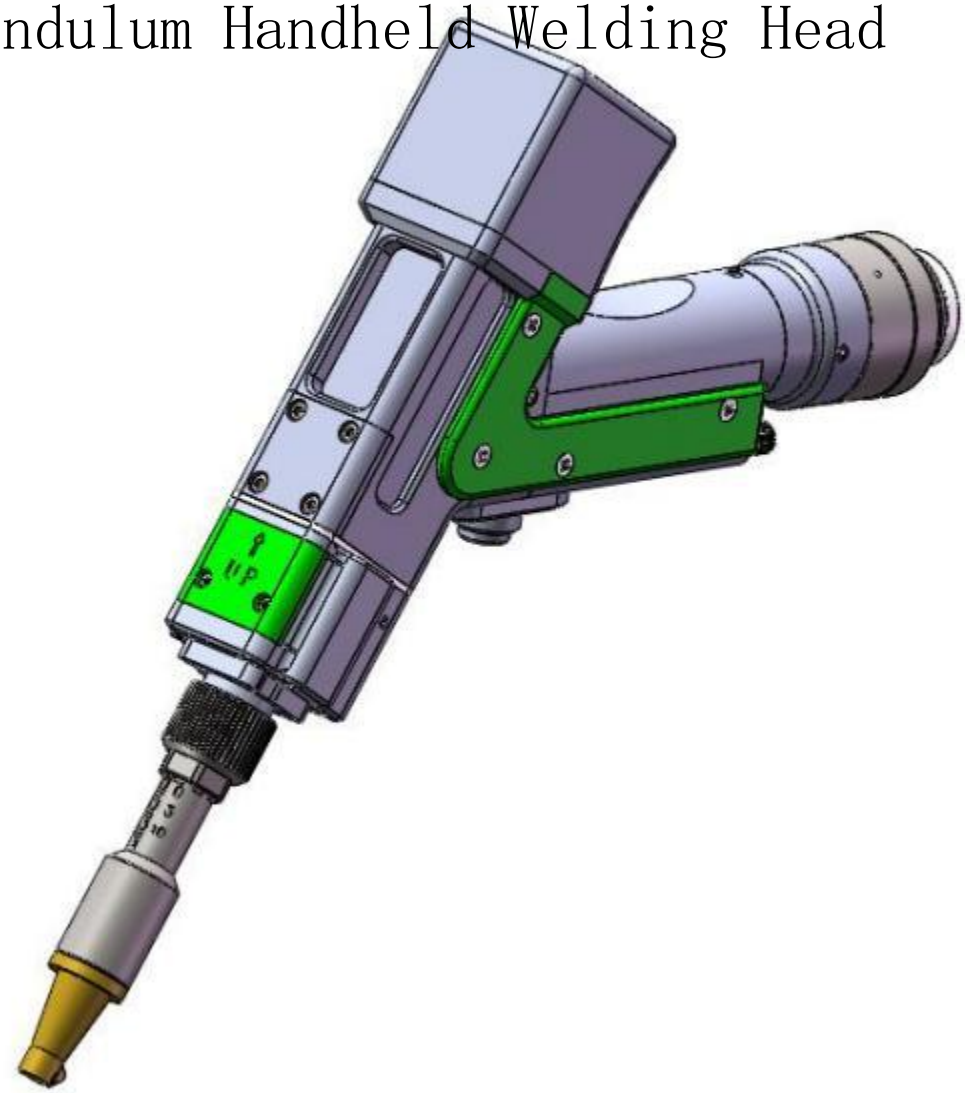
深圳市睿法智能科技有限公司

FWH20-S10A 智能单摆手持焊接头
FWH20-S10A Intelligent Single Pendulum Handheld Welding Head



深圳市睿法智能科技有限公司

Shenzhen RelFar Intelligent Technology Co.,Ltd.

网址： www.relfar.com

电话： 0755-23143635

地址： 广东省深圳市宝安区福海街道和平社区思源一区 E 栋

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深圳市睿法智能科技有限公司

Shenzhen RelFar Intelligent Technology Co.,Ltd.

Web: www.relfar.com

Tel: 0755-23143635

Address: E Block, Siyuan Zone 1, Peace Community, Fuhai Avenue, Bao'an District, Shenzhen City, Guangdong Province.

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前言

感谢您选择本公司的产品！

为了使您对我公司有一个总体认识，本手册对此产品的特点、结构特征、技术参数、使用说明、保养维护等做了详细的介绍，在使用此产品前，请您详细阅读本手册，这将有助于您更好的使用它。

由于产品功能的不断更新，您所收到的产品在某此方面可能与本手册陈述有所出入，在此谨表歉意。如在使用过程中有所疑问，请及时来电咨询，我们定当竭诚为您服务。

Introduction

Thanks for choosing our products!

To ensure you an overall understanding about this product, the manual has made a detailed introduction on features, structure, technical parameters, instructions and maintenance of this product. Before using the product, please read the manual carefully to help you use it better.

For the constant renovation of function for the product, I want to apologize for that there may be differences between the product and the manual. If you have any question when using it, please call us in time. We will help you as possible as we can.

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第一章 概述
Chapter 1 Overview

1.1 产品参数 Product Parameter

名称 Name	智能单摆手持焊接头 Intelligent single pendulum handheld welding head
型号 Model	FWH20-S10A
光纤接口 Fiber interface	QBH
波长范围 Wavelength range	1070±20nm
额定功率 Rated power	≤2000W
准直焦距 Collimating focal length	50mm
聚焦焦距 Focus length	150mm
焦点调节范围 Focus adjustment range	-10mm～+10mm
光斑调节范围 Spot adjustment range	0～5mm
辅助气压 Auxiliary gas pressure	≤1Mpa
重量 Weight	0.72Kg

1.2 注意事项

※ 为了保证人身安全，在操作前，请佩戴专用光纤激光防护眼镜。

※ 保持产品清洁，防止冷却液、冷凝水或其它异物侵入 腔内，否则会造成相关零件功能污染和功能性影响。

Cautions

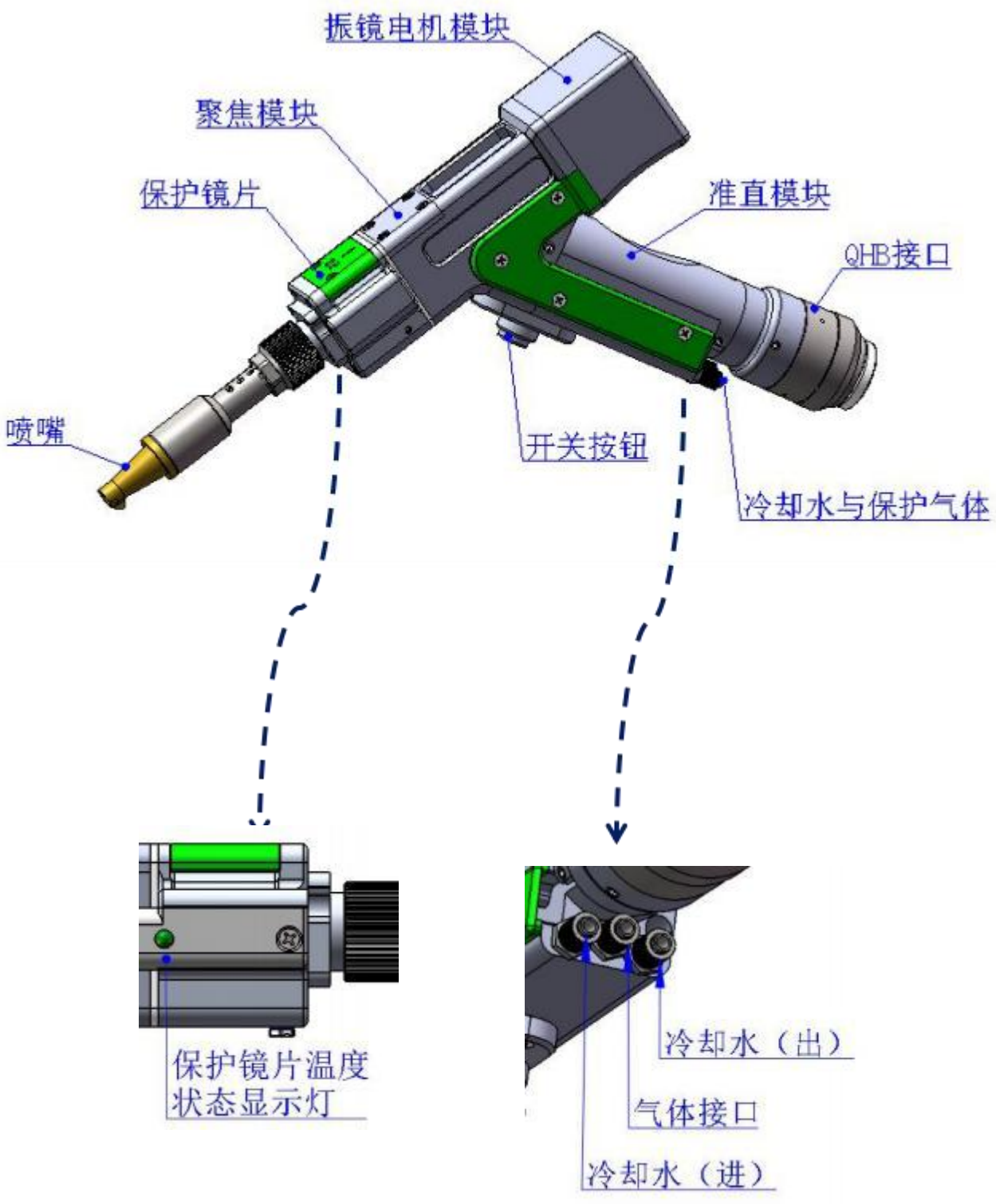
To ensure personal safety, please wear special fiber laser protective glass before operation.

Please keep the product clean and stop the entry into the cavity of cooling liquid, condensate water and other objects to, otherwise, the function may be impacted.

第二章 结构特征

Chapter 2 Structure and Feature

2.1 产品结构 Product Structure

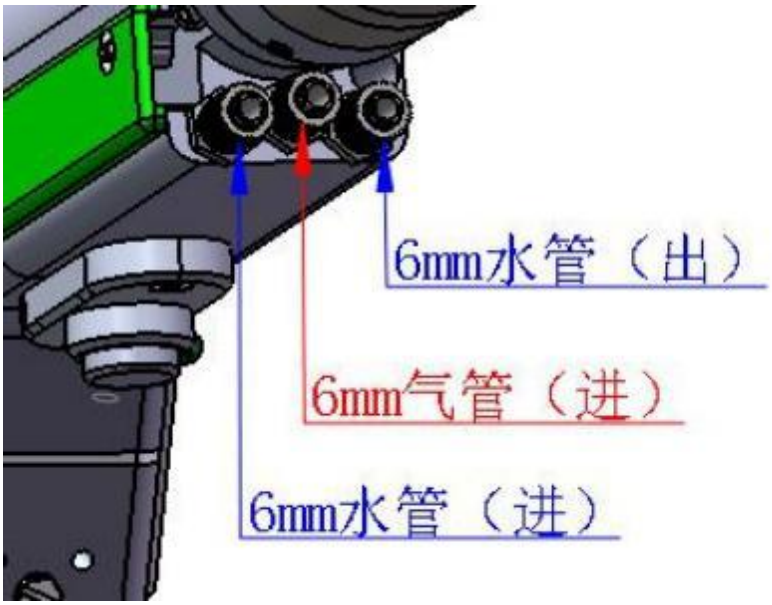


第三章 产品安装
Chapter 3 Product Assembly

3.1 管路连接 Tube connection

冷却水路与辅助保护气体连接

Cooling pipe and auxiliary gas pipe are connected.



冷却水与保护气体连接，以及使用要求：

注： 常规使用气体： 压缩空气（需要进行油水过滤）

常规使用气体有： 氩气、氮气、压缩空气（需要进行油水过 滤）。

3.1.1 冷却水： 接6mm气管，主要作用当腔内光路产生热 量，通过内部结构件水路，冷却带走多余热量，保证焊接性 能，冷却水管路要求串连，连接一进一出水流循环。

3.1.2保护气体： 接 6mm 气管，用于对接焊接气体保护， 输入压力＜1Mpa。

Connection between cooling water and protective gas as well as the operating requirements

Attention: commonly used gas: compressed air (It’s necessary to filter oil and water)

Compressed used gas: Argon, Nitrogen and compressed air (It’s necessary to filter oil and water)

3.1.1 Cooling water: connected with 6mm gas pipe. When the light path in the cavity generates heat, the internal waterway will remove excess heat to ensure the welding performance. Cooling water pipe requires series and connection with the inlet and outlet pipes.

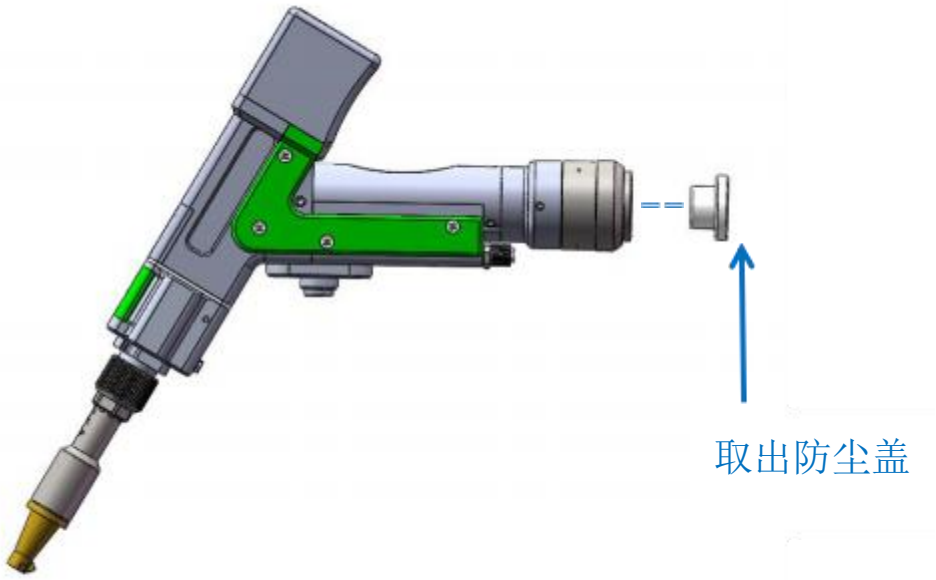
3.1.2 Protective gas: connected with 6mm gas pipe. It is used for the protection of welding gas with input pressure less than 1Mpa.

3.2 光纤输入安装

※ 将QBH水平放置,取出防尘密封盖。

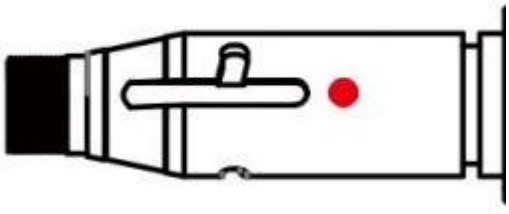
3.2 Fiber input installation

Put QBH horizontally and take out the dust seal cover



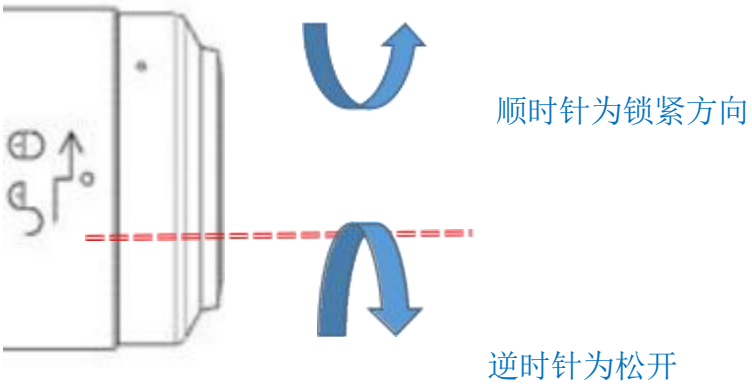
※ 光纤头上红点对准QBH红点，慢慢将光纤头插入QBH中。

Align the red point on the optical fiber head with that in QBH, and insert the optical fiber head into QBH slowly.



※ 将QHB拧至锁紧状态： 顺时针方向旋至极限位置（可以 感觉到“哒”的一声），向上提起转动外套，再次顺时针旋 转转动外套直至压紧光纤头。

Tighten QHB to the locked state: rotate the QHB clockwise to the limit position with a “click”, then lift the rotary knob up and rotate the knob clockwise again until it presses down on the optical fiber head.



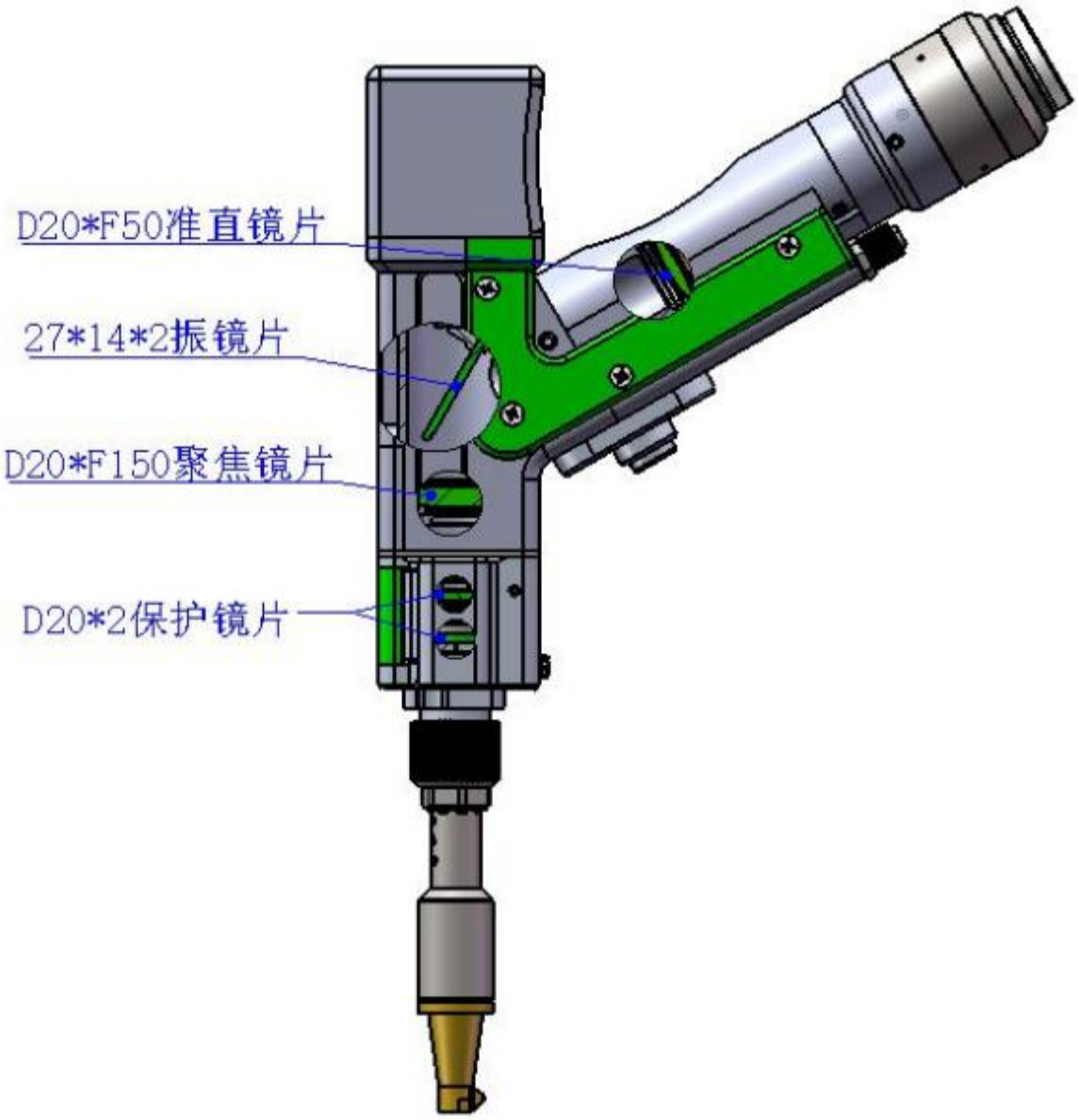
第四章 维护与保养

Chapter 4 Maintain

4.1 光学镜片结构 Structure of optical lens

※更换部件都是在无尘车间内装配，除了保护镜抽屉可以拆装，其他模块原则上禁止拆卸。如必须查看准直镜片和聚焦镜片，振镜片，请把产品放置洁净环境下拆除。

Replaceable components should be equipped in the dust-free plant. In principle, the modules of the optical lens can't be assembled or disassembled except the drawer of protective lens. If you have to check the collimating lens, focusing lens and galvanometer lens, please disassemble them in the clean environment.



4.2 光学镜片清洁Cleaning of optical lens

※清净光学镜片，操作方法与要注意要点：

※工具： 无尘手套或无尘指套、无尘擦拭棉签、异丙醇、 灌装干燥纯净的压缩空气。

※将异丙醇喷撒至无尘擦拭棉签上，镜片正对双眼，左手 大拇指和食指轻轻捏住镜片的侧面边缘，右手持无尘擦拭棉 签，从下往上或者从左往右，单一方向轻轻擦拭镜片正反两 面，（切忌不能来回擦拭，以免镜片二次被污染） 并用灌装 干燥纯净的压缩空气吹拂镜片表面，确认清洁后镜片表面无 任何异物。

Operating method and cautions:

Tool: dust-free gloves or dust-free fingertips, dust-free cotton swab, isopropyl alcohol and canned dry pure compressed air.

Spray the isopropyl alcohol onto the dust-free cotton swab, make the lens face your eyes, gently pinch the side edge of the lens with the thumb and forefinger of your left hand, wipe the front and back of the lens in one direction from left to right or from top to bottom with dust-free cotton swab held in the right hand (remember not to wipe the lens back and forth to avoid the second contamination), and blow the surface of the lens with dry pure compressed air to ensure there is no dust on the lens.

4.3 光学镜片拆装Disassembly of optical lens

4.3.1 准直镜片拆装 Disassembly of collimating lens

工具： 2mm内六角扳手、专用夹具板手、无尘棉签、酒精

Tool: 2mm inner hexagon wrench, special fixture wrench, clean cotton swab and alcohol.

※拆装过程需要在洁净的场所完成，拆装镜片时必须带上无尘手套或无尘指套。

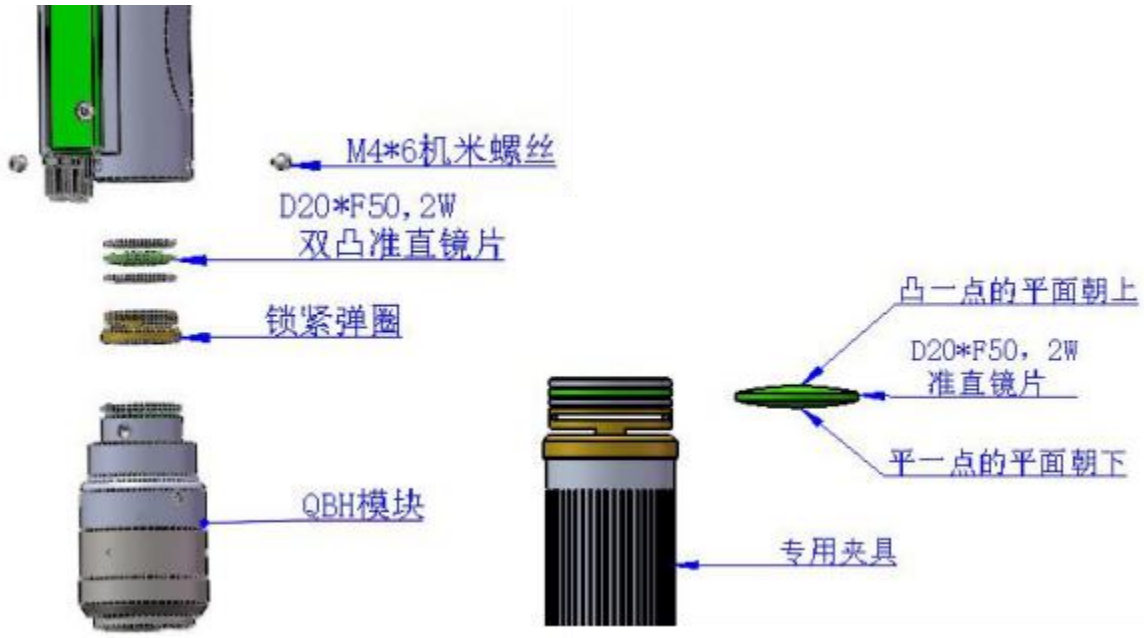
The disassembly of lens should be operated with hand wearing dust-free gloves or fingertips in clean environment.

※拆装步骤：Steps:

第一步： 首先清洁干净激光头表面所有灰尘。

第二步： 用2mm的内六角板手松开图中3-M4*6机米螺丝。 第三步： 把QBH模块取出，并用美纹纸封好端口，防止灰尘 进入腔体。

第四步： 用专用拆装镜筒夹具，逆时针旋转松开锁紧弹圈， 慢慢把焊接头向下取出。并用美纹纸封好端口，防止灰尘进 入腔体,更换准直镜片。（注意，垫圈放置位置和厚度，此 垫圈会影响光路问题，拆装后，记录下垫圈厚度尺寸。）



Step 1: remove all the dust on the surface of laser head
Step 2: loosen the 3-M4*6 set screw in the figure with a 2mm inner hexagon wrench.
Step 3: take out QBH module and seal the port with masking tape to stop the entry of dust into the cavity.
Step 4: use the special fixture for the disassembly of lens cone, rotate counterclockwise to loosen the locking spring ring and slowly take out the welding head download. Seal the port with masking tape to stop the entry into the cavity of dust. Change the collimating lens. (Pay attention to the position and thickness of washer because it will impact the light path. After disassembly, take a record of the thickness and size of the washer.)

4.3.2 聚焦镜片拆装 Disassembly of focusing lens

工具： 2mm内六角扳手、无尘棉签、酒精、美纹胶纸

Tool: 2mm inner hexagon wrench, clean cotton swab, alcohol and masking tape

※拆装过程需要在洁净的场所完成，拆装镜片时必须带 上无尘手尘或无尘指套。

The assembly and disassembly of lens should be operated with hands wearing dust-free gloves or fingertips in clean environment.

※拆装步骤：Steps:

第一步： 用2mm内六角扳手旋转松脱M4螺丝。

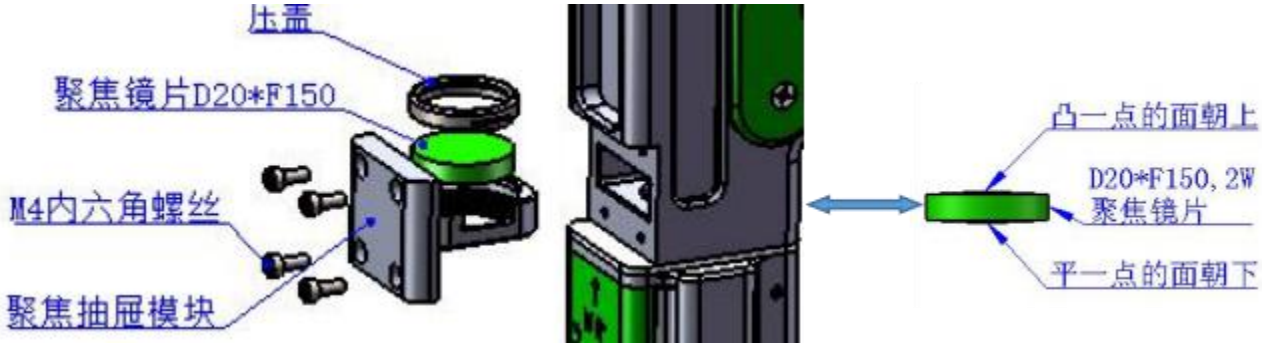
第二步： 水平方向直接抽拉取出聚焦模块。

第三步： 并用美纹纸封好端口，防止灰尘进入腔体受到污染。

第四步： 压盖轻轻向下压后旋转90°，两处凸台对齐左 右开口，向上取出压盖，即可更换聚焦镜片。

（注意： 安装镜片凹凸方向朝向）

Step 1: loosen M4 screw with a 2mm inner hexagon wrench.
Step 2: pull out of the focusing module horizontally
Step 3: seal the port with masking tape to stop dust from entering the cavity to cause contamination.
Step 4: the cover is gently pressed down and rotated 90°.Align the two convex places with the left and right openings. Take out the cover upward and the protective lens can be changed.
(Note: install lens in concave and convex direction.)


压盖
聚焦镜片D20*F150
M4内六角螺丝
聚焦抽屉模块
凸一点的面朝上
D20*F150, 2W
聚焦镜片
平一点的面朝下

4.3.3 保护镜片拆装Disassembly of protective lens

※拆装过程需要在洁净的场所完成，拆装镜片时必须带上 无尘手尘或无尘指套。

The assembly and disassembly of lens should be operated with hands wearing dust-free gloves or fingertips in clean environment.

操作方法：Steps:

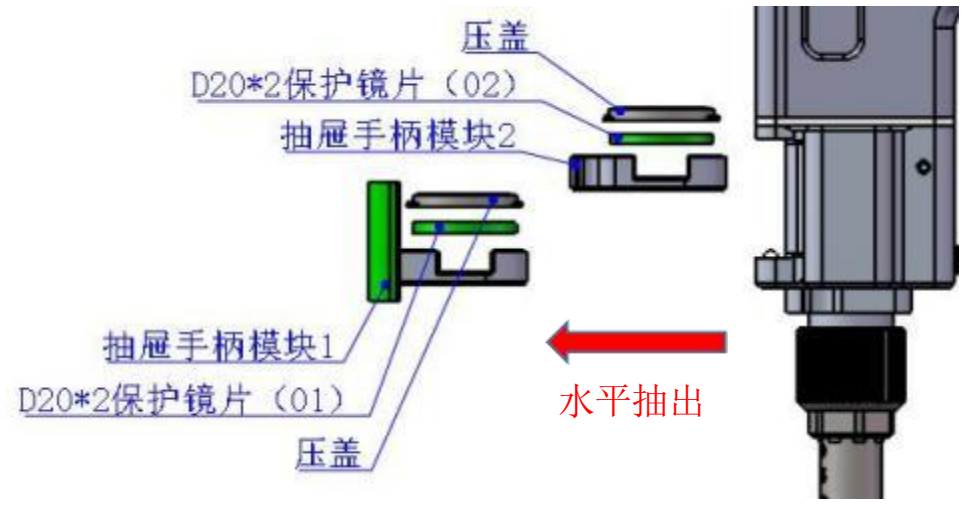
更换保护镜01

第一步，用手拿着绿色抽屉模块 1手柄两侧面，水平方向抽 出保护镜片后。注意防尘，用美纹纸封好腔体上露出的窗口， 防止灰尘进入腔内受到污染，再更换保护镜片。

第二步： 压盖轻轻向下压旋转90°，当两处耳端两处槽口对 齐即是松开，取出压盖，更换保护镜片。

更换保护镜02

第一步： 取出绿色抽屉手柄模块1，水平方向抽出手柄模块 2。注意防尘，用美纹纸封好腔体上露出的窗口，防止灰尘 进入腔内受到污染，再更换保护镜片。
第二步：压盖轻轻向下压旋转 90°，当两处耳端两处槽口对齐即是松开，取出压盖，更换 保护镜片。



Change protective glass 01:

Step 1: hold both sides of the green drawer handle module 1 in hand and pull out the protective lens horizontally. Take care of the dust, seal the port exposed on cavity with masking tape to stop the entry of dust into the cavity and replace the protective glass.

Step 2: the cover is gently pressed down and rotated 90°. Loosen it when the two sides align with the two notches. Take out the cover and change the protective lens.

Change protective glass 02:

Step 1: take out the green drawer handle module 1 and pull out the protective lens horizontally. Take care of the dust, seal the port exposed on cavity with masking tape to stop the entry of dust into the cavity and replace the protective glass.

Step 2: the cover is gently pressed down and rotated 90°. Loosen it when the two sides align with the two notches. Take out the cover and change the protective lens.

第五章 焊接系统

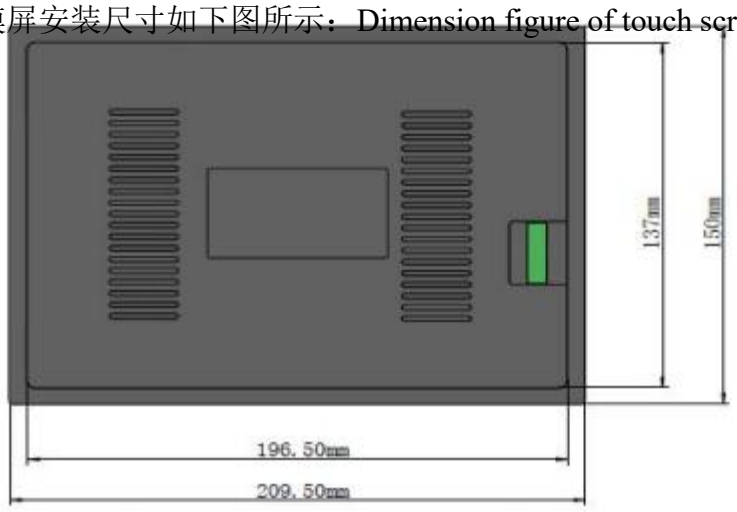
Chapter 5 Welding System

5.1产品安装尺寸图Product dimension figure

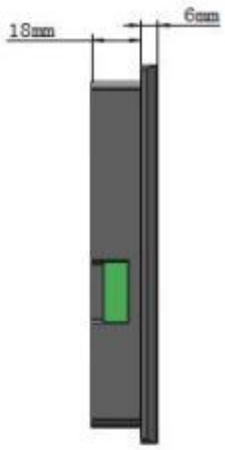
5.1.1 触摸屏安装尺寸Dimension of touch screen

外型尺寸（209.5*150*24)mm Size:（209.5*150*24)mm

触摸屏安装尺寸如下图所示：Dimension figure of touch screen:



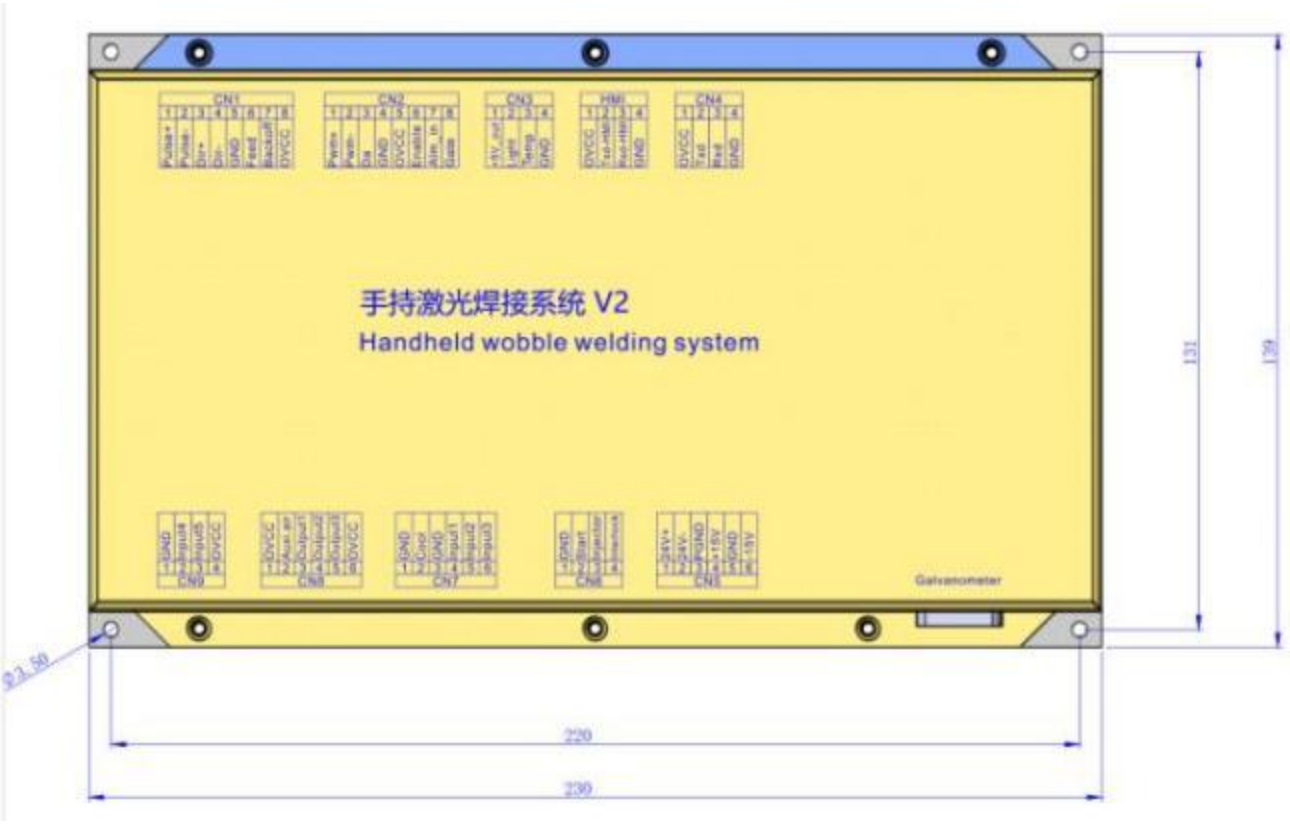
后视图

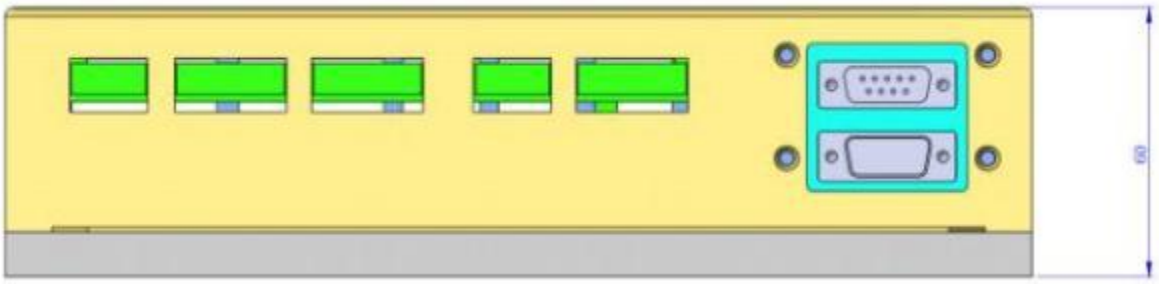


左视图

上视图

5.1.2 主板安装尺寸


手持激光焊接系统 V2
Handheld wobble welding system
Galvanometer
131
139
220
230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第六章 电气
Chapter 6 Supplies

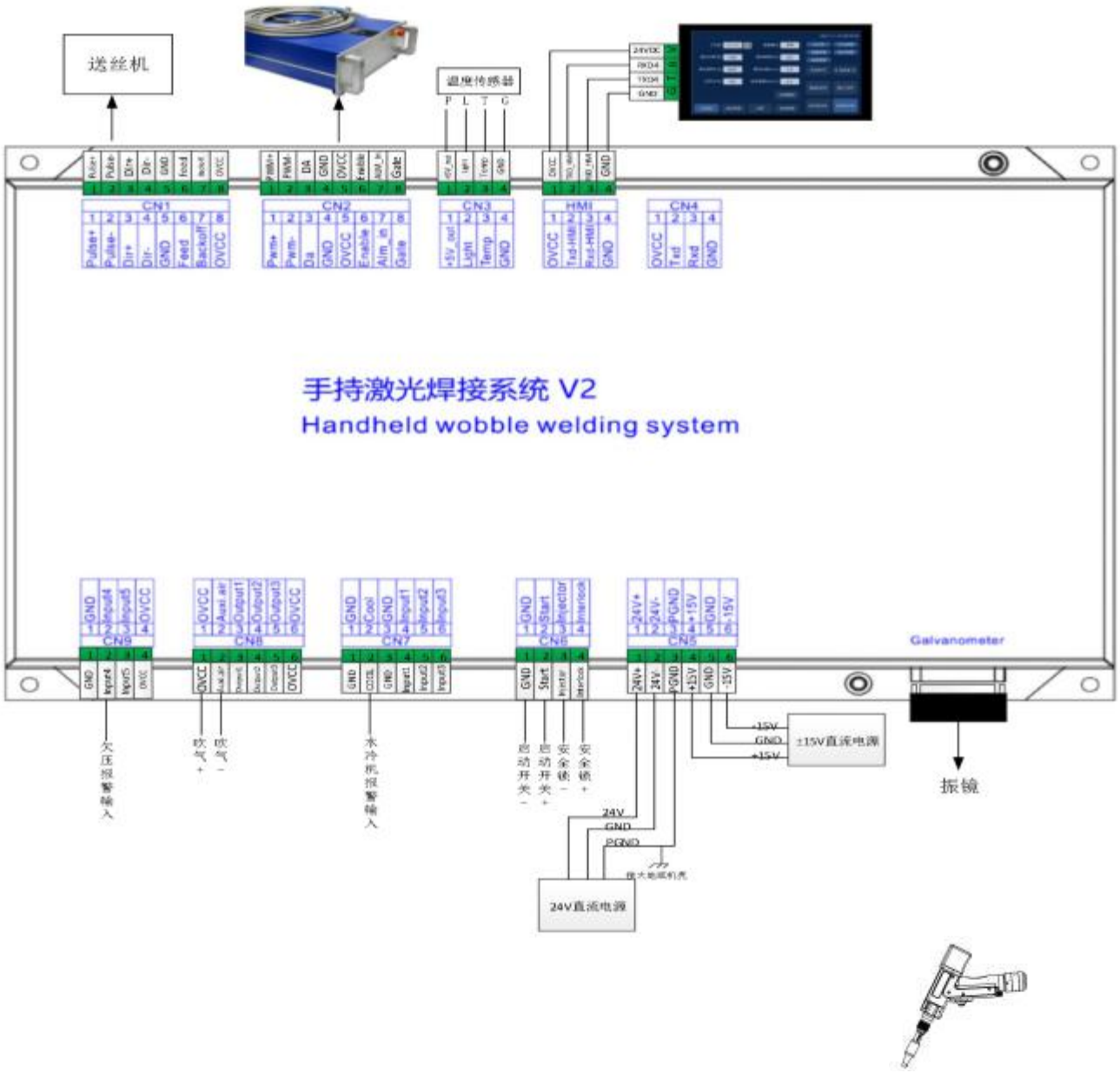
6.1 电气物料表 Electrical material list

清单 List				
序号 Serial number	名称 Name	图示 Picture	数量 Number	备注 Remark
1	手持焊枪电机线 Handheld welding gun motor wire		1PCS	
2	24V 电源盒 24V power box		1PCS	
3	15V 电源盒 15V power box		1PCS	
4	地线夹组件 Earth clamp assembly		1PCS	
5	显示屏 Display screen		1PCS	
6	触摸屏4 芯连接线-1.5m-黑色 Touch screen 4-core cable-1.5m- black		1PCS	
7	蓝牙天线 Bluetooth antenna		1PCS	
8	焊接系统控制卡 Welding system control card		1PCS	

6.2 系统接线 System wiring

下图为整个系统的接线示意图，系统接线可以参考该示意图，详细的接口定义请参考相关章节。

The following is the wiring diagram of the whole system. System can refer to this diagram. For the detailed interface definition, please refer to the relevant chapter.



重要:

主板中保留的引脚请勿接线。

Important:
Do not connect the pins reserved on the mainboard.

6.3 CN5供电接口 CN5 power supply interface

供电接口是6PIN 绿色端子，是外部为主板与振镜提供的一个电源接 口，电压为直流24V（DC 24V）与直流±15V（DC ±15）。表6.3.1 为CN5 供电接口定义。

Power supply interface is a 6-pin green terminal and a power interface provided for mainboard and galvanometer by external part. The voltage is DC 24V and DC ±15. Chart 6.3.1 shows the definition of CN5 power supply interface.

表6.3.1 Chart 6.3.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	24V+	电源输入 Power input	+24V 外部电源输入，电源输出电流大于3A + 24 V external power input. The power output current is more than 3A.
2	24V-	电源参考地 GND	____
3	PGND	外部屏蔽地 External shield ground	一般接大地或机壳 Generally connected to the ground or case
4	+15V	电源输入 Power input	+15V 外部电源输入，电源输出电流大于3A + 15 V external power input. The power output current is more than 3A.
5	GND	电源参考地 GND	____
6	-15V	电源输入 Power input	-15V 外部电源输入，电源输出电流大于3A - 15 V external power input. The power output current is more than 3A.

6.4 CN1 送丝机接口 CN1 wire feeder interface

送丝机接口CN1 是一个8PIN 绿色端子，支持电机送丝与IO 送丝。 表6.4.1 送丝机接口定义。

CN1 wire feeder is a 8-pin green terminal supporting motor wire feeding and IO wire feeding. The definition of wire feeder is shown in Chart 6.4.1.

表6.4.1 Chart 6.4.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	Pulse+	电机送丝脉冲+接口 Motor wire feeding pulse+ interface	电机送丝使用，接驱动器PUL+ Used during motor wire feeding, connected with driver PUL+
2	Pulse-	电机送丝脉冲-接口 Motor wire feeding pulse- interface	电机送丝使用，接驱动器PUL- Used during motor wire feeding, connected with driver PUL-

3	DIR+	电机送丝方向+接口 Motor wire feeding Dir+ interface	电机送丝使用，接驱动器 Dir+ Used during motor wire feeding, connected with driver Dir+
4	DIR-	电机送丝方向-接口 Motor wire feeding Dir- interface	电机送丝使用，接驱动器 Dir- Used during motor wire feeding, connected with driver Dir-
5	GND	参考地 GND	——
6	Feed	送丝控制接口 Wire feeding control interface	用于 IO 控制送丝机自动送丝 Used for automatic wire feeding by IO controlled wire feeder
7	Backoff	抽丝控制接口 Wire drawing control niterface	用于 IO 控制送丝机自动抽丝 Used for automatic wire drawing by IO controlled wire feeder
8	OVCC	+24V 电源输出 +24V power output	供电电源，最大可输出 500mA Power supply can output 500mA at most

6.5 CN2激光器接口CN2 laser interface

激光器接口是一个8PIN 绿色端子，表6.5.1 为激光器接口定义。

Laser interface is a 8-pin green terminal. Chart 6.5.1 shows the definition of laser interface.

表6.5.1 Chart 6.5.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	PWM+	调制信号+ Modulating signal+	占空比1%-99%可调，24V 电平 Duty cycle from1% to 99% is adjustable, 24V level
2	PWM-	调制信号- Modulating signal-	占空比1%-99%可调，24V 电平 Duty cycle from1% to 99% is adjustable, 24V level
3	DA	模拟电压输出 Analog voltage output	0-10V 模拟电压，用于激光器峰值功率调节 0-10 V analog voltage is used for adjustment of laser peak power
4	GND	电源参考地 GND	一般接DA-和Enable-端 Generally connected with DA- and Enable terminals
5	OVCC	+24V 电源输出 +24V power output	供电电源，最大可输出500mA power supply, maximum output 500mA
6	Enable	激光使能信号 Laser enable signal	24V 电平，高电平有效 24V level, high level is effective
7	Alarm	激光器故障报警输入 Laser fault alarm input	——
8	GATE	红光指示信号 Red light indicator signal	部分激光器需要此信号，此功能出厂时保留使用 Part of laser need this signal and this function is reserved before delivery.

6.6 CN3温度传感器接口 CN3 temperature sensor interface

温度传感器接口CN3 是一个4PIN 绿色端子，用户将带有端子的配套连接线直接插入即可。表6.6.1 为温度传感 器接口定义。

CN3 temperature sensor interface is a 4-pin green terminal. Users can directly insert the connecting wire with terminal into this interface. Chart 6.6.1 shows the definition of temperature sensor interface.

表6.6.1 Chart 6.6.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	+5V_out	传感器P 口 Sensor P interface	+5V 供电电源，最大可输出500mA +5V power supply, maximum output 500mA
2	Light	传感器L 口 Sensor L interface	____
3	Temp	传感器T 口 Sensor T interface	____
4	GND	传感器G 口 Sensor G interface	____

6.7 HMI触摸屏接口 HMI touch screen interface

HMI 接口是4PIN 绿色端，主板通过此端口向HMI 供电和通信，表 6.7.1 为HMI 接口定义。

HMI interface is a 4-pin green terminal through which mainboard supplies power to HMI and communicates with it. Chart 6.7.1 shows the definition of HMI interface.

表6.7.1 Chart 6.7.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	OVCC	+24V 电源输出，500mA +24V power supply, 500mA	面板供电 Power supply by panel
2	TXD_HMI	接HMI 的发送端 HMI sending end	串口通信TXD 信号 Serial communication TXD signal
3	RXD_HMI	接HMI 的接收端 HMI receiving end	串口通信RXD 信号 Serial communication RXD signal
4	GND	电源参考地 GND	____

6.8 CN4预留串口接口 CN4 reserved serial port interface

预留串口CN4 接口是4PIN 绿色端，保留不接线，表6.8.1 为CN4 接口定义。

CN4 reserved serial port interface is a 4-pin green terminal without wiring. Chart 6.8.1 shows the definition of CN4 interface.

表6.8.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	OVCC	+24V 电源输出，500mA +24V power supply, 500mA	供电 Power supply
2	TXD	TXD 信号 TXD signal	串口通信TXD 信号 Serial communication TXD signal
3	RXD	RXD 信号 RXD signal	串口通信RXD 信号 Serial communication RXD signal
4	GND	电源参考地 GND	——

6.9 CN6外部启动与安全锁接口 CN6 external start and interlock interface

CN6 接口是一个4PIN 绿色端子，表6.9.1 为CN6 接口定义.

CN6 interface is a 4-pin green terminal, the definition of which is shown in Chart 6.9.1.。

表6.9.1 Chart 6.9.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	GND	参考地 GND	一般接到焊接头上的启动按键开关- Generally connected with the Start switch- on the welding head
2	Start	外部启动开关输入 External start switch input	一般接到焊接头上的启动按键开关+ Generally connected with the Start switch+ on the welding head

3	Injector	安全夹信号输入 Injector signal input	必须将该引脚连接到安全夹上，焊接前，将安全夹夹在金属材料上。 The pin must contacted to the injector. Before welding, clamp the safety clamp to the metal material.
4	Interlock	安全锁信号输入 Interlock signal input	必须将该引脚连接到手持头的喷嘴上，焊接时， 将喷嘴与金属材料接触。 The pin must be contacted to the nozzle of the handheld head. When welding, the nozzle should be in contact with the metal material.

6.10 CN7通用输入接口1　CN7 general input interface 1

CN7 接口是一个6PIN 绿色端子，NPN 类型，表6.10.1 为CN7 接口 定义。

CN7 interface is a 6-pin green terminal of NPN type. Chart 6.10.1 shows the definition of CN7 interface.

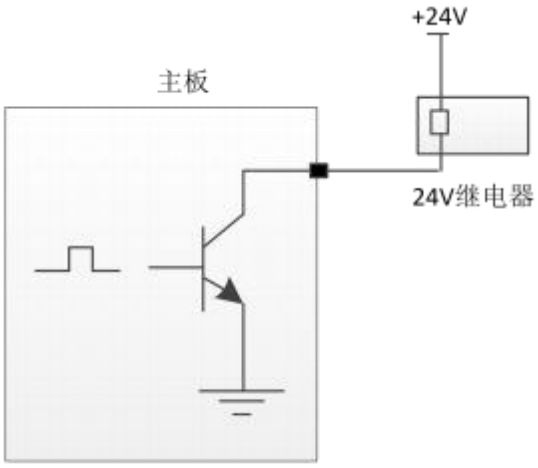
表6.10.1 Chart 6.10.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	GND	参考地 GND	____
2	Cool	水冷机报警输入 Water chiller alarm input	
3	GND	参考地 GND	____
4	Input1	保留 Reserve	____
5	Input2	保留 Reserve	____
6	Input3	保留 Reserve	____

6.11 CN8通用输出接口 CN8 general output interface

CN8 接口是一个6PIN 绿色端子，采用OC 输出可以直接驱动继电 器，最大电流可达500mA，表6.11.1 接线示意图如下所示。

CN8 is a 6-pin green terminal adopting OC output to drive relax directly with the maximum current adding up to 500mA. Chart 6.11.1 shows the wiring diagram.



输出口继电器接线示意图　　Wiring diagram of output port relax

表6.11.1 Chart 6.11.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	OVCC	+24V 电源输出 +24V power output	供电电源，最大可输出500mA Power supply can output at most 500mA.
2	Auxi.air	保护气体 Protective gas	用于保护气体吹气控制 For the blowing control of protective gas
3	Output1	绿灯 Green light	——
4	Output2	红灯 Red light	——
5	Output3	蜂鸣器 Buzzer	——
6	OVCC	+24V 电源输出 +24V power output	供电电源，最大可输出500mA Power supply can output at most 500mA.

6.12 CN9通用输入接口2 CN2 general input interface 2

CN9 接口是一个4PIN 绿色端子，表6.12.1 为CN9 接口定义

CN9 interface is a 4-pin green terminal. Chart 6.12.1 shows the definition of CN9 interface.

表6.12.1 Chart 6.12.1

引脚 Pin	信号 Signal	定义 Definition	说明 Description
1	GND	参考地 GND	——
2	Input4	欠压报警输入 Low pressure input	
3	Input5	保留 Reserve	——
4	OVCC	+24V 电源输出 +24V power output	供电电源，最大可输出500mA Power supply can output at most 500mA.

6.13 Galvanometer振镜接口 Galvanometer interface

系统提供两个DB9 振镜接口，一个DB9 公头一个DB9 母头。
The system provides two DB9 galvanometer interfaces, one for male and the other for female.

7.1 HMI功能介绍 HMI function introduction

手持激光焊接系统操作面板（简称“HMI”） 采用7 寸组态TFT 触摸屏，界 面美观，操作方便。可以分别设置激光相关的参数，在主界面上能实时显示输入输出IO 状态、报警信息以及运动状态。HMI 主界面如下图所示。

Handheld laser welding control system operating panel (“HMI” for short) adopts a 7-inch configuration TFT touch screen with beautiful interface and convenient operation. It can set laser related parameters. On the main interface, the input and output IO status, alarm information and motion state can be displayed in real time. HMI main interface is shown in the figure below:

HMI 主界面 HMI main interface

【蓝牙标志】：显示此设备是否与移动端进行蓝牙匹配连接。

【摆动关闭】：通过该按钮可以使振镜电机摆动开启或关闭。

【启用安全锁】：通过该按钮可以启动安全锁或关闭，当启用安全锁时，当焊接头在焊接时没有接触到焊接材料，则会停止出激光。

【自动送丝关】：通过该按钮可以控制是否在焊接时进行自动送丝。只有在允许出光是才会自动送丝

【禁示出光】：通过该按钮可以允许出激光或禁止出激光。

【报警状态区域】：当报警信号使能之后，对保护气体欠压报警、冷水流量

报警、激光报警与温度报警状态进行实时显示，启用安全锁则实时显示安全锁状态； 当报警信号未触发时，相应报警状态前为蓝色； 产生报警时，对应的报警图标会红蓝交替闪烁。

【主页面】【送丝参数】【诊断】【系统参数】：显示当前页面参数的参数类别，点击对应图标可进行对应参数页的切换。例如： 主页面图标变亮，说明当前显示区域的参数为主页面的参数； 需要切换到送丝参数时，点击送丝参数位置则切换到送丝参数页，对应的送丝参数位置会变亮。

【手动吹气】【送丝机】：手动进行吹气测试和送丝机的送丝与退丝测试。例如： 长 按 手动吹气区域则一直进行吹气，松开手动吹气区域则关闭吹气，手动 送丝与抽丝则长按对应的小三角箭头。

Bluetooth logo: to show whether this device is connected with the mobile terminal through bluetooth.

Swing off: to set galvanometer motor swing on or off

Safety lock: to start or close the safety lock. When the lock is started, during the welding,the laser will stop when the welding head does not touch the welding material.

Automatic wire feeding off: to control whether to start automatic wire feeding during welding. It will start automatic wire feeding only when laser emits light.

Emit laser: to start emitting laser or stopping emitting laser

Alarm status area: when alarm signal enables, protective gas low pressure, cool water flow alarm, laser alarm and temperature alarm status will be displayed in real time. When the safety lock is started, its status will be displayed in real time. When the alarm signal is not triggered, the alarm icon is blue; when it is triggered, the alarm icon is blue and red alternately.

Homepage/ Wire feeding parameter/ Diagnosis/ System parameter: to display the type of parameter on the current page. Click an icon to enter the switch of the corresponding parameter page. For instance, if the icon on the homepage turns on, the parameter in the current display area is the parameter of the homepage. When it needs to switch to wire feeding parameter, just click the position of wire feeding, and the icon of this parameter will turn on.

Blowing manually/ Wire feeder: for manual blowing test and the wire feeding and wire withdrawing tests of wire feeder. For example, long press manual blowing key, and it will blow all the time; loosen this key, and it ill stop blowing. For manual wire feeding and wire withdrawing, long press the corresponding small triangle area.

7.2 HMI操作介绍 HMI operation introduction

7.2.1 参数设置：

参数设置包括： 主页面、系统参数、送丝参数、诊断页的设置。

【主页面】：用于设置焊接时激光、摆动和工艺库等相关的参数。

工艺库： 点击工艺库白色框区域，可选择已设置的工艺库参数。

焊接模式： 设置焊接模式： 连续，脉冲模式。

激光功率： 设置焊接时激光器的峰值功率。

激光频率：设置激光器PWM 调制信号的频率。

占空比：设置 PWM 调制信号的占空比，设定范围为1%～100%。

摆动频率： 设置电机摆动的频率。

摆动长度： 设置电机摆动的宽度。

送丝速度： 设置焊接时送丝的速度。

出光时间： 点焊模式下的出光时间。

点焊模式：点击进入点焊出光模式。

Parameter setting:

Parameter setting includes: Home page, System parameter, Wire feeding parameter and Diagnosis page

Home page: used to set parameters related to laser, swing and process library when welding.

Process library: click the white box area in process library. The set process library parameter can be selected.

Welding model: to set welding mode, continuous and pulse modes.

Power: to set the peak power of laser when welding

PWM frequency: used to set the frequency of laser PWM modulating signal

Duty cycle: used to set duty cycle of PWM signal with the range from 1% to 100%

Swing frequency: used to set motor swing frequency

Swing length: used to set motor swing length

Wire feeding parameter: used to set system parameter, including wire feeding, slow rise and fall parameters

Light emission time: the time that processing lasts when single point welding mode is set.

Point welding mode: click to enter the single point light emission mode

7.2.2【系统参数】：用于设置设备基本参数，一般由厂家进行配置，进入页 面前需要输入密码。

系统进入密码为： 666888 六位数。

脉冲开时间： 脉冲模式下的出光时间。

脉冲关时间： 脉冲模式下的关光时间。

缓升时间：用于设置激光器模拟电压在启动时，从起始功率变化到最大功率时缓慢增大的时间。

缓降时间：用于设置激光器模拟电压在停止时，从最大功率变化到关光功率时缓慢减小 的时间。

开光功率：用于设置激光器的起始功率，为焊接功率的百分比。

开光渐进时间：控制激光器出光缓慢上升至设置功率所用时间。

关光功率：用于设置激光器的关光功率，为焊接功率的百分比。

关光渐进时间：控制激光器关光功率缓慢下降所用时间。

语言：用于切换语言切换。

提前开气延时：在启动加工时，可以设置延迟开气。当按下外部启动按钮时，先吹气延时一段时间后，然后开始出激光。

延迟关气延时：在停止加工时，可以设置延迟关气。当停止加工时，先停止出激光，延 时一段时间后，然后再停止吹气。

自动摆动：用于设置振镜时候进行自动摆动； 启用自动摆动，安全锁导通时，振镜自动 进行摆动，安全锁不导通时，延时一段时间后自动让振镜电机不摆动。

设备参数：用于切换到设备参数页面，需输入密码。

授权：用于主板的授权管理。

设备编号：用于设置控制系统的蓝牙编号。当用户有多台设备时，可自由定义编号进行 管理。

中心偏移：用于红光中心偏移的设置。

System parameter: used to set the basic parameters of device. Generally, the setting is performed by manufacturers. Before entering the page, users need to enter password.

System password: 666888

Pulse on time: the time to start light emission in pulse mode

Pulse off time: the time to stop light emission in pulse mode

Slow rise time: used to set the time that the laser analog voltage rises from initial power to the maximum power when the it is enabled.

Slow fall time: used to set the time that laser analog voltage falls from the maximum power to initial power when it is stopped.

Light on power: used to set the initial power of laser, the percentage of welding power

Light on asymptotic time: the time to control the light on power of laser to rise slowly to the set power

Light off power: used to set the light off power of laser, the percentage of welding power

Light off asymptotic time: the time to control the light off power to fall slowly

Language: to switch language

Advance gas on delay: when starting processing, users can set gas activation delay. When the external start button is pressed, after blowing delay for some time, the laser can emit light.

Gas off delay: when stopping processing, users can set gas closure delay. When processing is stopped, stop the laser first. After delay for some time, stop gas blowing.

Automatic swing: used to set whether the galvanometer swings automatically. When automatic swing function is enabled and the safety lock is connected, But if the safety lock is not connected, make the motor not carry out automatic swing after delay for some time.

Device parameter: used to switch to the device parameter page. It requires password.

Authorization: for the authorization management of mainboard

Device number: used to set the bluetooth number of control system. When users have multiple devices they can define the number for management.

Offset in middle: for the setting of the offset in middle of red light.

7.2.3【送丝参数】：用于设置送丝参数，包括补丝参数、退丝参数等。

退丝速度： 松开启动开关后电机退丝的速度。

退丝时间： 电机退丝的时间。

补丝速度： 电机补丝的速度。

补丝时间： 电机补丝的时间。

送丝延迟时间： 出光后延迟一段时间再送丝，一般为0。

连续送丝： 用于送丝机换丝，单击一次可持续送丝，再次单击后停止。

连续退丝： 用于送丝机换丝，单击一次可持续退丝，再次单击后停止。

Wire feeding parameter: used to set parameters related to wire feeding, wire supplement and withdrawal

Wire withdrawal speed: the wire withdrawal speed of motor when the start button is loosened.

Wire withdrawal time: the time for motor wire withdrawal

Wire supplement speed: the speed of motor wire supplement

Wire supplement time: the time for motor wire supplement

Wire feeding delay time: wire feeding after light delay for a period, generally it's 0.

Continuous wire feeding: used to change wire for the wire feeder. Click once for continuous wire feeding, click again to stop it.

Continuous wire withdrawal: used to change wire for the wire feeder. Click once for continuous wire withdrawal, click again to stop it.

【诊断】：用于监测当前系统的IO 状态。

7.2.4【设备参数】：用于设置设备相关参数。

激光器额定功率：用于设置激光器的额定功率。

振镜最大偏角：用于设置振镜最大偏角范围。

最大激光频率：设置激光器PWM 信号的最大频率，当焊接参数设置的 PWM 频率超过 最大频率时，PWM 频率会被限制到最大频率。

最大摆动长度：设置摆动时的最大长度，当焊接参数设置的长度超过最大的长度时，长度会被限制到最大长度。

送丝步距： 电机送丝时的步距。

送丝电机方向： 设置电机送丝的方向极性。

振镜矫正系数：当设置的长度与实际的长度不一致，存在微小差别时，可以通过该参数

修正，不需要修正时，一般设置为1。

镜片温度报警使能：使能镜片温度报警，当温度超过限制值时，会产生报警信号。

镜片温度报警限值：镜片温度限制值。

激光报警使能：使能激光器报警，当激光器产生报警时，会产生报警信号。

激光报警电平：激光机报警逻辑电平。

冷水机报警使能：使能冷水机报警，当冷水机产生报警时，会产生报警信号。

冷水机报警电平：冷水机报警逻辑电平。

欠压报警使能：使能气体报警，当气体欠压产生报警时，会产生报警信号。

欠压报警电平：欠压报警逻辑电平。

Diagnosis: to monitor the IO status of current system

Device parameter: used to set parameters related to device

Laser rated power: used to set the rated power of laser

Maximum deflection angle of galvanometer: used to set the range of the maximum deflection angle of galvanometer.

Maximum frequency: set the maximum frequency of laser PWM signal. When PWM frequency set by welding parameter exceeds the maximum frequency, the frequency will be limited to the maximum value.

Maximum swing length: set the maximum length during swing. When the length set by welding parameter exceeds the maximum length, the length will be limited to the maximum length.

Wire feeding step: used to set the step during motor wire feeding.

Direction of motor wire feeding: used to set the direction polarity of motor wire feeding.

Galvanometer correction coefficient: when there is a nuance in the set length and the actual length, it can be modified by this parameter. When there is no need for correction, it is usually set as 1.

Lens temperature alarm enable: enable lens temperature alarm. When the temperature exceeds the limited value, the alarm signal will be generated.

Lens temperature alarm limited value: the limited value of lens temperature

Laser alarm enable: used to enable laser alarm. When laser generates alarm, the alarm signal will be generated.

Laser alarm level: used to set laser alarm to trigger the level logic.

Water-cooling machine alarm enable: used to enable water cooling machine alarm. When the water cooling machine generates alarm, the alarm signal will be generated.

Water-cooling machine alarm level: used to set water-cooling machine alarm to trigger the level logic

Low pressure alarm enable:used to enable gas alarm. When gas low pressure generates alarm, the alarm signal will be generated.

Low pressure level: used to set low pressure alarm to trigger the level logic.

第八章 监控保护装置

Chapter 9 Monitoring Protection Device

8.1 保护镜片温度参数设定

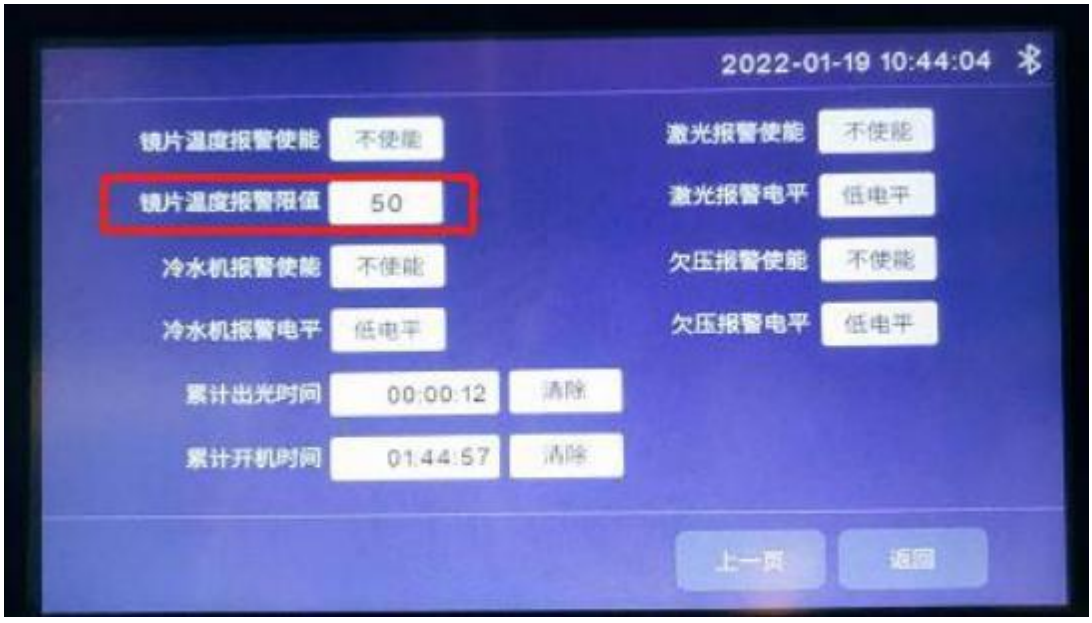
【主页面】→【系统参数】→【设备参数】 →【输入密码**888666**】→下一页→镜片温度报警限值。

镜片温度设定值，建议设定为**50**，当镜片温度超过设定值后，主页面出现报警提醒，手持焊接头侧面同时显示灯变为红色。

Temperature parameter setting of Protective Lens

Home page-System parameter-Device parameter-Enter password 888666-Next page-Limited value of lens temperature alarm

The lens temperature value is proposed to be 50. When the temperature exceeds this value, there will be an alarm prompt on the home page and at the same time, the indicator light on the side of the handheld head turns red.



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Address: E Block, Siyuan Zone 1, Peace Community, Fuhai Avenue, Bao’an District, Shenzhen City, Guangdong Province.