WSX Laser Drives the Future

ND27/ND31/ND65

User Manual

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www.wsxlaser.com

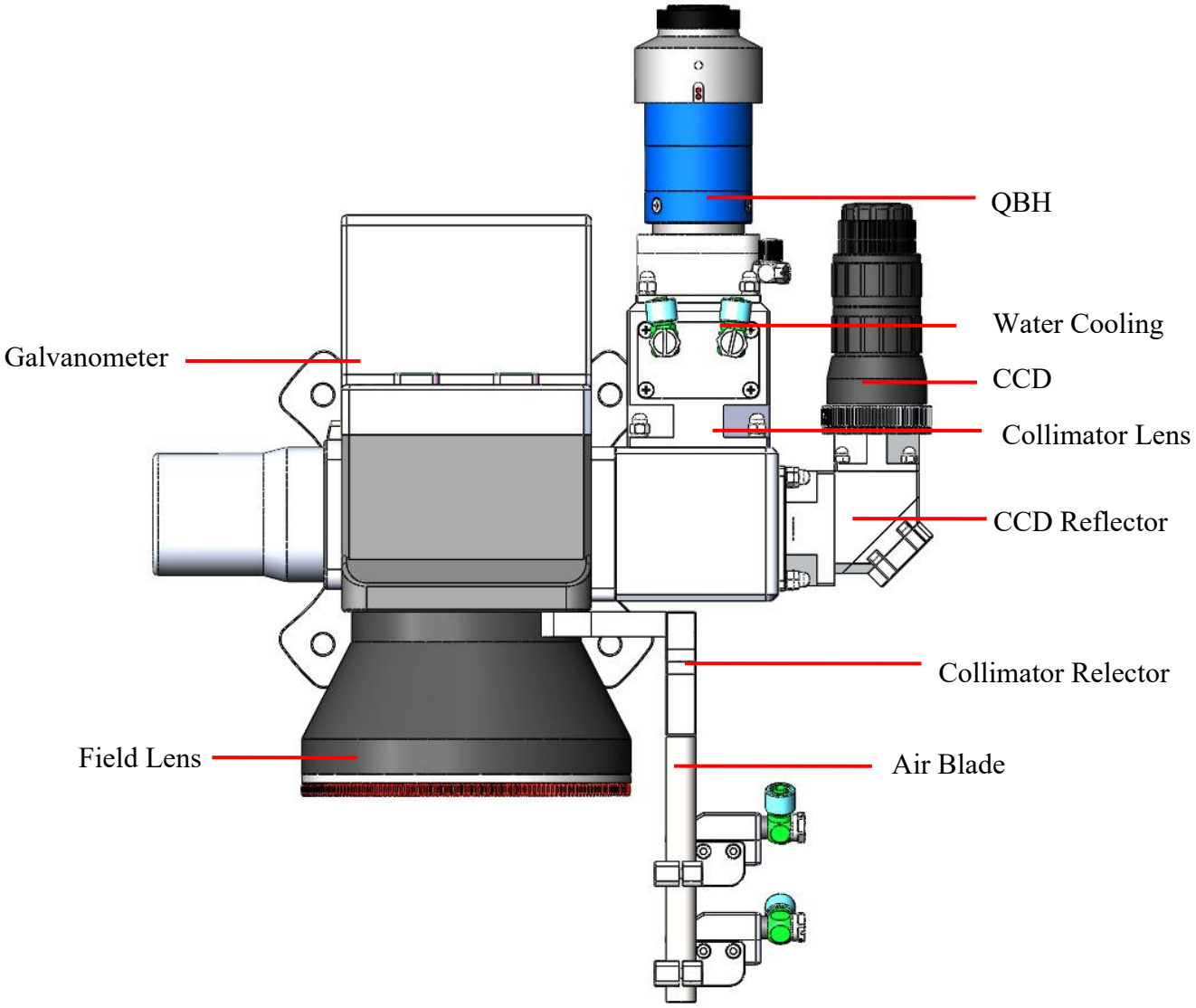
Contents

Please read this manual carefully and make sure you understand its contents before using the laser head.

1. Product Description

1.1. Product Structure

ND27 Galvanometer Welding Head



Note：

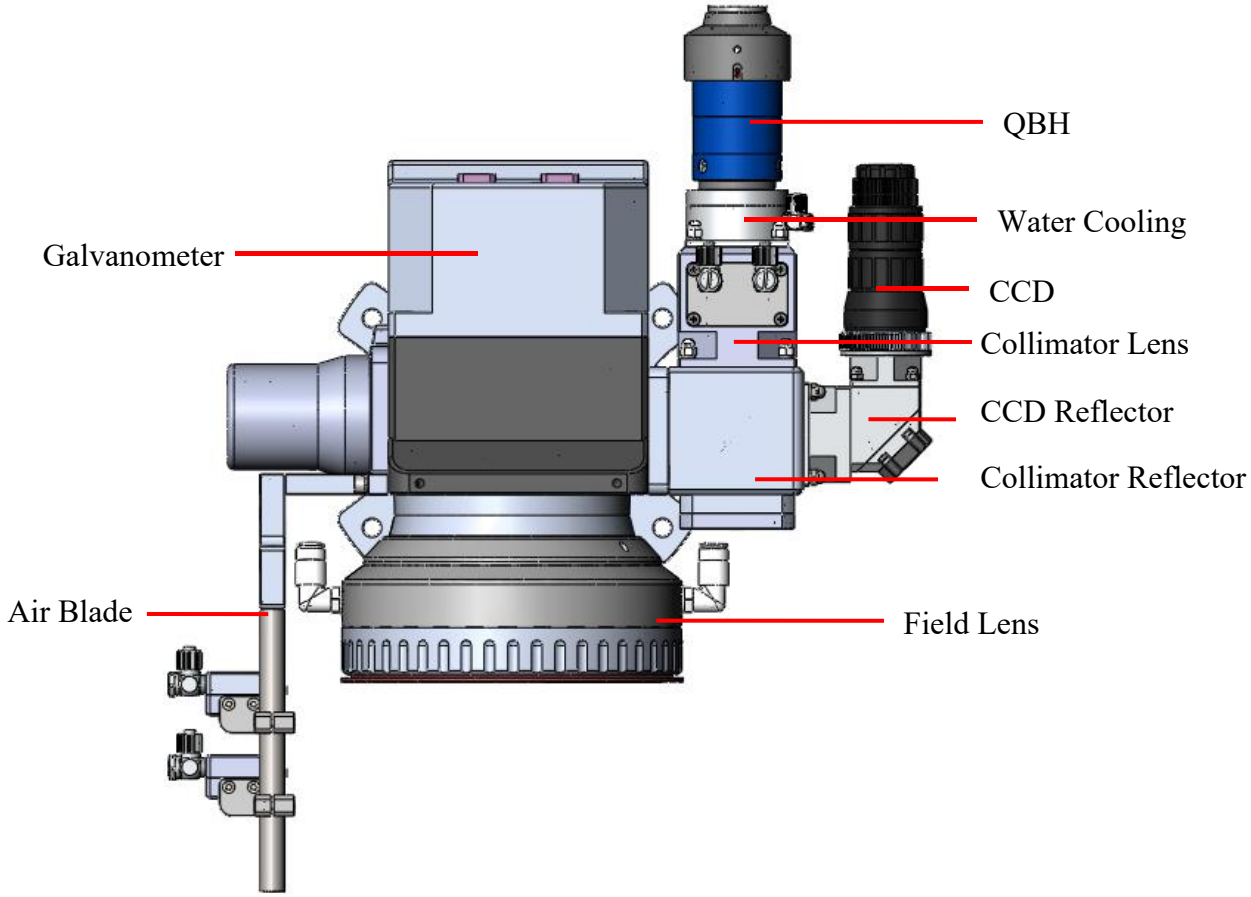
1.Water pipe connection, the water must be sufficient when using, and the water pressure is above 0.4MPa；

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

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.

ND31 Galvanometer Welding Head



Note：

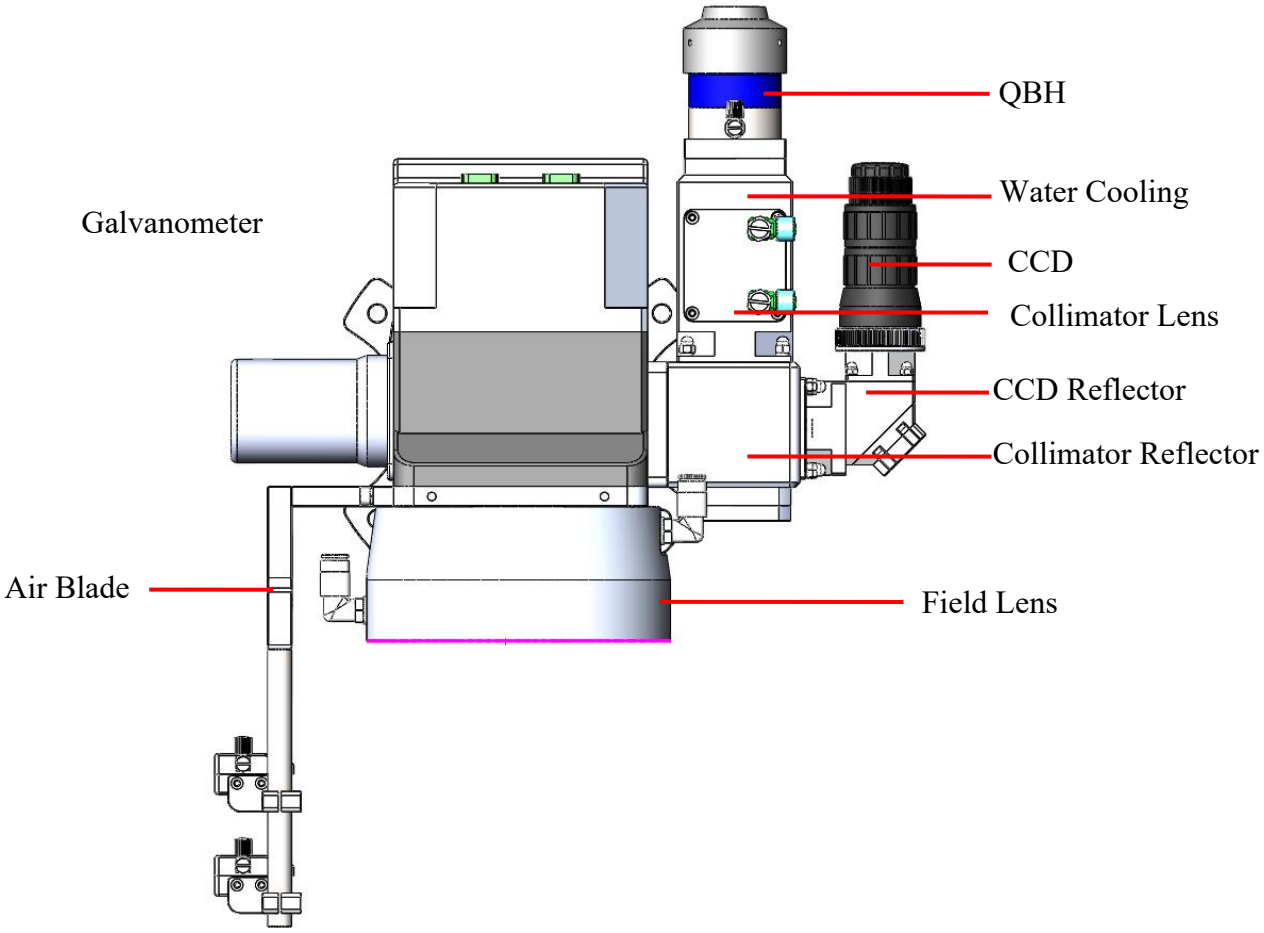
1.Water pipe connection, the water must be sufficient when using, and the water pressure is above 0.4MPa；

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

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.

ND65 Galvanometer Welding Head



Note：

1.1.Water pipe connection, the water must be sufficient when using, and the water pressure is above 0.4MPa；

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

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.

1.2. Main function

1、Compact structure, higher efficiency in welding of medium and thick plates;
2、It has the advantages of fast welding speed and high precision, and high production efficiency in multi-point welding;
3、The water-cooled design of collimating and galvanometer lens ensures long-term efficient and stable work of welding head;
4、The laser head uses a motor to drive the X and Y-axis galvanometer lenses, and is focused by the F-THETA focusing lens group. It has a variety of swing modes, which can significantly improve the welding quality;
5、Equipped with air curtain components to reduce the contamination of the lens by welding fumes and splash residues.

2. Technical parameter

Model No.	Wavelength	Connector	Collimating length	Field lens focal length	Peak power	Scan range
ND27	1064±20	QBH	100/150	F254	2000W	150*150
ND31	1064±20	QBH	100/150	F400	4000W	180*180
ND65	1064±20	QBH	F100	F350	6000W	210*210

*The above parameter list is for general configuration only for reference. For other information, please consult supplier technicians.

3. Installation and connection

3.1. Safety 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 - 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.

3.2. 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.

3.3. Packing list

No.	Item	Specification/ model	Qty.	Note
1	Galvanometer welding head	ND27/ND31/ND65	1	Air blade (1pcs) separately
2	Switching power supply	±24V,4A	1	
3	ND60 control box	ND60-KZX-07T	1	
4	Switching power supply	±24V,4A	1	
5	Marking card DA card connecting cable 5 meters (with screws)	ZJ2-PCIE&DA-5MT1	1	
6	DC power supply external wiring harness 2 meters	ZJ2-DCPOWER-2m	1	
7	Motor extension cable 5 meters (with double magnetic ring)	ZJ2-MOTEXT-5M	2	
8	White light	NS-SX9W	1	
9	Display	DVS-CM700-CA	1	
10	CCD camera (movable cross)	BK480BPJ-M(black)	1	

11	PCIE Card	PCIE	1	Golden Orange Marking Card Packaging Box
12	15 Core pin/shell		1	
13	15 Core pin/shell		1	
14	25 Core pin/shell		1	
15	Galvanometer, IO signal connection line		1	
16	Encrypted cable		1	
17	CD		1	

3.4. Preparation for Installation

3.4.1. 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.

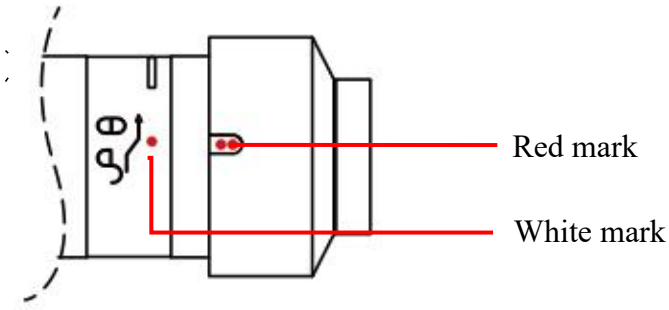
3.4.2. Preparation of installation personnel

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).

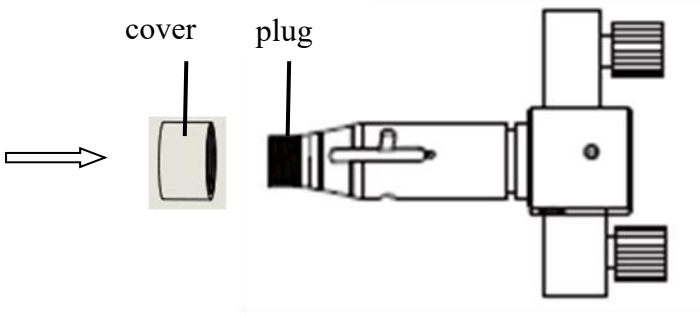
Pay attention to dust: When replacing the lens, it is very important to operate in a clean environment.

3.5. QBH and Fiber Connection

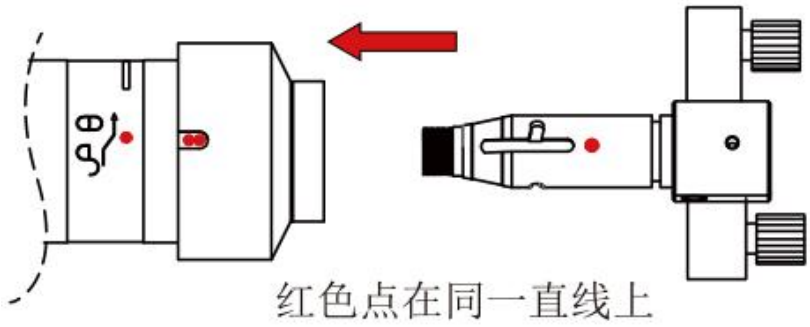
Step one：Before turning the rim as below, make sure the red marks are aligned to the white marks.



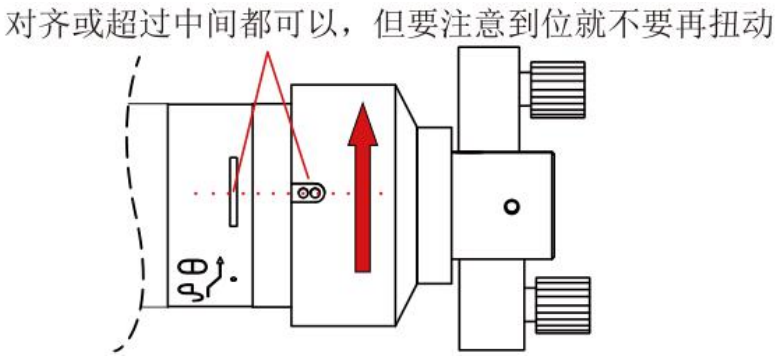
Step two：Remove the dust cover of fiber rod, clean the fiber rod with anhydrous ethanol. Before installing, check the protective cover of fiber plug to see if it is locked, avoid the cover from loosening and effecting the welding performance or burning the fiber and welding head.



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.



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.

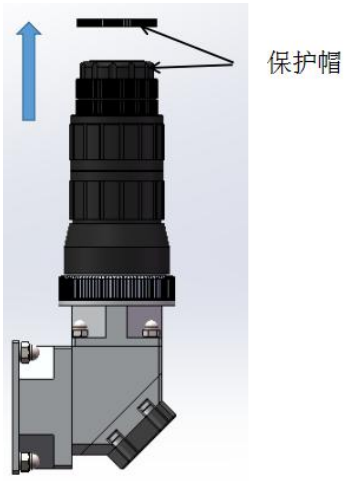
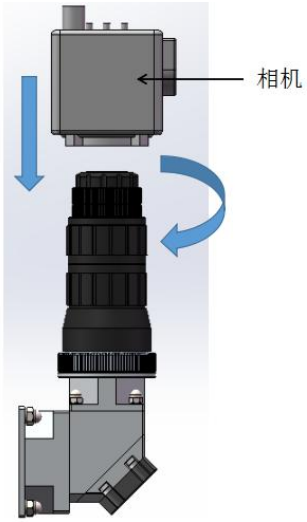
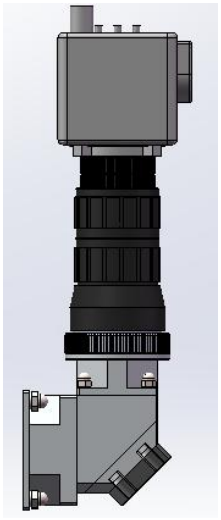
4. Cover the connection between QBH and optical fiber connector with self-adhesive paper to prevent dust from entering, which will increase the difficulty of maintenance;

5. The cooling water pipe of the optical fiber connector should be connected well and no water leaks. If water accidentally enters the QBH, please stop using it immediately.

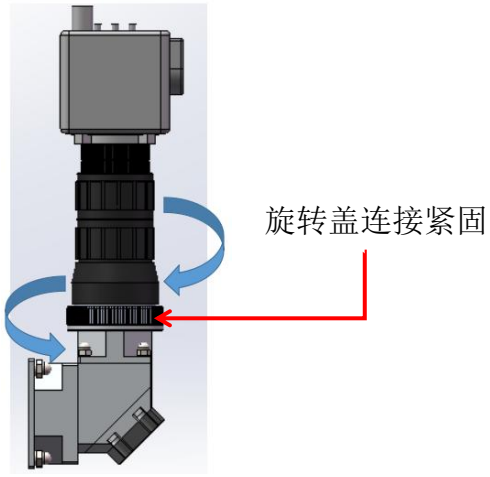
3.6. CCD相机安装步骤

第一步：如下图一所示，把镜头上的保护帽取下。

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！**

		
图示 1：取下保护帽	图示 2	图示 3

3.7. CCD工业接口清晰度调节

相机角度调整： 如果相机拧紧后和安装座有一个角度，拧松右图的压紧盖，再顺时针转动镜头下部，使得相机其中一个垂直方向的平面与安装座平行。（如右图所示）	

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（右图）：

1 、将工业相机正确安装到上镜头；

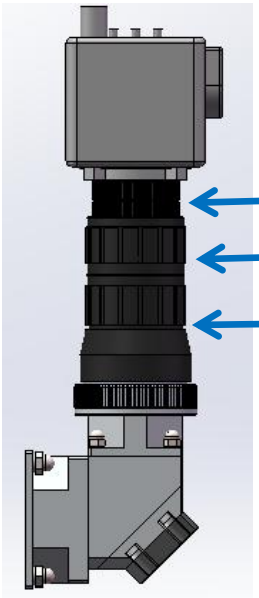
2 、拧松调焦环1和调光环2上的锁定螺丝；

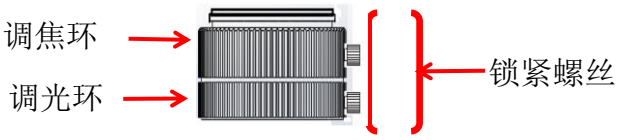
3 、将镜头调光环2调到一定的亮度（在屏幕上清晰看到图像）；

4 、通过调节调焦环1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。）





3.8. CCD图像与激光中心重合调节

在工作的过程中，CCD图像中心（十字架交叉点）必须与激光中心重合。调节方法如下：

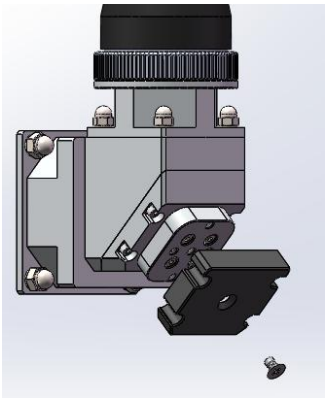
如上图所示，屏幕上CCD十字架交叉点在激光中心的左上方，可用左图中安装座上的四角位上的A、B、C、D四颗调节螺丝进行调整。

●用六角扳手将D螺丝适当松开，为CCD向右向下移动腾出空间；

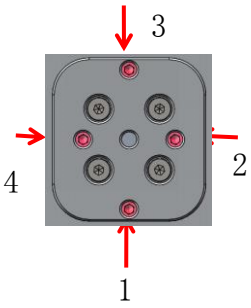
●用六角扳手将A螺丝紧拧，迫使CCD向右向下移动，直至CCD十字架交叉点与激光中心重合；

●如上述两部未能将CCD十字架交叉点调整到激光中心点或CCD十字架交叉点移动到激光中心位置下方，则用六角扳手将B螺丝适当松开，为CCD十

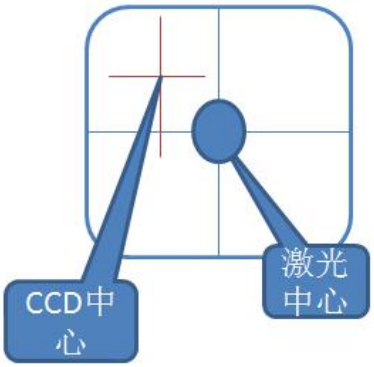
调节步骤说明



1、松开M3螺丝，取出盖子



2、把图示4颗螺丝松开，调节

字架交叉点向右向上移动腾出空间，再用六角扳手将C螺丝拧紧，迫使CCD十字架交叉点向右向上移动，直至CCD十字架交叉点与激光中心重合。 ●当CCD十字架交叉点偏离于激光中心的其他位置时，可仿照上述方法用六角扳手通过先松开对角螺丝，再紧拧调节螺丝将CCD十字架交叉点做相应调整。	 中心点位置

4. 维护

4.1. QBH与光纤接头的保养和维护

1、需要清洁无尘的工作环境！

2、任何装入激光头的激光电路设备必须仔细进行除尘处理！

3、任何装配或是部件更换必须在干净的环境下进行！

4、在移除旧的镜片组件前，请准备好新的组件！

5、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！

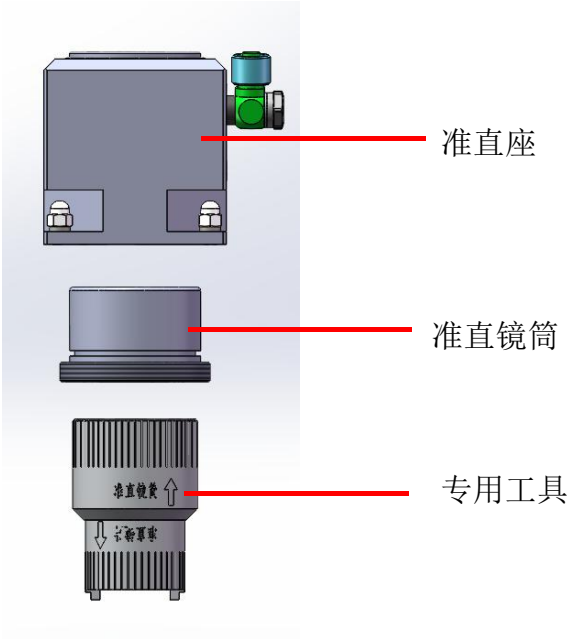
6、任何安全或是保护设备被移除后，必须在设备运行或是调试之前重新装入！

检查并确认该设备运行良好！

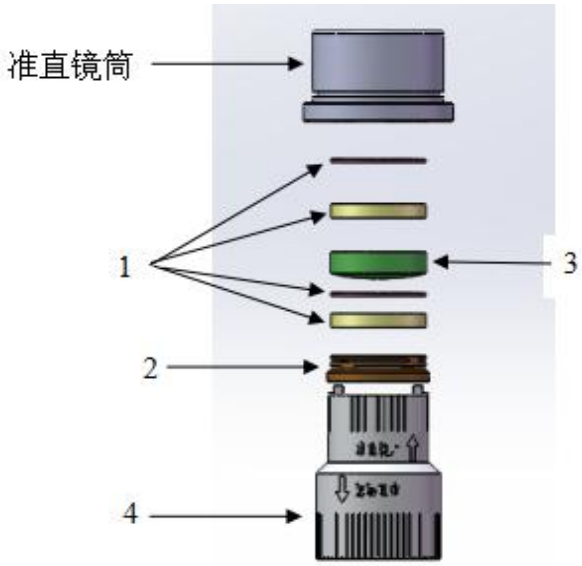
7、QBH与光纤接头连接处用不干胶纸包覆，避免灰尘进入，导致保养难度增加。

8、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，并联系我司处理。

4.2. 准直镜片的更换



步骤一：先把激光头表面用无水乙醇擦干净，然后把准直座四个螺帽松开，分离整个准直组件，再用专用工具把准直镜筒从准直座里旋出。



示意图中数字代码说明：

1、垫圈　　2、弹簧压圈

3、准直镜片　　4、专用工具

步骤二：

1. 用专用工具4拧动弹簧压圈2，直到弹簧压圈螺牙完全脱开为止。

2. 将拧松弹簧压圈2后的整个准直镜筒朝下倒扣在干净的平面上（在此过程中弹簧压圈2要保持在准直镜筒内），准直镜筒向上轻轻抽出，注意不要让准直镜片3掉落。（**注：记录拆卸前的物料顺序**）

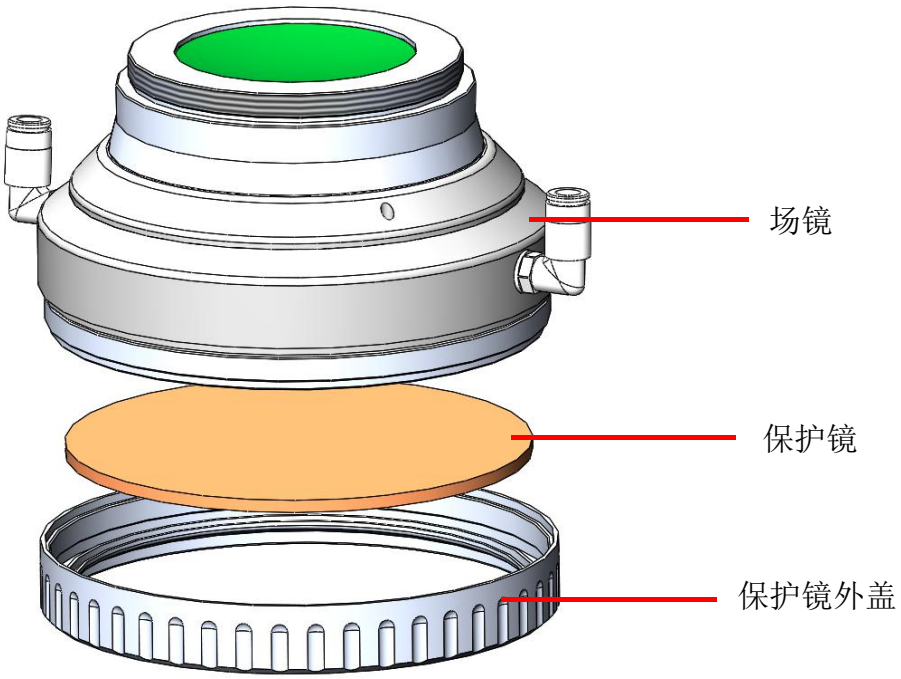
3. 取走准直镜片3上放的垫圈1后把镜片取下，然后就可以更换或保养镜片。

4. 保养或更换好镜片后，请按拆卸时的顺序逆向安装，锁紧弹簧压圈2时力度要轻，以免损坏镜片。

5. 弹簧压圈2拧到底之后，请往回退1/5圈，保证弹簧压圈2有间隙（0.1~0.15mm）。

4.3. 场镜保护镜片的更换

4.3.1 以F400场镜保护镜为例，如下图：



先将保护镜外盖旋开，再将新保护镜更换在原先的位置，再按照拆卸的步骤进行倒序复原。其他场镜保护镜的更换方法如上图所示，将不再赘述。如有其他疑问，请联系我司。

（注：在拆卸或者安装的过程中，请注意保护镜切勿掉落）

4.4. 焊接头定期维护注意事项

1. 检查保护镜片有无污染，如有污染及时更换（每日检查）；

2. 定期检查QBH接头是否松动（每3日检查）；

3. 连接线不能有水进入，注意保护接口部分；振镜异常时查看接口（如航空插头）里是否有水珠。

5. 电气

为了您的人身安全及使用产品的安全性，请注意：

1. 认真阅读本说明书。　　2. 电气接线正确。

3. 安装滤波和稳压电路。　　4. 接地良好。

5. 软件参数设置正确。

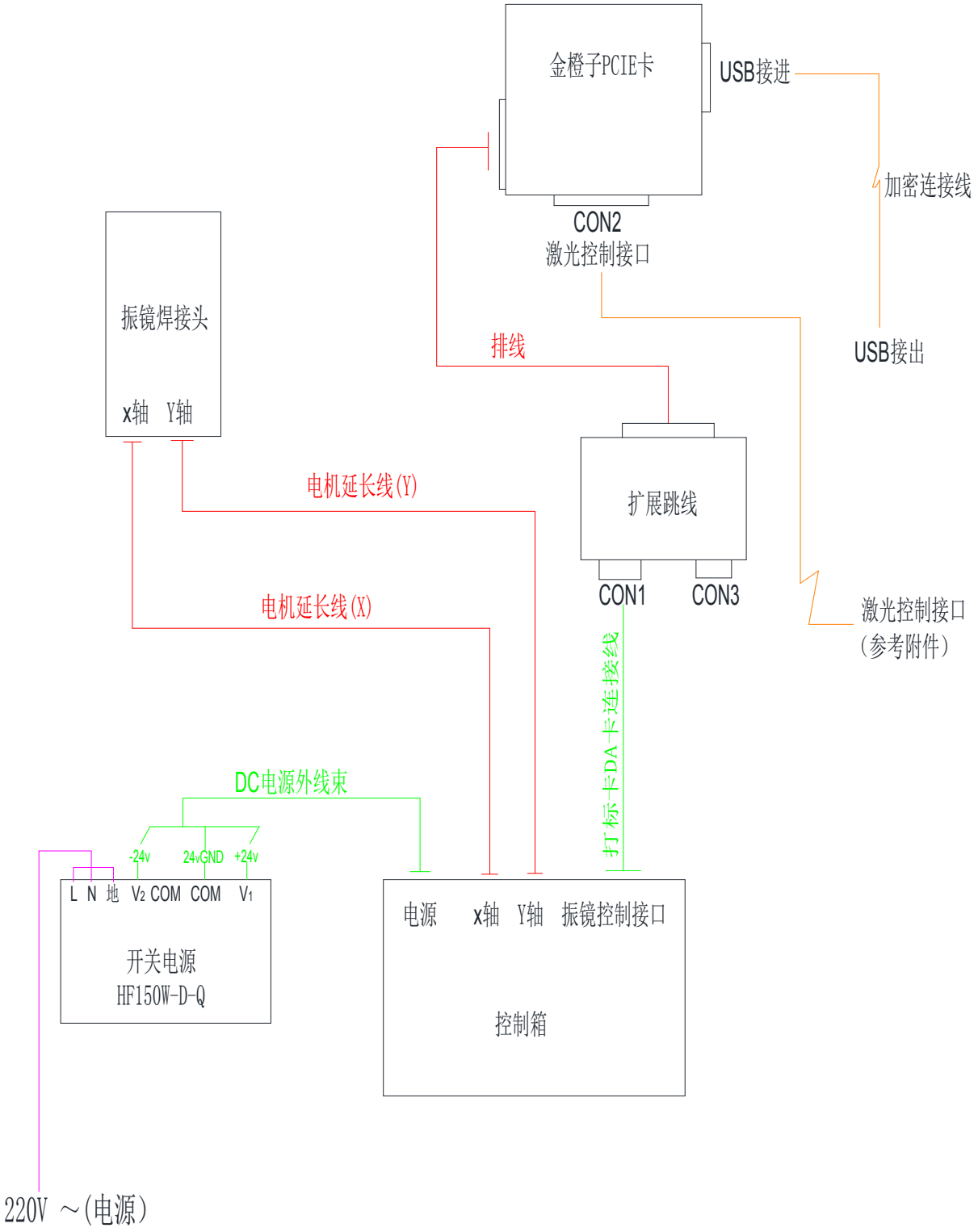
5.1. 电气实物图

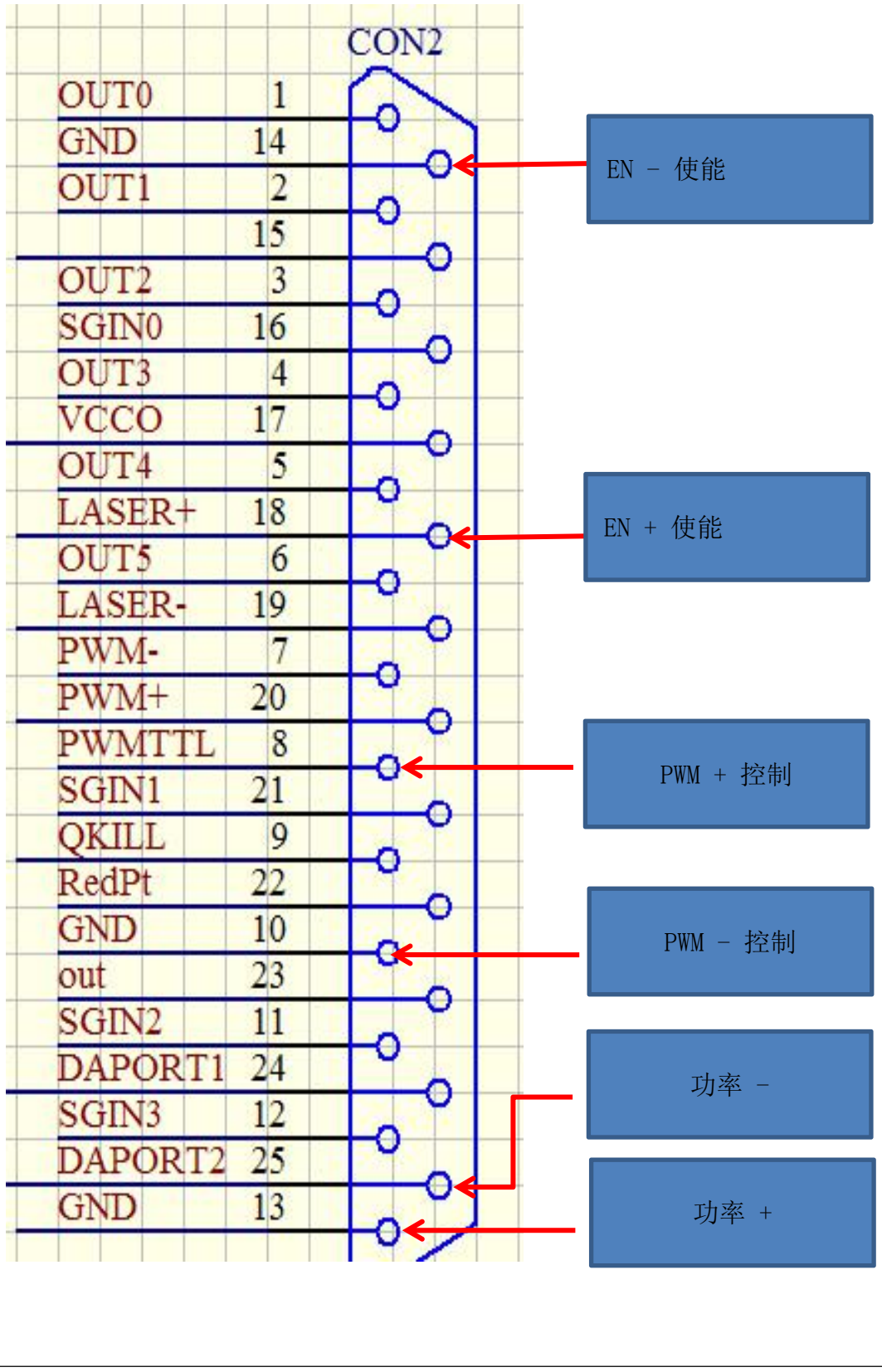
		
开关电源	电机延长线（X轴）	电机延长线（Y轴）
		
ND60控制箱组件	打标卡DA卡连接线	金橙子PCIE卡
		
扩展跳线	加密连接线	光盘

5.2. 接线定义放大图

			
开关电源接线	ND60控制箱组件	打标卡连接	焊接头连接

5.3. 接线图定义图

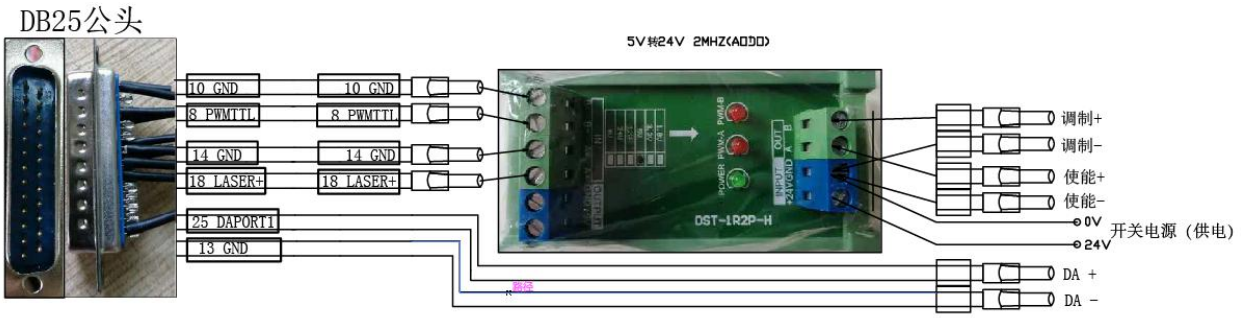

金橙子PCIE卡
USB接进
加密连接线
CON2
激光控制接口
振镜焊接头
x轴 Y轴
排线
USB接出
扩展跳线
电机延长线(Y)
CON1
CON3
电机延长线(X)
激光控制接口
（参考附件）
打标卡DA卡连接线
DC电源外线束
-24v
24vGND
+24v
L N 地 V2 COM COM V1
开关电源
HF150W-D-Q
电源 x轴 Y轴 振镜控制接口
控制箱
220V ～(电源)

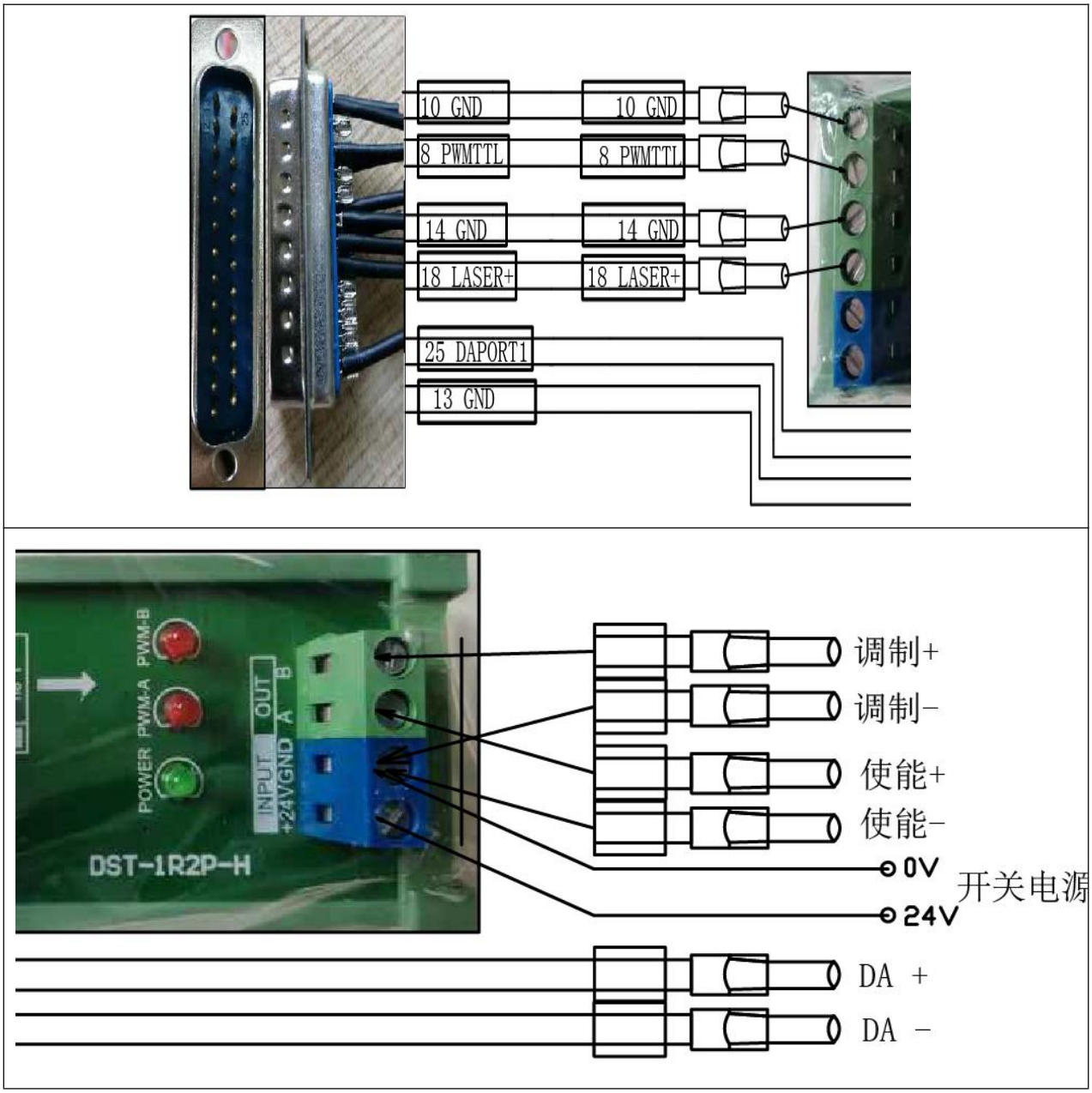

CON2
OUT0 1
GND 14
OUT1 2
15
OUT2 3
SGIN0 16
OUT3 4
VCCO 17
OUT4 5
LASER+ 18
OUT5 6
LASER- 19
PWM- 7
PWM+ 20
PWMTTL 8
SGIN1 21
QKILL 9
RedPt 22
GND 10
out 23
SGIN2 11
DAPORT1 24
SGIN3 12
DAPORT2 25
GND 13
EN - 使能
EN + 使能
PWM + 控制
PWM - 控制
功率 -
功率 +

5.4.CON2插座管脚定义示意图

管脚号	信号名称	说明
16，21 11，12	SGIN0—SGIN3	通用输入信号0—3与GND信号组成回路。使用此信号时，将此信号与GND信号分别连接至开关的两端即可。本信号为输入信号。对应软件上的In0-3
1，2，3， 4，5，6，	OUT0---OUT5	通用输出信号Out0—Out5。以GND信号作为参考地。本信号为TTL输出信号。低电平时的电压值约为0V。高电平时的电压值约为板卡供电电压VCC（5V）
7，20	PWM-，PWM+	PWM信号，差分输出。
8	PWMTTL	PWM信号，TTL输出。参考地信号为GND。对于CO2激光器，本信号用于设置激光器的功率，同时也作为Tickle信号输出；对于Yag激光器，本信号作为重复频率信号用于Q驱动器。
10,14	GND	控制卡的参考地。也是控制卡5V输入电源的参考地
15		此管脚为悬空状态empty。
17	VCC0	5V电源输出正极性端。本信号为输出信号。
18	LASER+	激光开关信号（光闸信号）。TTL输出与GND信号组成回路。高电平有效。
19	LASER-	激光开关信号（光闸信号）。TTL输出与GND信号组成回路。低电平有效。
9	QKILL	首脉冲抑制信号。TTL输出参考地信号为GND。
22	REDPT	为红光指示信号
23	Out	预留，为高电平状态
25	DAPORT1	为激光功率控制信号。本信号为[0V—10V]的模拟信号，与GND信号组成回路
24	DAPORT2	频率控制信号/首脉冲抑制信号。本信号为[0V—5V]的模拟信号，与GND信号组成回路。
13	GND	GND控制卡的参考地

5.5. 激光控接线图


DB25公头
5V转24V 2MHZ(AD□□)
10 GND
8 PWMTTL
14 GND
18 LASER+
25 DAPORT1
13 GND
10 GND
8 PWMTTL
14 GND
18 LASER+
DST-1R2P-H
调制+
调制-
使能+
使能-
0V
24V
开关电源（供电）
DA +
DA -


10 GND
8 PWMTTL
14 GND
18 LASER+
25 DAPORT1
13 GND
10 GND
8 PWMTTL
14 GND
18 LASER+
POWER PWM-A PWM-B
INPUT +24VGND
OUT A B
DST-1R2P-H
调制+
调制-
使能+
使能-
0V
24V
开关电源
DA +
DA -

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