

Be sure to read the manual before using the system

- This manual is the user manual of double swing handheld laser welding / cleaning system
- Read the manual carefully first to ensure the correct electrical connection

# BWT20C

## Qilin double swing handheld laser cleaning system user manual

V20 control box + BWT20C cleaning head



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## FCC Certification statement

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 words 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 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 you 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 before use.



### **important:**

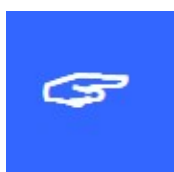
Represents an important information to note during the product. Please do not ignore this information, which provides effective operational help.



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 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.

BWT20C The shipping list of the user's manual is shown in the following table: (As the product will be updated and upgraded, the shipping list may also be adjusted.)

	component	quantity	explain
1	BWT20C Handheld biaxial cleaning	1	
2	V11 + C Control box	1	
3	7-inch LCD screen (HMI)	1	
4	7-inch display cable (DB9 head)	1	

5	Plus or minus 15V power supply	1	
6	Plus or minus 15V power cord	1	
7	24V power cord	1	
8	DB15 + 3P air plug	1	
9	Set of wire protection box	1	
10	laser goggles	1	
11	protective glass	5	

# catalogue

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# Chapter 1 summary

## The main contents of this section are:

- Introduction to the double-swing handheld laser cleaning system
- Product installation size drawing
- Control box mounting dimensions
- 15V switch power supply installation size

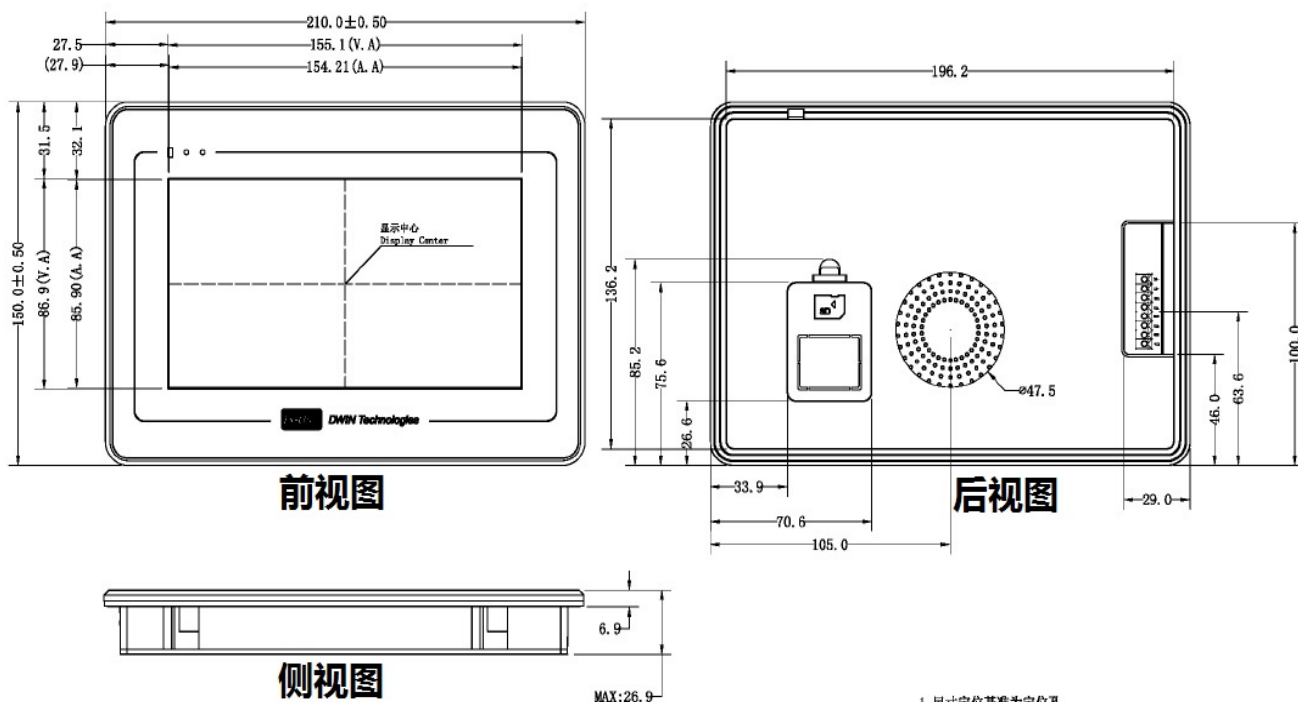
## 1.1 Qilin double swing handheld laser welding / cleaning system introduction

Qilin double swing handheld laser control system is a control system for fiber laser cleaning. There are five cleaning modes: line, ring, snowflake, cow head and hot wheel. The overall weight is light, fast cooling of the optical cavity, ergonomic design, high-end chip, a variety of safety protection measures, greatly improve the work efficiency.

## 1.2 Product installation size drawing

### 1.2.1 Touch-screen installation dimensions

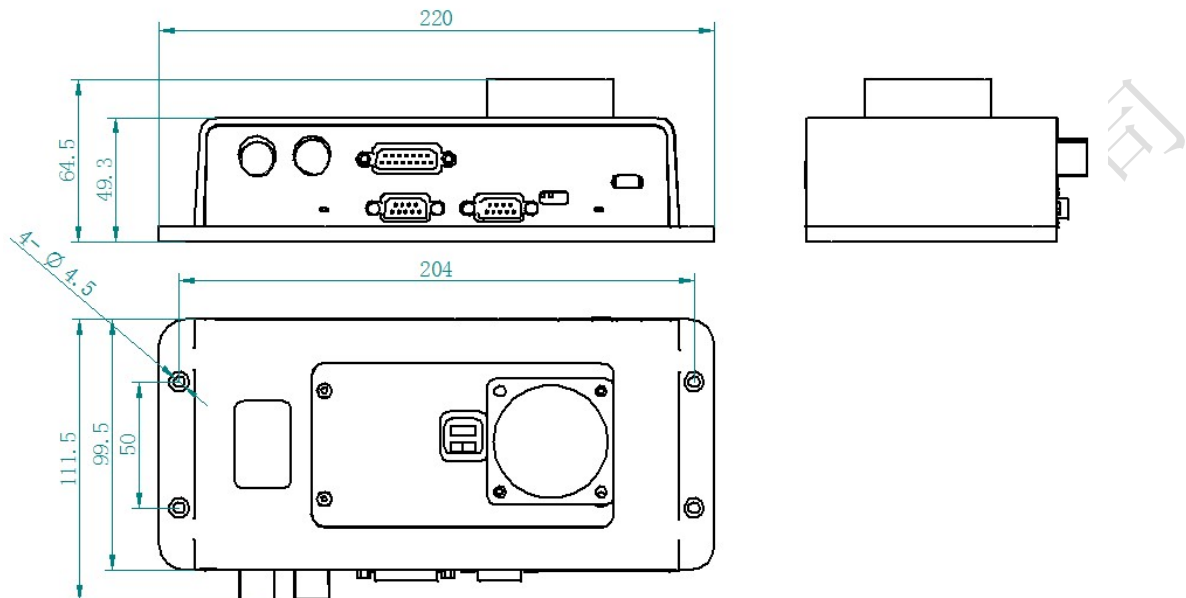
The installation dimensions of the touch screen are shown below:



1. 尺寸定位基准为定位孔  
Location hole is used as position reference.
  2. 未标注公差为 $\pm 0.3\text{mm}$   
Unmarked Tolerance is  $\pm 0.3\text{mm}$
- 注：虚线标注为有效显示区域  
Active area is marked in Dash lines

### 1.2.2 Control box mounting dimensions

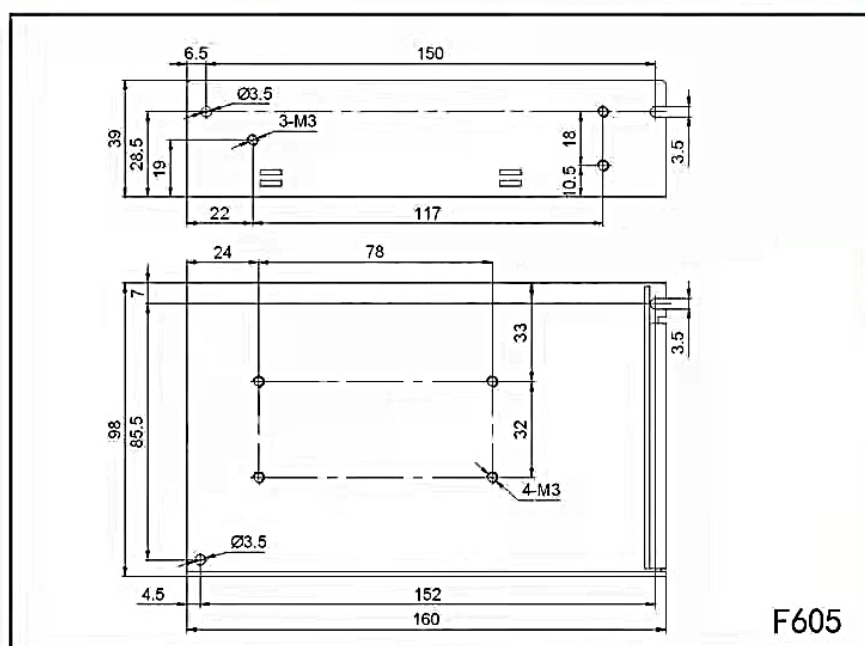
The installation size of the control box is shown in the following figure



### 1.2.3 Installation dimensions of 15 V switching power supply

The installation size of the 15V switching power supply is shown in the following figure

安装尺寸图



# Chapter 2 System wiring

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

- Control box
- wiring
- Structural diagram of the gun and the pipe interface
- Power Hface
- HMI
- Laser-decoding interface
- Double-swing handheld laser welding head

## **connector**

- **Lead trigger**

### **line**

- **Fan interface**

### **introduction**

- **Control**

### **interface of**

### **the wire**

### **feeder**

- **Laser device**

### **control**

### **interface**

- **Gas control, air pressure**

### **detection interface**

- **Dial switch**

## 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.

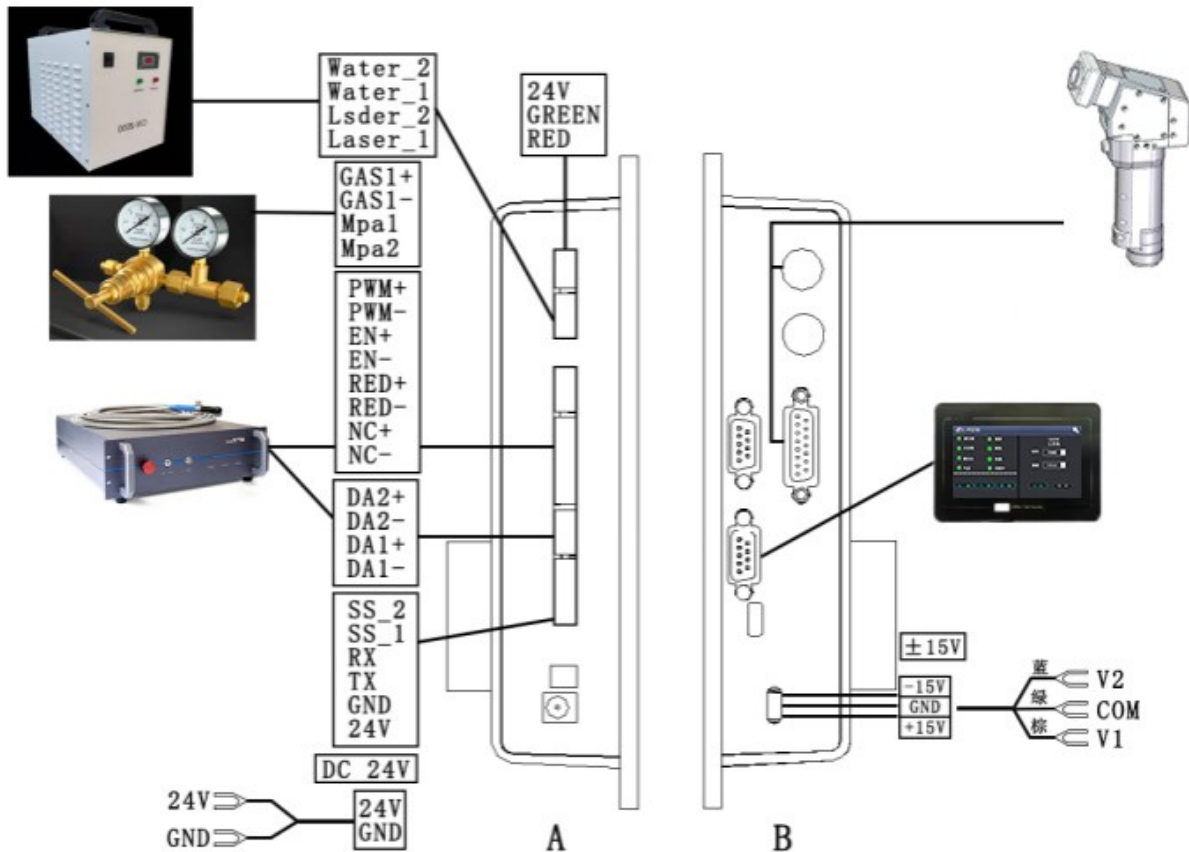
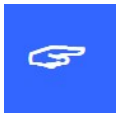


Figure 2.1 Schematic diagram of the system wiring



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

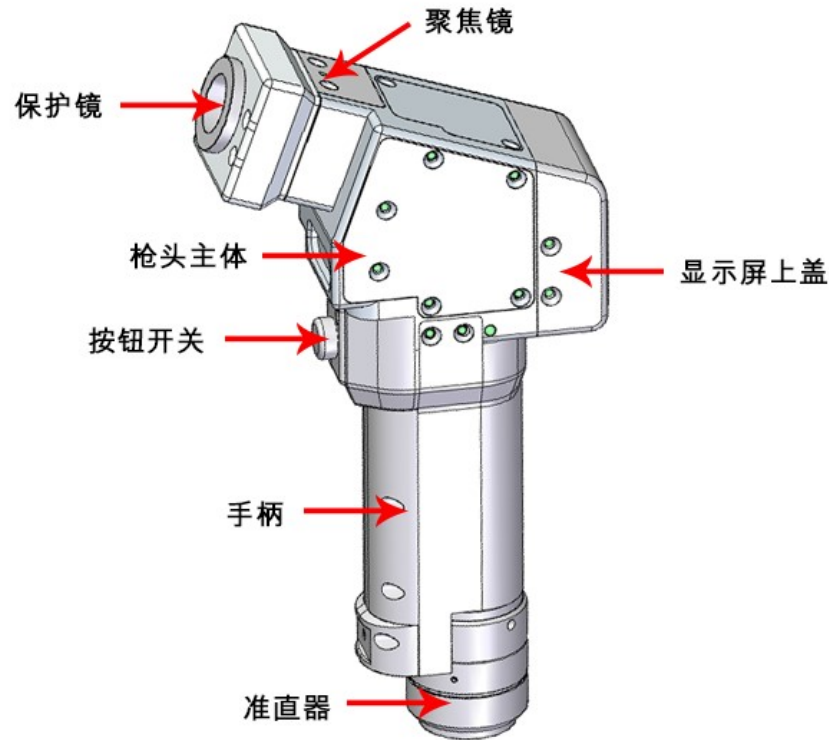


Figure 2.21 Structural diagram of the BWT20C gun

parameter	Double swing cleaning head
interface type	The QBH / RD connector
laser power	3000W
Collar focal length	40
Focus focal length	600
Regulate the spot	Line, ring, snow, cow head, hot wheels
Adjustable surface	30-150mm
hunting frequency	125hz
Cleaning intensity	Heavy cleaning, standard cleaning, and nondestructive cleaning
cooling-down method	Water cooling / air cooling
Applicable wavelength	1064-1080nm
Collimine lens	D20F40



Focus on the lens	D20F600
Reflective mirror	22.5×17T3
Protection mirror specifications	D20T2
Maximum air pressure support	0.6Mpa
Focus of vertical adjustment range	±10mm
TBM	1KG



Figure 2.21 Schematic diagram of water pipe connection, DB15 and Samsung Aviation plug socket

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

Tracheal: single connector, gas output.

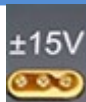
DB15 interface: connect the control system and the gun head communication function.

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

## 2.3 Power interface



Figure 2.3.1 Schematic diagram of the Power interface



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

Table 2.3.1 shows the definition of the + 15V interface power line

**Table 2.3.1**

pin	signal	defi niti on	expl ain
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 for providing the power supply for the internal control system of the control box. The DC voltage is 24V (DC24V)

Table 2.3.2 defines the wiring of the POWER 2 power cord



Figure 2.3.2 shows the schematic diagram of the POWER 2 power supply line



Table 2.3.2 shows the definition of the + 24V interface power line.

Table 2.3.2

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-computer 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.

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, the laser decoding interface



LASER RS232 The interface is the board card and the laser communication port.

pin	signal	definition	explain
1	DB 9 (public)	Laser and board card communication interface	indeterminate

## 2.6 Double swing handheld laser 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 handheld welding / cleaning head

## 2.7 Lead trigger line (Note: special for lead wire welding)

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

Table 2.7 defines for the safety clip interface.

Table 2.7

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

## 2.8 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

## 2.9 Control interface of wire feeding machine (note: special wire feeder for welding)

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 defines the control interface of the wire feeder.

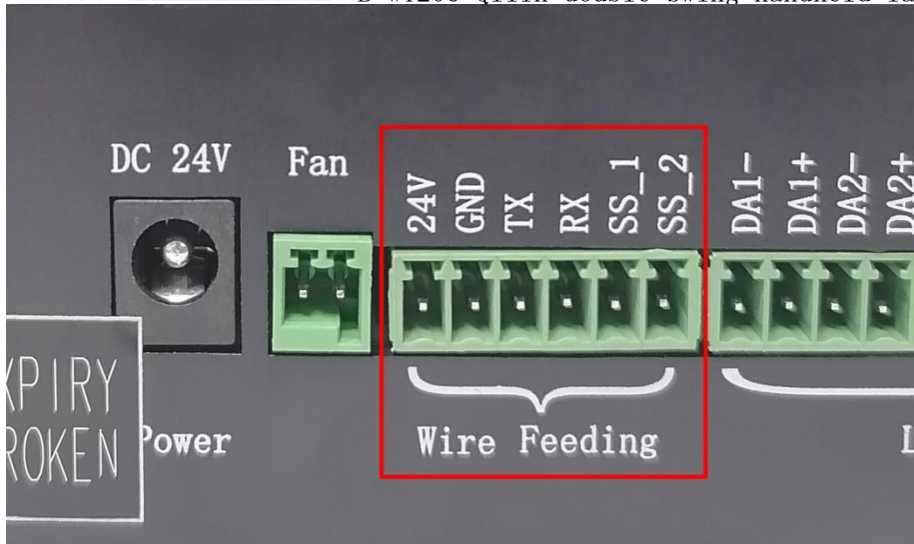


Figure 2.9 Schematic diagram of the control interface of the wire feeder

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 transmitter communicates with the control system with 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	When short circuit SS_1 and SS_2
6	SS_2	Wfeeder trigger signal 2	When short circuit SS_1 and SS_2



## 2.10 Laser control interface

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

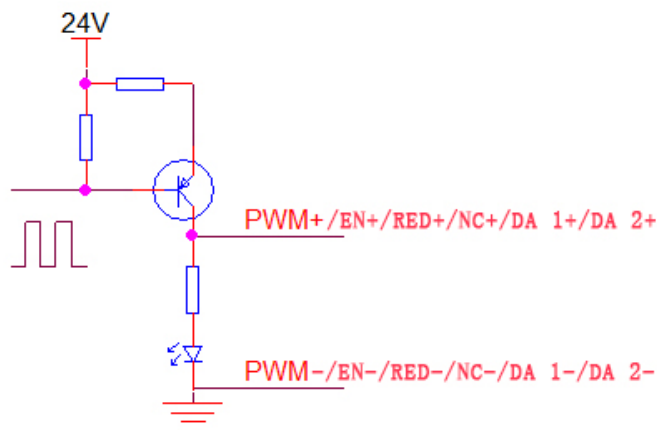


Figure 2.10 Diagram of the laser control interface

Table 2.10 shows the laser interface definition.

Table 2.10

pin	signal	definition	explain
1	PWM+	Laser modulation signal +	Duty cycle 0% -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-	Analog voltage output-	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

控制系统	不同厂家激光器型号														
麒麟系统	热刺 FSC1000/1500/2000/3000		凯普林 500T/1000T/1500T		飞博YDFL-1000-CW		创新MFSC - 1000X/1500X		锐科RFL-C系		锐科RFL-C-X/H		杰普特口 CTRL-INTERFACE		
PWM+	12. MOD SW IN+		21. PWM+		15. GATE		17. 调制输入 +		15. MOD+		15. MOD+		3. 调制+		
PWM-	13. MOD SW IN-		8. PWM-		16. GND IO		4. 调制输入 -		16. MOD-		16. MOD-		16. 调制-		
EN+	5. LASER EN+		19. 使能+		18. EX-EN		18. 使能输入 +		18. Laser EN		18. Laser EN		4. 使能+		
EN-	6. LASER EN-		6. 使能-		20. GND IO		5. 使能输入 -		20. EGND		20. EGND		5. 使能-/报警输出-		
DA1+	14. ANG 0~10V+		15. AD+		12. IFWD SET		15. DA (0-10V) 输入+		12. Analog		12. 0-10V		18. 0-10V+		
DA1-	15. ANG GND-		14. AD-		14. CASE		2. DA (0-10V) 输入-		14. AGND		14. AGND		6. 0-10V-/模拟输入地		
RED+					17. RED-EN				17. Red Laser						
RED-															
备注									23. EVCC		24V	17. EVCC	24		
												21. AD/RS	V		
			10. 互锁	短接	1. INTLK1A	短接	19. 互锁+	短接	2. 预留Interlock	短接	2. ITL-A	短接	8. 互锁 1+	短接	
			23. 互锁	短接	4. INTLK1B	短接	6. 互锁-	短接	3. 预留Interlock	短接	3. ITL-B	短接	21. 互锁 1-	短接	
			12. 互锁	短接	2. INTLK2A	短接			8. 预留远程上电	短接	8. RPA	短接	9. 互锁 2+	短接	
			25. 互锁	短接	3. INTLK2B	短接			9. 预留远程上电	短接	9. RPB	短接	22. 互锁 2-	短接	
									10. 预留急停	短接					
									11. 预留急停	短接					
							钥匙拧到ON, 开机后等待自检完成按下 START即可						激光器前面板钥匙拧到robot后按下 start即可		

Figure 2.10, Defindigram of laser wiring of different manufacturers

## 2.11 Gas control and air pressure detection interface (note: special welding interface)

The control box provides a dedicated IO interface, all output IO can use OC output to directly drive the relay, the maximum current can reach

500 mA, the wiring diagram is shown below.

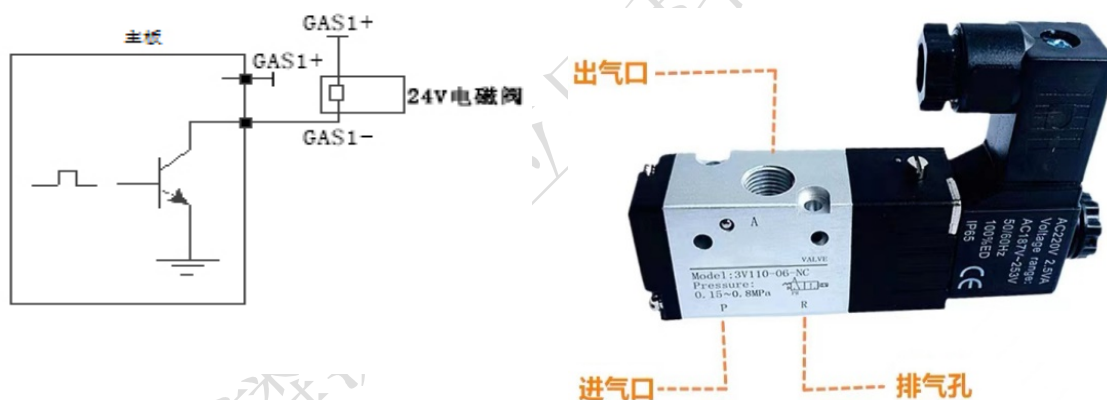


Figure 2.11.1, schematic diagram of the gas control interface

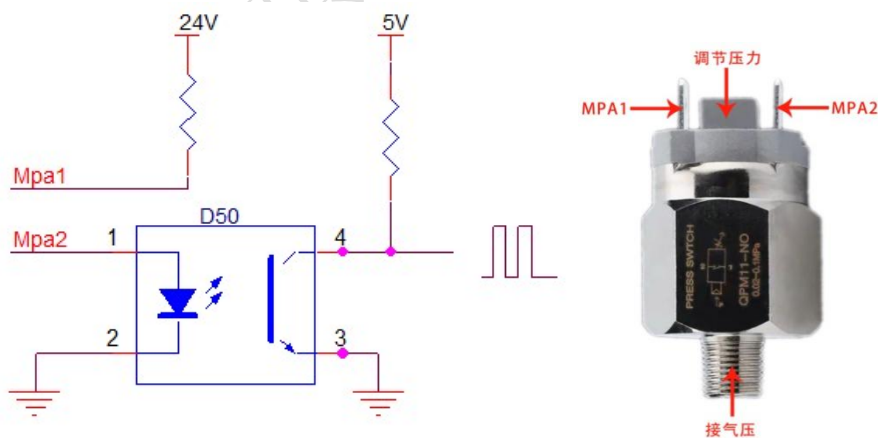


Figure 2.11.2, Schematic diagram of the air pressure detection interface

Table 2.11

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	Valvalve-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, the dial-code switch

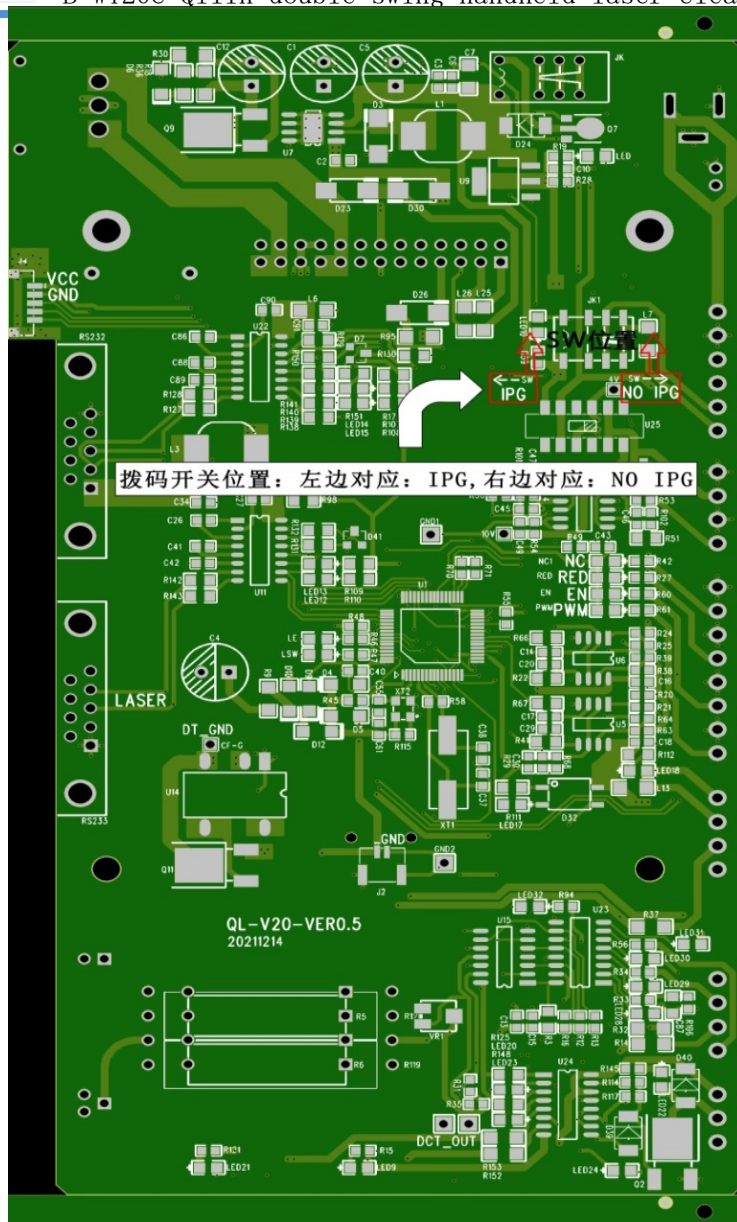


Figure 2.12, schematic diagram of the dial-code switch

order number	characteristic	definition	explain
1	IPG	Laser control signal	PWM, EN, RED, NC output of 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-

# Chapter 3 Human-machine

## interface: HMI introduction

### The main contents of this section are:

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

### 3.1 Man-machine interface function and operation introduction

The operation panel of Qilin double swing handheld laser cleaning system adopts 7-inch configuration capacitive touch screen, which is dignified, generous and easy to operate. Can be set up laser, laser cleaning head related parameters, but also can control the light mode, at the same time can control the energy strength during cleaning, the highest can achieve laser no damage cleaning material surface.

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

Main interface, schematic diagram



This interface is the welding interface mode, switch the welding interface and replace the handheld welding to start welding.

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





Press the "" in the main interface to enter the setting interface, as shown in the figure below



Parameter setting, red light offset setting, S / N and language setting, and hardware configuration are all functions in welding mode. Please select cleaning mode

After selecting the cleaning mode, as shown in the figure below





**Important reminder:** In the cleaning mode, it is necessary to continuously buckle the welding gun twice to continue the light for cleaning.

Cleaning mode: line, ring, snowflake, cow head, hot wheel.

Cleaning strength: including heavy cleaning, standard cleaning, non-destructive cleaning, click to change the cleaning mode.

Cleaning power: Set the peak power of the laser during cleaning.

Wash width: Set the cleaning range of the laser during cleaning.

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.

Red light: Opening the red light preview swings out the set graph.

Exit: Exit the cleaning mode and enter the welding mode.

**Clean the 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 X coordinate position.

Start correction: zero the X coordinates.

Clear correction: clear the previous step.

## Note for using the cleaning system

1. The double swing handheld welding head includes lasers, 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 equipment leakage or static electricity, ensure the use of light double pendulum industrial welding head equipment.
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 it is 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 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 / cleaning control system. If the external wire transmitter, 24V power supply should provide 200W (power voltage 24V, output current equal to or greater than 8A)!
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 installation, 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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