

Be sure to read the manual before using the system

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

# BWT20

## Qilin double swing handheld laser welding system user manual

V11 control box + BWT 20 welding head



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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 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.



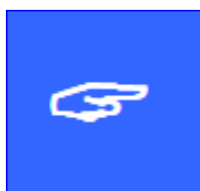
### **warn:**

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.



### **important:**

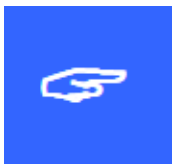
Represents an important information to note during the product. Please do not ignore this information, which provides effective operational help.



This label indicates laser radiation, which will generally be affixed to the product output of laser. 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, and check whether the product is complete and all parts are intact 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.

BWT 20 The shipping 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 | BWT 20 Hand-held welding torch  | 1        |           |
| 2 | The V 11 control box            | 1        |           |
| 3 | T20 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  | Urgent stop trigger 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 |  |

# catalogue

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# Chapter 1 summary

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

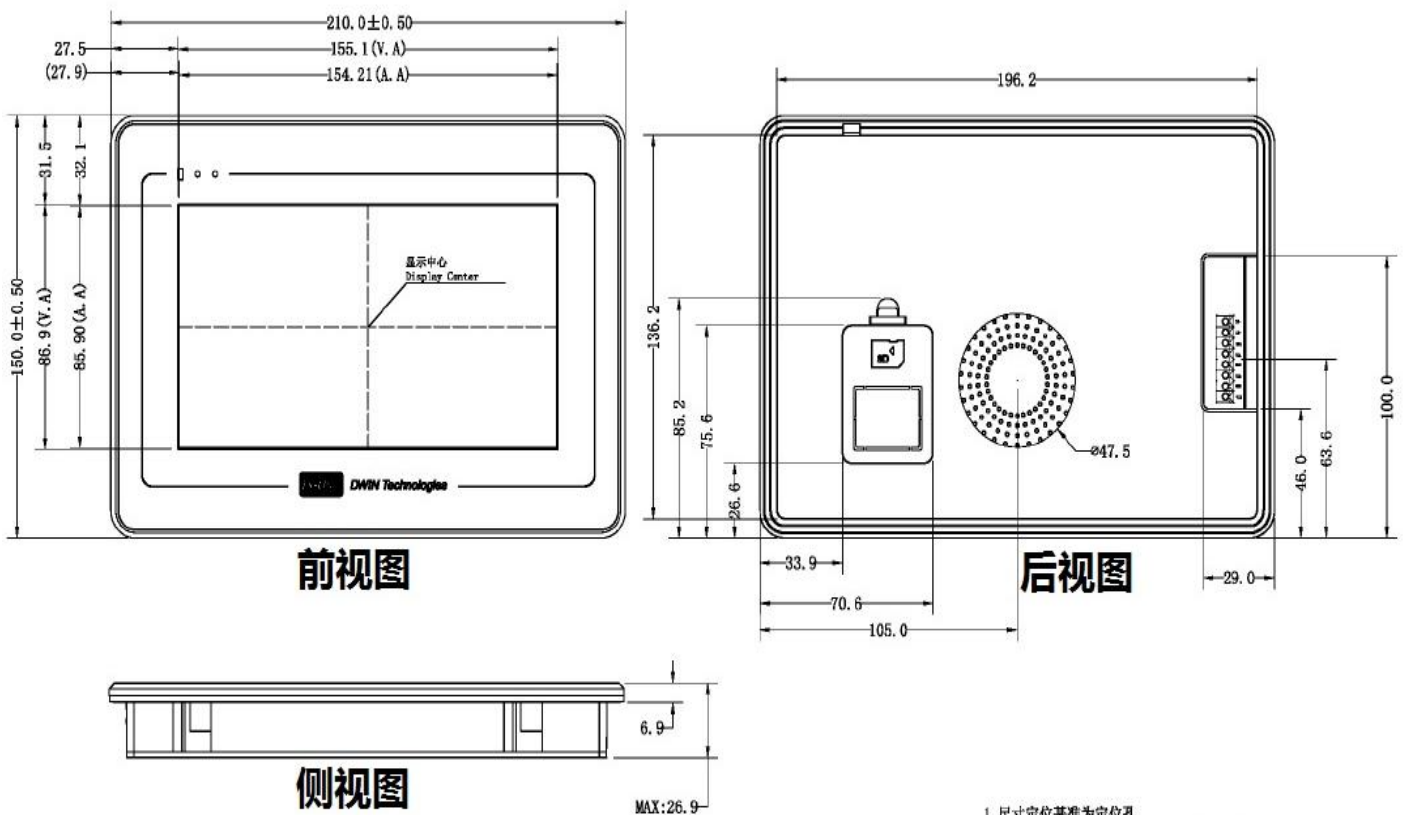
- Introduction to the double-
- swing handheld laser  
welding system  
Product installation size  
drawing

## 1.1 Qilin double swing handheld laser welding system brief introduction

Qilin double swing handheld laser welding system is a control system developed for fiber laser welding. Double vibration lens motor control, there are seven swing modes: point, line, ring, oval, triangle, eight characters, semicircle. High-speed digital motor swing design, circulation waterway design, fast cooling optical cavity, ergonomic design, high-end chip, a variety of safety protection measures and other functions and features.

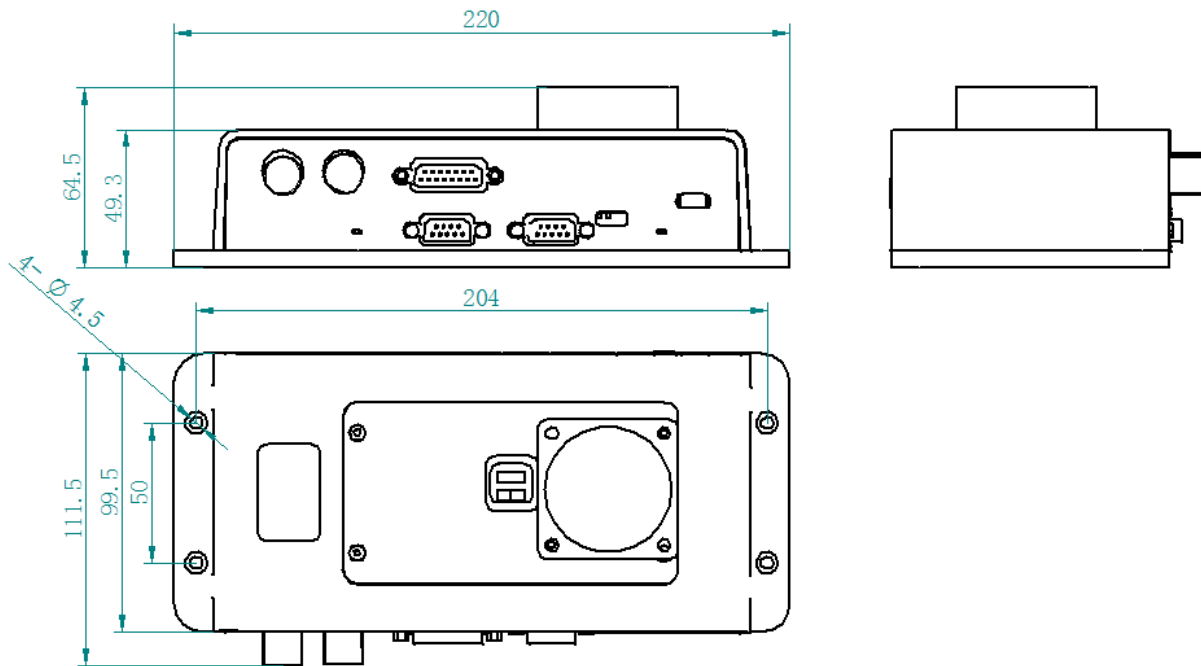
## 1.2 Installation size of the touch screen

1.21 Touch screen installation dimensions are shown below:



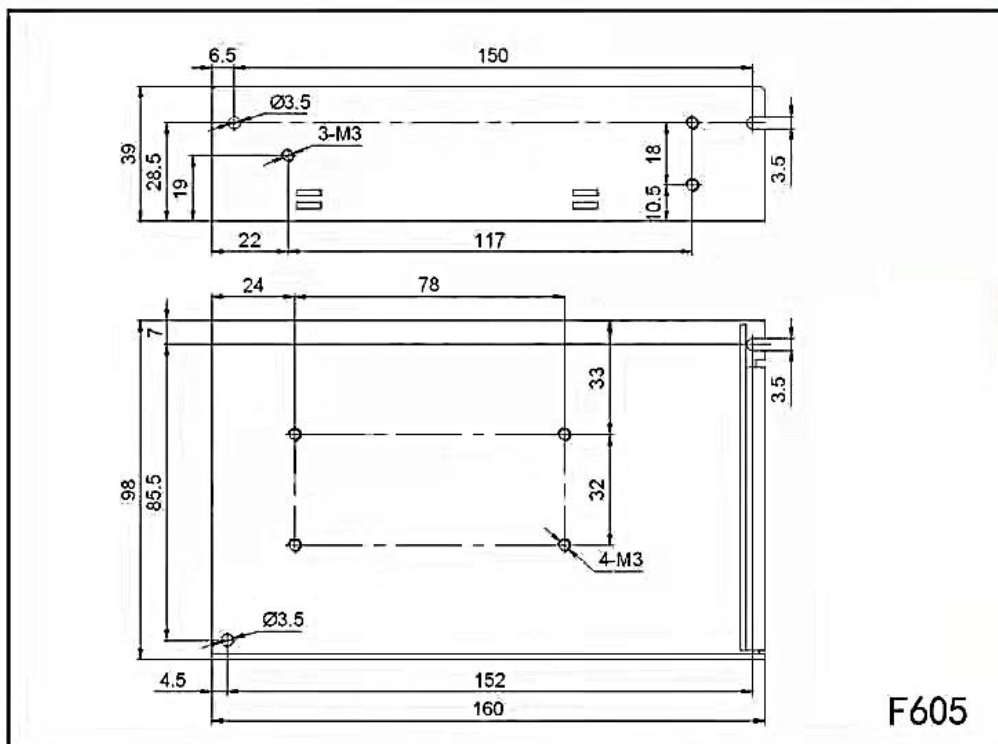
1. 尺寸定位基准为定位孔  
Location hole is used as position reference.
  2. 未标注公差为 $\pm 0.3\text{mm}$   
Unmarked Tolerance is  $\pm 0.3\text{mm}$
- 注: 虚线标注为有效显示区域  
Active area is marked in Dash lines

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



1.2.3 Installation size of 15 V 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
- Double-swing handheld laser welding head connector
- Lead trigger line

- **Fan interface  
introduction**
- **Control  
interface of  
the wire  
feeder**
- **Description of  
wire feeder**
- **Laser device  
control  
interface**
- **Gas control, air pressure  
detection interface**
- **Alarm signal  
interface**
- **Warning lamp  
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.

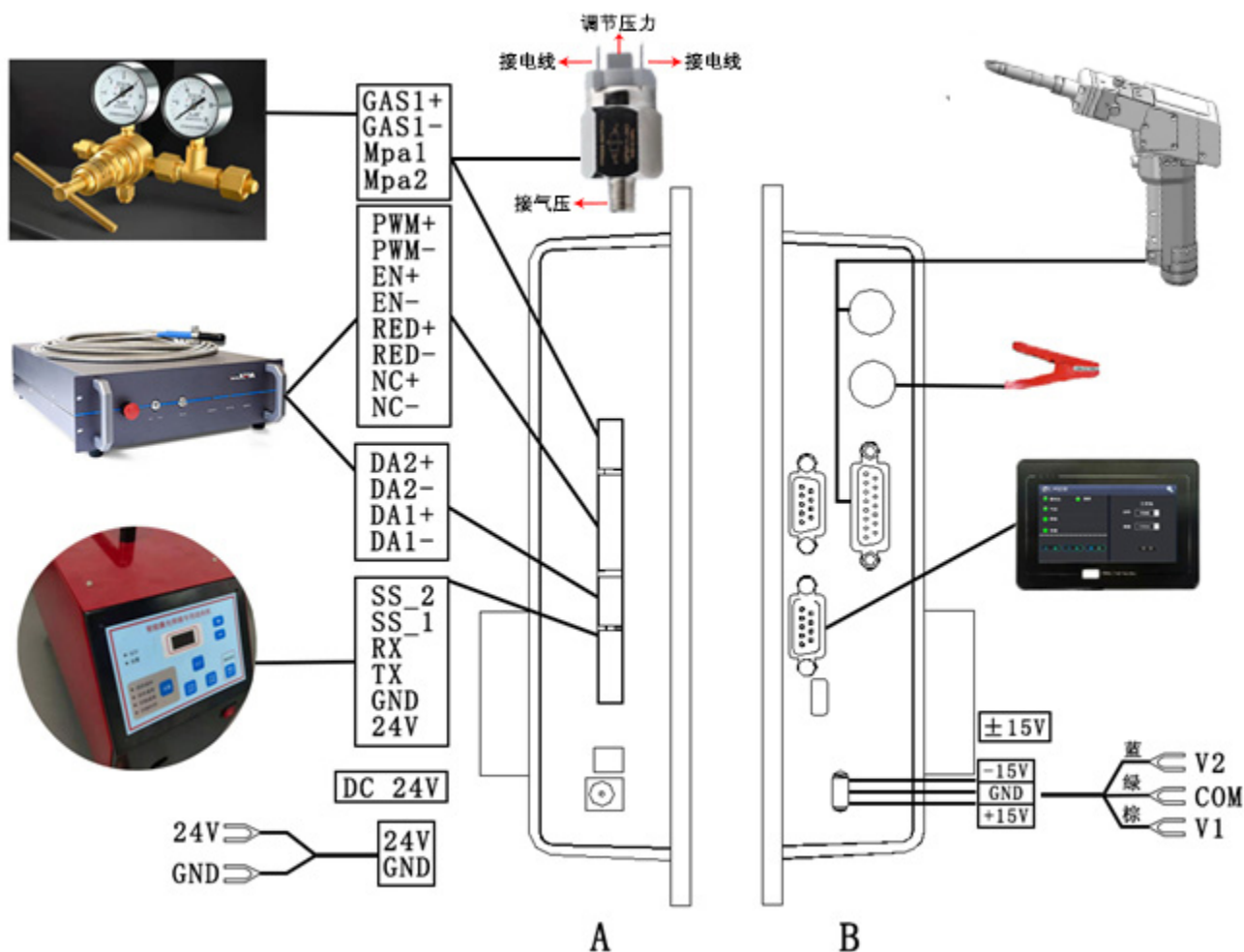
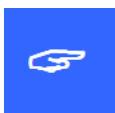


Figure 2.1 Schematic diagram of the system wiring



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

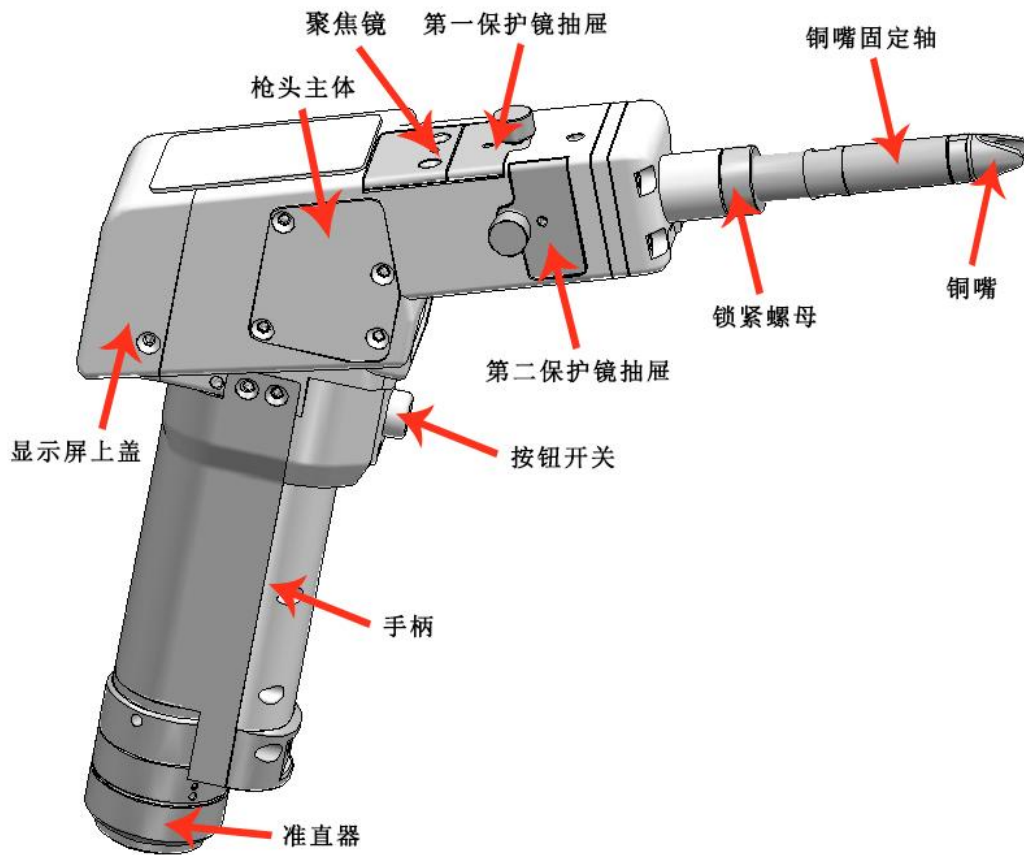


Figure 2.21, a structural diagram of the gun

| parameter                        | scope  |
|----------------------------------|--|
| interface type                   | QBH  |
| laser power                      | 2000W  |
| Collar focal length              | 50   |
| Focus focal length               | 150  |
| Regulate the spot                | Points, line, circle, ellipse, triangle, 8 words, semicircle |
| Adjustable surface               | 0—5mm  |
| cooling-down method              | Water cooling / air cooling                                  |
| Applicable wavelength            | 1064-1080nm  |
| Collimane lens                   | D20F50   |
| Focus on the lens                | D20F150  |
| Reflective mirror                | 22.5×17T3  |
| Protection mirror specifications | D20T2  |
| Maximum air pressure support     | 0.6Mpa   |



|                                    |                  |
|------------------------------------|------------------|
| Focus of vertical adjustment range | $\pm 3\text{mm}$ |
| TBM                                | 0.98KG           |



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.

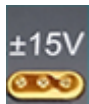
DB15 interface: connect the control system and the gun head communication function.

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<br>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<br>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 | defi<br>niti | expl<br>ain |
|-----|--------|--------------|-------------|
|-----|--------|--------------|-------------|

|   |      | on                           |   |
|---|------|------------------------------|---|
| 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 |

## 2.6 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 | defi<br>niti<br>on              | expl<br>ain  |
|-----|--------|---------------------------------|--|
| 1   | DB15   | Vibrator scope & OLED interface | Control line for communication with the hand-held welding head |

## 2.7 Lead 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 defines for the safety clip interface.

| 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 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 defines the control interface of the wire feeder.

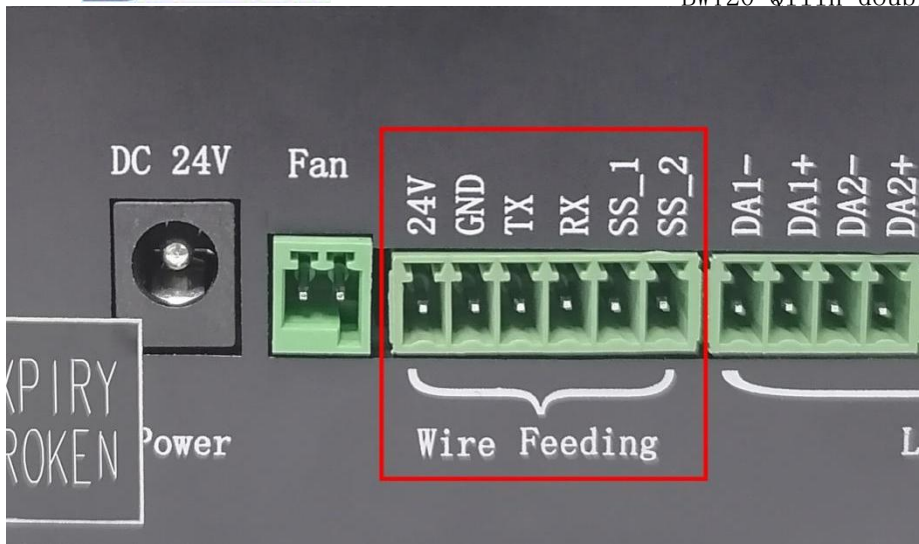


Figure 2.9 Schematic diagram of the control interface of the wire feeder

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 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                      | 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 Description of the wire feeder keys

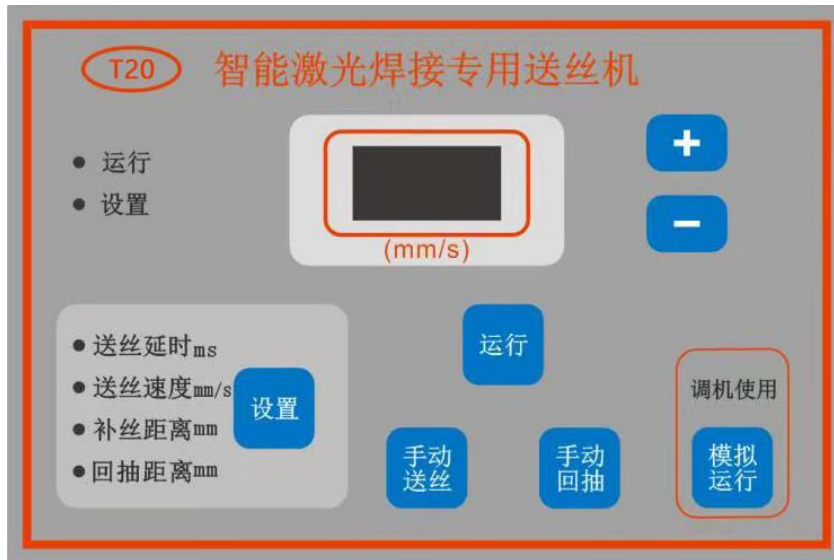


Figure 2.10 Schematic diagram of the control interface of the wire feeder  
**Filming machine instructions:**



: Send wire setting +



: Send wire settings-



: Set wire delay, wire speed, wire filling distance and withdrawal distance.



: Save the parameters after setting the parameters.



: Click the manual wire, and the wire wheel runs the wire at the maximum speed.



: Click manual withdrawal, and the delivery will at the maximum speed.



: After the wire speed is set, click simulation Run is the set wire speed.

Silk delay: after setting, light delay and then wire.

Wire delivery speed: running speed of the wire wheel.

Fililling distance: silk compensation distance after puldrawing stops.

Return distance: after the wire stops, the wire pulls back.



## 2.11 Laser control interface

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

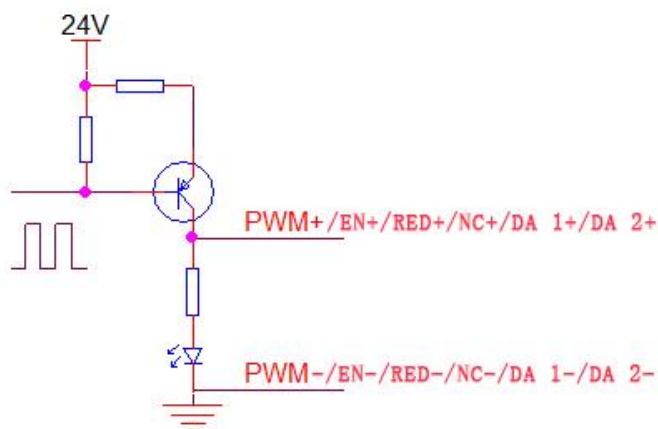


Figure 2.11 Schematic diagram of the laser control interface

Table 2.11 shows the definition of the laser interface.

Table 2.11

| pin | signal | definition                        | 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- | 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<br>FSC1000/1500/2000/3000 | 凯普林<br>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+     | 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. 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 | 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     | 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    | 12. 0-10V    | 18. 0-10V+          |           |          |    |           |                           |
| DA1- | 15. ANG GND-                 | 14. AD-                 | 14. CASE       | 2. DA (0-10V) 输入-    | 14. AGND      | 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     | 24V                 | 21. AD/RS |          |    |           |                           |
|      |                              | 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        |          |    |           |                           |
|      |                              |                         |                |                      |               |              |              |                     |           |          |    |           | 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

## 2.12 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.

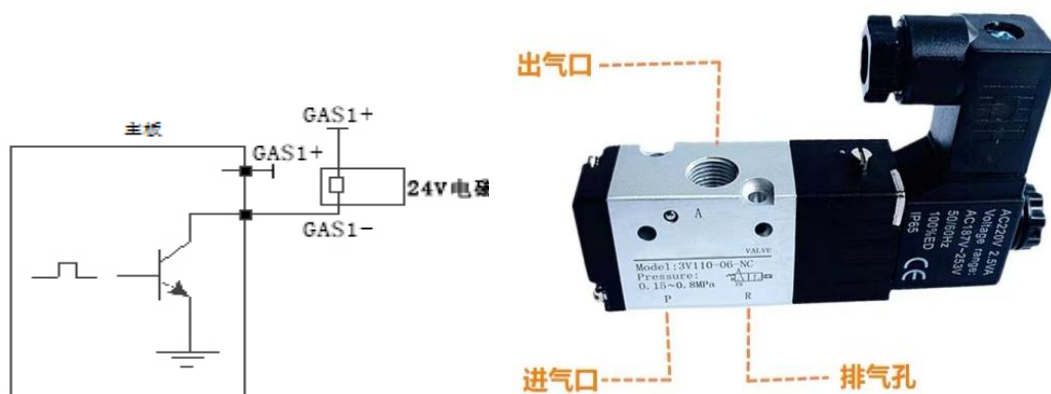


Figure 2.121 Schematic diagram of the gas control interface

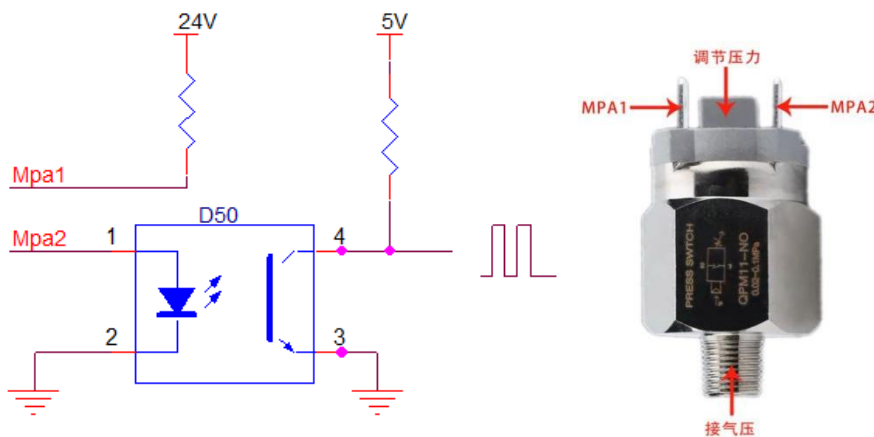


Figure 2.122 Schematic diagram of the air pressure detection interface

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 | 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 |

### 2.13, the dial-code switch

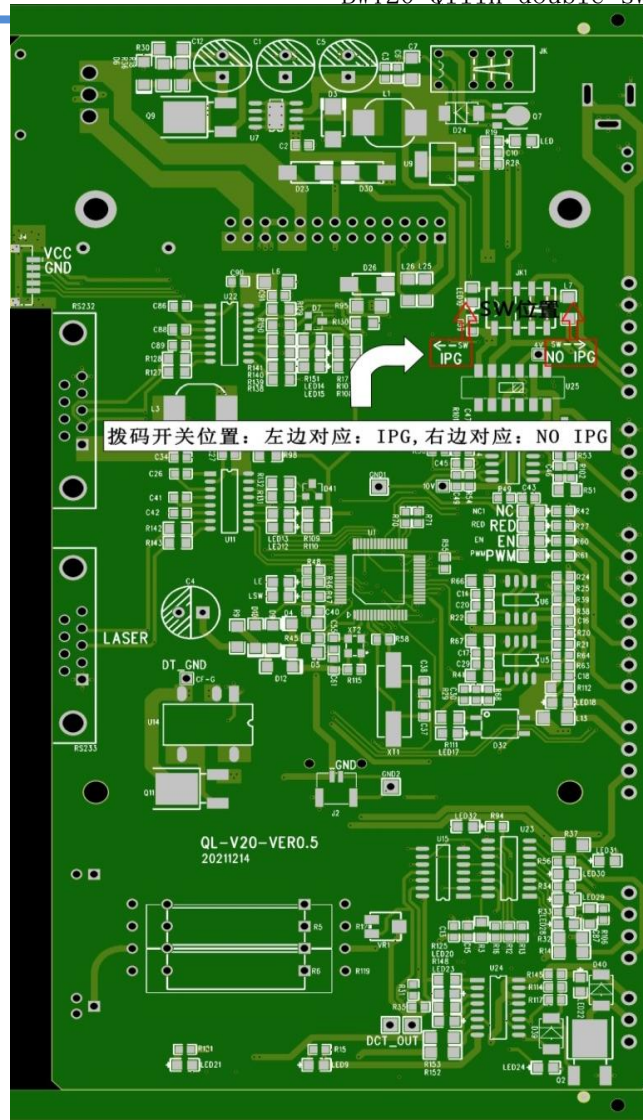


Figure 2.13, schematic diagram of dial switch

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

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

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

- 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 double swing handheld laser welding system adopts 7-inch configuration capacitive touch screen, which is dignified, generous and easy to operate. The relevant parameters of the laser and laser swing head can be set respectively, and the light mode can be controlled. At the same time, the process parameters stored inside the machine can be selected on the main interface, and at the same time, these art parameters can be adjusted and saved, facilitating the subsequent direct call, and the process package can also be customized.

#### 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.

Send wire: when the wire is opened, the wire sending opportunity is sent during the light. When the wire is closed, the wire sending machine is not controlled by the welding gun light signal.

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.

Process package: The process package has four common materials, and the thickness and parameters corresponding to "custom" and "other" are described 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" means: galvanized plate 1.0mm, and so on: "SECC/3.5mm" means: 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 main editing interface. After editing parameters, you can save the parameters without clicking confirmation.



Schematic diagram of editing the main interface

#### 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 modulation 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 out 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 "" in the main interface to enter the setting interface, as shown in the figure below



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**parameter setting:****gas control:**

Advance quantity: when starting processing, it 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 stop processing, stop the laser first,

After a time delay, then stop blowing.

Proportional valve: if the equipment is connected to the proportional valve control, the air flow size can be controlled.

**Start lift:**

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

Slow descent time: After the laser power is turned off, the laser energy is slowly turned off.

Light off delay: after closing the laser when set for 100ms, the full power input is 100ms to optimize 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 correction: save the set offset parameters to the system and zero the display coordinates.

Clear correction: Clear the set offset parameters and reset the display coordinates.

**SN and language settings:**

**System SN identification code: Product Serial number.**

Firmware version: is the version currently used by the system.

Available period (days): usable period, 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: English, Russian, Korean, Vietnamese, Japanese, Chinese

0"" in the upper right corner: Click to enter the corresponding LOGO number and replace the LOGO. (It can be repeated before the shutdown, and can not be changed after the shutdown)

Laser unlock code: When the laser is locked, it can be unlocked through this interface. No need to connect the computer to unlock it can directly input the unlock code provided by the laser manufacturer to unlock. (Currently, only chuangxin laser unlocking is supported)

**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.

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

## Process Package of Reference

### Parameters:

|              | 1500W laser control    |       |           |            | Laser head control |           |       |
|--------------|------------------------|-------|-----------|------------|--------------------|-----------|-------|
| order number | Material and thickness | power | frequency | duty cycle | pattern            | frequency | width |
| 1            | Stainless Steel 1.0    | 30%   | 3000HZ    | 100%       | ○                  | 10hz      | 1.6mm |
|              | Stainless Steel 2.0    | 60%   | 3000HZ    | 100%       | △                  | 10hz      | 2.6mm |
|              | Stainless Steel 3.0    | 90%   | 3000HZ    | 100%       |                    | 10hz      | 3mm   |
| 2            | Carbon steel 1.0       | 30%   | 3000HZ    | 100%       | ○                  | 10hz      | 1.6mm |
|              | Carbon steel 2.0       | 60%   | 3000HZ    | 100%       | △                  | 10hz      | 2.6mm |
|              | Carbon steel 3.0       | 85%   | 3000HZ    | 100%       |                    | 10hz      | 3mm   |
| 3            | Galvanized plate 1.0   | 35%   | 3000HZ    | 100%       | ○                  | 16hz      | 1.6mm |
|              | Galvanized plate 2.0   | 65%   | 3000HZ    | 100%       | △                  | 16hz      | 2.6mm |

|   |                         |     |        |      |   |      |       |
|---|-------------------------|-----|--------|------|---|------|-------|
|   | Galvanized plate<br>3.0 | 85% | 3000HZ | 100% |   | 16hz | 3mm   |
| 4   | Aluminum plate 1.0      | 40% | 3000HZ | 100% | ○ | 10hz | 1.6mm |
|   | Aluminum board 2.0      | 70% | 3000HZ | 100% | △ | 8hz  | 2.6mm |
|   | Aluminum board 3.0      | 85% | 3000HZ | 100% |   | 8hz  | 3mm   |
| The above parameters are provided for the reference purposes only |                         |     |        |      |   |      |       |

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

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

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

## Use the laser welding system precautions

1. The light double pendulum industrial welding head contains lasers, water cooler, laser welding system and laser welding head. In order to avoid interference, ensure that the argon arc welding machine and related equipment with large interference, and 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

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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, use the beautiful strip tape to seal and wrap it 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 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 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.:

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Thank you for using the products of Shenzhen Qilin Laser Application Technology Co., LTD. !