

Be sure to read the manual before using the system

- This manual is the user manual of single pendulum handheld laser welding system
- Read the manual carefully first to ensure the correct electrical connection

# DWT21

V 21 control box + D WT21 welding head

## Qilin handheld single swing wide swing laser welding system user manual



**Guangdong Qilin Laser Technology Co., Ltd.**

Address: Room 901, Building E1, SongshanLake Intelligent Valley, Yanhe North Road No.9, Liaobu Town, Dongguan City, Guangdong China

Tel.: 0755-27999931

mail:

address: [www.qilinlaser.com](http://www.qilinlaser.com)

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This product has been certified by the Federal Communications Commission (Federal Communications Commission) and complies with the relevant safety regulations of American electronic products.

## security information

When using the system, please ensure that the operation is correct and safe. Some signs or text will be used to remind you of dangerous matters and some important information.



**danger:**

Represents a serious danger. In the process of use, if the operation is improper or the use method is wrong, it may lead to serious injury or even death, please users and related personnel do not operate easily, until to ensure that the correct operation method and the correct way of use.



**warn:**

Indicates that a danger exists. In the process of use, if the operation is improper or the use method is wrong, which may cause injury to the personnel, please do not operate easily, until we ensure that the operation method is correct and the use method is correct.



**prudent:**

Represents a product potential risk. During use, if the use method is wrong or improper operation, the product or some parts may be damaged. Please users and related personnel do not operate easily until the operation method is correct and the use method is correct.



**important:**

Represents an important information to note during the product. Please do not ignore this information, which provides effective operational help.



This label indicates laser radiation, which will generally be affixed to the output laser products. Please, be careful of laser and safety when using such equipment.

# Receiving goods, unpacking and inspection

The product uses shock-proof soft packaging. If the package has any external damage marks, please check the damage to the equipment and notify the carrier and the carrier of the damage in written documents.



## important:

**After receiving the product, please check whether the outer package is in good condition, the product and parts after unpacking. If any damage is found, please contact the Qilin Laser immediately.**

Remove all the goods from the packaging, and keep the packaging materials and wiring spare parts. When dismantling the package and removing the goods, Please be careful of the goods for safety. After removing the goods, please check if the parts are complete and intact. If any missing parts or parts are damaged, please contact Qilin Laser immediately. If any obvious damage to the equipment, do not install or debug the equipment.

DWT21 The delivery list of the user's manual is shown in the following table: (As the product is constantly updated, the shipping list may also be adjusted.)

	component	quantity	explain
1	D WT 21 Hand-held welding torch	1	
2	The V 21 control box	1	
3	T21 + 1 step-in double wire feeder	1	apolegamy
4	7-inch LCD screen (HMI)	1	
5	The 7-inch display screen cable	1	
6	Plus or minus 15V power supply	1	
7	Plus or minus 15V power cord	1	
8	24V power cord	1	
9	Trigger the guide line	1	
10	7.5 m DB15 main set line	1	
11	Safety clip (with clip)	1	
12	Set of wire protection box	1	
13	Copper mouth and wire clip box	1	
14	laser goggles	1	
15	Protect the lens	5	

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# Chapter 1 summary

**The main contents of this section are as follows:**

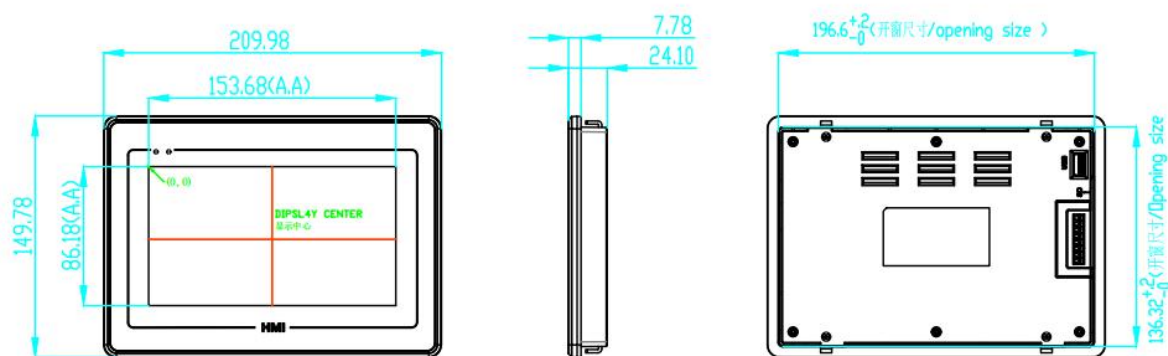
- Introduction to the laser welding system
- Product installation size drawing

## 1. 1 Qi Lin handheld single swing wide swing width laser welding brief introduction

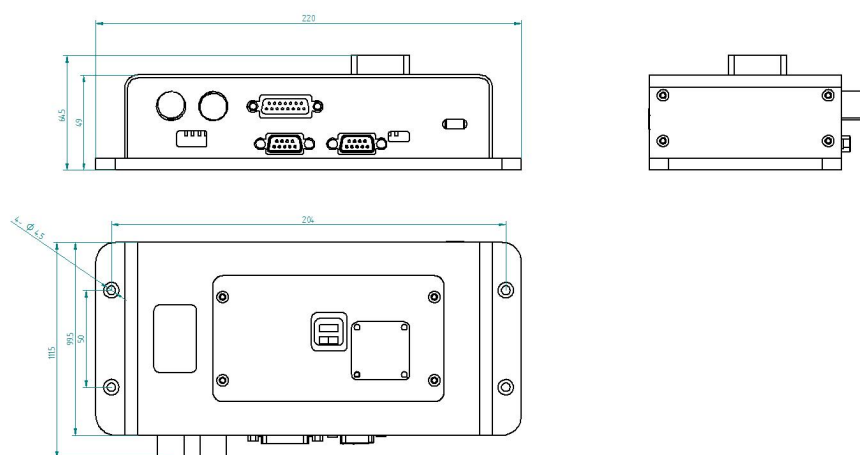
Qilin single axis handheld laser welding system is a control system developed for fiber laser welding. Single vibration motor design, the overall weight is light, fast cooling optical cavity, ergonomic design, high-end chip, a variety of safety protection measures and other functions and features.

### 1.2 Installation size of the touch screen

1.21 The installation dimensions of the touch screen are shown below:



1.2.2 Installation dimensions of the control box are as shown in the figure belo





# Chapter 2 System wiring

**The main contents of this section are as follows:**

- Control box wiring
- Structural diagram of the gun and the pipe interface
- Power Hface
- HMI
- Welding head interface
- Fan interface
- introduction
- Control interface of the wire feeder
- Description of the wire feeder button
- Laser device control interface
- Gas control, air pressure detection interface
- Alarm signal interface
- Alarm lamp interface
- Dial swit

## 2.1 Wiring of the control box

The following figure shows the wiring diagram of the whole system. The system wiring can refer to the schematic diagram and refer to the relevant chapter for detailed interface definition.

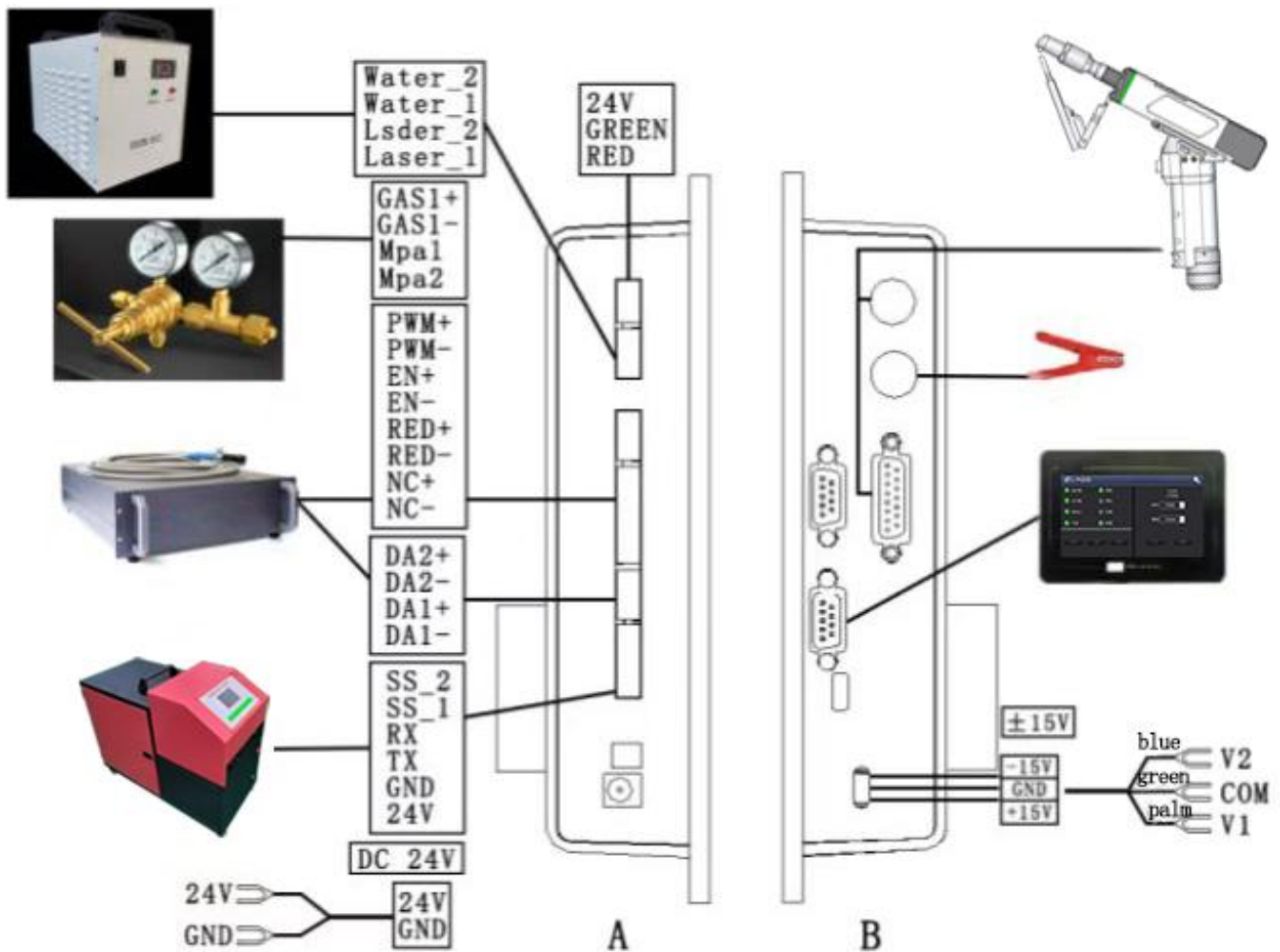


Figure 2.1 Schematic diagram of the system wiring



**important:**

**Do not connect any instructions in the control box to other lines.**

## 2.2 Structural diagram of gun and pipe and water pipe interface

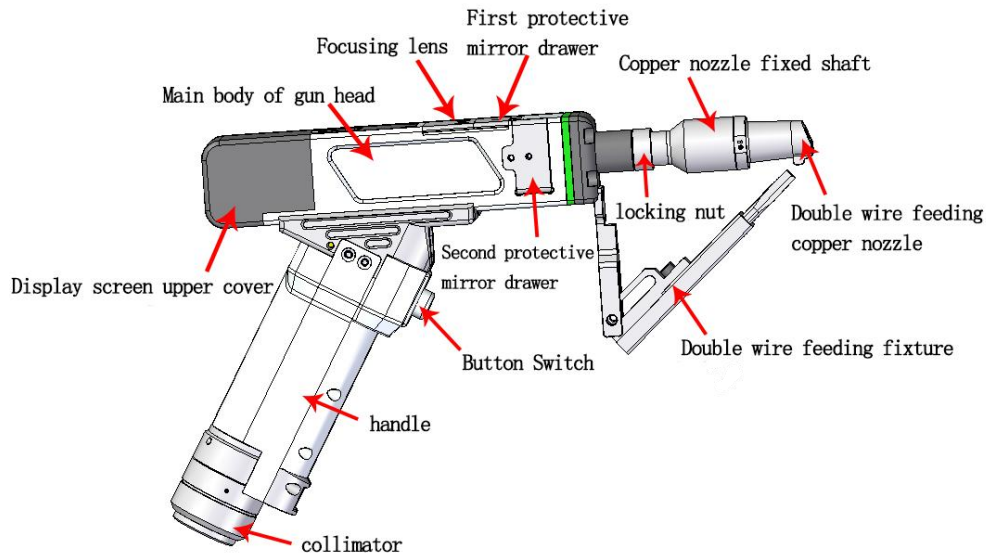


Figure 2.21, a structural diagram of the gun

parameter	scope
interface type	QBH connect
Maximum carrying power	2000W
Collar focal length	50
Focus focal length	150
Regulate the spot	Point, line
Adjustable surface	0—8mm
Applicable wavelength	1064-1080nm
Collimine lens	D20F50
Focus on the lens	D20F150
Protection mirror specifications	D20T2
Maximum air pressure support	0.6Mpa
Focus of vertical adjustment range	±3mm
TBM	0.75KG



Figure 2.22 Schematic diagram of gas pipe and water pipe interface

Water pipe: a water pipe in and out, forming a closed water cycle.

Tracheal: single connector, gas output.

DB15 interface: connect the control system and the gun head communication function.

Samsung Air plug: Connect the conduction and trigger signal connector.

## 2.3 Power interface



Figure 2.31 Schematic diagram of the Power interface



+ 15V interface is the interface that provides power for the motor drive inside the control box, the voltage is positive or minus 15V (+ 15V),

Table 2.31 defines the definition of + 15V interface

Table 2.31

pin	signal	definition	explain
1	V1	Power supply input is positive at 15V	+ 15 External power input, external power output The current is greater than 2A
2	COM	Power reference	Power to
3	V2	Power supply input is negative for 15V	-15 External power supply input, external power supply output The current is greater than 2A

The DC24V interface is the interface that provides the power supply for the internal control system of the control box. The DC voltage is 24V (DC24V)



Table 2.32 defines the wiring of the POWER 2 power cord.

Figure 2.32 shows the schematic diagram of the POWER 2 power supply line



Table 2.32 shows the definition of the + 24V interface power line

**Table 2.32**

pin	signal	definition	explain
1	24V	power input	+ 24V external power supply input, the output power requirements of the power supply: above 200W, that is, the output current is greater than 8A (wire supply for mechanical and electrical demand)
2	COM	Power reference	Power to

## 2.4 Human-machine interface HMI

The HMI interface is a DB9 black plug through which the motherboard supplies and communicates to the HMI,



Figure 2.4 HMI, schematic diagram

Table 2.4 defines the HMI interface.

**Table 2.4**

pin	signal	definition	explain
1	24V	Power supply output, 500 mA	HMI supply electricity
2	GND	Power supply output ground	Power reference
3	T XD	The sender of the HMI	Serial port communication with the TXD signal
4	RXD	The receiving end of the HMI	Serial port communication with the RXD signal

## 2.5 Welding head interface

The motherboard provides a vibrating scope interface, compatible with the common digital lens interface on the market,

Table 2.6 shows the definition of the vibration scope interface.

**Table 2.6**

pin	signal	definition	explain
1	DB15	Vibrator scope & OLED interface	Control line for communication with the hand-held welding head

## 2.6 Lead on the trigger line

The control box provides a special security trigger signal line interface, which can provide a security guarantee for the operation.

Table 2.7 shows the definition of the safety clip interface.

**Table 2.7**

pin	signal	definition	explain
1	CF	trigger signal	The light condition is triggered
2	DT	Guide communication number	The light condition are achieved when on

## 2.7 Introduction of the fan interface

The control box provides a dedicated 24V fan port interface position, independent socket, not easy to insert wrong.



Figure 2.8 Schematic diagram of the fan interface



## 2.8 Control interface of the wire feeder

The control box provides a special communication interface for the control wire feeder, and the 24V power supply is directly connected to the power input end of the control box and can be provided 3A current

Table 2.9 provides the definition of the control interface for the wire feeder.

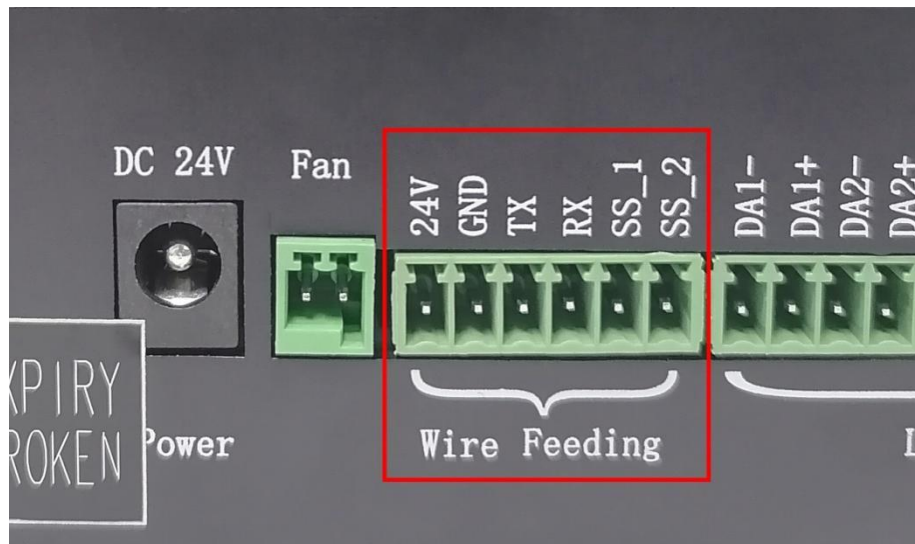


Figure 2.9 Schematic diagram of the control interface of the wire feeder

**Table 2.9**

pin	signal	definition	explain
1	24V	Power supply output end of wire feeder	Wfeeder 24V + power interface
2	GND	GND	GND
3	TX	Silk feeder and board card communication port	The wire transmitter communicates with the control system on TX signals
4	RX	Silk feeder and board card communication port	The wire feeder communicates the RX signals with the control system
5	SS_1	Wfeeder trigger signal 1	Auto _ out of SS_1 and SS_2
6	SS_2	Wfeeder trigger signal 2	Auto _ out of SS_1 and SS_2

## 2.9 Step in double wire delivery machine button description

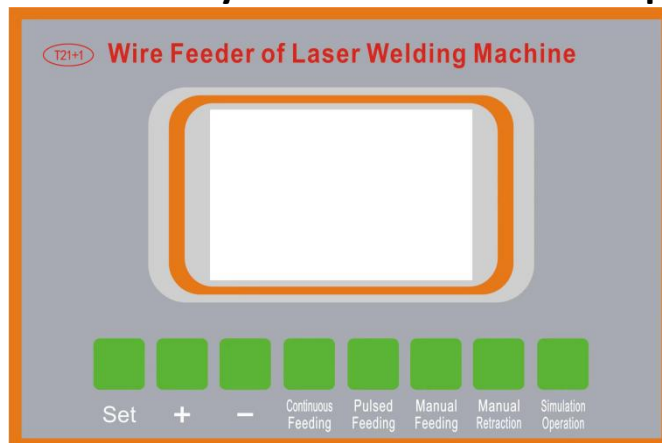


Figure 2.10 Description diagram of wire feeder keys

### Function Settings:

- ① Wire feeder speed: running speed of wire feeder (mm/s)
- ② Silk delay: open the laser to the setting time, and then start the wire
- ③ Silk filling distance: the filament compensation distance after the puldrawing stops
- ④ Return distance: after the wire stops, the wire draws back distance
- ⑤ Pulse time: the pulse receiving time of the transmitter (delivery time)
- ⑥ Pulse interval: stop pulse time of the wire feeder (stop time)



: Set the parameter button

: Send wire setting selection +

: Send wire setting selection-

: Set up the continuous wire delivery mode.

: Set up the pulse wire delivery mode.

: Click manual send wire, send wire wheel run send wire.

: Click the manual drawing to send the welding wire.

: After the wire feeder speed is set, manually trigger the wire feeder to simulate the welding

operation.

## 2.10 Laser control interface

The laser interface is an 8 PIN, green terminal + 4 PIN green terminal

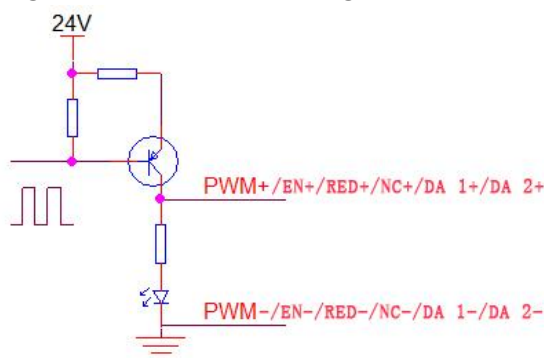


Figure 2.11 Schematic diagram of the laser control interface

Table 2.11 shows the definition of the laser interface.

**Table 2.11**

pin	signal	define	explain
1	PWM+	Laser-modulated signal +	Duty cycle 1% -100% adjustable, 24V and 5V switchable
2	PWM-	Laser Modulated signal-	Reference to the power source
3	EN+	Laser enabling signal +	Control laser light signal, high level effective, 24V and 5V can be switched
4	EN-	Laser-enabling signal-	Reference to the power source
5	RED+	Laser red light signal	Laser red light control (optional)
6	RED-	GND	Reference to the power source
7	NC+	The laser enables the backup port	Laser 24V backup port
8	NC-	Laser backup port ground	Reference to the power source
9	DA 1+	Analog voltage output +	For laser peak power regulation, 0-10V and 0-4V analog voltage selection
10	DA 1-	GND	Reference to the power source
11	DA 2+	Analog voltage output	For proportional valve adjustment, 0-10V analog voltage,
12	DA 2-	GND	Reference to the power source

## 2.10, definition of laser wiring of different manufacturers

control system	Laser models from different manufacturers												
Qilin system	Re ci FSC1000/1500 /2000/3000	Kai pu lin 500T/1000T/ 1500T		Fe bo YDFL-1000-CW		Chuang xin MFSC -1000X/1500X		Rui ke RFL-C-series		Rui ke RFL-C-X/H		Jie pu te kou CTRL- INTERFACE	
PWM+	12.MOD SW IN+	21.PWM+		15.GATE		17.Modulation In +		15.MOD+		15.MOD+		3.modulate+	
PWM-	13.MOD SW	8.PWM-		16.GND IO		4.Modulation In -		16.MOD-		16.MOD-		16.modulate-	
EN+	5.LASER EN+	19.enable+		18.EX-EN		18.enable input+		18.Laser EN		18.Laser EN		4.enable+	
EN-	6.LASER EN-	6.enable-		20.GND IO		5.enable input -		20.EGND		20.EGND		5.enable-/Alarm output-	
DA1+	14.ANG 0~10V+	15.AD+		12.IFWD SET		15.DA (0-10V) input+		12.Analog		12.0-10V		18.0-10V+	
DA1-	15.ANG GND-	14.AD-		14.CASE		2.DA (0-10V) input-		14.AGND		14.AGND		6.0-10V-/Analog input ground	
RED+				17.RED-EN				17.Red Laser					
RED-													
notes								23.EVCC		24V		17.EVCC	
										21.AD/RS		24V	
		10.interlocking 1+	short circuit	1.INTLK1A	short circuit	19.interlocking+	short circuit	2.Reserve Interlock	short circuit	2.ITL-A	short circuit	8.interlocking 1+	short circuit
		23.interlocking 1-		4.INTLK1B		6.interlocking-		3.Reserve Interlock		3.ITL-B		21.interlocking 1-	
		12.interlocking 2+	short circuit	2.INTLK2A	short circuit			8.Reserved remote power on	short circuit	8.RPA	short circuit	9.interlocking 2+	short circuit
		25.interlocking 2-		3.INTLK2B				9.Reserved remote power on		9.RPB		22.interlocking 2-	
								10.Reserved emergency stop	short circuit				
								11.Reserved emergency stop					
						Turn the key to ON, wait for the self test to complete and press START after starting the machine						Turn the key on the front panel of the laser to the robot and press start	

Figure 2.10, Defindigram of laser wiring of different manufacturers

## 2.11 Gas control and air pressure detection interface

The control box provides a dedicated IO interface, all output IO are using OC output can directly drive the relay, the maximum current can reach 500 mA, the wiring diagram is shown below.



Figure 2.121 Schematic diagram of the gas control interface

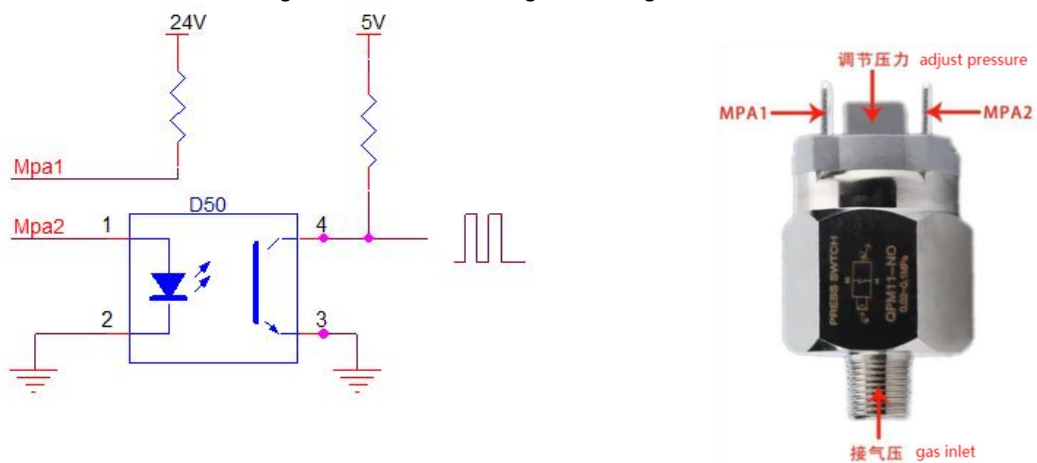


Figure 2.122 Schematic diagram of the air pressure detection interface

Table 2.12 defines the gas control interface

Table 2.12

pin	signal	definition	explain
1	CAS 1+	Used to protect the gas blowing control positive electrode	Air valve + board card GAS 1 +
2	CAS 1-	Used to protect the gas to blow the gas to control the negative electrode	Valve-board card GAS 1-
3	Mpa1	Used to detect the air pressure alarm	Air pressure alarm + connecting plate Mpa 1
4	Mpa2	Used to detect the air pressure alarm	Air pressure alarm + connecting plate Mpa 2

## 2.12 Alarm signal interface

Laser1 And 2 are the laser alarm signal interface, not on the green light, on the red light.

Water1 And 2 are the alarm signal interface of chiller, red light.

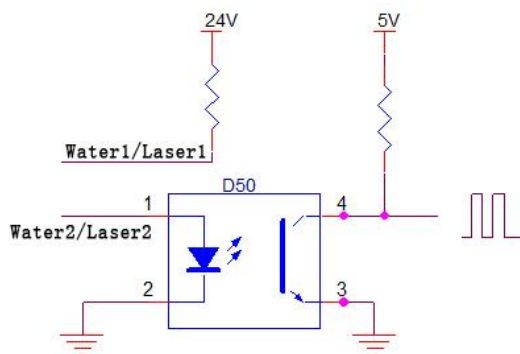


Fig. 2.13, Schematic diagram of the alarm signal interface

Table 2.13 is the definition of the alarm signal.

**Table 2.13**

pin	signal	definition	explain
1	Laser_1	Laser device alarm signal	Short contact during the laser alarm
2	Laser_2	GND	Laser alarm signal ground
3	Water_1	Chiller machine alarm signal	When the chiller alarms, open and break
4	Water_2	GND	Cold water machine alarm

## 2.13 Alarm lamp interface

When the RED has voltage, the alarm light is red.

When the alarm is removed, the GREEN has a voltage, and the alarm light is green.

Table 2.14 is the definition of the alarm signal light.

**Table 2.14**

pin	signal	definition	explain
1	24V	Power supply output end of the alarm signal lamp	Connect to the power supply terminal of the alarm signal lamp
2	GREEN	Alarm signal light-green light	Connect the alarm signal light
3	RED	Alarm signal light-red light	Connect the alarm signal light red



## 2.14, the dial-code switch



Figure 2.13, schematic diagram of dial switch

order number	characteristic	definition	explain
1	IPG	Laser control signal	PWM, EN, RED, NC output 5V Power adjustment: 0-4V analog voltage adjustable section
2	NO IPG	Laser control signal	PWM, EN, RED, NC output of 24V Power adjustment: analog voltage adjustable section 0-10V

# **Chapter 3 Human-machine interface HMI introduction**

**The main contents of this section are as follows:**

- Introduction of the main interface function and operation
- Set up the interface function and operation introduction



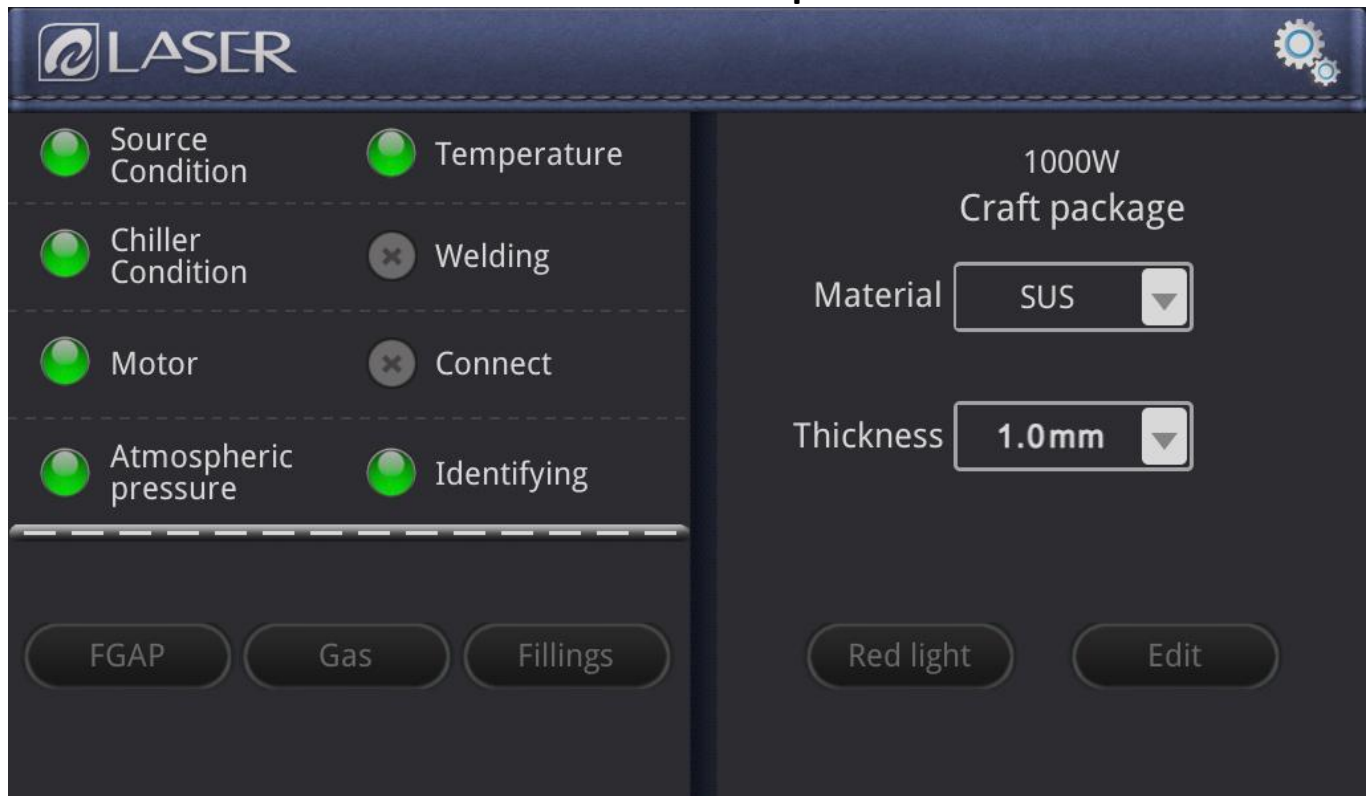
### 3.1 Introduction of HMI function and operation of human-machine

#### interface

##### 3.1.1 Introduction of the function and operation of the main interface

The operating panel of Qilin single swing width laser welding system adopts 7-inch configuration capacitor touch screen, which has a dignified and generous appearance. Can set the laser, laser swing head related parameters, but also can control the continuous pulse light out mode, simple and convenient operation, no need to edit the complex process, enter the page can be wide swing welding.

##### 3.1.2 Set the interface function and operation introduction



Main interface, schematic diagram

**Light lock:** the light switch is open to the normal light.

**Gas:** When the gas opens, the gas valve port will output 24V voltage, and the gas will automatically blow without opening during welding.

**Wire feeder:** when the wire feeder is opened, the wire feeder is sent during the light output, and when the wire feeder is closed, the wire feeder is not controlled by the light output signal of the welding gun (**Note: new When the wire is opened, long press the torch button key for 500ms, press the torch key twice to release, and withdraw the wire for 500ms**)

**Alarm signal light:** provide real-time monitoring and reminder, monitor and alarm the temperature of laser head, air pressure, welding torch, conduction and handle. The full alarm state is displayed synchronously on the main screen and alarm light to remind users and quickly check problems.

**Identification:** the system automatically recognizes the single and double swing welding, can achieve the single and double swing welding

**Red light:** open the red light preview, you can preview the welding position in advance, to achieve the effect of adjusting the position in advance before welding.

**Process package:** there are four common materials, the thickness of "custom" and "other" is as follows:

**Stainless steel (SUS):** "SUS/1.0mm" means: stainless steel 1.0mm, and so on: "SUS/3.5mm" means: stainless steel 3.5mm

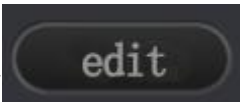
**Carbon steel (CS):** "CS/1.0mm" means: carbon steel 1.0mm, and so on: "CS/3.5mm" means: carbon steel 3.5mm

**Galvanized plate (SECC):** "SECC/1.0mm": galvanized plate 1.0mm, and so on: "SECC/3.5mm": galvanized plate 3.5mm

**Aluminum plate (AL):** "AL/1.0mm" means: aluminum plate 1.0mm, and so on: "AL/3.5mm" means: aluminum plate 3.5mm

**Custom (UDC):** can edit parameters, convenient for customers to process for welding at any time.

**Other (OTS):** internal manufacturer special process editing, special process can be used for special material welding.

Click " " to enter the editing main editing interface.

Schematic diagram of editing the main interface



**Edit:** no need to click to confirm, after changing the parameters, directly can use the parameters.

**Special note:** when the width is set to more than 5 mm, the frequency will reduce the multiplier. When the swing speed is reduced and the swing amplitude becomes larger, the double wire delivery machine is used for welding, and the welding grain width can reach 8 mm.

### Laser control:

**Power:** Set the peak power of the laser at welding.

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

**Duty cycle:** Set the pulse width of the laser PWM signal.

### Laser head control:

**Mode:** Set the motor swing mode.

**Frequency:** Set the speed of the motor to swing.

**Width:** Set the width of the motor to swing.

### Out-of-light control:

**Mode:** Continuous light out mode and pulsed light mode.

**Light time:** set the light time.

**Light output interval:** set, the interval of each light output.

**Restore factory Settings:** After entering the editing page, restore the single page parameters.



Press the " " on the read-only main interface to enter the setting interface, as shown in the following figure



## Parameter settings:

### gas control:

**Advance quantity:** When starting processing, delay opening can be set.

When the external start button is pressed, the air blow delays for a period of time, and then the laser starts.

**Delency:** When stopping processing, the delay can be set. When the processing is stopped, the laser output is stopped first, After a time delay, then stop blowing.

**Proportional valve:** If the equipment has a proportional valve to control the gas size, the size of the protective gas can be controlled by this function percentage.

### Start lift:

**Slow rise time:** the laser power slowly reaches the set peak power after the set slow rise time.

**Slow drop time:** After the laser power is turned off, the laser energy slowly turns off the laser after the set slow drop time.

**Light off delay:** after the laser is turned off, the set power will continue to shine until the set time ends, optimizing the wire breaking function.

### Red light offset setting:

**Red light offset setting:** When the red light is not in the center position of the nozzle, it can be adjusted through the red light offset setting position of X and Y coordinates.

**Start with the correction:** clear up the coordinates of X and Y.

**Clear correction:** clear the previous step.

### SN and language settings:

**System SN identification code:** the factory setting of hand-held welding, used for the decryption function.

**Firmware version:** It means the version currently used by the system.

**Available period (days):** available term, all functions are invalid after expiration. (Automatic reminder within 7 days)

**Registration code:** used for decryption. After receiving the registration code, enter and click confirm to decrypt.

**Language:** 23 languages, can switch languages (China, Britain, Russia, Korea, Vietnam and Japan, etc.)

### hardware configuration:

**Password:** 123456.

**Laser power:** The laser power used can be selected to retrieve the process package of this laser.

**Alarm point level conversion:** can choose high and low level to remove the laser, chiller and air pressure alarm.

Graph rotation Angle: graph rotation is not supported by single pendulum.

**Optical lock timing function:** After opening this function, the optical lock will automatically close for 15 minutes without operation. Closing this function requires you to manually close the optical lock.

## Single swing width swing reference parameters:

The 2000W laser control								
order number	Material and thickness	Welding mode	laser power	hunting frequency	Weld thickness	wire feed rate	width	gas pressure
1	Stainless Steel 2.0	Wide swing width welding mode	45%	10hz	Double 1.2	8	4	0.45Mpa
	Stainless Steel 3.0		55%	8hz	Double 1.6	7	5.2	0.45Mpa
	Stainless Steel 4.0		67%	6hz	Double 2.0	6	6	0.45Mpa
	Stainless Steel 6.0		75%	4hz	Double 2.0	6	8	0.5Mpa
	Stainless Steel 8.0		85%	4hz	Double 2.0	6	10	0.55Mpa
2	Carbon steel 2.0	Wide swing width welding mode	45%	10hz	Double 1.2	8	4	0.45Mpa
	Carbon steel 3.0		55%	8hz	Double 1.6	7	5.2	0.45Mpa
	Carbon steel 4.0		67%	6hz	Double 2.0	6	6	0.45Mpa
	Carbon steel 6.0		75%	4hz	Double 2.0	6	8	0.5Mpa
	Carbon steel 8.0		85%	4hz	Double 2.0	6	10	0.55Mpa
3	Galvanized plate 2.0	Wide swing width welding mode	45%	10hz	Double 1.2	8	4	0.45Mpa
	Galvanized plate 3.0		55%	8hz	Double 1.6	7	5.2	0.45Mpa
	Galvanized plate 4.0		67%	6hz	Double 2.0	6	6	0.45Mpa
	Galvanized plate 6.5		75%	4hz	Double 2.0	6	8	0.5Mpa
	Galvanized plate 8.0		85%	4hz	Double 2.0	6	10	0.55Mpa
4	Aluminum board 2.0	Wide swing width welding mode	45%	10hz	Double 1.2	8	4	0.45Mpa
	Aluminum board 3.0		55%	8hz	Double 1.6	7	5.2	0.45Mpa
	Aluminum plate 4.0		67%	6hz	Double 2.0	6	6	0.45Mpa
	Aluminum board 6.0		75%	4hz	Double 2.0	6	8	0.5Mpa
	Aluminum plate 8.0		85%	4hz	Double 2.0	6	10	0.55Mpa
The above parameters are provided for your reference only								

Note: For different lasers, other parameters remain unchanged, only the power modification, can be set according to this formula:

When selecting 1000W laser:  $P(1000W \text{ laser}) = P(1500W \text{ laser}) * (1000 / 1500)$

When selecting 2000W laser:  $P(2000W \text{ laser}) = P(1500W \text{ laser}) * (2000 / 1500)$

## Use the laser welding system precautions

1. Handheld single swing width swing welding head includes laser, water cooler, laser welding system and laser welding head. In order to avoid interference, keep away from the argon arc welding machine and related equipment with large interference to ensure that the safe distance is kept at more than 5 meters. Ensure that the laser welding machine has independent space when conditions permit.
2. In order to reduce the leakage or static electricity of the equipment, ensure that the welding head equipment uses effective earth wire.
3. Please repeatedly confirm whether the cable joint is connected and locked normally. After locking, it can be wrapped with insulation tape.
4. Check whether the laser head and the optical fiber are locked and connected. After confirming that they are normal, the beautiful strip tape can be sealed and wound to ensure that the dust does not enter the laser head cavity.
5. Check whether there is water seepage in the cavity and many waterways in the cavity. Do not loosen the screws without professional training to prevent water droplets from entering the cavity.
6. Check whether the protective lens drawer is normal, ensure that the sealing ring is normal and effective, when replacing the protective lens, ensure that the alcohol wipes the external stains of the laser head, at least 5 times, and ensure that the lens environment is clean and clean before the lens is replaced.
7. The laser head is so complex. To avoid short circuit, stay away from the water source and make sure that no liquid can be sprayed on the laser head.
8. Laser head refuses to use strong wind to blow and clean the laser head, and can only be wiped with alcohol and dust-free cloth.
9. The laser head is installed with a digital motor. When used, it must be put gently to prevent motor failure.
10. When the laser head is not used, please use the system gas blowing air for many times to discharge the dust, and remove the copper nozzle, use the sealing tape to seal, and use the copper nozzle to blow the air for more than 2 times before using it.
11. Continuous interruption of power supply will cause damage to the welding control system, if the external wire transmitter, 24V power supply, please provide 200W (power voltage 24V, output current is equal to or greater than 8A) above the reliable power supply!
12. The external safety lock is 24V high level, do not short connect with the aviation plug GND shell of the system cable, or do not pay attention to collide with each other when installing, otherwise the short circuit may burn the power supply or the main control board.



**Quality assurance description:**

The warranty period of this product is 12 months, starting from the date of factory. If the product is faulty during the warranty period, it can be sent back Our company, free maintenance, free of labor costs. All lens categories (e. g. collimated lens, focusing lens, mirror, cover Protection lens, motor lens, etc.), appearance parts (cavity and handle, etc.) and consumables (copper nozzle, stainless steel pipe, and other easy to lose Product) is not in the warranty scope.

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If you have any comments or suggestions on the product and instructions during use, please call for consultation.

Tel.: 18018735163

Fax: 0755-27999931

Address: Room 901, Building E1, SongshanLake Intelligent Valley,Yanhe North Road No.9, Liaobu Town,Dongguan City,Guangdong China

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