万顺兴激光|智造世界未来

WSX Laser Drives the Future

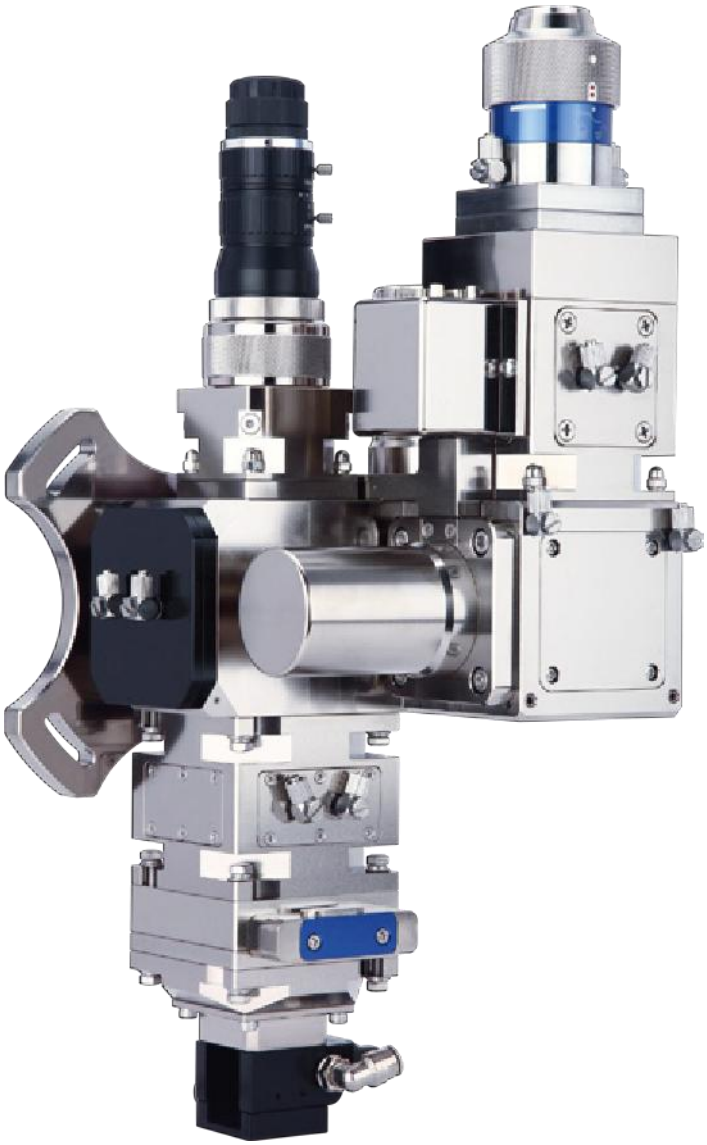
ND60

User Manual

Shenzhen Worthing Technnology Co., Ltd.

www.wsxlaser.com

contents



Product: wobble welding head

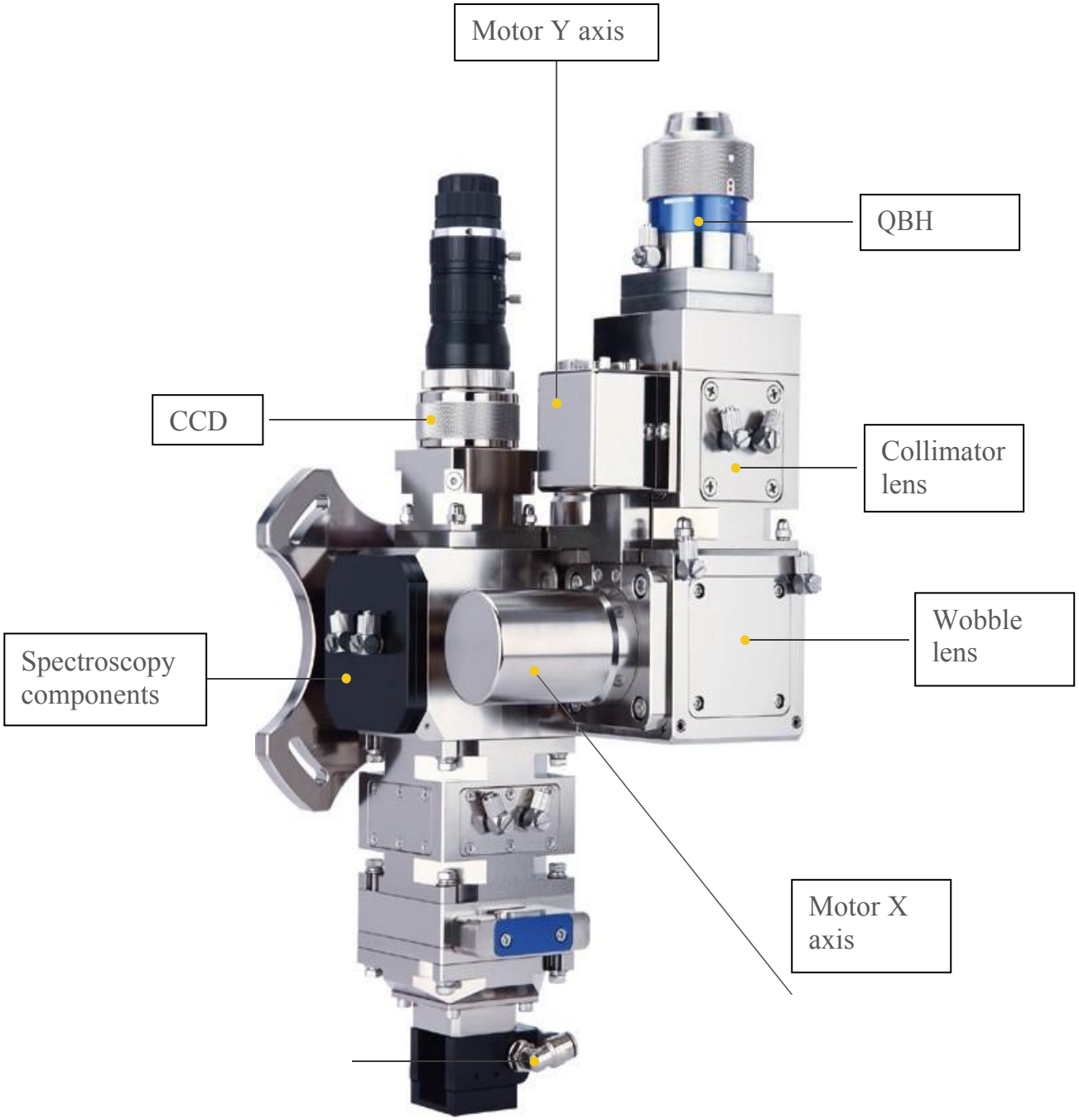
Model number：ND60

Product features: This welding head has strong advantages in high-reflection material welding and high-power welding applications. It is a cost-effective welding head. The welding head adopts motor-driven X, Y-axis vibrating lens, with multiple swing modes, and swing welding allows workpieces to have irregular welding, larger gaps and other processing parameters, which can significantly improve the welding quality. The internal structure of the welding head is completely sealed, which can prevent the optical part from being polluted by dust. It equips with air curtain parts to reduce the contamination of the lens by welding fumes and spatter residues. The protective glass adopts a drawer structure, which is easy to replace. It can be equipped with various lasers with QBH connectors.

Before operating this laser head, Be sure to read this manual carefully and make sure to understand its contents! Please keep this manual properly for future operation and maintenance.

1. Product description

1.1 Diagram of the product structure



1.2 Main function

1.2.1 Components

QBH

与激光器光纤连接的核心连接器，提供行业标准的光纤接入口。准直件组件 准直镜片装配于激光头内，包含准直镜腔、双凸镜片、垫圈、锁紧弹圈。振镜组件 采用电机驱动 X、Y 轴振镜片，具有多种摆动模式，扩大焊缝的面积，允许工 CCD 组件

提供过滤光源，为 CCD 提供安全、可靠、真实的光源。

分光镜腔座组件 把激光反射

到工件加工表面。聚焦组件

聚焦组件装配于激光头内，包含聚焦镜片组、聚焦镜腔、垫圈、锁紧弹圈和镜片降温的水冷系统。

保护镜组件

使焊渣不能直接飞溅到聚焦镜片上，保护并延长聚焦镜片的使用时间。

气帘组件

将反弹的焊渣吹走，为保护镜提供保护。

1.2.2 设计与功能 本激光头以光纤激光器为光源，在受控距离下在平面机床上对金属进行焊接。 本激光头焊接精准，耐用，便于维护而且易于调整。 所有媒介连接都内置于激光头内！

1.2.3 辅助媒介

保护气体 为保护焊接处不氧化，使焊接处得到良好的保护，所使用的保护气体应具备不 与焊接体发生有害的化学反应的化学特性。

保护气质量必须符合 ISO 8573-1:2010, Class 2.4.3 标准，不可有杂质粒子、水、油。保护气体纯度越高，保护镜片寿命越长。

2 技术参数 最大功率：

4000W准直焦距：

100mm/150mm 聚焦焦距：

200mm/250mm 重　　量：
6.5 kg

可用于锐科，创鑫，光惠，杰普特，相干，IPG，SPI，Rofin，nLight 等各种激 光器。

3. 安装与连接

3.1 安全须知 任何维修或是需要专业知识的事故调查工作必需由受过专业训练的人员进行！ 受训专业人员必需接受过安全培训并了解可能发生的危险和熟悉应对危险的安 全措施。除法律法规规定的安全规定外，生产厂家指明的安全规定也必须得以 遵守。 需在使用前了解的相关安全设备的知识及拥有必要的安全设备。

危险 – 超高气压！ 激光头部分组件的压力最高可达 2.5MPa。 危险 –超高电压！

在设备维护及修理期间，必需关闭电源并防止在此期间被打开。

危险 – 夹手危险！ 设备维修和维护期间，切勿将手或是身体的其他部位置于移动轴的前进 方向或是激光头下!

危险 – 激光！

在机器维护及激光头修理期间，必需关闭电源！工作中，机器可能会生成四级激光！

避免眼睛或是皮肤受到激光的直射或是散射！ 不可直视激光光柱，即使带着视力保护器具！ 请使用符合 DIN EN 207 和 BGV B2 标准的护目镜！

注意 – 高清洁度光学镜片 切勿用裸手接触激光头内的镜片高清洁度区域，镜片上灰尘及附着赃物 可能造成激光镜片的烧焦损坏。 只可在穿戴防护手套时接触镜片的非敏感区域。

3.2 开箱检查

开箱前检查

1.包装箱完好无损；

2.标识牌是否清楚明了，有合格标志，并与贵司采购的规格型号相符；

3.上下两处开口的防撕封条没有破损或被拆开；

4.如与以上不符的，请退回我司。

开箱 1.标识牌指向面为开口所在面；

2.用美工刀轻轻划开封胶带，刀尖切入不能超过 2mm，否则可能伤及本体。

深圳市万顺兴科技产品包装清单

晃动焊接头*1 (配置以业务下单为准)	
ND60 控制箱*1	
开关电源*1	
打标卡 DA 卡连接线 5 米*1	
DC 电源外线束 2 米*1	
电机延长线 5 米*2	
出气棒*2 长度以机型配置为准(同轴不带出气棒)	

开箱后检查

1.箱内有《物料包装清单》一张；

2.按《物料包装清单》清点物料；

3.如有不符合贵司采购要求的，或漏装短装的，请第一时间与我司反馈。

3.3 安装前准备

准备工具

1.公制内六角把手一套；

2.无尘清洁棒一包，无水乙醇一瓶（500ml），无尘手套一包；

3.清洁无尘工作环境；安装人员准备 1.仔细阅读本手册；

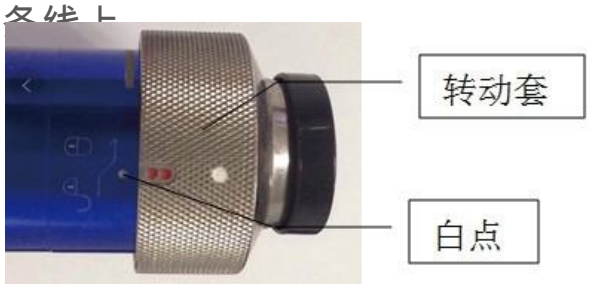
2.先用洗手液洗手干净；

3.戴上无尘手套；

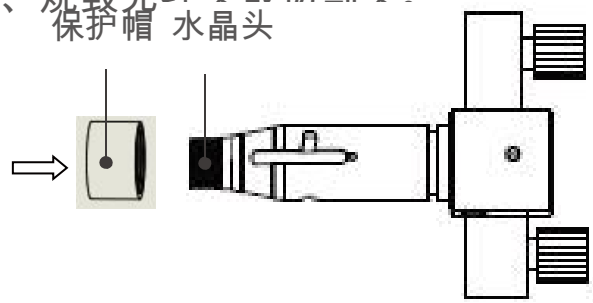
4.必要时戴上口罩。（提示 - 除尘工作至关重要）

3.4 QBH 与光纤连接

第一步：旋转下图所示的转动套前，确认转动套侧面红点与外套白点在一条线上。

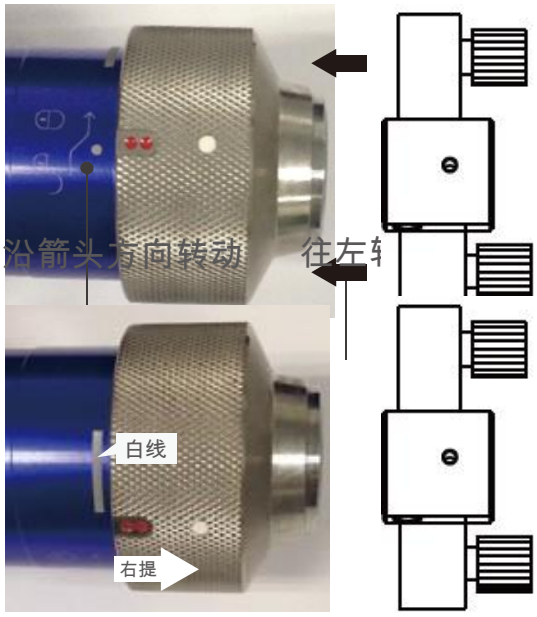


第二步：把光纤棒的防尘盖取下，用无尘清洁棒和无水乙醇清洁光纤棒头部。安装前，必须检查光纤棒水晶头之保护帽是否锁紧，避免保护帽在机器工作时因为松动而影响焊接效果、烧毁光纤头或切割头。

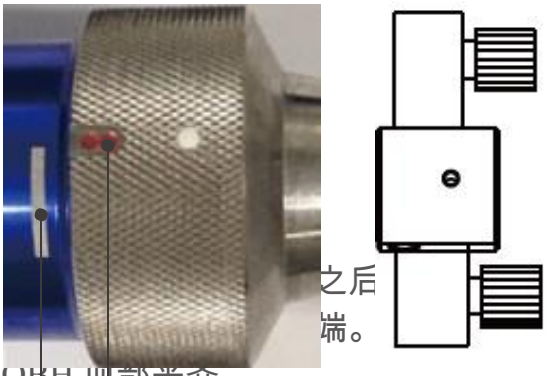


第三步：取下 QBH 的防尘盖，将清洁好的光纤头与 QBH 同轴，并保证 QBH 上的白点与光纤头的定位槽（光纤头上的长槽）在同一直线上，再将光纤头轻轻插入 QBH，直至光纤头与 QBH 两接触面贴合。

第四步：光纤头插入 QBH 后，用手轻压转动套，并沿转动外套上箭头方向 旋动转动套约 15 度。到位后，用手提 起转动套，直至转动套底面基本与 QBH 顶部平齐，再以相同方向旋转转 动套至极限即可。转动力度应适中。



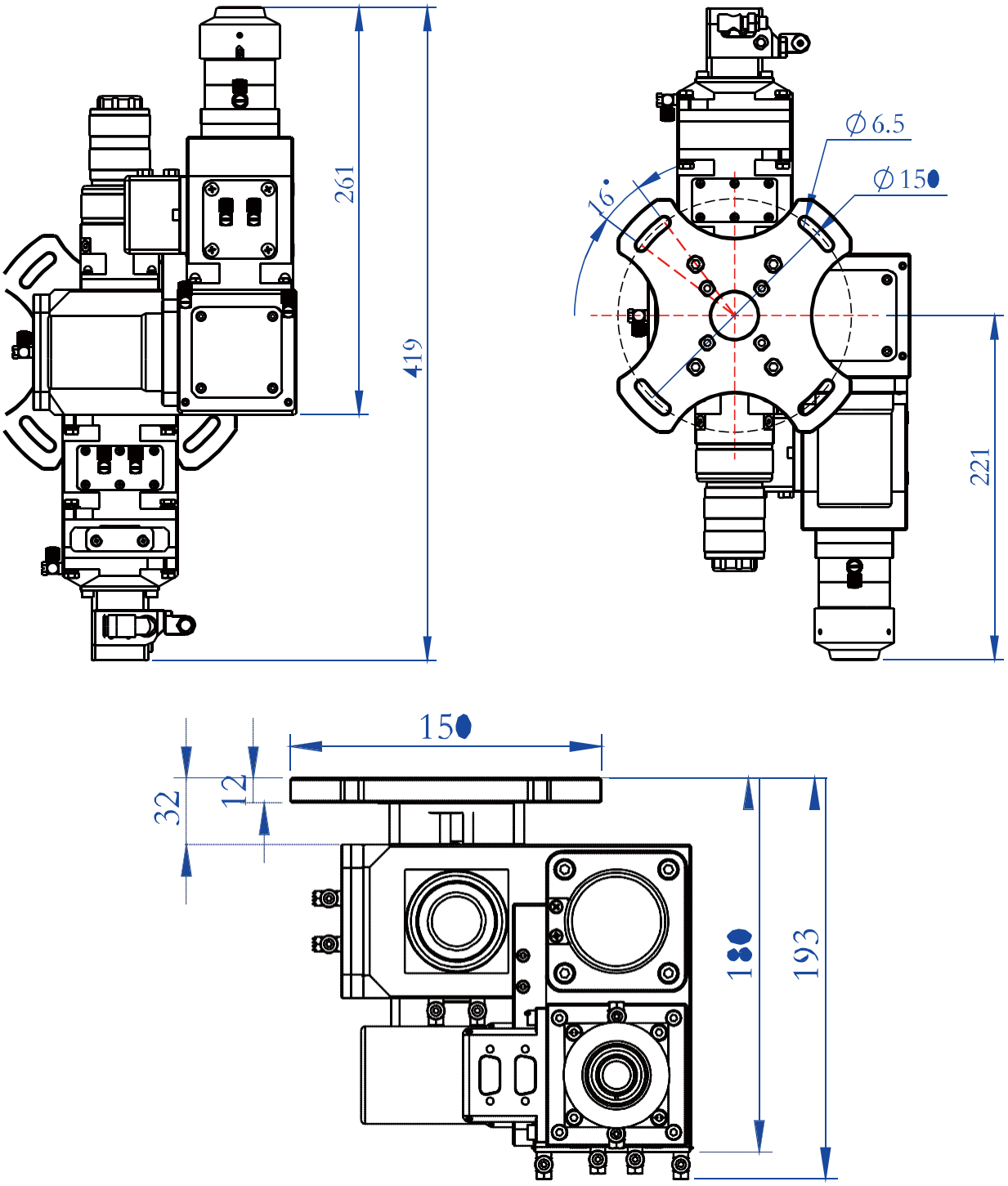
转动套旋转 15 度后，红点位置靠近外套白线，此时应向右提起转动套。



之后 于白线
端。 应与
QBH 顶部平齐。

注：1.插拔光纤头需轻插轻拔；2. 插拔时，要使 QBH 和光纤接头同轴线进出；3.操作过程需尽量保持无尘状态

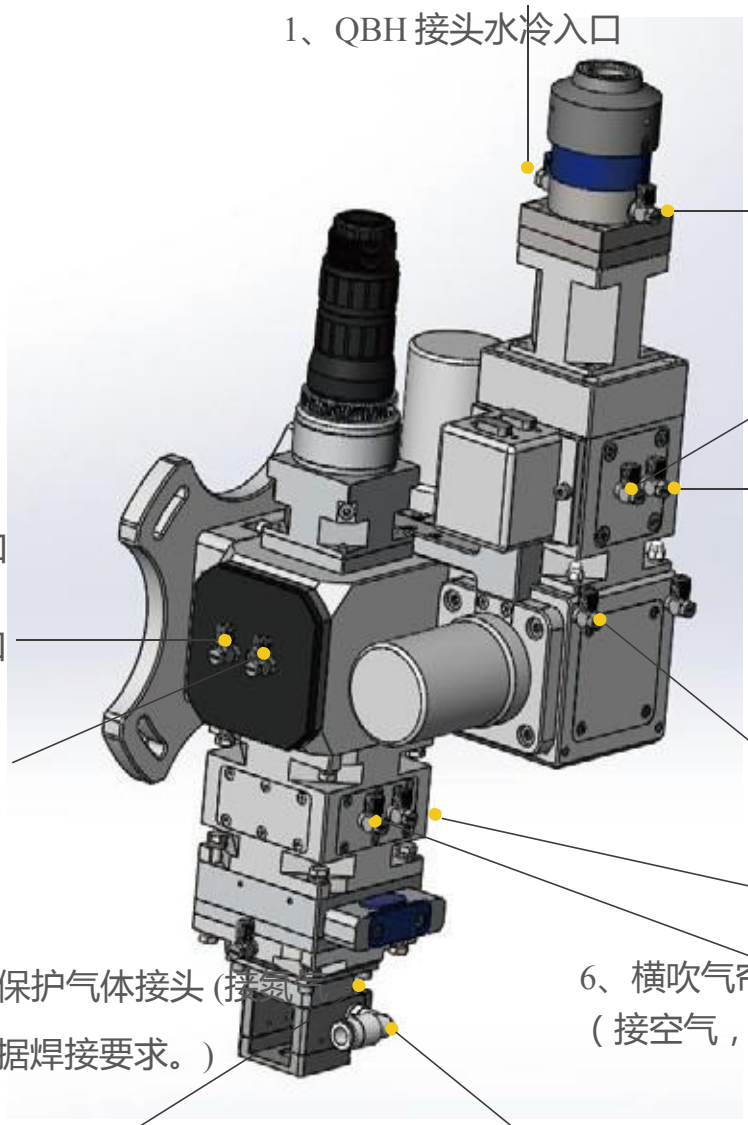
3.5 焊接头的安装及外形图



激光头安装时需牢固可靠 激光头在垂直方向上的角度可根据客户要求自行设置

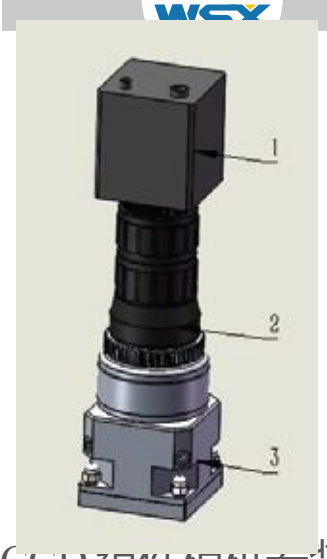
3.6 水气连接

水冷接头&气管接头示意图



注：1~5 为Φ6 水管连接，使用时必须保证水量充足，水压在 0.4MPa 以上；

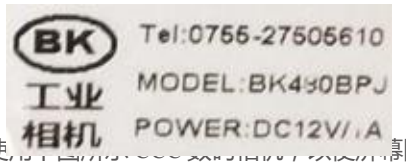
6，7 为Φ8 气管接口； 请保持所连接的管线的折弯半径不小于 30mm。



1、相机

2、CCD 接口（镜头）

3、安装座

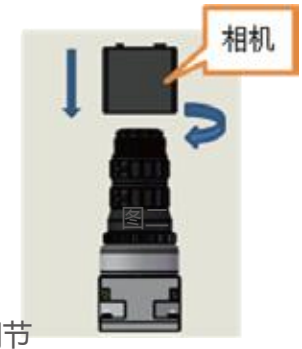


注：建议使用本产品所附 CCD 数码相机，以使屏幕图像更加清晰。

CCD 组件相机安装步骤：

第一步：如下图一所示，把镜头上的保护盖取下。 第二步：如下图二所示，把相机拧紧到取下保护盖的镜头上，使相机和镜 头紧贴（如图三）。 注意：相机拧紧力度适中，避免拧紧力小导致相机松动和拧紧力大损 坏相机 。

图一



图二

图三

4. CCD 清晰度调试

CCD 清晰度调节

目的：为使显示器上图像清晰,需按下列步骤调节。 调节步骤（左图）：

1、将工业相机正确安装到上镜头；

2、拧松光圈环 1 和调焦环 2 上的锁定螺丝；

3、将镜头光圈环 1 调到一定的亮度（在屏幕上清晰看到图像）；

4、通过调节调焦环 2 调整像距，使屏幕上图像清晰；如不清晰再重复上述第 1、2、3 步骤；最后旋紧光圈环和调焦环的锁定螺丝，将光 圈和调焦环锁紧在适当的位置。

注：本焊接头出货时，随机附配有两个规格的铝环（5mm 环，10mm 环），其用途为增减成像像距。当 CCD 调焦范围不够时，用户可根据实际屏幕显示状况加装或卸下铝环，以使屏幕图像更加清晰。）

5 维护

5.1 QBH 与光纤头的保养与维护

注意！需要清洁无尘的工作环境！ 任何装入激光头的激光电路设备必须仔细进行除尘处理！ 如果必须更换镜片组件，则相关工作必须在干净的环境下进行！ 任何装配或是部件更换必须在干净的环境下进行！ 在移除旧的镜片组件前，请准备好新的组件！ 如果没有备用镜片组件，建议向本公司采购！

在条件难达到要求时，建议立即用不粘胶保护膜封住镜片移除后的开口！ 尽量减少激光头通路暴露于空气中的时间以防灰尘和脏污进入！ 任何安全或是保护设备被移除后，必须在设备运行或是调试之前重新装入； 检查并确认该设备运行良好。

QBH 与光纤接头的保养和维护

1、QBH 与光纤接头连接处用不干胶纸包覆，避免灰尘进入间隙，导致保养难度增加； 2、光纤接头冷却水管连接好，不能漏水，如 QBH 意外进水，请立即停止使用，并 返回我司处理。

5.2 聚焦组件的保养与维护

拆卸前及拆卸时，需记住各零组件的相对位置顺序，以方便在聚焦镜片保养后将各

聚焦镜片的拆卸和安装，拆卸聚焦镜组件流程： 1、用开口扳手拆下用于固定聚焦组件等的 2 个外六角螺丝 2

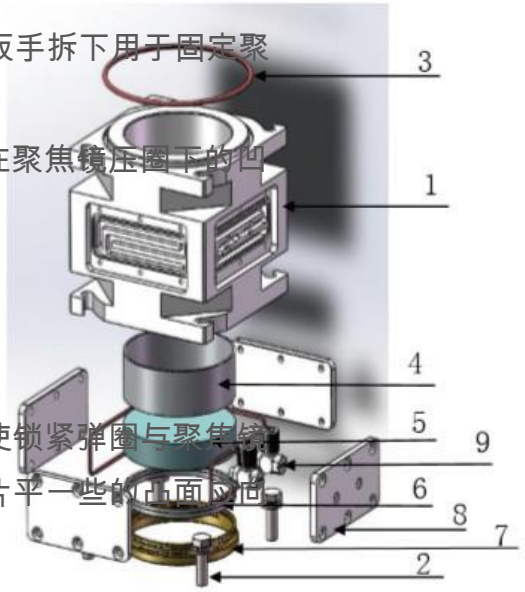
，松动另外 2 个，旋转并取下聚焦组件； 2、用专用工具卡在聚焦镜压圈下的凹槽，拧开用于固 定聚 焦镜的聚焦镜压圈 7；

3、取下聚焦镜垫圈 4；

4、对聚焦镜片进行保养或更换。

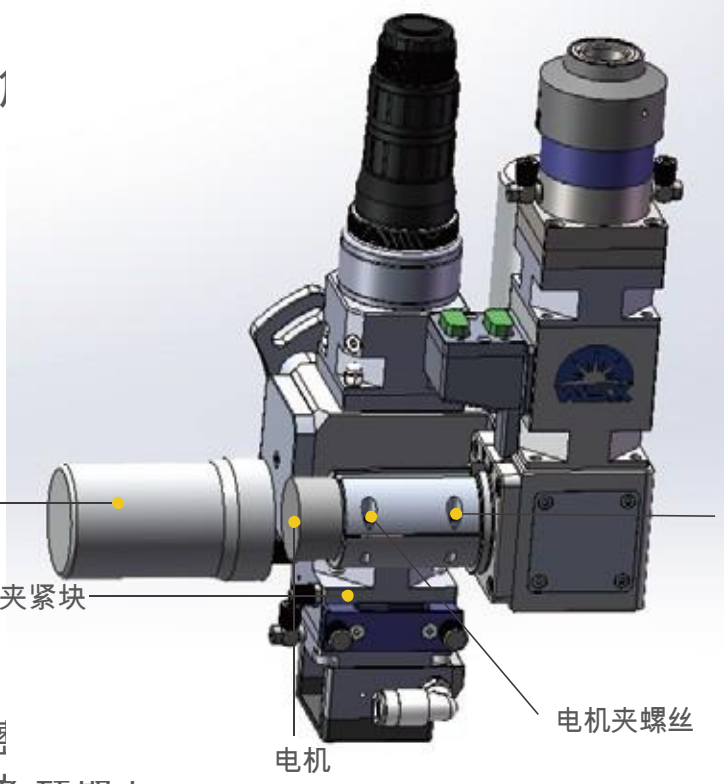
5、聚焦镜片及组件之安装按照上述过程逆向进行；

6、 安装聚焦镜片时, 当锁紧弹圈扭到底后, 需回扭 1/5 圈， 使锁紧弹圈与聚焦镜片之间保持 0.1~0.15 的间隙； 7、安装聚焦镜片时，聚焦镜片平一些的一面应面下



1、聚焦镜腔座 2、外六角螺丝 3、O型圈 4、聚焦镜垫圈 5、聚焦镜 6、垫圈 7、聚焦镜压圈 8、水冷盖板 9、水管弯接头

5.3 反射镜片



反射镜片角度调

1、将电机护罩旋转取下；

2、用内六角扳手将螺丝松动，使电机夹紧块可转动；

3、旋转电机，微调反射角度，使光斑显示在正中心，更直观查看焊接动态效果。

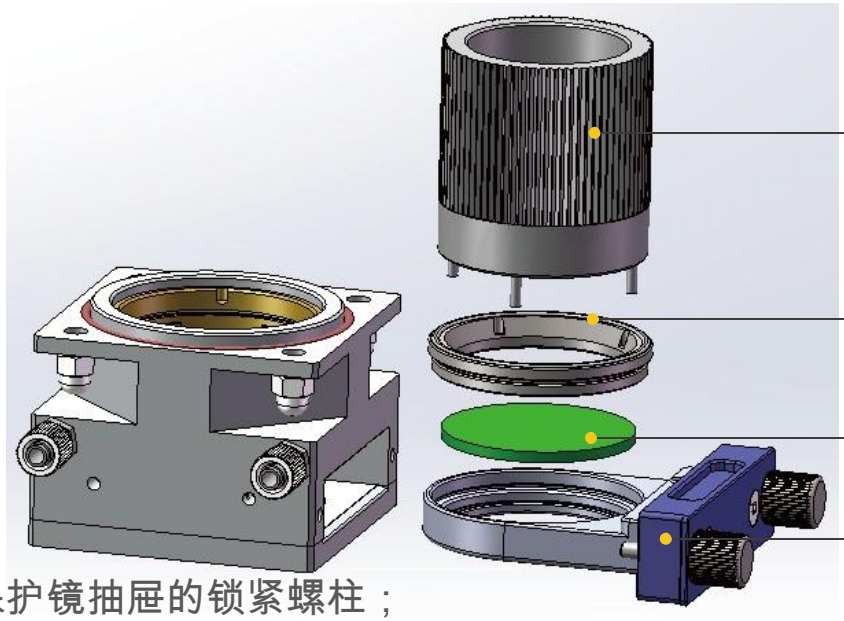
6．保护镜片的清洁与安装

1、用无尘清洁棒蘸取异丙醇溶剂，清洁镜片，

2、然后用皮老虎吸取干净空气吹掉附着的粒子等异物；

3、重复多次，直到镜片干净；

4、如果保护镜片已经不可能清洗干净或是受损，则必须更换新镜片。



1、扭松 2 个保护镜抽屉的锁紧螺柱；

2、注意：迅速用不粘胶保护膜封住镜片移除后的开口；

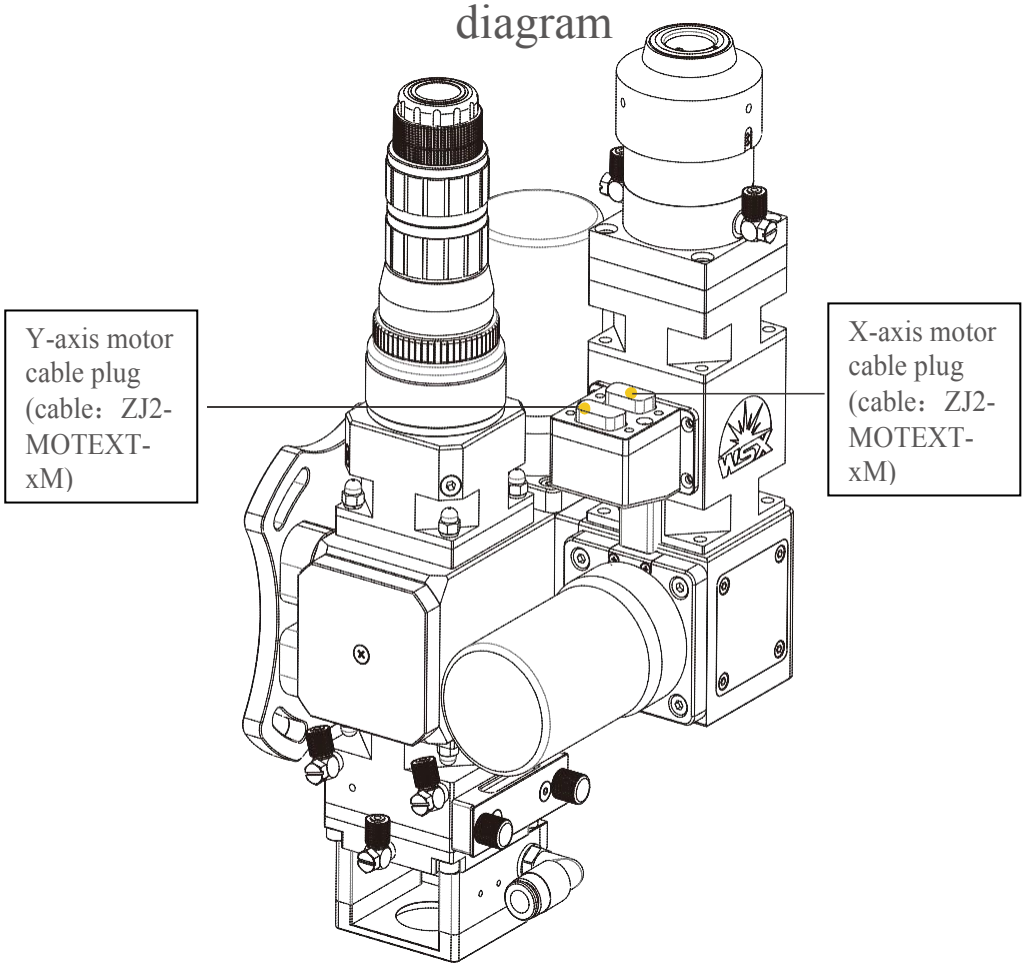
3、将保护镜抽屉（包含保护镜片）放在清洁的环境保养；

4、用专用夹具把镜片锁紧环取下。

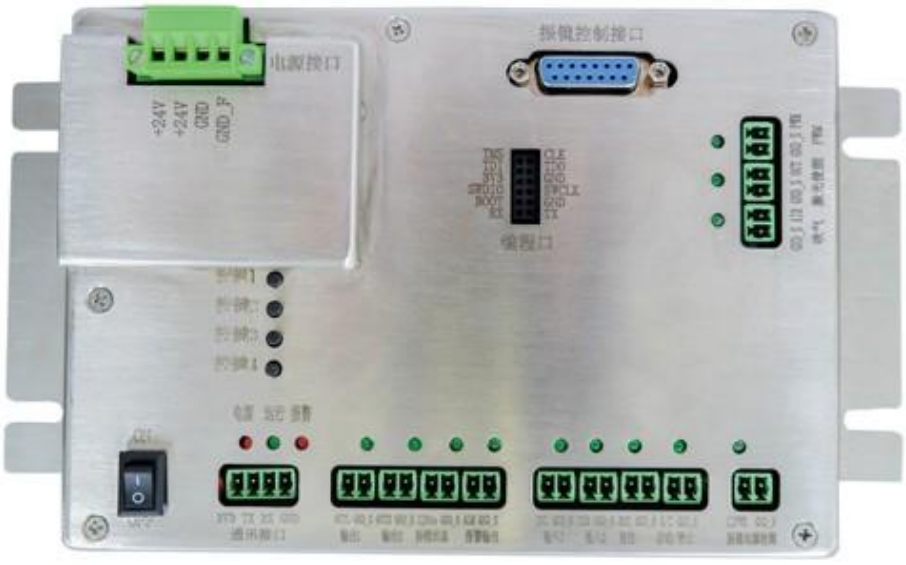
5、撕掉保护镜片的保护膜，将保养好的保护镜片放入抽屉组件内并锁紧，然后 整个抽屉组件平插入聚焦组件内锁紧； 6、注意：保护镜抽屉的方向，如果方向弄反，将不能插入；

electrical Instructions

diagram



WARNING! Be sure to ground before powering on!

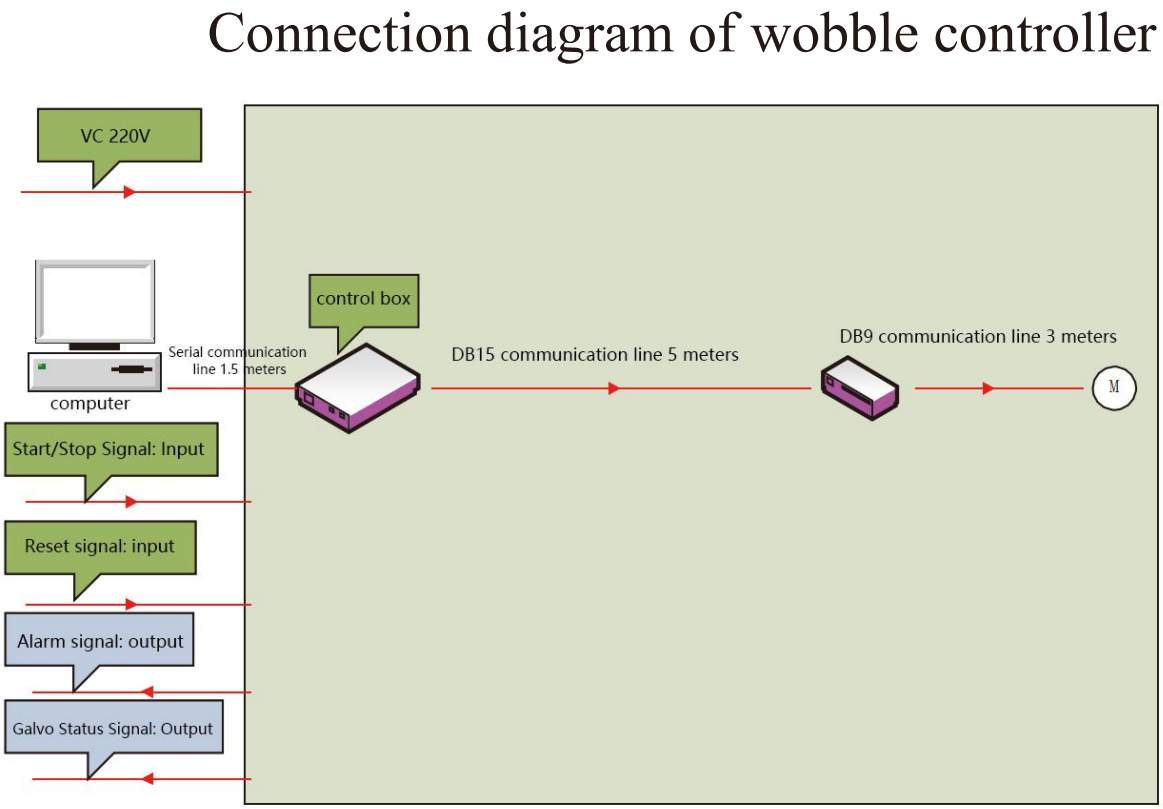


1.Hardware overview

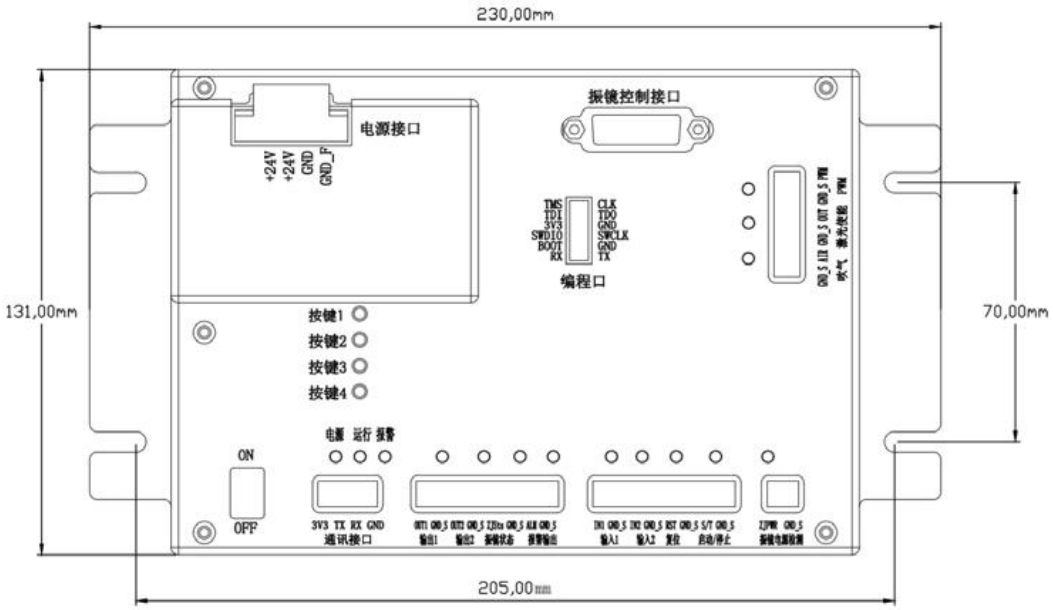
1.1 part list

Wobble controller(WSX-SGLZJ-XT01)				
No.	Item	qty	Signal definition	Specifications
1	Wobble controller	1		
2	Wobble controller cable	1	24V/GND/GND-S	0.75 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, the signal wire end sleeve is marked with sleeve
3	The 8-pin control signal cable	1	1.Start / Stop 2.Reset 3.GND 4.Alarm 5.control state 6.GND 7.Galvo state 8.GND	TRVVP high-flexibility shielded drag chain cable 8-core 0.3 square flexible wire, one end with screwless spring-type PCB terminal block KF2EDGKD(M)-2P 3.81MM, signal cable end head cover sleeve marking sleeve
4	USB to TTL level serial cable	1	1.TX 2.RX 3.GND	USB to TTL level 3.3V, length: 2.0 meters

1.2 connection



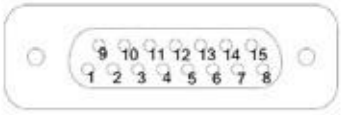
1.3 Structure and size



1.4 port definition

Galvo interface (1 circuit in total)

15pin definition as follows：



CLK+	1	9	CLK-
Sync+	2	10	Sync-
X-CH-	3	11	X-CH+
Y-CH+	4	12	Y-CH-
ZJ_Power	5	13	GND_S
ZJ-INA	6	14	GND_S
ZJ-INB	7	15	GND_S
ZJ_Power_GND	8		

clk+/-:Clock of the galvo signal

Sync+/-:Synchronization of the galvo signal

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

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

ZJ_Power：Power detection input pin of the galvo drive

ZJ-INX：Galvo X-axis motor working status detection input pin

ZJ-INY：Galvo Y-axis motor working status detection input pin

ZJ_Power_GND：Galvo drive power GND

Power interface

1	2	3	4
GND-FG	GND_24V	24V	24V

Indicator

Indicator	function
power	This light is always on when the 24V power supply is normal
Running	This light will flash when there is port output, otherwise it is always on when power on.
Alarm	This light will be on when the control card system detects an abnormal stop of the output; abnormal conditions Yes: 1. There is no power supply to the motor driver, 2. The motor is running abnormally.
Output 4	reserved
Output 3	reserved
Galvo output state	Lights up when the galvo vibrates

Alarm status	light will be on when alarm
Input 4	reserved
Input 3	reserved
Reset state	Lights up when reset
Running control state	Lights up when the start vibration signal is valid
Motor drive power	（Reserved function）
PWM	reserved
Enable	reserved
Gas	reserved

Output control port

Alarm output	When there is an alarm, this port outputs a low level. High level is 24V
GND_S	Grounding
Galvo running state output	When the galvo is output, this port outputs a low level. High level is 24V
GND_S	Grounding
Output 1/2	Reserved
GND_S	Grounding

Input control port

Start / Stop	This port is connected to a low level to enable the output of all ports. High level is 24V
GND_S	Grounding
Reset	When this port is connected to low level, the system resets the parameters of all ports to factory settings, the graph is a circle, and the radius is 3mm. High level is 24V.
GND_S	Grounding
Input 1/2	Reserved
GND_S	Grounding

Laser control port

PWM	Reserved
Enable	
Output control	

Serial port

power	reserved
RX	receive
TX	transmit
GND	grounding

Note: Please refer to the software interface for details. User can set the parameters of a single port on the host computer, and can also control the on and off of a single port to switch between different ports.

Button

Speed composite	1: Press the +/- buttons at the same time to control the signal output of the galvanometer port on or off. 2: Press and hold button 1 first, then press button +/- to increase/decrease the port's swing speed, and each time you press the button, increase/decrease by one unit; 3: Press and hold button 2 first , and then press the button +/- to increase/decrease the size of the graphics output by the port. Each time you press the button 1, it increases/decreases by one unit;
Output graphics switching	
“+”	
“-”	

2、Quick guide

2.1 Features

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

2.2 Install the software

2.2.1 Serial port drive installation mode

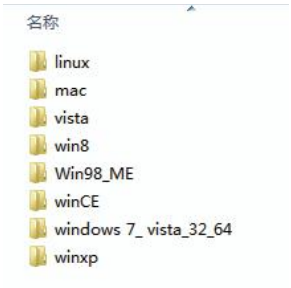
Select the "Computer" icon on the desktop of the computer you are using, right-click, select "Properties" in the pop-up menu, click Properties, the pop-up menu will appear in the red box as shown in the figure below. Select the corresponding installation package to install, as shown in the figure below, the computer is win7 64-bit system:

2.Turn off the anti-virus software;

3.Change the directory to: ..\galvo controller software V21_serial port driver\galvanometer host computer serial port driver

4.Decompress .NET_Framework4.5.zip, enter the decompression directory, double-click . NET_Framework4.5, enter the installation, until the installation is complete.

Change the directory to: ..\V21_serial port driver of the host computer of the galvanometer controller\serial port driver of the galvanometer host computer\PL2303HX Select windows7_vista_32_64), enter the corresponding directory, double-click to execute the program, and enter the installation until the installation is completed. :

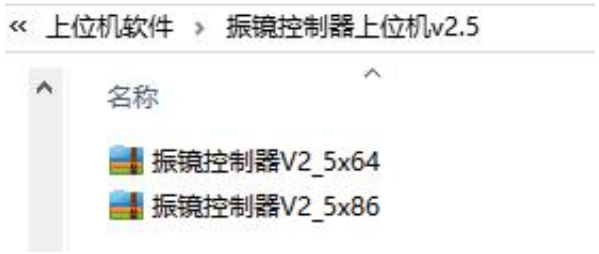


5.Connect a serial cable between the computer USB port and the control board, and the control board is connected as follows:

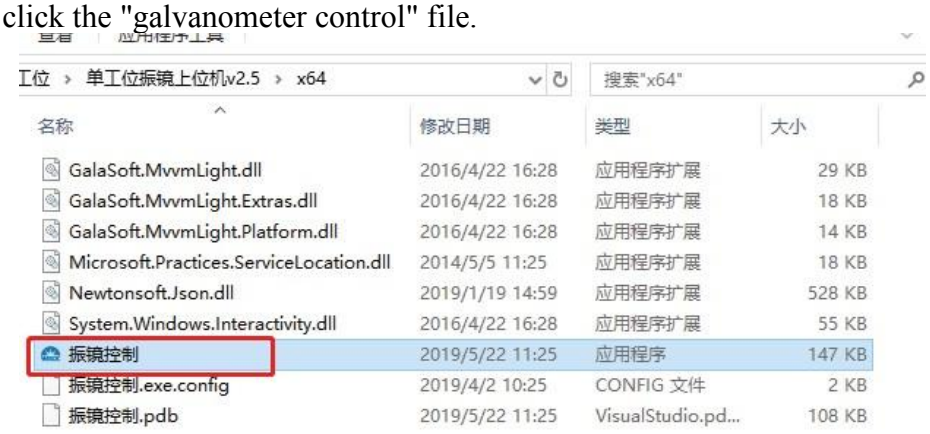
6.The directory is switched to: ..\V21_serial port driver for the host computer software of the galvanometer controller, according to the computer system confirmed in step 1, select the corresponding host computer software (as shown in the figure below):

A. Galvo controller V2_x64 can be used in 64-bit computer system;

B. Galvo controller V2_x86 can be used for 32-bit computer system;



Unzip the corresponding compressed package, switch the directory to the pressurized folder, and double-click the "galvanometer control" file.



7. 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 and so on. If the connection is unsuccessful, there will be no specific com number displayed here.

2.3

2.3.1 UI

Click the advanced parameters, enter the login interface, and enter the advanced parameter setting interface after login

Note: Advanced parameter password: 27702280, parameter range setting password: 27702280

2.3.2 Operation overview

serial number：	Display serial number	Connect the device	Link with the control card through a host computer
Output port	Displays the currently used output ports		
Shape	Select the shape of the wobble figure	Galvo on	Turn on the galvo
Direction	Select the direction of the wobble figure		
Angle of rotation	Select the angle	Read the parameters	Read the parameters for the current device
Motion speed	Set the galvo wobble speed		
X-axis compression ratio	Adjust the compression ratio of the X-axis	Set up parameters	Import the set parameters to the current device
Y-axis compression ratio	Adjust the compression ratio of the Y-axis		
Trapezoid correction ratio	Adjust the trapezoid correction ratio	Import parameters	Import the file parameters into the software
Rhomboid correction ratio	Adjust the rhomboid correction ratio		
Length	Set the length of the wobble figure	Export parameters	Export the software-set files to a folder
Width	Set the width of the wobble figure		
Advanced parameters	Set the advanced parameters for the system	Parameter range settings	Set the maximum speed and swing range

3、Appendix

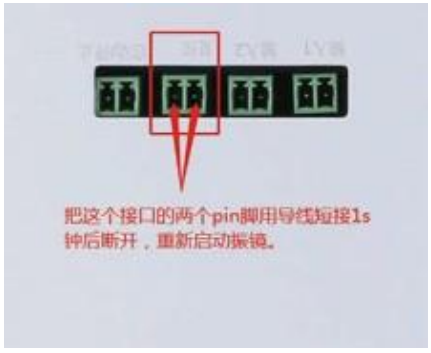
3.1 Troubleshoot

If a certain output port has no graphic output

Solution:

A，Connect the serial port tool, open the host computer software, switch the output port to the problematic port, and confirm that the motion speed and the diameter of the corresponding graphics cannot be zero.

B. Short-circuit the two pins of the reset port with wires for 1 second, then disconnect, and restart the galvanometer output to confirm.



After the above two countermeasures have been tried, if the problem is not solved, then please confirm whether it is a hardware problem.

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深圳市万顺兴科技有限公司
电话：400-836-8816
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地址：广东省深圳市龙华新区大浪街道浪口工业园青年梦工厂 3