Product Description
SUP31F(V1.0)

Wuxi Super Laser Technology Co.Ltd

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Copyright Statement

Update Record

Version	Updated content	Time	Compiler
V1.0	First Edition	25.7.15	Liu Chen

I. Precautions

This product belongs to the accessories of laser processing equipment and is applied in the field of metal material processing. According to the relevant regulations, this product complies with the basic safety standards for indoor and outdoor use of hand-held, movable and fixed electrical products. According to the actual demand, it is recommended to set up an operation area of 2~10 square metres for each product (indoor height of 3 metres or more is recommended).

Warning! Please read all safety warnings, instructions, illustrations and specifications of this manual in their entirety. Failure to observe all instructions below may result in electric shock, fire or various other serious injuries! This product is intended for use in professional industrial specialities only and must be used by professionals! It must not be used by persons who are not professionally qualified!

1.1 Transport and storage requirements

The handheld laser welder should be able to work normally under the following environmental conditions.

(1) Ambient air temperature range:

During transport and storage: - 25℃ to + 55℃.

(2) Relative air humidity:

At 40℃, not more than 70 %;

At 20℃, not more than 90 %.

(3) The dust, acid, corrosive gases or substances in the surrounding air does not exceed the normal content, except for these substances due to the welding process.

(4) No significant vibration and shock.

1.2 Description of possible hazards

1.2.1 Machine hazards

① Entrapment or other secondary hazards caused by the fastening structure.

② Smash injuries or other secondary hazards caused by falling equipment.

1.2.2 Electrical Hazards

① Electrocution or other secondary hazards caused by leakage of power supply of equipment.

② Equipment running static electricity caused by electric shock or other secondary hazards.

1.2.3 Thermal hazards

① Laser processing generates a lot of heat caused by heat stroke, dehydration or other secondary hazards.

② laser processing of high-temperature materials, residues, splashes caused by scalding, environmental fire or other secondary hazards.

1.2.4 Radiation hazards

① Laser direct or reflected after the second irradiation caused by personnel skin damage, retinal damage or other secondary hazards.

② laser energy generated electrolysis plasma hazards or other secondary hazards.

③ Material decomposition caused by laser irradiation, secondary radiation or other secondary hazards caused by excited radiation.

1.2.5 External interference hazards

Abnormal work of the product triggered by external factors, there may be equipment failure resulting in dangerous conditions.

External environment refers to:

① Temperature
② Humidity
③ External shock/vibration
④ Vapour, dust or gas in the environment.
⑤ Electromagnetic interference
⑥ Original power interruption/fluctuation
⑦ Lightning strike
⑧ Inadequate hardware/software compatibility or integrity
⑨ External communication does not comply with the communication protocol.

1.2.6 Restricted Space Hazards

Hazards that may result from the use of handheld laser processing equipment in a restricted space:

① Increased concentration of hazardous substances in the space
② High concentration of process gases (argon, nitrogen, etc.) in the space
③ Oxygen deficiency
④ Enhanced electric current
⑤ Increase in temperature
⑥ Radiation hazard caused by direct laser light or reflection, diffuse reflection.

1.2.7 Hazards of working at heights

① Hazard of falling objects.
② The fall hazard of the user.

1.3 Preventive measures

In response to the above hazards, in order to ensure safe production and normal operation of the product, the following safety signs are posted on the whole product, clearly informing all personnel using, maintaining and approaching the product to pay attention to the following safety matters and must take the following safety measures.

Warning! Please read all safety warnings, instructions, illustrations, specifications and all other parts of this manual. Failure to observe all of the following instructions may result in electric shock, fire or various other serious injuries!

1.3.1 Production operating environment

① Product use should be divided into dedicated laser welding areas.

② Flammable and explosive materials should be prohibited around the product to avoid safety hazards.

③ The product should avoid exposure to fog, wind, lightning, rain, snow, hail and other non-good weather conditions when working outdoors.

④ Good ventilation and visibility (daylight or light) should be maintained when the product is working indoors.

⑤ The dust, acid, alkali and corrosive gas in the working environment of the product should not exceed the normal level.

⑥ The temperature range of the working environment of the product: -10~50℃, humidity range ≤70%.

⑦ The working environment of the product should avoid obvious vibration and shock.

1.3.2 Engineering protection measures

① The periphery of the laser welding area should be set up to isolate the protective fence, which should be able to withstand a certain amount of laser energy and prevent the laser from irradiating outside the area.

② Without the authorization of the operator, other personnel should not enter the laser welding area.

③ This product adopts 220V AC power supply, the applicable range is 220V±5% AC 50/60Hz, the power supply voltage should be stable without shock. Please pay attention to the safety of electricity to avoid electric shock hazard.

④ In order to ensure the normal operation of the product and avoid static electricity injury and product leakage, the product should adopt safety grounding measures, i.e., connect the easy-to-conduct parts to the protection (grounding) conductor in the fixed wiring of the product, so that the easy-to-touch conductive parts will not become electrically charged when the basic insulation fails; depending on the situation, additional safety measures (e.g., double insulation or reinforced insulation) can be added, or grounded individually;

⑤ An emergency stop switch control device must be available within 2 m of the operator's work area centred on the individual.

1.3.3 Personal protective measures

Warning! The operator must be a professional who, in addition to being familiar with this product and the associated welding system, is also familiar with the properties of the material being processed, with possible side effects, and is capable of assessing health risks and ensuring effective preventive measures.

① Individuals should wear professional laser protective clothing and gloves.

② Individuals should wear laser protective glasses and masks with corresponding power and wavelength.

1.3.4 Product Maintenance Protection Measures

① When replacing the wearing parts, make sure the product is powered off to avoid light out.

② The control box of this product does not contain accessories that require user operation, for any installation, maintenance and dismantling of this product should be carried out in the case of power failure at the designated maintenance point, please contact your local dealer.

1.3.5 Other Precautions

① Warning! The product is adapted to lasers with wavelengths of 1080nm and its vicinity, which are invisible light and whose radiation is difficult to detect before it has a direct effect, and requires special attention! Operators must wear all protection, the work area must be protected as required, the work area may not enter any other personnel!

② laser instantaneous output of energy is very high, work or placed or idle are not to point the light outlet to personnel or other items.

③ Class 4 lasers can indirectly irradiate the skin and eyes due to diffuse reflection of the material even if they do not directly irradiate the skin and eyes, at which point irreversible damage can still occur. The operator must wear protective equipment such as glasses and protective clothing.

④ Laser irradiation on smooth surfaces produces specular reflection, which is particularly evident when processing highly reflective materials such as copper and aluminium. The angle of reflection also changes due to changes in the melt pool when processing the material. The operator should have a good understanding of the possible reflection angles to avoid laser reflection hazards to personnel and equipment.

⑤ The gas surrounding the molten pool forms an electrolytic plasma when irradiated by a high-energy laser. The splash waste and exhaust gases generated by the laser action on the material can also be hazardous to personnel. The operator must wear protective equipment such as a mask.

⑥ When working, add an emergency stop switch control device within 2m of the operator's work area with the individual as the centre.

⑦ When working at height, the operator should wear a safety rope, helmet, etc., and the equipment to take fixed measures to prevent falling.

⑧ When working indoors or in restricted spaces, maintain adequate ventilation measures to avoid the deposition of harmful substances. Maintain adequate visibility to avoid strong light irritation to human eyes. Adequate measures need to be provided to exclude from the processing area smoke that may be generated, exhaust gases, etc. need to be adequately purified and discharged into the atmosphere away from people.

1.3.6 Safety signs

The following safety signs must be fully understood and used.

Signs	Name
	Fireable Area
	Warning! Be Safe!
	Beware of hot surfaces
	No chemical fibre clothing
	No flammable materials
	Laser Radiation Avoid direct or scattered radiation to eyes and skin Class 4 Laser Products
	Laser windows Avoid exposure to laser radiation emanating from the window.
	Light-blocking goggles must be worn

	Beware of lasers
	Beware of ionising radiation
	Beware of electric shock
	Must be earthed
	Must be unplugged
	Do not close circuit breaker

Ⅱ. Product Overview

This product belongs to the laser welding equipment accessories, used in the field of metal materials processing, including carbon steel, stainless steel, aluminium, copper and other common metals and other metals that can absorb 1080nm band laser.

It is suitable for continuous lasers with laser power of 1500W and below and wavelength of 1080±10nm.

The cooling method is air-cooled, and argon is recommended as the refrigerant.

Cannot be used for processing of non-metallic materials such as wood, stone, plastics, composites and so on.

Cannot be used for underwater work, see [Production and Operation Environment] for detailed working condition requirements.

This manual includes SUP31F series of handheld laser welding head products, the basic functions, installation and setup, operation, use and maintenance and other aspects of the general description.

2.1 Description of the gun body

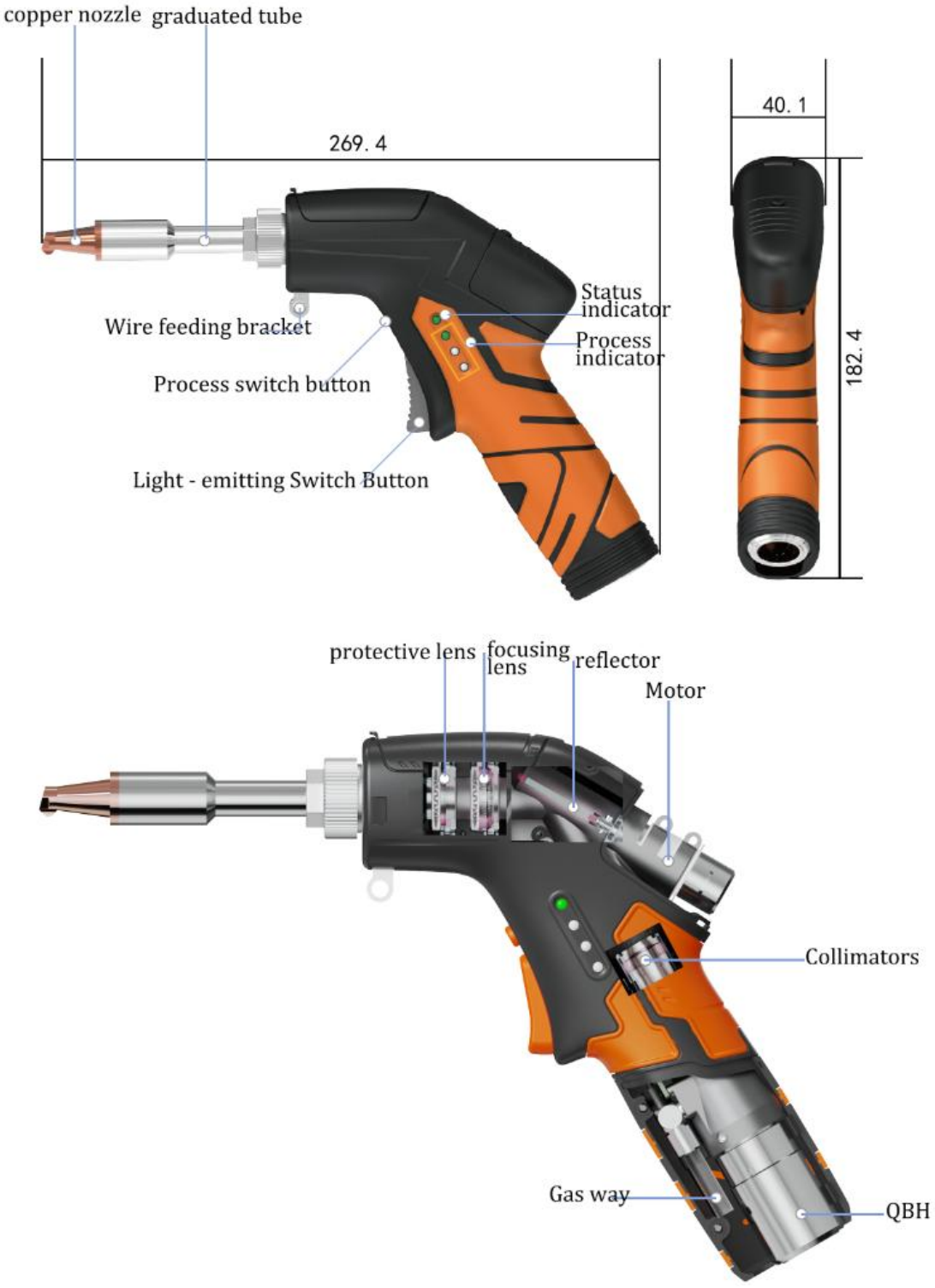


Figure 2.1 SUP31F gun body

Auxiliary function description:

1、 Status indicator:

Always on green	Green blinking	Red light always on	Red blinking
Normal standby	Safety ground lock on	Continuous light	System Alarm

2、 Process indicator light:

As shown in Fig. 2.1, corresponding to [commonly used process 1, 2, 3], such as calling [commonly used process 1], the No. 1 light is green.

3、 Process switching button:

When clicked, it switches [Common Processes] in sequence for quick calling of processes. Three groups of process parameters can be preset and switched by the button as required.

4、 Out light switch button:

When the safety ground lock signal is on, press the light out button, the system controls the laser to light out.

2.2 Product Features

- Basic features:

Digital servo drive	Air-cooled cooling	Maximum power 1500W	Maximum welding seam 8mm

- Basic Functions

Serial number	F type
1	Laser welding function
2	Laser cutting function
3	Welding seam cleaning function
4	Lens temperature monitoring function
5	System fault diagnosis
6	Process library support
7	Quick Cut Processes
8	Quick adjustment of wire feeder

2.3 Product operating environment and basic parameters

Table 2.1 shows the operating environment requirements and main parameters of the SUP31F handheld laser welding head:

Table 2.1 Operating environment requirements and basic parameters

Power supply voltage (V)	220V±5% AC 50/60Hz
Operating ambient temperature (℃)	-10～50℃
Working environment humidity (%)	≤70%
Cooling method	Air-cooled
Applicable wavelength	1080nm (±10nm)
Applicable power	≤1500W

Collimator	D16*T5/F50
Focusing lens	D20*T4.5/F150
Reflector	30*14*T2
Protective Lens	D18*T2
Recommended air flow	10~15L/min (20℃ 0.15MPa)
Focus vertical adjustment range	±10mm
Weight	0.58kg
Adaptable laser	After passing through the collimating mirror, the beam Φ ≤10mm

Ⅲ. Product accessories and installation

3.1 Unpacking list

Take the standard version as an example, the product factory list as shown in Table 3.1, the physical if different from the schematic, please refer to the specific order.

Table 3.1 Product factory configuration list

SUP31F packing list				
Serial number	Material No.	Name	Specification	Quantity
1	A01050004	Handheld laser air-cooled welding head	SUP31F	1
2	A05010021	Self-made laser welding system	SUP- LWS- E	1
3	K01092001	Eight core system connection cable	32C-10 M	1
4	C04010006	Display	SUP-DW128 HJT	1
5	C03020011	Switching Power Supply	100FGC-24	1
6	K04020001	Display cable (vertical side outlet)	1M	1
7	D01020009	Protective Lens	D18T2	5
8	B06030003	Double feeding copper nozzle	AS-20D	1
9	B06010001	Copper nozzle	AS-12	1
10	B06010002	Copper nozzle	BS-16	1
11	B06010003	Copper nozzle	CS-12	1
12	B06010004	Copper nozzle	ES-12	1
13	B06010005	Copper nozzle	FS-16	1
14	B06020003	Copper nozzle	C	1
15	B06020005	Nozzle adapter	S	1
	B06020006	Nozzle	1.5 single layer	1

			M8	
16	B03210160	Graduated tube	FT80	1
17	J01050004	Copper nozzle box		1
18	E01090001	Large crocodile clip		1

Figure 3.1 Product Unboxing 1

Figure 3.2 Product Unboxing 2

3.2 Control Box Wiring and Interface Definition

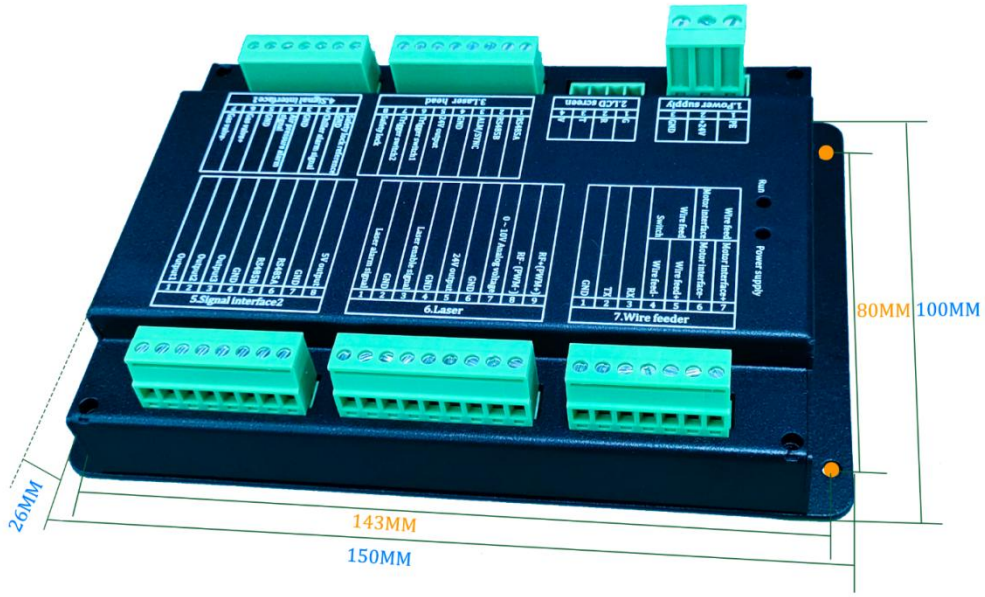


Figure 3.3 Control Box

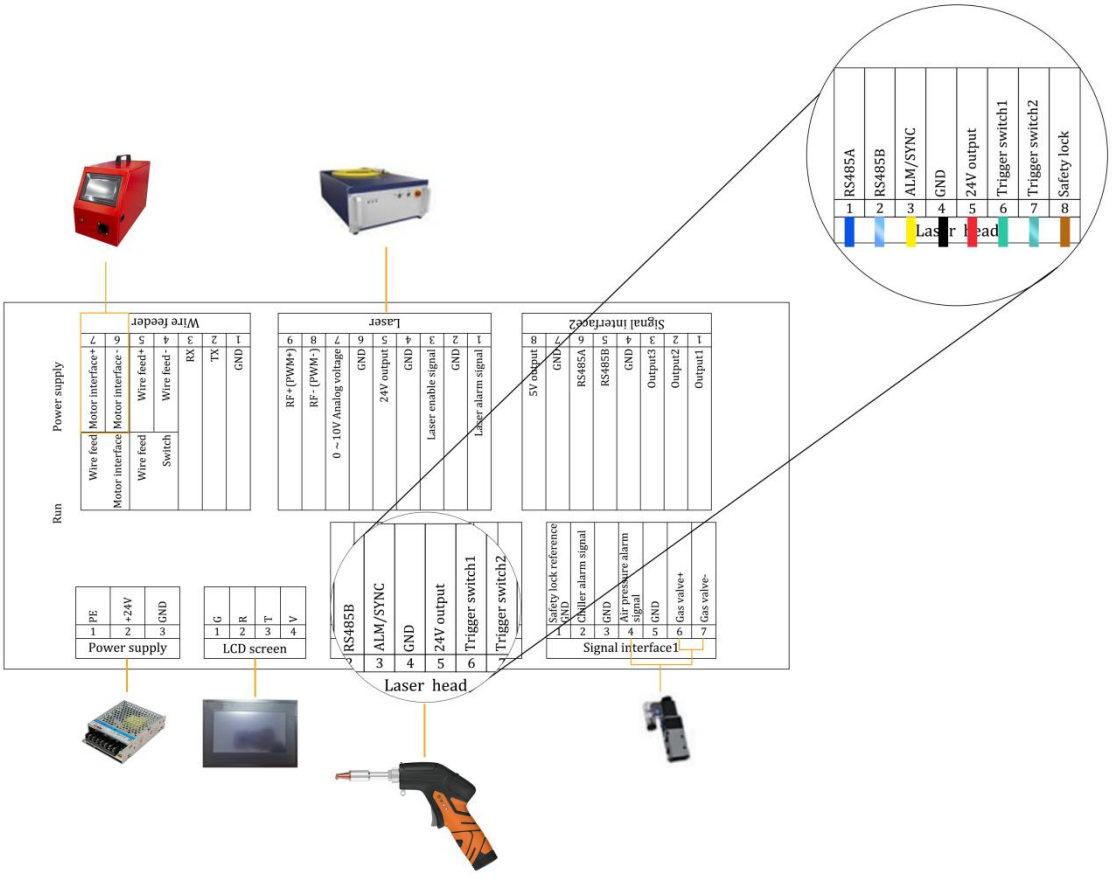


Figure 3.4 Wiring diagram

In order to avoid abnormalities in the product's power consumption, the earth wire of the switching power supply must be effectively grounded! The product shell must be grounded!

The diagrams in Figs. 3.1 and 3.2 only refer to a certain type of product, and do not specifically refer to the corresponding product.

3.2.1 Control Box - [1. Power Supply].

The control box signals [1.Power Supply] interface, as shown in Table 3.2. Please use the supplied 24V switching power supply to power . The dimensions of the power supply are shown in Figure 3.5

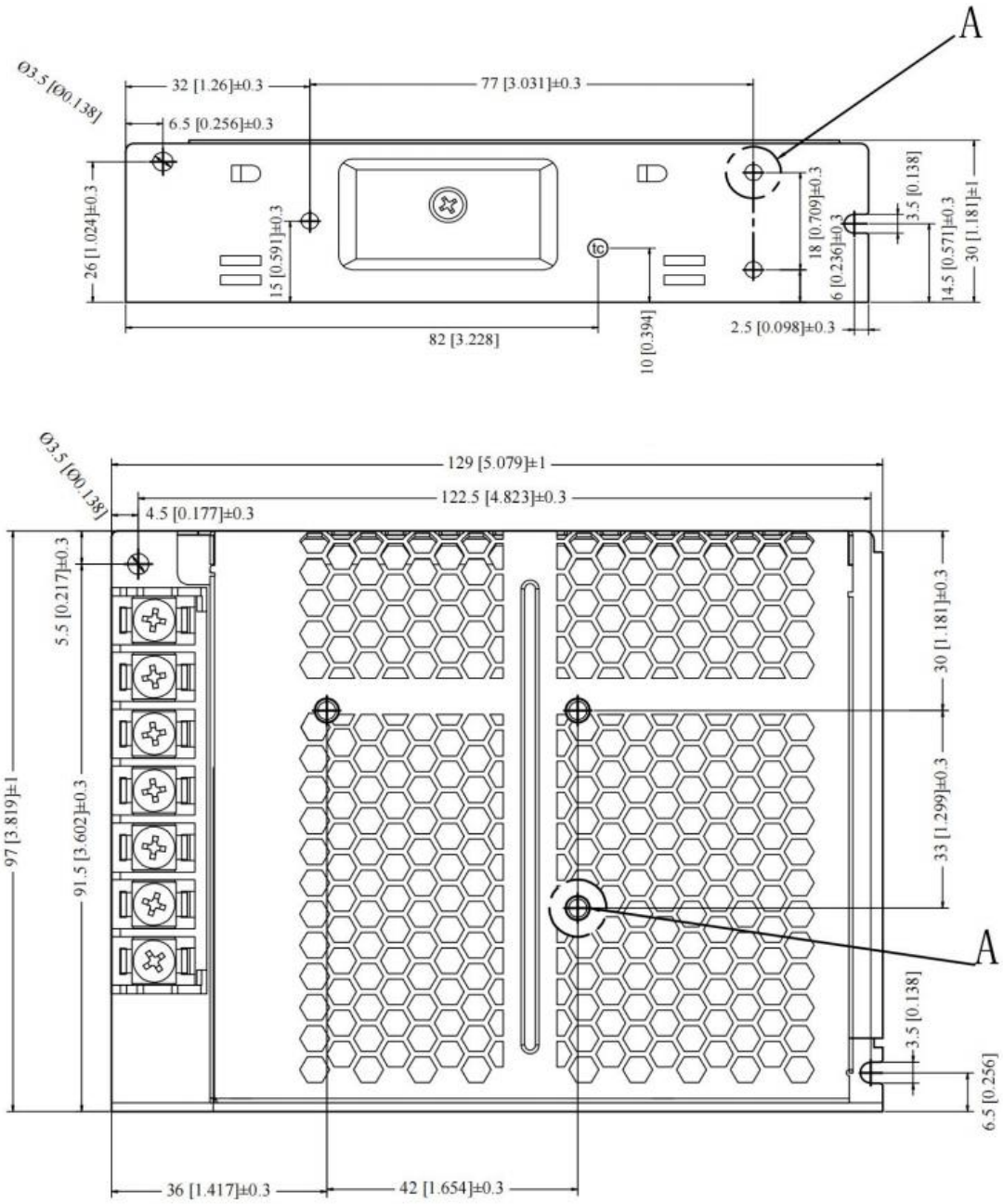


Figure 3.5 Dimensions of power supply

Table 3.2 Functional description of [1.Power Supply] interface

1.Power Supply		
Pin No.	Signal Definition	Function Description
1	PE	Earth wire.
2	+ 24V	24V input, connected to 24V switching power supply output, marked [+ V0]
3	GND	Public ground, connect to 24V switching power supply output negative, marked [- V0].
Note: PE must be effectively grounded. 1, to confirm that the earth wire conductive, no false connection, disconnection; 2, the ground itself is stable and not charged (both the fire wire, zero line to the PE line of the AC and DC voltage are less than 10V, it is best to maintain 0V).		

3.2.2 Control Box - [2. LCD]

[2. LCD screen] interface, as shown in Table 3.3. Screen appearance dimensions as shown in Figure 3.6 (A.A for the effective display area) installation dimensions diagram as shown in Figure 3.7.

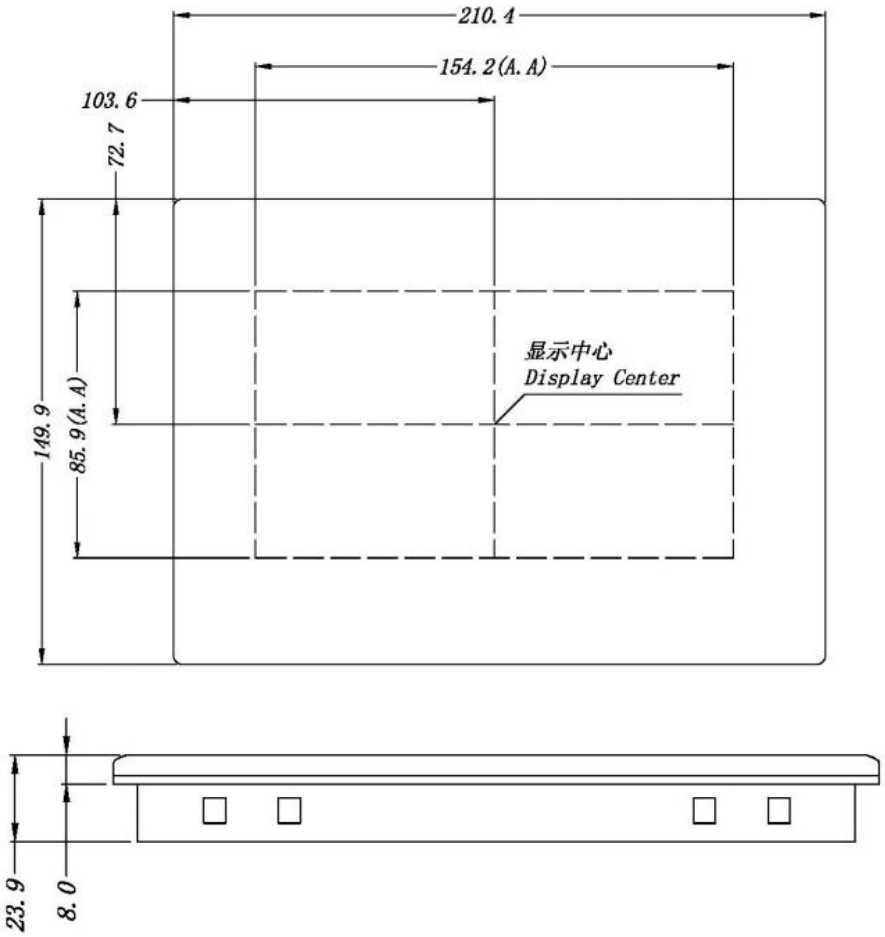


Figure 3.6 display screen appearance dimensions

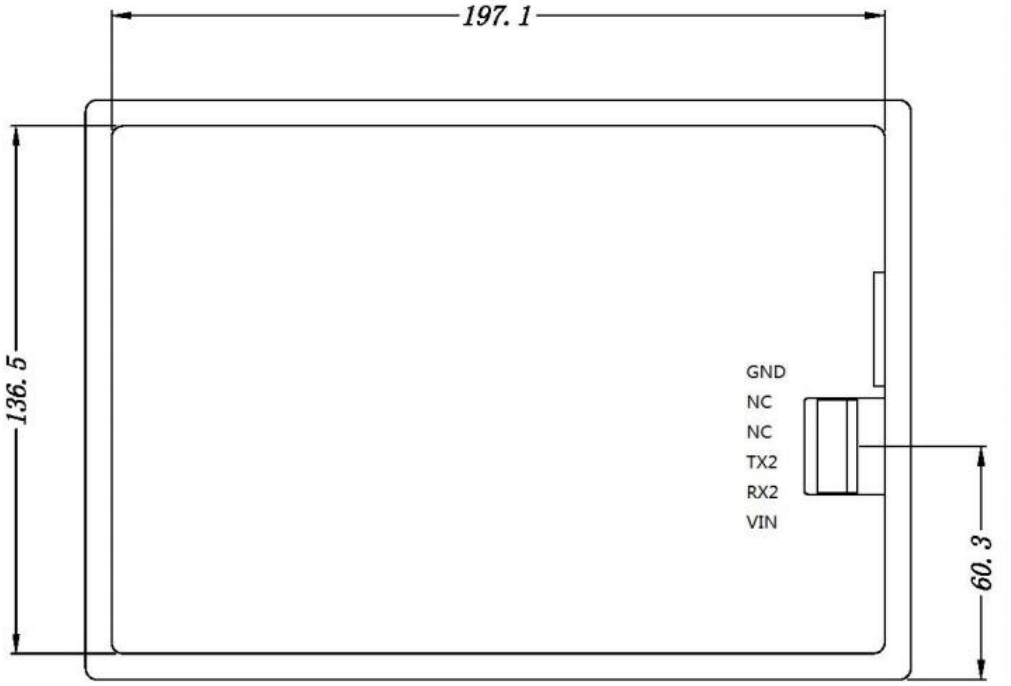


Figure 3.7 Display installation size diagram

Table 3.3 [2.LCD] interface function description

2.LCD		
Pin No.	Signal Definition	Function Description
1	G	White wire, two terminals [4P-1 pin] - [6P-G pin], 24V power negative and cable shield.
2	R	Black wire, two terminals [4P-2 pin] - [6P-R pin], 232 signal.
3	T	Brown wire, two terminals [4P-3 pin] - [6P-T pin], 232 signal.
4	V	Blue wire, two terminals [4P-4 feet] - [6P-V feet], 24V power positive.
Note: The complete screen cable is supplied with the box, plug and play.		

3.2.3 Control Box - [3. Laser head]

The [3.Laser head] interface is shown in Table 3.4.

Table 3.4 [3. Laser head] interface function description

3.Laser head		
Pin No.	Signal Definition	Function Description
1	RS485A	Blue line,marker[3-1]
2	RS485B	Blue-white wire,marker [3-2]
3	ALM/SYNC	Yellow line,marker [3-3]
4	GND	Black wire + shield,marker [3-4]
5	24V Output	Red wire,marker [3-5]
6	Trigger switch 1	Green wire,marked[3-6]
7	Trigger switch 1	Green-white wire,marked[3-7]
8	Safety lock	Brown wire,marked[3-8]

3.2.4 Control Box - [4. Signal interface 1]

[4. Signal interface 1] Connect air valve, safety ground lock (big alligator clip), etc.

Table 3.5 [4. Signal interface 1] Functional description

4.Signal interface 1		
Pin No.	Signal definition	Function
1	Safety lock reference GND	Connect to the big alligator clip. Clamped on the workpiece, the gun head touches the workpiece, then [Safety Ground Lock] and [Safety Ground Lock Reference Ground] conduct.
2	Chiller alarm signal	Input port. Connect the water cooler alarm signal and set the [water cooler alarm level] according to the water cooler alarm output voltage. Air-cooled equipment is not connected.
3	GND	Signal ground
4	Air pressure alarm signal	Input port. Connect the air pressure alarm signal and set the [air pressure alarm level] according to the valve alarm output voltage.
5	GND	Signal ground
6	Gas Valve +	Valve open: 24V output from "Valve"; Valve closed: no output from "Valve".
7	Gas Valve -	Signal ground

3.2.5 Control Box - [5. Signal interface 2]

The [5. Signal interface 2] is a reserved port for external expansion devices for customised functions. It is not normally used.

Table 3.6 [5. Signal Interface 2] Functional Description

5.Signal Interface 2		
Pin No.	Signal Definition	Function Description
1	Output 1	Reserve the output port for controlling three-colour lamp Three-colour lamps need to be common anode, the recommended positive terminal connected to 24V, three-colour wire were connected to 1, 2, 3 feet. 1.[standby mode], [output 1] interface and [GND] conductivity 2.[Operation mode],[output 2]connector and[GND]conductivity 3.[Alarm mode], [output 3] interface and [GND] conductivity
2	Output 2	
3	Output 3	
4	GND	Signal ground
5	RS485B	485 communication
6	RS485A	
7	GND	Signal ground
8	5V Output	Normal 5V output

3.2.6 Control Box - [6. Laser]

The [6.Laser] interface is used to control the laser.

Table 3.7 [6. Laser] interface function description

6. Laser		
Pin No.	Signal Definition	Function Description
1	Laser alarm signal	Input port. Receive laser alarm. According to the laser's signal device [laser alarm level].
2	GND	Signal ground
3	Laser enable signal	Connect laser enable +, output 24V when light is emitted.
4	GND	Signal ground
5	24V Output	Normal 24V output
6	GND	Signal ground
7	0~10V Analogue voltage	Analogue output (default is 0~10V analogue voltage).
8	RF - (PWM -)	PWM - modulating signal
9	RF + (PWM +)	PWM + modulating signal

3.2.7 Control Box - [7. Wire Feeder]

The [7. Wire Feeder] controls the operation of the Super Weaver wire feeder.

Table 3.8 [7. Wire Feeder] Interface Function Description

7. Wire Feeder			
Pin No.	Signal Definition		Function Description
1	GND		Signal ground. Connects to the wire feeder signal line,marker[GND].
2	TX		232 communication. Connect to the wire feeder signal line,marker[RXD].
3	RX		232 communication. Connect the wire feeder signal line,marker[TXD].
4	Wire Feed Switch	Wire feed-	Signal ground. Connect the wire feeder signal wire, marker[wire feed-].
5		Wire Feed	Wire feed enable. When wire feeding, [wire feed -] [wire feed] is enabled. Connect to the wire feeder signal line,marker"wire feed".
6	Wire feed Motor interface	Motor interface -	24V pulse signal. Connect the motor wires according to "6-Motor-" and "7-Motor" corresponding to the wire marking. When feeding the wire, [7] pin is 24V pulse signal, [6] is negative, and the opposite is true when pumping back. The two legs can not be mixed.
7		Motor interface +	

Standard wire feeder only need to connect [4, 5 feet], process library models connect [1, 2, 3 feet] for communication. [AE], [C] model motor only connect [6, 7 feet].

3.3 Equipment Connection

Figure 3.7 Welding head interface diagram

As shown in Fig:

Black	Transparent
System connection line	Air hose

3.3.1 Fibre head connection

The product [QBH] interface is suitable for most industrial lasers Attention should be paid when installing:

① Keep the device clean;

② Place the fibre head horizontally with [QBH] during installation;

③ Subject to the [Locked] and [Unlocked] scales in Fig. 3.8, rotate the QBH to loosen it first, insert the fibre head and then lock it. After locking, the fibre optic head is placed inside the [QBH] and cannot be shaken, and the [QBH] cannot be rotated.

Figure 3.8 QBH [unlocked], [locked] state

3.3.2 Control box connection

The handheld laser welding head is connected to the control box through the [system connection cable]. As shown in Figure 3.9. [Welding Head] - [System Connection Cable] is connected. The [System Connection Wire] - [Control Box] is connected using (3.81-8P) terminals, for detailed definitions see Section: 3.2.3 Control Box - [3. Laser head].

Figure 3.9 Welding head and system connection line

Ⅳ. Interface operation and function switching

① Switching of [Welding System] [Cleaning System] can be realised through the screen.

② When using the cutting function, under [Welding System], set [Scanning Width] to [0]. And replace the [Cutting Copper Nozzle] as shown in Fig. 4.1.

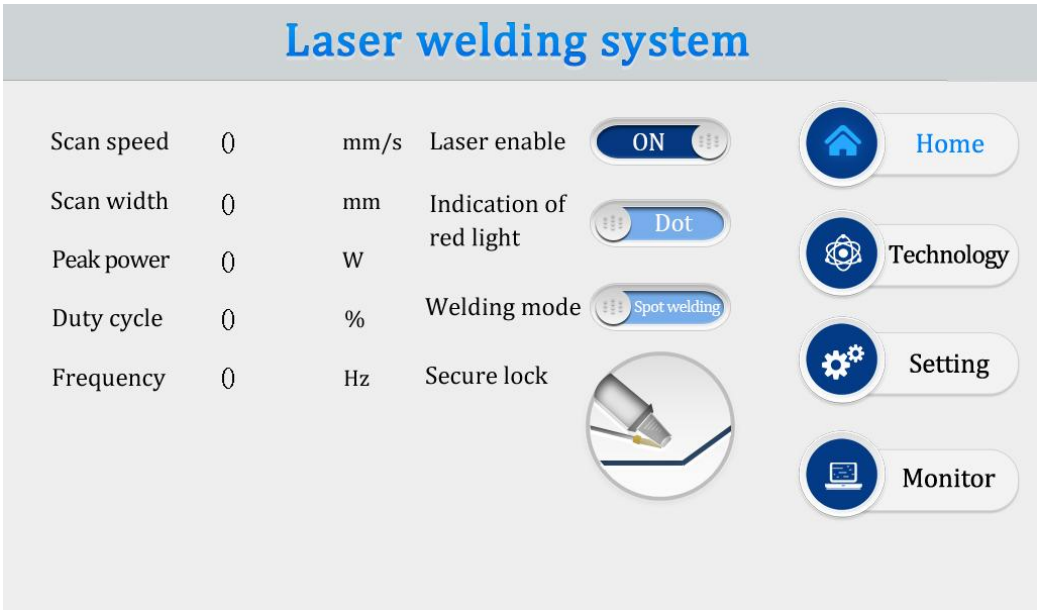
③ When using the weld cleaning function, under [Welding Mode], set [Scanning Width] slightly larger than [Weld Width]. And replace the [AS-20D Copper Nozzle] as shown in Fig. 4.2.

Figure 4.1 Cutting copper nozzle

Figure4.2 AS-20D type copper nozzle

4.1 Home Page

The switch used to display the current process, alarm information and adjust the main output signal as shown below.



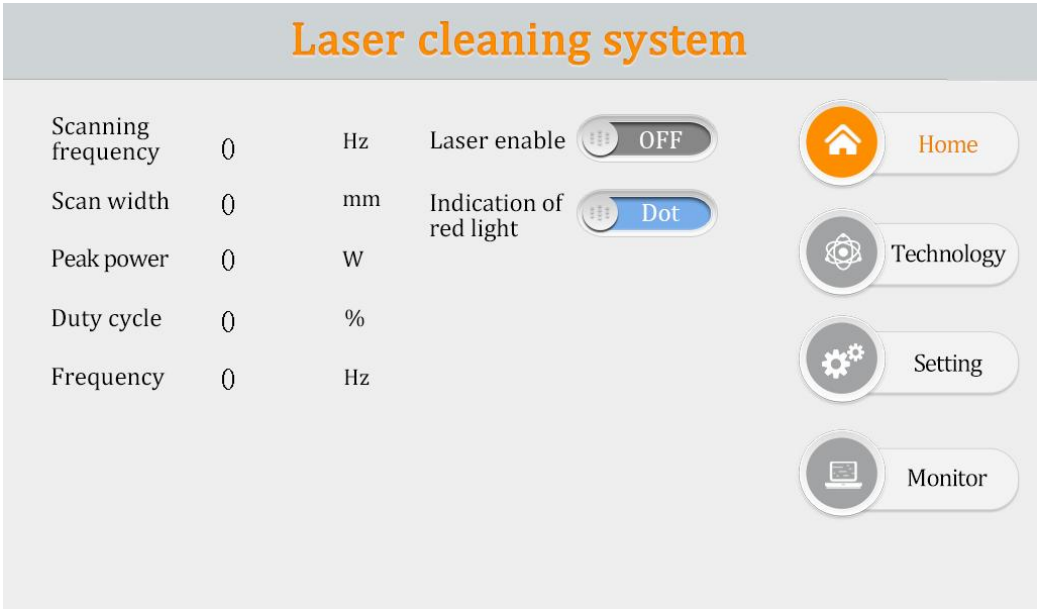


Figure4.3 Home Page

① [Laser enable-On/Off]: Controls and indicates whether or not to output [laser out light enable signal].

② [Indication of red light - Dot / line]： Control, said not out of the laser, the vibration mirror motor is swinging, adjust the red light for [point]or[line], does not affect the red light with or without, does not affect the welding of the swing.

③ [Welding mode - spot welding / continuous]: Usually use [continuous], [spot welding] for the intermittent light according to the parameters of the setup page, for fish scale pattern welding.

4.2 Process Page

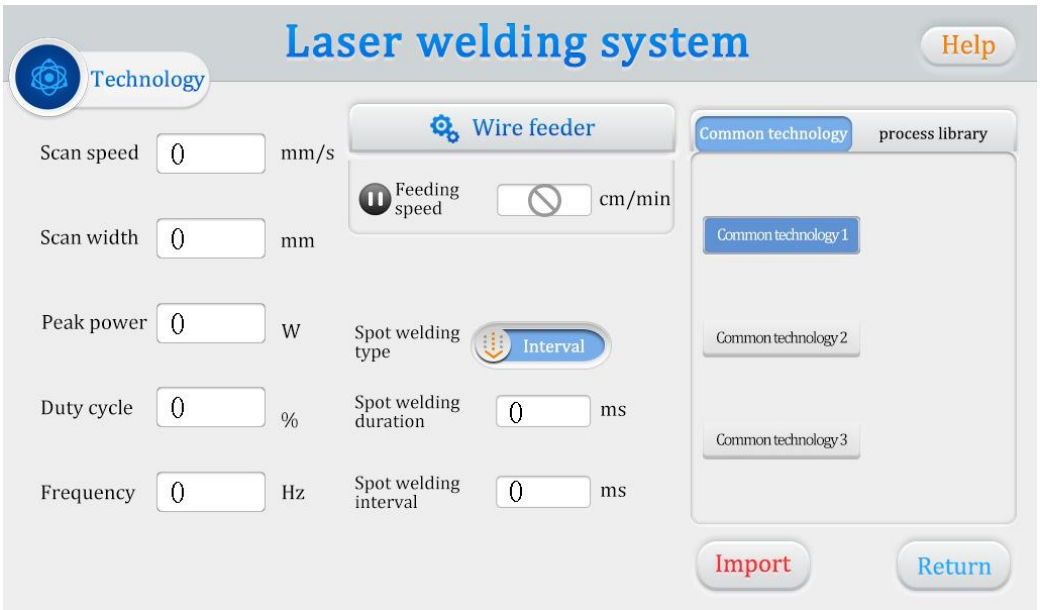


Figure 4.4 Process Page - Commonly Used

① [Scan Speed]: the line speed of the focused spot movement, affecting the welding quality. Take [Scan width] 3mm as an example, usually set to 600~1200. [Welding speed] increase, [Scan speed] correspondingly increase.

② [Scan Frequency]: the number of cycles of the focused spot scanning back and forth within 1 second, which affects the precision of the cleaned surface or the degree of fineness. Usually set to 50~100Hz.

③ [Scan Width]: Corresponds to the theoretical width of the spot, controlling the size of the spot. Depending on the size of the weld to adjust.

④ [Peak power]: the maximum power at the time of light output, or processing power, welding power.

⑤ [Duty Cycle, Frequency]: Usually set [Duty Cycle 100%] [Frequency 2000]. The equivalent processing power can be changed by adjusting the duty cycle and pulse frequency according to the characteristics of the laser, usually without adjustment.

⑥ [Common technology]： Indicates the current process group number, the welding mode provides 3 groups of commonly technology, press the gun body [Craft Switch Button]to switch quickly.

⑦ [feeding speed]: range is 15~600cm/ min  /  For wire feeding state run/stop (valid for single process). Combined with the process switching button, it is possible to quickly switch between wire feed and no wire feed.

Select [Common technology1], input parameters, and after [Import], all the parameters saved will be the parameters of [Common technology1].

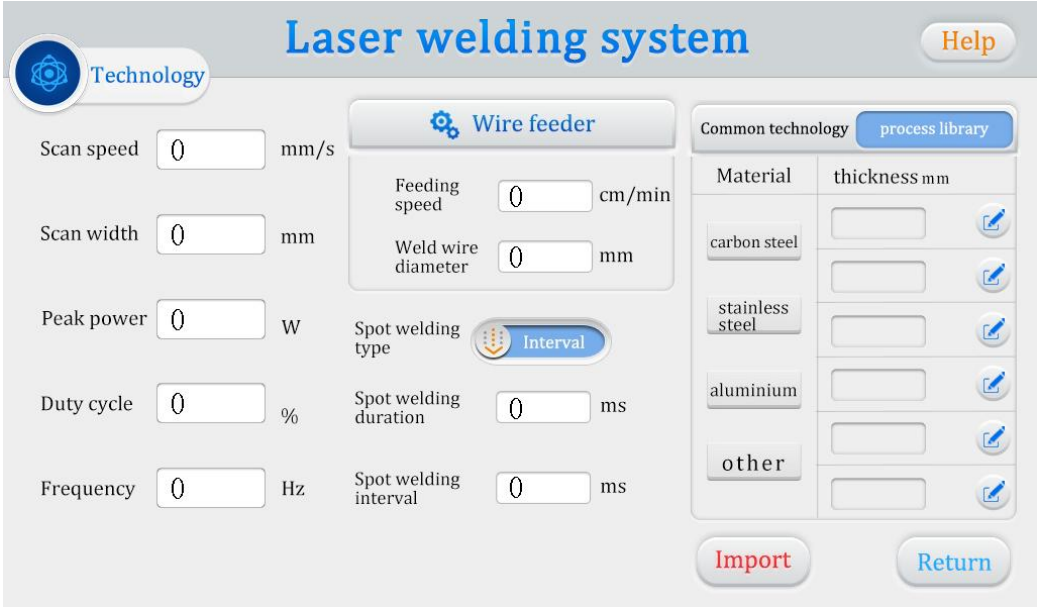


Figure 4.5 Process Page - Process Library

⑥ [Wire Feeder]

- The blue [Wire Feeder] icon indicates that the parameters can be adjusted and can be clicked to enter the "Wire Feeder Interface", while the grey [Wire Feeder] indicates that the wire feeder is not communicating normally and the parameters cannot be adjusted.

  When use with A type wire feeder, you need to set [Wire Feeder Motor] to ⊘ in the setting page. The wire feeder is connected to pins 1,2,3 of the control box through 232 communication - [7. Wire Feeder], and [Wire Feeder -] [Wire Feeder] is connected to pins 5 and 6, so that the function of the wire feeder can be fully called up.
- When matching with AE or C type wire feeder, set the setting page [Wire Feeder Motor] to [AE/C]. Connect the "motor" of the wire feeder to pins 6 and 7 of the control box [7. Wire Feeder], and the system will control the wire feeder.

⑦ [Weld wire diameter] here [Weld wire diameter] to help the operator to record the process conditions.

⑧ [Material - xx thickness] Click the thickness, such as [1.0mm] - [carbon steel], will display the recommended process parameters. Each material can be set corresponding to 12 thickness. Click [1/2] to switch to the second page of thickness.

4.3 Setting Page

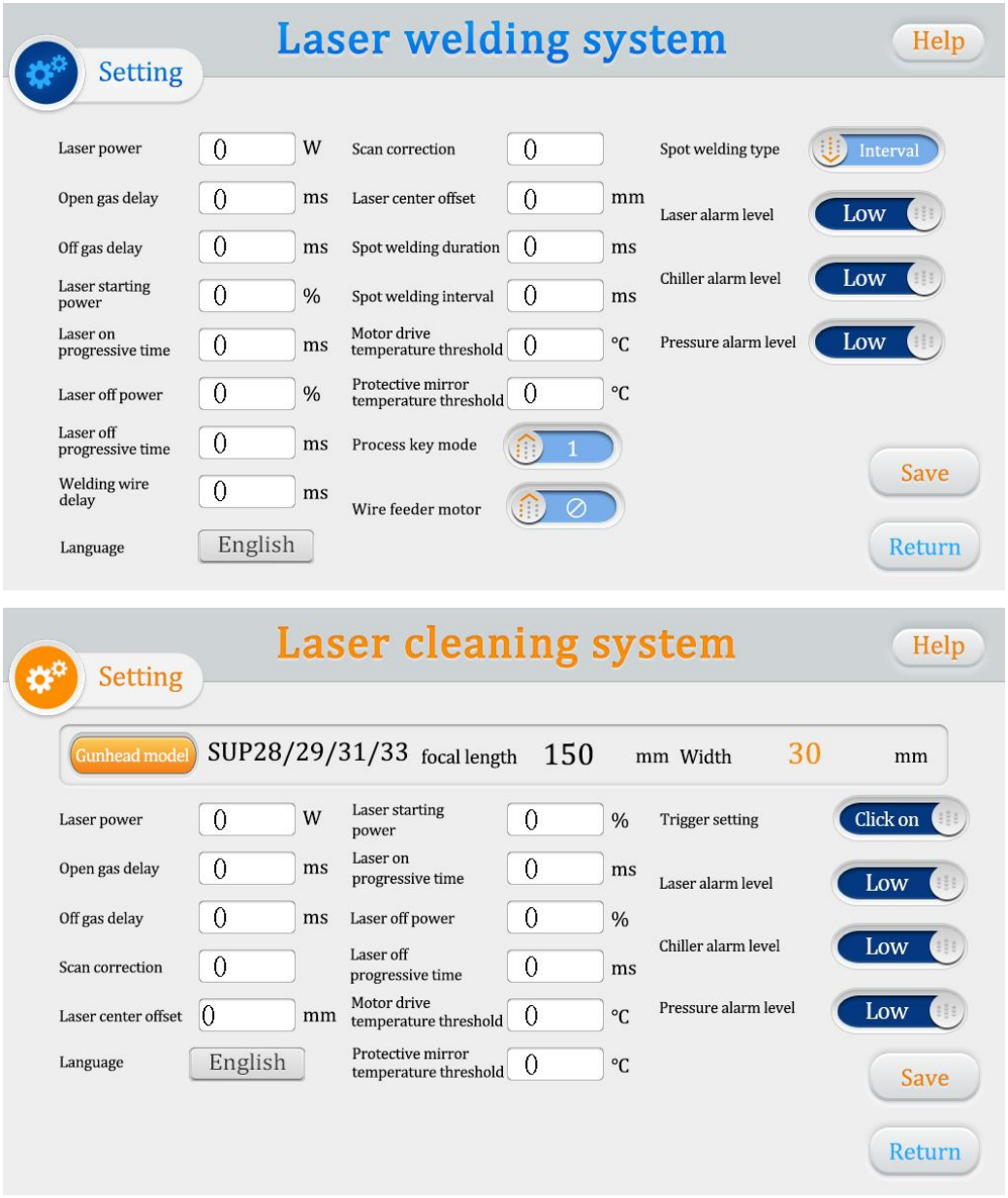


Figure 4.6 Setting Page

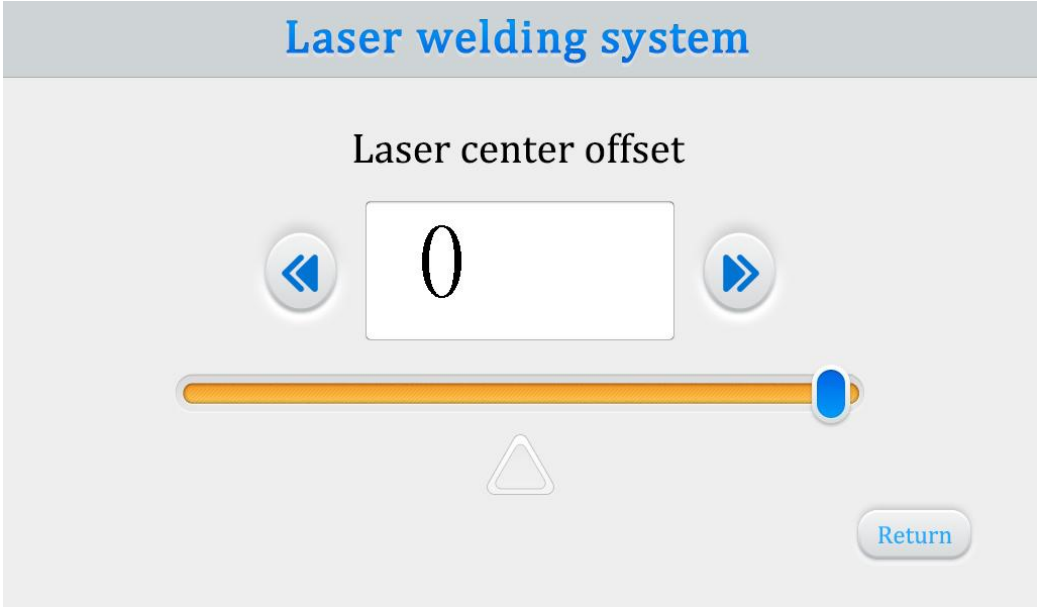


Figure 4.7 Laser Centre Offset

The page shown in Fig. 4.6 is used to set the factory parameters, including the power of the product and the alarm level.

① [Laser power]: Subject to the actual laser.

② [Welding wire delay]： Feed the wire in advance. Example: If 1000 is set, after pressing the trigger, the wire will be sent first for 1s and then the light will be emitted.

③ [Scan Correction]:correction coefficient=target line width/measurement line width, used to adjust the actual spot size, make it consistent with the system display.

④ [Laser Center offset]: [Negative] means left shift, [Positive] means right shift. It is used to adjust the light spot so that it is centred.

⑤ [Open gas delay]: Before the light is emitted, the air is emitted in advance.

⑥ [Off gas delay]: After switching off the light, delay switching off the light.

⑦[Laser starting/Laser Off-power][Laser on progressive-light/Laser off progressive-time]：As shown in Fig. 4.7, [On-light gradual time T1]indicates the time from [On-power N1]to [Peak power N3], and [Off-power gradual time T2]indicates the time from[Peak power N3]decrease to [Off-power N2].

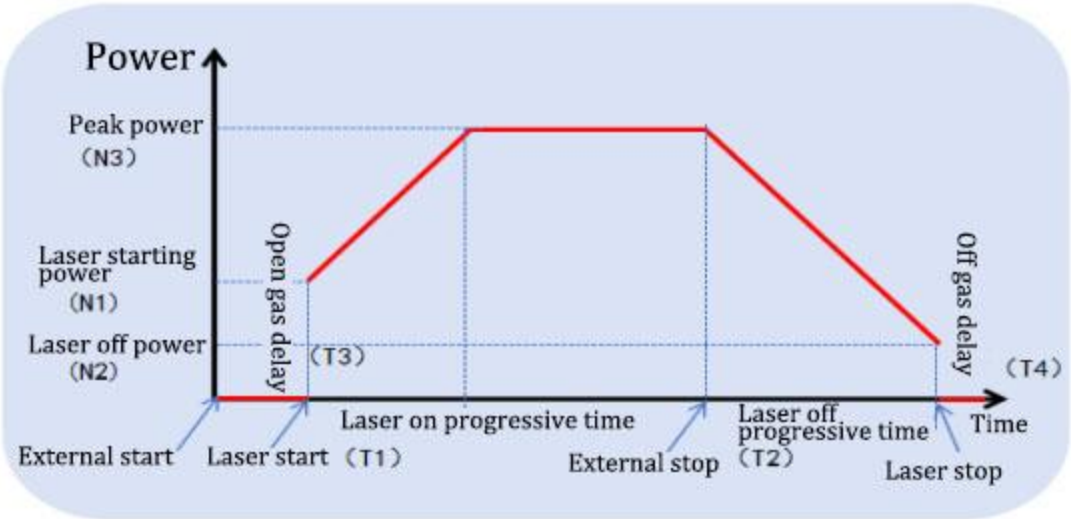


Figure 4.8 Light out of the air time relationship

⑧ [temperature threshold]: Maximum 80℃, the value is set to 0, do not detect the temperature alarm.

⑨ [alarm level - high / low]: set to low level when not in use, according to the external product settings.

⑩ [Spot Welding type - Intermittent / Fish Scale / Single Shot]: [Fish Scale] is suitable for fish scale welding, [Intermittent] is suitable for segmental welding. Single-shot] applies to continuous welding for a short period of time. When [Single Shot] is selected, set the [Spot Welding Duration] to stop the light when the welding is completed, and you need to pull the trigger again to light up again.

⑪ [Spot Welding Duration][Spot Welding Interval]: As shown in Fig. 4.9, [T1] does not emit light, [T2] emits light.

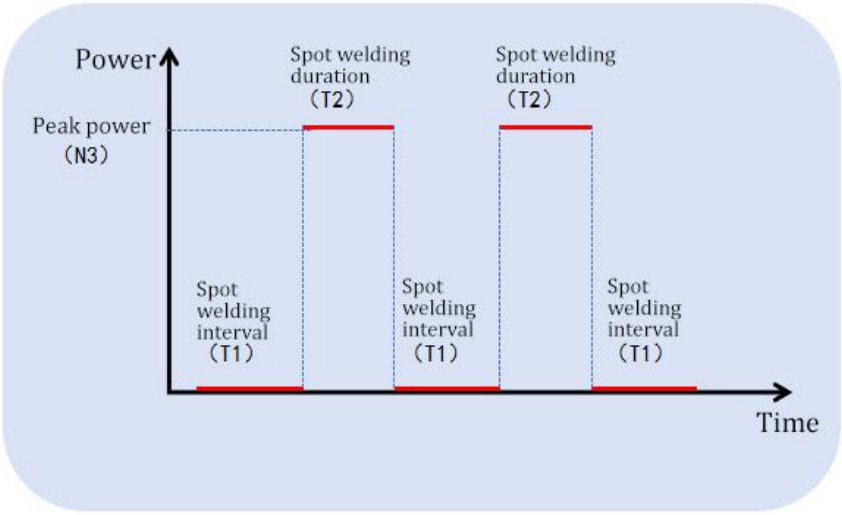


Figure 4.9 Spot welding power time relationship

⑫ [Process key mode]:

1	2	3
Process cannot be switched by pressing the key	Switching between process 1/2	Switch between process 1/2/3

⑬ [Thread Feeder Motor]: Select the actual thread feeder model as described in the process page. Select AE for AMFAE, C for AMFC, or ⊘ for other models.

⊘	AE	AE
Other models	AMF- AE	AMF- C

4.4 Monitoring Page

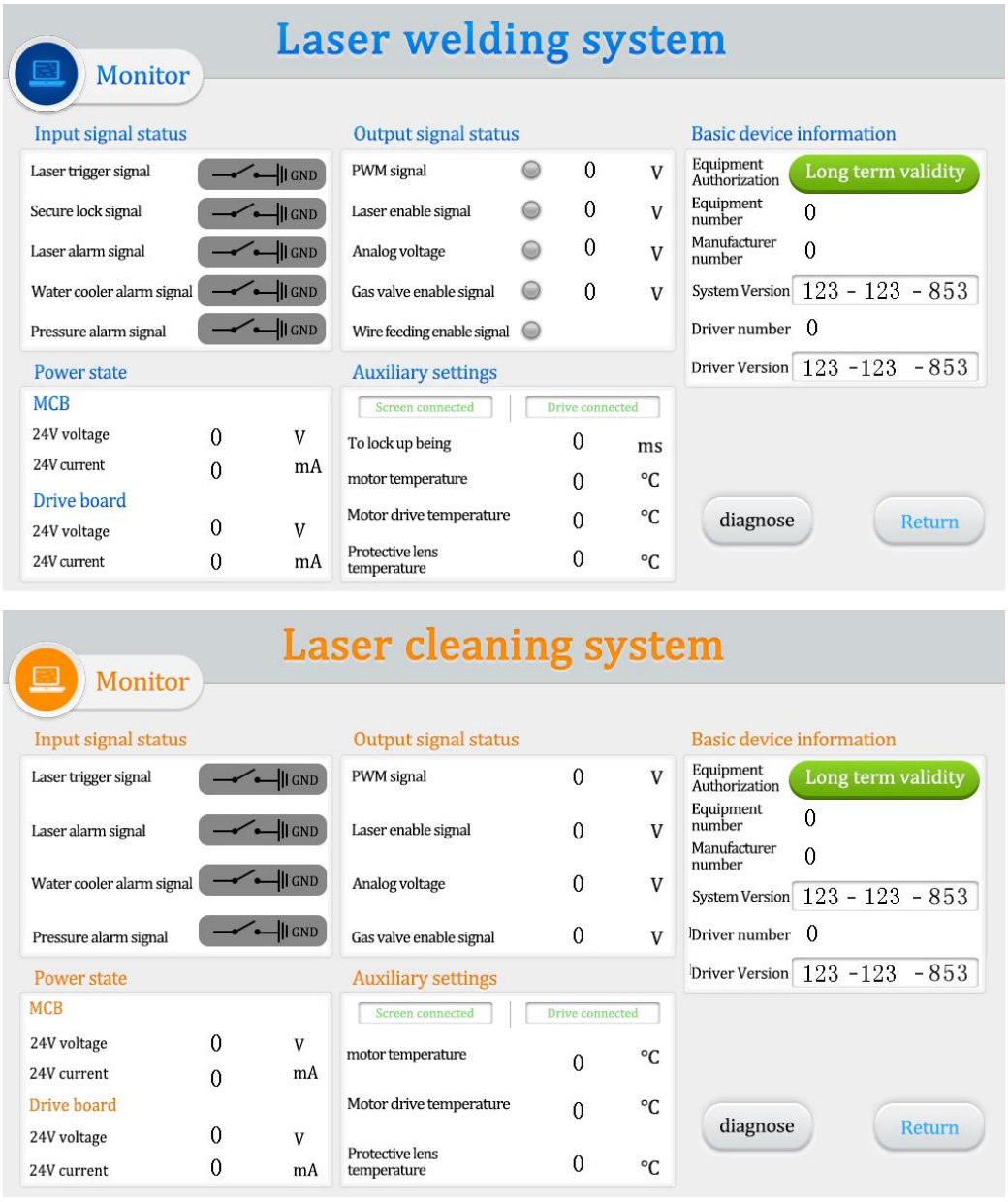


Figure 4.10 Monitoring Page

The page shown in Figure 4.10 displays the monitored information of the real machine.

① Where [Input Signal Status] [Output Signal Status] [Power State] are real-time

monitoring signals for judging whether the product is working normally or not.

② [Basic Product Information]:

- [Equipment Authorization] can be clicked to operate, used for product encryption.
- [Equipment number] [Manufacturer number] [System Version] is purely display information for after-sales work provided to technicians.

③ [Auxiliary Settings]:

- [XX Temperature] is the actual measured temperature, and the system alarms when it exceeds the corresponding [XX Temperature Threshold] on the setup page.
- Ground Lock Anti-Shake] is the compatible intermittent time in case of poor contact of the [Safety Ground Lock] signal, range [0~300ms]. Click [Equipment Authorization] and enter [FFFFFFFAAXXX], [XXX] indicates the time. Effective in welding mode.

4.5 Diagnostic Page

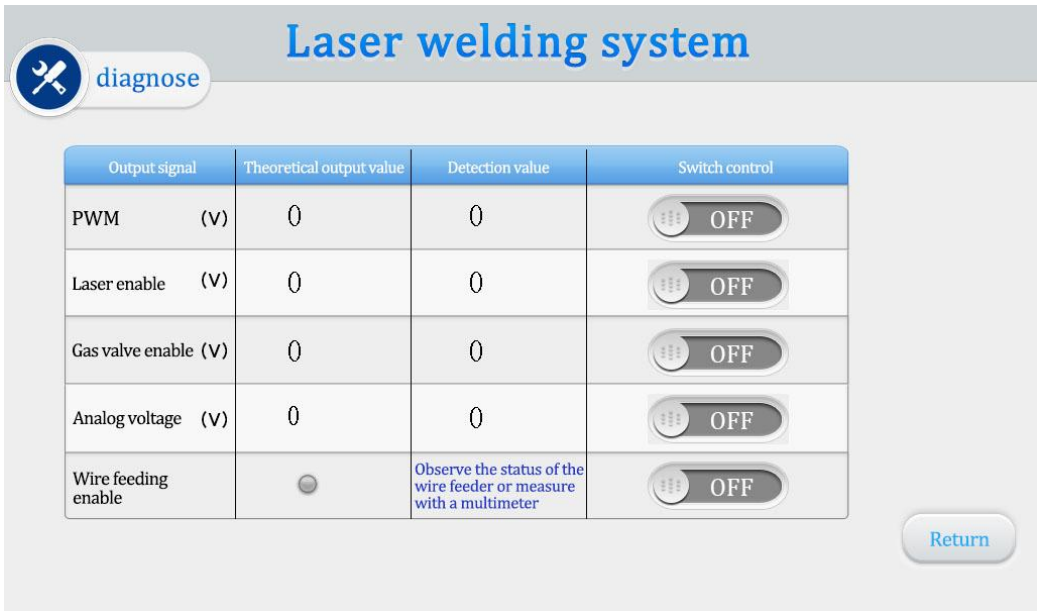


Figure 4.11 Diagnostic Page

Diagnostic page add

ALM line abnormality] alarm, enter [FFFFFFF33001] to enable detection, [FFFFFFF33002] to disable detection;

[Drive voltage abnormality] alarm and [Drive current abnormality] alarm, input [FFFFFFF36001] to enable detection, [FFFFFFF36002] to disable detection;

[Motor swing abnormality] alarm, input [FFFFFF31001] to enable detection, [FFFFFF31002] to disable detection;

Motor fault abnormality] alarm, input [FFFFFFF32001] to enable detection, [FFFFFFF32002] to disable detection.

The above figure is a demonstration of the diagnostic mode. This mode can only do [Individual signal] output, used to judge whether each output signal of the main control board is normal or not in a safe situation, this mode can not be out of the light.

4.6 Wire Feed Page

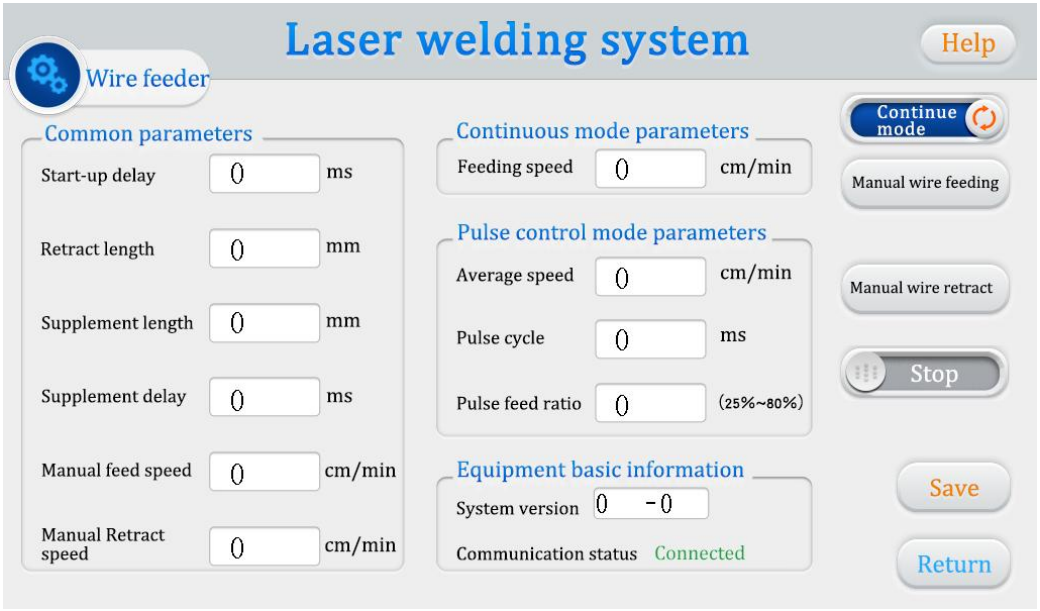


Figure 4.12 Process Library - Wire Feeder Parameters

Refer to the introduction of [Wire Feeder] and the selection of [Wire Feeder Motor] in the process page mentioned above, after normal communication, you can enter the wire feeder page from the process page.

① [General Parameters] The parameters of wire feeder can be adjusted when connecting to the wire feeder, and the parameters of the wire feeder page are the same as those of the original [Wire Feeder].

② [Continuous Mode / Pulse Mode] is used to switch the state of wire feeding, usually use [Continuous Mode], [Pulse Mode] is used for fish scale welding.

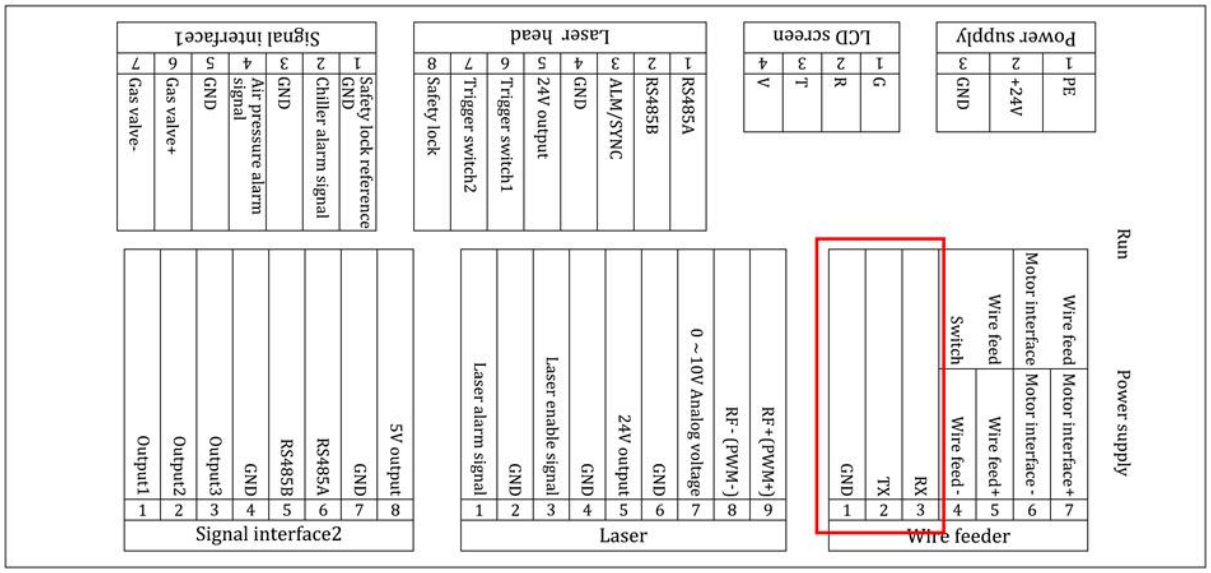


Figure 4.13 Wire Feeder Communication Interface

V. Daily Maintenance

1. It is recommended to clean the dust of the cooling system of the chassis once a month to keep the chassis smoothly ventilated. 2.

2. Lens maintenance and replacement needs to be ensured in a relatively clean field environment. When opening the protective lens, focusing lens compartment cover, pulling out the lens holder and other open operations, you should do a good job of protection (cover with a beautiful paper). Replacement methods for the different lenses corresponding to all gun models can be found in the WeChat applet→ Super Laser→ lens installation.

3. When using, please hold it gently. For complex production environment, please clear the dust in time.

VI. Product common problems and treatment measures

Warning! Before dealing with any problem, all power must be cut off to avoid any danger!

The repair and maintenance of this product must be completed by professional personnel! Do not operate without training! Please contact your dealer for a professional to handle any problems!

Repair can not solve the problem of product appearance.

Common alarm descriptions and problem solving measures are as follows:

Problem item	Phenomenon	Solution
Temperature alarm, prompting all kinds of temperature is too high	Home page prompts XXX temperature is too high	General lens temperature alarm, usually first check whether the lens is damaged, replace the damaged lens. If the lens is normal, you need to shield this alarm directly in the setup page, set the corresponding lens temperature alarm threshold to 0 in the setup page to save.
Chiller/Laser/Air Pressure Alarm	Home pop-up window shows laser/air pressure alarms	Alarm logic of the level: the system will compare the wiring of the corresponding product with the level set in the setting page, and the alarm will be raised if it is different. Usually, the alarm occurs because the alarm level is set wrongly, so you can change the corresponding alarm level. If the alarm occurs when there is an alarm signal connected and the alarm occurs no matter how to set the alarm, please unplug the alarm signal wire and set it to low level.
Poor soldering effect	Starts with a strong light and slowly gets weaker/weaker, making it impossible to fuse the wire.	This is usually caused by damage to the lens of the welding gun, including but not limited to the protective lens, focusing, collimation and reflection, any one or more of which may be damaged. Replace the protective lens and look at the focus, then check the reflection and collimation, and replace the damaged lens. About the copper nozzle at the spark may be the focus problem, should be ruled out first. Also check if the laser fibre head part is dirty or damaged.
Motor does not swing	Spot for a point	First, whether the software part of the correct settings Settings - scanning correction: 1.0 or 1.25 Process - scanning width: greater than 0 Home-Indication red light: line Second, the hardware part of the check (first installation) Motor drive for the motherboard 24V power supply,

		we should first measure the [laser head] interface [24V output] [GND] is normal. This interface controls whether the motor can swing.
Motor swing abnormal	① after power on the welding head tail motor whistling / swinging red light anomaly / heat / can not adjust the swing width ② Directly burned lens, sealing ring and focusing lens burned at the same time	The [RS485A] [RS485B] of the [laser head] interface controls the motor swing width, speed and other parameters. Problems such as ① may occur when there is a signal error (poor wire contact, disconnection), external interference, or when the driver does not match the motor. If the problem of ② occurs, it is recommended to check the surrounding sources of interference, if there is no source of interference, it may be the motor cable failure, directly replace the motor cable can be.

For more problems, please refer to the page of WeChat applet [Problems].

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