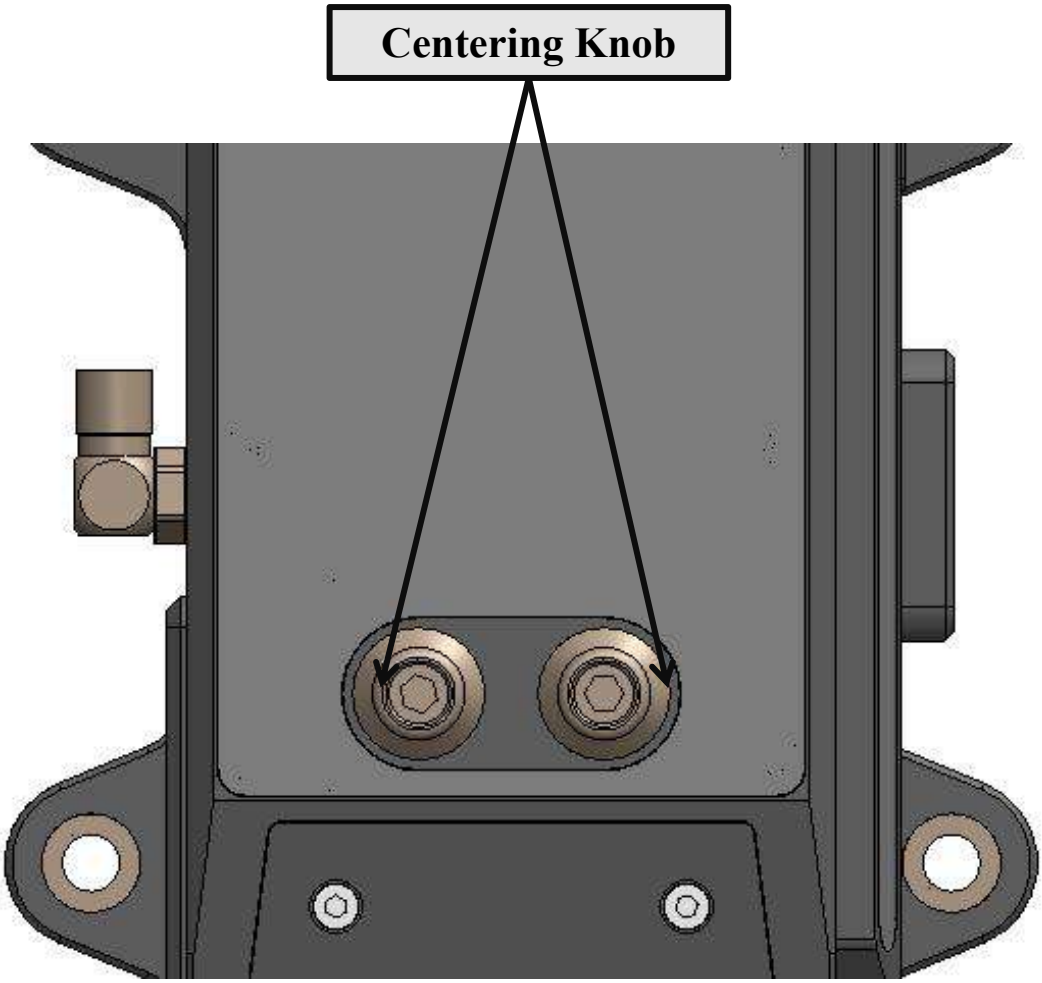
EX41A.X00 NO (normally open) W-Axis Positive Limit

EX41A.X01 NO (normally open) W-Axis Negative Limit

EX41A.X03 NO (normally open) Cutting Head Alarm

4.5 Centering Alignment Instructions

① To achieve a good joint-cutting effect, the laser beam SHOULD be kept in the center of the nozzle. When it deviates from the center of the nozzle, it needs to be centered through the beam centering module, as shown in Figure 2.4.



2.4

Note: When the centering knob is turned clockwise, the center of the lens moves inward.

When the centering knob is turned counterclockwise, the center of the lens moves outward.

4.6 Mobile APP Operation Instructions

4.6.1 Mobile APP Software Installation.

① After installation, the icon appears as shown in Figure 2.5; continue by clicking 'Install', and the icon after installation is shown in Figure 2.6. This APP currently only supports installation on Android devices.

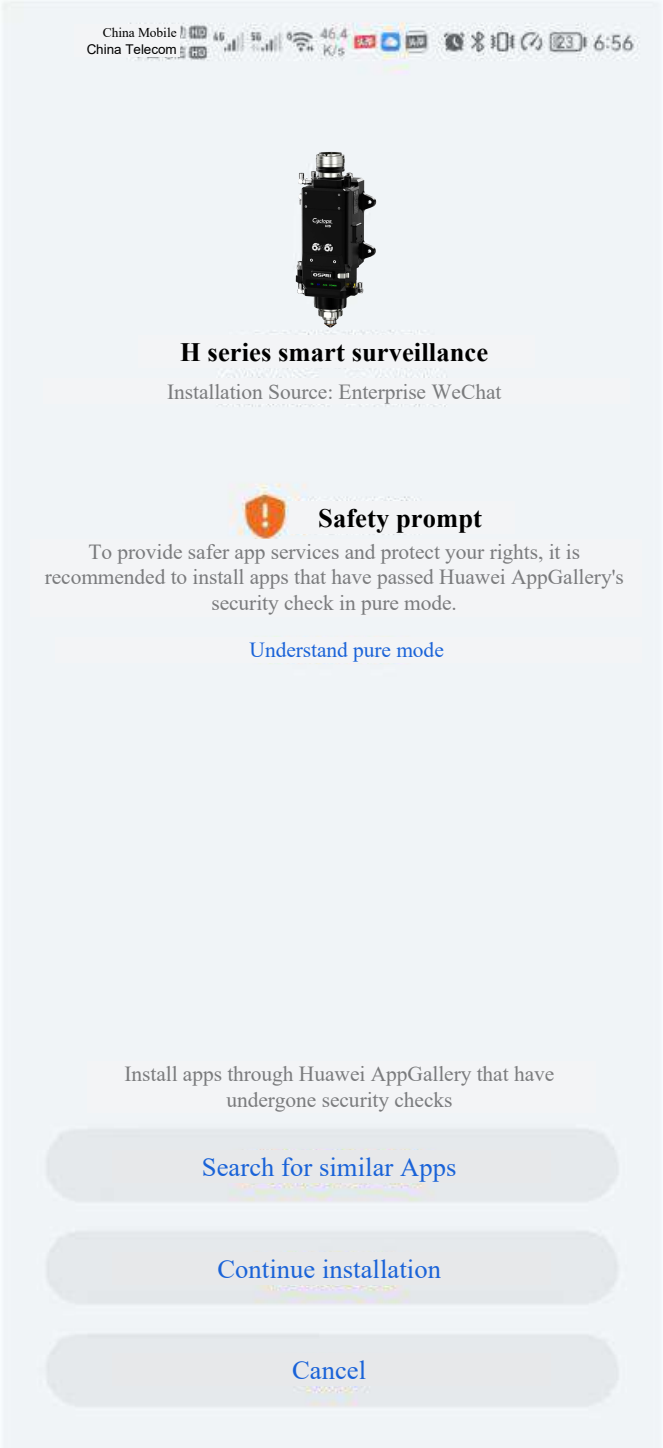


Figure 2.5

Figure 2.6

Icon is displayed after installation

4.6.2 APP Software Connection.

Figure 2.7

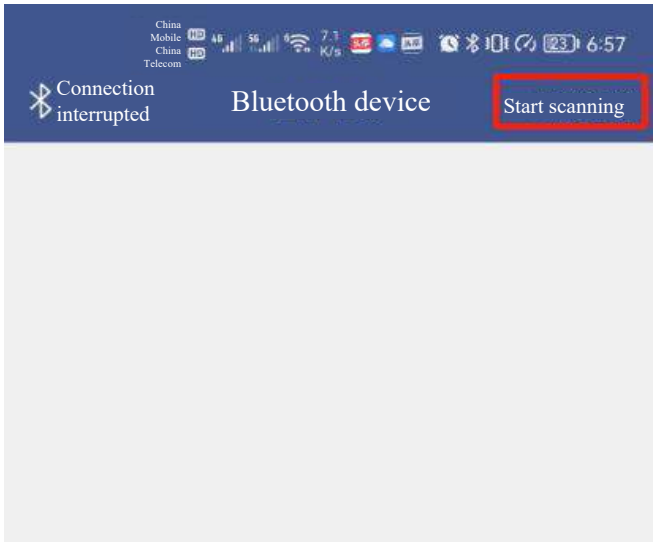


Figure 2.8

① Click the Bluetooth icon to open the Bluetooth connection interface, as shown in Figure 2.7.

② Start scanning; if nothing is displayed, click it for another more times, as shown in Figure 2.8.

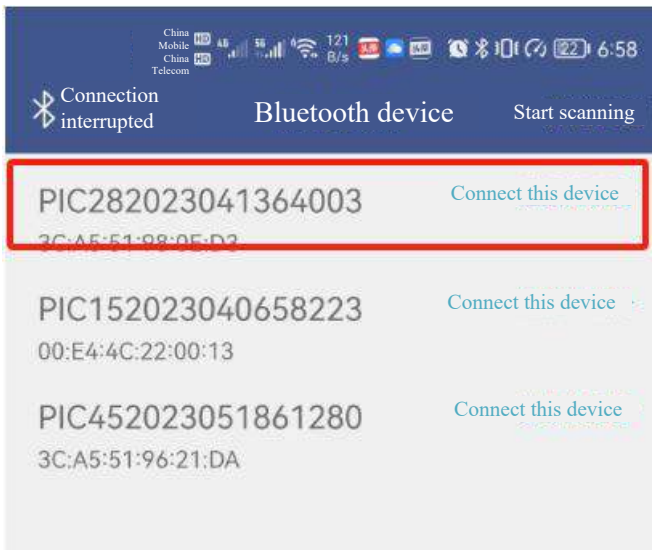


Figure 2.9

③ After the device is scanned, select the device to connect and click the [Connect Device] button, and then the mobile phone can communicate with the device in real time, as shown in Figure 2.9.

4.6.3 Software Introduction.

① After running the GH15B APP, the progress bar color on the main interface will change according to the actual temperature value monitored, as shown in Figure 3.0.
Green: The lens temperature is monitored to be normal and the software can be used normally.
Yellow: The lens temperature is too high, and attention should be paid to check if the lens is contaminated.
Red: The lens temperature is too high and the software cannot continue to be used. The machine must be stopped for checking.

Figure 3.0

4.6.4 Temperature Parameter Setting and Modification of Equipment Name.

① This APP has temperature setting function. You can set different temperature thresholds according to actual situation . Click "Parameter Setting" and input the password "85225225" to enter the temperature settings interface, as shown in Figure. 3.1.

② The software can also monitor the real-time dimensions of the electronic scale, internal temperature and humidity of the cavity, cutting gas pressure, and detect any leaks in the cutting gas.

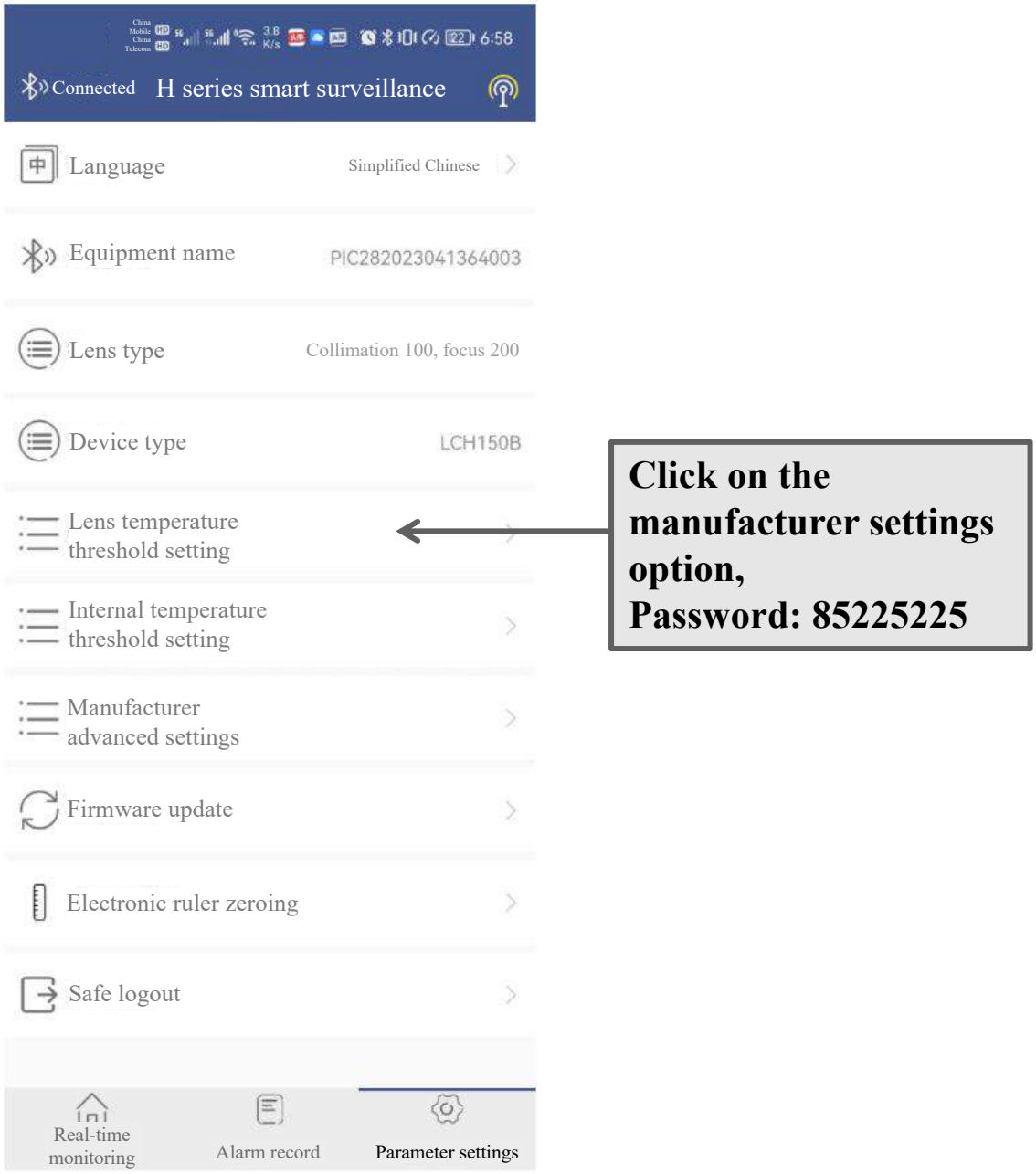


Figure 3.1

② Enter temperature setting interface to set the temperature according to the actual conditions. The forewarning value must be lower than the alarm value. After settings, click "Confirm". This window also allows for setting of the cutting head encoding; when the Bluetooth mode is disconnected, it automatically switches to the 5G model state, as shown in Figure 3.2:

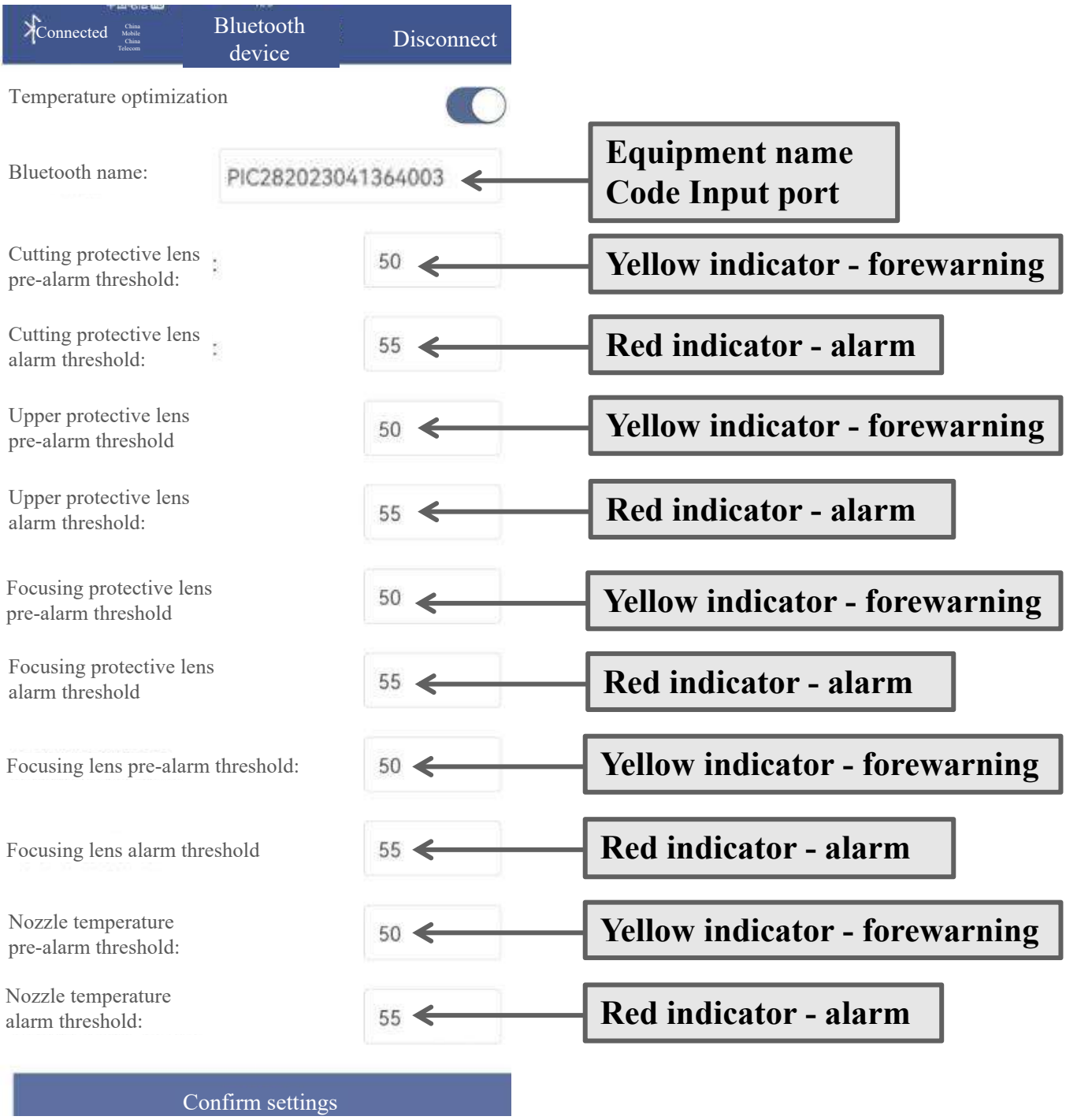


Figure 3.2

Chapter 5 Product Maintenance

5.1 Maintenance of Protective Lens

In case poor cutting performance occurs while cutting protective lens is normal, but burning points on the ceramic piece, the collimation protective lens or focus protective lens possibly is polluted or damaged. In this condition, please pull out the protective lens cartridge to check the lens. Before checking, use a clean cloth dampened with alcohol to wipe the exterior clean.

5.1.1 Disassembly and assembly of the first and second collimation protective lens, as shown in Figure 3.3.

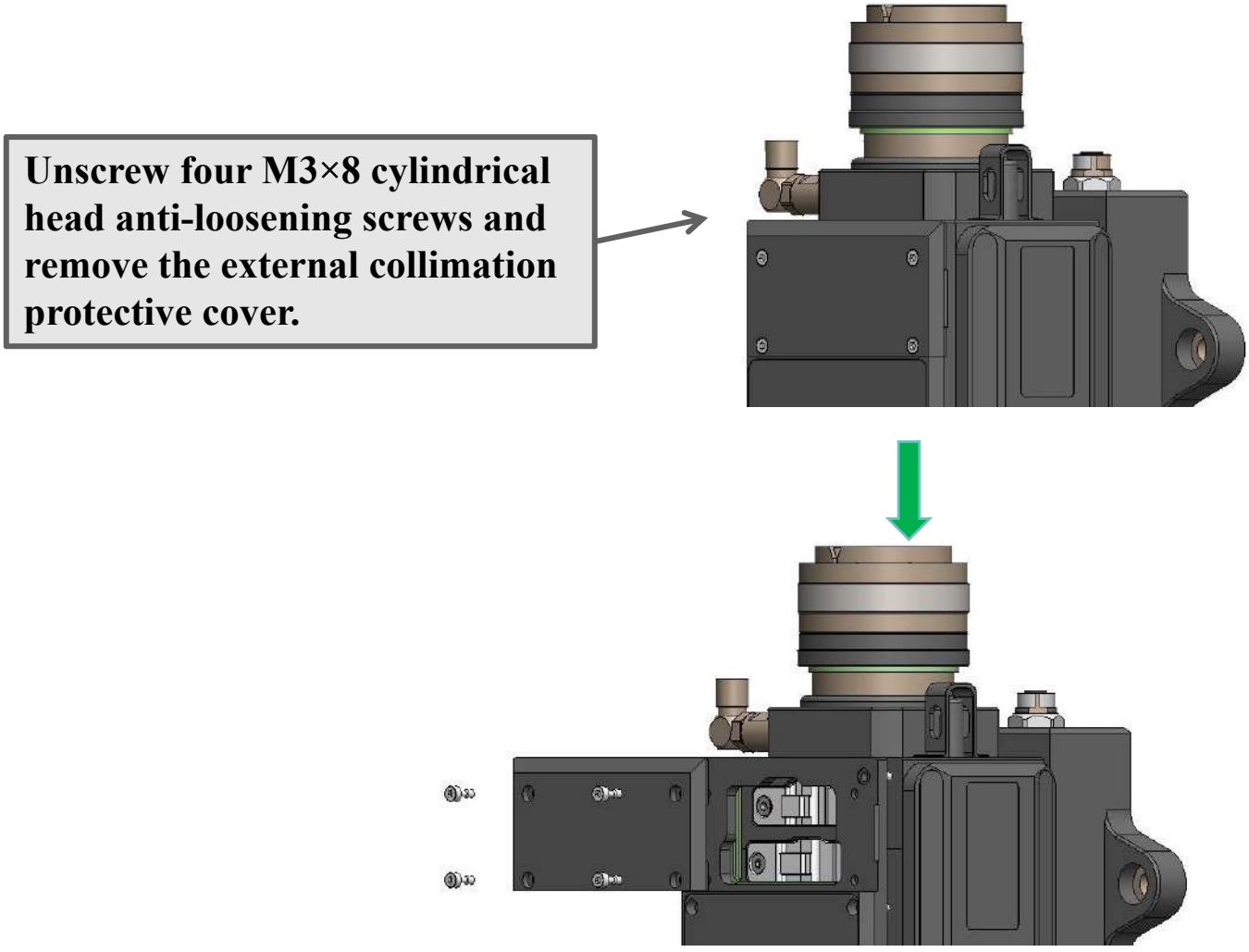


Figure 3.3

(1) Disassembly and assembly of the first collimation protective lens, as shown in Figures 3.3, 3.4, and 3.5.

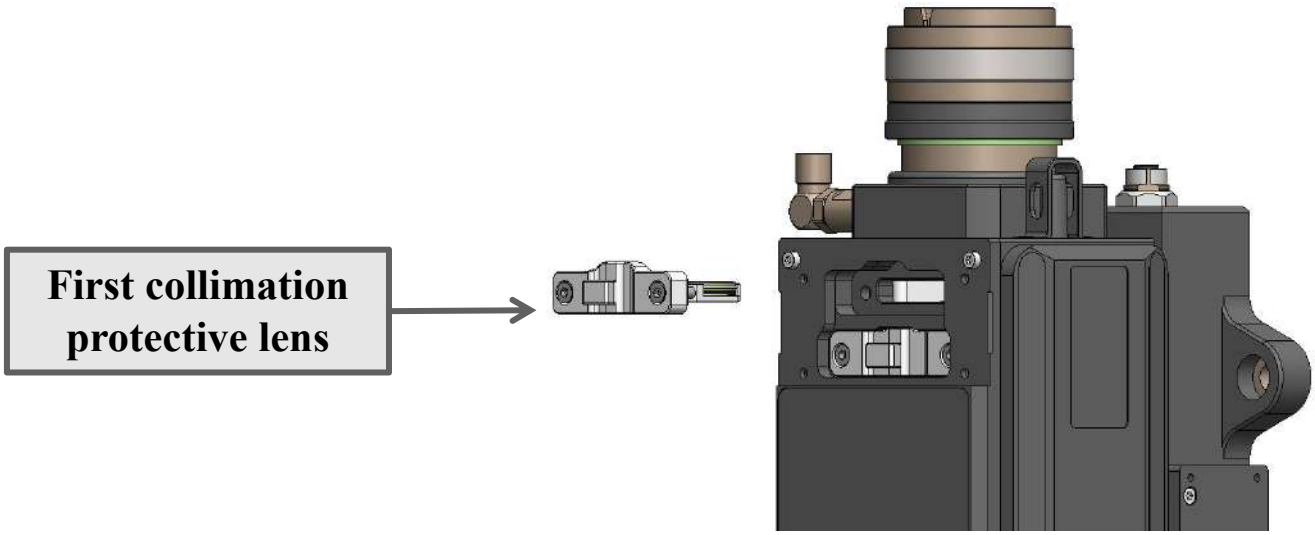


Figure 3.4

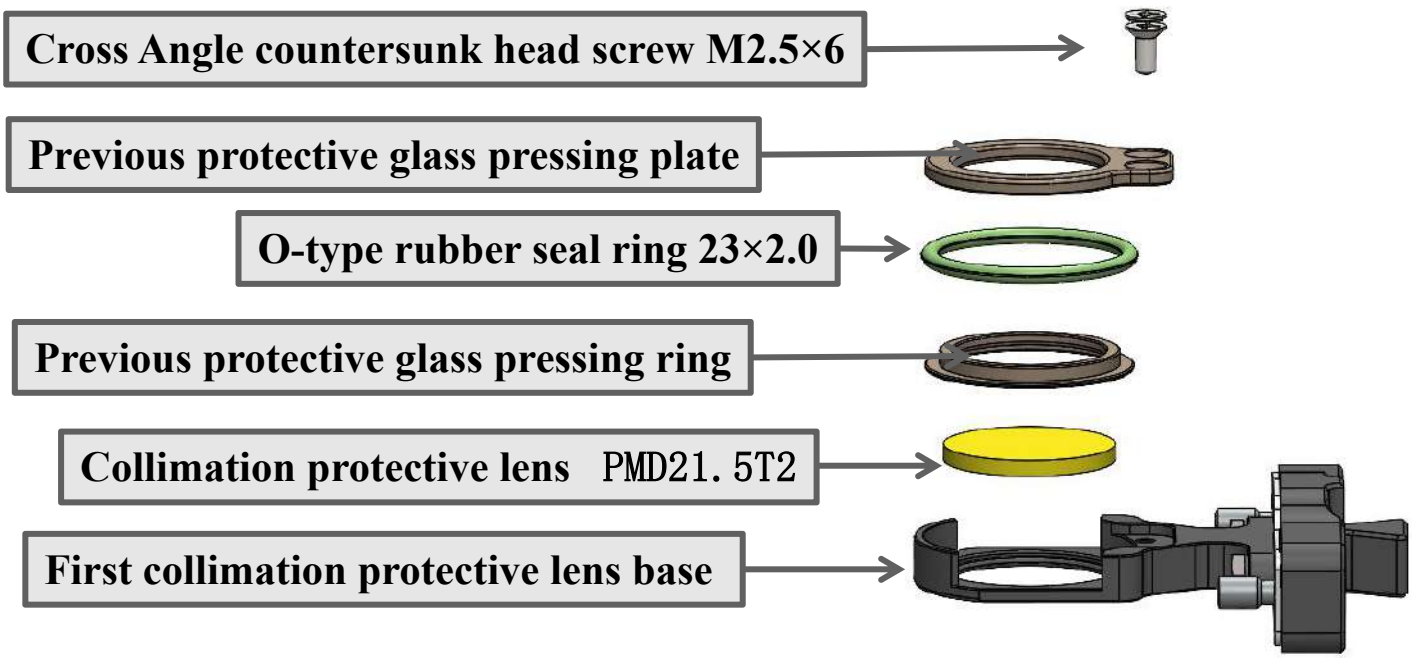


Figure 3.5

(2) Disassembly and assembly of the second collimation protective lens, as shown in Figures 3.3, 3.4, and 3.5.as shown in Fig. 3.5.

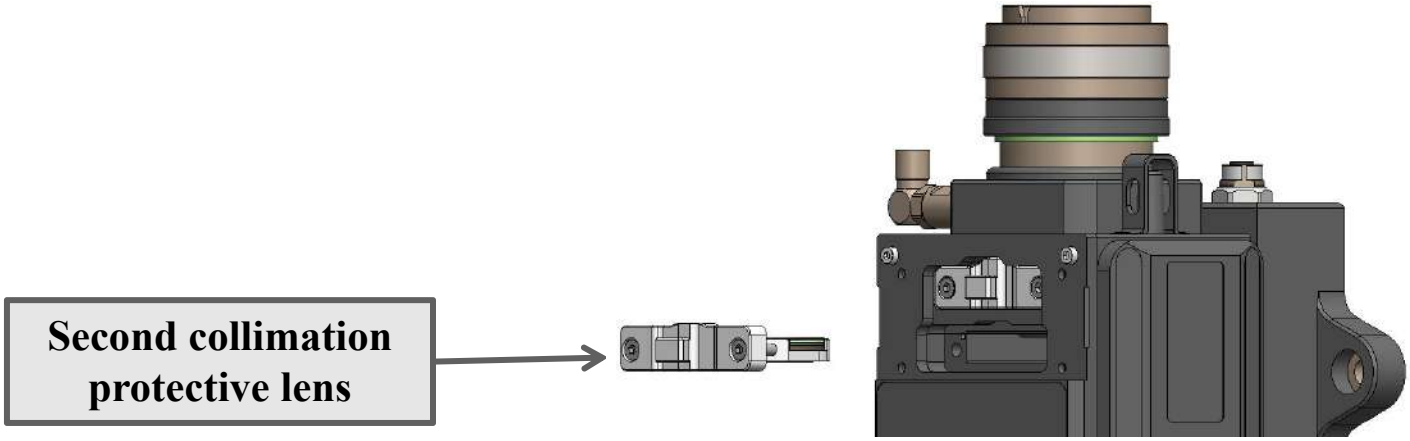


Figure 3.4

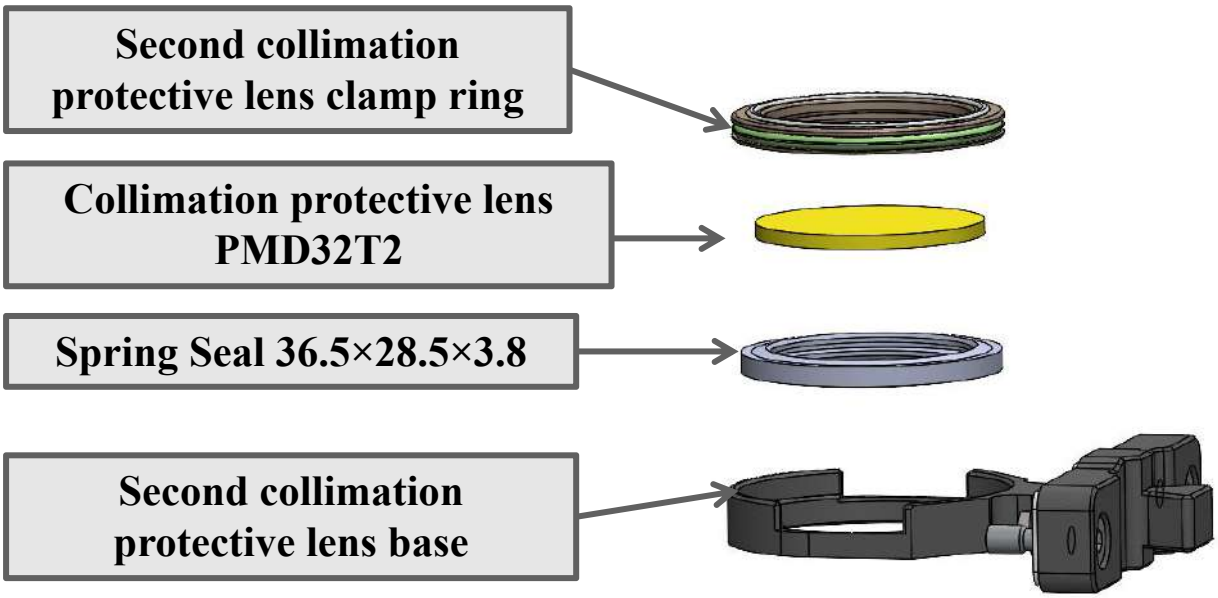


Figure 3.5

Figure 3.6

Figure 3.7

① Tools: Dust-free wiping swabs, isopropyl alcohol, dry and pure compressed air.

② Spray isopropyl alcohol onto the dust-free wiping swabs.

③ Gently pinch the both sides of the lens with the left thumb and index finger, and hold the wiping swabs with right hand to gently wipe both sides of the lens in a single direction from bottom to top or from left to right, As shown in Figure 3.5.

④ After wiping, blow the lens surface again with filled dry and pure compressed air to ensure that there are not foreign matters on the lens surface, as shown in Figure 3.6.

⑤ The cleansed lens must be installed into the cutting head's body as soon as possible or stored in other clean and sealed container.

5.1.2 Disassembly of Focus Protective Lens

Loosen the two M4×16 hexagon socket anti-falling screws, pull out the protective lens cartridge, and replace the protective lens (PMD34T5), as shown in Figures 3.8 and 3.9 below.

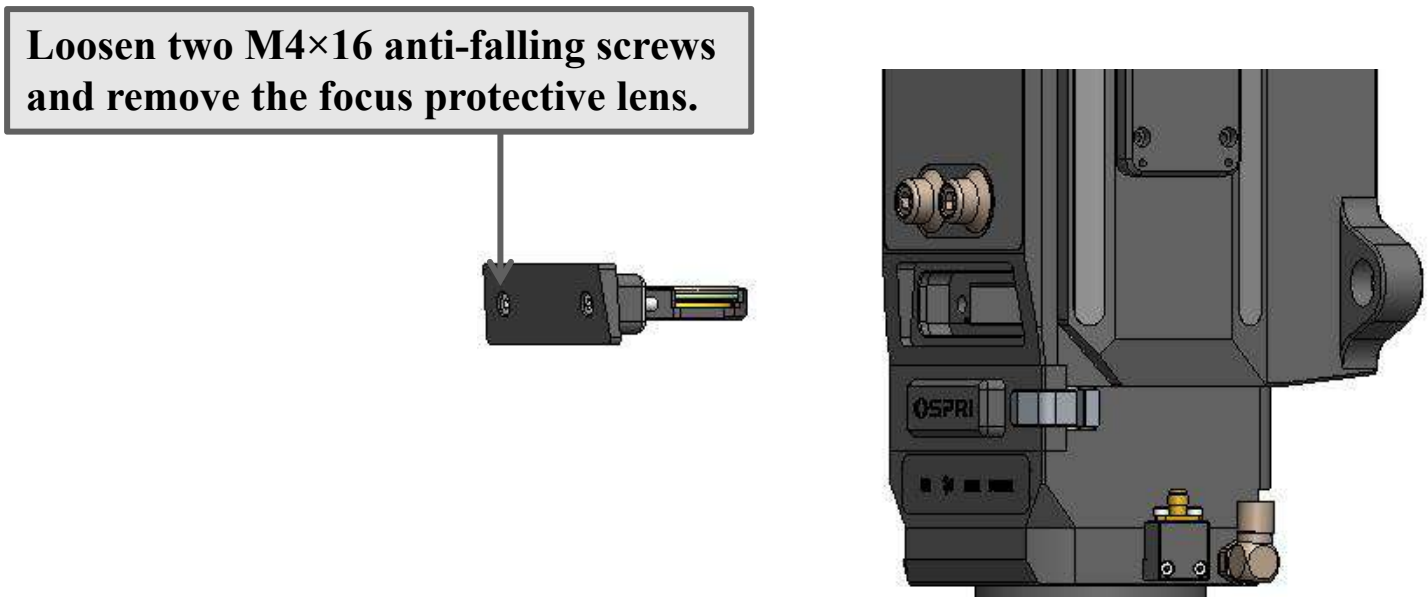


Figure 3.8

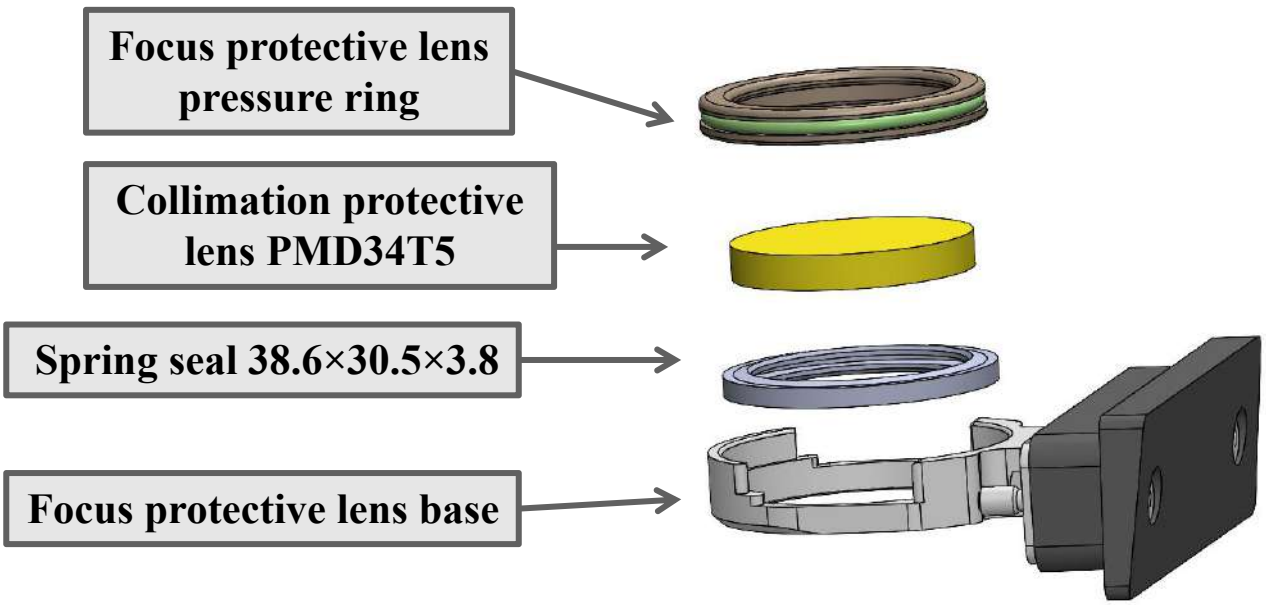


Figure 3.9

Figure 4.1

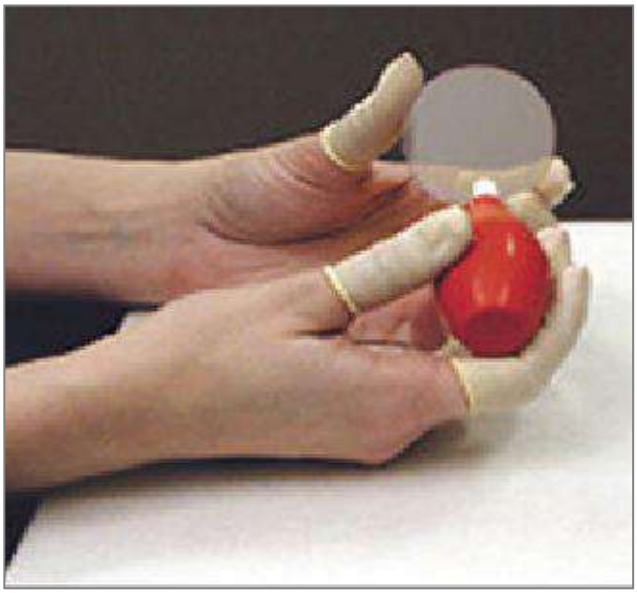


Figure 4.2

① Tools: Dust-free wiping swabs, isopropyl alcohol, dry and pure compressed air.

② Spray isopropyl alcohol onto the dust-free wiping swabs.

③ Gently pinch the both sides of the lens with the left thumb and index finger, and hold the wiping swabs with right hand to gently wipe both sides of the lens in a single direction from bottom to top or from left to right, As shown in Figure 4.1.

④ After wiping, blow the lens surface again with filled dry and pure compressed air to ensure that there are not foreign matters on the lens surface, as shown in Fig. 4.2.

⑤ The cleansed lens must be installed into the cutting head's body as soon as possible or stored in other clean and sealed container.

5.1.3 Disassembly, Assembly, and Replacement of Cutting Protective Lens

Press the latch, open the outer cover, remove the cutting protective lens cartridge, replace the protective lens, and remember to close the outer cover before replacing the lens and then open it again after the replacement to insert the cartridge back into the cutting head, preventing prolonged exposure of the laser head internals.

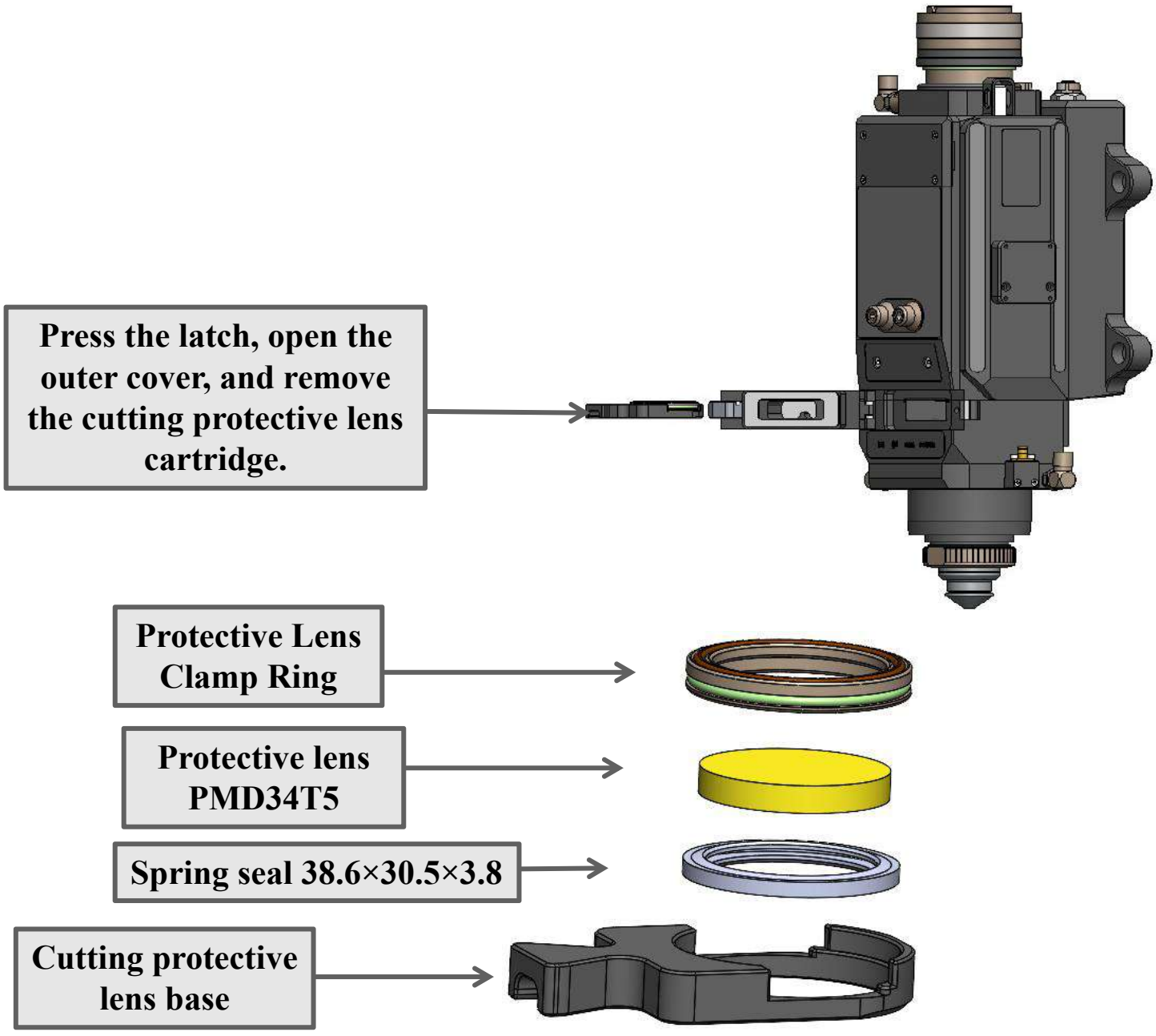


Figure 4.3

Figure 4.4

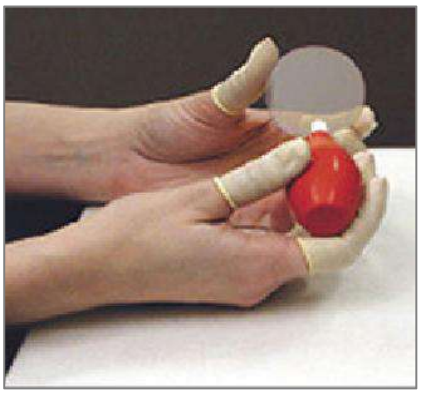


Figure 4.5

① Tools: Dust-free wiping swabs, isopropyl alcohol, dry and pure compressed air.

② Spray isopropyl alcohol onto the dust-free wiping swabs.

③ Gently pinch the both sides of the lens with the left thumb and index finger, and hold the wiping swabs with right hand to gently wipe both sides of the lens in a single direction from bottom to top or from left to right, As shown in Figure 4.4.

④ After wiping, blow the lens surface again with filled dry and pure compressed air to ensure that there are not foreign matters on the lens surface, as shown in Figure. 4.5.

⑤ The cleansed lens must be installed into the cutting head's body as soon as possible or stored in other clean and sealed container.

Attention: When cleaning and replacing the protective lens, avoid the grease on hands or dust in the environment from contaminating the protective lens . In principle, the focus lens, collimation lens and cutting lens are generally forbidden to be disassembled. If lenses may be contaminated, users can first test the lenses with ceramic piece, or contact with our technical staff if necessary

5.2 Maintenance of Sensory Components.

5.2.1 Cleaning of the Ceramic Ring.

① Remove the nozzle counterclockwise, as shown in Figure. 4.6.
② Remove the ceramic clamp ring counterclockwise, as shown in Figure 4.6.
③ Remove the ceramic body vertically downward, as shown in Figure. 4.6.

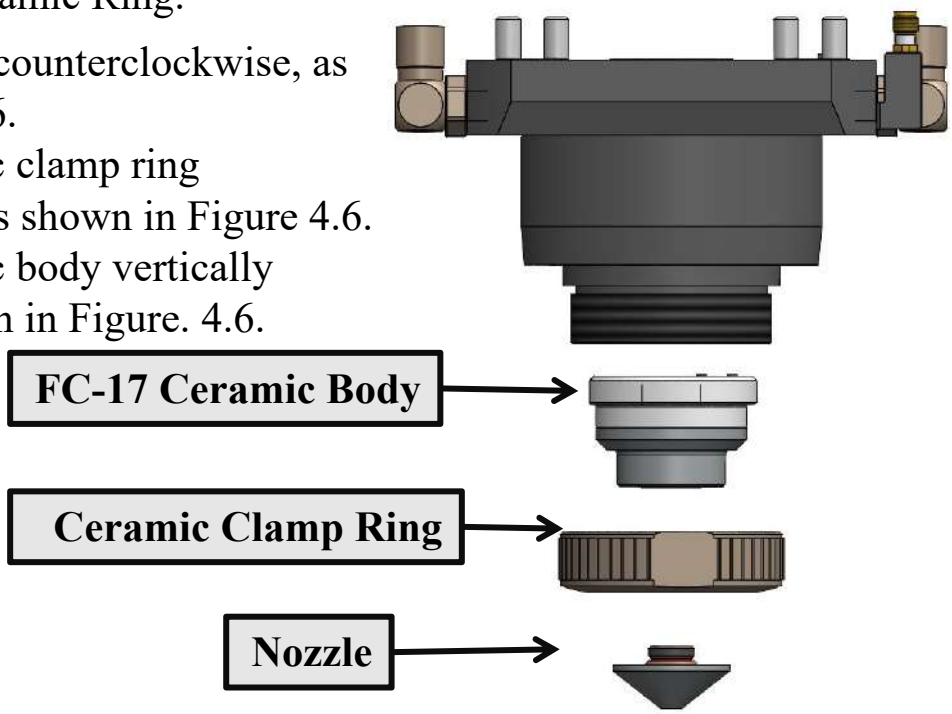


Figure 4.6

5.2.2 Cleaning of the Ceramic Ring.

① Take out the ceramic and clean it with anhydrous alcohol or isopropyl alcohol, as shown in Figure 4.7.
② Spray isopropyl alcohol onto the dust-free swab, remove the ceramic ring and clean it with the swab,
as shown in Fig. 4.8.
③ After that, clean the ceramic ring with dry and pure compressed air to ensure that the ceramic surface is clean and dry without moisture before installation, as shown in Figure 4.9.

Figure 4.7

Figure 4.8

Figure 4.9

Note: Cleanliness of ceramic surface is directly related to the operating performance of the following system. It is necessary to clean timely the dirt on the ceramic surface in order to ensure the working performance of the system.

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