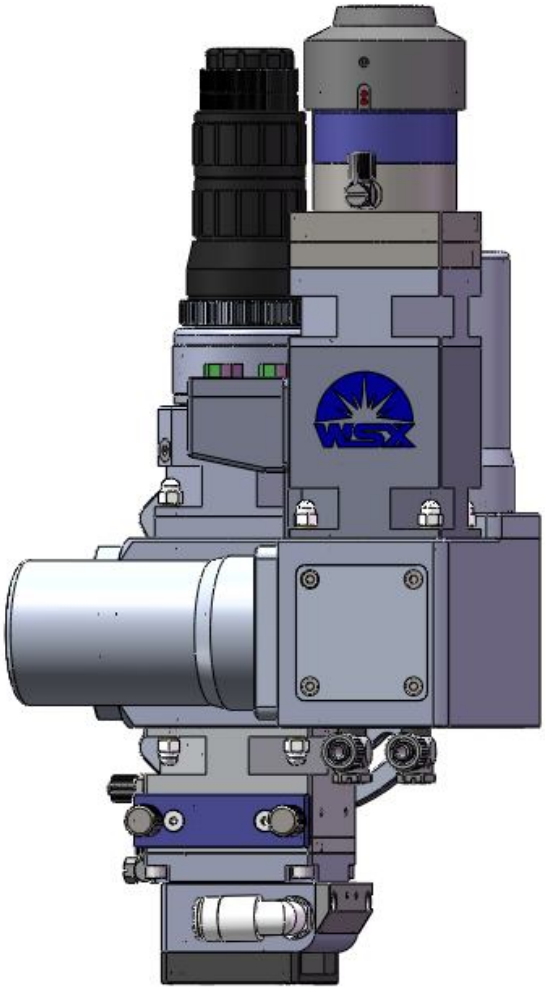
Wobble Welding Head
ND24B



User Manual

Shenzhen Worthing Technology Co., Ltd.

Attention

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.

Do not stare into beam!
Please wear goggles of DIN EN 207 and BGV B2 standard!

Do not touch the laser head with any body parts when it works!

Take care not to be burned by the remaining heat after welding!

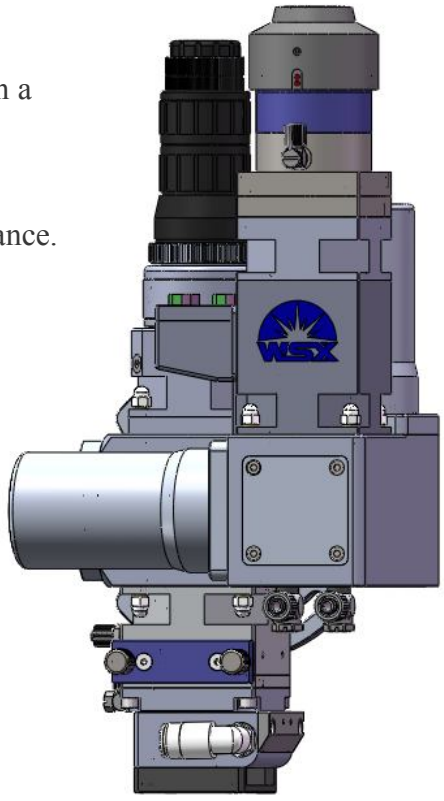
Precision products. Do not strike it!

Product： Wobble Welding Head

Model No.： ND24B

Product Features:

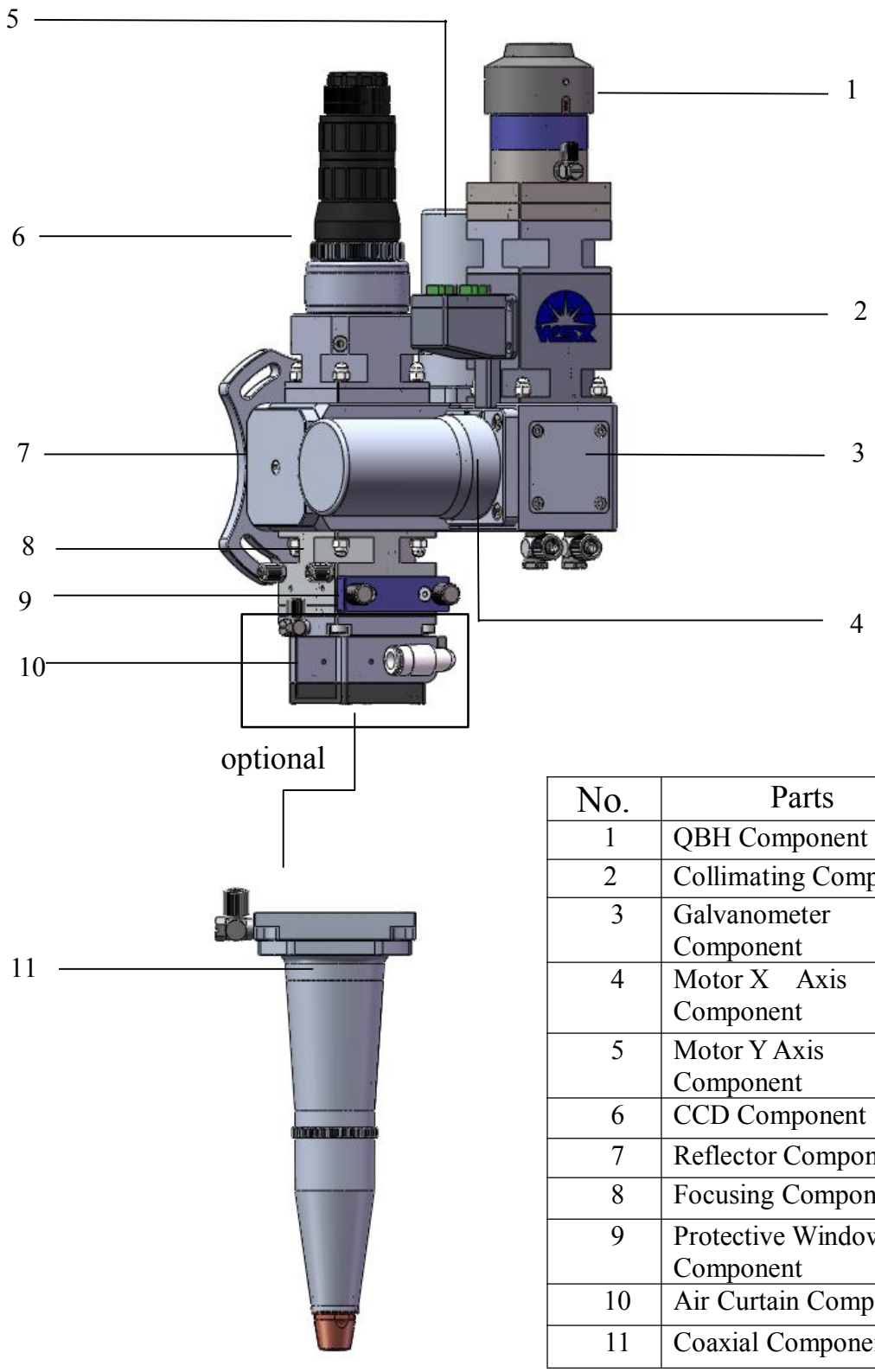
1. Adopting the motor to drive the X, Y-axis galvanometer lens with a variety of wobbling modes.
2. It allows the work piece with irregular welds, and the larger clearance.
3. Processing parameters can significantly improve the quality
4. Greatly improve the finish.
5. Enhancing welding consistency of back reflection materials.



Contents

1. Product Description

1.1 Structure Diagram



No.	Parts
1	QBH Component
2	Collimating Component
3	Galvanometer Component
4	Motor X Axis Component
5	Motor Y Axis Component
6	CCD Component
7	Reflector Component
8	Focusing Component
9	Protective Window Component
10	Air Curtain Component
11	Coaxial Component

1.2 Main Function

Components Introduction

※QBH Component
It is the core connector which connects to fiber laser and provides standard fiber access.

※Collimator Lens Component
Collimator lens component is assembled inside the laser head; it contains collimator lens cavity and collimator lens group.

※Galvanometer Component
Motor-driven X, Y-axis lens have multiple wobble modes, enlarging the area of the welding seam and allowing the workpiece to have irregular welding seams and larger gaps.

※CCD Component
Provide filtering, focusing function; provide safe, reliable and real light source to CCD.

※Spectroscopic Component
Reflect the laser to the workpiece surface.

※Focusing Component
Focusing component is assembled inside the laser head.It contains adjustment structure, focusing locking device, focusing lens group, focusing lens cavity and water cooling system.

※Protective Window Component
The welding slag can not directly splash on the focusing lens, which protects and prolongs the use time of the focusing lens

※Gas Rod Component
Provide inert gas to protect welding seam during welding.

1.2.1 Design & Function

This laser head uses fiber laser machine as light source and weld the metal on plain machine table in controlled distance.It features high welding precision, outstanding durability, ease maintenance and adjustment.
All media connections are built inside the laser head.

1.2.3Auxiliary Medium

※Inert gas
◎In order to protect the welding position from oxidation, the protective gas should not have any harmful chemical reaction with welding material.

◎ The protective gas must meet the Standard of ISO 8573-1:2010, Class 2.4.3 without impurity particles, water and oil. High purity protective gas will prolong the lifespan of protective window.

2 Technical Specification

Item	Parameter
Max Power	2000W
Collimating Length	100mm
Focusing Length	200mm
Weight	3.8 kg
Clear Aperture	¢27

Fit for all famous laser soucres .

3.Installation & Connection

3.1 Safety Instructions

3.1Safety Instructions

Any maintenance or fault survey should be conducted by professional trained personnel who must have got safety training and be aware of the possible danger and safety measure. Users should learn the related safety knowledge and prepare necessary safety devices before using.

Caution - High Pressure !

The gas pressure inside some laser head component can reach to 2.5MPa.

Caution - High Voltage !

Keep the power off during the maintenance and repair.

Caution - Pinching Hand !

During maintenance and repair, do not put hands or any other body parts under the laser head or forward direction of the moving axis!

Caution - Laser !

Keep the power off during the maintenance and repair. The laser machine will generate level 4 laser while working.

Keep the eyes or skins from being directly shot or scattered by laser.

Do not look directly into the laser beam even if wearing eye protecting equipment.

Please wear the goggles which meet the standard of DIN EN 207 & BGV B2.

Caution - High Cleanliness Optical Lens

Do not touch the high cleanliness area of optical lens inside the laser head with bare hands. Dust or dirt attached on the lens may cause scorch damage.

It is allowed to touch the nonsensitive area of lens only if wearing protective gloves.

3.2 Unpacking Check

※Unpacking Check

1.Intact box;
2.The label should be clear with conformity mark and accord with the purchased models;
3.The upper and lower opening tear-proof seals are not broken or disassembled;
4.If the above does not match, contact the seller.

※Open the box

1.The signage surface points to opening surface;
2.Open the box with a knife, and the depth of knifepoint cutting into the box shall not exceed 2mm.

3.3 Preparation for Installation

※Tools

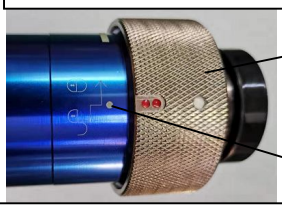
1.A set of metric hexagonal handle;
2.One bag of clean rod, one bottle of anhydrous ethanol(500ml), one package of clean gloves.
3.Clean and dust-free working environment.

※Preparation of installation personnel

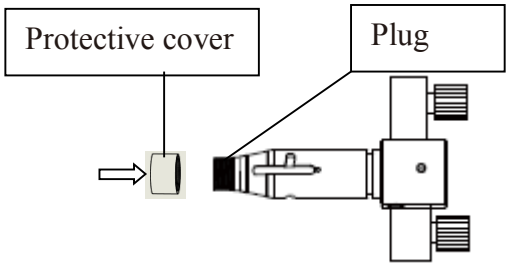
1.Read this manual carefully;
2.Wash hands with soap;
3.Wear dust-free gloves;
4.Wear a mask if necessary.(Note - Dust removal is of utmost importance)

3.4 QBH and Fiber Connection

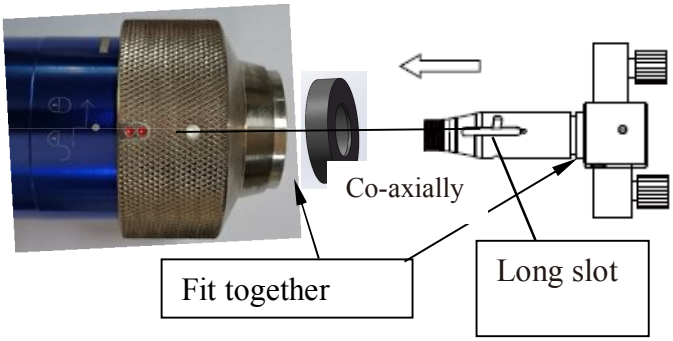
Step one： Before turning the rim as below, make sure the red marks are aligned to the white marks.



Step two： Remove the dust cover of fiber rod, clean the fiber rod with anhydrous ethanol. Before installing, check the protective cover of fiber plug to see if it is locked, avoid the cover from loosening and effecting the welding performance or burning the fiber and welding head.

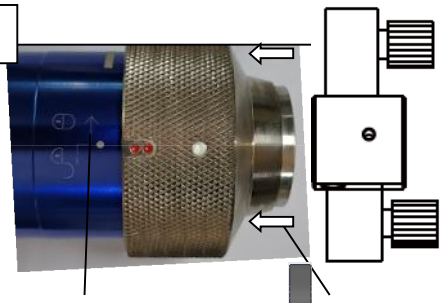


Step three： Remove the dust cover from QBH, place the clean fiber rod and the QBH coaxially, make sure the white mark on the QBH is aligned with the locating slot (long slot on fiber rod), insert the fiber rod into QBH gently, until the fiber rod joints the QBH contact surface.

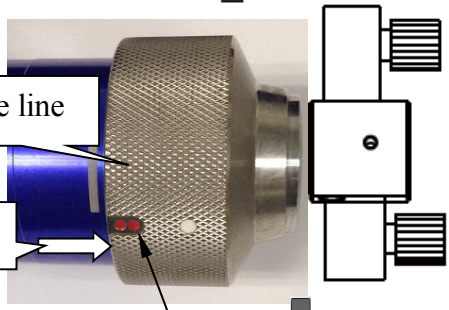


Step four： After inserting the fiber rod into QBH, press the rim gently and turn it about 15 degree along the arrow on the rim. Then pull the rim until its underside is parallel with the top of QBH, turn the rim at the same direction till the limit.

A

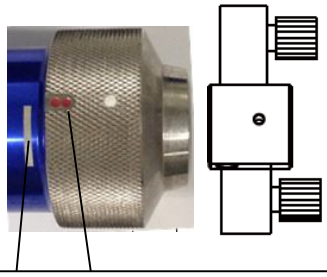


B



Turn the rim 15 degree, the red dot should be close to white line, pull the rim towards the right.

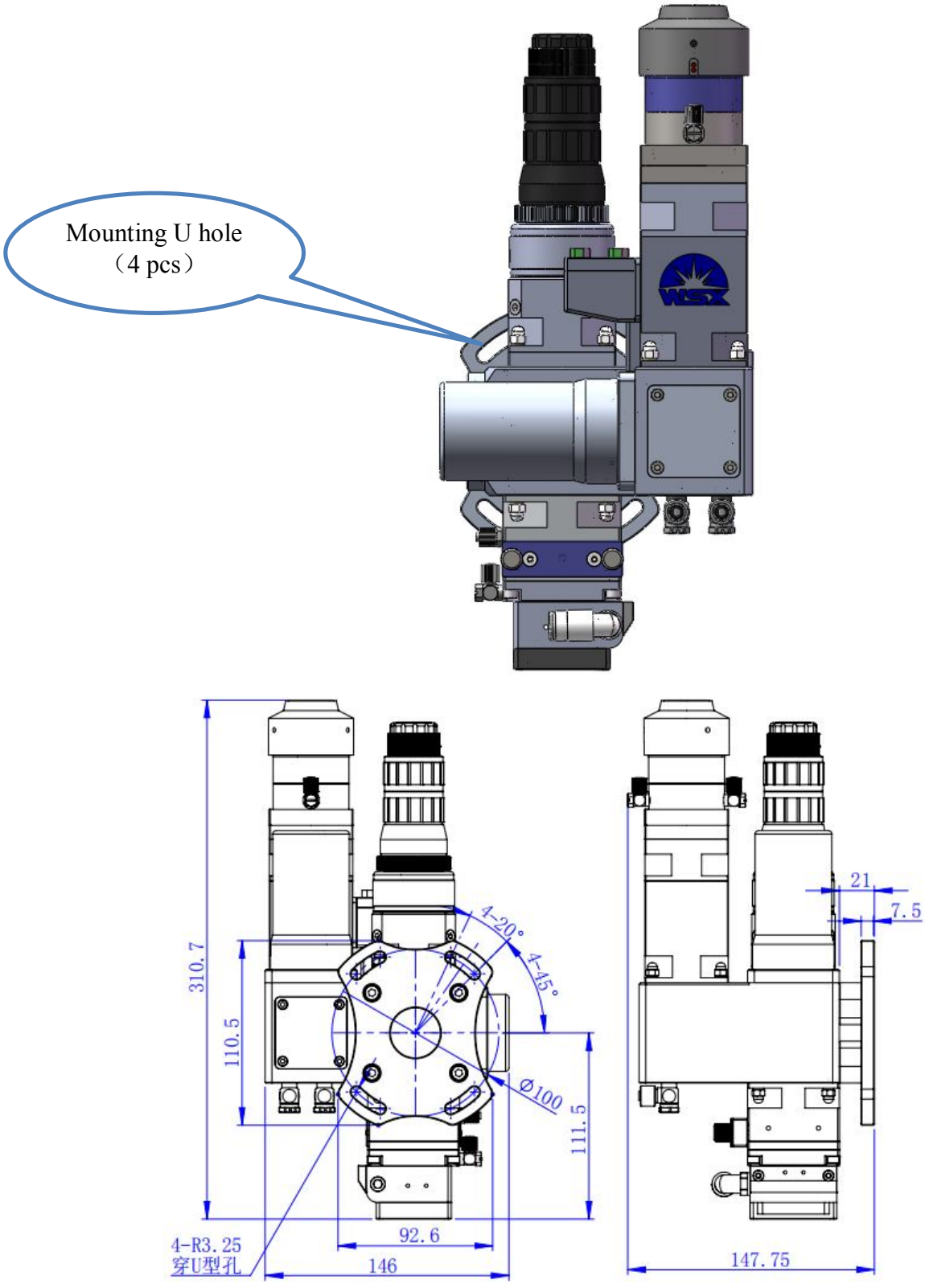
C



Pull the rim and continue turning, the red dot should be in the scope of the white line or close to the end of white line. The underside of rim

Note：1. Insert or pull out the fiber rod gently;
2. When inserting or pulling out, QBH and fiber rod should be coaxially;
3. The operation should be kept as dust-free as possible.

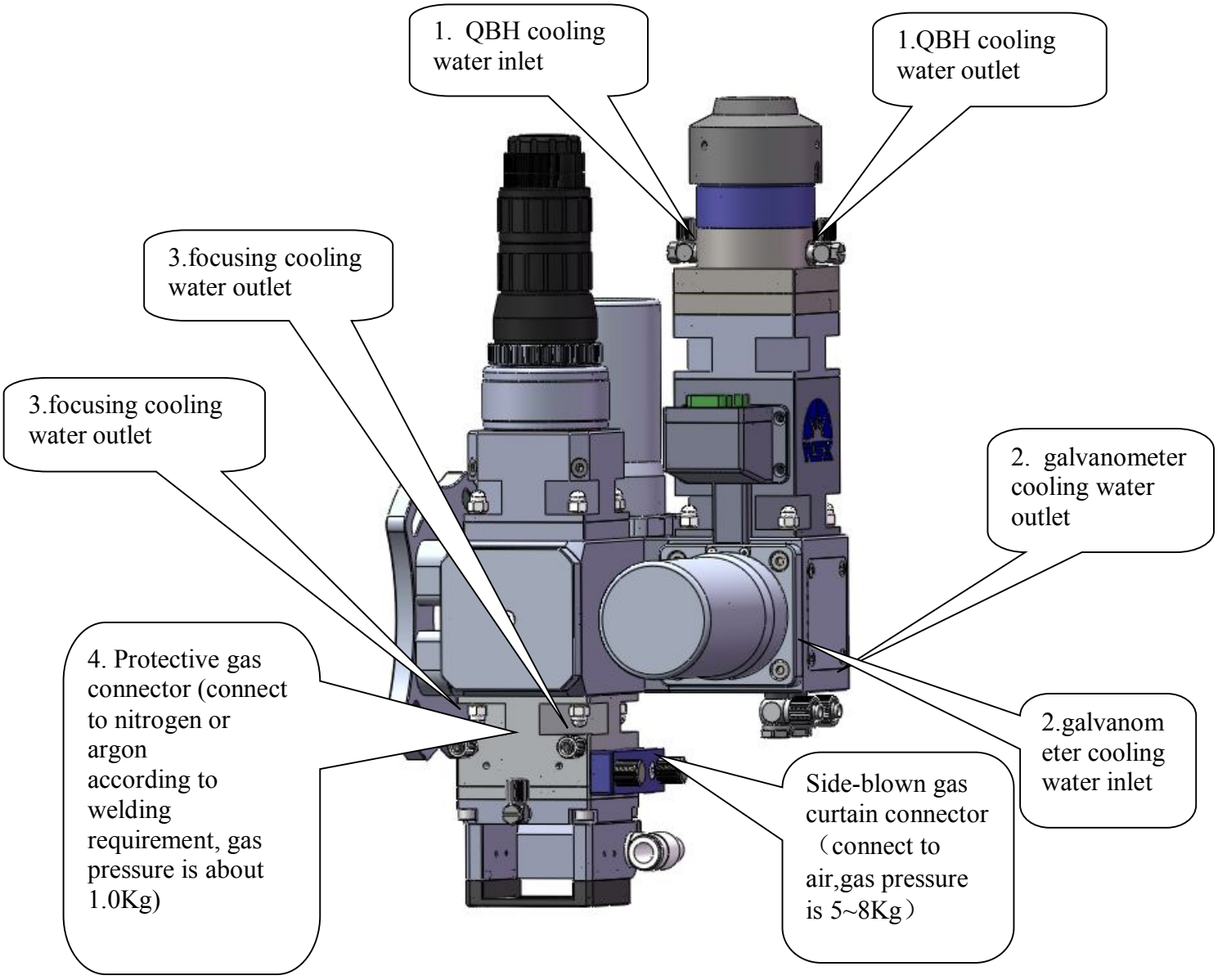
3.5 Installation and outside drawing



Installation of laser head should be solid and reliable.
The angle of laser head in the vertical direction can be set according to customer requirement.

3.6 Connection of water and gas

Water cooling connector & gas connector diagram



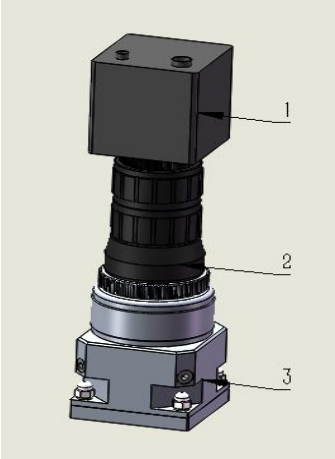
Note：

1） 1~3 and 6 is Φ6 water pipe connector，when using must ensure the water quantity is sufficient, the water pressure is above 0.4MPa；

2）4、5 is Φ8 gas pipe connector；

3, Please keep the bending radius of the connected pipeline not less than 30mm.

3.7 CCD component connection



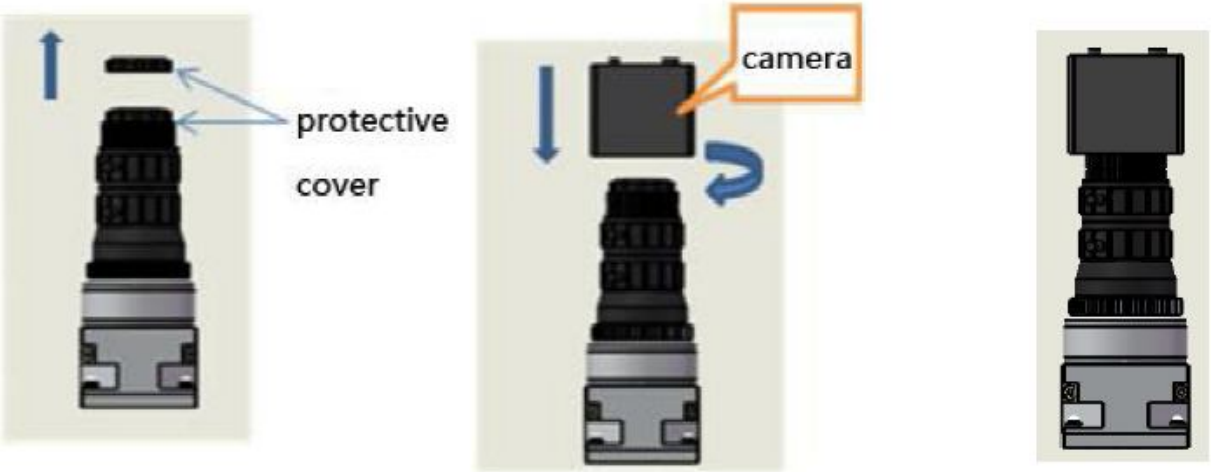
1 Camera
2 CCD interface
3 Mounting base

Installation steps of CCD Camera：

Step 1：Remove the protective cover as shown below;

Step 2：Tighten the camera to the lens after removing the cover, keep the camera and lens close.

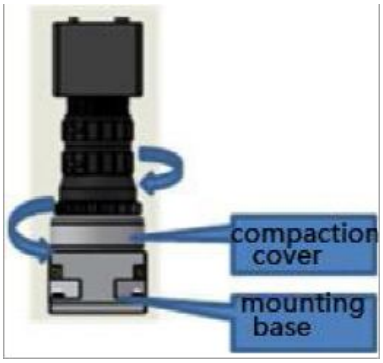
Note：Tighten in moderate intensity, avoid loose or damage caused by improper force.

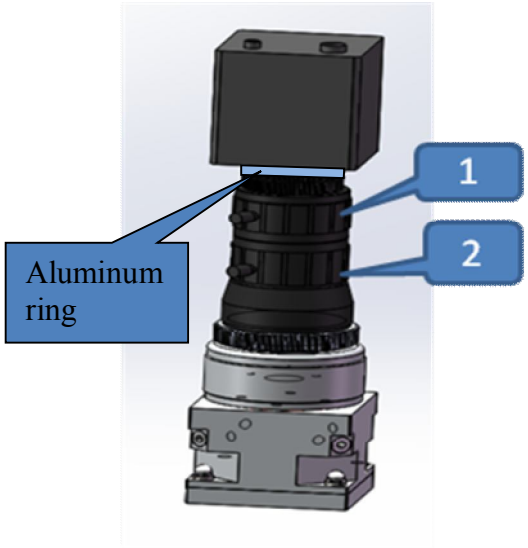


4.Debugging

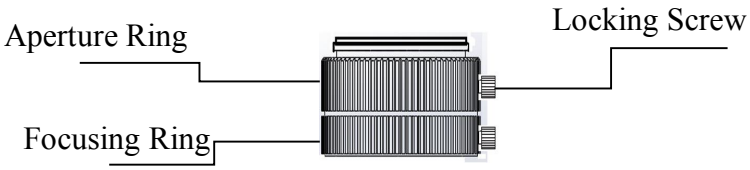
4.1 CCD Definition Debugging

Camera angular adjustment：
If the camera is tightened at an angle to the mounting seat, loosen the compaction cover as the left picture, turn the lower part of the camera clockwise, make one of the vertical planes of the camera parallel to the mounting seat.（As shown on the right）

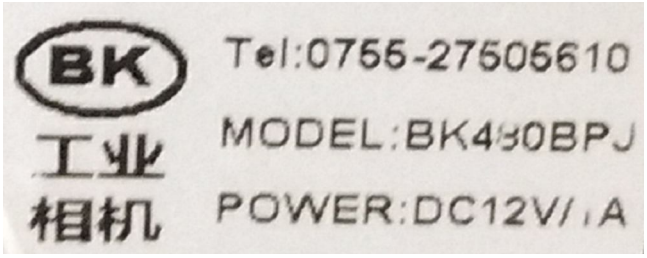




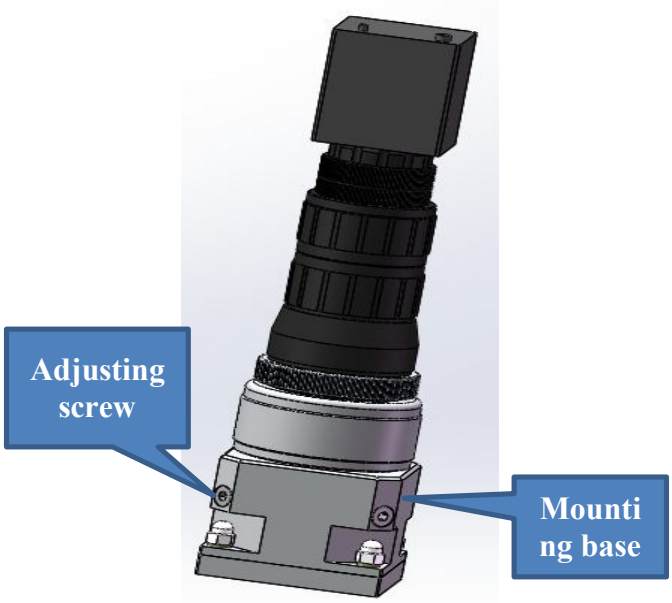
CCD definition debugging
Purpose：To make the image clear on the display, adjust as following steps.Adjustment steps（left picture）：
1、Install industrial camera to the lens properly;
2、Loosen locking screws on Aperture Ring(1) and Focusing Ring(2);
3、Adjust Aperture Ring(1) to get a certain brightness;(image is clearly visible on the screen)
4、Adjust image distance with Focusing Ring(2) to make the image clear;
If the image is not clear enough, repeat the above step 1,2,3, then tighten the locking screws on Aperture Ring and Focusing Ring.
Note：This welding head is equipped with aluminium rings in two different specifications(5mm / 10mm). These are used to increase/decrease image distance. User can assemble or unassemble the aluminium rings to adjust the CCD focusing range according to actual screen display.

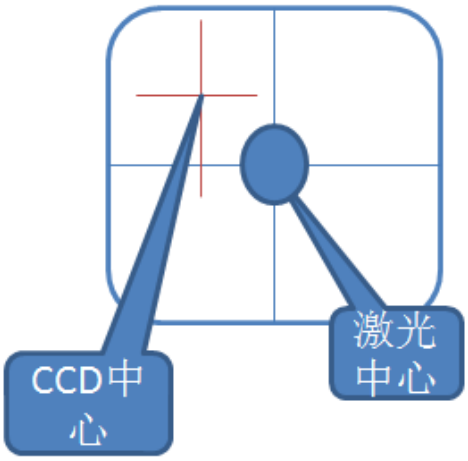


Note：It is recommended to use the CCC digital camera as shown below to make screen images clearer



2 CCD image and laser center coincidence adjustment





In the process of welding, the CCD image center (cross intersection) must coincide with the laser center.

Adjustment method as follow：

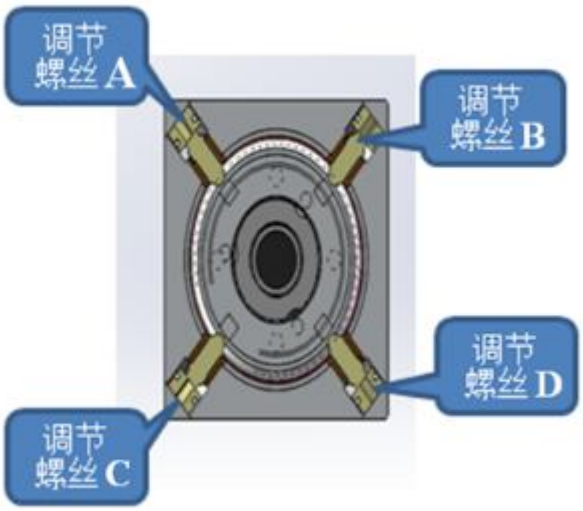
As shown above, the cross point of the CCD on the screen is on the upper left of the laser center and can be adjusted with four adjustment screws mounted on the quadrangle of the seat in the left image.

1, Release D screw properly with hexagonal wrench to make room for CCD to move right down;

2, Tighten the A screw with a hexagonal wrench, forcing CCD to move right down until the intersection of the CCD cross coincides with the center of the laser;

3, If the above two steps fail to adjust the CCD cross intersection to the laser center point or the CCD cross crossing point to move below the laser center position, then use a hexagonal wrench to properly loosen the B screw to make room for the CCD cross crossing point to move up to the right, Then tighten the C screw with a hexagonal wrench, forcing the cross point of the CCD cross to move up to the right until the intersection of the CCD cross coincides with the center of the laser.

4, When the cross crossing of CCD deviates from other positions in the center of the laser, use the hexagonal wrench to adjust the cross point of the CCD cross by loosing the diagonal screw first and then tightening the adjusting screw to adjust the cross point of the CCD cross.



Special attention:before using the adjustment screw, the diagonal screw must be released to make room for CCD component movement. Avoid blindly tightening adjustment screws and damage CCD components.

5. Maintenance

5.1 Maintenance of QBH and Fiber

Clean and dust-free working environment is required!

Any laser circuit equipment fitted with a laser head must be carefully dedusted!

Assembly or replacement of lens or other components must be conducted in clean working environment!

Prepare new lens component before removing the old one!

Users could purchase spare lens components from us!

In case that user could not meet the above requirements, it is advised to use nonstick protective film to seal the opening after the removing of the lens immediately.

Minimize the time of laser path being exposed to the air to prevent the dust and dirt entering into the laser head.

If any safety or protection device has been removed, it must be reinstalled before the equipment being operated or debugged and checked whether the device could run well.

Maintenance of QBH and Fiber Connector

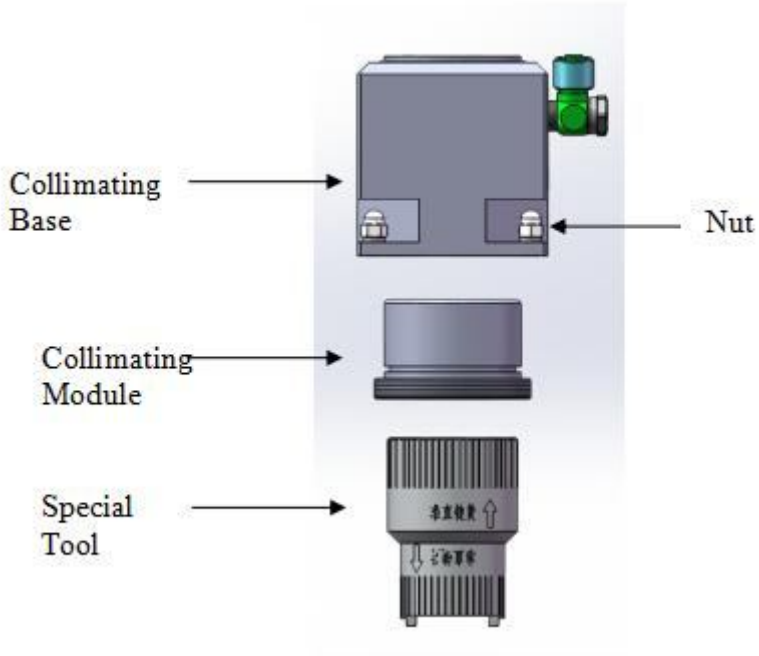
1、Use self-adhesive paper to cover the junction of QBH and fiber connector to prevent dust from entering the gap.

2、Fiber connector water cooling pipe must be connected well to prevent leaking. If QBH has water inside accidentally, please stop using immediately and send it to the factory to handle with.

When disassembling, please record the relative position of the parts in order to facilitate the correct installation after maintenance.

※ Removal and installation of lens

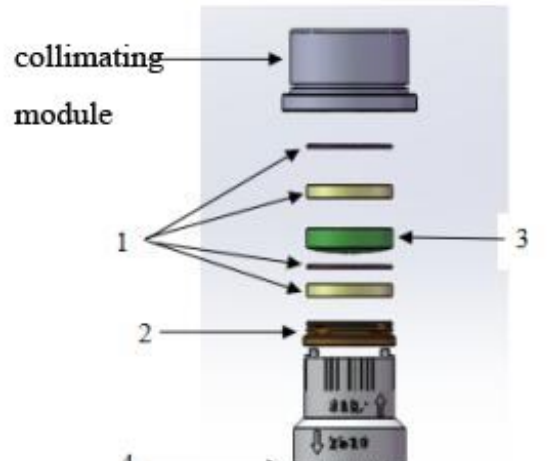
First wipe the surface of the laser head with absolute ethanol, then loosen the four nuts of the collimating seat, separate the entire collimating assembly, and then use a special tool to unscrew the collimating lens barrel from the collimating seat, as shown in the figure below Show:



The collimating lens removal process is as follows:

1. use special tool 4 to twist the locking ring 2 until the spring ring screw are completely removed.
2.After loosen the spring ring, put the whole collimator coil upside down on the clean plate (keep the coil in the collimator base during this process), draw up the collimating lens cavity 1 gently, be careful not to drop the lenses.
3. remove the washer 5 on the lens and remove the lens to replace or maintain the lens.
4. After repairing or replacing the lens, please reverse the installation in the order of disassembly, and lock the spring pressure ring to be lighter to avoid damage to the lens.
5. After the spring pressure ring is turned to the end, please retract 1/5 times to ensure that the spring pressure ring 3 has a gap (0.1~0.15mm).

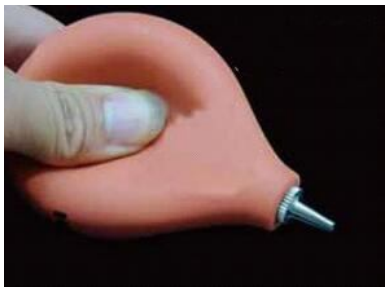
Note: Keep the original order between the parts, the lens should be the same direction as the original!



1.washer 2. locking ring
3.collimating lens 4. special tool

Cleaning and installation of lens and protective window

1. Use a dust-free clean rod dipped in isopropyl alcoholsolvent to clean the lens;
2. Use a hand bellows to draw clean air and blow the attached granules or other foreign matters off the lens;
3. Repeat the above steps several times, until the lens is clean;
4. If the protective window can not be cleaned or it is damaged, user must change a new one.

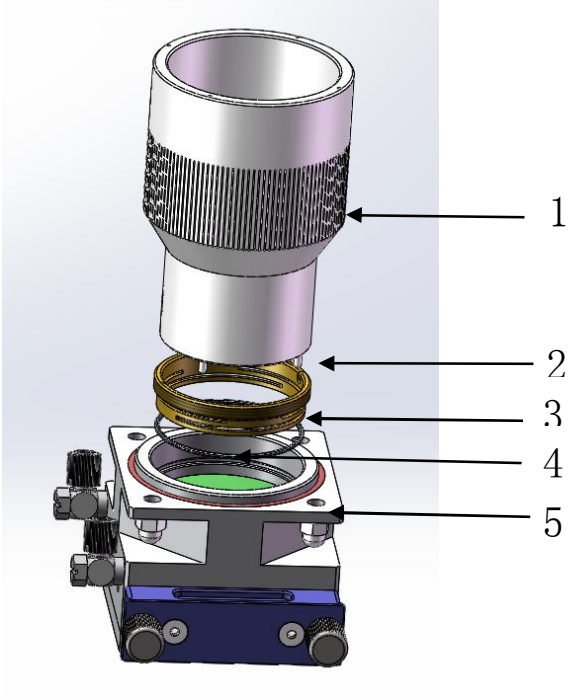


5.3 Maintenance of the focus component

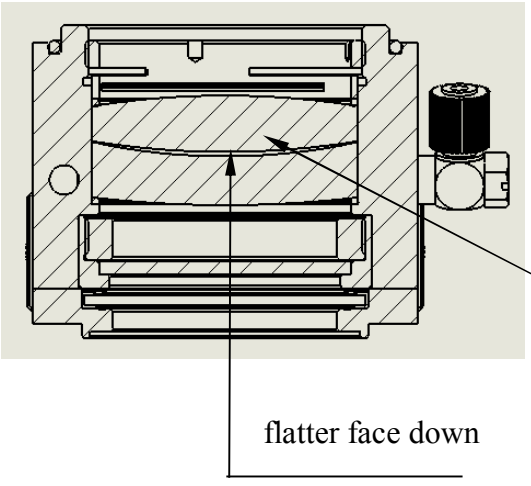
Before disassembly, do remember the relative position sequence of each component to facilitate proper replacement of the components after the focus lens is maintenance.

※Disassembly process of focusing lens assembly:

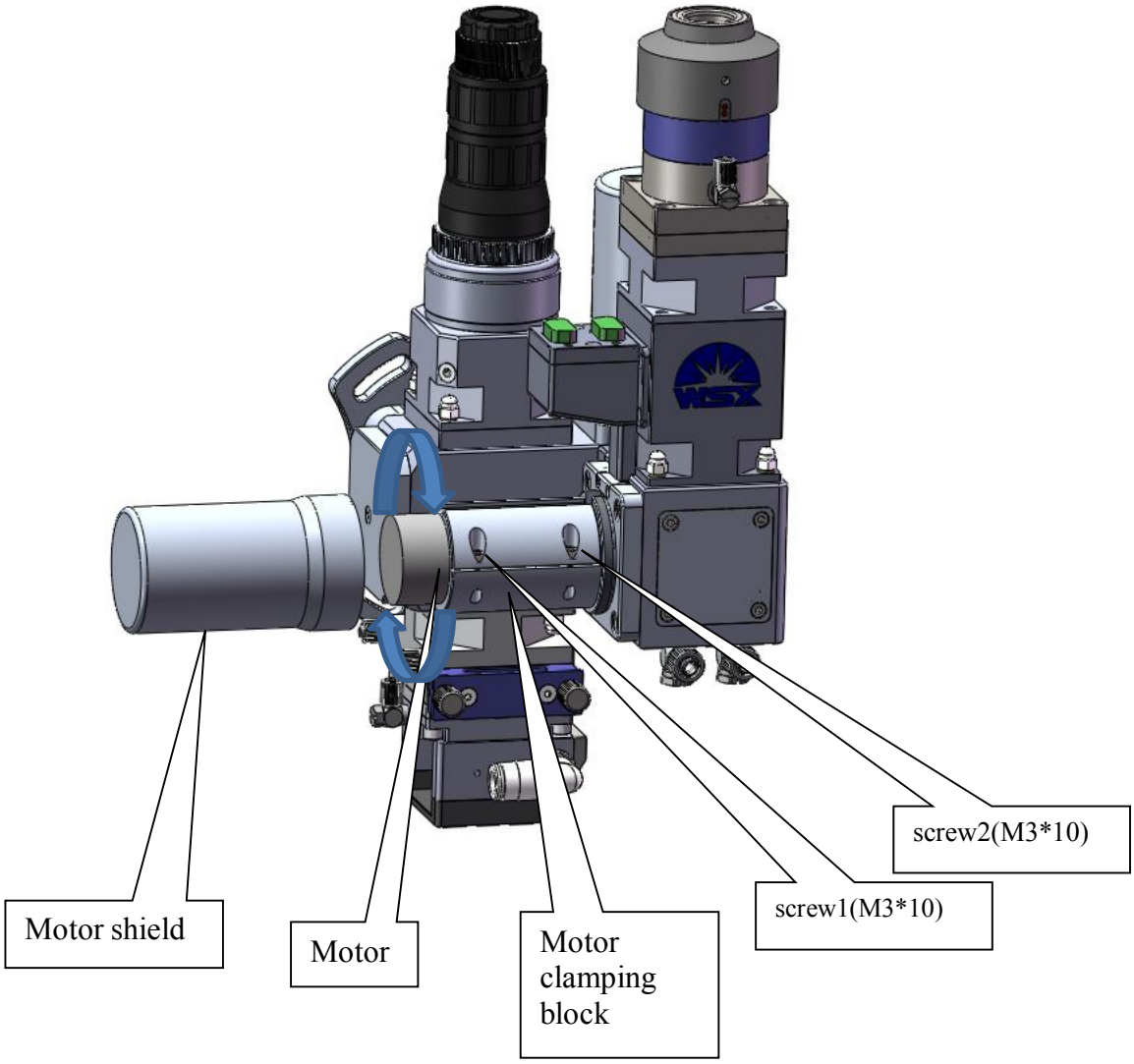
1. Use an open-end wrench to remove the 4 nuts and 4 studs used to fix the focusing assembly, rotate and remove the focusing assembly;
2. Use the special tool 1 to clamp the locking elastic ring 2, rotate and take out the locking elastic ring 2:
3. Remove the focusing lens gasket 3;
4. Take out the biconcave focusing lens group and maintain or replace it.
5. The installation of the focusing lens and components is reversed according to the above process;
6. When installing the focusing lens, after the locking elastic ring is twisted to the end, it needs to be twisted 1/5 turn to keep a gap of 0.1~0.15 between the locking elastic ring and the focusing lens;
7. When installing the focusing lens, the flat convex surface of the focusing lens should be downward to keep the lens clean during the whole process.



1. special tool 2. locking elastic ring; 3. washer 4. biconcave focusing lens group; 5. nut

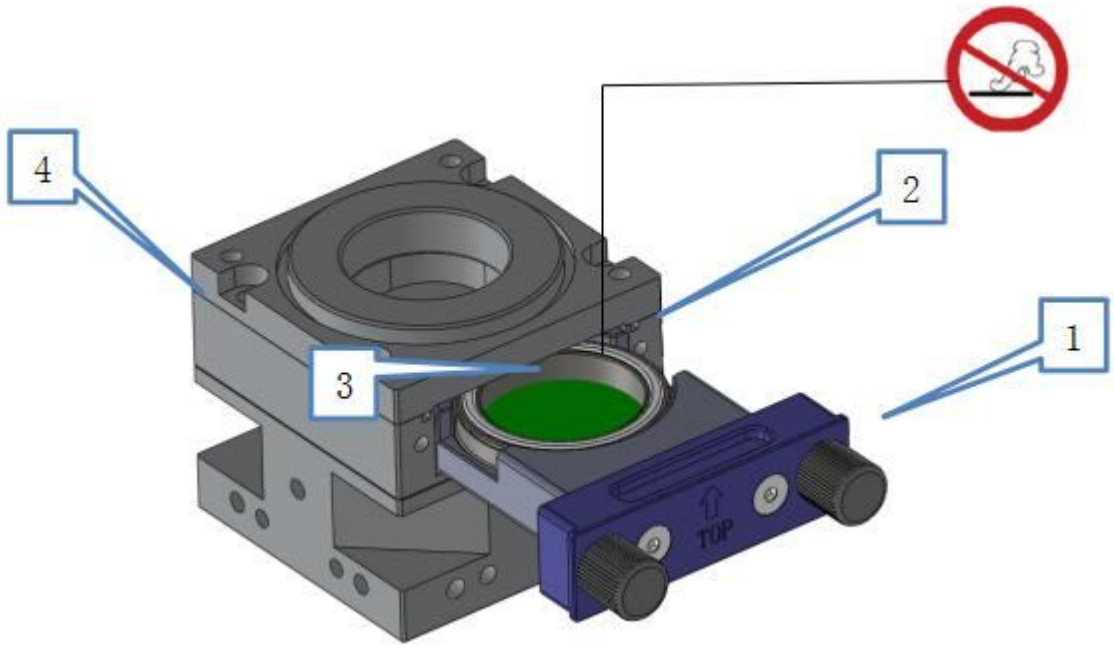


5.4Maintenance of reflector components



Mirror angle adjustment steps:
1. Rotate and remove the motor shield;
2. Loosen screw 1 and screw 2 with an Allen wrench to loosen the motor clamping block;
3. Rotate the motor to fine-tune the reflection angle, so that the spot is displayed in the center, and the dynamic effect of welding is better visually viewing;
4. The method for adjusting the angle of the X-axis and Y-axis mirrors is the same.

5.5 Maintenance of protective window



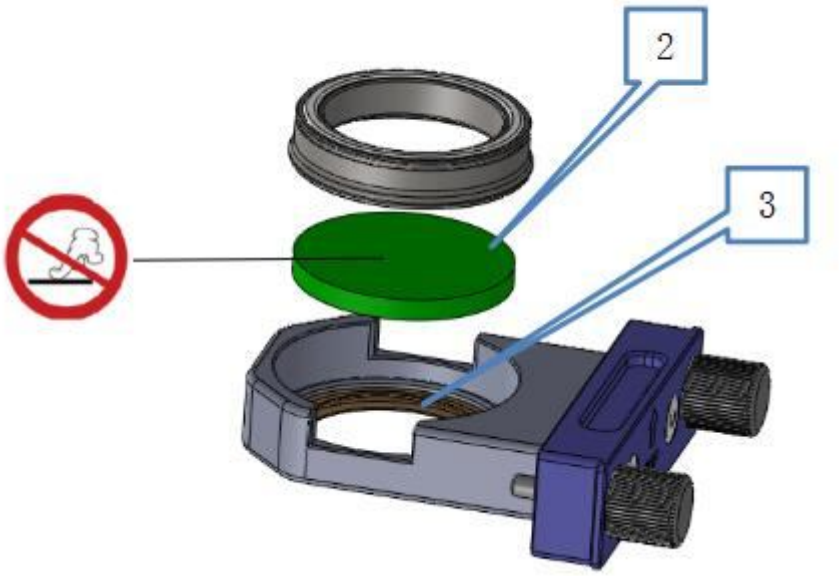
1 Locking stud 2 Lens pressure ring
3 Protective window 4 Protective window base

Protect lens maintenance:

1 Loosen the two locking studs 1 by hand, and pull the protective window module out of the protective lens base 4.
2 Note: quickly seal the opening after the lens is removed with a non-adhesive protective film!
3 Put the protective window module in a clean environment for maintenance.
4 Tear off the non-adhesive protective film at the entrance of the protective window module, insert the maintained protective window module flat into the entrance until it is inserted to the end, and finally tighten the two locking studs 1 to lock the protective lens assembly.

Note: Check whether the protective lens assembly is locked (the protective lens assembly that is not locked can be pulled out).

5.6 Change of Protective window



Replace the protective window.
1 Open the pressure ring 1, take out the lens 2 and put it in a clean container. The protective window 2 cannot come into contact with non-gas materials.
2 Check whether the sealing ring 3 is deformed or notched. If it is defective, replace it.
3 Ensure that the components are clean. After installing the sealing ring, install the lens 2 in the original direction and press the pressure ring 1.

Note: During the operation, keep the environment clean and the parts clean. The protective window **needs to be installed in the direction, not reversed.**

Electrical Parts

1. Electrical Components of welding head

① ② ③ ④

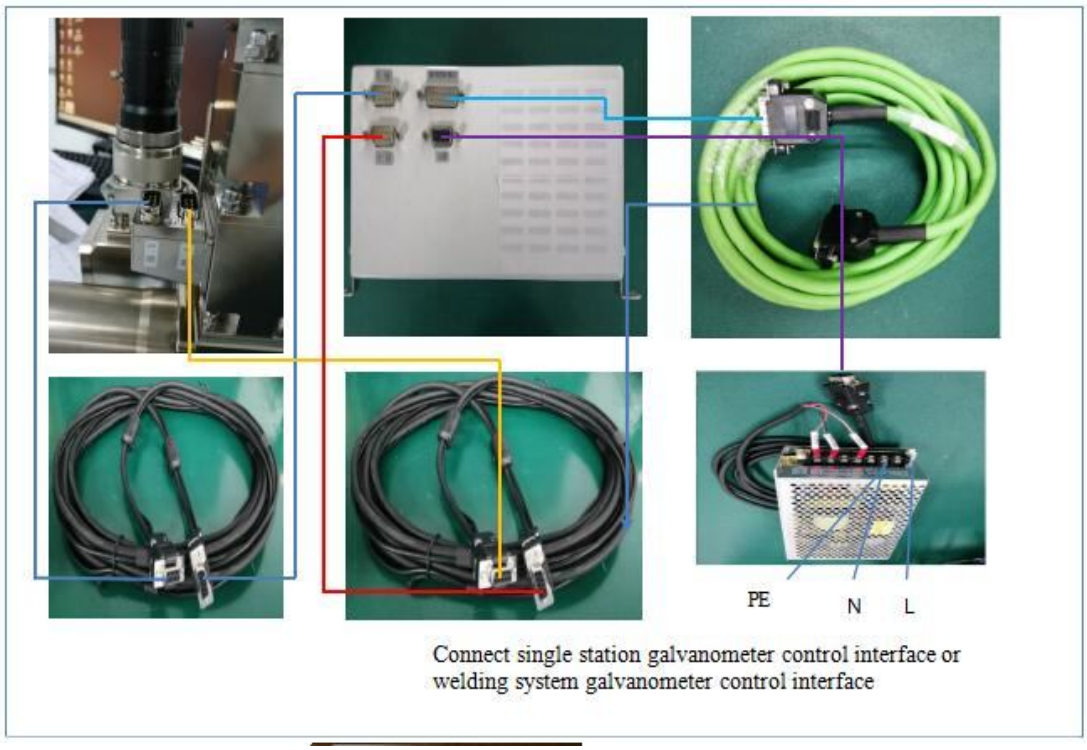
①、Switching power supply and power lead wire
②、Motor extension cord
③、 marking card DA card connection line (galvanometer control signal line)
④、Galvo control box

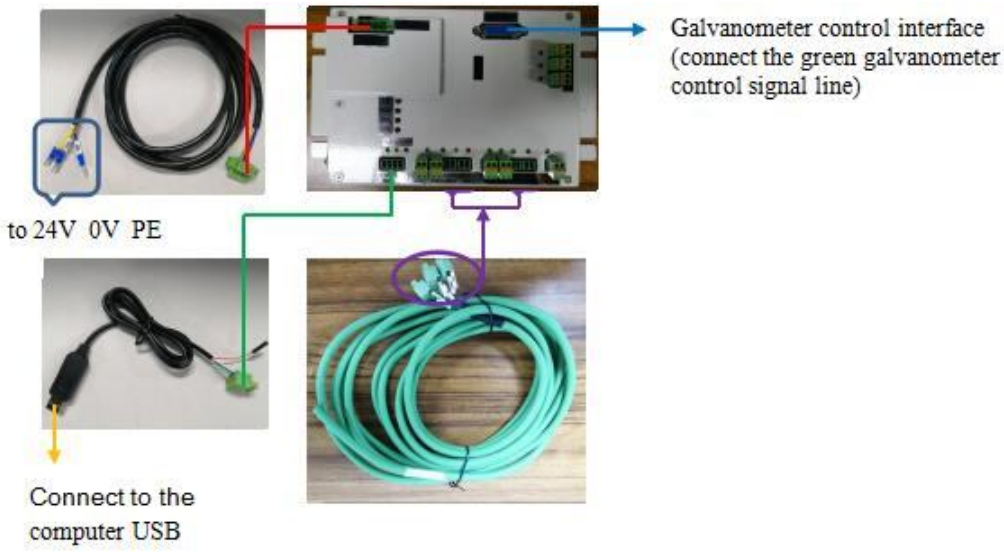
2. Electrical components of single station galvanometer control system

① ② ③ ④

①、single station galvanometer controller
②、USB to TTL level serial line
③、the galvanometer controller power cord
④、 8-core control IO line

3.The electrical connection diagram.





Content

Preface

Thank you very much for using our company's single station galvanometer driver! Before use, please read the equipment manual carefully to ensure that the company’s equipment is used correctly. Please keep the manual properly for reference at any time. Due to different configurations, some models do not have some of the functions listed in this book. Please refer to the actual product. Due to continuous upgrades and improvements of the product, some content in this book may differ slightly from the actual product. Please refer to the actual product.

This manual provides users with relevant instructions and precautions for installation, parameter setting, and processing operations. In order to ensure the correct installation and operation of the system, please read this manual carefully before installation, and save it or hand it to The user of the software.

For the safety of operators and mechanical equipment, please be sure to install and operate the equipment by professional process engineers. If you have any questions, please contact us in time, our professionals will be happy to serve you!

Safety Precautions

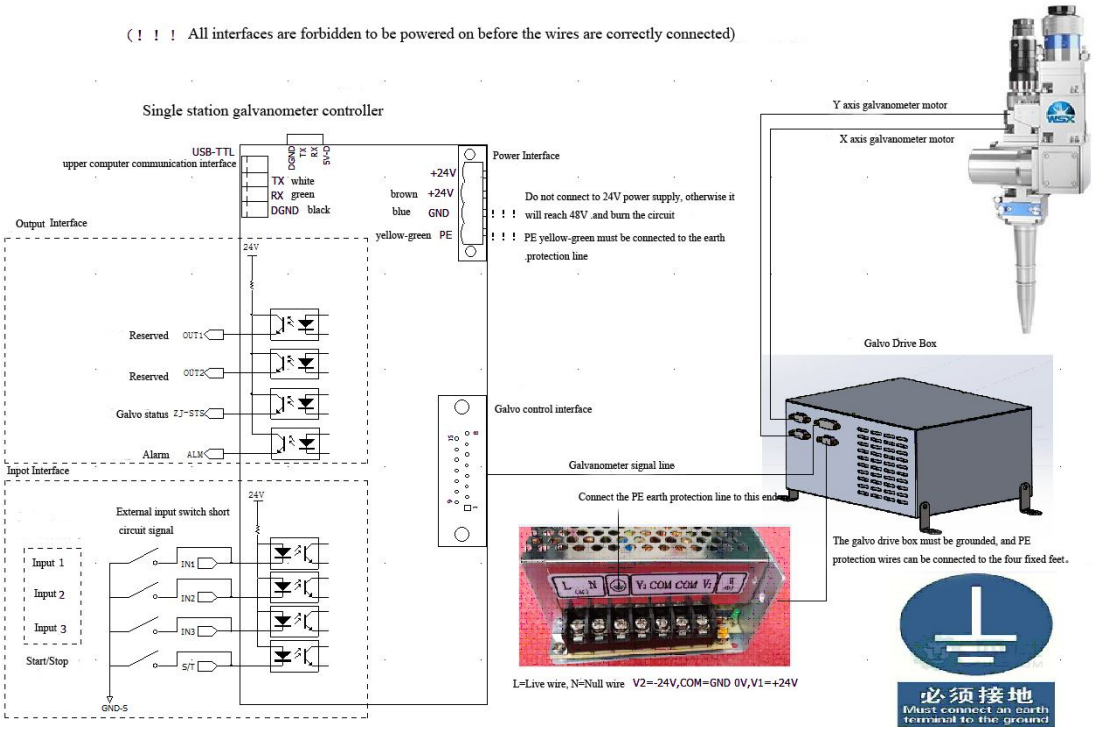
 注意	Before operating the equipment, the user must carefully read this manual and related operation manuals, strictly abide by the operating procedures, non-professionals are not allowed to turn on, and all connected equipment must be connected to the earth protection line.
 警告	This equipment uses the fourth types of lasers (strong laser radiation), which may cause the following accidents: Lead surrounding combustibles; During laser processing, other radiation and toxic and harmful gases may be generated due to different processing objects; Direct exposure of laser radiation can cause human injury. Therefore, the place where the equipment is used must be equipped with fire-fighting equipment. It is strictly forbidden to stack flammable and explosive materials on the workbench and around the equipment. At the same time, it must be well ventilated. Non-professional operators are prohibited from approaching the equipment.
 提示	The processed objects and emissions shall comply with local laws and regulations.
 警告	Laser processing may have risks, and users should carefully consider whether the processed object is suitable for laser processing. There are high voltages or other potential dangers inside the laser equipment. Non-manufacturers are strictly prohibited from disassembling. The machine and other related equipment must be safely grounded before it can be turned on. It is strictly forbidden to open any end cover when the equipment is working. During the working process of the equipment, the operator must observe the working conditions of the equipment at any time. If an abnormal situation occurs, immediately cut off all power supplies and actively take corresponding measures. When the equipment is turned on, there must be someone on duty, and it is strictly forbidden to leave without authorization. All power must be cut off before personnel leave.
 注意	The "Safety Rules" chapter of this book contains more detailed equipment safety instructions, please read carefully and follow them.

1.Product Description

1.1 Single station galvanometer controller accessories details

No.	Parts	Pc	Line signal definition	standard configuration	specification
1	Single station galvanometer controller	1	With shell	YES	
2	3-core 24V power cord + terminal + sleeve (2 meters)	1	24V/GND/PE	YES	.75 square wire, pure copper. One end is equipped with UT1-4U type crimping terminal, the other end is equipped with 5.08mm plug-in terminal
3	Single station galvanometer 12 core control line	1	1. Galvo status 2.GND_S 3. Alarm output 4.GND_S 5. Input 1 6.GND_S 7. Input 2 8.GND_s 9. Input 3 10.GND_s 11. Start/Stop 12.GND_s	YES	DGW-ZJ12PINKZ-A-5M/T
4	USB to TTL level serial cable	1	1.TX 2.RX 3.GND	YES	DPCKXZJ-001

1.2 Connection diagram



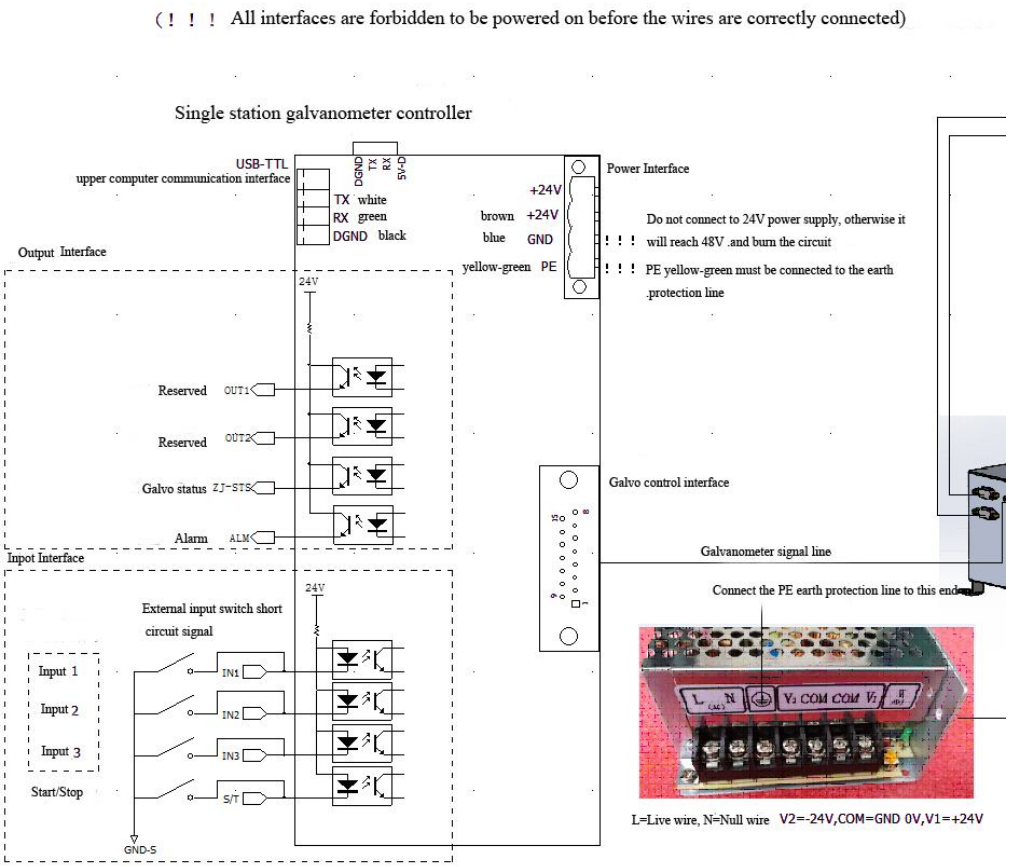
注意

The housing of the galvanometer controller, the housing of the galvanometer drive box and the ground terminal of the switching power supply must all be well connected to the PE earth protection line!

The "power interface" of the galvo controller is DC 24V power supply, and the ground terminal of the power supply must be well connected to the PE earth protection line! It is necessary to ensure that the connected power supply is measured as 24V with a multimeter before inserting the terminal into this interface, so as to avoid accidentally connecting other power sources higher than DC 24V and causing the product to burn!

Zoom in

Controller



注意

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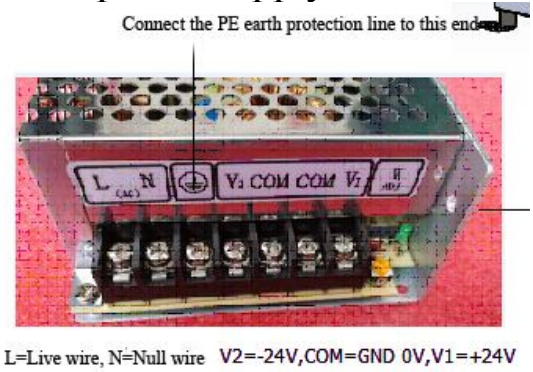
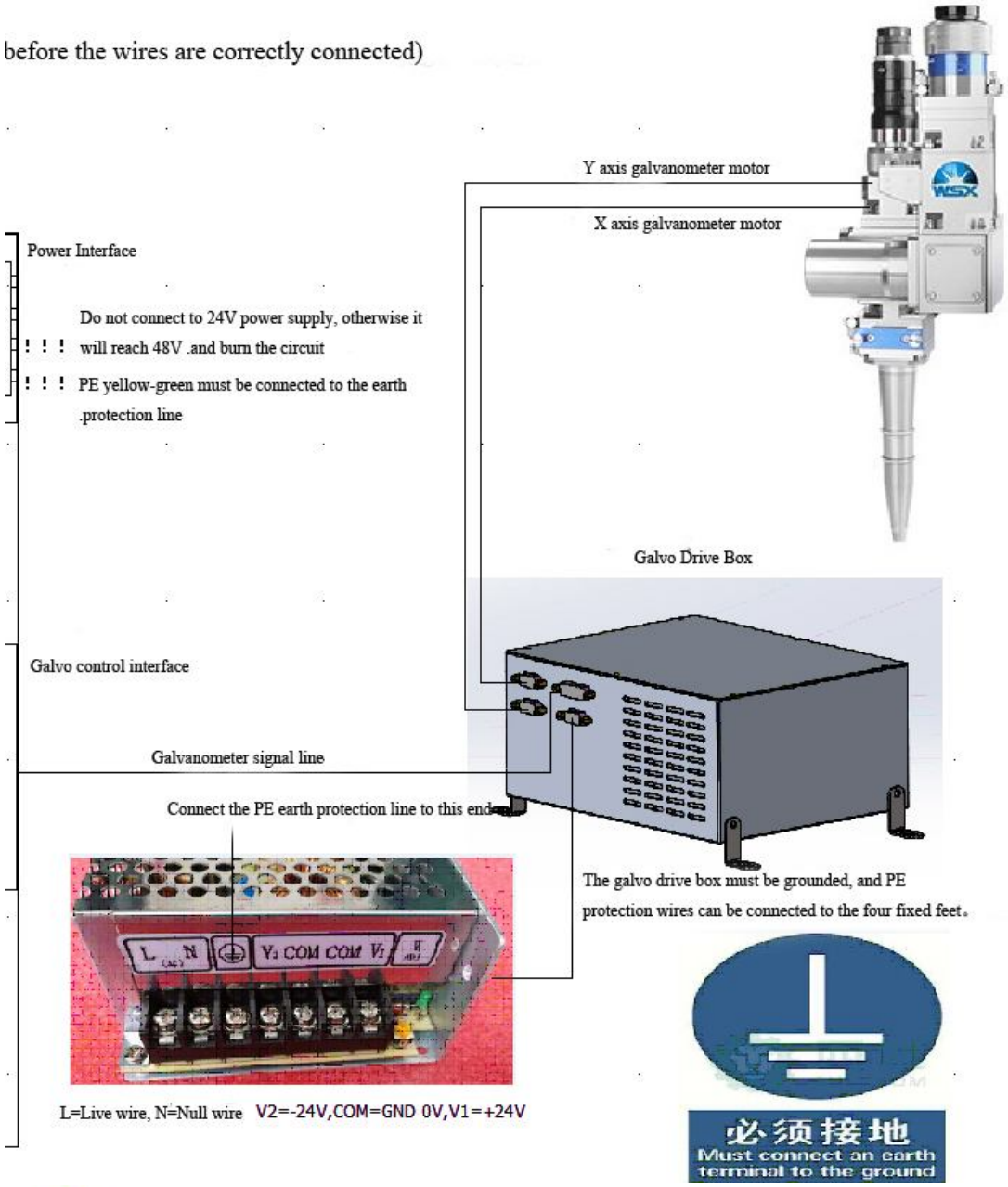
Switch power supply



注意

The ground terminal of the switching power supply must be well connected to the PE earth protection line! This type of power supply has two voltages, positive and negative 24V, V2=-24V, V1=+24V, and the COM terminal is GND=0V. Please pay attention to identification when wiring!

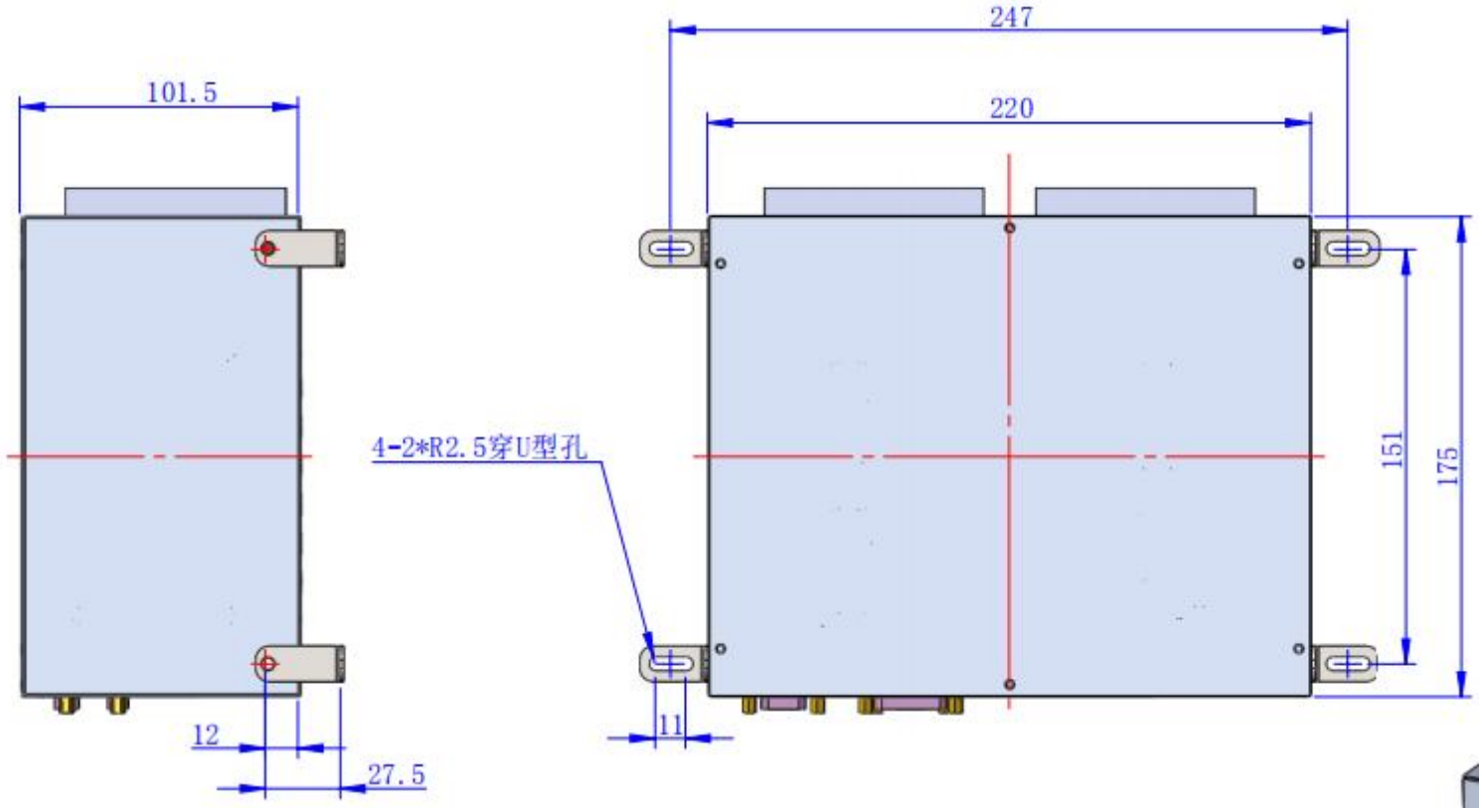
Fiber welding head and drive box



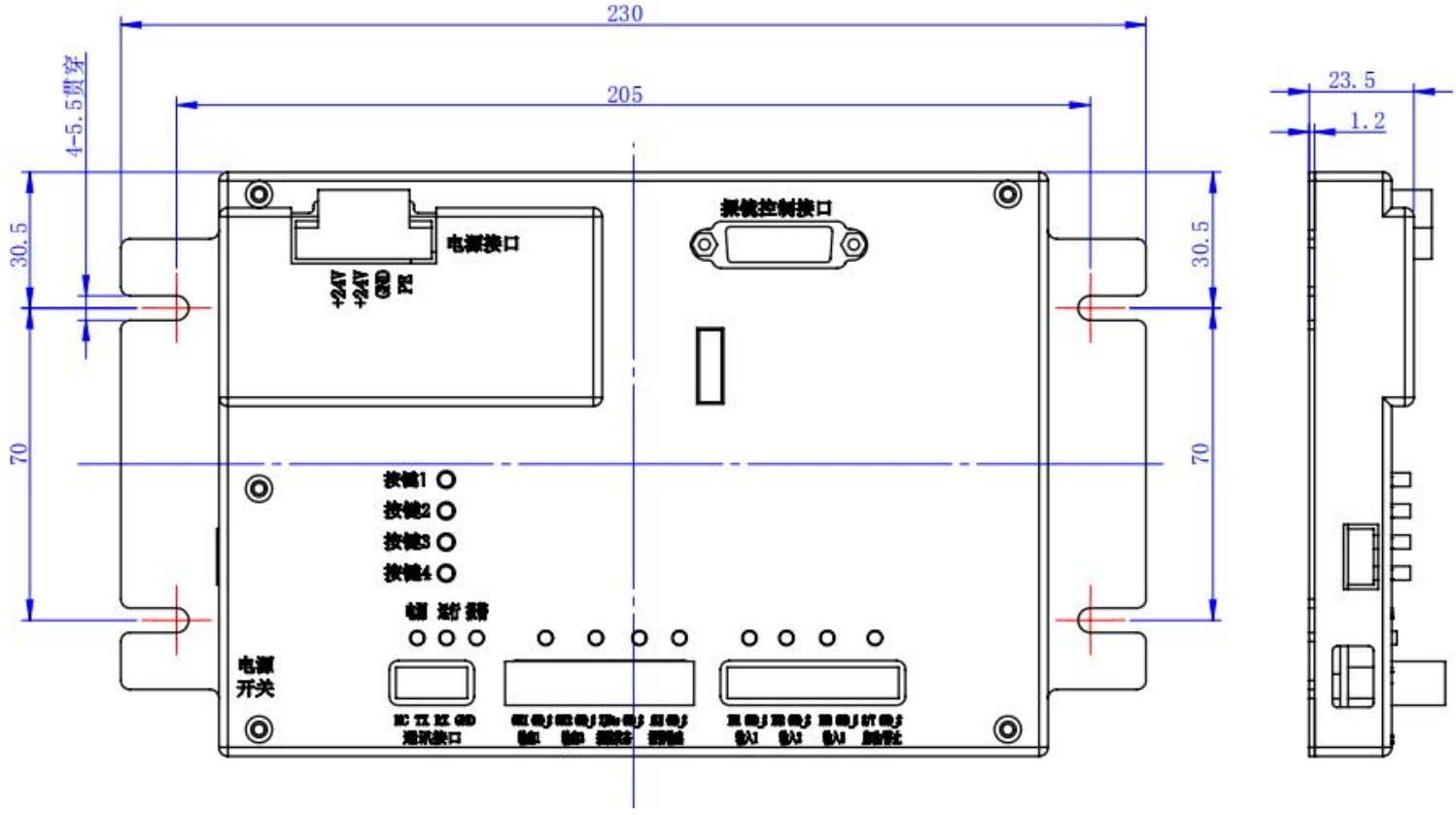
注意

The housing of the galvanometer drive box and the ground terminal of the switching power supply must all be well connected to the PE earth protection line!
The housing of the galvanometer drive box must be connected to the earth wire to avoid greater external interference into the drive, resulting in abnormal signals and abnormal swings! All wiring plugs must be inserted firmly and the screws must be locked to prevent abnormal swing!

1.3 Structure and size



Drive box size



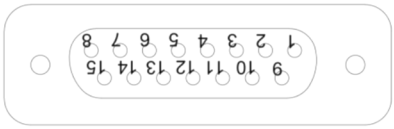
Single station control box size

1.4 Interface and definition

Galvo control interface

It is necessary to ensure that the galvanometer signal wire plug is inserted stably and reliably, and the screws are tightened to ensure good contact between the signal terminals and avoid the galvanometer not swinging due to poor wire contact!

The 15pin female interface pins are defined as follows:



CLK+	1	9	CLK-
SYNC+	2	10	SYNC-
XCH+	3	11	XCH-
YCH+	4	12	YCH-
NC	5	13	NC
NC	6	14	GND_S
NC	7	15	GND_S
NC	8		

CLK +/-:The clock signal of the galvanometer signal

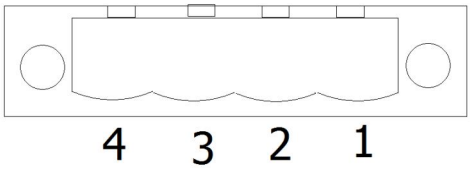
SYNC+/-:Sync signal of galvanometer signal

XCH+/-:Galvo signal X-axis data signal

YCH+/-:Galvo signal Y-axis data signal

GND-S：Optocoupler external signal ground;

Power interface



1	2	3	4
PE（Earth protection ground wire）	GND(0V)	+24V	+24V

注意

This interface is DC 24V power supply, and the ground terminal of the power supply must be well connected to the PE earth protection line! It is necessary to ensure that the connected power supply is measured as 24V with a multimeter before inserting the terminal into this interface, so as to avoid accidentally connecting other power sources higher than DC 24V and causing the product to burn!

After the power supply is properly connected and can be turned on and functioning normally, be sure to tighten the screws of this power interface to avoid poor contact of the terminal and cause the system to stop working!

Indicator

Indicator	**Function**
Power Indicator	The light is always on when the +24V power supply is normal
Running light	This light will flicker when there is port output, otherwise it will be always on when power is on.
Alarm light	This light will be on when the internal communication of the chip is abnormal (the chip pin is abnormal)
Input 1	Reserved, without any function output
Input 2	Reserved, without any function output
Galvo output status indicator	The galvanometer will stay on when it starts
Alarm output indicator	This light will be on when the internal communication of the chip is abnormal (the chip pin is abnormal)
Input 1 indicator	After the switch is shorted to input 1 port, this light will be on
Input 2 indicator	After the switch is shorted to input 2 port, this light will be on
Input 3 indicator	After the switch is shorted to input 3 port, this light will be on
Start/stop indicator	After the switch is shorted to the start/stop port, this light will be on

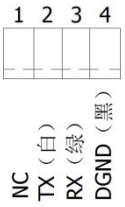
Output Interface

Alarm Output	When there is an alarm, this port outputs high level. High level is >20V
GND_S	Optocoupler external signal ground
Galvo status output	When the galvanometer output is activated, this port outputs a high level. High level is >20V.
GND_S	Optocoupler external signal ground
Output 1/2	Reserved, without any function output
GND_S	Optocoupler external signal ground

Input Interface

Input 1	When this port is shorted to GND_S, signal input is realized. Input 1, input 2, and input 3 are used together to realize the process parameter switching of the corresponding upper computer. After each switching operation, the galvanometer needs to be restarted to take effect. For details, please go to "Process Switching Combination Signal Operation Table"
GND_S	Optocoupler external signal ground
Input 2	When this port is shorted to GND_S, signal input is realized. Input 1, input 2, and input 3 are used together to realize the process parameter switching of the corresponding upper computer. After each switching operation, the galvanometer needs to be restarted to take effect. For details, please go to "Process Switching Combination Signal Operation Table"
GND_S	Optocoupler external signal ground
Input 3	When this port is shorted to GND_S, signal input is realized. Input 1, input 2, and input 3 are used together to realize the process parameter switching of the corresponding upper computer. After each switching operation, the galvanometer needs to be restarted to take effect. For details, please go to "Process Switching Combination Signal Operation Table"
GND_S	Optocoupler external signal ground
Start/Stop	When this port is shorted to GND_S, the galvanometer starts to swing, and the output port: the state output of the galvanometer is high> 20V
GND_S	Optocoupler external signal ground

Upper computer communication interface (USB-TTL serial port)



1	2	3	4
NC（Non-used）	TX （white）	RX （green）	DGND （black）

注意

This interface is a USB-to-TTL level communication interface. The short communication line should be used as much as possible. It is not recommended that the user extend and change the shipment wire privately, so as to avoid aggravated long-term interference and affect the communication signal! If the user must make private changes, it is recommended not to exceed 2 meters in length!

1.5 Key combination function

Key combination function

When using the keys to operate, please use moderate force to avoid breaking or loosening the keys due to excessive force operation or collision!

Button adjust spot size	1. Increase the light spot: first press "button 1" without letting go, and then press "button 3", the amplitude of the light spot will increase by 0.1 units, and each press will increase in turn; 2. Reduce the light spot: first press "button 1" without letting go, and then press "button 4", the amplitude of the light spot will decrease by 0.1 unit, and it will decrease in turn with each press.
Press the key to adjust the swing frequency	1. Speed up the frequency: first press "button 2" without letting go, press "button 3" again, the swing frequency will increase by 50Hz, and each press will increase in turn; 2. Frequency slowing down: first press "button 2" without letting go, and then press "button 4", the oscillation frequency will decrease by 50Hz, and it will decrease in sequence with each press.
Output graphics switch	Operate button 2 alone to switch the swing pattern: straight line-rectangle-circle-eight characters
Galvo start stop switch	Press "Button 3" and "Button 4" simultaneously to turn on or off the galvanometer
Reset system	In the shutdown state, press and hold "Button 1" and "Button 2" at the same time without letting go, and then release it after turning it on for 1 second to reset back to the factory default settings and complete the system reset. In the shutdown state, press and hold "Button 1" and "Button 2" at the same time without letting go, and then release it after turning it on for 1 second to reset back to the factory default settings and complete the system reset.

1.6 Process switching combined signal operation table

Process switching, input combined signal operation
(!!! Input 1, input 2, and input 3 are all external switch control methods), as shown below

OFF signal ON signal

Process parameter switching operation			
Single station galvanometer controller input interface			Upper computer process group serial number
Input 1	Input 2	Input 3	
OFF	OFF	OFF	Group 0
ON	OFF	OFF	Group 1
OFF	ON	OFF	Group 2
ON	ON	OFF	Group 3
OFF	OFF	ON	Group 4
ON	OFF	ON	Group 5
OFF	ON	ON	Group 6
ON	ON	ON	Group 7

注意

After each switching operation, the galvanometer interface needs to be restarted to take effect, that is, the galvanometer interface is restarted after the switching signal is given (the start/stop interface turns from OFF to ON), and the switching is complete!

2. Upper Computer Operation

2.1 Function Features

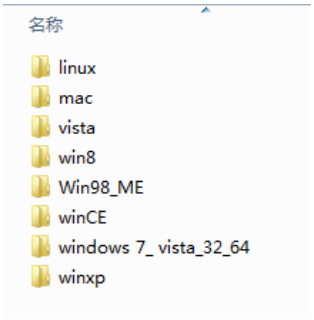
1. Convenient operation method, improve work efficiency and avoid misoperation;
2. Simple installation interface, the control box can be directly installed on the guide rail, and all pluggable wiring ports are used for convenient wiring;
3. Work offline, just import data, which effectively improves the convenience;

2.2 Software Installation

2.2.1 Serial port driver installation method

1. Select the "Computer" icon on the desktop of the computer you are using, right-click, select "Properties" in the pop-up menu, click Properties, the position in the red box in the pop-up menu as shown in the figure below, check the version of the windows system installed on the computer and the number of bits of the system, as follows The computer shown in the figure is a win7 64-bit system:

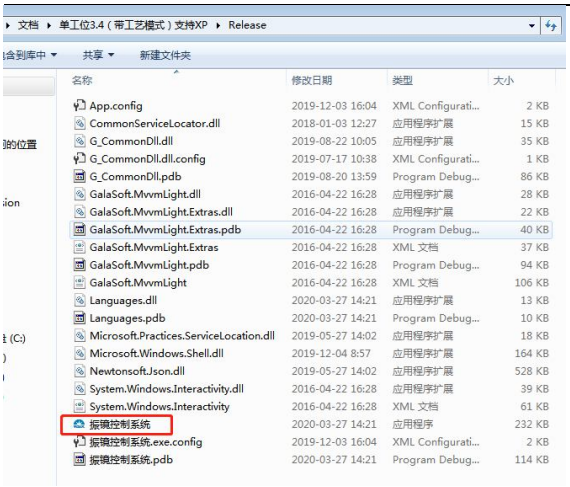
2. Turn off the computer's antivirus software;
3. Switch to the directory: ..\Single station galvanometer host computer software V21_serial port driver\galvanometer host computer serial port driver
4. Unzip .NET_Framework4.5.zip, enter the unzipped directory, double-click .NET_Framework4.5, enter the installation, until the installation is complete.
Switch to the directory: ..\Single-station galvanometer host computer software V21_serial port driver\galvanometer host computer serial port driver\PL2303HX According to the windows system version confirmed in step 1, select the corresponding driver version (according to step 1, You should choose windows7_vista_32_64), enter the corresponding directory, double-click to execute the program, enter the installation, until the installation is complete.：



5. Connect a serial port cable between the computer USB port and the control board, and the control board end is connected as follows:

6. Switch the directory to: ..\Single-station galvanometer PC software V21_serial port driver, according to the computer system confirmed in step 1, select the corresponding PC software (as shown below): Single-station PC 3.4 (with Process mode).zip.

7. Decompress the corresponding compressed package, switch the directory to enter the pressurized folder, and double-click the "galvanometer control system" file



8. After executing the host computer software, there will be the following interface, if the connection is successful, there will be a specific com number in the box behind the serial port number, such as com1, com2, etc. If the connection is unsuccessful, there will be no specific com number displayed.

2.3 Start using

2.3.1User Interface

2.3.2 Operation overview

Serial number	Show serial port number	Connect the device	Link with the control card through the peripheral computer
Output port	Display the output port currently in use		
shape	Choose the shape of the swing pattern	Turn on galvanometer	Turn on galvanometer
direction	Select the swing direction of the swing pattern		
Rotation angle	Choose angle	Read parameters	Read the parameters of the current device
Movement speed	Set the swing speed of the galvanometer		
X axis compression ratio	Adjust the compression ratio of the X axis	Set parameters	Import the set parameters to the current device
Yaxis compression ratio	Adjust the compression ratio of the Y axis		
Keystone correction ratio	Adjust the keystone correction ratio	Import parameters	Import file parameters into the software
Diamond correction ratio	Adjust the diamond correction ratio		
length	Set the length of the swing pattern	Export parameters	Export the files set by the software to a folder
width	Set the width of the swing pattern		

3.Appendix

3.1 Troubleshooting common problems.

Question 1: The power indicator does not light up or the running light does not light up after booting

Troubleshooting:

1. Whether the power supply wiring is correct and whether the wiring sequence complies with the power line sequence in the manual
2. Is the power supply wrongly connected to +24V and -24V, resulting in the total voltage reaching 48V (some switching power supplies have two power supplies, namely positive power and negative power, for example, some switching power supplies V1 is a positive 24V power supply, and V2 is a negative 24V power supply , COM is GND 0V. Our controller only needs 24V power supply, so we can only connect positive 24V and GND 0V. If the positive 24V and negative 24V are incorrectly connected, the power supply is not 24V, but 48V, which far exceeds the control The normal power supply of the device)
3. Whether the switching power supply has normal output voltage and whether there is a short circuit (you can first disconnect the power cord of the controller to check)
4. Whether the power switch button of the controller is damaged and disconnected (the place where the jumper is used to short-circuit the switch when opening the shell)

Problem 2: After the USB cable is connected to the upper computer, the software of the upper computer cannot be connected or occasionally connected badly

Troubleshooting:

1. First, check whether the USB cable is disconnected, disassemble the USB shell, use a multimeter to check whether the two ends of the cable are connected, whether the wiring sequence is wrong, and whether the thread at the green terminal is loose and falling, resulting in poor interface contact
2. Whether the software version of the host computer is V3.3 or higher with craft mode, and the motherboard version is the latest 2C11 or higher

Problem 3: The galvanometer does not swing

Troubleshooting:

1. Whether the galvanometer signal line connects the galvanometer controller and the drive box, whether the galvanometer output is turned on (the host computer turns on the galvanometer or the "start/stop" interface is shorted on the controller), the galvanometer controller Whether the status light of the galvanometer is always on; whether the wiring on the driver box is correct, and whether the driver board light in the driver box is glowing green
2. After connecting to the host computer software, read the parameters to check whether the length, width and diameter of the graph are zero. After the width and diameter are increased, turn on the galvanometer to observe whether the output is normal
3. If you have a machine that is in normal use, you can connect the normally swinging

drive box to the galvanometer controller of the problem. This operation can quickly eliminate whether it is the controller or the drive box or the galvanometer signal wire. Problem, and then eliminate one by one to find the root cause.

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