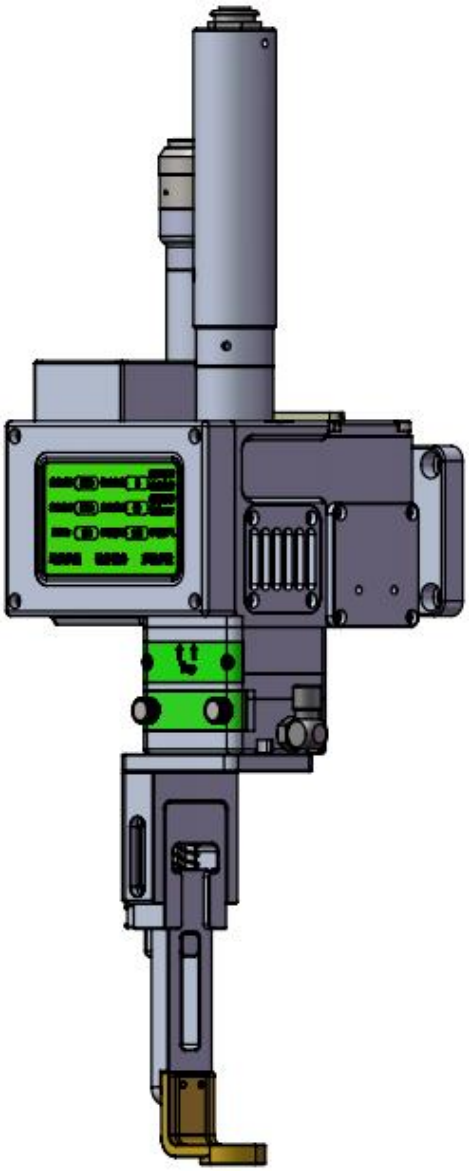
Shenzhen RelFar Intelligent Technology Co., Ltd.

FWP30-VES10A Intelligent Double Swing Welding Head



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Shenzhen RelFar Intelligent Technology Co., Ltd.

Introduction

Thank you for choosing our products!

To enable you to have an overall understanding of our company, there is a detailed introduction regarding features, structural features, technical parameters, instructions for use and maintenance of the product in the Manual. Carefully read the Manual to help you better us it before the product is used.

Due to constant update of product functions, the product you received may differ from the description in the manual. We hereby express our deep sorry for this matter! In case of any question in the use process, timely call us for consultation, and we will offer dedicated service to you wholeheartedly.

Shenzhen RelFar Intelligent Technology Co., Ltd.

catalogue

Chapter I Overview

1.1 Product parameter

Fiber interface	QBH			
Wavelength scope	1070±20nm			
Rated power	≦3000W			
Collimation focal length	100mm			
Focus focal length	200/250/300/350mm			
Scanning Range	○	▭	—	🌀
Intelligent protection function	Φ20 mm	L20mm*W 5mm	L20mm	Φ20mm
Auxiliary gas	Yes			
Effective clear aperture	Coaxial/paraxial			
Weight	24mm			
Fiber interface	3.25KG			

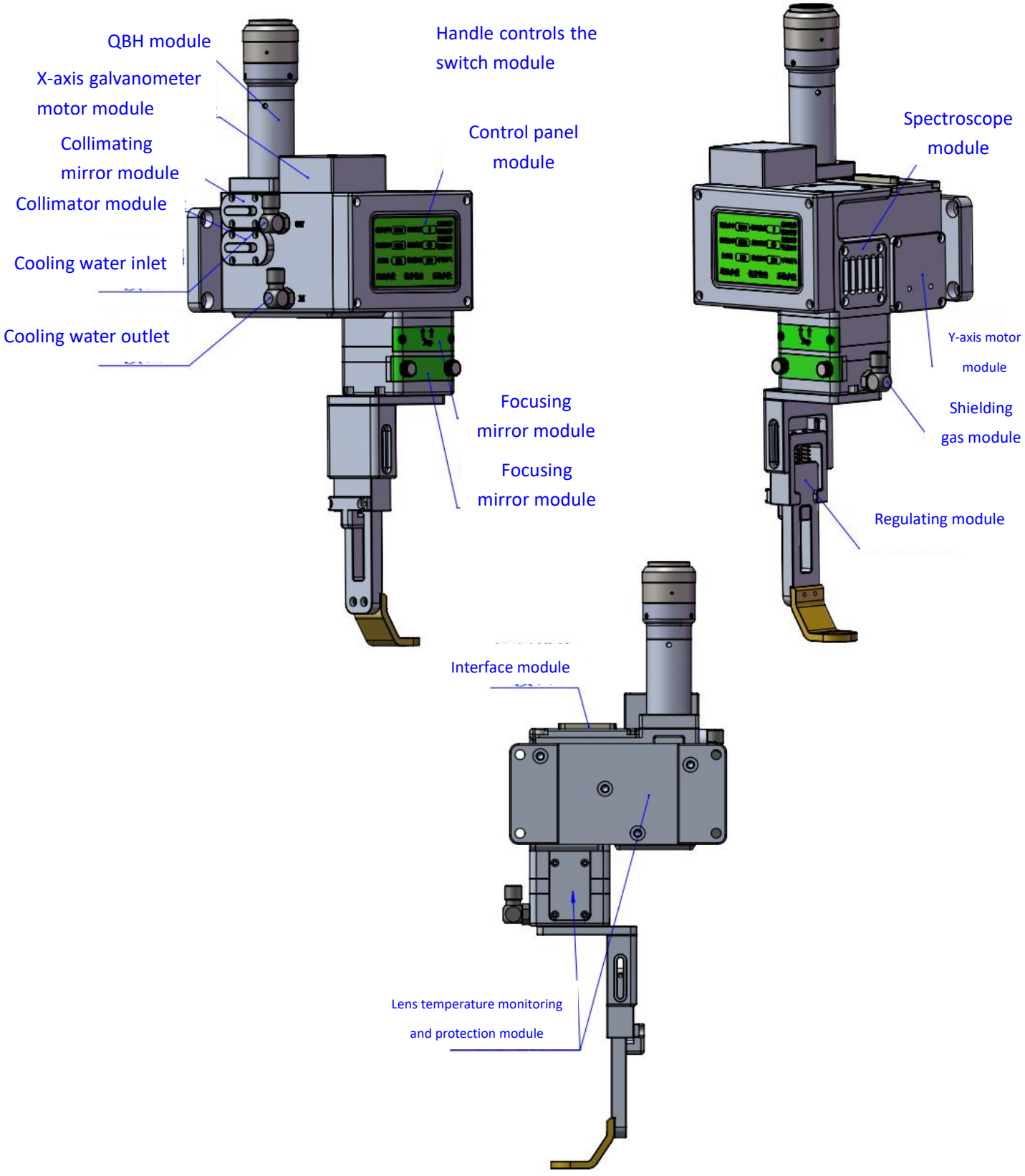
1.2 Precautions

※ To ensure personal safety, wear the special fiber laser protective glasses before operation.

※ It's necessary to keep the product clean and prevent the cooling liquid, condensate water or other foreign matter from intruding into the cavity, or the functional contamination and functional impact of related parts will be incurred.

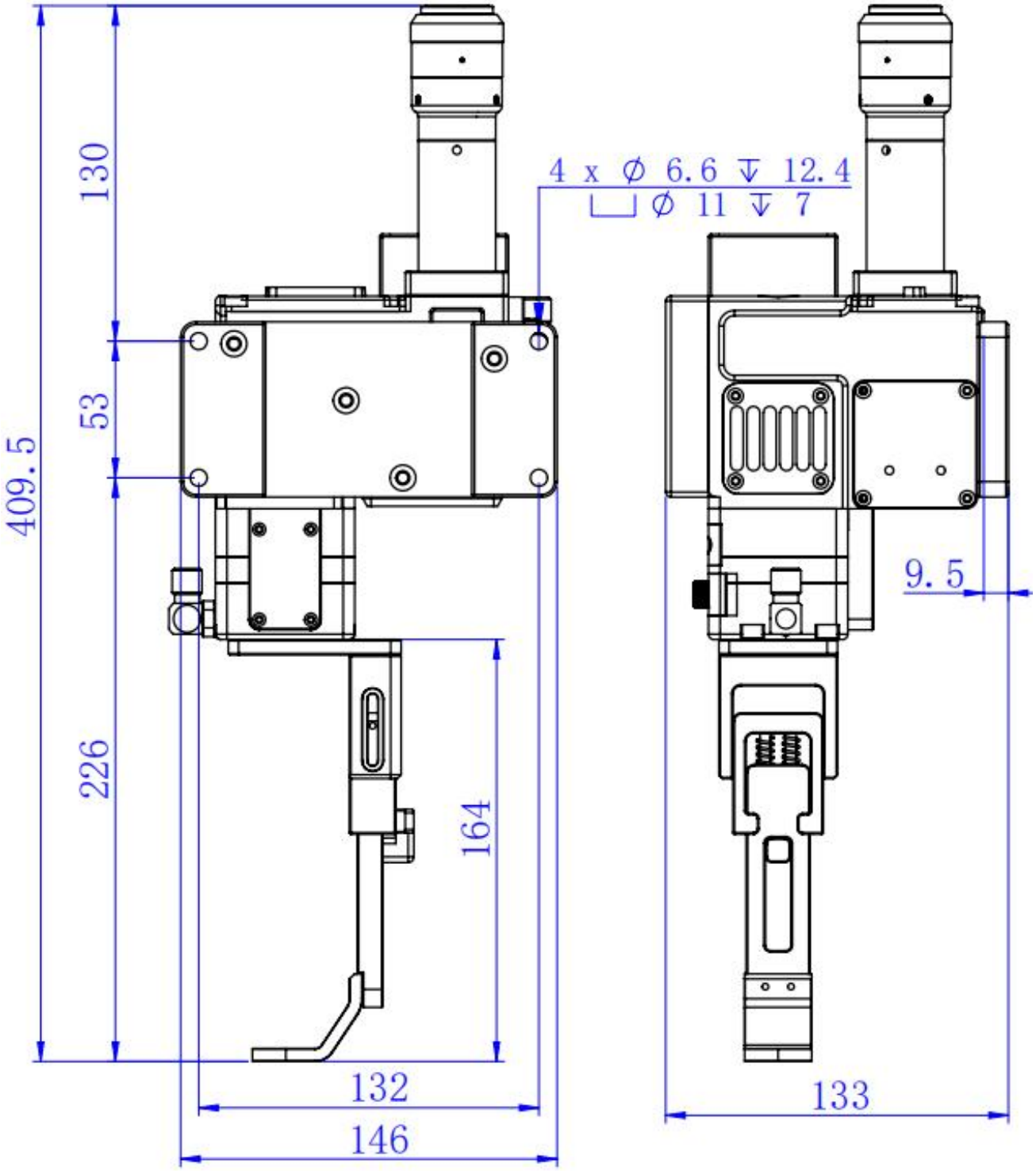
Chapter II Structural Characteristics

2.1 Product structure

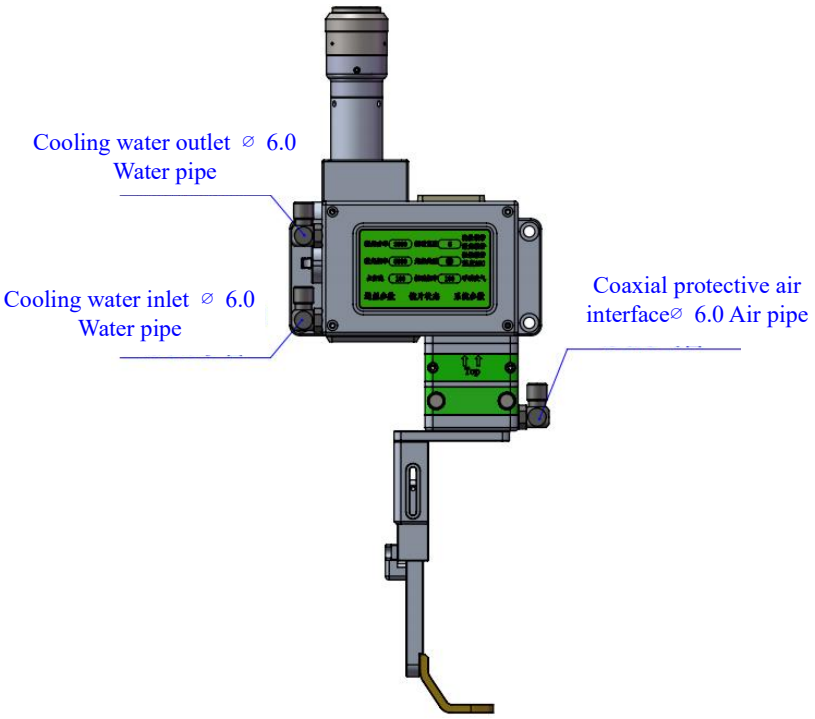


Chapter III Product Installation

3.1 Installation dimension



3.2 Pipe connection



Connection of cooling water and proective gas and usage requirements:

Note: Gas for regular use: Compressed air (oil-water filtration required)

Gas for regular use: argon, nitrogen and compressed air (oil-water filtration required).

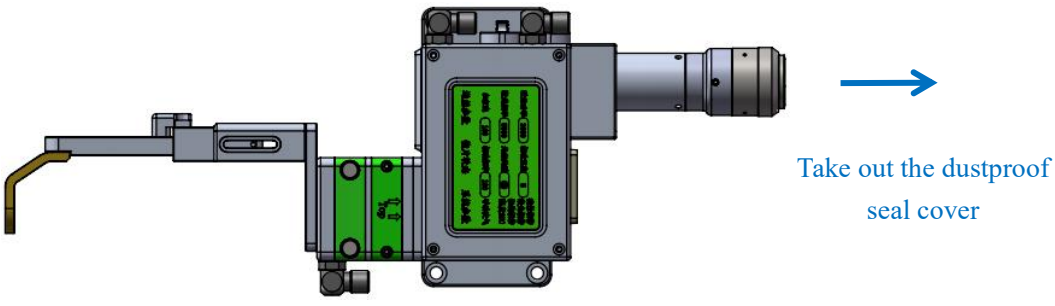
3.2.1 Cooling water: The 6mm air tube is connected. The main function is that the excess heat is taken away by cooling through the internal structural member water route when the heat is produced by the light path in the cavity to ensure the welding performance. The series connection of cooling water pipeline is required, with one-in and one-out water circulation connected.

3.2.2 Coaxial protective air: The 6mm air tube is connected for butt welding gas protection, with input pressure＜1Mpa.

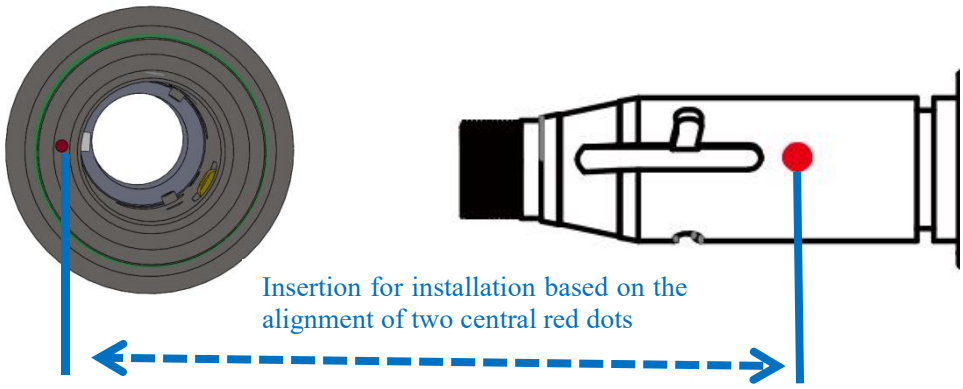
Laterally blowing interface: It is connected with coiled pipe to blow air from the side so as to blow away the welded splashes.

3. 3 **Optical fiber input installation**

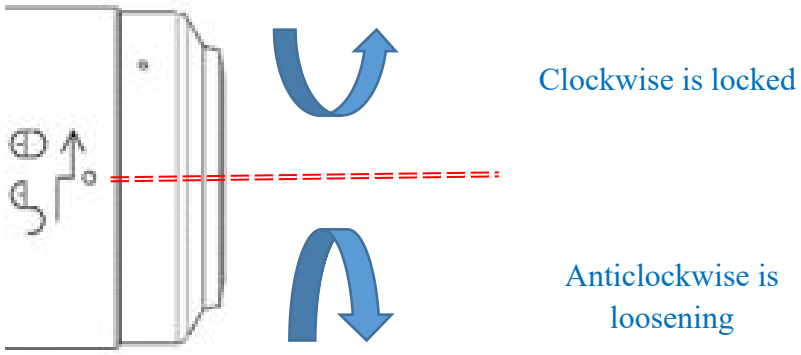
※ The QBH is a horizontal arrangement to take out the dustproof seal cover.



※ Align the red dot on the fiber optic head with the QBH red dot, and slowly insert the fiber optic head into the QBH.



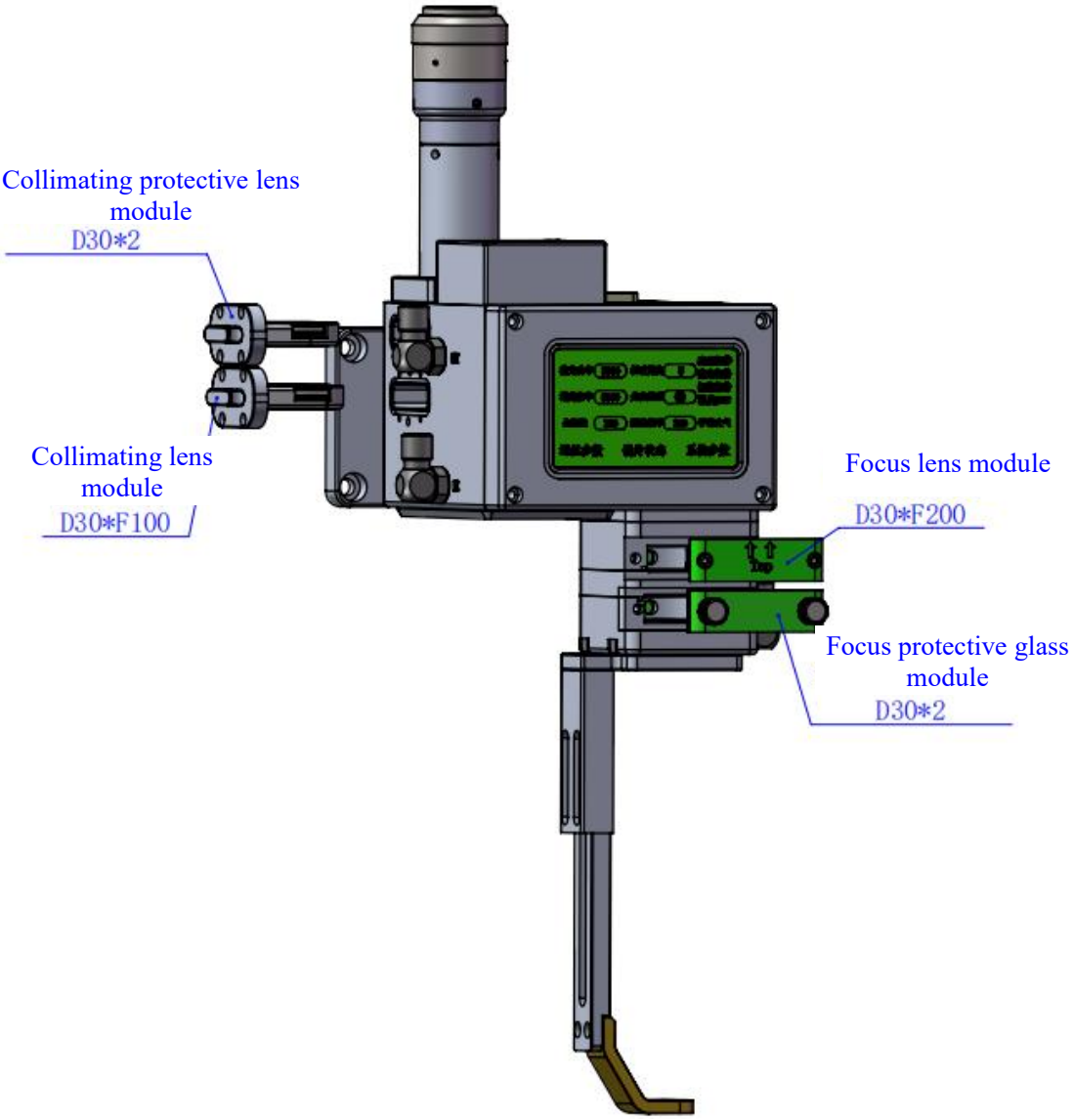
※ The QHB is screwed to the locking state: Rotate it to the limiting position clockwise (hearing the "click"), lift up the rotating mantle, and clockwise rotate the mantle until the head of optical fiber is compressed.



Chapter IV Maintenance

4.1 **Structure of optics lens**

※ The assembly is completed in the dust-free plant at the time of replacement of parts. In principle, other modules are forbidden to be dismounted except that the drawer protective glass can be disassembled and assembled. If it is necessary to check the collimating lens, focus lens and galvanometer lens, the product shall be put into a clean environment for disassembly.



4. 2 **Cleaning of optics lens**

※When the optics lens are cleaned, the operation method and attention points are as follows:

※Tools: Dust-free gloves or dust-free fingerstall, dust-free wiping cotton swab, isopropyl alcohol, and caned dry and pure compressed air.

※ Spray the isopropyl alcohol onto the dust-free cotton swab, align the lens to eyes, gently pinch the side edge of the lens with left thumb and

index finger and hold the dust-free cotton swab with right hand to gently wipe the front and back of the lens in a single direction from bottom to top or from left to right (avoid wiping back and forth to avert the secondary contamination of lens), blow the surface of the lens with filling dry and pure compressed air and confirm the surface of lens is free from foreign matters after cleaning.

4.3 Disassembly and assembly of optics lens

4.3.1 Disassembly and assembly of collimating protective lens

Tools: 2mm hexagon key wrench, dust-free cotton swab, alcohol

※ The disassembly and assembly shall be completed in a clean place. When the lens are dismounted, the dust-free gloves or dust-free fingerstall.

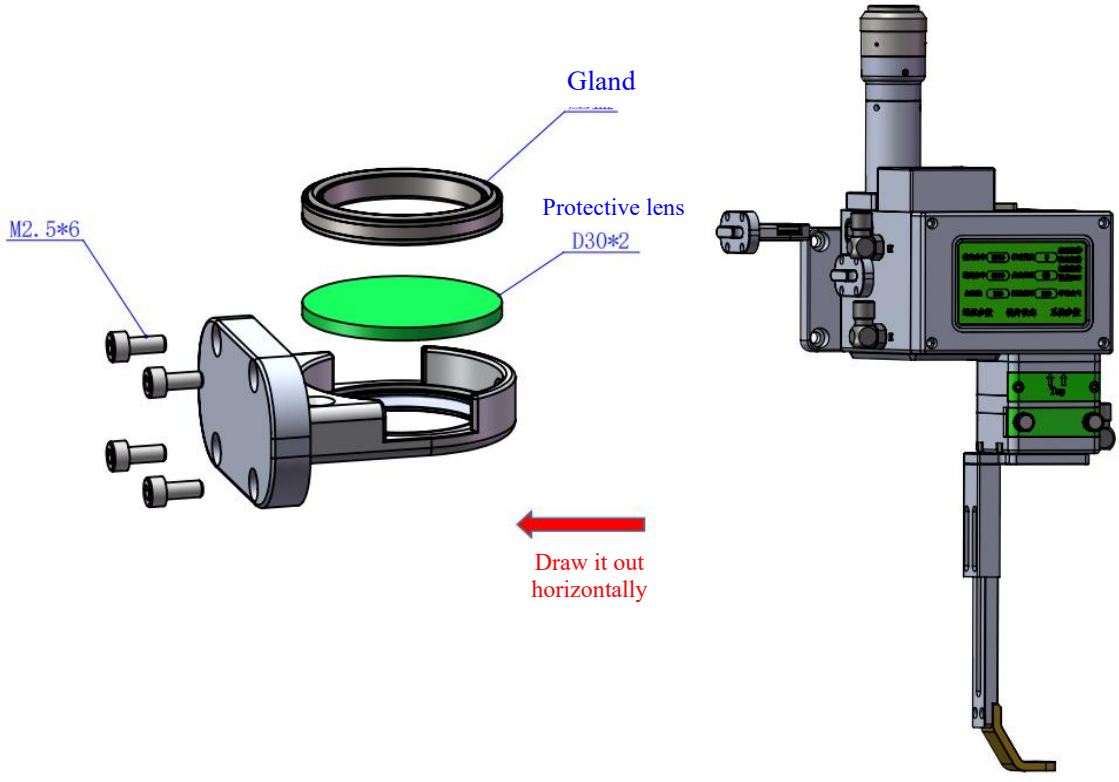
※ Disassembly and assembly steps:

Step I: Clean up all the dust on the surface of the laser head firstly.

Step 2: Loosen the 4-M2.5 hex socket cap screw in the figure by hand with a 2mm hex wrench.

Step 3: Take out the collimating protective lens drawer assembly directly in the horizontal direction (pay attention to dust prevention, after taking out the drawer module, seal the window exposed on the cavity with masking tape to prevent dust from entering the cavity and being polluted, and then replace the protective lens).

Step 4: Remove the gland upward to replace the lens.



4.3.2 Disassembly and assembly of collimating lens

Tools: 2mm hexagon key wrench, dust-free cotton swab, ethyl alcohol and masking tape.

※ The disassembly and assembly shall be completed in a clean place. When the lens are dismounted, the dust-free gloves or dust-free fingerstall.

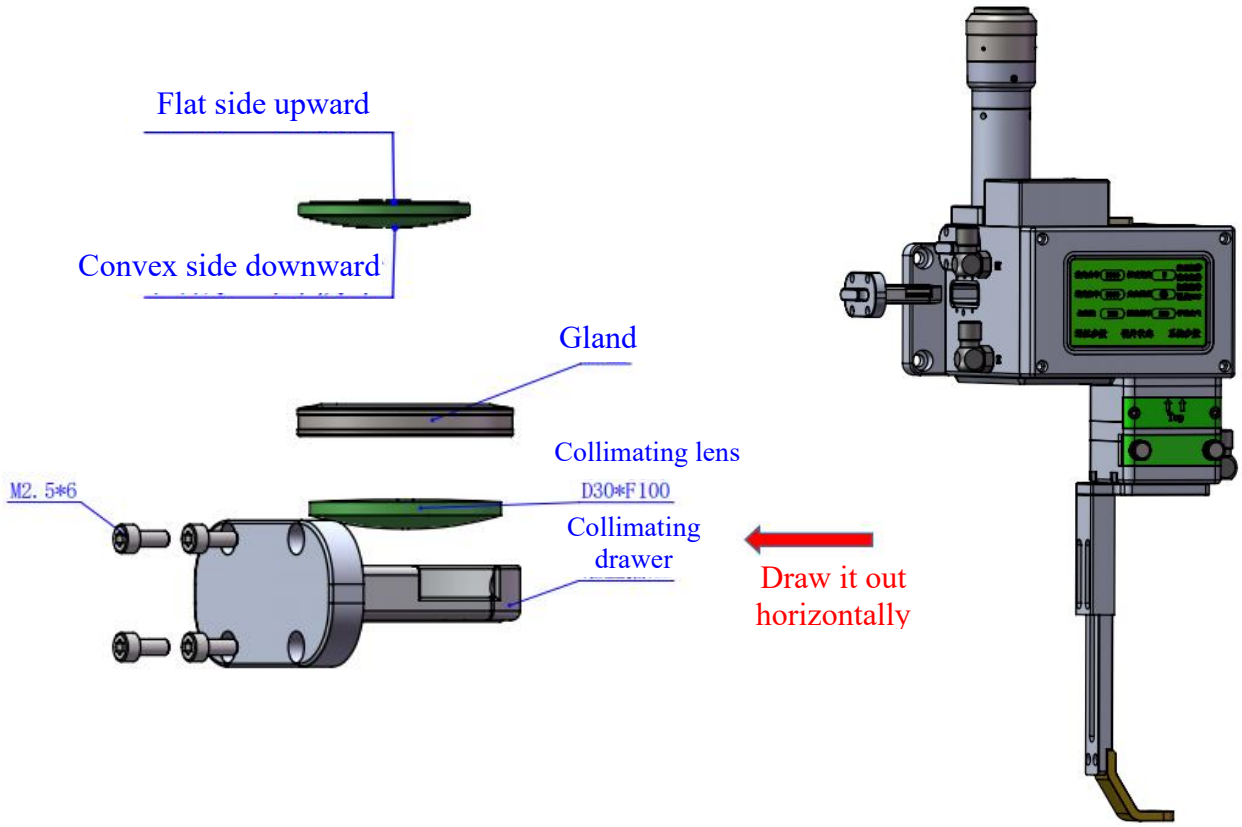
※ Disassembly and assembly steps:

Step 1: Clean up all the dust on the surface of the laser head firstly.

Step 2: Loosen the 4-M2.5 hex socket cap screw in the figure by hand with a 2mm hex wrench.

Step 3: Horizontally take out the collimating drawer module and seal the port with masking tape to prevent the dust from entering the cavity.

Step 4: Take the gland upward and replace the lens. (Note that arrow sand is marked on the concave and convex surface of the lens or on the side of the mirror to identify the orientation of the lens)



4.3.3 Disassembly and assembly of focus lens

Tools: 2mm hexagon key wrench, dust-free cotton swab, ethyl alcohol and masking tape.

※ The disassembly and assembly shall be completed in a clean place. When the lens are dismounted, the dust-free gloves or dust-free fingerstall.

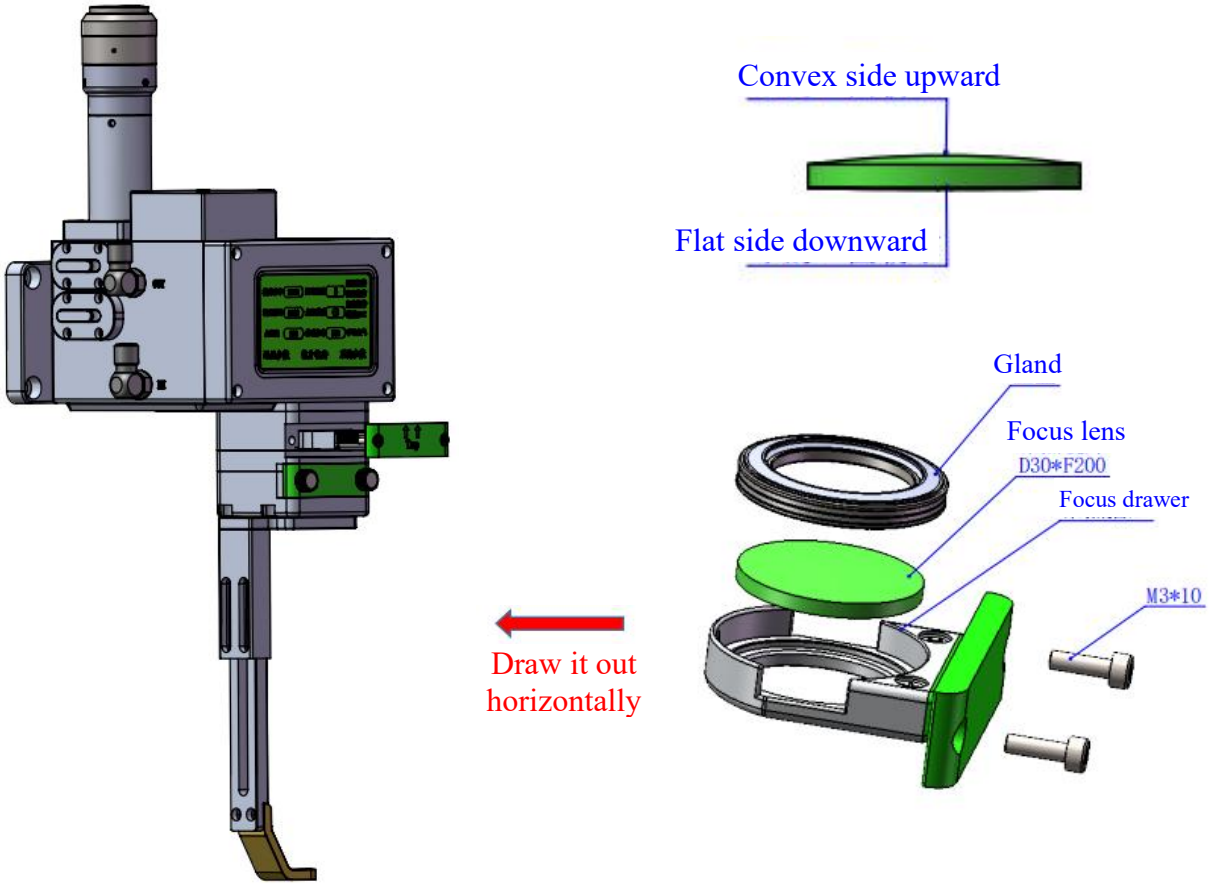
※ Disassembly and assembly steps:

Step 1: Clean up all the dust on the surface of the laser head firstly.

Step 2: Loosen the 2-M3 screw with 2.5mm shex wrench.

Step 3: Horizontally take out the collimating drawer module and seal the port with masking tape to prevent the dust from entering the cavity.

Step 4: Take the gland upward and replace the lens. (Note that arrow sand is marked on the concave and convex surface of the lens or on the side of the mirror to identify the orientation of the lens)



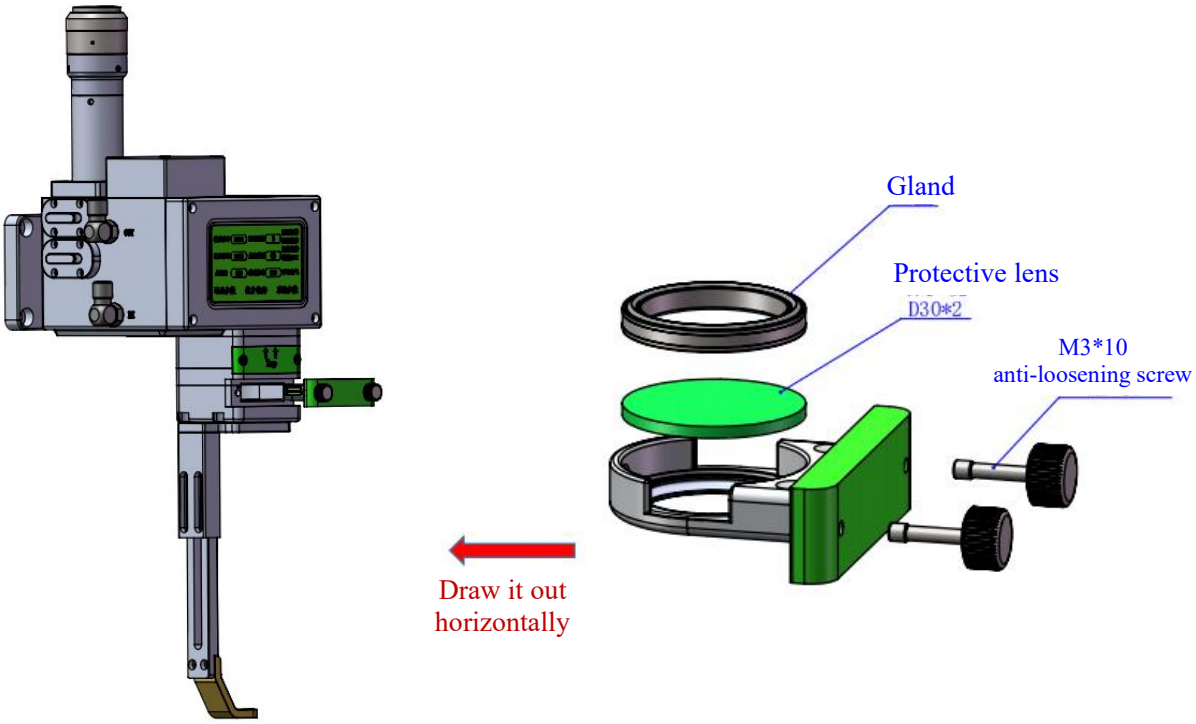
4.3.4 Disassembly and assembly of focus lens

※ The disassembly and assembly shall be completed in a clean place. When the lens are dismounted, the dust-free gloves or dust-free fingerstall.

Operation method:

First, loosen the left and right screws and pull the screws horizontally to pull out the protection drawer. Remove the gland upward to replace the

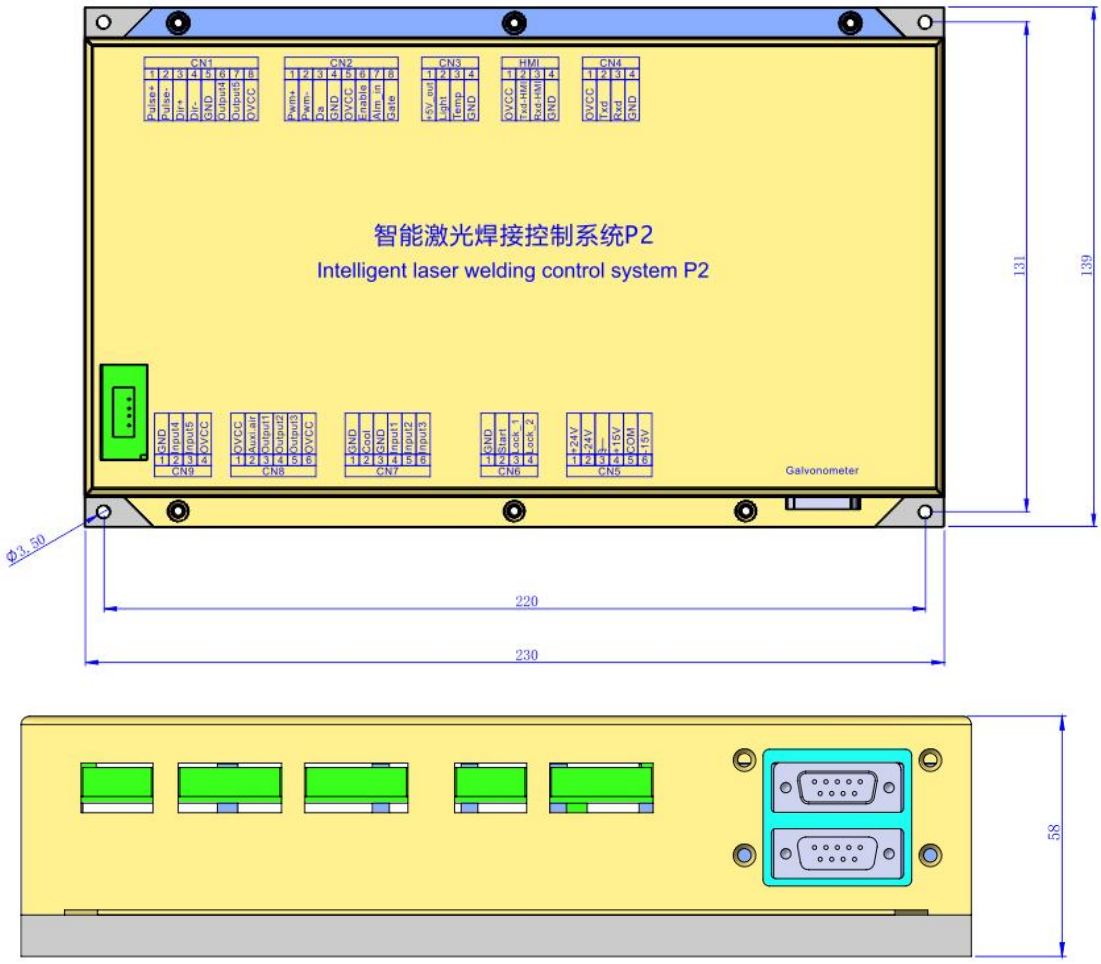
lens. Pay attention to dust prevention and seal the exposed window on the cavity with masking tape to prevent the dust from entering the cavity that results in the pollution after the drawer is taken out, and then replace the protective glass.



Chapter V Welding System

5.1 Installation dimension drawing for product

5.1.1 Installation dimension of mainboard



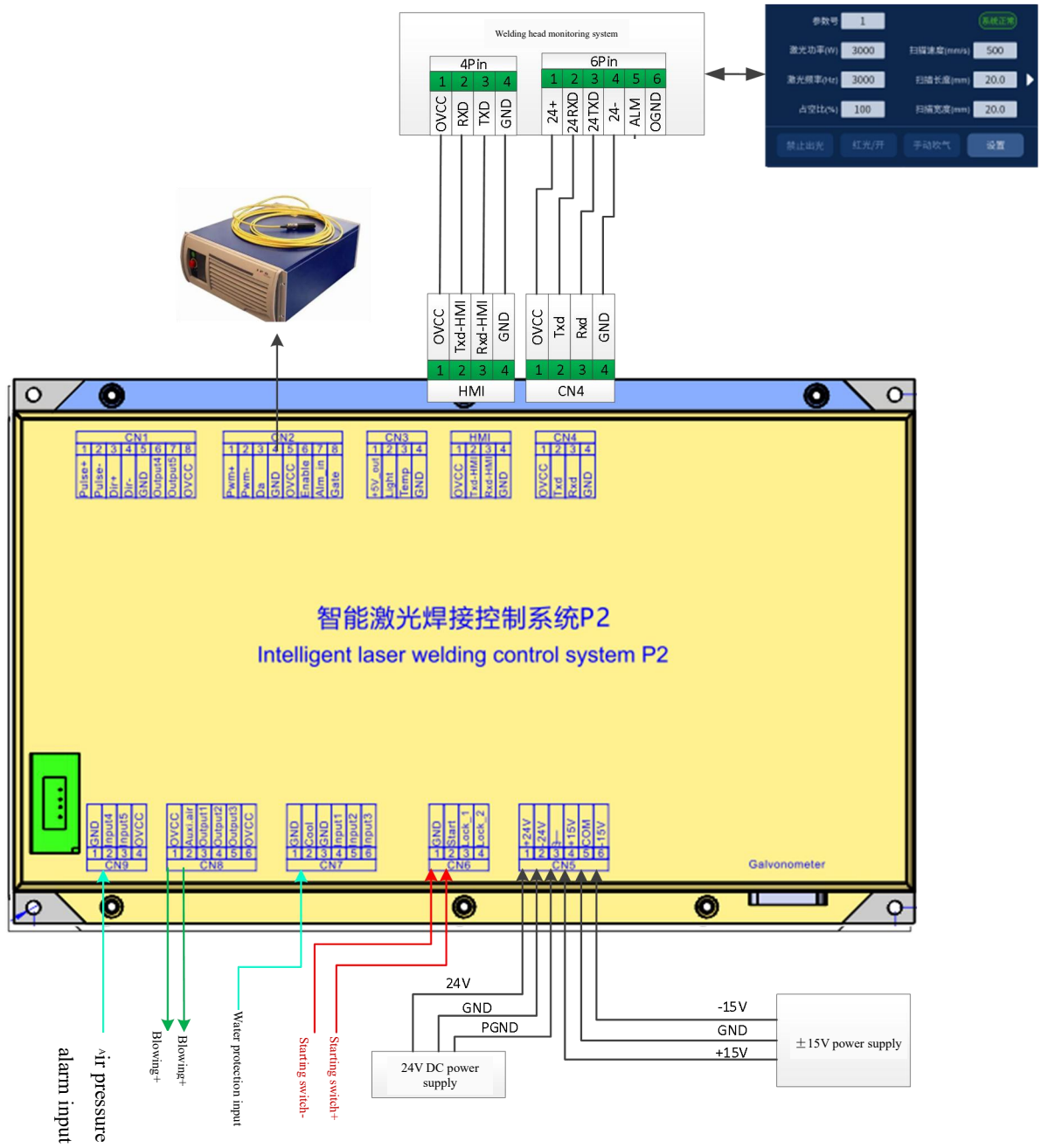
Chapter VI Electrical

6.1 Packing list

List				
S/N	Name	Graphical Representation	Quantity	Remarks
1	Intelligent double swing welding head		1	
2	24V Switching power supply		1	
3	±15V Switching power supply		1	
4	Platform welding control line		1	
5	Intelligent laser welding control system P2		1	
6	Protective lens		4	

6.2 System wiring

The following figure is a schematic diagram for wiring of the whole system. Refer to the schematic diagram for system wiring. Refer to relevant chapters for detailed interface definition.



Note: Don't connect the reserved pin in the mainboard.

6.3 CN5 power supply interface

The power supply interface falls into 6PIN green terminal, providing a power interface for mainboard and galvanometer externally, with voltage: DC 24V (DC 24V) and DC ±15V (DC ±15).

Table 6.3.1 shows the definition of CN5 power supply interface.

Table 6.3.1

Pin	Signal	Definitions	Instruction
1	24V+	Power supply input	+24V external power input and power supply output current: above 3A
2	24V-	Power reference ground	—
3	PGND	External shielding ground	Generally connecting to ground or enclosure
4	+15V	Power supply input	+15V external power input and power supply output current: above 3A
5	GND	Power reference ground	—
6	-15V	Power supply input	+15V external power input and power supply output current: above 3A

6.4 CN1 wire feeder interface

The wire feeder interface CN1 is a 8PIN green terminal, supporting motor wire feed and IO wire feed. Table 6.4.1 shows the definition of wire feeder interface.

Table 6.4.1

Pin	Signal	Definition	Instruction
1	Pulse+	-----	Reserved unconnected
2	Pulse-	-----	Reserved unconnected
3	DIR+	-----	Reserved unconnected
4	DIR-	-----	Reserved unconnected
5	GND	Reference ground	—
6	Feed	Wire feed control interface	Reserved unconnected
7	Backoff	Wire draw control interface	Reserved unconnected
8	OVCC	+24V power output	Power supply, maximum output: 500mA

6.5 CN2 laser interface

The laser interface is a 8PIN green terminal. Table 6.5.1 shows the definition of laser interface.

Table 6.5.1

Pin	Signal	Definition	Instruction
1	PWM+	Modulating signal+	Duty ratio: 1%-99% (adjustable), 24V level
2	PWM-	Modulating signal-	Duty ratio: 1%-99% (adjustable), 24V level
3	DA	Analog voltage output	0-10V analog voltage, used for laser peak power adjustment
4	GND	Power reference ground	Generally connecting to DA- and Enable-end
5	OVCC	+24V power output	Power supply, maximum output: 500mA
6	Enable	Laser enabling signal	24V level and high level: effective
7	Alarm	Laser failure alarm input	—
8	GATE	Red light index signal	The signal is needed by part of lasers. The function is reserved for use when leaving the factory

6.6 CN3 temperature sensor interface

The temperature sensor interface CN3 is a 4PIN green terminal. Table 6.6.1 shows the definition of temperature sensor. The user directly inserts the supporting connection line with terminal.

Table 6.6.1

Pin	Signal	Definition	Instruction
1	+5V_out	Sensor P interface	+5V Power supply, maximum output: 5mA
2	Light	Sensor L interface	Reserved unconnected
3	Temp	Sensor T interface	Reserved unconnected
4	GND	Sensor G interface	Reserved unconnected

6.7 HMI touch screen interface

The HMI interface is a 4PIN green terminal and power supply to and communication with HMI by the mainboard are performed via the port.

Table 6.7.1 shows the definition of HMI interface.

Table 6.7.1

Pin	Signal	Definition	Instruction
1	OVCC	Power supply, 500mA	Monitor board and panel power supply
2	Txd-HMI	Connecting to the HMI sending end	Serial port communication TXD signal
3	Rxd-HMI	Connecting to the HMI receiving end	Serial port communication RXD signal
4	GND	Power reference ground	—

6.8 CN4 reserved serial interface

The reserved serial port CN4 interface falls into 4PIN green terminal,

with no connection reserved. Table 6.8.1 shows the definition of CN4 interface.

Table 6.8.1

Pin	Signal	Definition	Instruction
1	OVCC	Power supply, 500mA	Monitor board and panel power supply
2	Txd	Connecting to TXD signal of monitor board	Serial port communication TXD signal
3	Rxd	Connecting to TXD signal of monitor board	Serial port communication RXD signal
4	GND	Power reference ground	—

6.9 CN6 external start and safety lock interface

The CN6 interface is a 4PIN green terminal. Table 6.9.1 shows the definition of CN6 interface.

Table 6.9.1

Pin	Signal	Definition	Instruction
1	GND	Reference ground	Generally connecting to the start button switch on the welding head-
2	Start	External start switch input	Generally connecting to the start button switch on the welding head+
3	Injector	Safety clamp signal input	The pin must be connected to the safety clamp and the safety clamp shall be clamped onto the metal material before welding.
4	Interlock	Safety lock signal input	The pin must be connected to the nozzle of the handheld head. The nozzle touches the metal material at the moment of welding.

6.10 CN7 common input interface 1

The CN7 interface is a 6PIN green terminal and of NPN type. Table 6.10.1 shows the definition of CN7 interface.

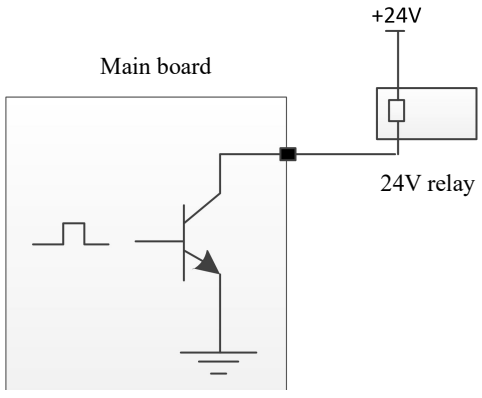
Table 6.10.1

Pin	Signal	Definition	Instruction
1	GND	Reference ground	—
2	Cool	Water-cooling machine alarm input	
3	GND	Reference ground	—
4	Input1	Reserved	—
5	Input2	Reserved	—
6	Input3	Reserved	—

6.11 CN8 common output interface

The CN8 interface is a 6PIN green terminal. The OC output can be used to directly drive the relay and the maximum current can reach to 500mA.

Table 6.11.1-Schematic Diagram for Wiring is as follows:



Schematic Diagram for Output Port

Table 6.11.1

Pin	Signal	Definition	Instruction

1	OVCC	+24V power output	Power supply, maximum output: 500mA
2	Auxi.air	Protective gas	Used for protective gas blowing control
3	Output1	Green light	—
4	Output2	Red light	—
5	Output3	Buzzer	—
6	OVCC	+24V power output	Power supply, maximum output: 500mA

6.12 CN9 common input interface 2

The CN9 interface is a 4PIN green terminal. Table 6.12.1 shows the definition of CN9 interface.

Table 6.12.1

Pin	Signal	Definition	Instruction
1	GND	Reference ground	—
2	Input4	Undervoltage alarm input	
3	Input5	Reserved	—
4	OVCC	+24V power output	Power supply, maximum output: 500mA

6.13 Galvanometer interface

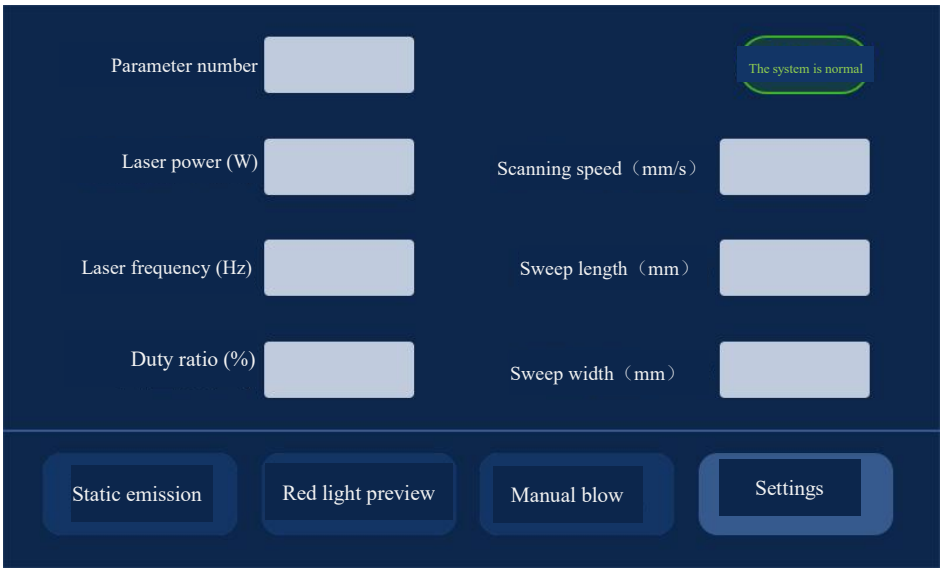
The system provides two DB9 galvanometer interfaces, one DB9 male and one DB9 female.

Chapter VII Introduction To HMI Operation

7.1 Introduction to HMI function

As for the laser welding system operation panel (hereinafter referred to as "HMI"), the 7-inch configuration TFT touch screen is used, with beautiful interface and convenient operation.You can set parameters related to laser and swing, and support the authorization staging function. The current processing parameters, alarm information and running state can be displayed in real time on the main interface.

The HMI main screen is shown in the following figure



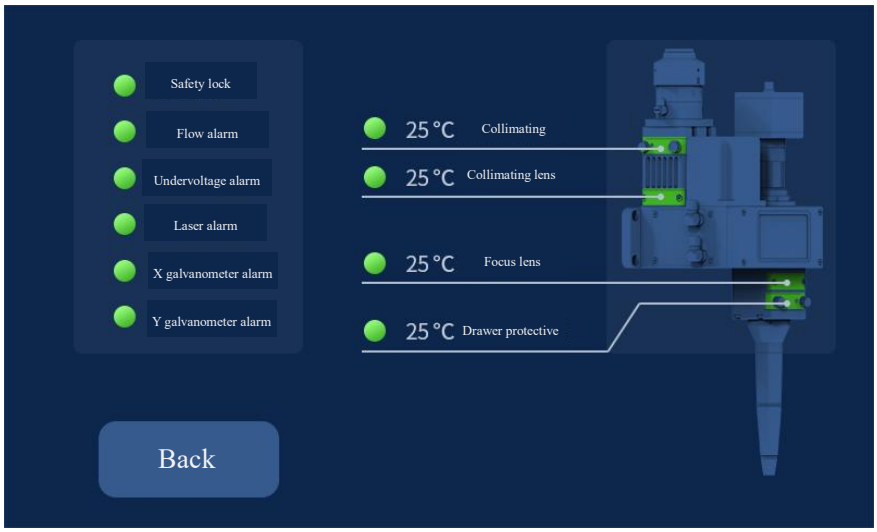
3.1 HMI Main interface

【No light(Permissible light output)】： When the display disables light, light processing cannot be performed at this time. When the display allows light processing, light processing can be performed when the system is normal. The user can also control whether the system can emit light through this button, which has a protective effect.

【Red light preview/on(Red light preview/Off)】： Through the button to control whether to display red light, automatic control during processing.

【Manual blow】： Click < Manual Blow > Touch button to perform manual blow test.

【System normal (alarm)】:Displays whether the current system generates alarms. Click here to enter the diagnosis page to see the specific alarm status and gun head temperature, no alarm when the green light.



【Light out、blow】:Display the current processing state, for light and wire feeding.

【Settings】： Click the < Settings > touch button to enter the parameter setting page, you can configure < Home page >, < system parameters >, < device parameters >, < authorization code >, < center offset >.

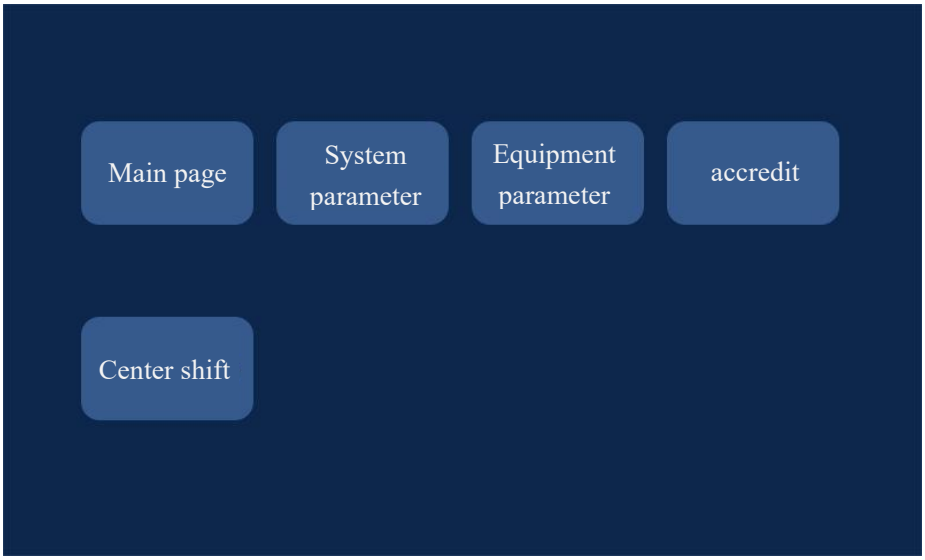
【 / 】:You can switch the next page of the current category

parameter by pressing the left and right buttons.

7.2 HMI Introduction to HMI operation

Parameter setting

Parameter Settings include home page, system parameter, device parameter, authorization, and center offset.



【Main page】： Used to set parameters such as laser control and swing type during welding.

Parameter number： he system supports nine groups of parameter stores.

Laser power： Set the optical output power during welding.

Laser frequency：Set the frequency of the PWM modulation signal of the laser.

Duty cycle： Set the duty cycle of the PWM modulation signal, the setting range is 1% ~ 100%.

Scanning speed： Set the speed of the galvanometer scan.

Sweep length： Set the length of the galvanometer scan in the X

direction.

Sweep width： Set the width of the galvanometer scanning in Y direction.

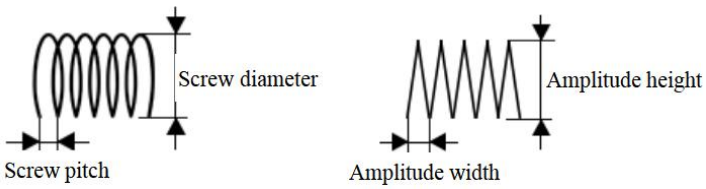
Scanning foreignization is enabled： Sets whether the 'Scan type' parameter is differentiated according to the 'linear selection' parameter. 12 scanning waveforms can be combined by foreignizing enable, scanning type and linear selection.

Scanning type: Set the basic scanning shape, supporting circle, rectangle, straight line three shapes.

Scanning times: Continue to press the start button when the light out of the maximum number of scanning times to stop the light, ∞ times the infinite cycle until the start button is released.

Scan foreignization Enable: Set whether the Scan Type parameter is foreignized based on the Linear Selection parameter. 12 scanning waveforms can be combined by foreignizing enable, scanning type and linear selection.

Linear selection: Set the linear type of alienation, support spiral, sawtooth, point three linear.



Amplitude height: Set linear to tooth height when serrated, linear is a

special parameter for serrated mode.

Amplitude width: Set linear to the tooth width when the serrated, linear is the special parameter of the serrated mode.

Pitch: Set linear to spiral pitch, linear is a special parameter for spiral mode.

Spiral diameter: Set linear to spiral diameter, linear is a special parameter for spiral mode.

Number of points: The number of points when linearity is set to point, and linearity is a special parameter for point mode.

Outgoing light time: Set linear to the outgoing light time of each point, and linear is a special parameter for the point mode.

【System parameter】： This parameter is used to set basic system parameters.

Time for enabling gas in advance: Delay in enabling gas can be set when processing is enabled. The emission of laser will start after blowing is delayed for a period of time by pressing the external start button.

Time for delay in disenabling gas: Delay in disenabling gas can be set when processing is disenabled. Stop blowing after stopping laser emission, and then delaying for a period of time when processing is stopped.

Laser enabling power: Used to set the laser initial power, it is the percentage of the welding power.

Control the time taken for the laser emission of the laser to slowly rise to the set power.

Laser disenabling power: Used to set the laser disenabling power, it is the percentage of the welding power.

Time of advancing gradually when laser disenabling: Control the time taken by the laser disabling power of laser to slowly lower.

Language: Used for language switch.

X scale factor： It is used to set the maximum range of X galvanometer swing. This parameter must be consistent with the actual range of galvanometer swing, otherwise the actual scan length may be inaccurate.

Y scale coefficient： This parameter is used to set the maximum range of Y galvanometer swing. This parameter must be consistent with the actual range of galvanometer swing, otherwise the actual scanning width may be inaccurate.

Field mirror type： Reserve switches between different field mirrors. Reserve parameters do not need to be set.

【Equipment parameter】： This parameter is used to set device parameters. To enter device parameter configuration, enter the password 666888.

Laser power rating： Used to set the rated power of the laser.

Maximum scanning speed： Used to set the maximum galvanometer

scanning speed.

Minimum sweep speed： Used to set minimum galvanometer scanning speed.

Maximum scan length： This parameter is used to set the maximum scan length allowed by the device.

Minimum sweep length： This parameter is used to set the minimum scan length allowed by the device.

Maximum laser frequency： Used to set the maximum laser frequency.

Minimum laser frequency： Used to set the minimum laser frequency.

Maximum sweep width： This parameter is used to set the maximum scanning width allowed by the device.

Minimum sweep width： This parameter is used to set the minimum scanning width allowed by the device.

Temperature monitoring alarm： When the temperature monitoring alarm is enabled, an alarm is generated when the detected lens temperature exceeds the set alarm temperature.

Collimating mirror alarm value： Collimating protective mirror temperature alarm value, the lens temperature exceeds the alarm value to trigger the alarm and stop processing.

Collimator alarm value： Collimator temperature alarm value, the

temperature of the lens exceeds the alarm value to trigger the alarm and stop processing.

Focusing mirror alarm value： Focusing mirror temperature alarm value, the lens temperature exceeds the alarm value to trigger the alarm and stop processing.

Drawer mirror alarm value： Drawer protective mirror temperature alarm value, the lens temperature exceeds the alarm value to trigger the alarm and stop processing.

Laser alarm enabled： When the laser alarm is enabled, the alarm is generated according to the signal of the laser alarm input pin detection.

Laser alarm level： Set the logic level of the laser alarm signal. When the alarm is enabled, if the low level is set, the actual detection of the laser alarm input pin is also low, the alarm will be generated; If the high level is set, the actual detection of the laser alarm input pin is not low, then an alarm is generated.

The undervoltage alarm was enabled： When the undervoltage alarm is enabled, the alarm is generated according to the signal of the undervoltage alarm input pin detection for air pressure detection.

Undervoltage alarm level： Set the logic level of the undervoltage alarm signal, refer to the laser alarm level parameter.

The chiller alarm was enabled： When the chiller alarm is enabled, the alarm is generated according to the signal of the chiller alarm input

foot detection.

Chiller alarm level： Set the logic level of the chiller alarm signal, refer to the laser alarm level parameters.

Cumulative light time： View the total optical output time of the current system, and clear time.

Cumulative boot time： View the total startup time of the current system. You can clear the time.

【accredit】： Used for authorization management of the mainboard, you can view system version information.

【Center shift】： It is used to set the position fine adjustment when the red light point is not in the center position, and supports the fine adjustment in the four directions of up and down and left and right.

x-shift： Offset distance in the X direction of the galvanometer.

Y-shift： ffset distance in the Y direction of the galvanometer.

Moving step： The amount of red light moved to offset the button with a single click.

Shenzhen RelFar Intelligent Technology Co., Ltd.

Thank you for using the intelligent technology product of Shenzhen RelFar!

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