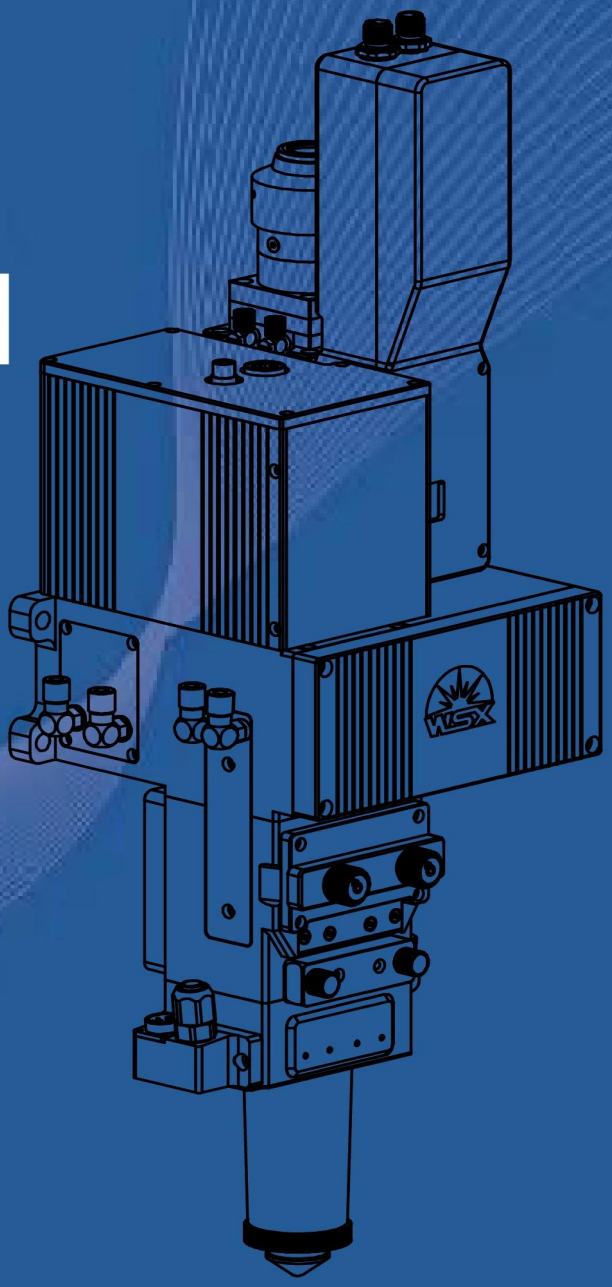
PRODUCT INSTRUCTION MANUAL



GSL63 Wobble cutting head (FUJI servo)

Structure and function introduction

Shenzhen Worthing Technology Co Ltd

www.wsxlaser.com

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1. Product structure

1.1 Technical parameters

Basic parameters	
Model:	GSL63
Max working power	≤6kw
Laser wavelength range	1070±30nm
Fiber types	QBH, G5, QD
Collimation focal length	100mm
Focusing focal length	150mm/200mm
Focusing adjustment range	±38mm (Focus length F200mm)
	±21mm (Focus length F150mm)
Centering adjustment range	±1.5mm
Cutting gas connection	Φ12mm (standard) or Φ10mm (optional); gas pressure ≤2.5Mpa
Cooling gas connection	Φ6mm; gas pressure ≤0.6Mpa
Cooling water connection	Φ6mm; gas pressure ≤0.6Mpa
Working temperature	3℃ ~ 55℃
Storage temperature	-20℃ ~ 55℃
Weight	12.7kg

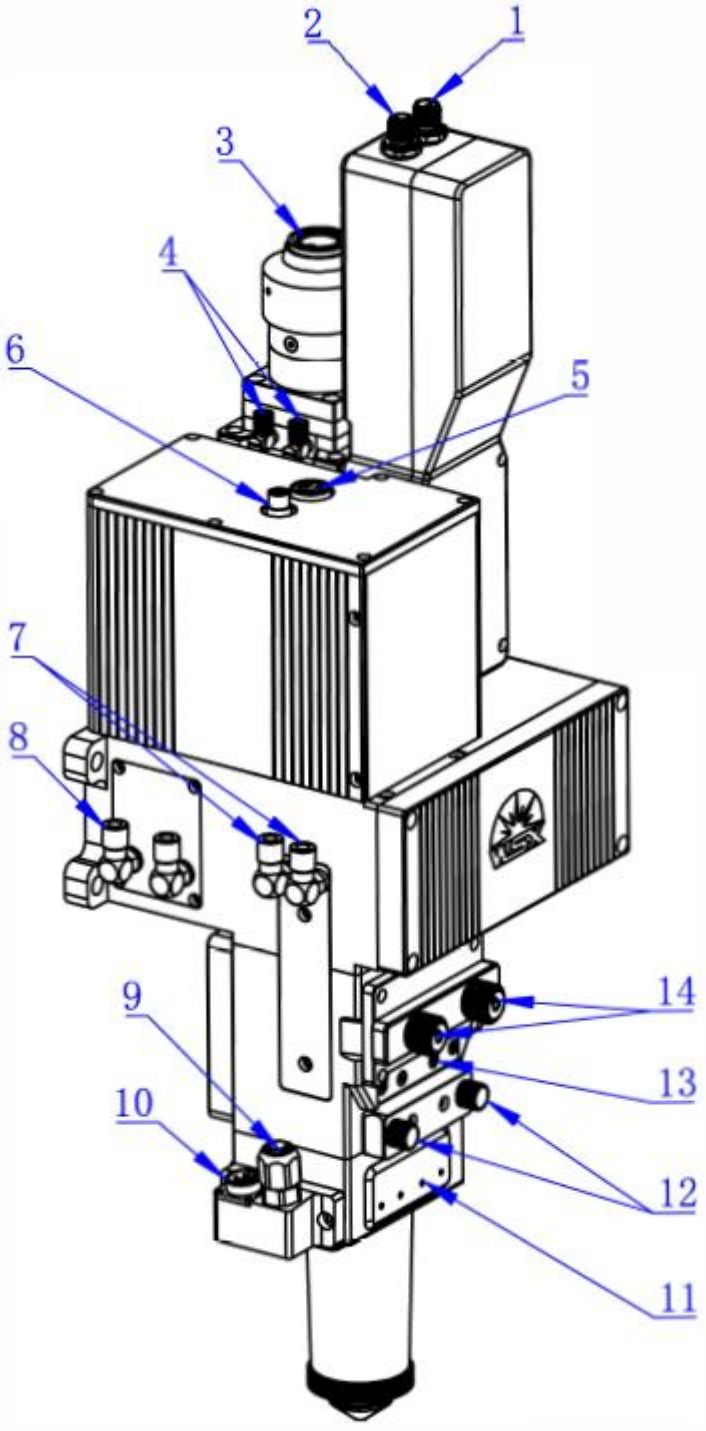
Note: To avoid damage during storage and transport:

1. The cutting head should be stored in the proper temperature and humidity;

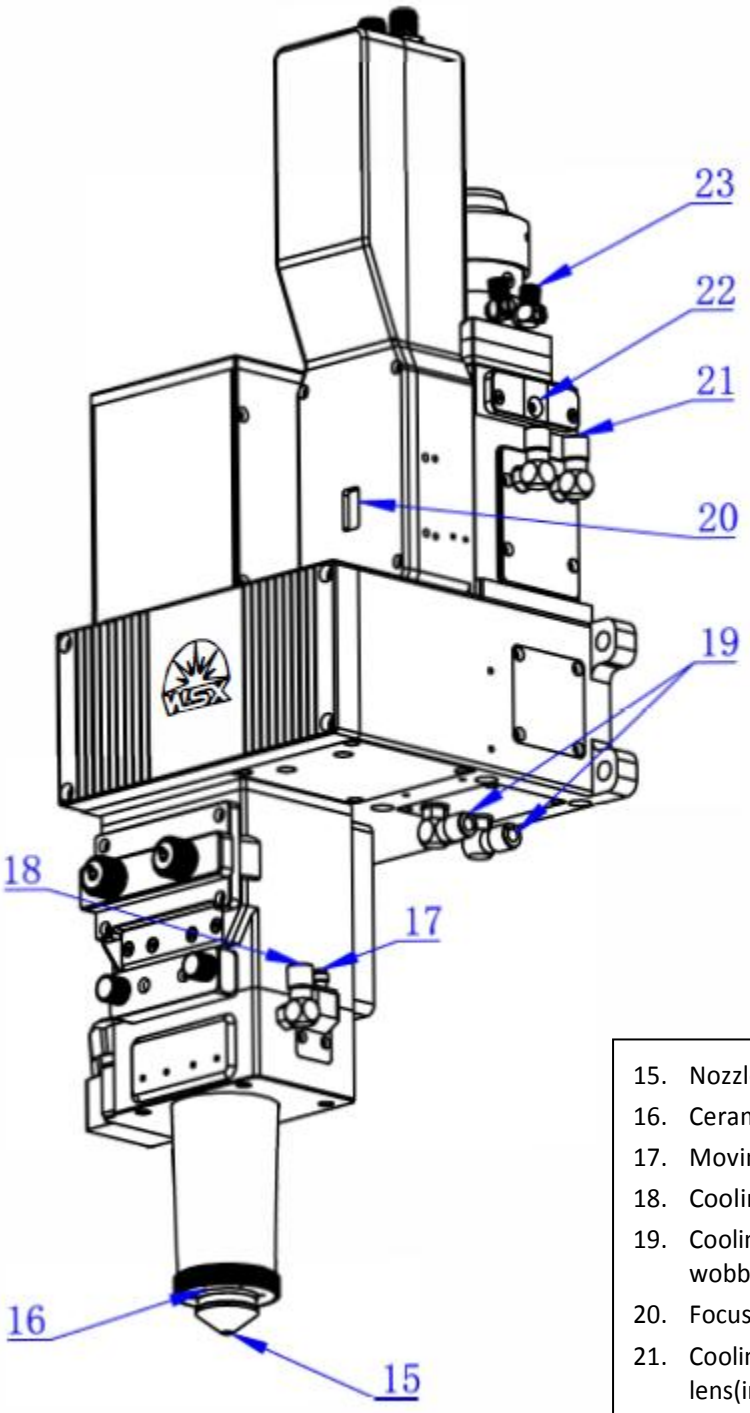
2. Avoid vibration and shock;

3. Do not put the cutting head in or near magnetic fields (such as permanent magnets or strong alternating fields).

1.2 Connections

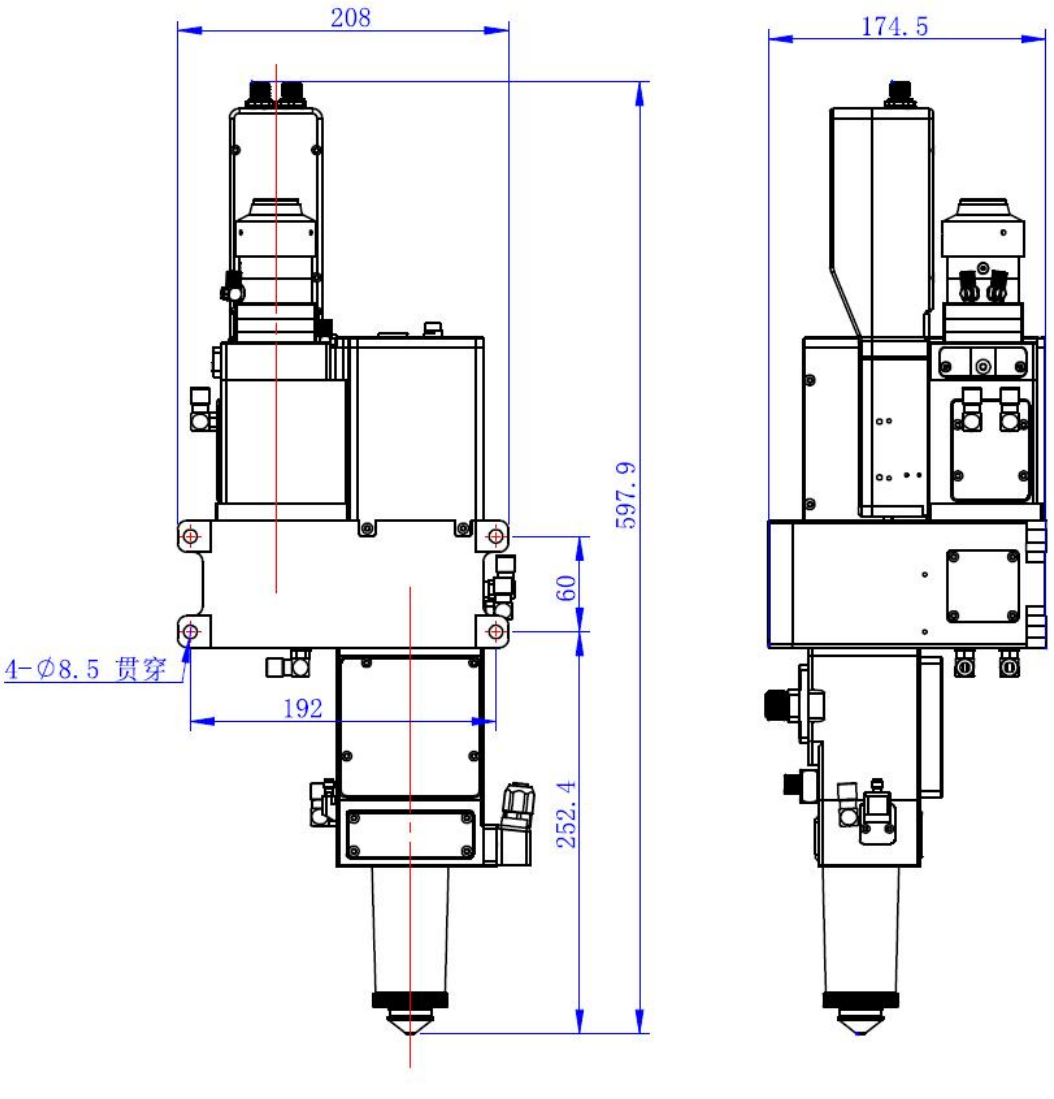


1. Encoder & Limit Signal
2. Power wire
3. Fiber Access
4. Cooling water(in/out)
5. Communication port
6. Monitoring signal input
7. Cooling water for focus/reflector lens(in/out)
8. Cooling warer for X axis wobble lens(in/out)
9. Cutting gas
10. Monitoring signal output
11. Status monitoring indicator LED
12. Lower protective window
13. Focus protective window
14. Focus center adjusting screw



15. Nozzle
16. Ceramic ring
17. Moving signal
18. Cooling gas
19. Cooling water for Y axis wobble lens(in/out)
20. Focus dial
21. Cooling water for collimating lens(in/out)
22. Upper protective window
23. Cooling water for QBH

1.3 Installation size



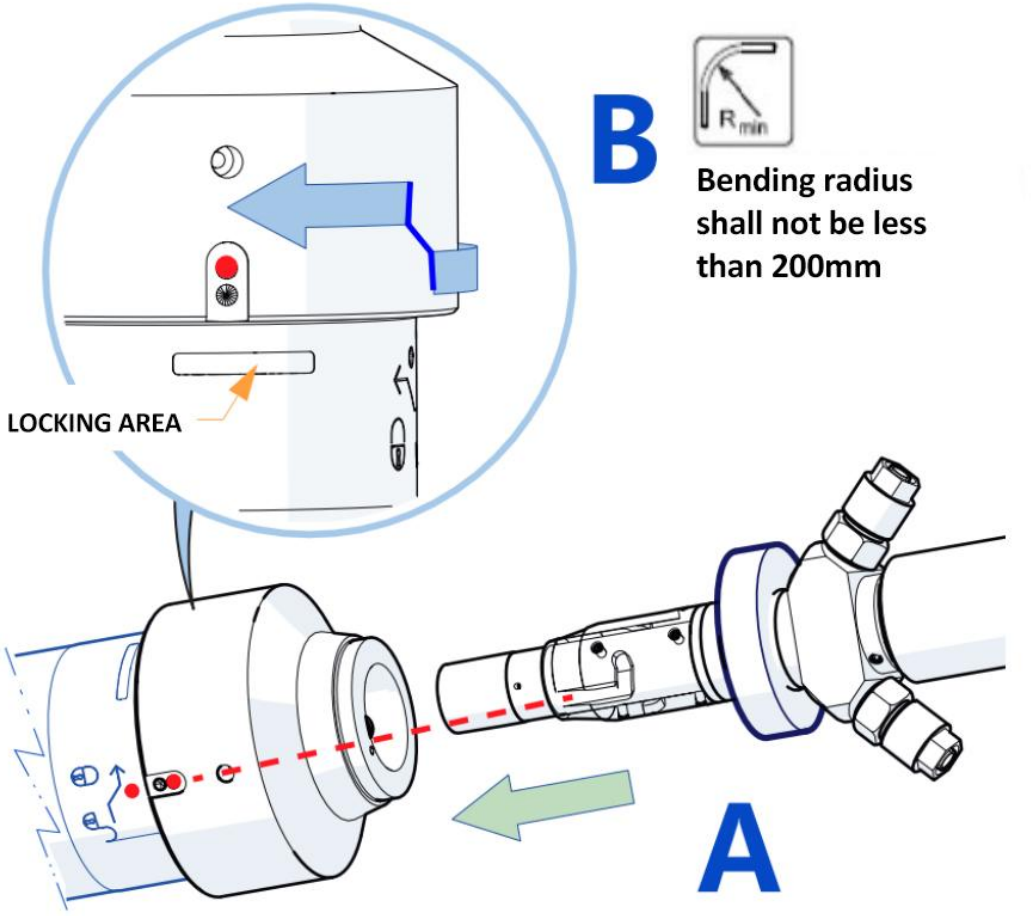
1.4 QBH fiber socket installation

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 QBH interface are polluted;

· Horizontal insertion;

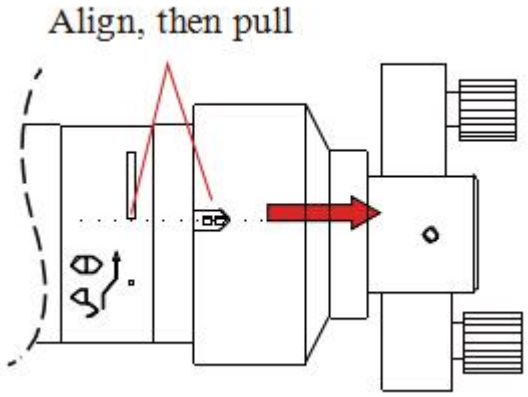
· After inserting the fiber, wrap white tape around the gap between the fiber and the cutting head interface.



1.Remove the protective film/cover from the fiber optic socket.

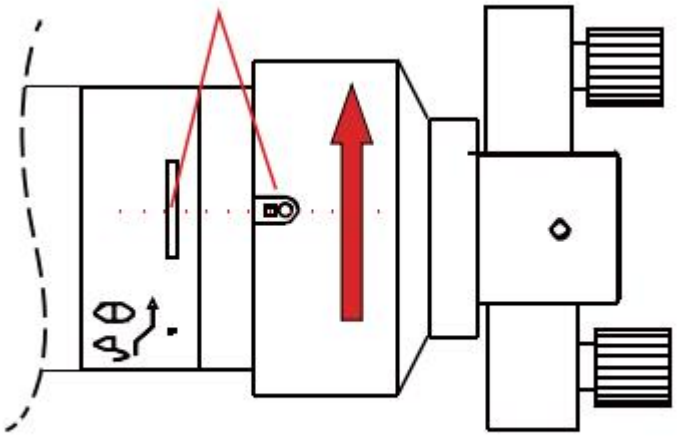
2.Insert the fiber optic plug (aligned) into the unlocked fiber optic socket (sealing cap in the lowest position) until it stops. The sealing cap closes and locks in the direction of the fiber (see Detail B). NOTE: Before inserting the plug, the dowel pin of the plug sealing cap must be aligned with the socket slot (see Detail A)

3. Pull the turning rim as the picture below



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

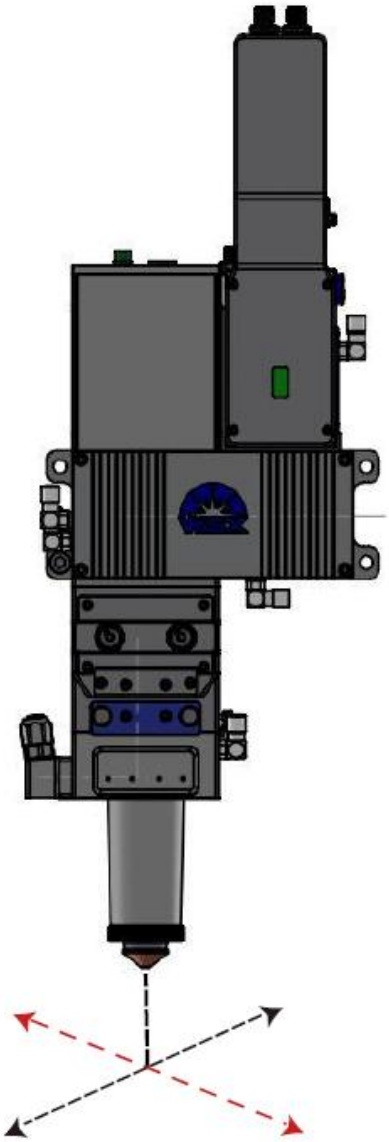
The red marks can be aligned to or over the middle of the white bar, but do not twist any more when it is in the right position.



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 the fiber plug with the laser head in a horizontal position.

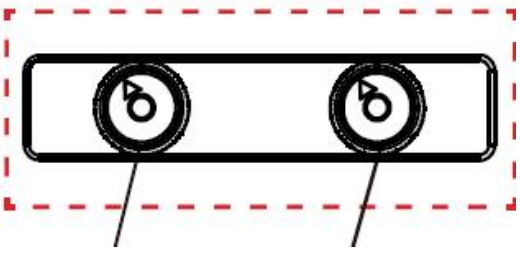
1.5 Coaxiality adjustment



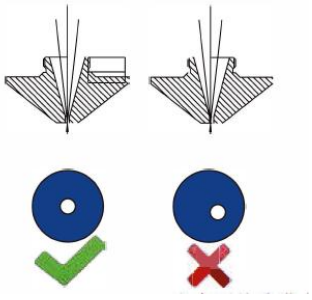
1. adjust the X/Y horizontal adjustment screws of with an Allen wrench so that the beam passes through the center of the nozzle.
2. when the beam passes through the center of the nozzle, the cutting effect is best.
3. If the beam does not pass through the center of the nozzle, it may cause no light and poor cutting effect.

Method for detecting whether the beam passes through the center of the nozzle:

1. using transparent tape on the nozzle (the nozzle should preferably be new or not deformed).
2. adjust the power of the laser to about 50W; (500W for example, adjust the spot power to 10 %)
3. after 1 to 2 seconds out of the light, remove the transparent tape.
4. the transparent tape facing the lighting source, observe the nozzle printed on the tape and the laser printed on the round burn spot through the tape is concentric.
5. if concentric, then the debugging results qualified; if not, then continue to debug until qualified.



X/Y adjusting



Concentric checking

1.6 Kerf method to find zero focus and focus

Purpose:

Correct the "rollback distance" to make the actual physical focus coincide with the software zero focus, and use it as a benchmark for subsequent process debugging.

Method:

1. Using the cutting kerf method, see the size of the cutting seam to determine the focus position. The kerf at the focus position is the smallest.

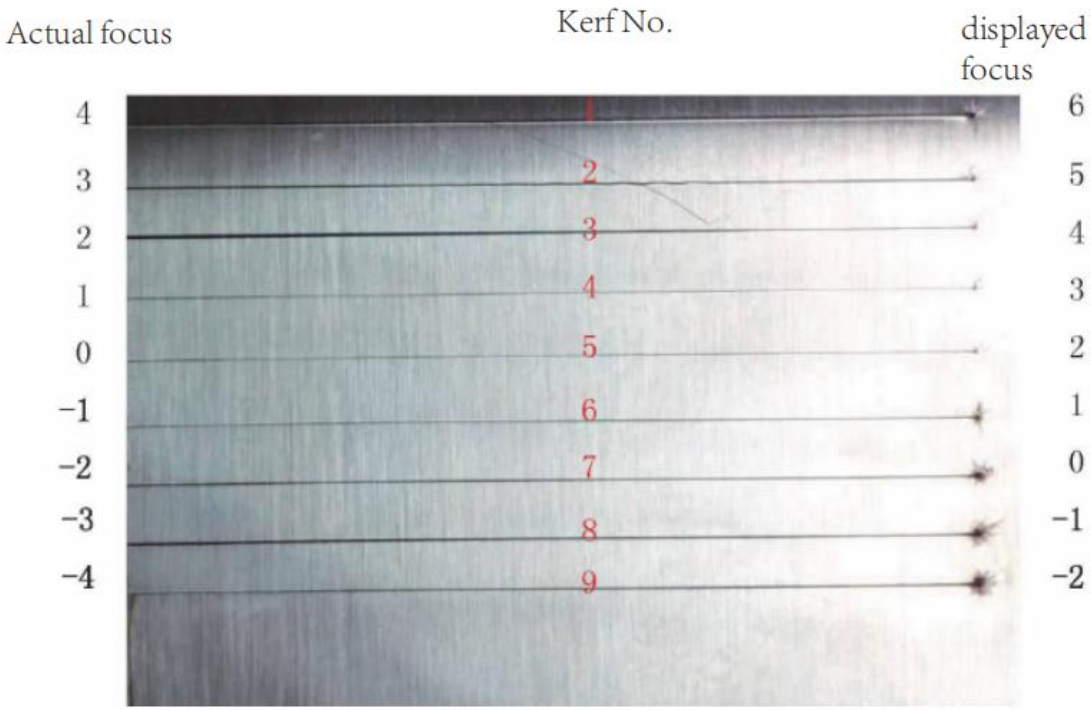
2. Correct the "rollback distance" to make the actual physical focus coincide with the software zero focus, and use it as the benchmark for subsequent process debugging.

For example: 1. Platform settings:

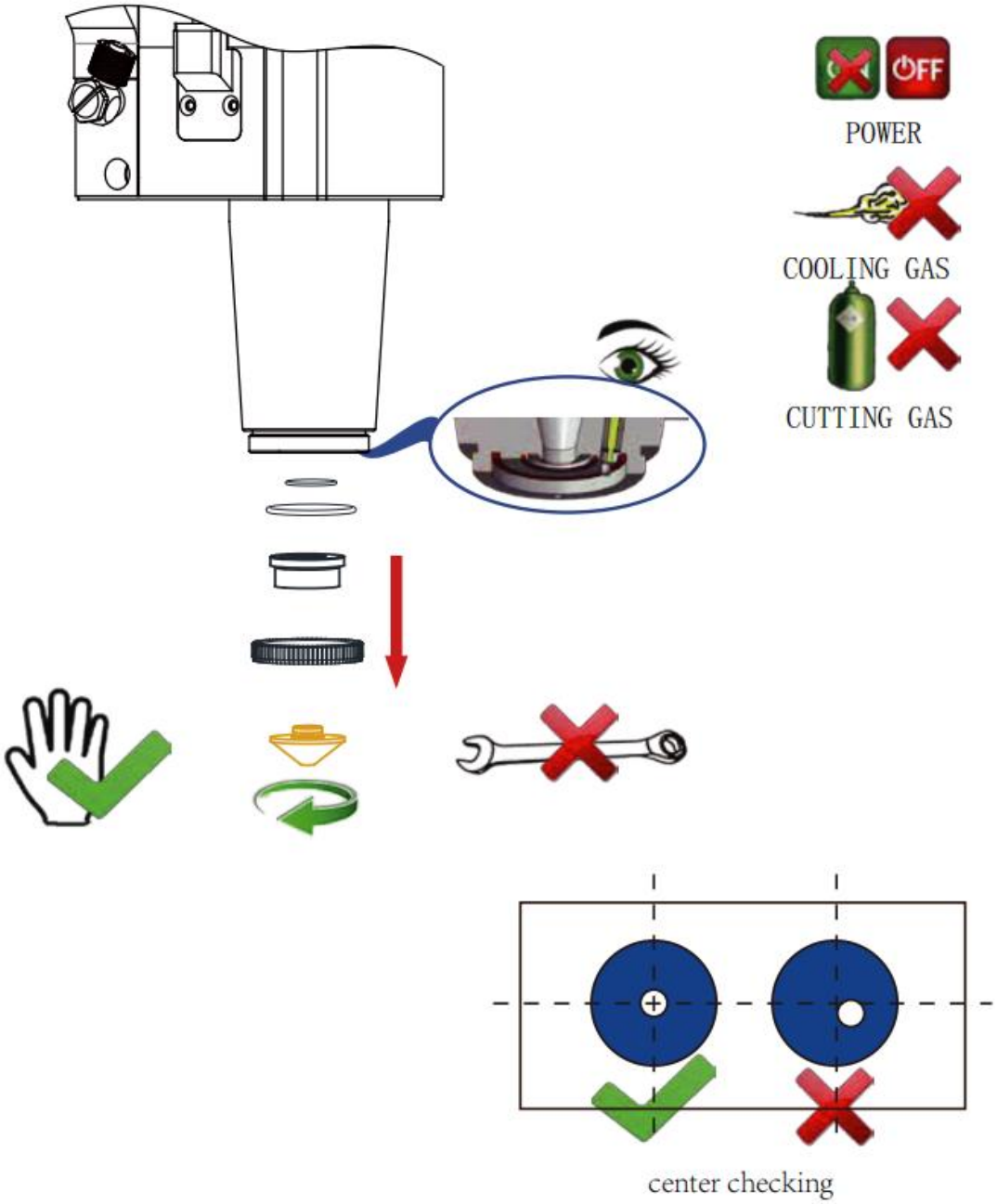
2. Start cutting from focus +6 displayed on the software, with an interval of 1mm, and cut to focus -2. It is observed that the fifth line is the thinnest, then the actual focus 0 is at the current software display focus +2 position.

3. Correction: If the actual focus of the kerf method is higher than the focus displayed by the software, then the rollback distance = rollback - difference value

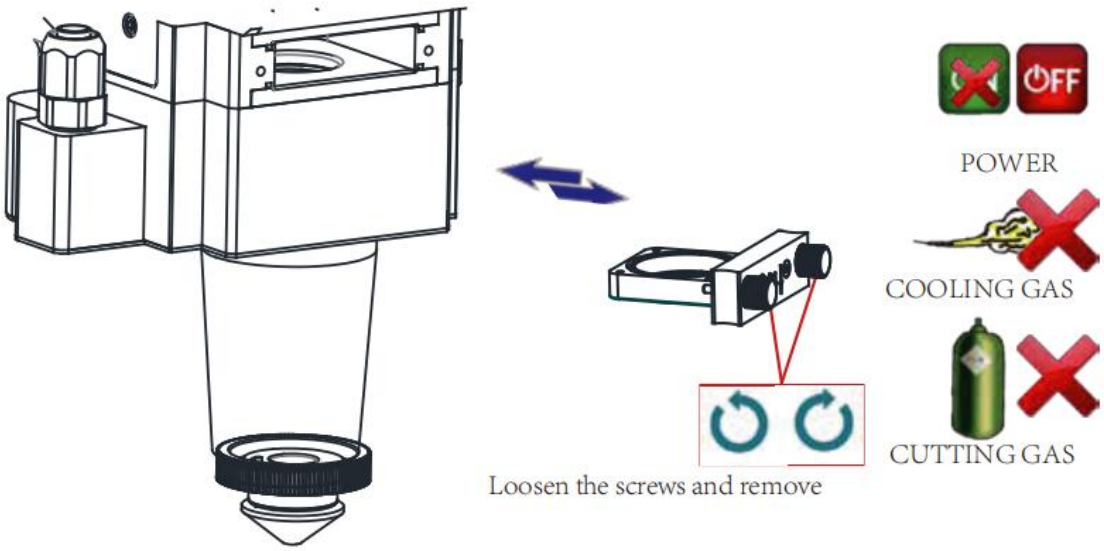
Rollback distance=9-2=7, otherwise the same principle



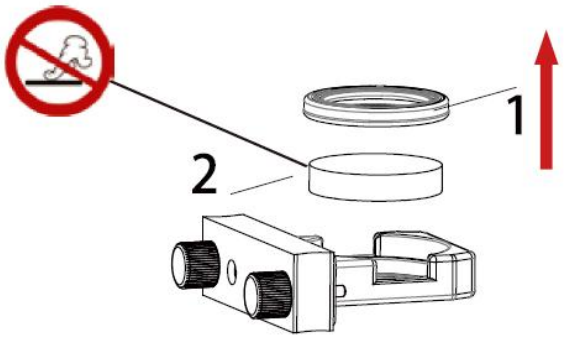
1.7 Replacement of Ceramic Ring & Nozzle



1.8 Replacement of Lower Protection Window



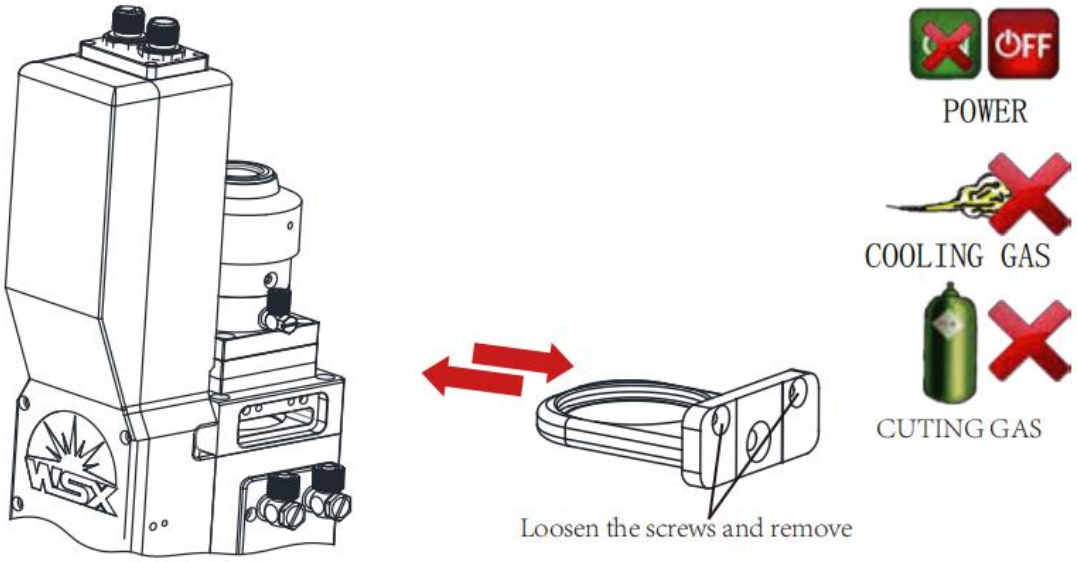
Pay attention to dust: when removing and installing the lens, wear dust gloves and finger covers in a clean place . When changing lens, use adhesive paper to paste sealed window, prevent dust to enter the interior cause pollution.



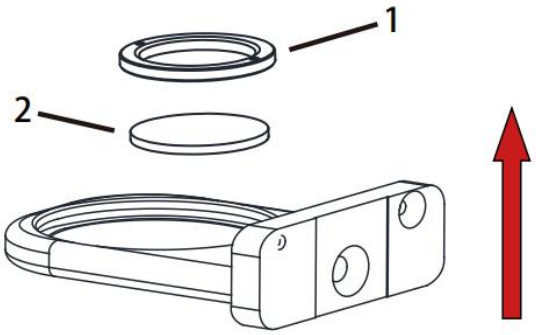
1、Pressing ring 2、Protective glass

Note : Remove in the direction of the arrow, otherwise it may cause damages.
DO NOT operate with wrench or iron pliers.

1.9 Replacement of Upper Protection Window

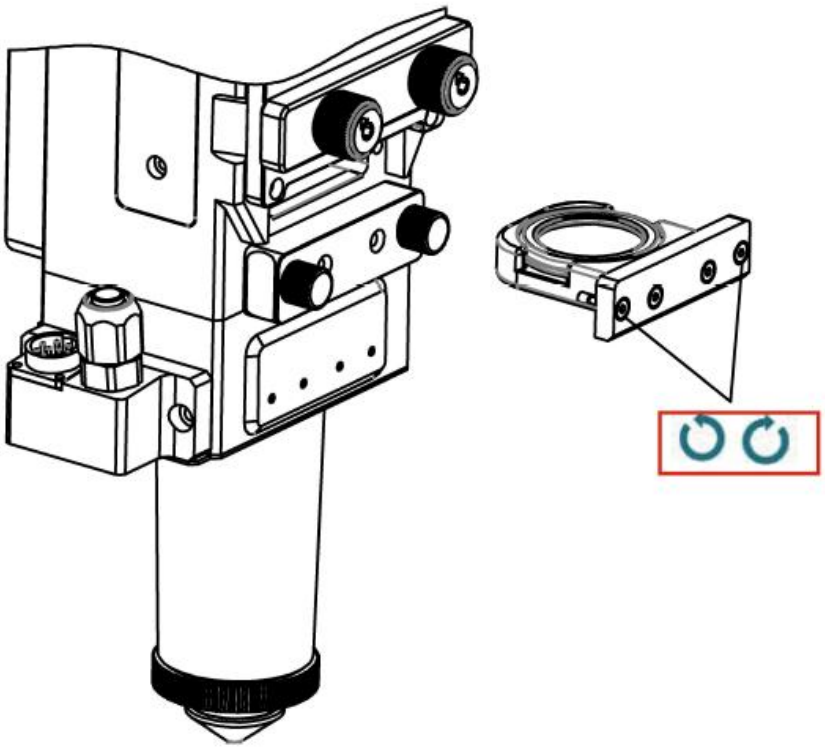


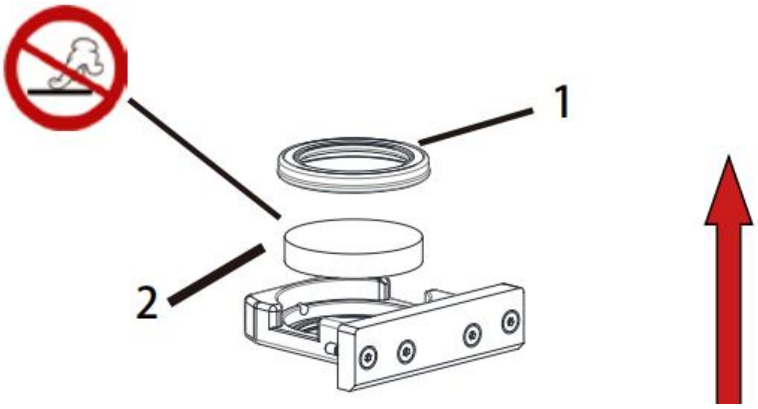
Pay attention to dust: when removing and installing the lens, wear dust gloves and finger covers in a clean place . When changing lens, use adhesive paper to paste sealed window, prevent dust to enter the interior cause pollution.



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

1.10 Replacement of Focus Protection Window



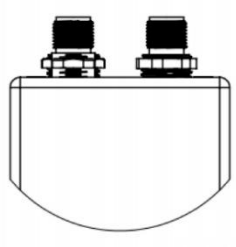


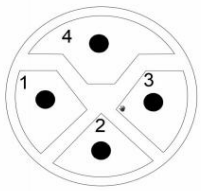
1、Pressing ring 2、Protective glass

Note : Remove in the direction of the arrow, otherwise it may cause damages.
DO NOT operate with wrench or iron pliers.

2. Electrical Specifications

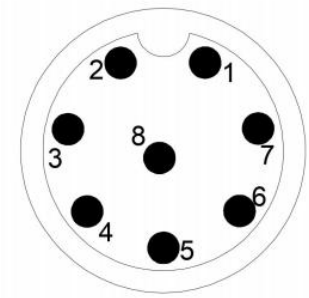
2.1 Electrical interface and definition





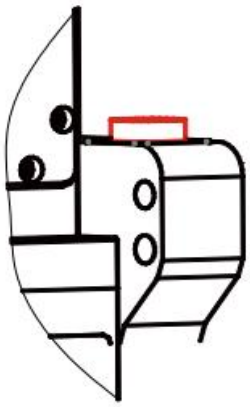
1	W
2	U
3	V
4	PE

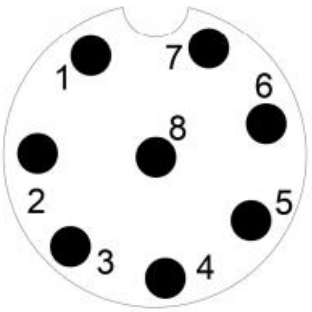
Servo motor power interface



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

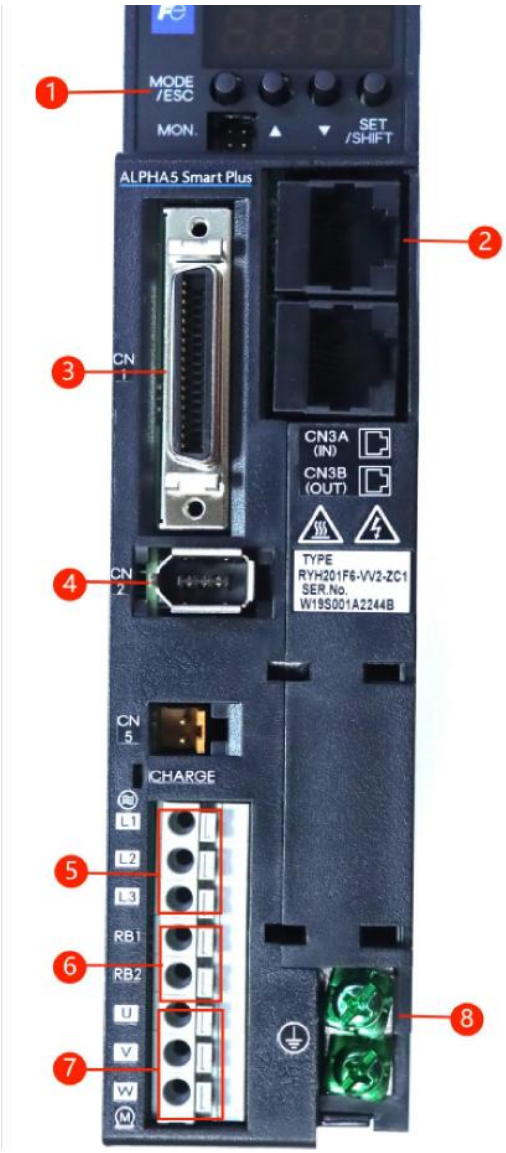




Pin	Definition
1	485A
2	485B
3	AML-OUT
4	24V
5	GND-S
6	--
7	0V
8	--

Monitoring signal interface

2.2 Servo drive connection



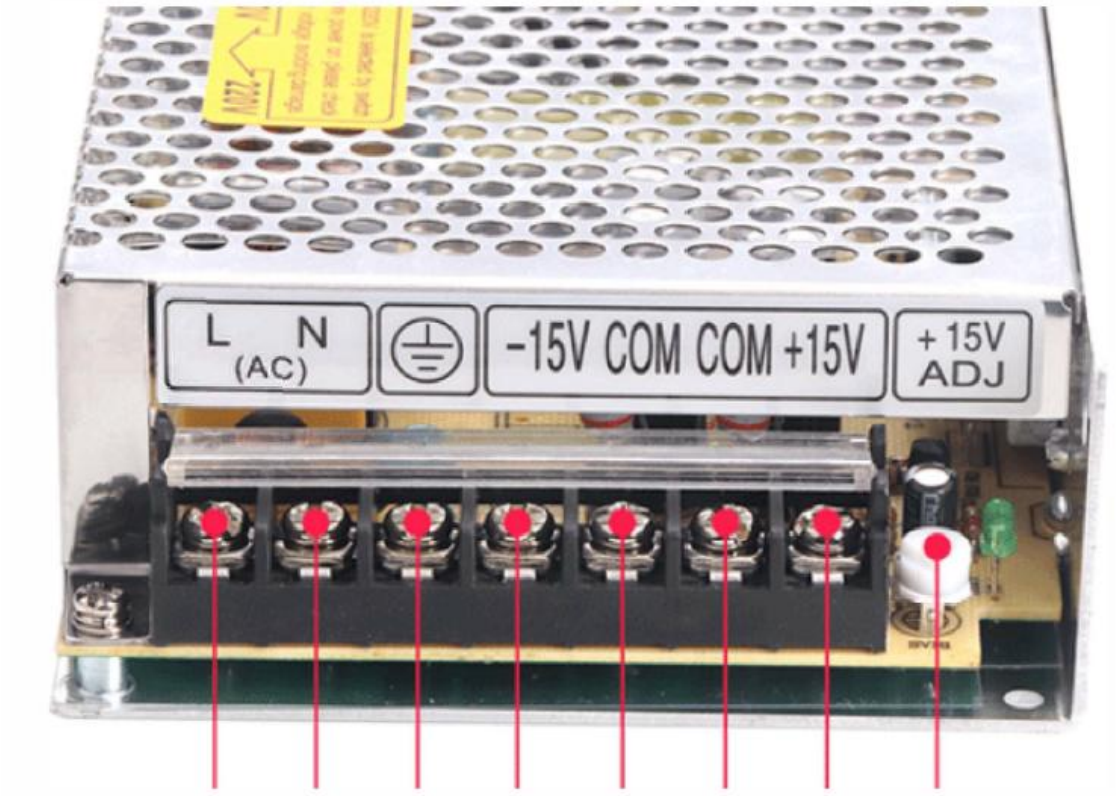
No		
1	button	MODE: Switching menus △: Up ▽: Down SET: Set & save
2	Data communication RS485 port	Connect the computer with a debugging cable to debug the drive
3	Pulse IO control port	IO control signal input/output
4	Encoder cable communication port	Connect to motor encoder
5	Power input port	Single phase 220V power, L1 to fire wire, L2 to zero wire
6	External braking resistor interface	Connect to regenerative resistors
7	Motor power cable port	Connect to servo motor U, V , W phases
8	Earth ground port	Connect to ground PE

Note: 1. The driver input power is single-phase AC220V.

2. External braking resistor interface need not be connected.

3. Please refer to Fuji ALPHA5 series manual for drive commissioning.

2.3 Power switch connection



1 2 3 4 5 6 7 8

No	
1	Fire Wire
2	Zero Wire
3	Ground
4	Output -15V
5	Output Negative
6	Output Negative
7	Output +15V
8	Output Voltage Adjustment (range: ±10%)

2.4 Limit signal connection

No		Description	Note
1	24V	Connect to power switch V+	
2	0V	Connect to power switch V-	
3	W+	Connect to WSX system W+	
4	W-	Connect to WSX system W-	

2.5 Galvo connection

No		Description	Note
1	485A	Wiring with USB to RS-485/422 converter (T/R+)	
2	485B	Wiring with USB to RS-485/422 converter (T/R-)	
3	+15V	Connect to power switch +15V	
4	-15V	Connect to power switch -15V	
5	GND	Connect to power switch COM	
6	GSTA1	Alarm output signal (alarm output 24V)	
7	GSAT2		
8	ON/OFF	Reserved	
9	IN/COM	Reserved	
10	GALA1	Reserved	
11	GALA2	Reserved	
12	PE	Connect to ground PE	

2.6 USB to RS-485/422 converter connection

No		Description	Note
1	T/R+	Connect to 485A	Connect USB port to computer
2	T/R-	Connect to 485B	
3	RXD+	-	
4	RXD-	-	
5	GND	-	

3 Motor and limit switch inspection method:

Motor inspection process:

1. Instrument: Multimeter.

2. Set the multimeter to 200 Ω resistance or buzzer on/off.

3. Measure the motor U, V, W, it is recommended to take in the cutting head aviation plug end.

4. motor U/V, U/W, V/W each two-phase resistance of about 17-20 Ω, on and off gear beeping sound for the motor is normal. If the resistance is O Ω, or infinity is abnormal for the motor.

5. Motor U, V, W any phase are not conductive with PE or shell, if there is then the motor is abnormal.

Limit switch inspection process:

1. Instrument: multimeter, adjusted to DC gear.

2. No special requirements, limit switch is NPN type normally closed signal.

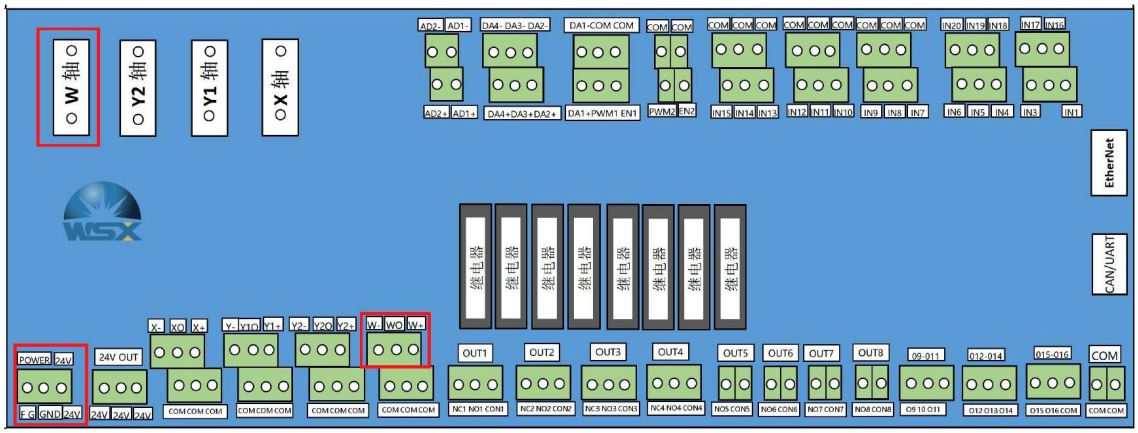
3. It is recommended to measure when the focus is at 0 position.

4. Tap the servo motor to confirm whether the motor can be forward and reverse.

4. Connect 24V and 0v to the DC24V power supply, and do not connect W+ and W1.

5. Multimeter red pen to measure 24V, black pen to measure the W + or W -. The focus in the 0 position output voltage of 24V, focus In the positive limit or negative limit output voltage is 0v.

4 Axis and WSX system connection:



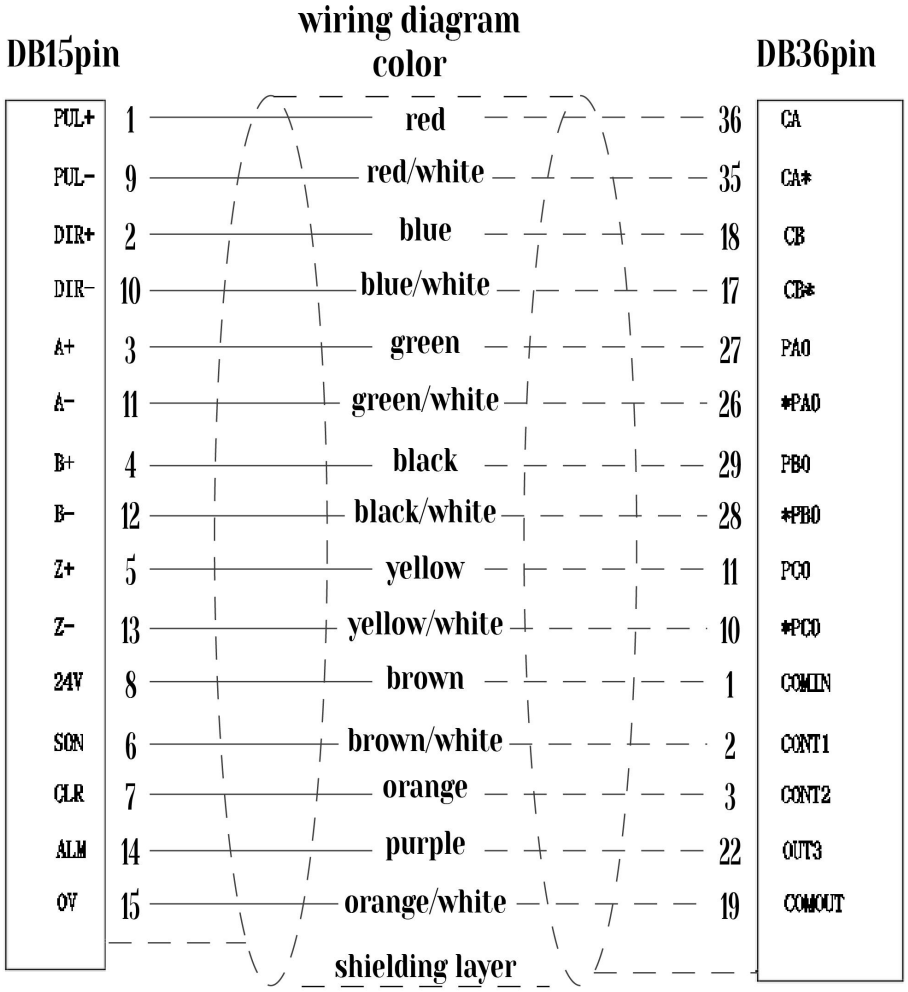
24V input

Note:

1. Pulse control line connects to the W axis of the system.

2. System W +, W- connects to focus axis limit switch W +, W- signal.

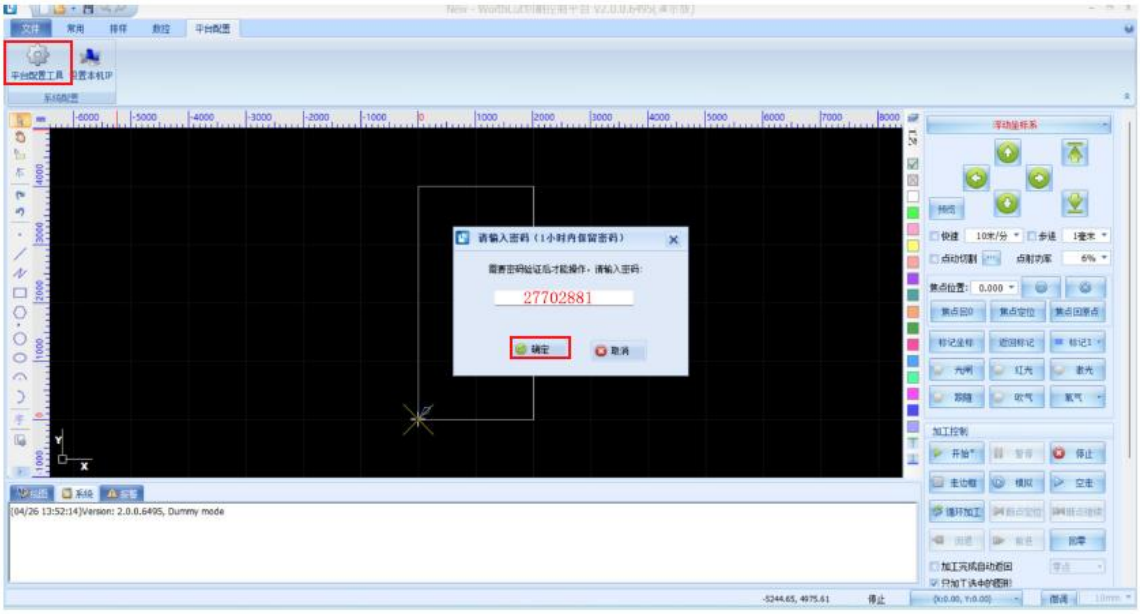
5 WSX cutting system and pulse control line wiring instructions

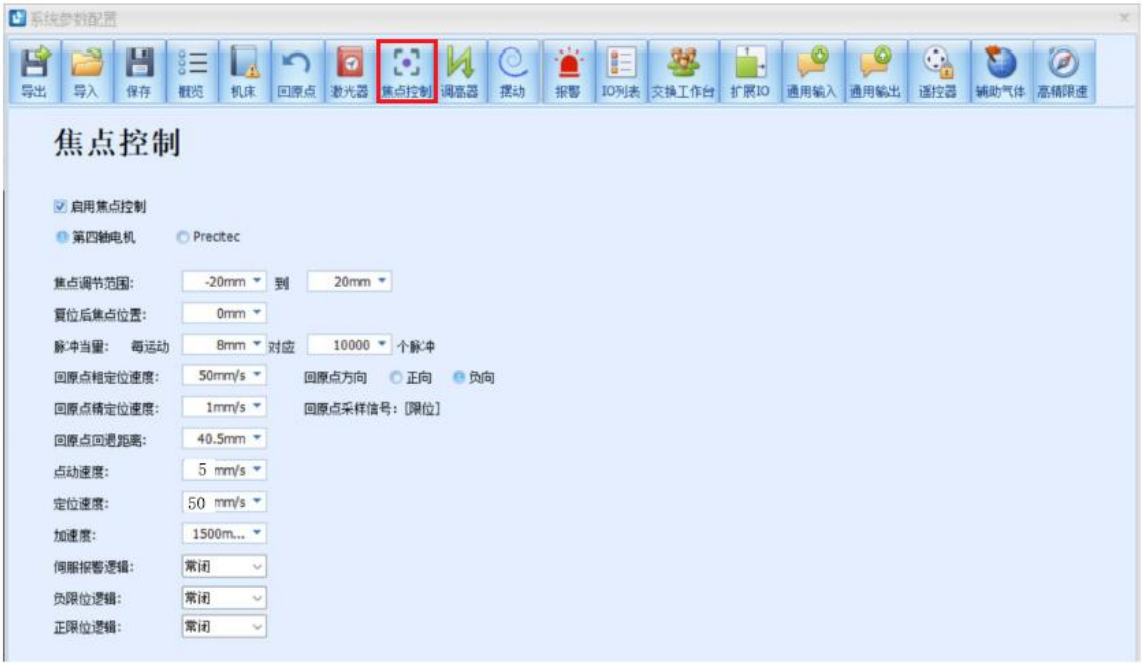


Fuji servo pulse parameters

parameter	value	parameter	value	parameter	value
PA1-01	0	PA1-05	10000	PA1-27	50
PA1-03	30	PA1-08	2500	PA1-28	50
PA1-04	1	PA1-15	28		

6 WSX cutting system platform configuration





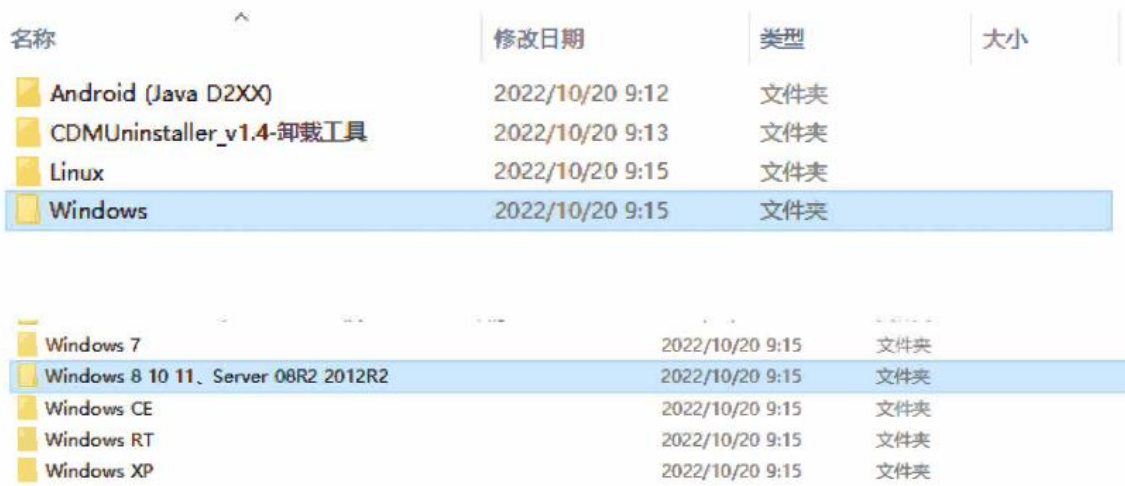
Operation Procedure: Click platform configuration tool ＞ Password (27702881) ＞ OK ＞ Enter system parameter configuration ＞ Focus control

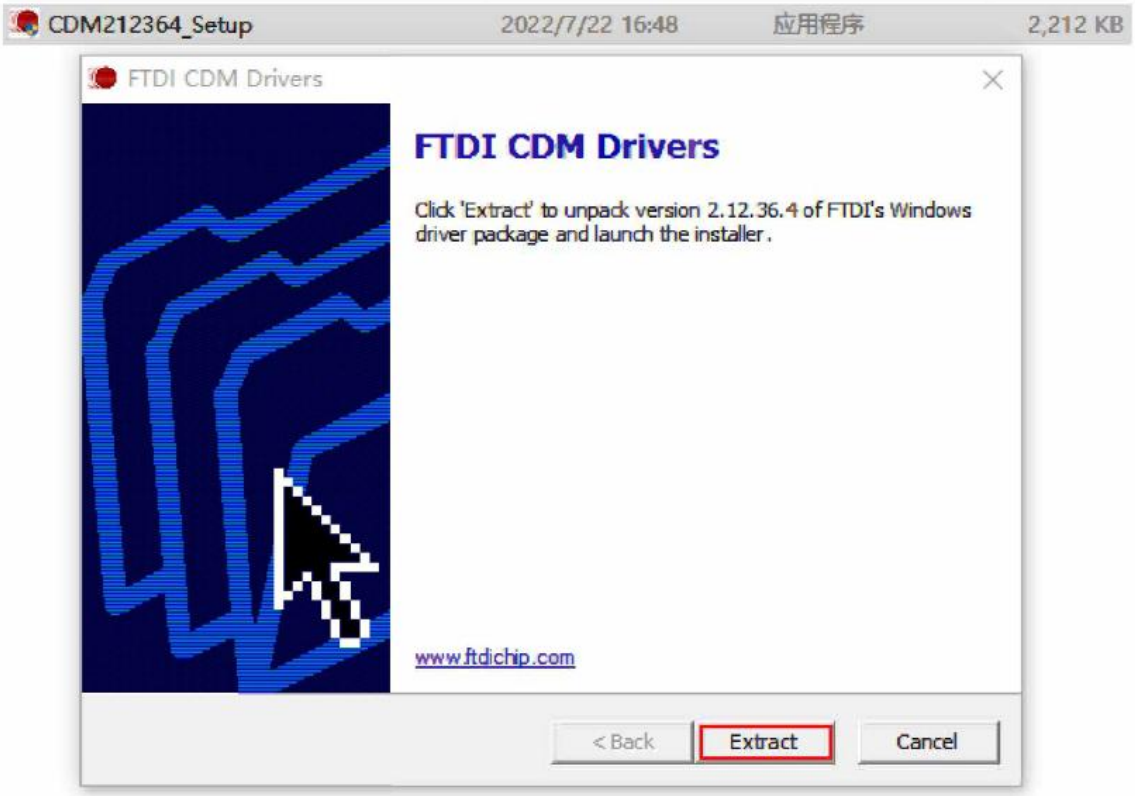
7 Greenlink RS485 driver installation process

7.1 Procedure 1

Procedure: Click computer properties ＞System type＞Version＞Install the serial port driver, select the file corresponding to the computer to install.

7.2 Procedure 2





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

7.3 Procedure 3

Operation Procedure: Click the next page〉 I accept this agreement〉 Next page

7.4 Procedure 4

Procedure: Click to complete

Note:

1. Click Computer Properties 〉 Device Manager 〉 to see if the port is marked with an exclamation mark, no exclamation mark indicates that the installation was successful.

2. The driver installation package can be downloaded from the Greenlink's official website.

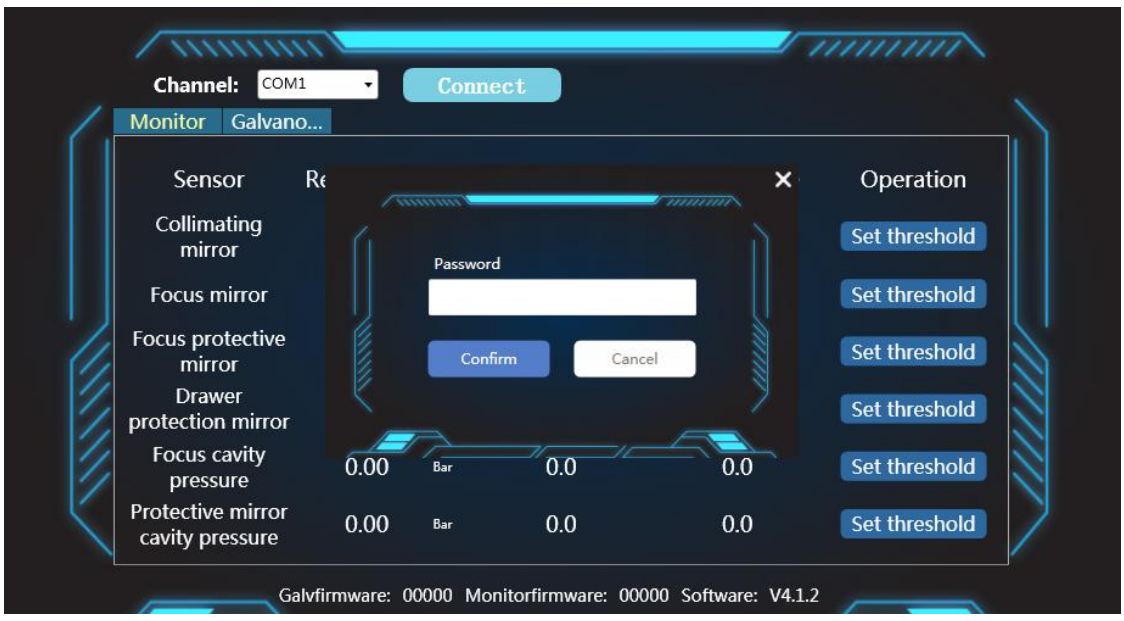
8 Monitoring function

8.1 Installation of monitoring software

Operation procedure: Open the GSL (temperature control version V4.0.0 baud rate 9600) file package〉 Click GSL63 ＞open the monitoring page

8.2 Use of monitoring functions 1

Operation Procedure: Select the corresponding serial port〉 Connect〉 Monitor

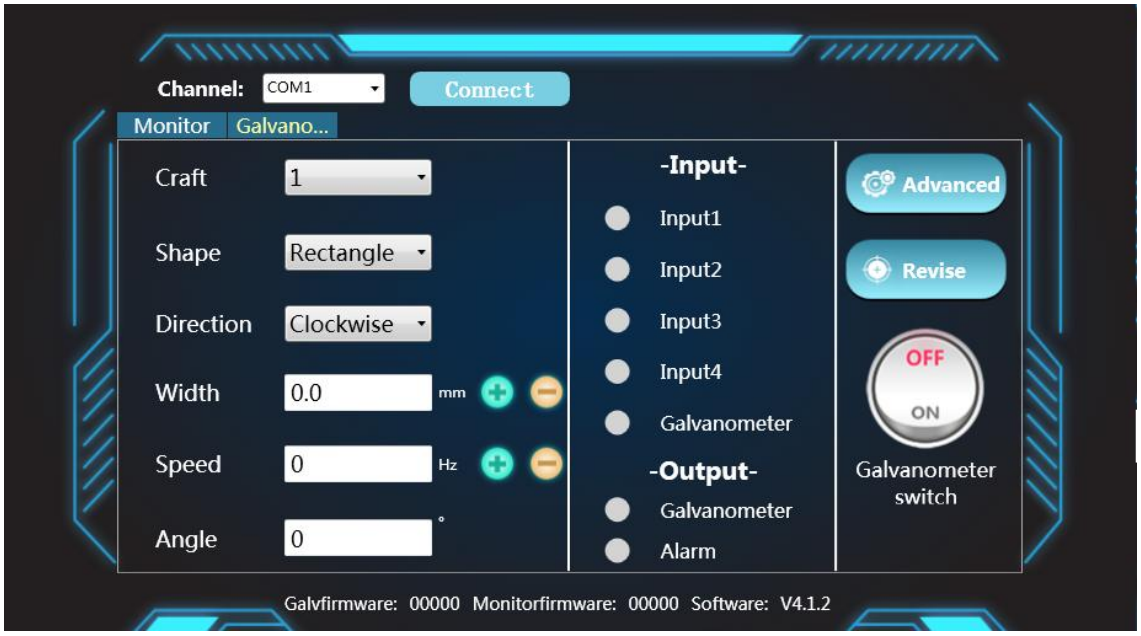


Operation Procedure: Set threshold〉 Enter password (666666) 〉 Confirm

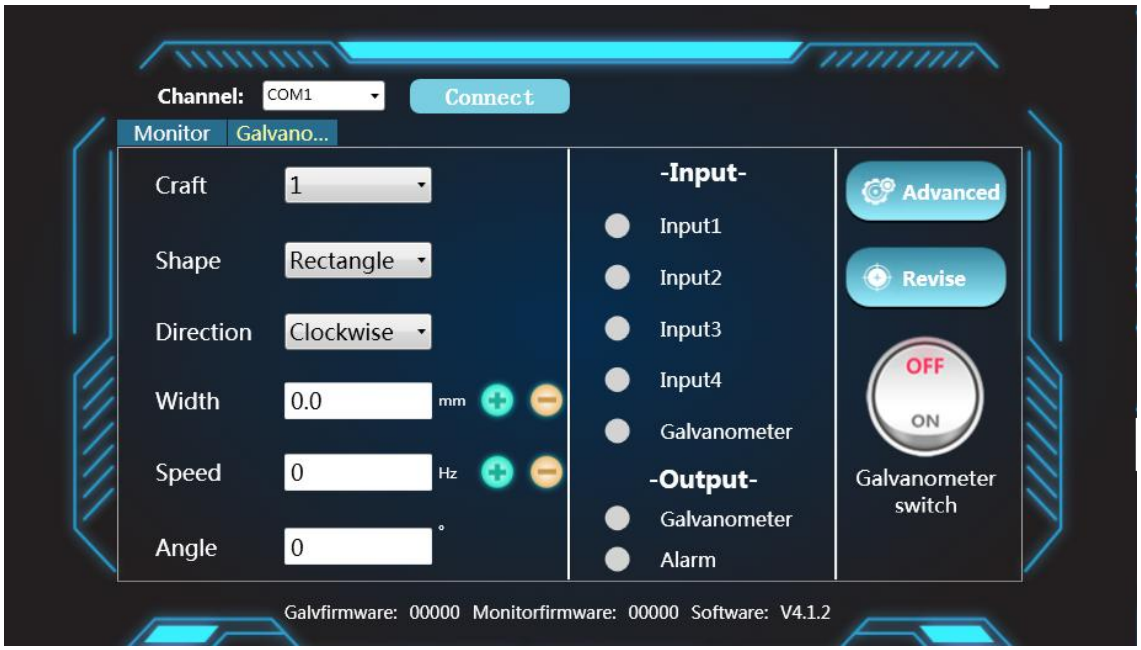
8.3 Use of monitoring functions 2

Operation Procedure: Modify temperature parameters〉OK

9 Use of wobble functions



Operation Procedure: Select the corresponding serial port〉 Connect〉 Galvanometer



Operation procedure: Modify the parameter password (666666) 〉 Confirm〉 Click the galvanometer switch

10 Common fault alarm codes

Alarm codes		Alarm codes	
oc1	Overcurrent 1	LuP	Insufficient voltage in main circuit
oc2	Overcurrent 2	rH1	Internal regenerative resistor overheating
oS	Overspeeding	rH2	External regenerative resistor overheating
Hu	Overvoltage	rH3	Regenerative transistor abnormal
Et1	Encoder abnormal 1	oF	Out of tolerance
Et2	Encoder abnormal 2	AH	Amplifier overheat
ct	Control circuit abnormal	EH	Encoder overheat
dE	Memory abnormal	dL1	Loss of ABS data1
Fb	Fuse broken	dL2	Loss of ABS data2
cE	Motor combination abnormal	dL3	Loss of ABS data3
tH	Regenerative transistor overheating	AF	Multi-rotation overflow
Ec	Encoder communication abnormal	E	Initialization error
ctE	CONT repeat	PoF	Servo motor not energized
oL1	Overload 1	Pn0	Zero speed stop
oL2	Overload 2	PP1	Pulse train input operation
rH4	Inrush current suppression circuit abnormal	Pot	Detection of overtravel signals in positive/negative direction

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