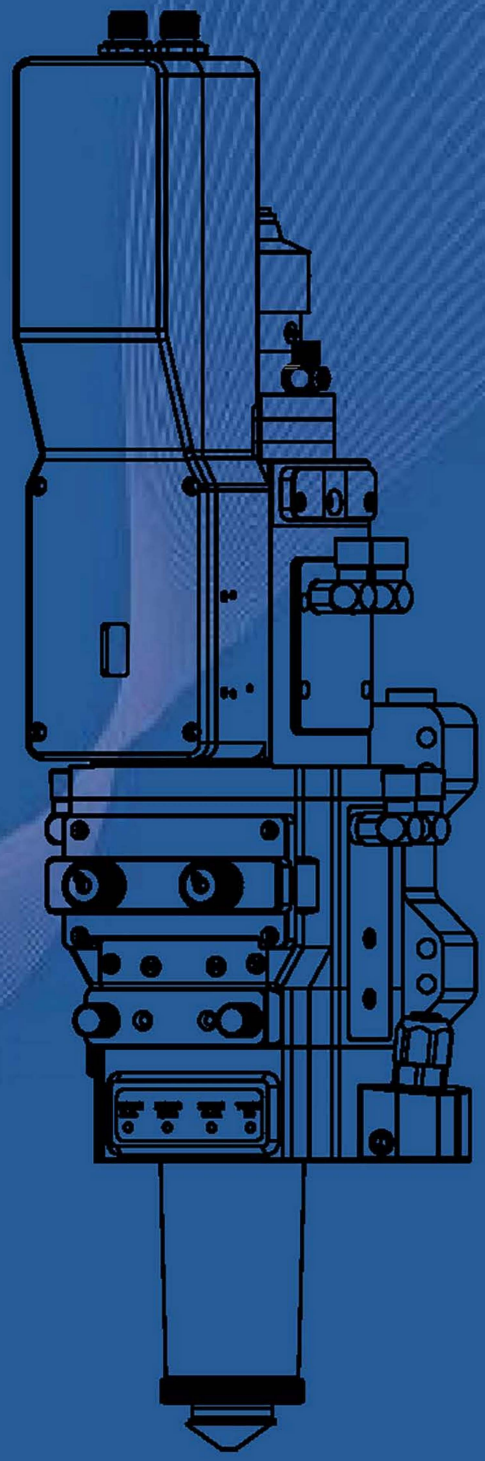
PRODUCT INSTRUCTION MANUAL



NC68 (HCFA servo)
Auto focus fiber laser cutting head

Please read this manual carefully and make sure you understand its contents before using the laser head.
Please keep this manual for future operation and maintenance.

Contents

1.Technical parameters and structure

1.1 Technical parameters

Model number： NC68

Laser wavelength： 1030～1090nm

Working power： ≤8000W

Fiber connector： QBH/QD/G5

Lens configuration： collimation F100， focus F150/F200

Focus adjustment range： Adjustment range of focus lens F150 is ±18mm; Adjustment range of focus lens F200 is ±35mm

Beam center adjustment range： ±1.5mm

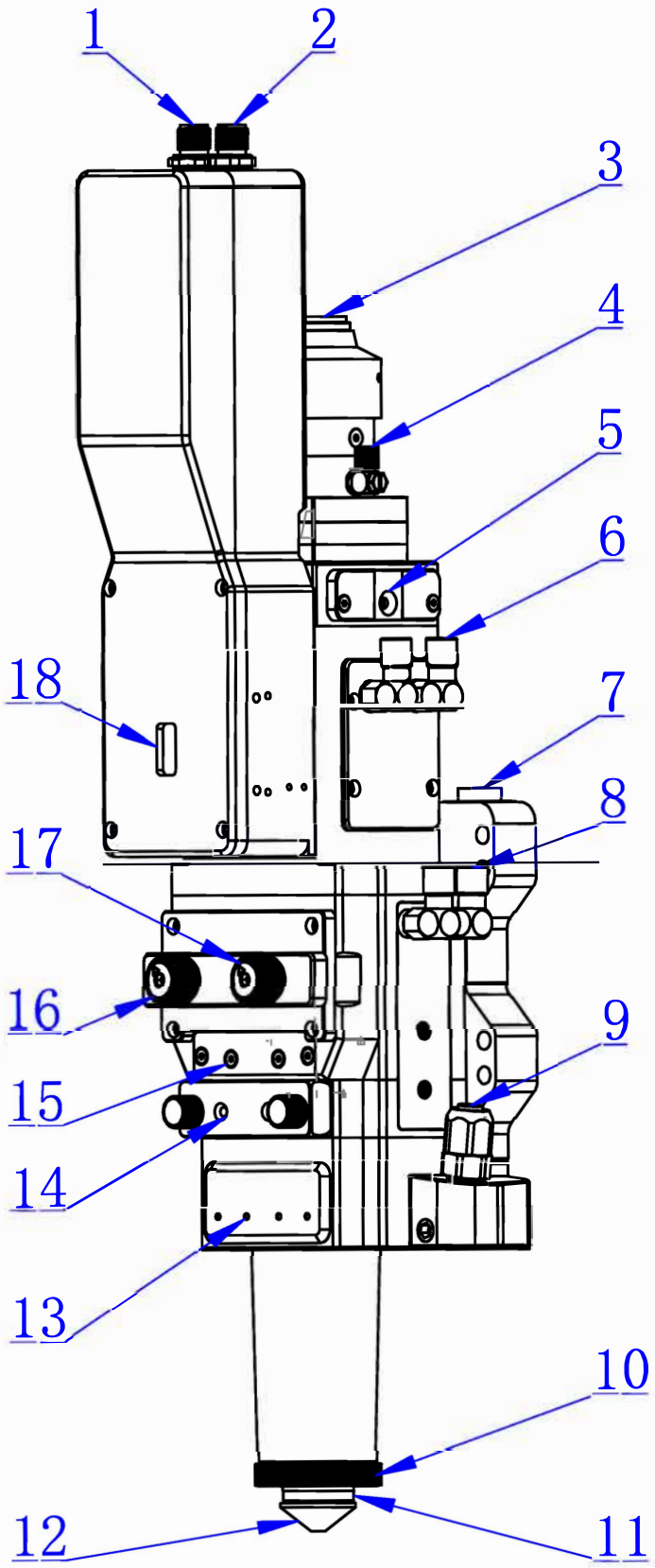
Cutting gas connector： Standardφ10(optionalφ12)， Gas pressure≤2.5MPa

Cooling gas connector： φ6， Gas pressure≤0.6MPa

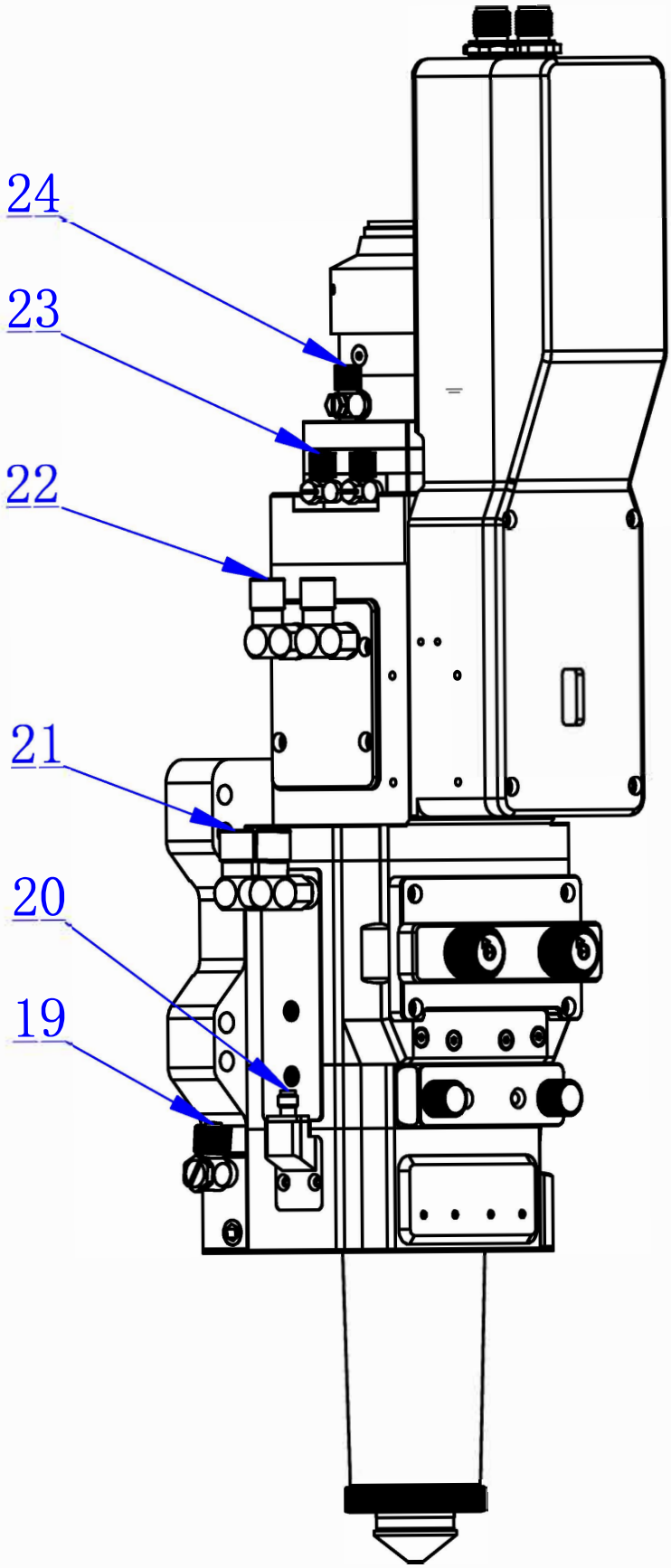
Water connector： φ6， water pressure≤0.5MPa

Weight： about 7.8kg

1. 2 Interfaces



1. Power cable interface
2. Encoder & limit signal cable interface
3. Fiber interface
4. Water connector(φ6)
5. Upper protection window
6. Water connector(φ6)
7. Monitoring signal cable connector
8. Water connector(φ6)
9. Cutting gas connector (standardφ10,optionalφ 12)
10. Locking ring
11. Ceramic ring
12. Nozzle
13. Monitoring LED
14. Lower protection window
15. Focus protection window
16. Focus center adjustment(X.Y)
17. Focus center adjustment(X.Y)
18. Observation window



19.Cooling gas connector(φ6)

20.Follow-up signal interface

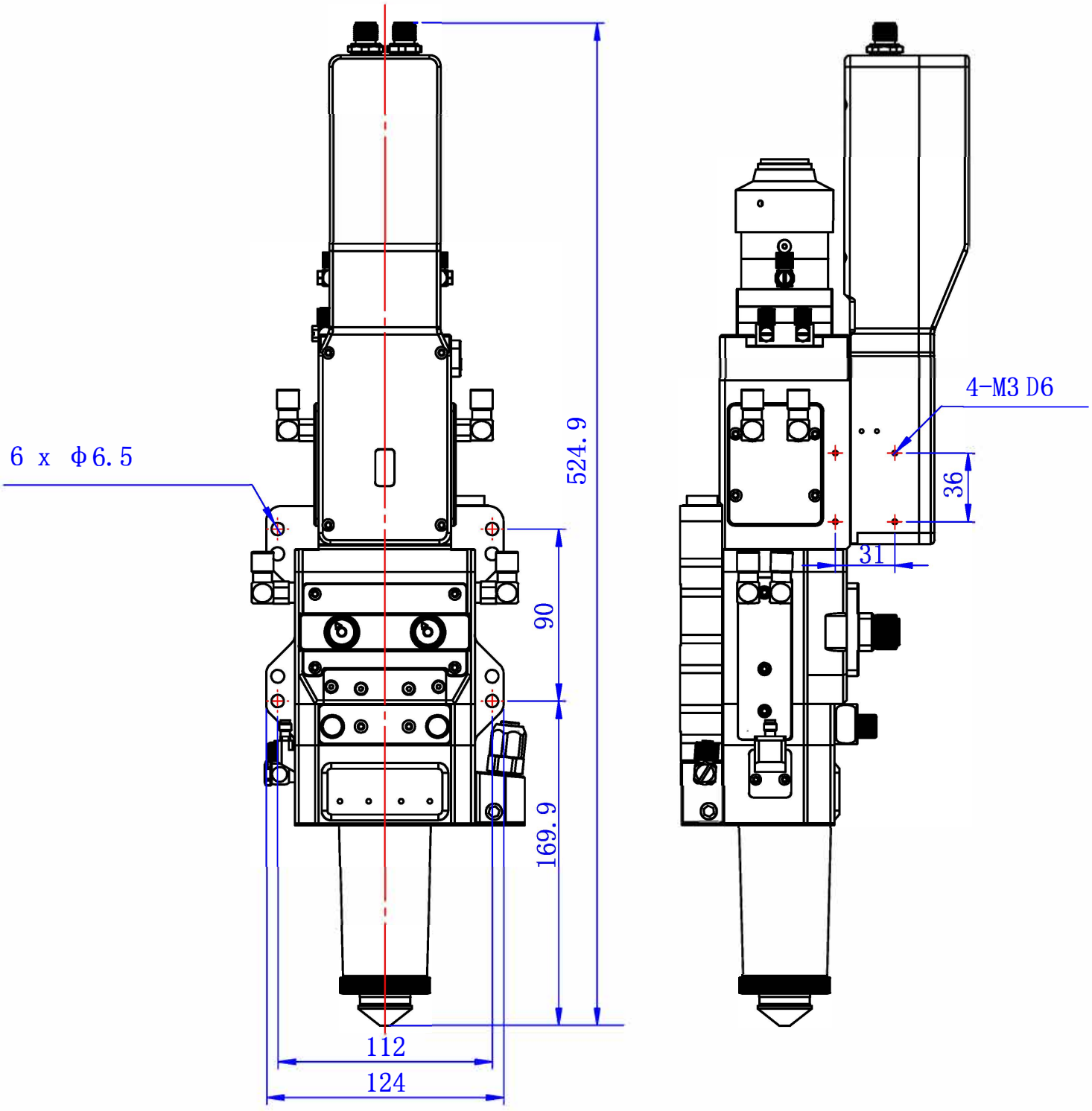
21.Water connector(φ6)

22.Water connector(φ6)

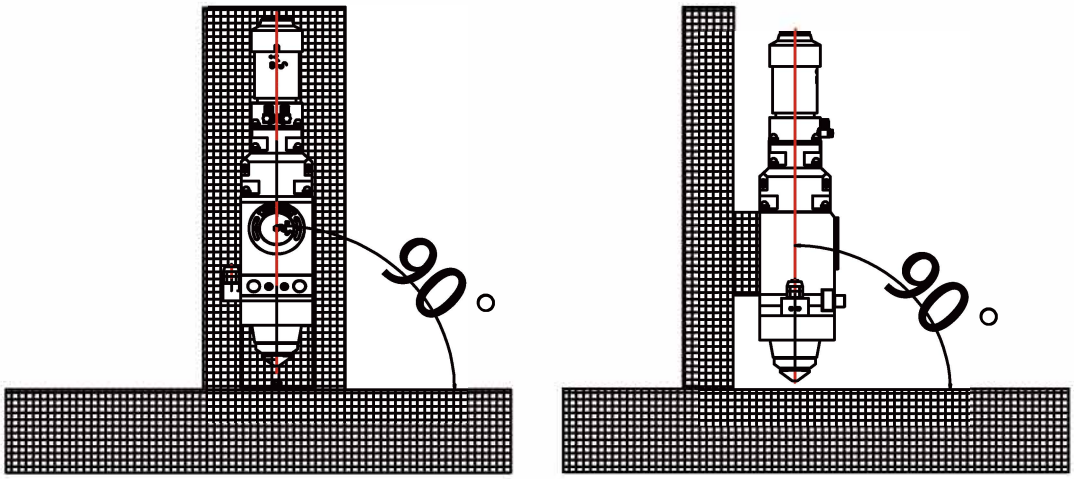
23.Water connector(φ6)

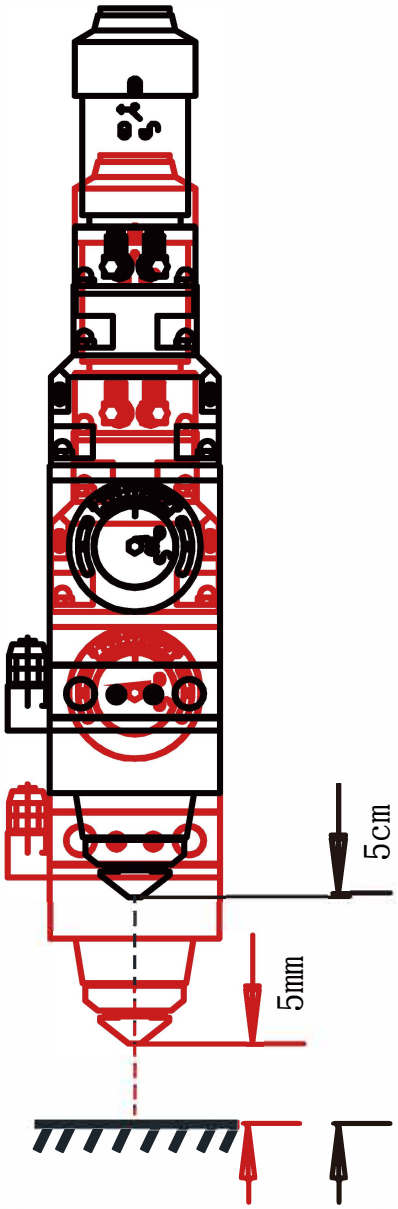
24.Water connector(φ6)

1. 3 Installation size

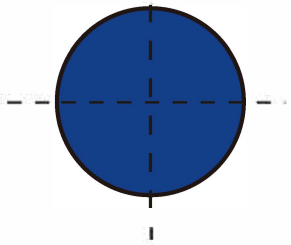


1.4 Installation debugging

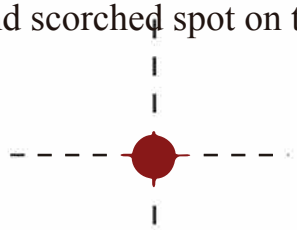




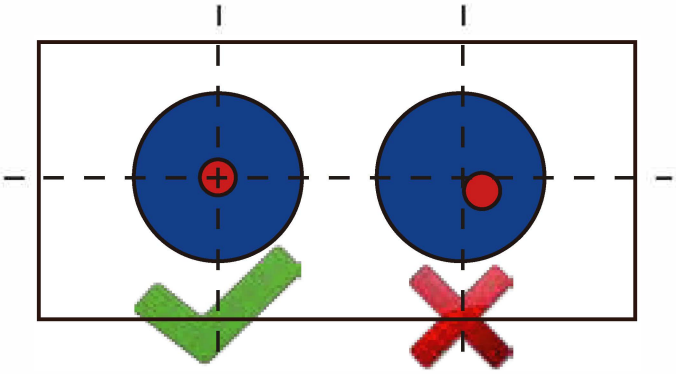
Step 1: set the laser power to 500W, make a short burst at the height of 5cm from the plate, burn around scorch on the plate;



Step 2: set the laser power to 100W, make a short burst at the height of 1~5 cm from the plate, burn a round scorched spot on the plate;



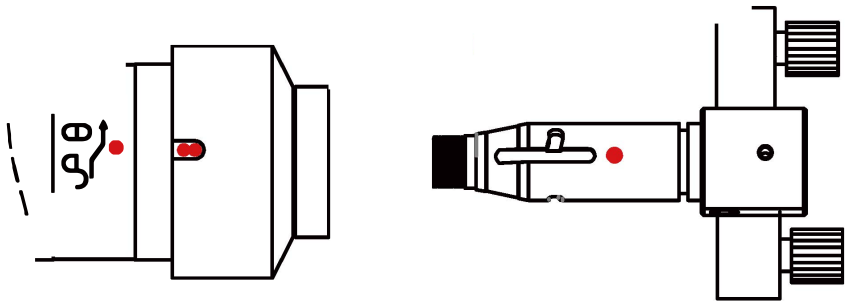
Step 3: compare the concentricity;



1.5 Fiber connection

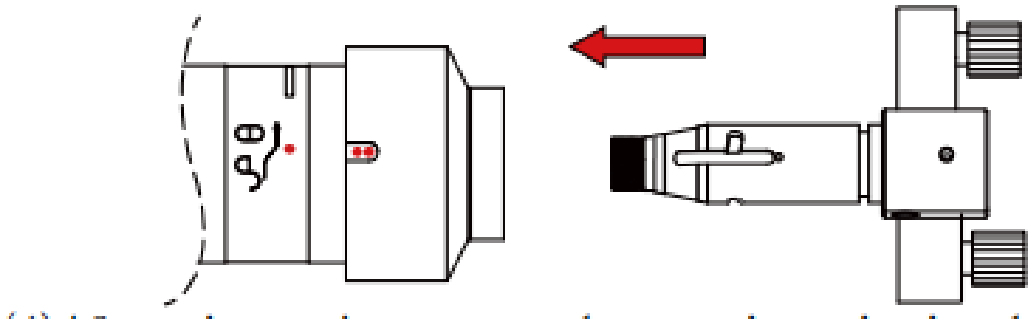
(1)Place the laser head and optical fiber connector in a horizontal state;

(2)Clean the QBH and fiber connector with clean rod and ethyl alcohol.

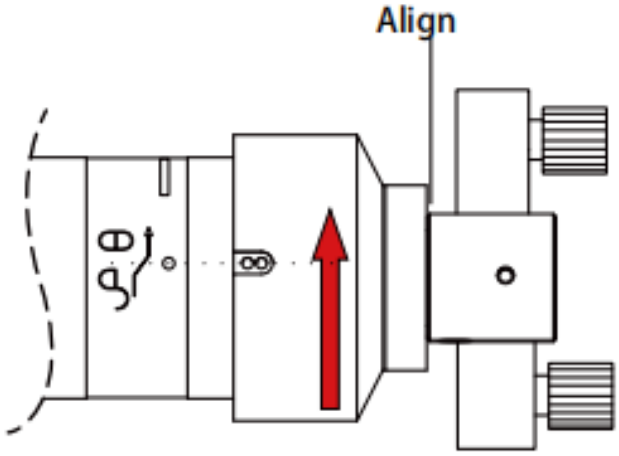


Align the red marks

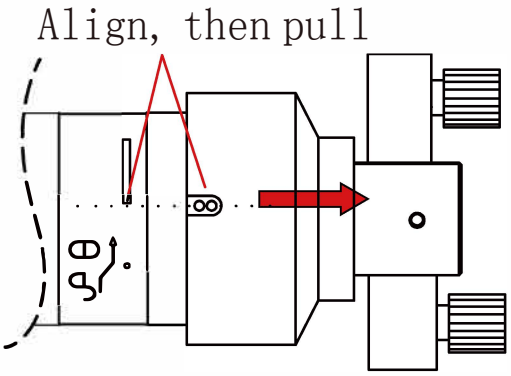
(3) Insert the fiber connector into QBH gently;



(4) After inserting, turn the turning rim in the arrow direction until the two red marks are aligned to the white mark;

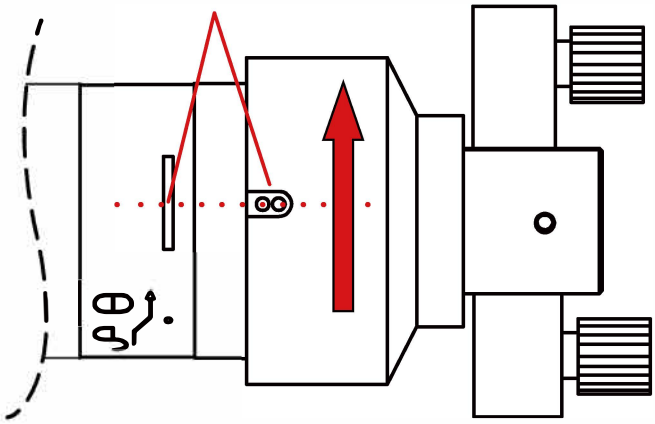


(5) Then pull the turning rim as the picture below;



(6) Turn the rim in the direction as picture below at moderate intensity to make it tight (Use thumb and index finger).

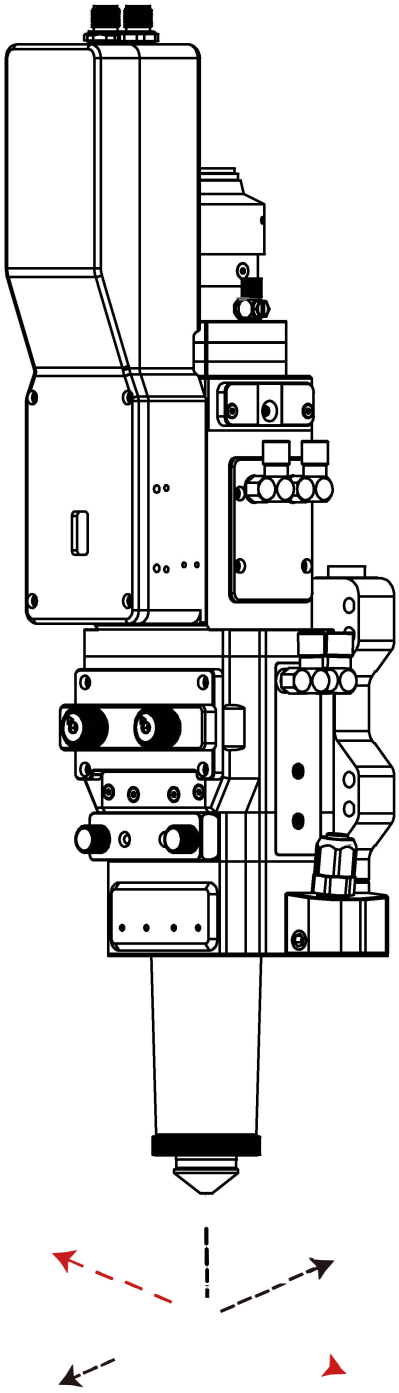
The red marks can be aligned to or over the middle of the white bar, but do not twist any more when it is in the right position.



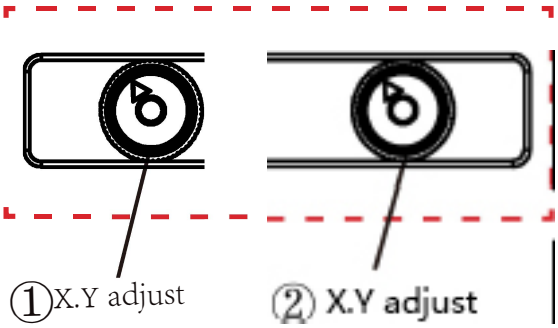
Note: Do not twist vigorously , it may cause damage to precision machinery.

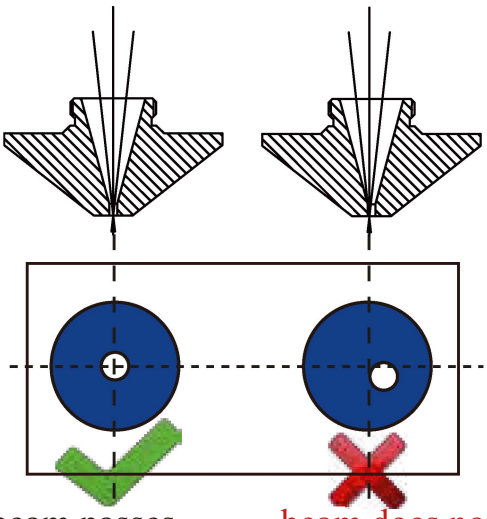
To avoid dust or dirt entering into the fiber optic connector by accident, please clean the fiber rod first. Insert he fiber plug with the laser head in a horizontal position.

1. 6 Optical Center 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 best 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.



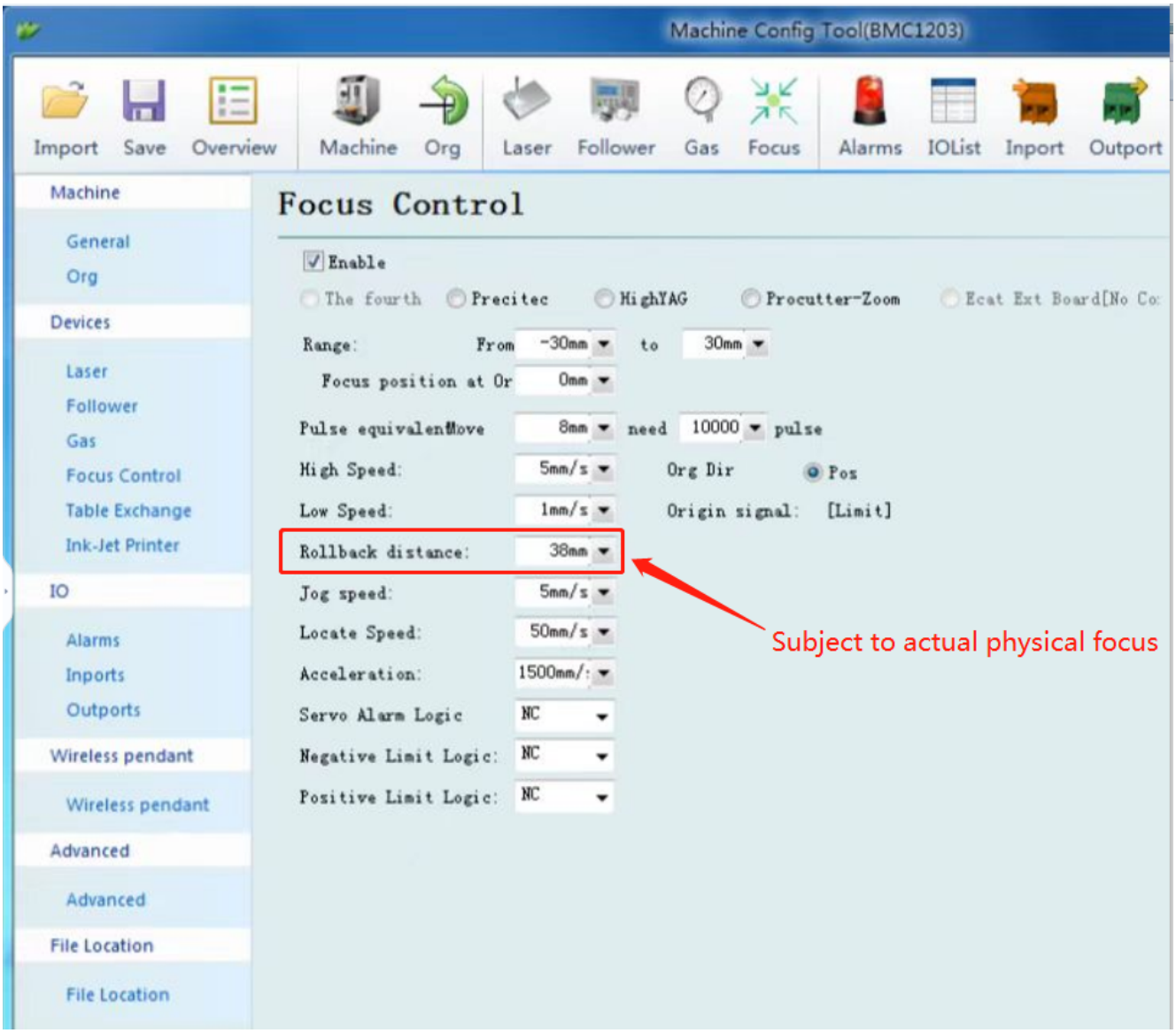


beam passes through the center (correct)

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 emitted for 1 – 2 seconds;
4. Face the tape to light source and observe the round mark of nozzle on the tape and burned spot of laser passing through the tape.
5. If they are concentric, the testing result is good, but if not, please keep adjusting.
6. When adjustment is finished, tighten the center locking ring (red part) immediately.

1. 7 Configuration & focus measurement



Note: 1.This parameter is default value; when user changes it, please avoid hard ware damage;
2.Please contact technician to get specific parameters of different lens combinations.
3.Please choose normally closed mode for normally closed o limitation switch.

Cutting line method to find zero -focus

Purpose:

Correct the "Roll back distance" to make the actual physical focus coincide with the software zero -focus, and serve as the benchmark for subsequent process debugging.

method:

1. Use the cutting wire method to see the size of the cutting seam judging the focus position. The seam of the focus position is the smallest.

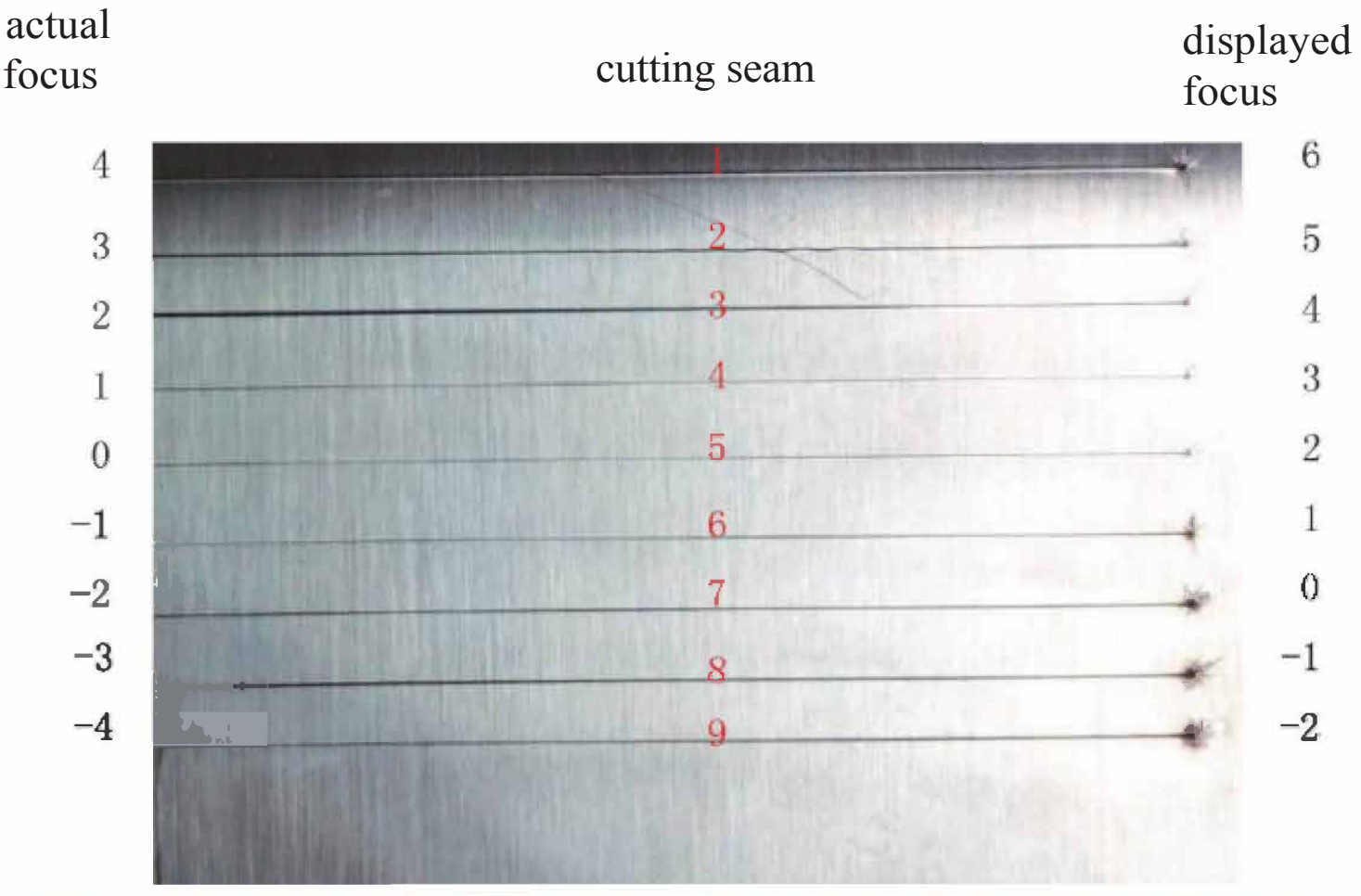
2.Correct the roll back distance to make the actual physical focus coincide with the software zero -focus, and serve as the benchmark for subsequent process debugging. For example: 1. Platform settings:

2. Start cutting from the focus of the software +6, the interval is 1mm, and cut to the focus -2. Observe that the fifth line is the thinnest, then the actual focus 0 is the + 2 position of the current software display focus.

3. Correction: If the actual focus of the cutting line method is higher than the focus of the software display, then

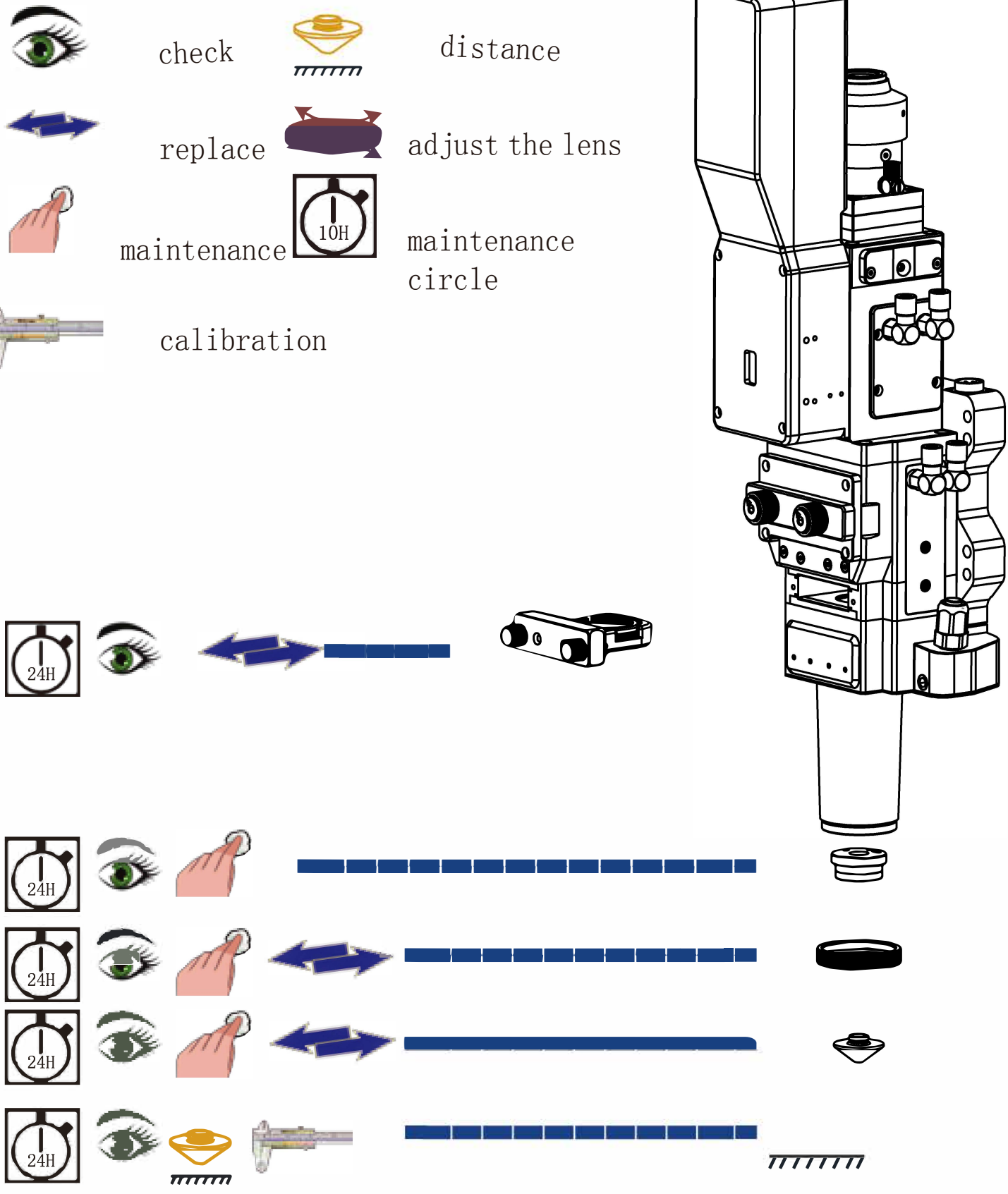
Roll back distance = roll back distance -the difference

Roll back distance = 9-2 = 7, otherwise the same principle.

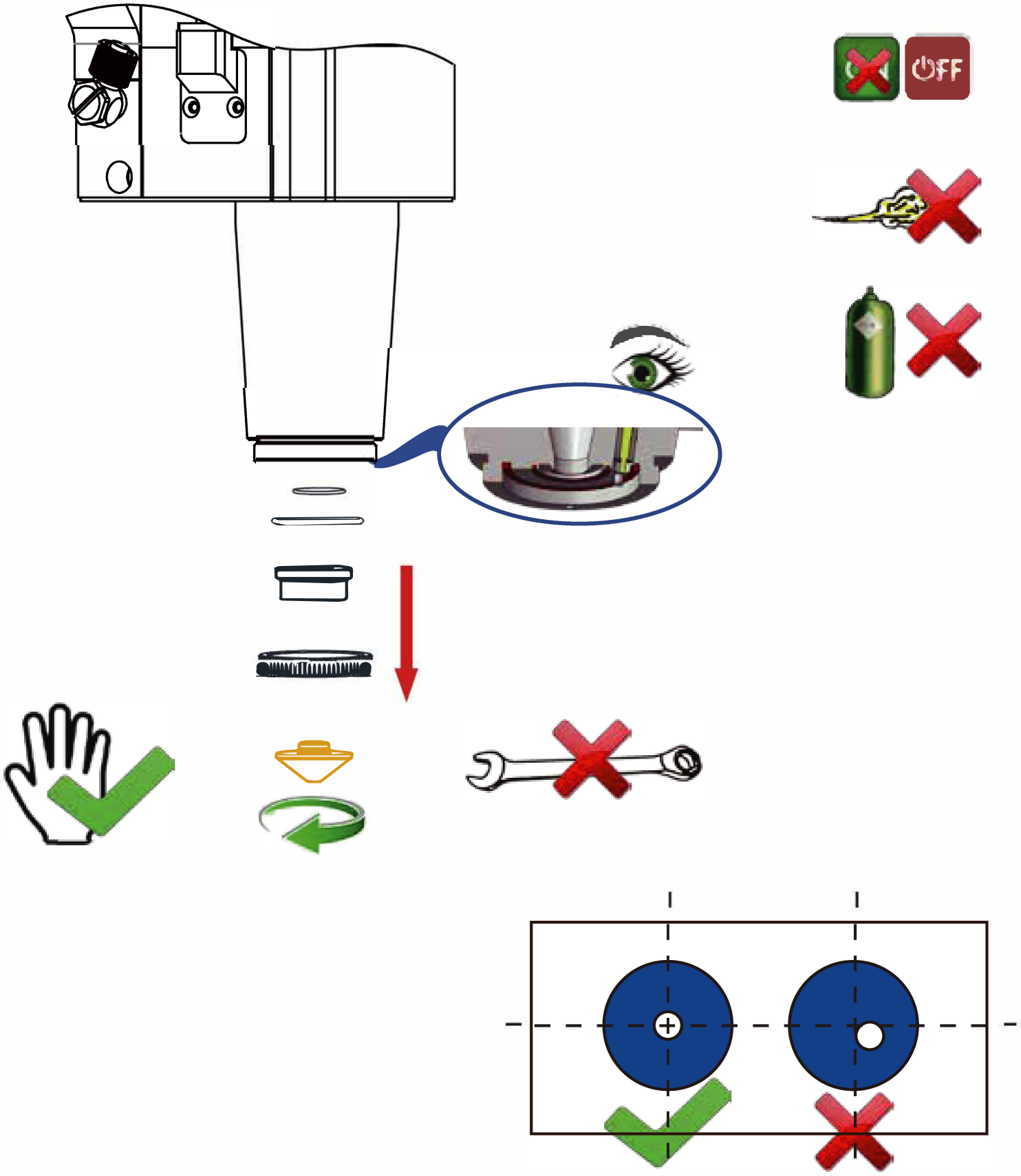


2. Maintenance/Disassembly

2.1 Routine inspection and maintenance

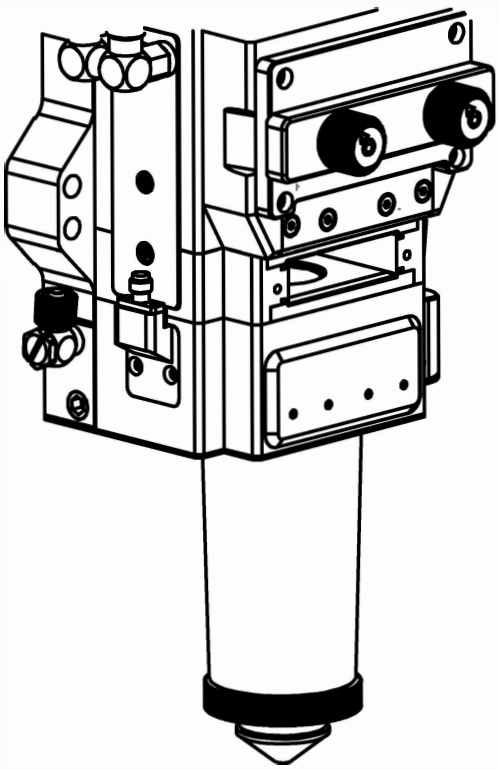


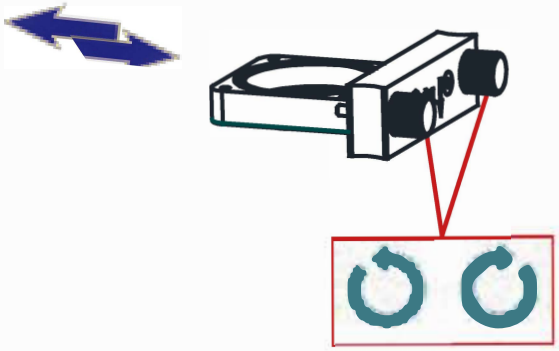
2.2 Replacement of Ceramic Ring & Nozzle



center checking

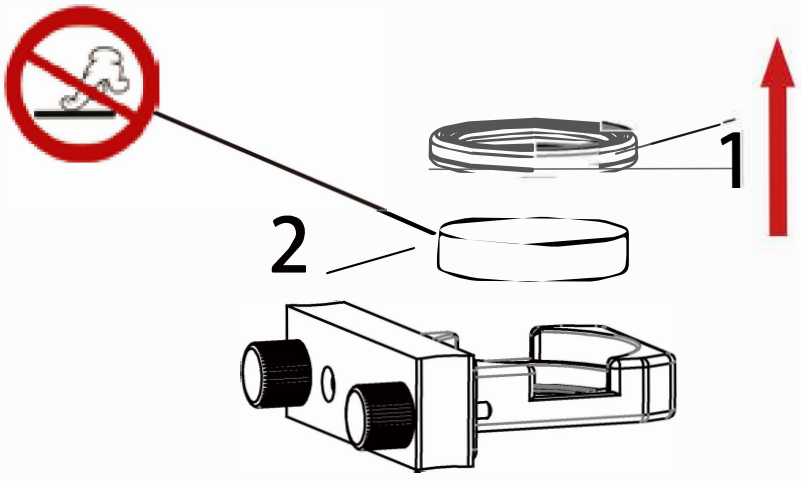
2.3 Replacement of Lower Protection Window





Loosen the screws and remove

Pay attention to dust: when removing and installing the lens, wear dust gloves and finger covers in a clean place . When changing lens, use adhesive paper to paste sealed window, prevent dust to enter the interior cause pollution.

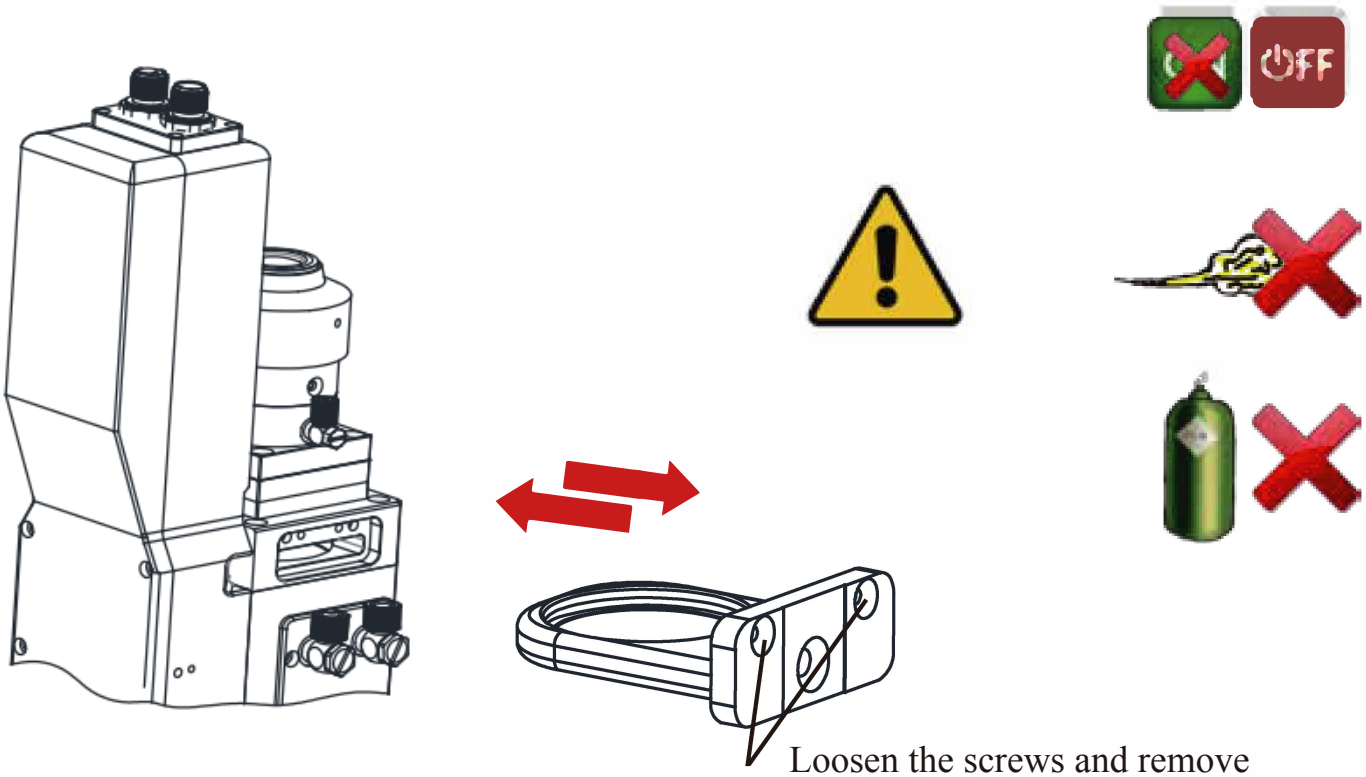


1、Pressing ring 2、Protective glass

Note : Remove in the direction of the arrow, otherwise it may cause damages.

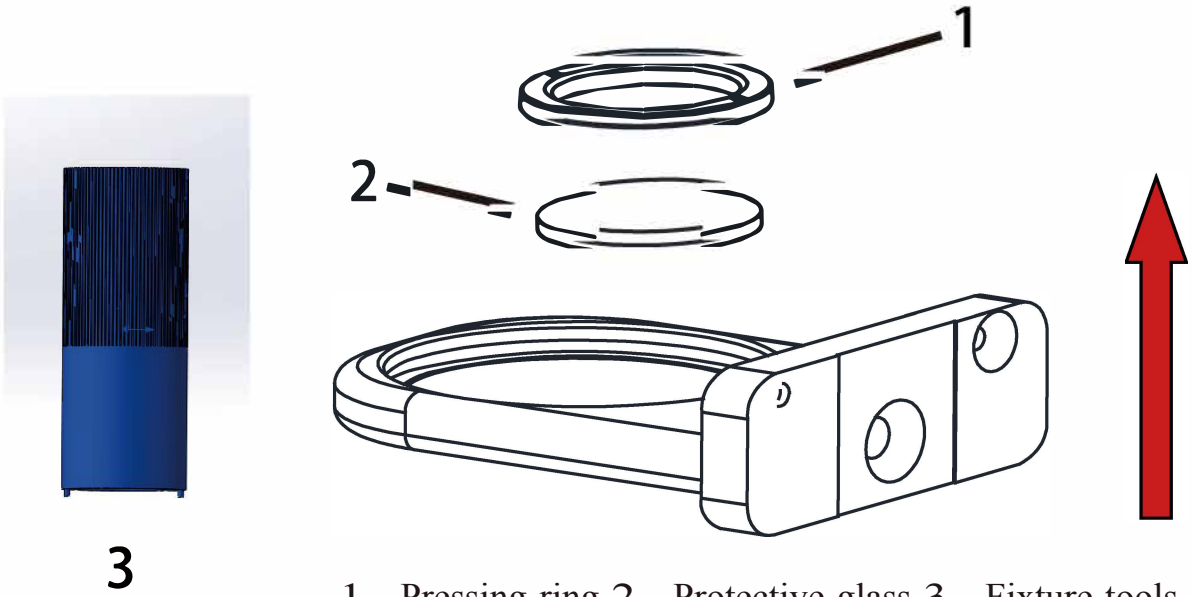
DO NOT operate with wrench or iron plier.

2.4 Replacement of Upper Protection Window



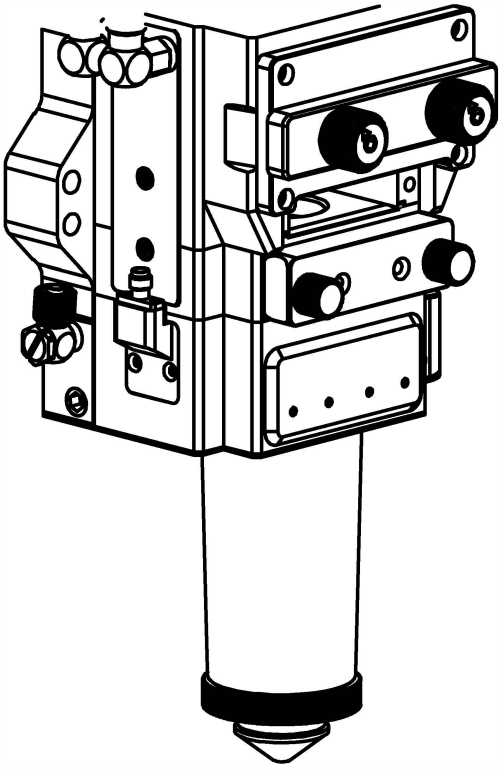
Loosen the screws and remove

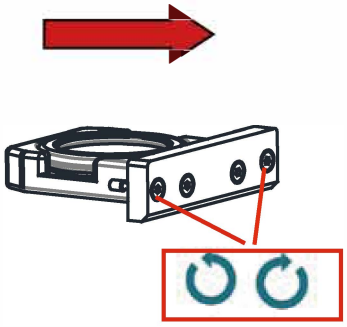
Pay attention to dust: when removing and installing the lens, wear dust gloves and finger covers in a clean place . When changing lens, use adhesive paper to paste sealed window, prevent dust to enter the interior cause pollution.



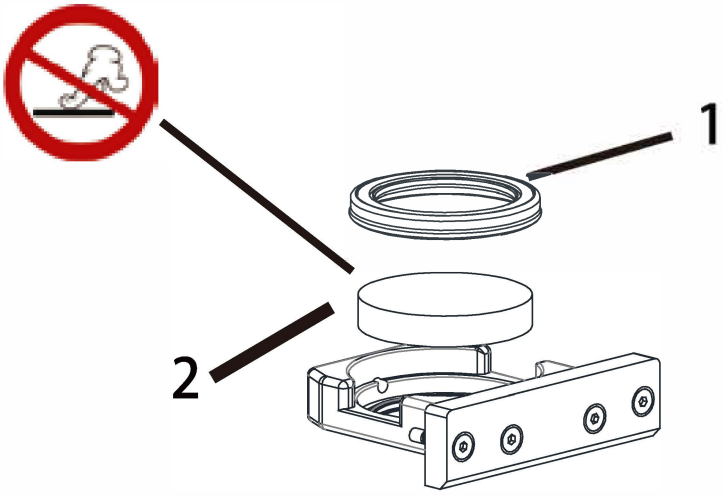
1、Pressing ring 2、Protective glass 3、Fixture tools
Note : Remove in the direction of the arrow with fixture tools,otherwise it may cause damages.
DO NOT operate with wrench or iron plier.

2.5 Replacement of Focus Protection Window



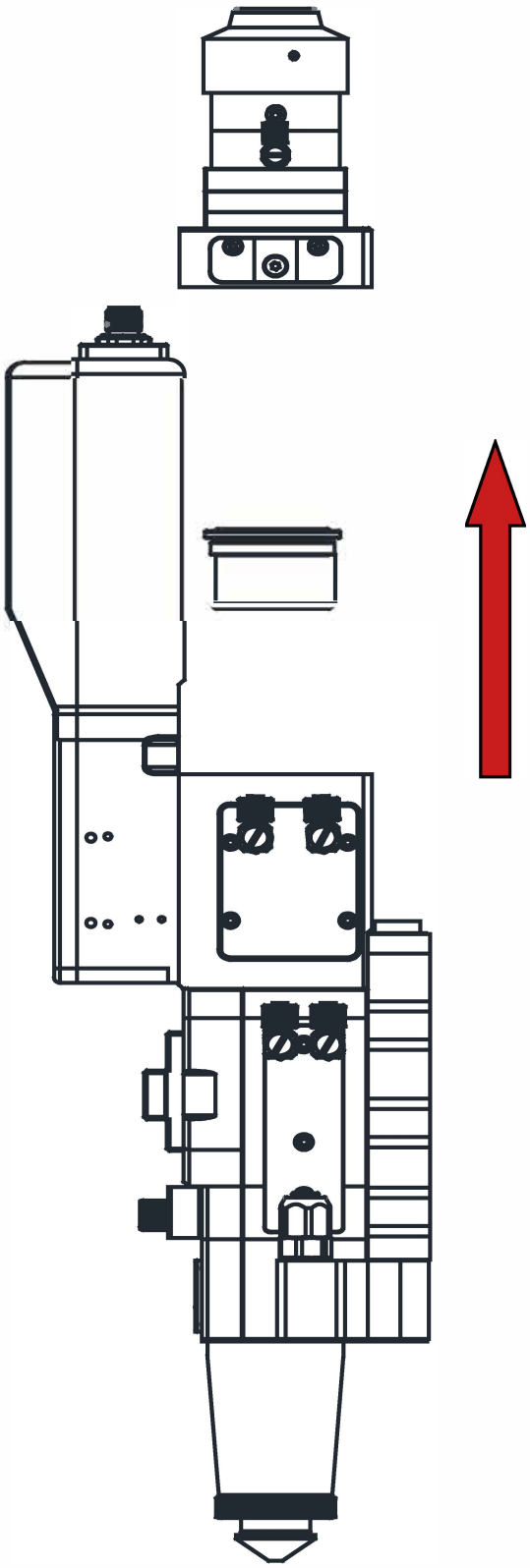


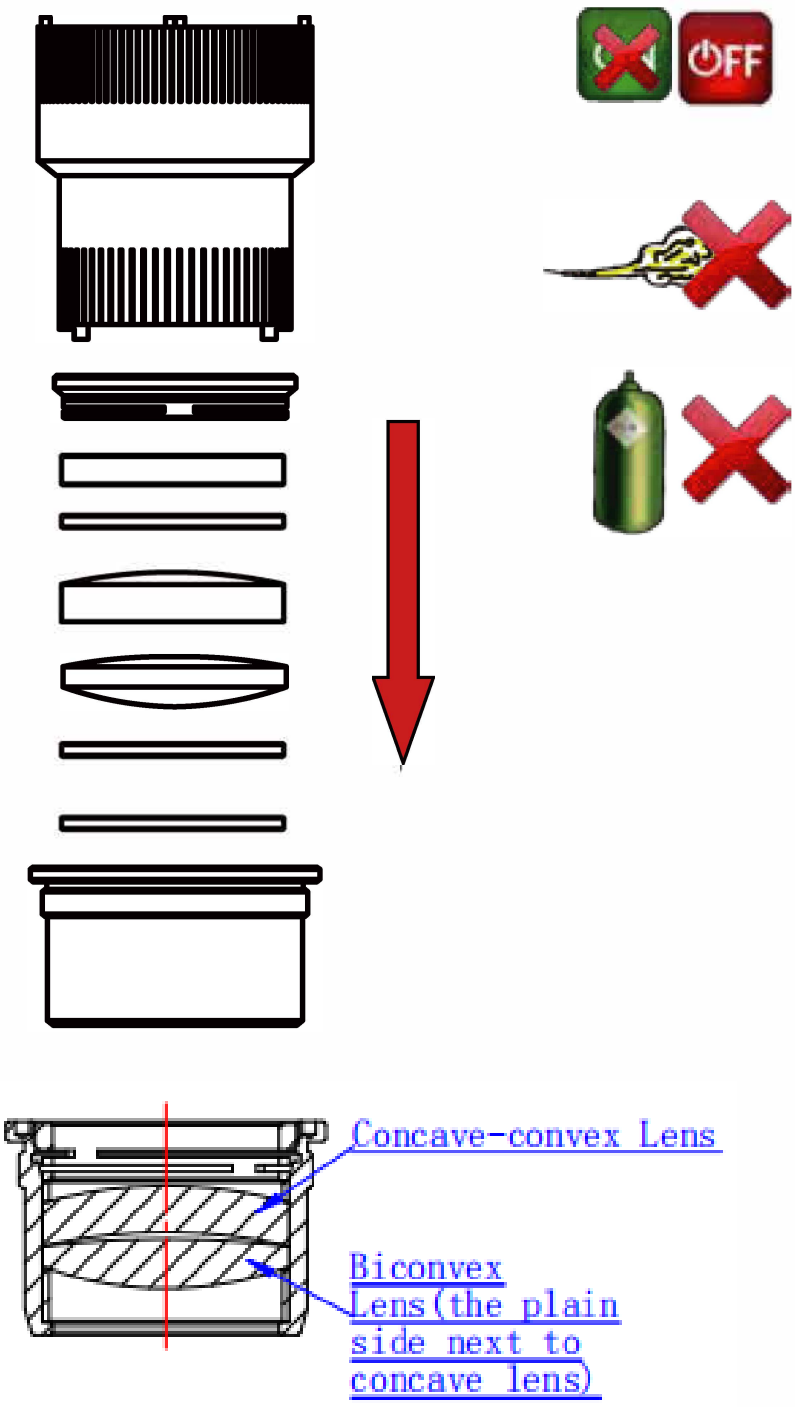
Loosen the screws and remove



1、Pressing ring 2、Protective glass
Note : Remove in the direction of the arrow, otherwise it may cause damages.
DO NOT operate with wrench or iron plier.

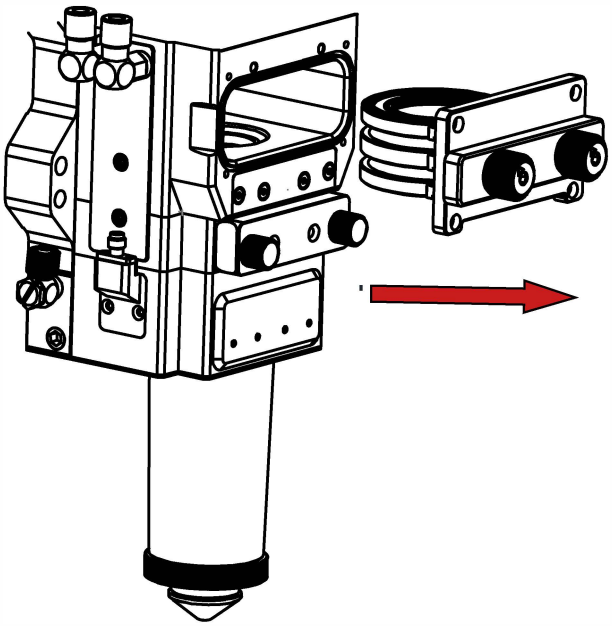
2.6 Replacement of Collimation Lens

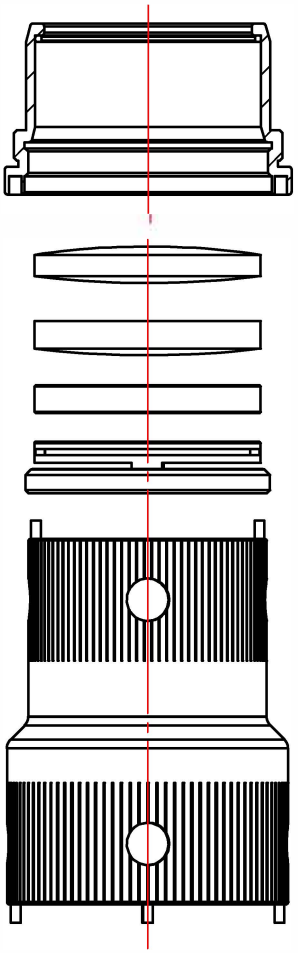


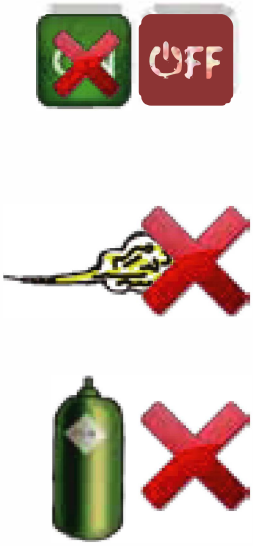


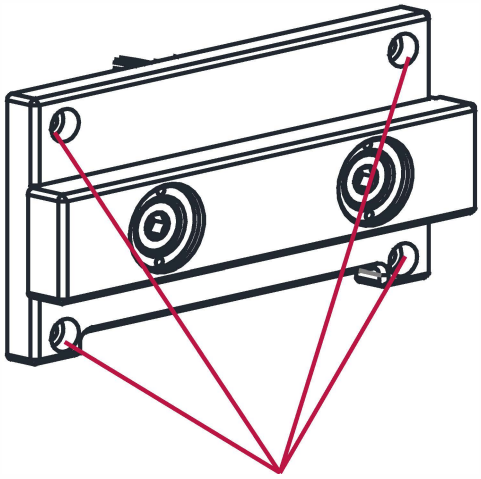
Note: To disassemble, use a special fixture to rotate and loosen the fixed gland. After taking out the lens, record the thickness and direction of the washer. After replacement, return to the original recording state in order.

2.7 Replacement of Focus Lens

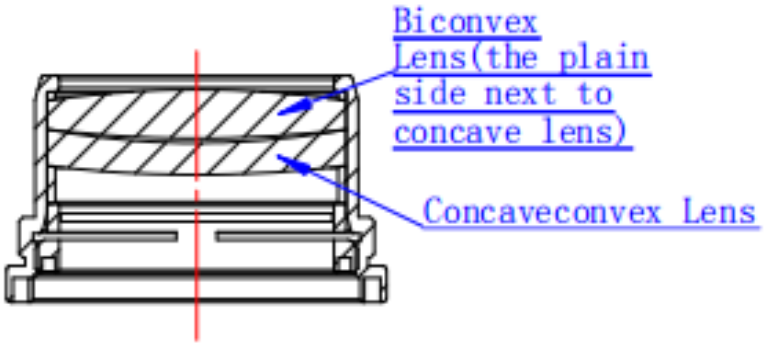








Loosen the screws and remove



Note: To disassemble, use a special fixture to rotate and loosen the fixed gland. After taking out the lens, record the thickness and direction of the washer. After replacement, return to the original recording state in order

2.8 using steps

test condition

Correct wiring, normal electric, good earthing with smoothing and voltage stabilizing circuit.

Steps

1. Adjust soft limitation to -100~100
2. Set inching speed to 1mm/s
3. Inching at positive direction until reach positive limitation
4. Inching at negative direction until reach negative limitation
5. After confirming effectiveness of positive & negative limitation, set back to origin
6. Restore soft limitation & inching speed to origin

Instruction

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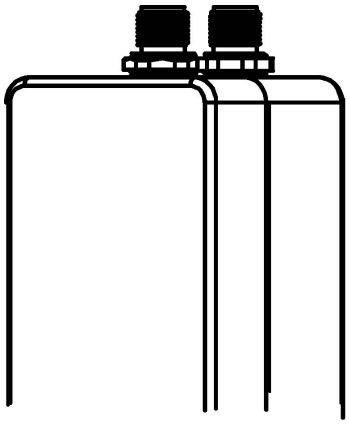
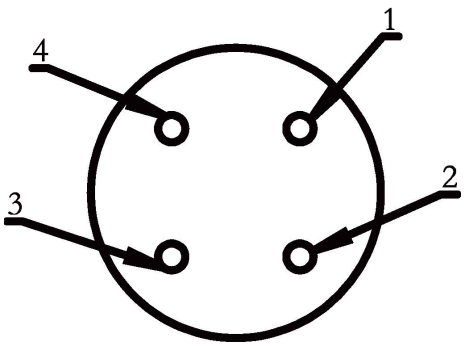
1. Make sure manual inching can find limit switch
2. Reduce manual speed to ensure that invalid limitation will not cause structural damage.
3. Make sure wire connection of negative limitation switch is correct and signal is normal
4. It's allowed to restore to origin automatically only after confirming positive & negative limitation
5. Restore parameters to ensure system running correctly

3. Electrical interface and definition

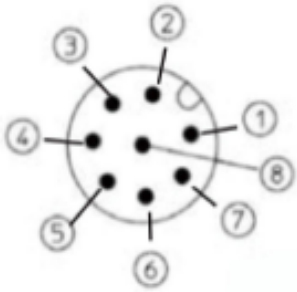
3. 1Electrical interface





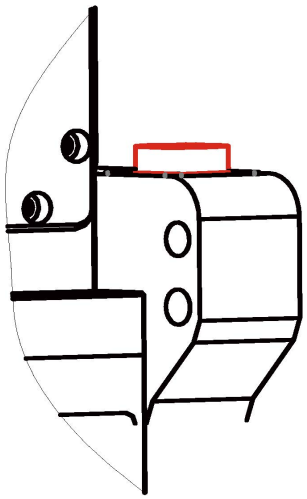
1	W
2	U
3	V
4	FG (Ground)

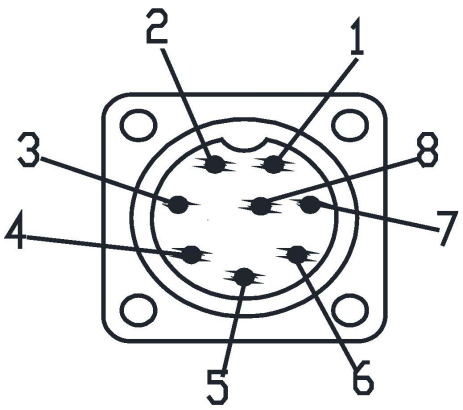
Servo Motor Power Supply Interface (Red)



pin	definition
shell	shielded wire
1	-D (Encoder Signal Data-)
2	+D (Encoder Signal Data+)
3	SG (Signal Ground)
4	VCC ((Encoder Power+5V)
5	+24V (Approach Switch Power)
6	0V (Approach Switch Power)
7	W+ (Approach Switch Signal)
8	W- (Approach Switch Signal)

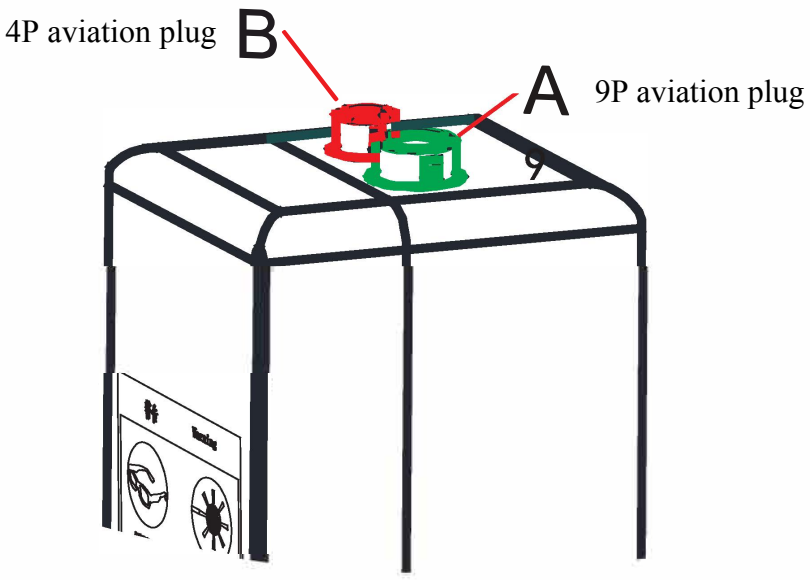
Servo Motor Encoder & Approach Switch Interface(Green)

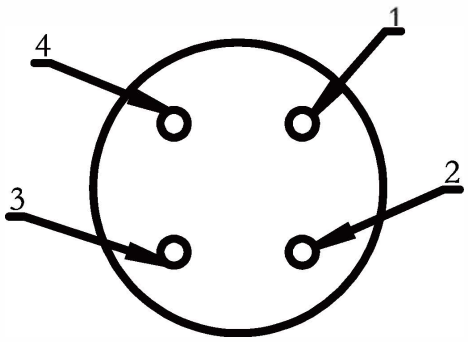




pin	definition
1	24V ground
2	24+ power
3	232 ground
4	alarm reset
5	ALM - OUT
6	232 TX
7	232 RS
8	null
9	null

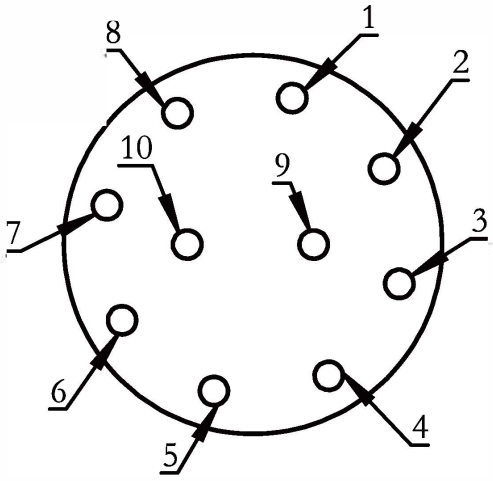
Lens Monitoring Signal Interface（Red）





1	W
2	U
3	V
4	FG(ground)

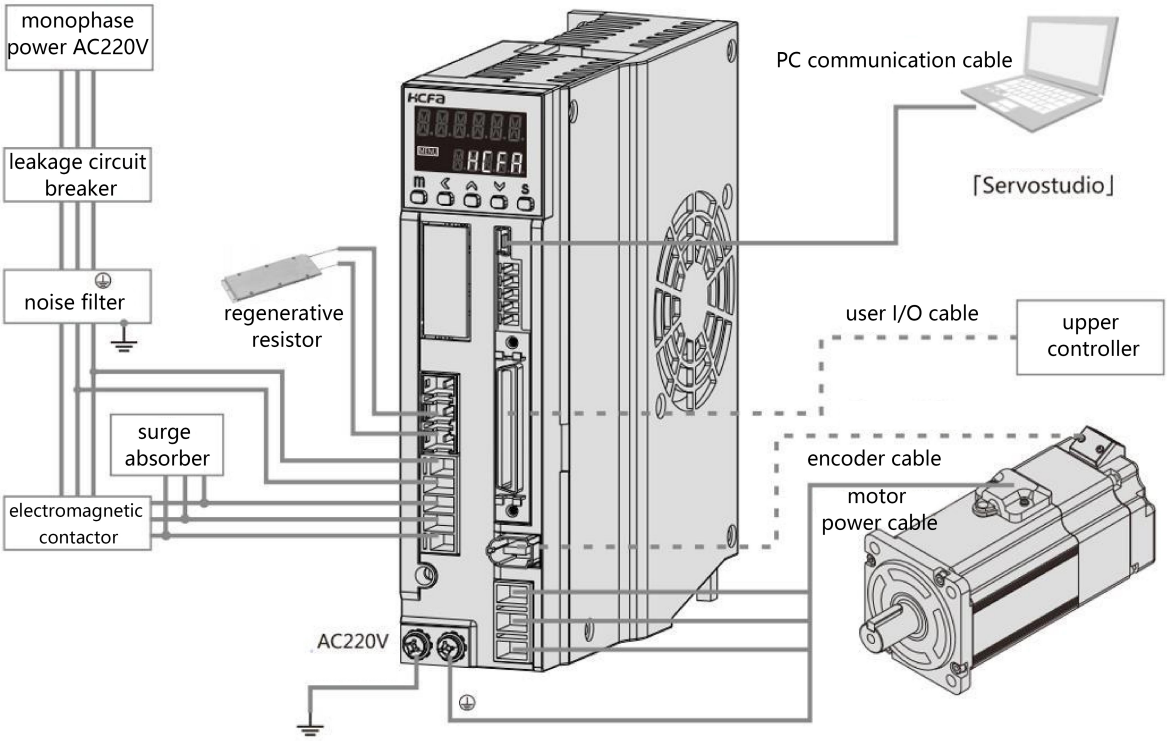
Servo Motor Power Supply Interface (Red)



1	FG (Shielded wire)
2	-D (Encoder Signal Data-)
3	+D (Encoder Signal Data+)
4	SG (Signal Ground)
5	VCC (Encoder Power +5V)
6	+24V (Approach Switch Power)
7	0V (Approach Switch Power)
8	W+ (Approach Switch Power)
9	W- (Approach Switch Power)

Servo Motor Encoder & Approach Switch Interface(Green)

3.2 Electrical connection



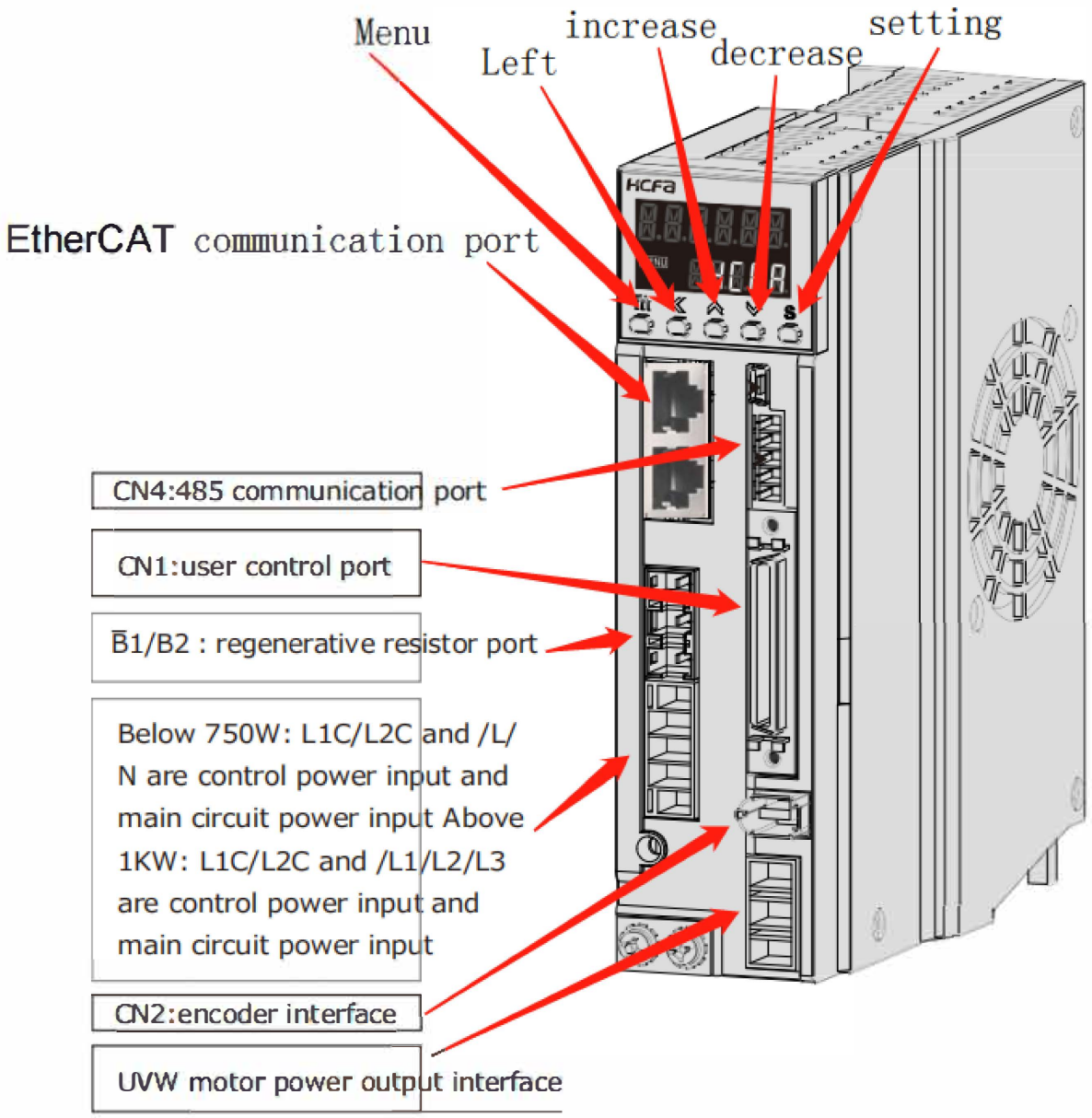
Wiring notes

The control circuit power supply and the main circuit power supply should be wired from the same AC220V main power supply;

For user I/O cables, please use shielded twisted pair cables

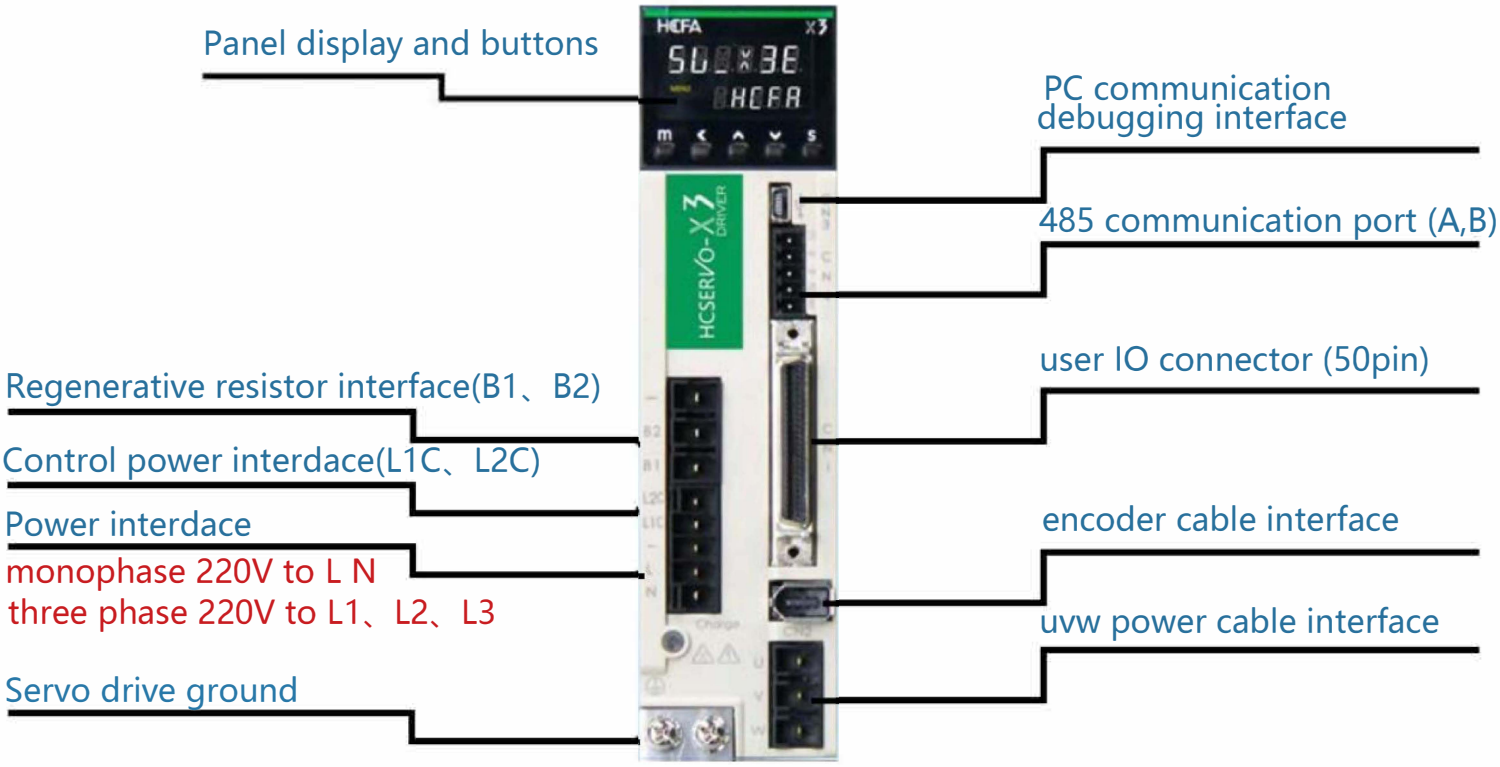
The length of the encoder cable should be less than 20M.

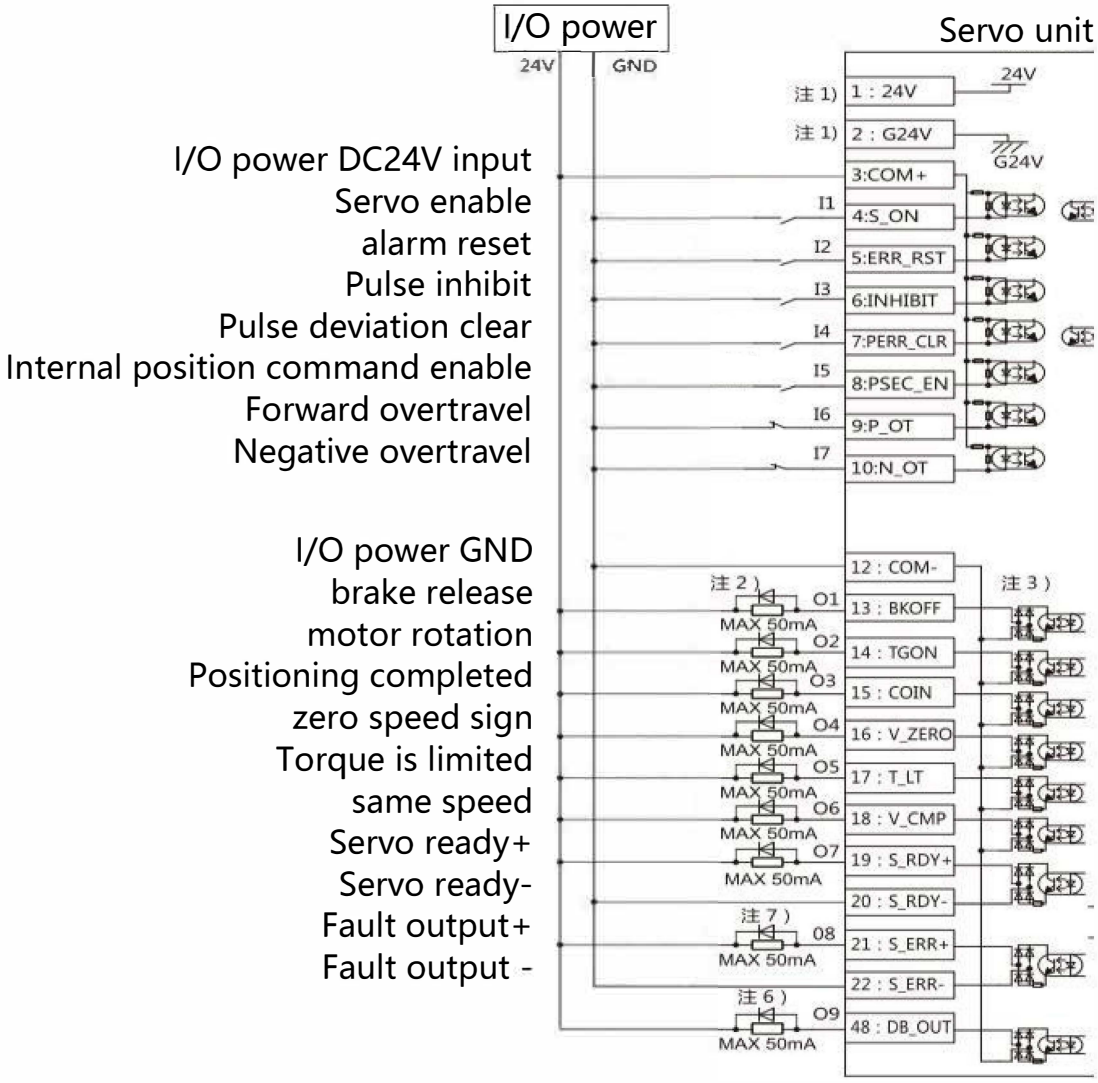
Note: For the debugging of the servo drive, please refer to the HCFA manual



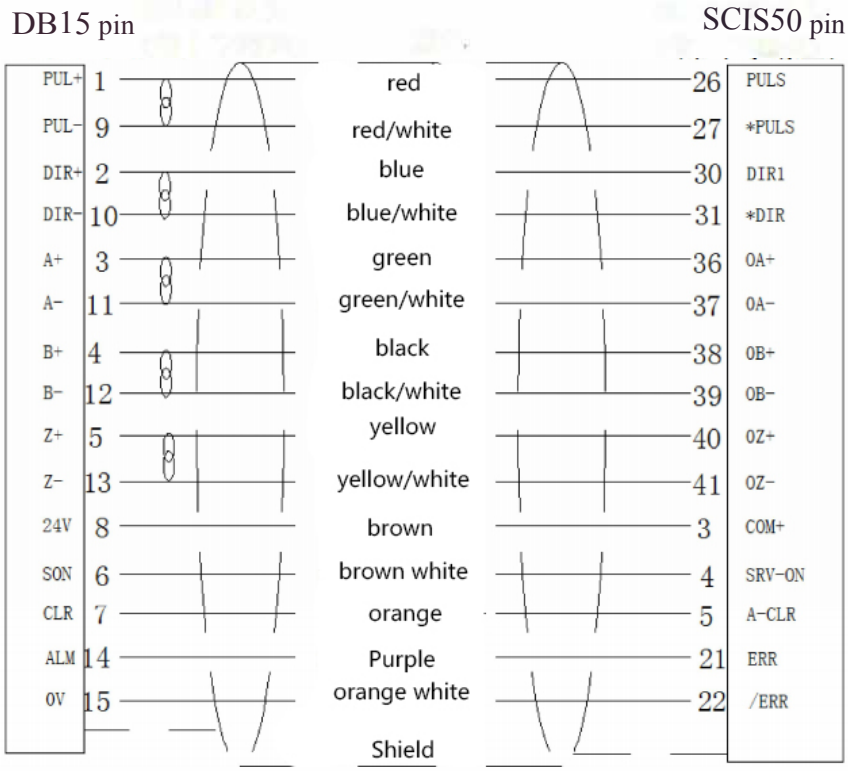
Parameter setting:

parameter	value	parameter	value	parameter	value
P0.00	0	P00.01	7	P00.03	14

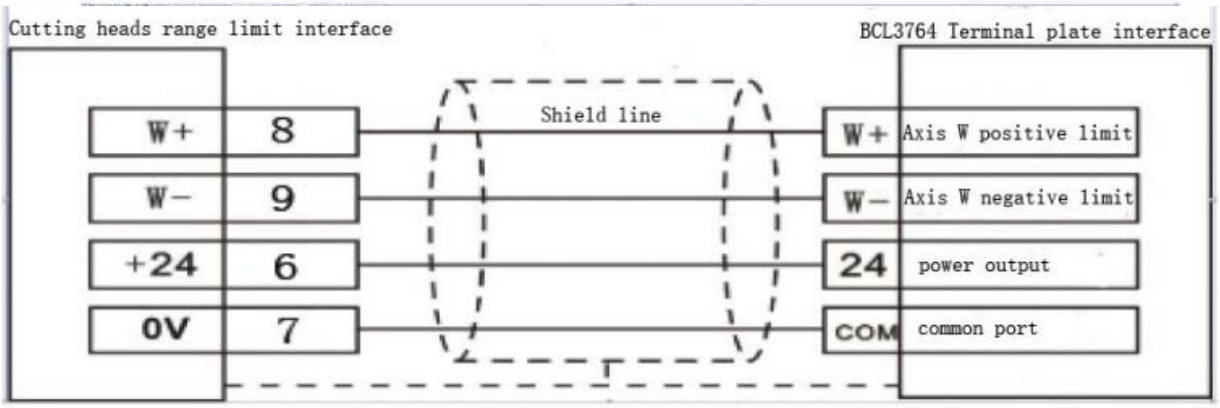

Panel display and buttons
PC communication debugging interface
485 communication port (A,B)
user IO connector (50pin)
encoder cable interface
uvw power cable interface
Regenerative resistor interface(B1、B2)
Control power interdace(L1C、L2C)
Power interdace
monophase 220V to L N
three phase 220V to L1、L2、L3
Servo drive ground


I/O power
Servo unit
24V
GND
I/O power DC24V input
Servo enable
alarm reset
Pulse inhibit
Pulse deviation clear
Internal position command enable
Forward overtravel
Negative overtravel
I/O power GND
brake release
motor rotation
Positioning completed
zero speed sign
Torque is limited
same speed
Servo ready+
Servo ready-
Fault output+
Fault output -
注 1) 1 : 24V
注 1) 2 : G24V
3:COM+
4:S_ON
5:ERR_RST
6:INHIBIT
7:PERR_CLR
8:PSEC_EN
9:P_OT
10:N_OT
12 : COM-
13 : BKOFF
14 : TGON
15 : COIN
16 : V_ZERO
17 : T_LT
18 : V_CMP
19 : S_RDY+
20 : S_RDY-
21 : S_ERR+
22 : S_ERR-
48 : DB_OUT
MAX 50mA

FSCUT2000A laser cutting control system BCL3764 terminal board w-axis DB15 servo control interface connection HCFA servo driver 50P interface definition



Cutting head focus adjustment range stroke limit switch interface definition



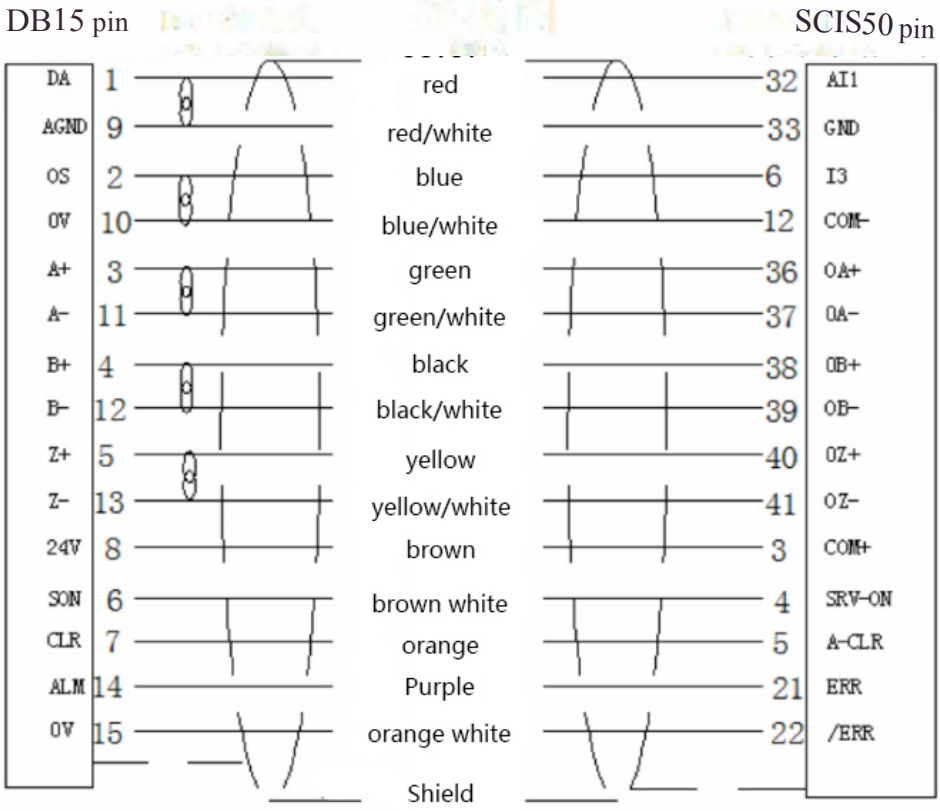
Parts of parameter list, subject to actual using and HCFA servo instruction.

NC68 parameter

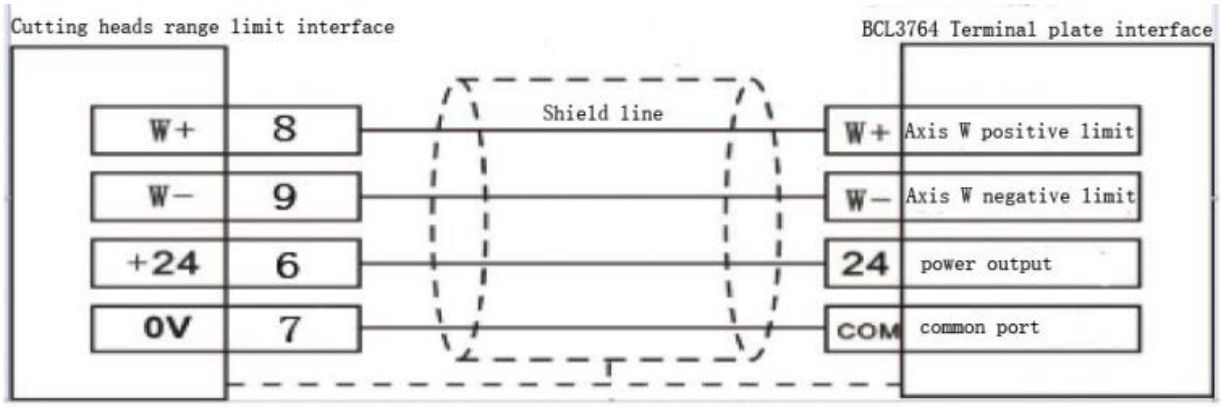
parameter	value	parameter	value	parameter	value
P0. 00	1	P0. 08	10000	P03. 10	600
P0. 01	0	P0. 14	2500	P06. 40	80
P0. 03	14	P03. 09	600		

Note: 1.Definitions of servo driver and servo motor connector shown in HCFA servo driver instruction; 2.Please use uniphase power, L connects to L1; N connects to L2.

FSCUT2000A laser cutting control system BCL3764 terminal board w-axis DB15 servo control interface connection HCFA servo driver 50P interface definition



Cutting head focus adjustment range stroke limit switch interface definition



Parts of parameter list, subject to actual using and HCFA servo instruction.

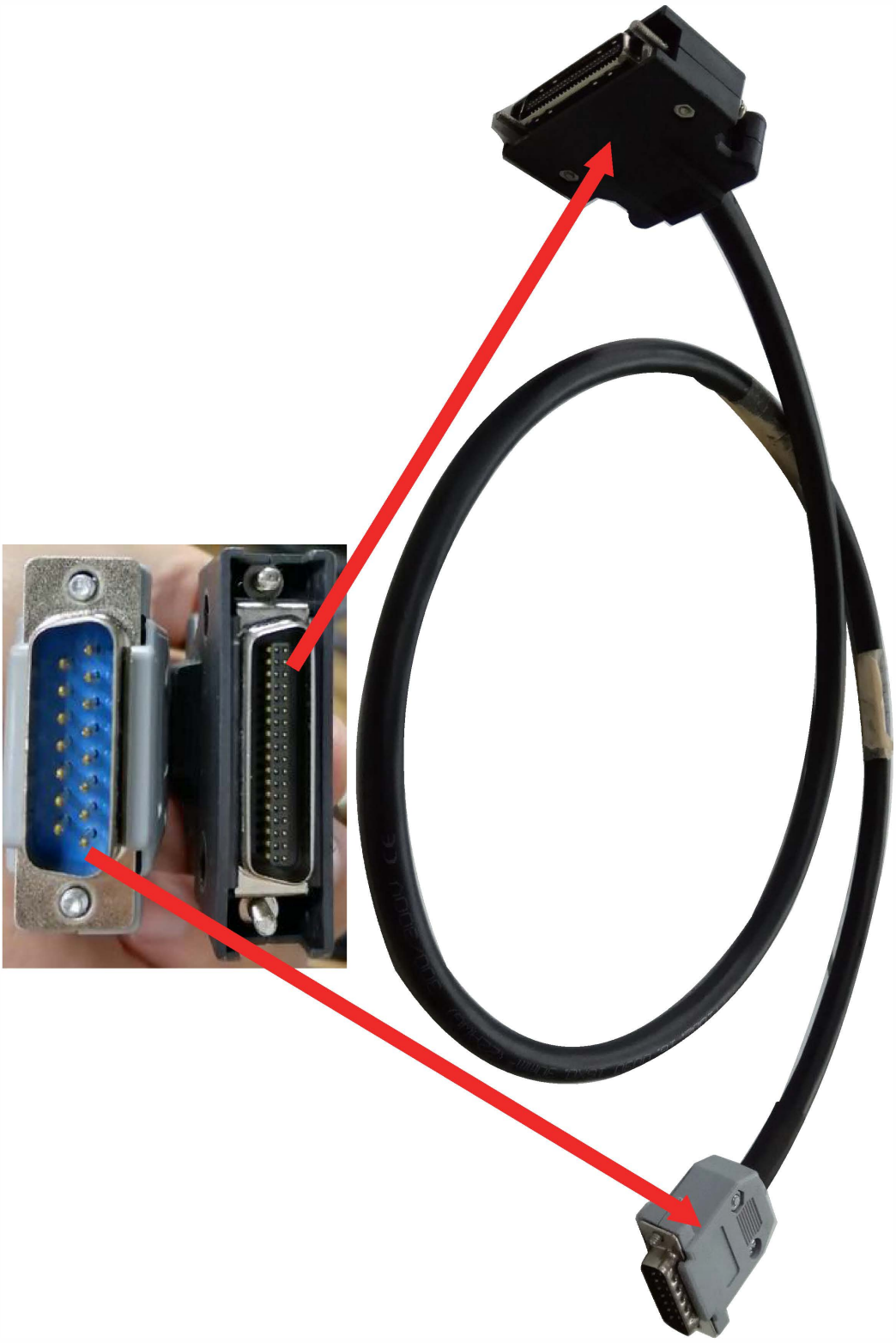
NC68 parameter

parameter	value	parameter	value	parameter	value
P0. 00	1	P0. 08	10000	P03. 10	600
P0. 01	1	P0. 14	2500	P06. 40	80
P0. 03	14	P03. 09	600	P04. 03	12

Note: 1.Definitions of servo driver and servo motor connector shown in HCFA servo driver instruction; 2.Please use uniphase power, L connects to L1; N connects to L2.

50Pin plug

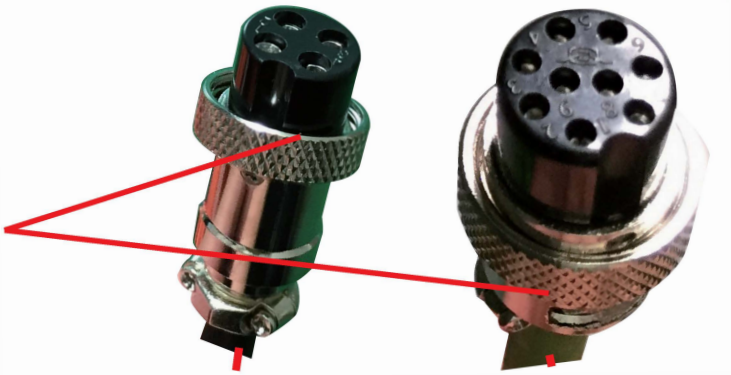
connects to drive CN1



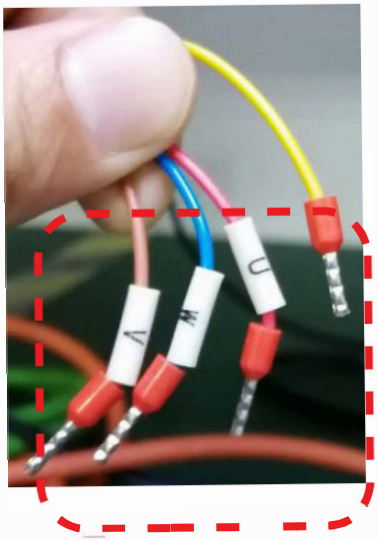
15Pin plug connects to W-axis


HCSERVO-X3
DRIVER
CN1
W axis
BCL3724 V2.1

3.3 Servo connection and inspection



Tighten to prevent loosening



The order of U V W cannot be reversed, and must be in one-to-one correspondence.

3.5 Checking of wiring between laser head and driver

(1) Check the mark of the UVW cable, which should correspond one-to-one with the UVW on the plug.

(2) The UVW cannot be connected to the ground wire and the casing, and the resistance between the UVW and the casing is greater than 5MΩ.

Test conditions: one end of the cutting head is connected, and one end of the driver is not connected.

(3) The resistance between UVW electrodes is about 20Ω. If the resistance is 0 (short circuit) or the multimeter shows infinity (open circuit), it is regarded as abnormal.

Test conditions: one end of the cutting head is connected, and one end of the driver is not connected.

(4) Ground (very important).

(5) When connecting the aviation plug, be sure to follow the steps below:

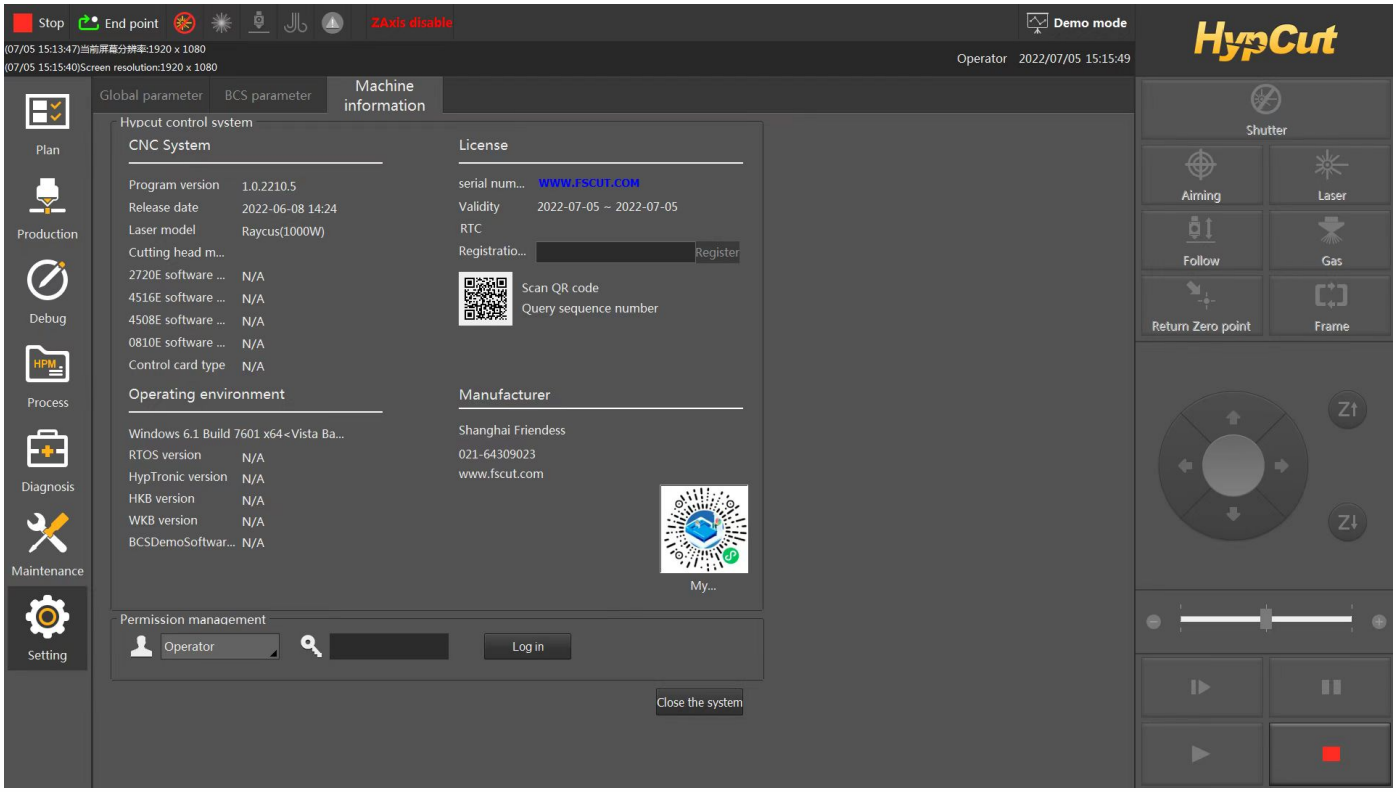
Step 1: Use an air gun to blow off the water, oil, dust and other debris in the aviation plug.

Step 2: Tighten the male and female headers of the aviation plug.

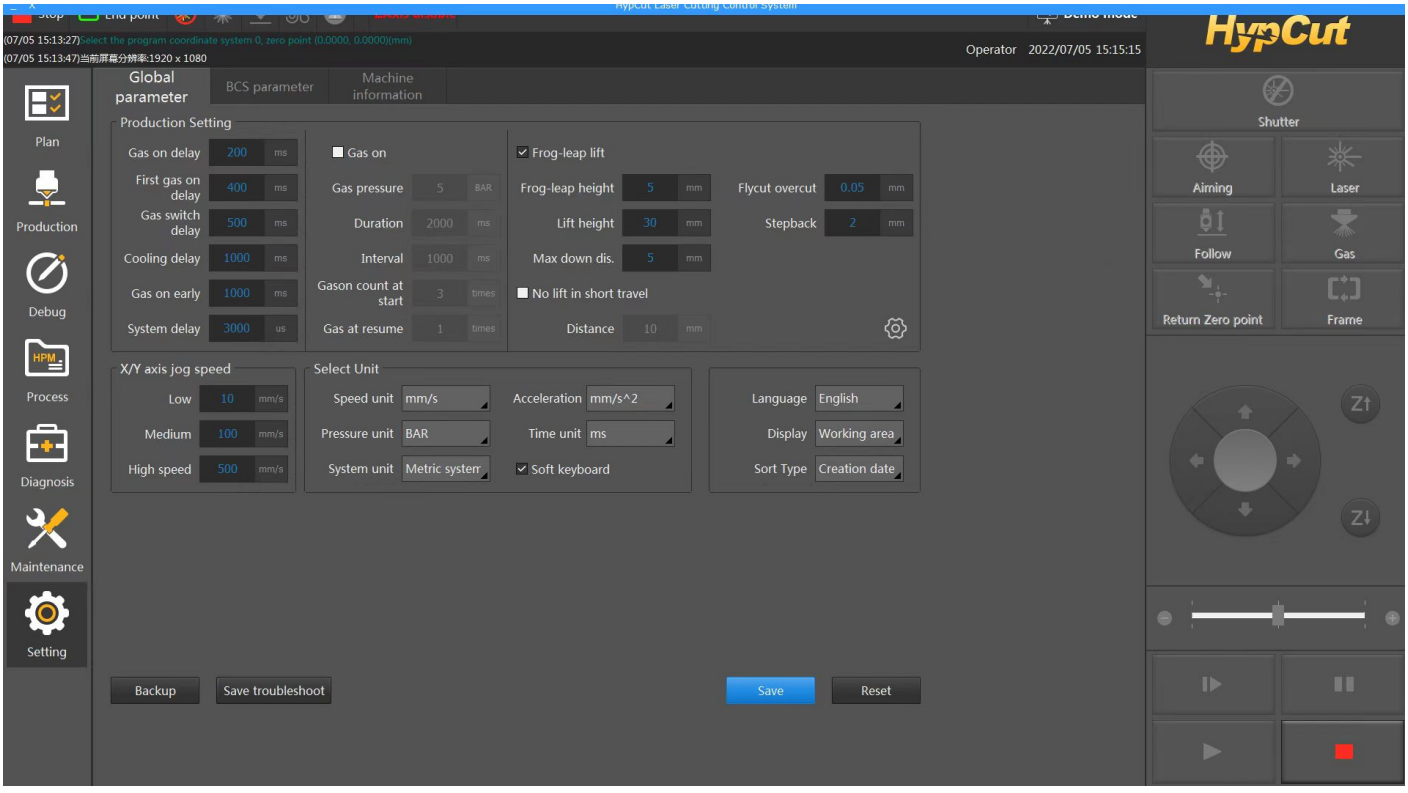
Step 3: Use masking tape or electrical tape to wrap the air plug to prevent moisture, oil and dust from entering the aviation plug.

4. HypCut bus system operation and setting

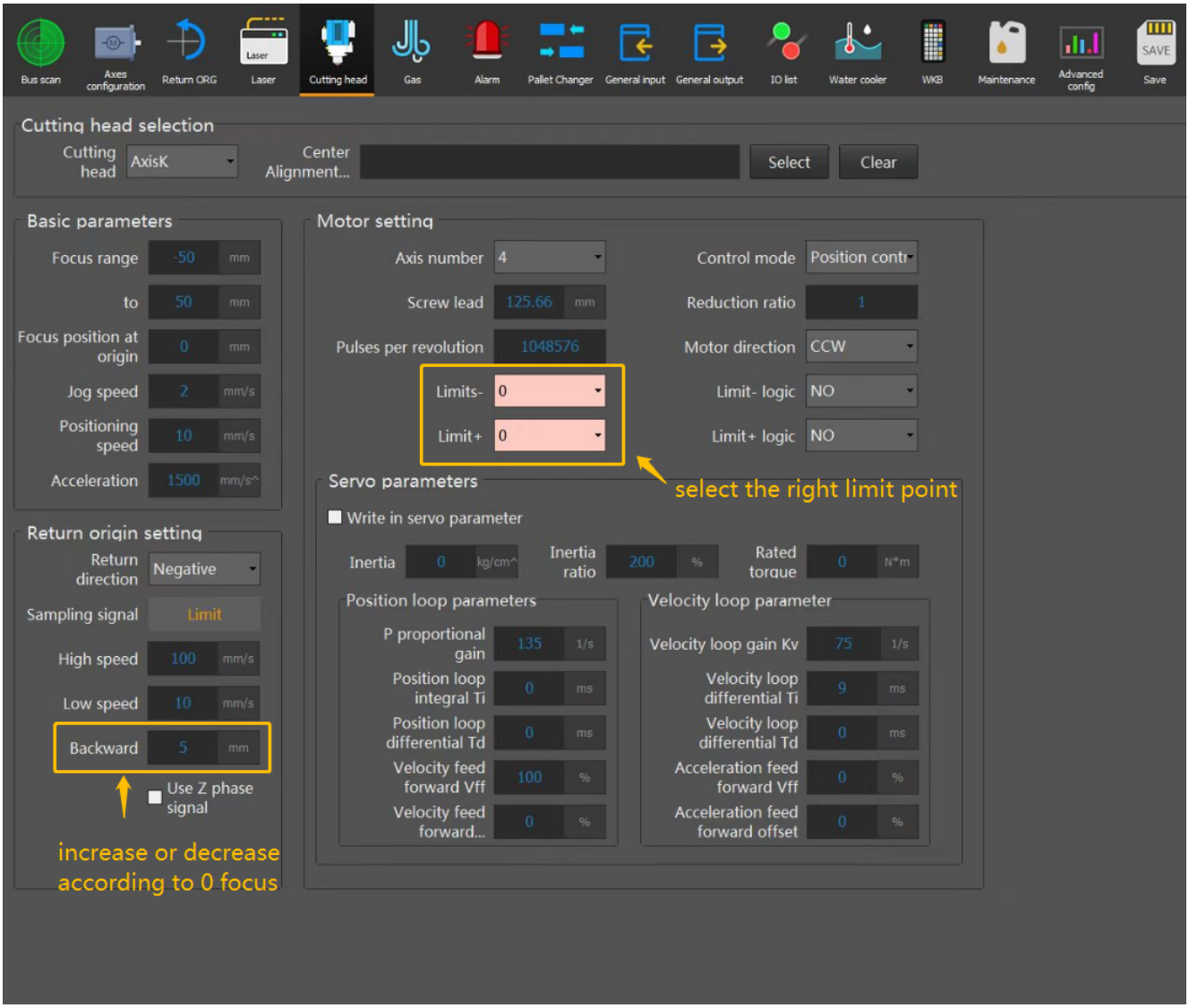
4.1 Settings > Device Information Interface > Enter Password 64309023 > Enter Expert Mode



4.2 Settings>Overall Parameters>Click Platform Configuration>



Axis configuration



Common problems and faults

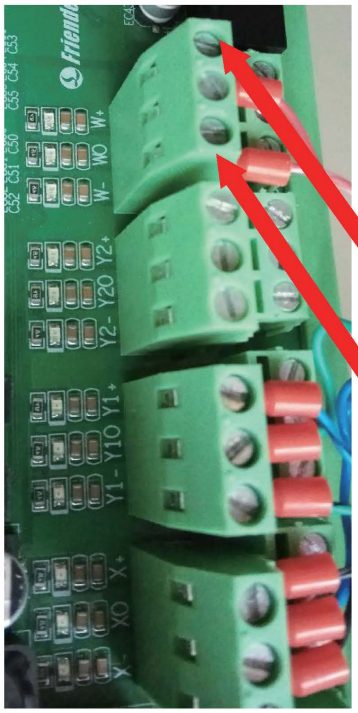
Fault code	Fault cause	Troubleshooting and handling methods
Err.007	Encoder initialization failed	Check the encoder wiring, or replace the encoder cable
Err.013	Encoder communication exception	1. Check the encoder wiring, or replace the encoder cable 2. Check that the encoder is well grounded
Err.017	Torque saturation timeout	Check that the UVW is disconnected
Err.018	Control power underpressure	1. Check the input power supply and wiring 2. Replace the drive
Err.019	Speed failure	1. Check the UVW and the encoder wiring 2. Check the drive & motor
Err.020	Overvoltage	Check the input power supply voltage
Err.043	The position deviation is too large	Check whether the motor line is disconnected

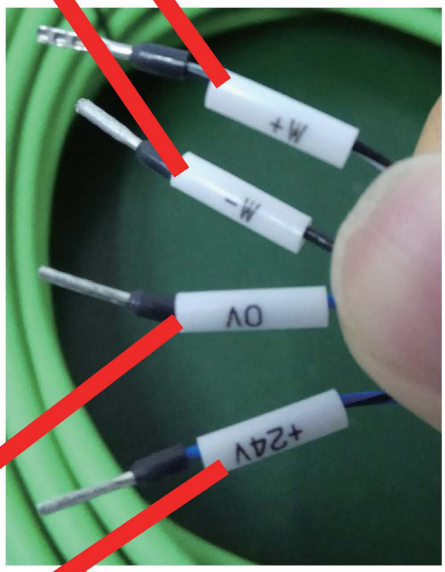
W

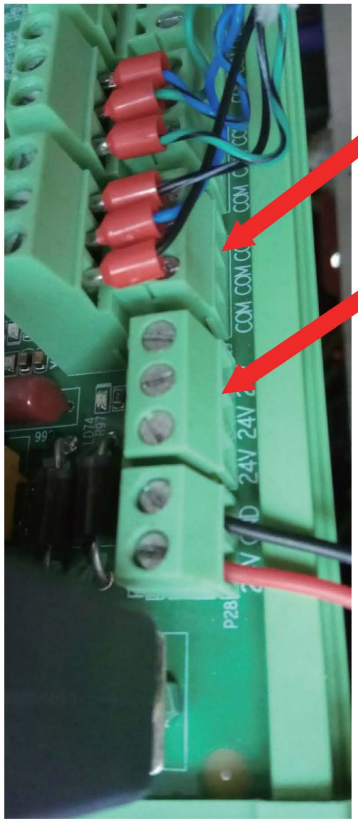
Y2

Y1

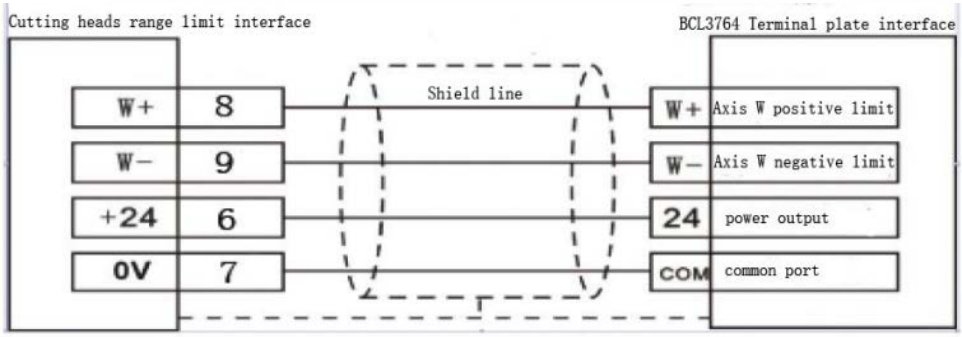
X







Definition of laser focusing adjustment range limitation switch connector



Limit signal inspection method:

Test condition

(1)Connect the DC24 power supply.
(2)Do not connect W+ W- first.
(3)The laser head scale 0 is in the middle of the window.

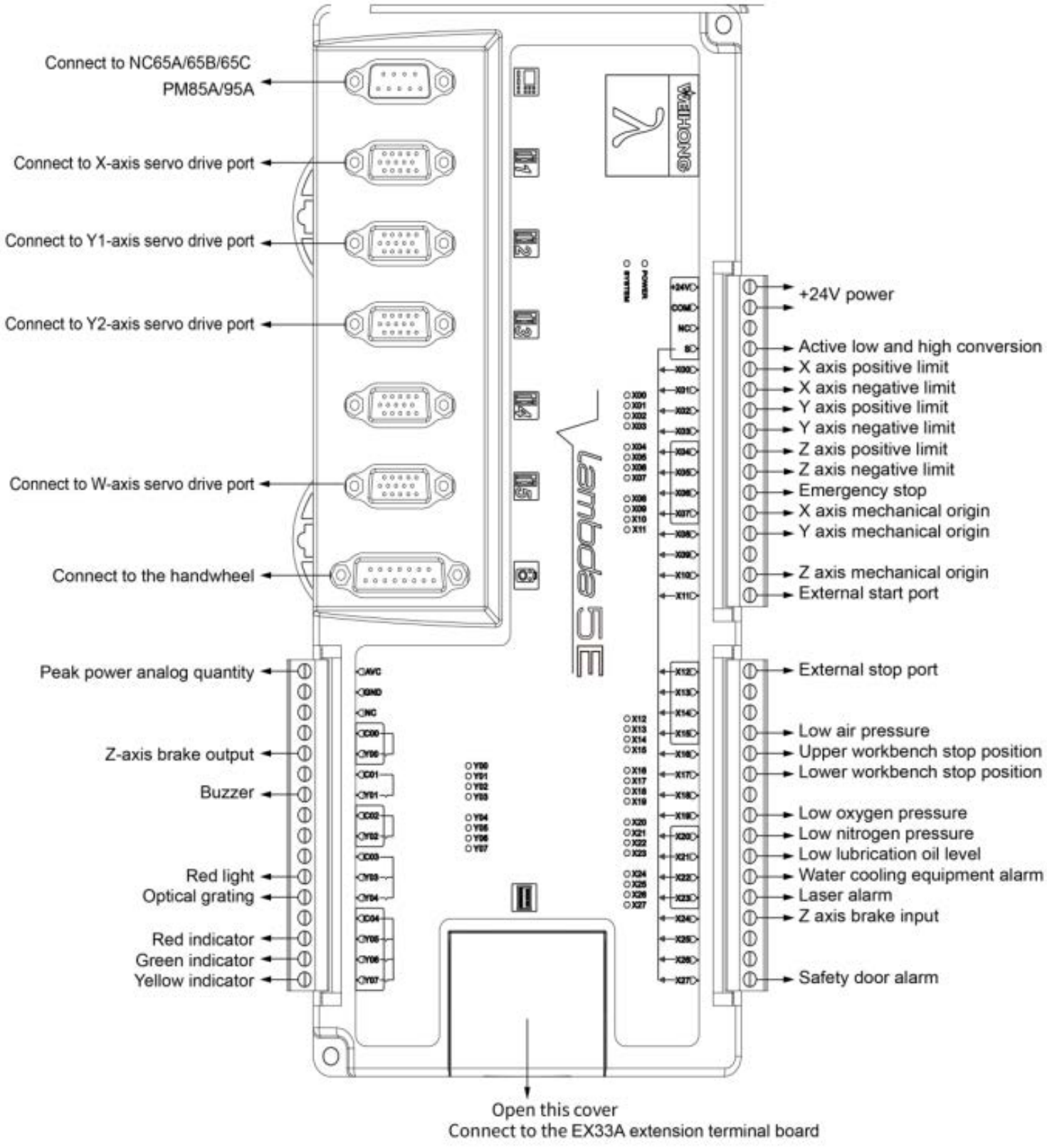
Steps

(1) Select the "DC voltage" gear for the multimeter, 200V or above.
(2) The red test lead is connected to the DC24V end, and the black test lead is connected to the W+ end (the side of the laser head line).
(3) If the displayed voltage value is greater than 18V, it is normal (theoretical value is 24V), and if it is less than 14V, it is abnormal (theoretical value is 0V).
(4) Jog in the positive direction, observe that the voltage changes, and the voltage difference is more than 12V, which is normal.
(5) The red test lead is connected to the DC24V end, and the black test lead is connected to the W- end (the side of the laser head line).
(6) If the displayed voltage value is greater than 18V, it is normal (theoretical value is 24V), and if it is less than 14V, it is abnormal (theoretical value is 0V).
(7) Jog in the positive and negative directions in turn, observe that the voltage has changed, and the voltage difference is greater than 12V, which is normal.
(8) Connect W+ W- to the corresponding port of the system expansion card.
(9) Open the control software, the limit logic high is normally closed. Jog the movement to the positive and negative limit and observe whether the system can detect the limit.
(10) The above is the detection method of the normally closed limit switch, and the opposite is true for the normally open type.

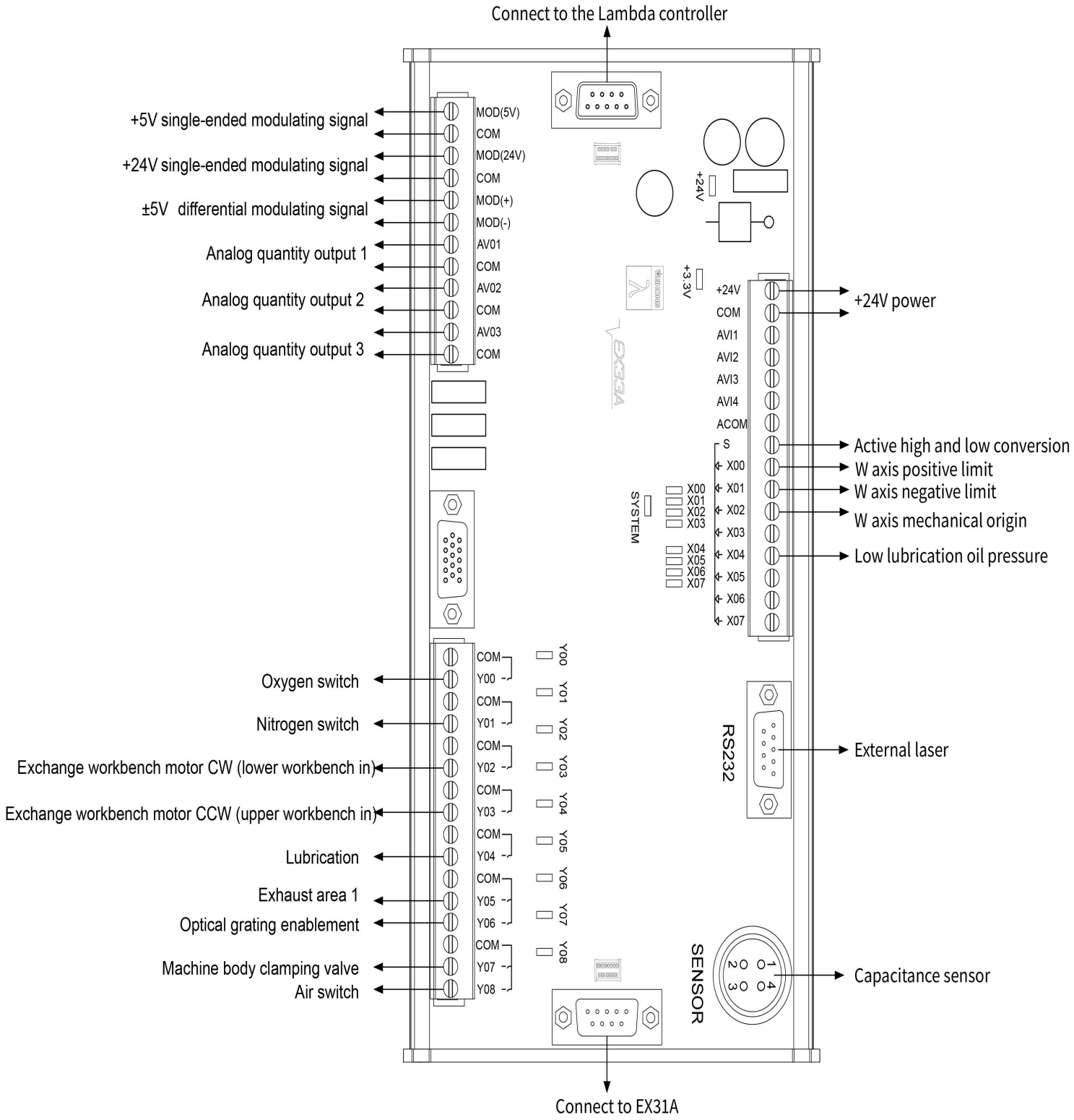
5.Weihong Introduction

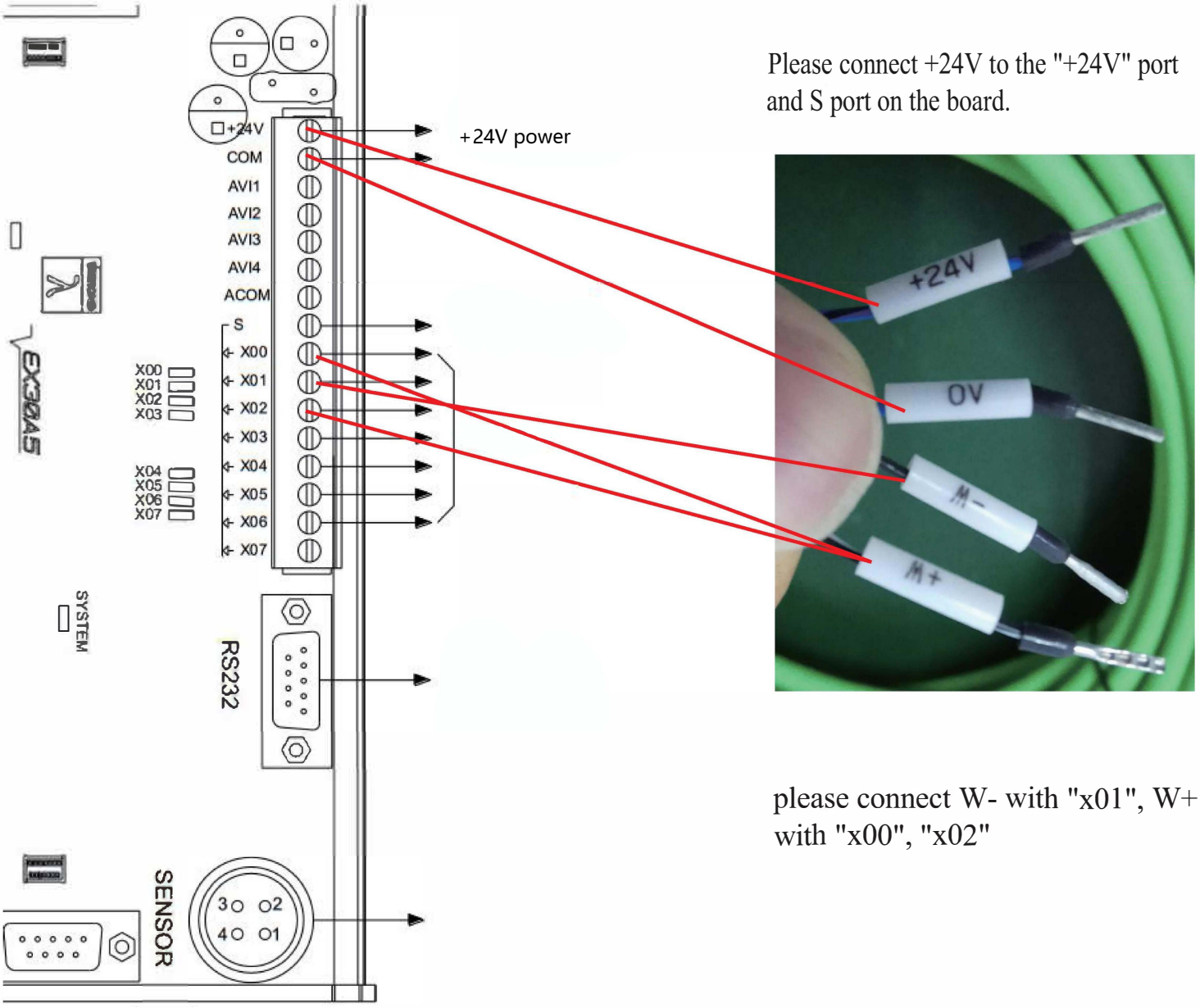
Weihong expansion board 1

Terminal board wiring diagram



Weihong expansion board 2

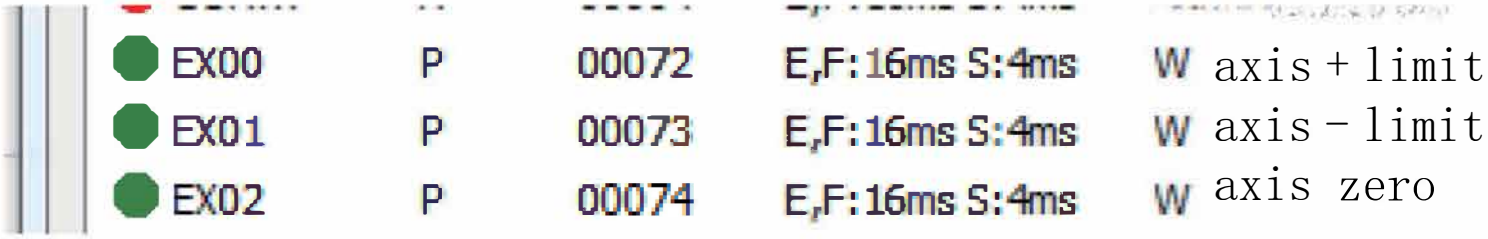




Please connect +24V to the "+24V" port and S port on the board.

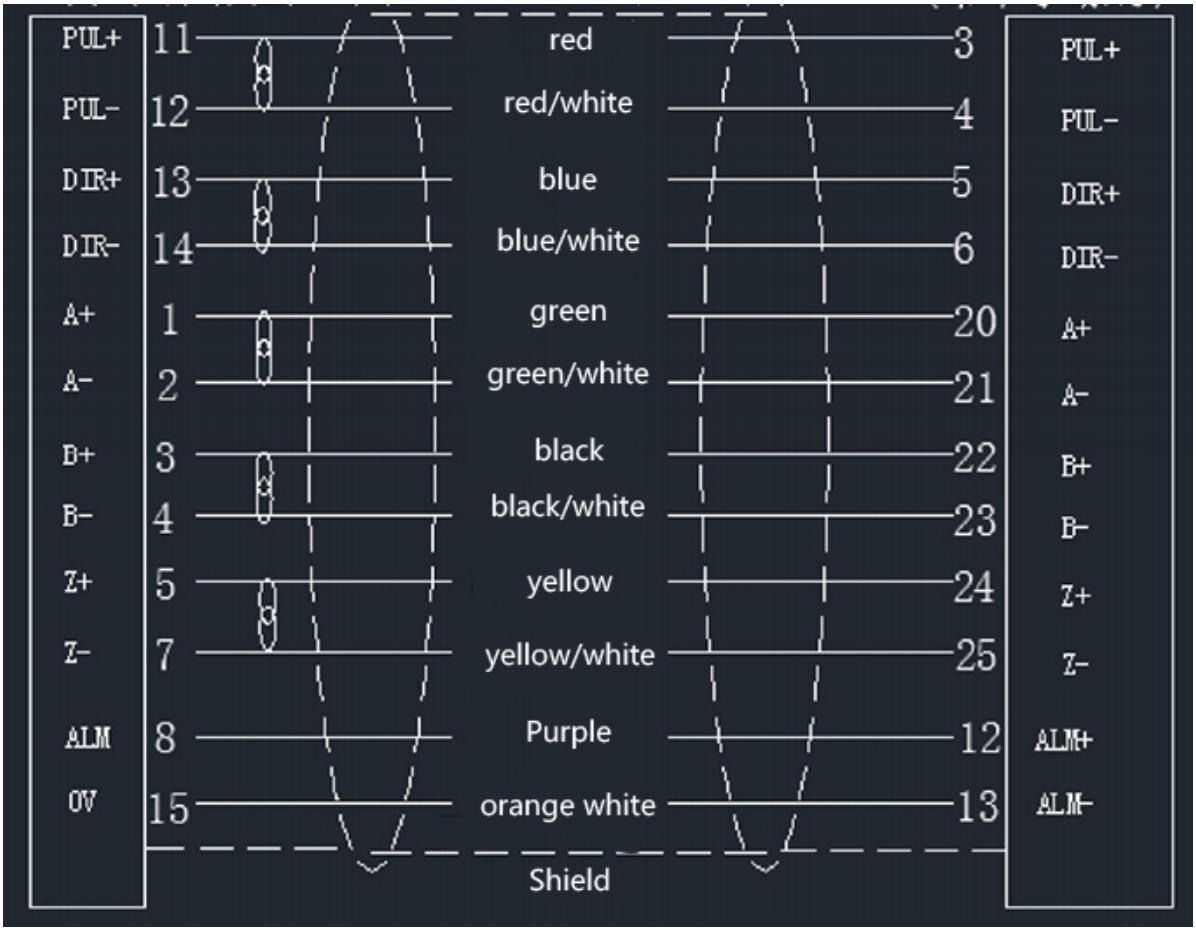
please connect W- with "x01", W+ with "x00", "x02"

Limit logic parameter configuration

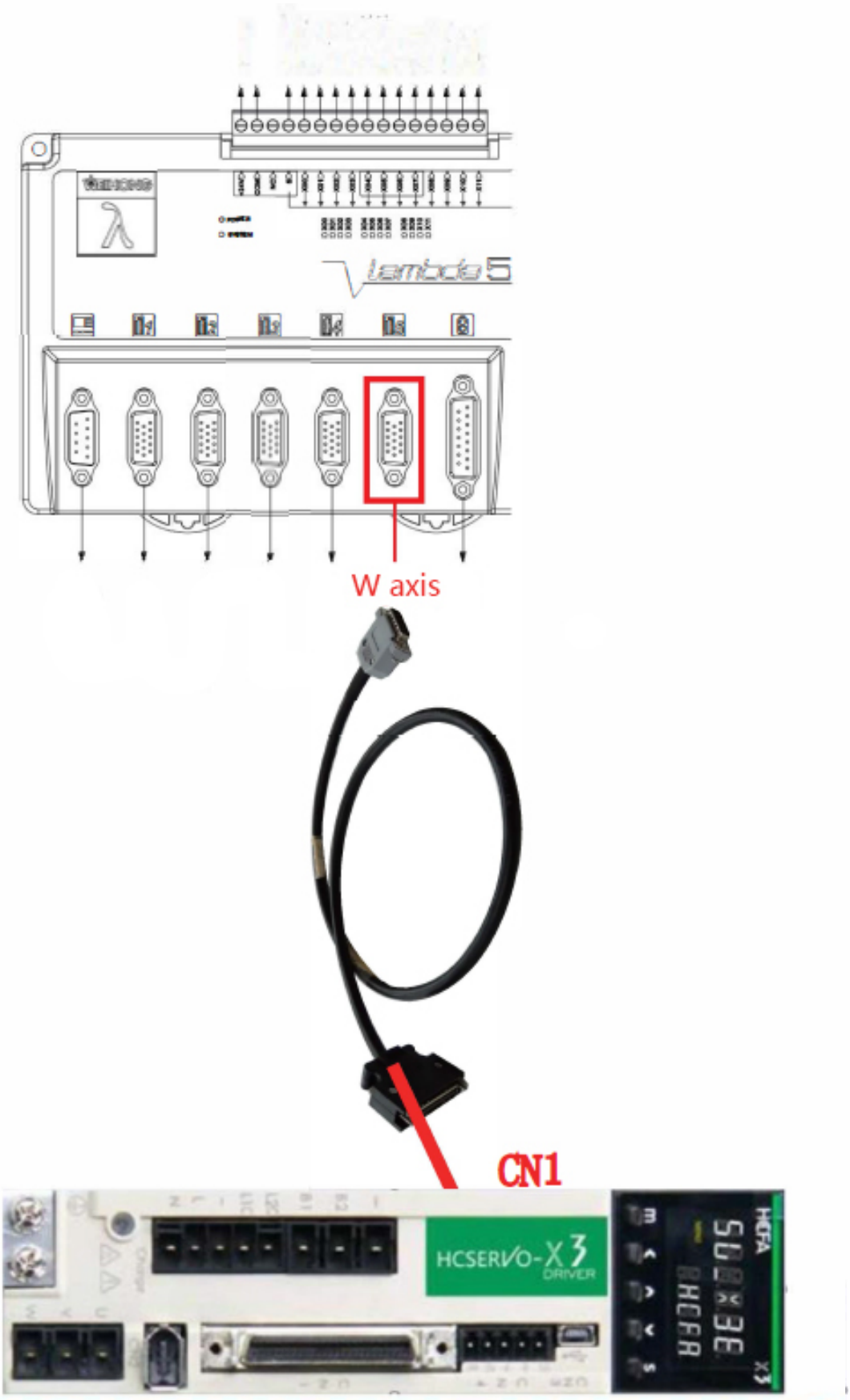


Connection of HCFA and Weihong communication line（NC68)

Weihong15P HCFA 50P

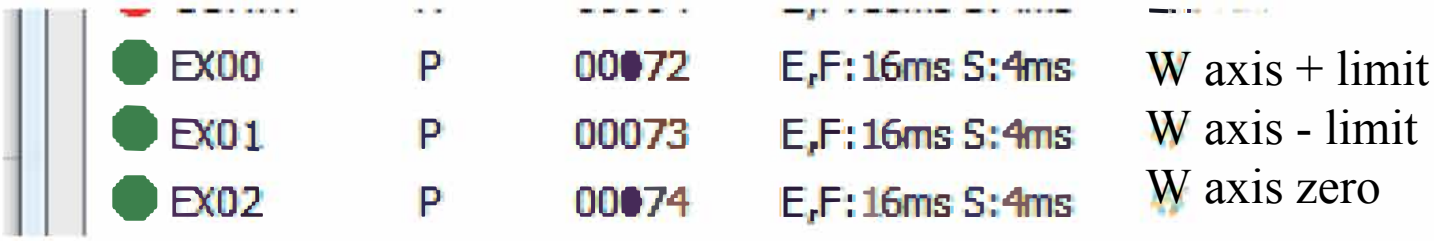


parameter	value	parameter	value	parameter	value
P0. 00	1	P0. 08	10000	P03. 10	600
P0. 01	1	P0. 14	2500	P06. 40	80
P0. 03	14	P03. 09	600		

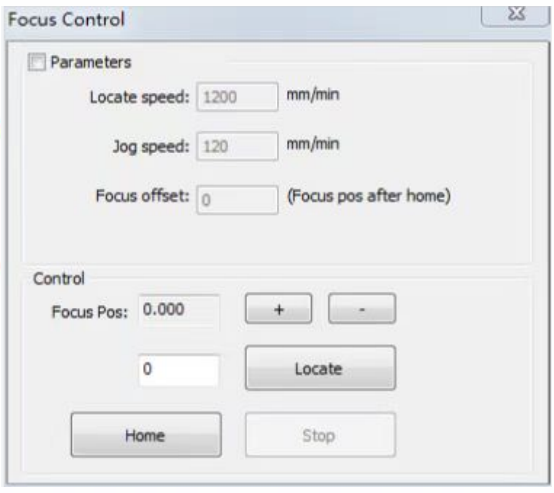

W axis
CN1
HCSERVO-X3
DRIVER

Name	Value	Unit	Effective
1.0.3 W-axis			
Encoder Direction(W)	1		Immediately
Axis Direction(W)	1		Immediately
Pulse Equivalent(W)	0.001	mm/p	Immediately
Command Pulse Count Per Rev	10000		Immediately
Feedback Pulse Count Per Revo	65536		Immediately
Upper Limit of Soft Limit (W)	100	mm	Immediately
Lower Limit of Soft Limit (W)	-100	mm	Immediately
Enable Soft Limit Protection (W	Yes		Immediately
Max Speed of Axis (W)	48000	mm/min	Immediately
Check Axis Encoder Error(W)	No		Immediately
Encoder Static Tolerance(W)	0.1	mm	Immediately
Encoder Dynamic Tolerance(W)	40	mm	Immediately

Limit logic parameter configuration

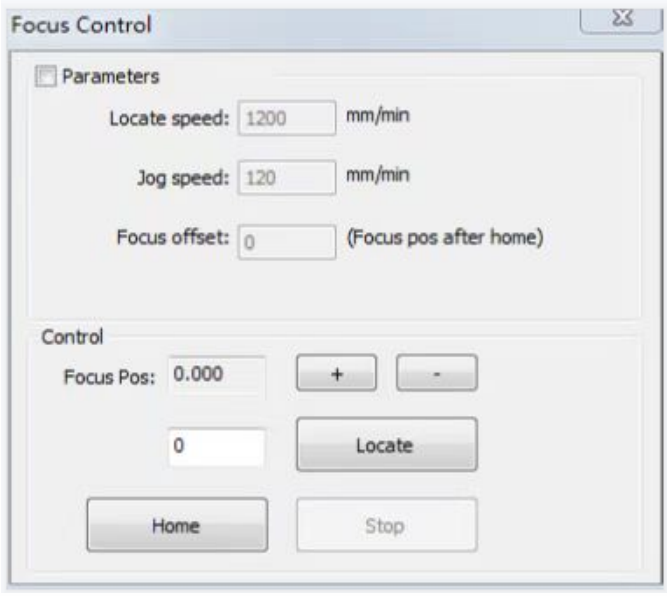


Name	Value	Unit	Effective
1.1.4 Origin Setting(W)			
Use Z Phase Signal(W)	No		Immediately
Coarse Positioning Direction(W	1		Immediately
Coarse Positioning Speed(W)	600	mm/min	Immediately
Fine Positioning Speed(W)	60	mm/min	Immediately
Retract Distance(W)	2	mm	Immediately
Retract Speed(W)	200	mm/min	Immediately
Min Distance between Coarse a	0.5	mm	Immediately
Enable Latch(W)	Yes		Immediately

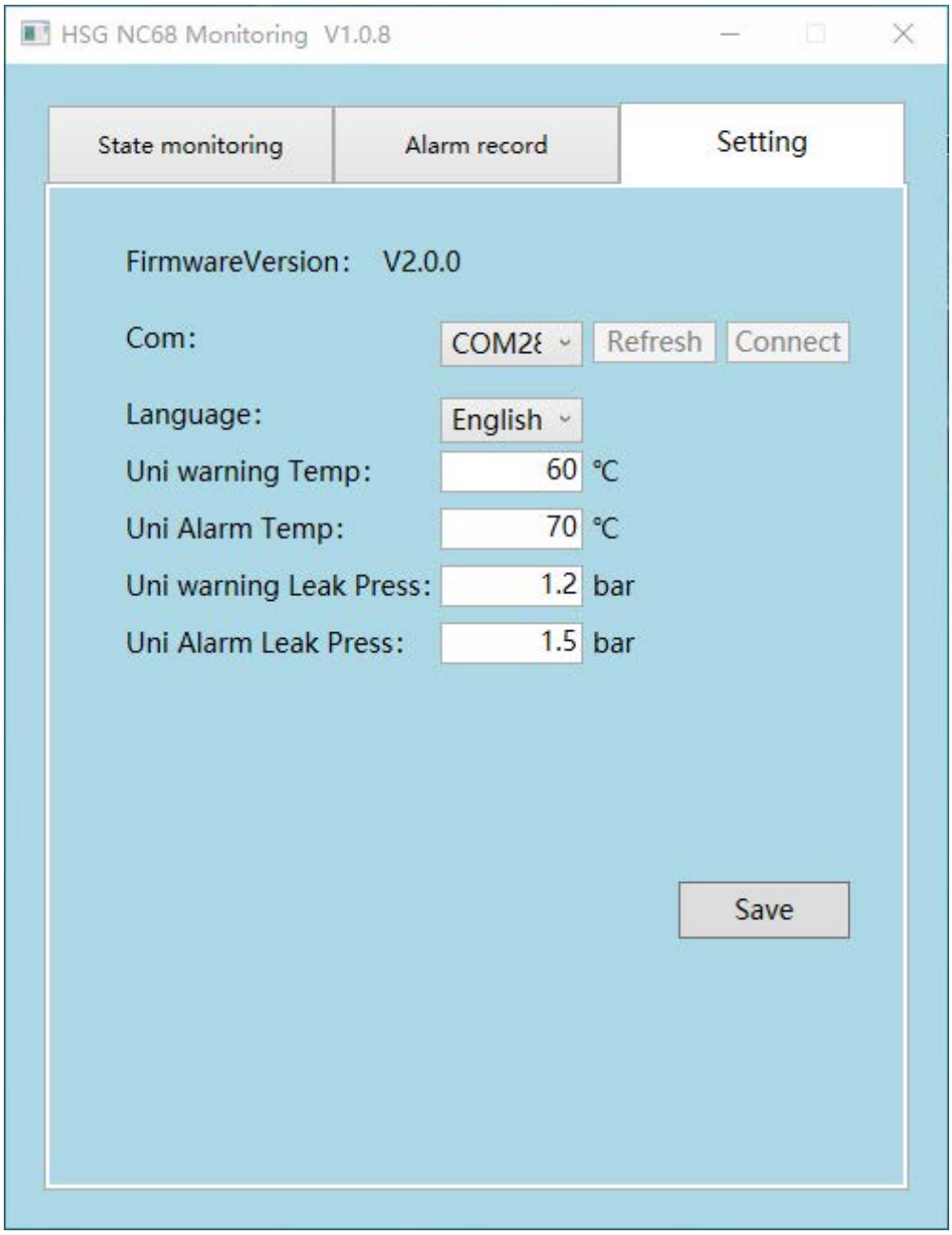


3.4.0 General Parameters			
Enable Exchange Workbench	Yes		Immediately
Control Mode at Workbench Ex	1		Immediately
Exchange Workbench by jog	No		Immediately
Workbench released machining	No		Immediately
Protect the machine tool when	Yes		Immediately
Delay after Exchanging Stoppin	2000	ms	Immediately
3.4.1 Z-axis Travel			
Use Different Lower Limit for W	No		Immediately
Soft Limit Lower Limit for Uppe	-300	mm	Immediately
Soft Limit Lower Limit for Lowe	-500	mm	Immediately
Z-axis docking position of the u	-10	mm	Immediately
Z-axis docking position of the l	-10	mm	Immediately
3.4.2 Clamping Device			
Delay as Signal to Clamp Machi	Yes		Immediately
Delay to Clamp Machine Bed	3000	ms	Immediately
Delay as Signal to Release Mac	No		Immediately
Delay to Release Machine Bed	3000	ms	Immediately
3.4.3 Protection Door			
Enable Protection Door	No		Immediately
3.5 Focus Control			
Enable Focus Control	No		After Restart
Focus control mode	0		After Restart
Foucs Reached Check Delay	1000	ms	Immediately
Go Home Check Delay	20	s	Immediately

Name: Enable Camera
Value: No
Desc.: Whether to enable camera.

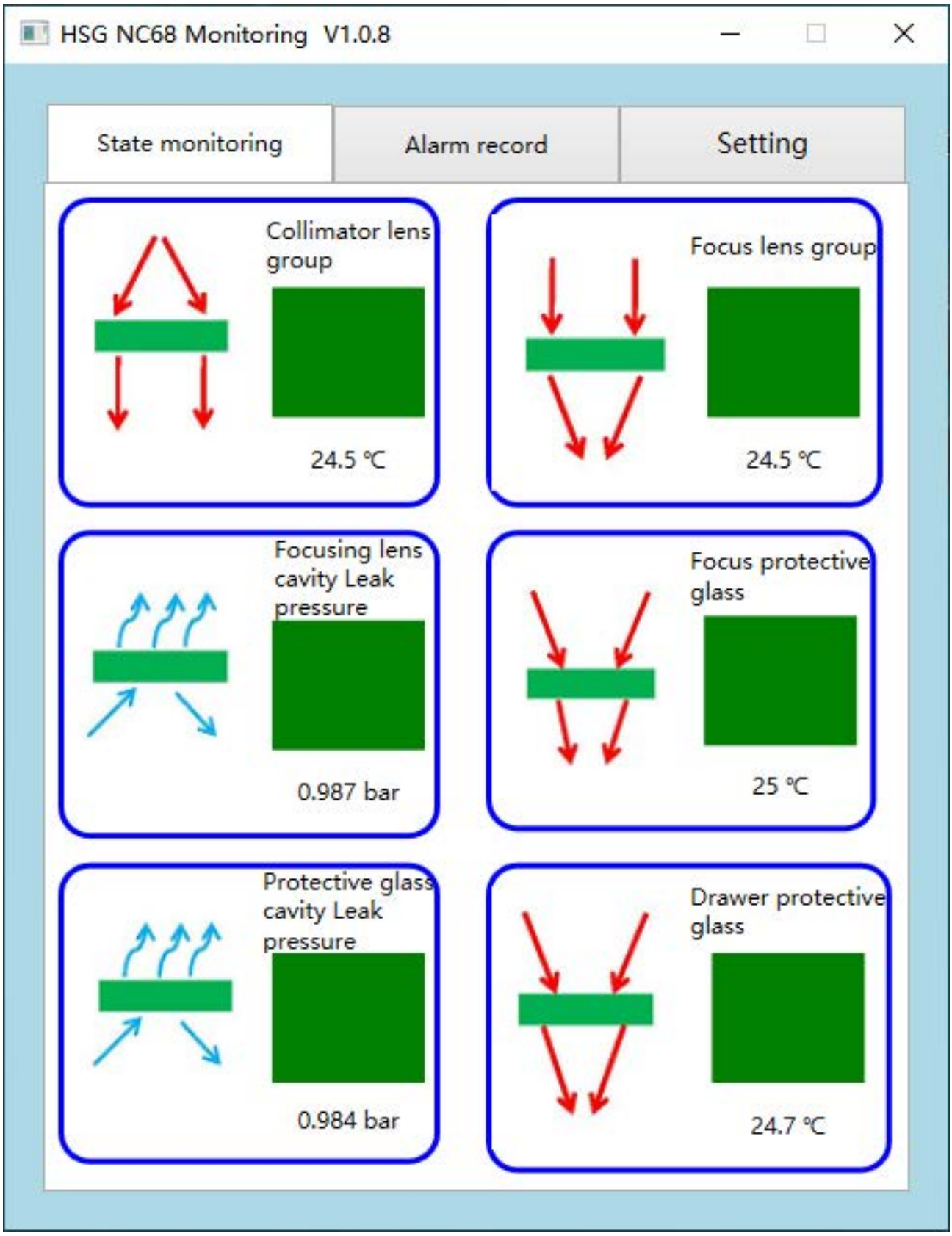


6. Instructions of monitoring functions



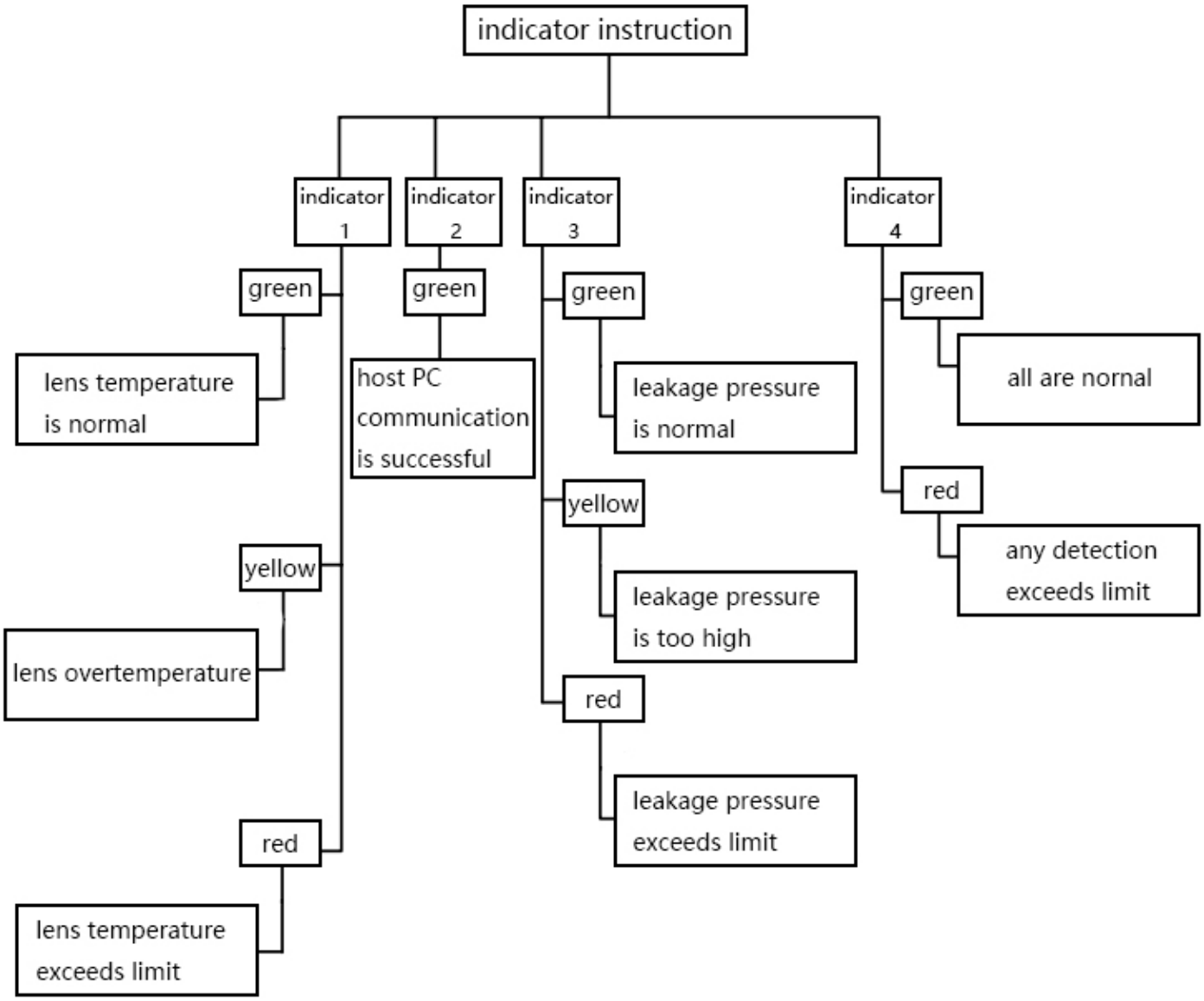
1. Refresh the serial communication, plug in the line, and click refresh
2. Connect the laser head through the refreshed serial port
3. The software can be switched between Chinese and English
4. Temperature rise prompt threshold
5. Temperature alarm prompt threshold
6. Leakage air pressure prompt threshold
7. Leakage air pressure alarm threshold

Note: When the host computer is not connected, the indicator light on the head is off. After modifying the parameters, it must be saved, and the alarm threshold must be set greater than the prompt threshold. The default atmospheric pressure of the leak air pressure sensor is 1bar, and the alarm setting is 1.2bar.



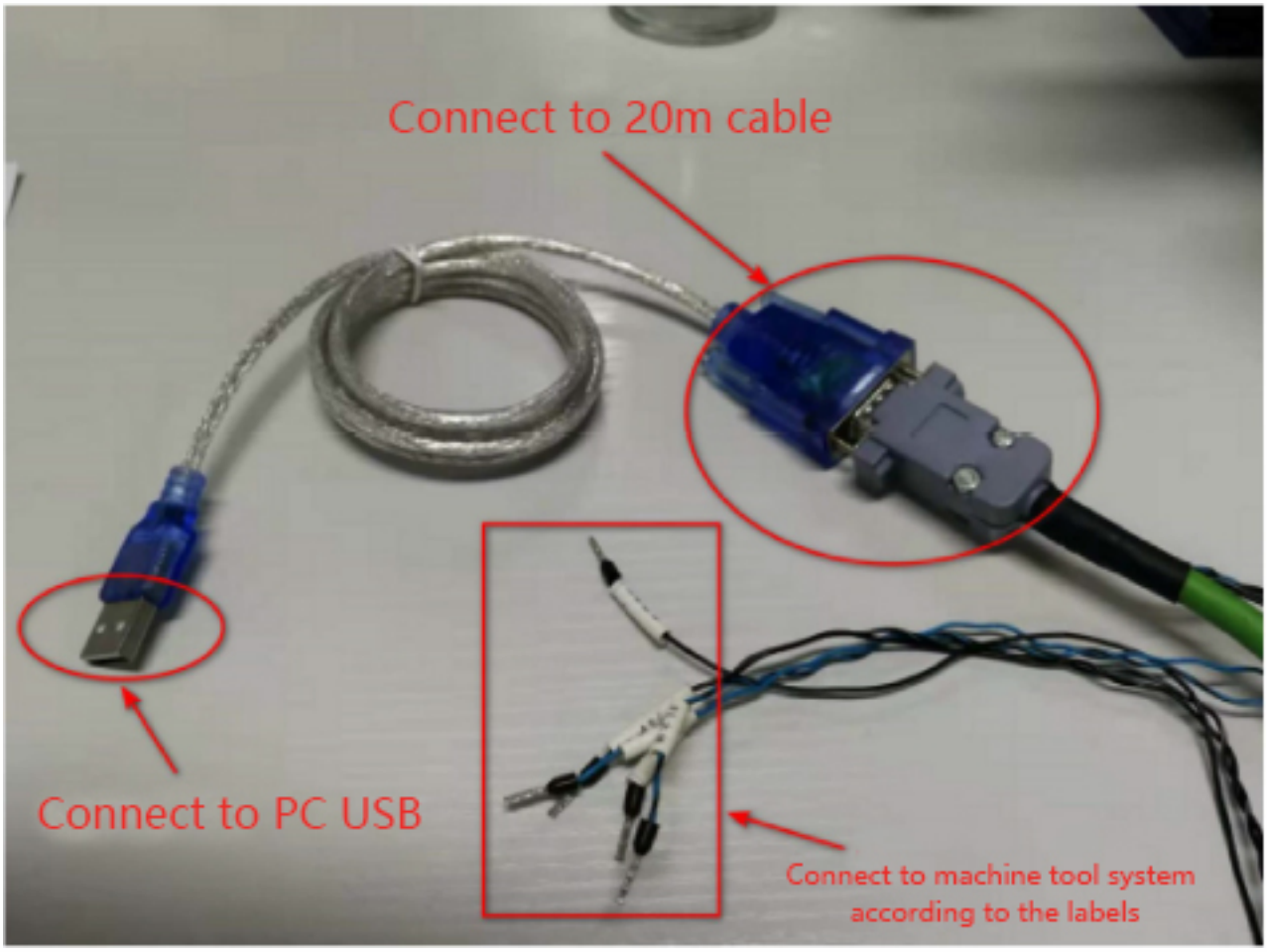
This page displays various current states of the laser head

Signal indicator signal definition:



Indicator status and color:

indicator 1: 0℃ ≤ temperature ≤ 60℃ (green/nornal)
60℃ ≤ temperature ≤ 70℃ (yellow/pre-warming)
temperature ＞ 60℃ (red/alarm)
indicator 3: 0 bar≤ pressure ≤ 1.2 bar (green/nornal)
1.2 bar ≤ temperature ≤ 1.5 bar (yellow/pre-warming)
pressure ＞ 1.5 bar (red/alarm)



Note:
1. The monitoring uses 24V power supply, the -24V indicated by the line mark refers to 0V;
2. The line mark PNP refers to the alarm output 24V, and the NPN alarm output 0V;

Appendix 1: Common electrical faults and solutions

Fault code	Fault cause	Troubleshooting and handling methods
Err.007	Encoder initialization failed	Check the encoder wiring, or replace the encoder cable
Err.013	Encoder communication exception	1. Check the encoder wiring, or replace the encoder cable 2. Check that the encoder is well grounded
Err.017	Torque saturation timeout	Check that the UVW is disconnected
Err.018	Control power underpressure	1. Check the input power supply and wiring 2. Replace the drive
Err.019	Speed failure	1. Check the UVW and the encoder wiring 2. Check the drive & motor
Err.020	Overvoltage	Check the input power supply voltage
Err.043	The position deviation is too large	Check whether the motor line is disconnected

Appendix 2: Cutting Abnormal Troubleshooting

The cause of the failure of the nozzle temperature is too high during the processing:
1. Centering offset.
2. Protection lens contamination.
3. Contamination of focusing lens or collimating lens.
4. Fiber rod contamination.
5. Plate heat transfer.
6. The inner core hole and the outer hole are not concentric
7. The defocus amount is too large.

Troubleshooting:

1. Check for misalignment, and adjust if there is any misalignment.

2. Take out the protective lens for inspection. After taking out the protective lens holder, be sure to use textured paper to seal the empty position of the cutting head. (Protection window, nozzle opening) Do not take out the protective lens holder and then blow air. If the protective lens is contaminated, it needs to be cleaned.

3. Check the optical lens inside the cutting head. Raise the cutting head to the highest position, turn on the red light, unscrew the nozzle, at the lower end of the ceramic body. Place a piece of white paper within a 40mm position and move it up and down to observe the uniformity distribution of the red light. When observing the red light, try to block the periphery of the red light to ensure a certain contrast and enable clearer observation. If there are obvious black spots, it can be judged that the internal focusing or collimating lens or the fiber end face is polluted. This needs to be handled by contacting the after-sales service engineer. Do not disassemble the laser head without authorization, and do not continue to use it, so as not to cause greater damage .

4. If there is no problem with the above inspections, the cutting nozzle is still very hot, and it is necessary to check the light without cutting and blowing at full power. Note that when the light is emitted, put a bucket of water about 1 meter below the nozzle, and put an iron plate in the bucket to prevent the bucket burnt ouut. Use full power to check whether the nozzle is hot. The time is 1~10 minutes. If the nozzle does not heat up, it means that the heat transfer of the plate during cutting causes the nozzle to heat up. If the nozzle is still hot, remove the focusing lens and the collimator lens and laser head.

5. Check the nozzle, the nozzle surface with damaged is not bright and easy to absorb heat, and the new nozzle surface is not easy to absorb heat.

The abnormal capacitance value alarm fault reasons:
1. The ceramic is damaged or loose.
2. The nozzle is damaged or loose.
3. The probe inside the sensor is damaged and inelastic.
4. The copper contacts of the ceramic and the stainless steel tooth ring are not connected
5. The resistance value of the ceramic is not large enough.
6. Signal cable problem.
Troubleshooting:
1. Check the ceramic and nozzle for damage or looseness. If damaged or loose, replace and reinforce.
2. After removing the ceramic and nozzle, check whether the probe contact of the cutting head sensor is damaged and whether it is still elastic. If so, you need to contact the supplier for replacement.
3. Check whether the signal line is disconnected, and check whether the copper contacts of the ceramic and the stainless steel tooth ring are connected.
4. If there is no problem with the above 3 points, clean the ceramic with alcohol, and dry it with a blower or oven. Because the surface of the ceramic is not dry, when the resistance value is less than 1 megohm, the capacitance value will also alarm abnormally.

Reasons for the failure of optical fiber interlock alarm:
1. The fiber installation is not in place.
2. QBH temperature is too high
3. QBH internal contact problem.
4. Laser fiber connector problem.
Troubleshooting:
1. Re-lock the fiber according to the instruction of the cutting head.
2. Check the water temperature and water pipes.
3. Contact the cutting head manufacturer for processing

Reasons for abnormal cutting effect:

1. Whether the cutting parameters are correct.
2. Whether the cutting focus is correct.
3. The cutting gas is correct.
4. Whether there is any problem with the cutting head lens.

Troubleshooting:

1. Check cutting parameters and cutting focus position.
2. Check gas adequacy and gas purity. According to the selected cutting gas, observe the barometer on the gas cylinder. If it is oxygen, it must be kept at about 10 kg. Check whether the output gas voltage value of the cutting system corresponds to the value displayed by the gas proportional valve, generally 10V corresponds to 10 kg; Adjust the thickness of the cut sheet accordingly. The purity can be satisfied by checking the gas cylinder label to meet the purity of more than 99.9%. If nitrogen cutting is used, it can also be detected by cutting the stainless steel end face. The yellowing of the end face is low in purity, and high-purity gas needs to be replaced immediately.
3. Take out the protective lens and check if there is any pollution. If there is pollution, the lens needs to be cleaned.
4. Check whether the inner lens of the cutting head and the fiber end face are normal.

The centering is easy to shift during the processing. Reasons for the failure:

1. Optical fiber loose
2. The problem of adjusting module
3. Ceramic is loose
4. Nozzle is loose

Troubleshooting:

1. Check whether the fiber is locked and whether there is still swing.
2. Contact the cutting head manufacturer.
3. Check whether the ceramic and nozzle are locked, if they are loose, they need to be reinforced
4. If no problem is found after the above, it is necessary to check whether the focusing lens barrel and collimating lens barrel are loose.

Analysis of the reasons for the slag burning under the protective lens

1. It may be related to the cutting process parameters, especially the thick plate perforation parameters.
2. It may be related to the blockage of the air passage.
3. It is recommended to put the air blow in front of the follower in the PLC process setting of the HypCut system,
4. It may be related to electronic valve, check valve and proportional valve.
5. It may be related to the cutting board, especially the film cutting.
6. The one-way valve is worn and dust blows to the protective lens and affects the lens.

Dust is easily generated here

poor cutting inspection:

If the cutting effect does not meet the requirements during the cutting process, especially when the cutting effect is not good when cutting with nitrogen or air, first check whether the gas path of the cutting head is blocked and whether there are foreign objects in the gas path, as shown in the figure below.