

HS series

HS11 optical fiber handheld swing welding joint WB instruction manual



Wuhan Xinghong Photoelectric Technology Co., Ltd

2021.01.20 (10th Edition)

Catalogue

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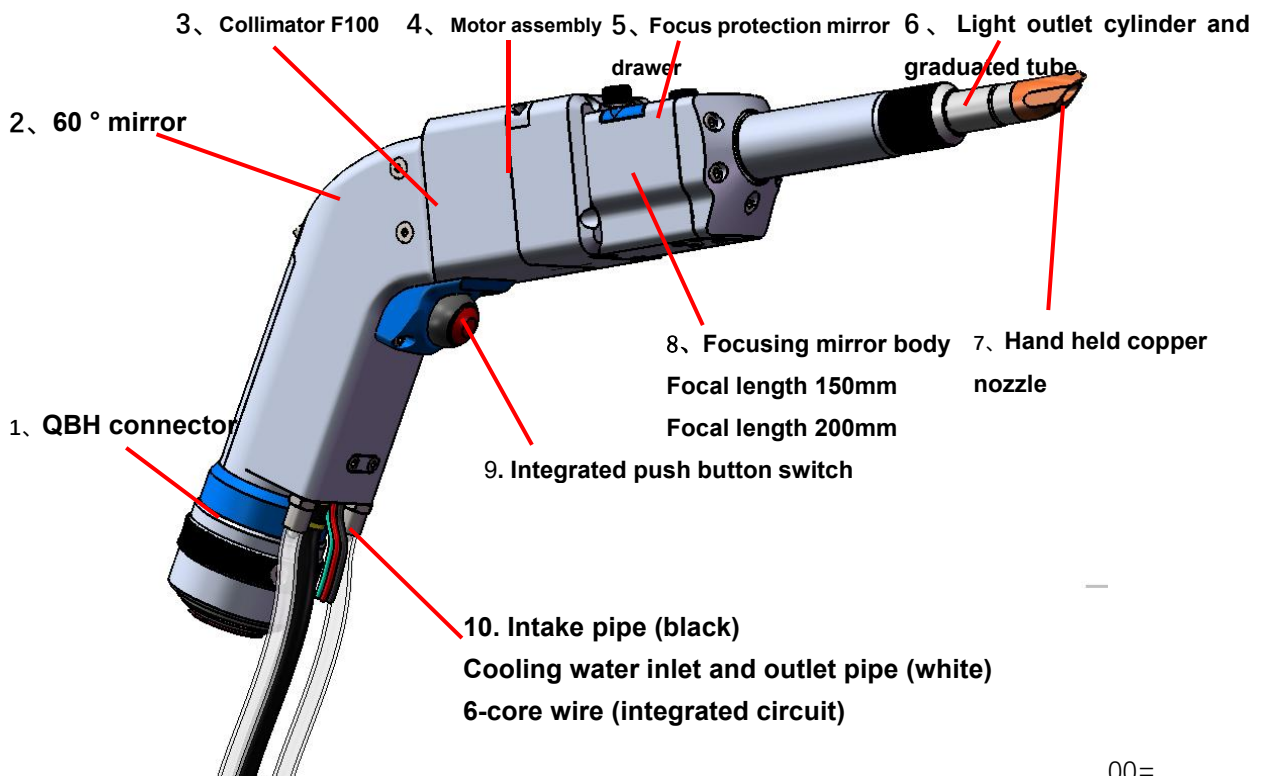
**Be sure to read the product manual in detail before
before installing and using the product**

You must wear safety glasses when operating the laser equipment. Safety glasses should be selected appropriately for the wavelength of the laser emitted by the laser. If the device is a laser tunable or Raman product, it emits laser light outside the normal output wavelength range of the device's laser and requires appropriate safety protection for this phenomenon. Laser safety glasses should be selected to shield the laser from the entire wavelength range emitted by the laser device.

Chapter 1: product introduction and display

1. Product introduction

The "WBK handheld welding system" consists of the "WB fibre optic continuous welding controller" and the "fiber optic handheld oscillating adjustable welding head" (the wire feed handheld oscillating welding system also includes (the wire feeder structure and its wire feeder). When you receive the product, open the box and it contains: 1 hand-held swing adjustable gun, 1 driver, 1 controller, 1 touch screen, 1 6-core cable, adjustment tool and several accessories.



Hand held swing head (sample)

Note: The water pipe is a transparent pipe respectively in the left and right, please see the logo before the water, the gas pipe in the middle of the two water pipes default for the black pipe, part will be a transparent pipe, please see the logo before the gas, if the water line to the gas line pipe mouth will cause
If you connect the water line to the air line, it will cause very serious damage, please be careful not to connect the wrong one.

2. Accessories display



Hand held swing adjustable head (sample)



Touch screen (sample)



Controller (sample drawing)



Driver (sample)



Safety protection clip (sample drawing)



Welding copper nozzle (sample drawing)



6-core wire (sample drawing)



Protective lens (sample)

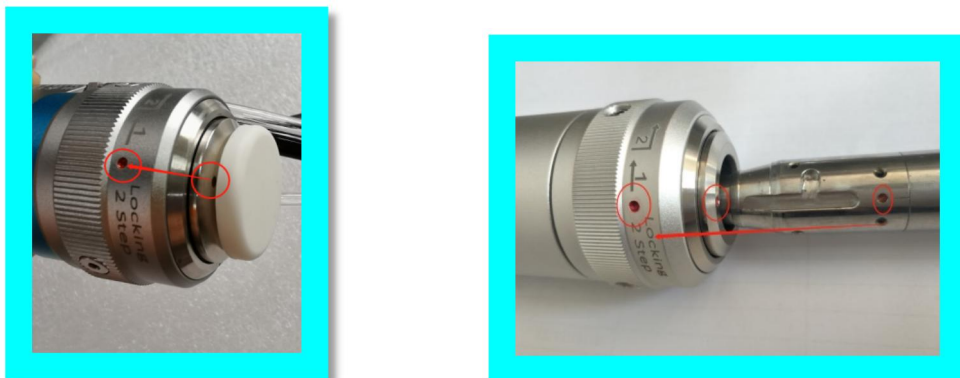
3. Special attention: 5 steps for inserting and unplugging optical fiber

Note: when inserting optical fiber, the laser head shall be placed horizontally; Ensure that the optical fiber is inserted horizontally

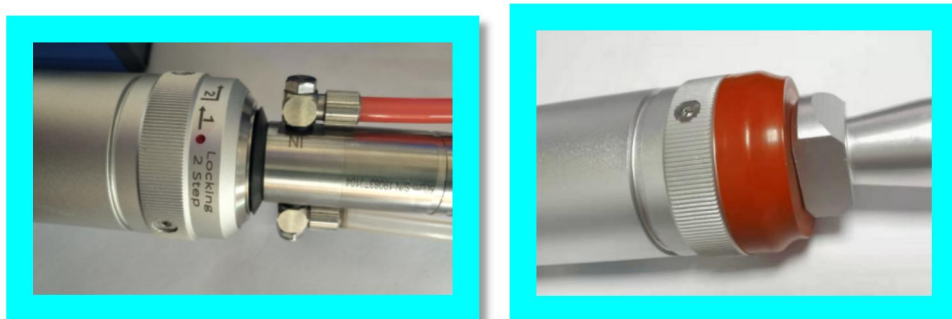
3.1 check whether QBH connector and optical fiber plug are dirty, and wipe them with alcohol and cotton swab (tissue paper) in time



3.2 QBH return to "two points and one line"
3.3 alignment and insertion of optical fiber plug



3.4 secondary locking clockwise
3.5 optical fiber protective jacket for complete protection

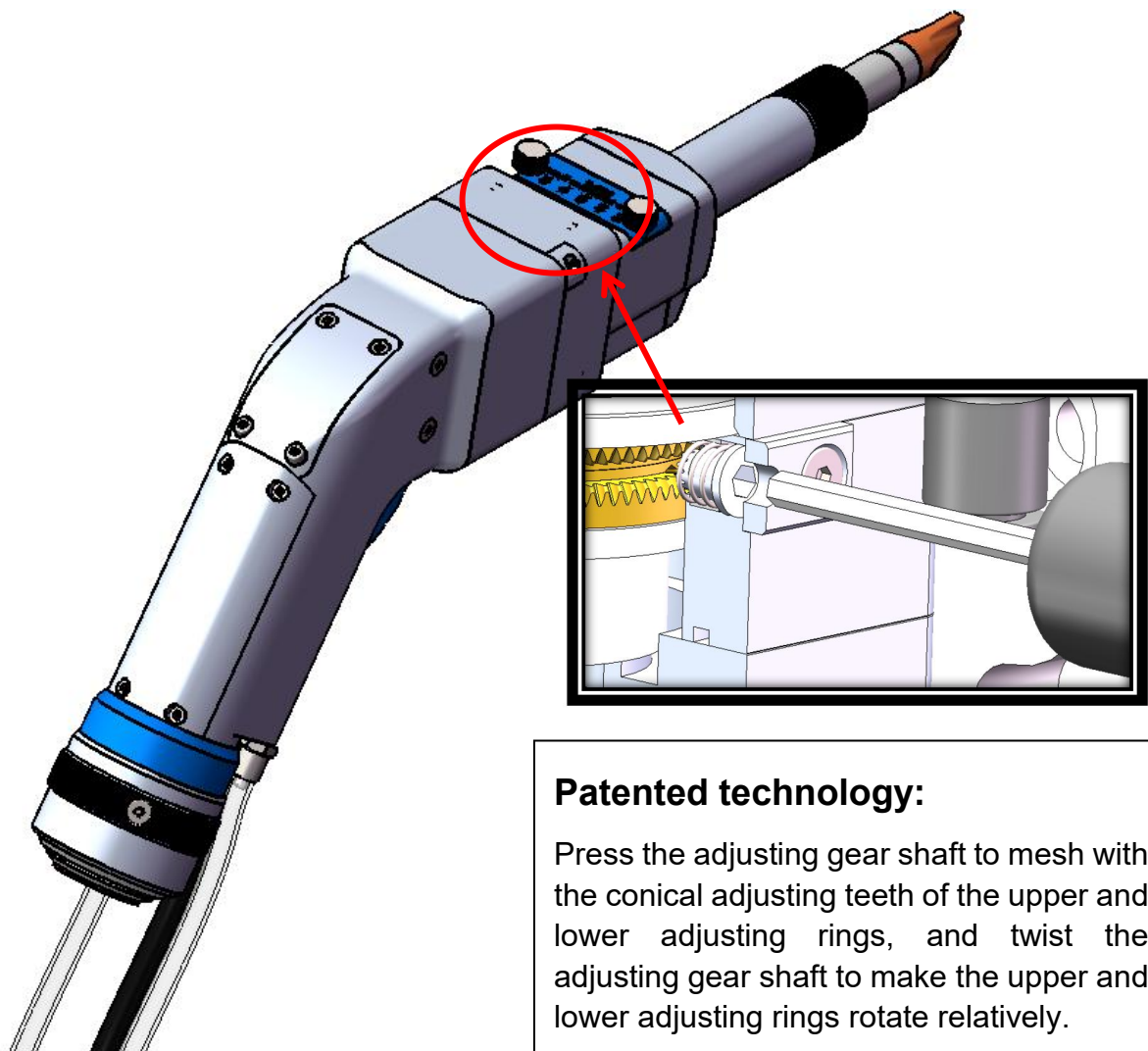


Note: when inserting optical fiber, the laser head shall be placed horizontally; Ensure that the optical fiber is inserted horizontally

Chapter II: Product functions, and general operation

1. Introduction of laser coil adjustment function

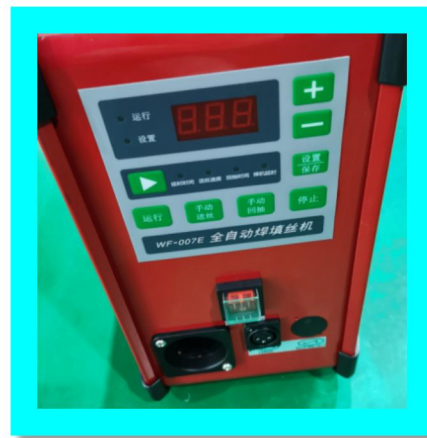
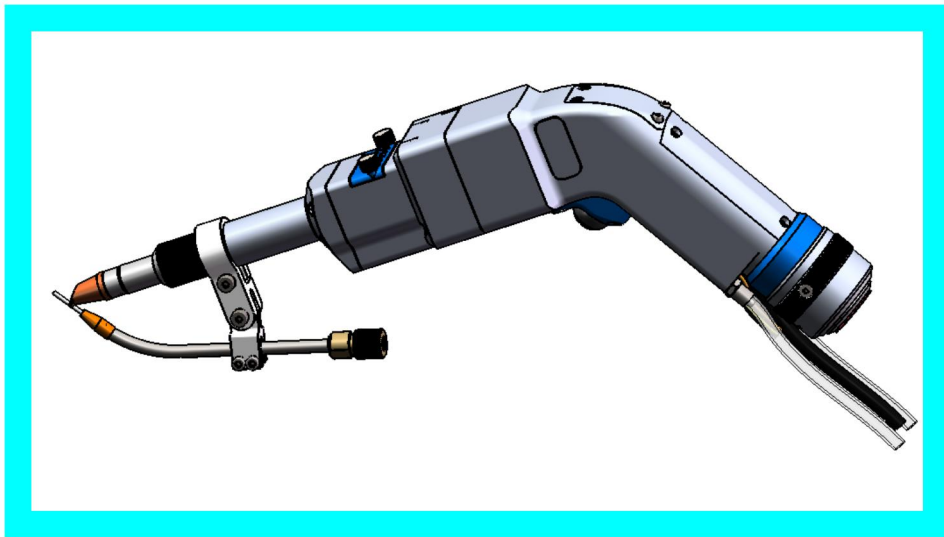
change the single welding mode of spot laser welding, and change the traditional spot light emitting mode to swing O-type light emitting mode, so as to better realize the welding effect of "fish scale welding" and expand the welding width; in addition, the welding spot can change the size of fixed spot, and the single welding mode of laser welding can realize multi-directional and different welding conditions, and various welding conditions can be realized.

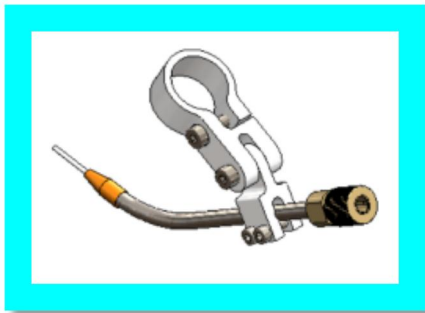
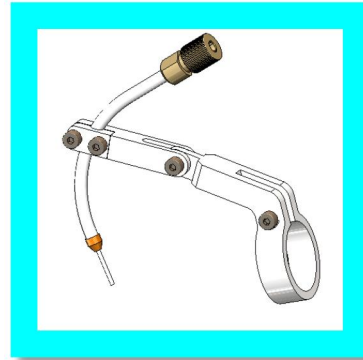
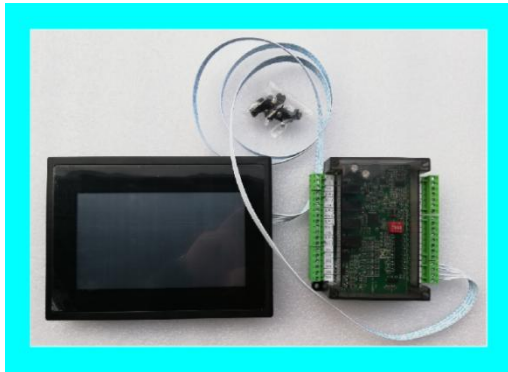


2. Introduction to hand-held swing wire feeding

The hand-held swing wire feeding welding joint consists of swing head, WB optical fiber continuous welding controller, wire feeder (including welding wire), wire feeding structural parts, etc.

The wire feeder needs to plug in the triangular plug to power 220V. Press the power switch (power on) and the power indicator (power) will light up. The manual feeding and withdriv on the panel of the wire feeder shall be operated as required.





Wire feeding support

Wire feeding copper nozzle



Welding wire fixing cap

The welding wire fixing cap needs to match the hole diameter according to the size of the welding wire. The hole diameter just passes through the welding wire without shaking.

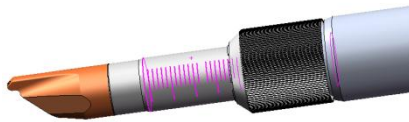
When using the wire feeding function, the wire feeding button switch on the touch screen must be turned on.

3. Defocus adjustment

The brightness of the laser beam is the strongest and the marking sound is the largest. When you hear the crackle, that is, the focus is right on the surface of the workpiece, which is zero defocus.

When negative defocusing, greater penetration can be obtained, and the internal power density of the material is higher than that of the surface, which is easy to form stronger melting and vaporization, so that the light energy can be transmitted to the deeper part of the material. Therefore, in practical application, when the penetration depth is required to be large, negative defocus is adopted; When welding thin materials, positive defocus should be used.

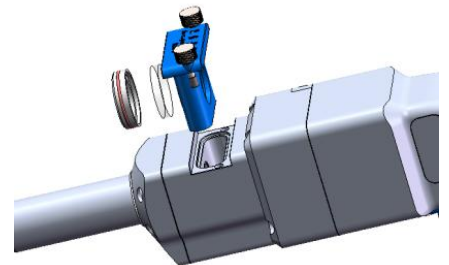
At the front end of the hand-held light output cylinder, the scale tube can be adjusted according to the user's application requirements to record the positive and negative defocus amount, which is convenient for the user's operation habits.



4. Replace the cleaning protective sheet

Important: when cleaning and replacing the protective film, you need the following equipment:

1. Powder free rubber gloves or finger covers, lint free cleaning rags and cotton swabs
3. Isopropanol (optical grade, anhydrous), acetone (optical grade, anhydrous)
5. Compressed air (no oil, no water)
6. Microscope, light source



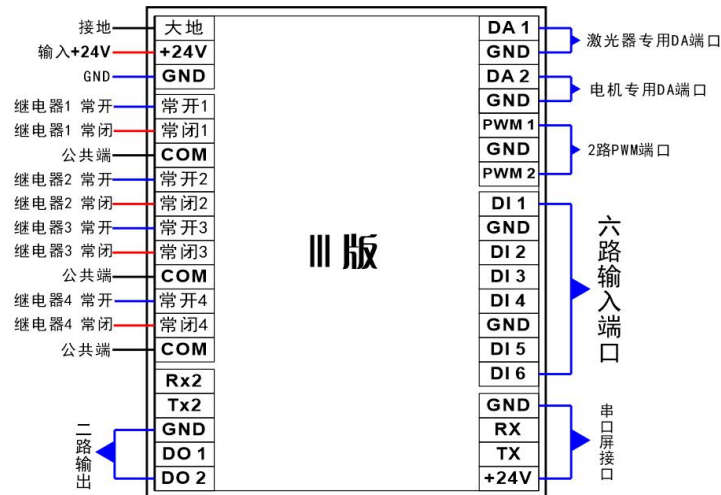
be careful:

- ★ do not repeatedly use lint free cotton cloth or cotton swab to wipe the protective lens.
- ★ do not touch the protective lens with your fingers.
- ★ do not blow directly with your mouth to protect the dirt on the lens surface, because it may bring new dirt.
- ★ do not touch the tip of the cleaning cotton swab with your fingers.
- ★ don't forget to clean when replacing the protective mirror drawer.
- ★ when using compressed air, please do not blow dirt directly from the front, but from the side to avoid dirt sneaking into the surface.

★ in particular, when cleaning the product, you must wear powder free gloves or finger covers. It is now clear that if the damage is caused by improper operation or the use of incorrect cleaning procedures or chemicals, the damage caused by this reason is not covered by the warranty.

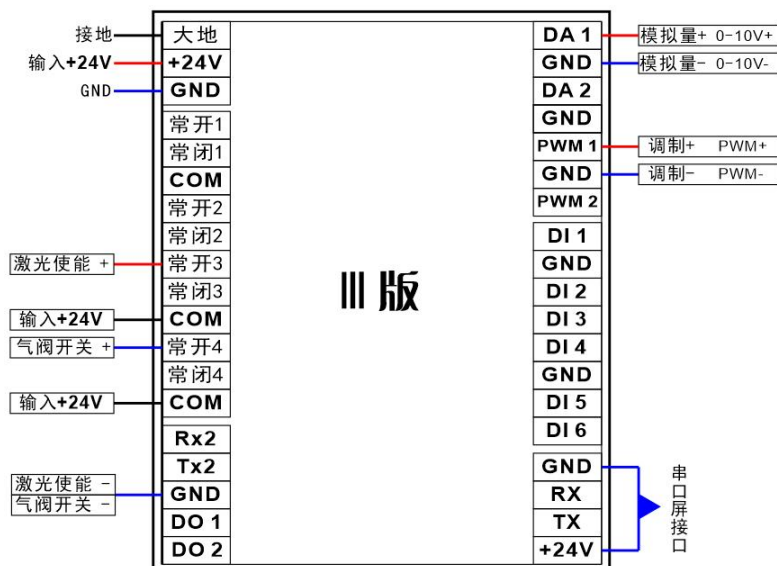
Chapter III: Introduction to control system

1. Controller port definition



控制器端口定义图

2. General wiring diagram of laser

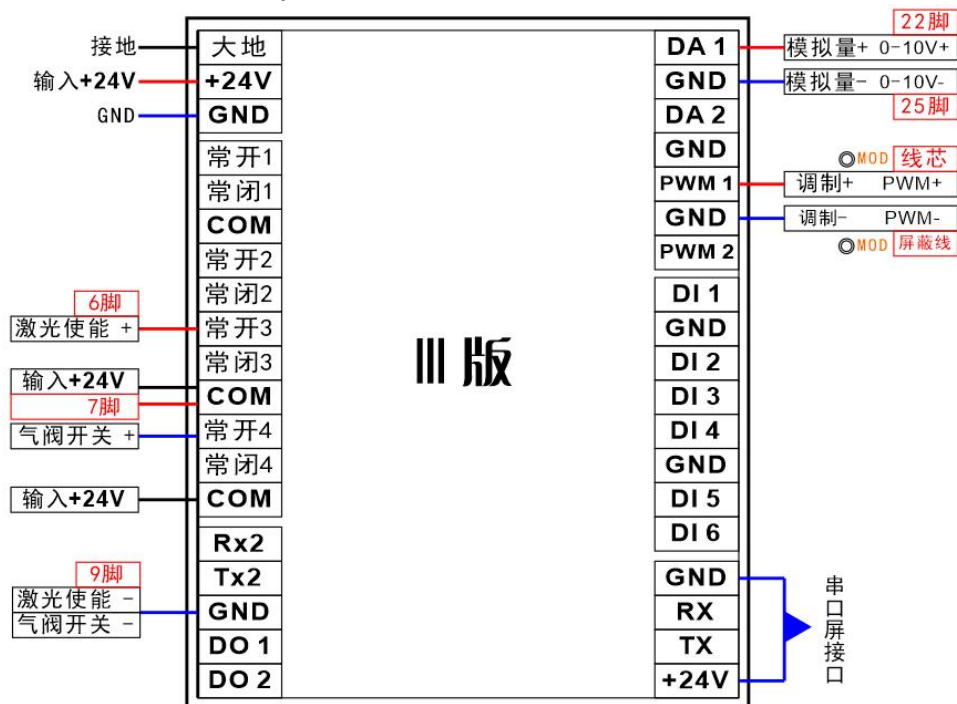


激光器常规接线图

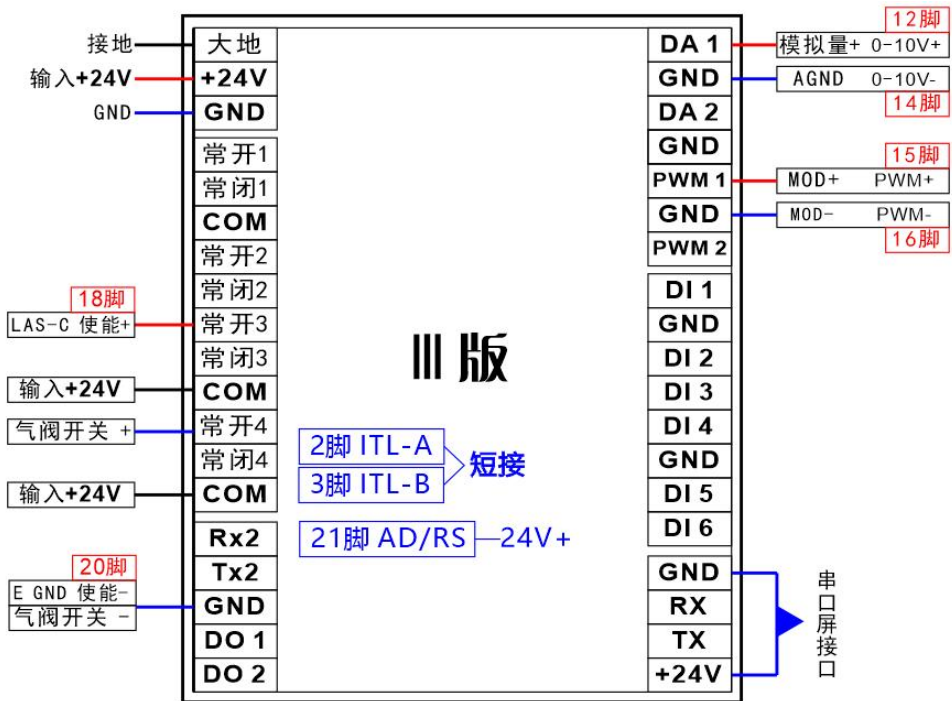
Note: the figure above shows the basic connection method of the laser. Please note that when connecting the laser control line, some brand lasers need to be connected with an external control line separately to control the light output normally. For example, the external control line of Ruike needs to supply + 24V

voltage separately to work normally.

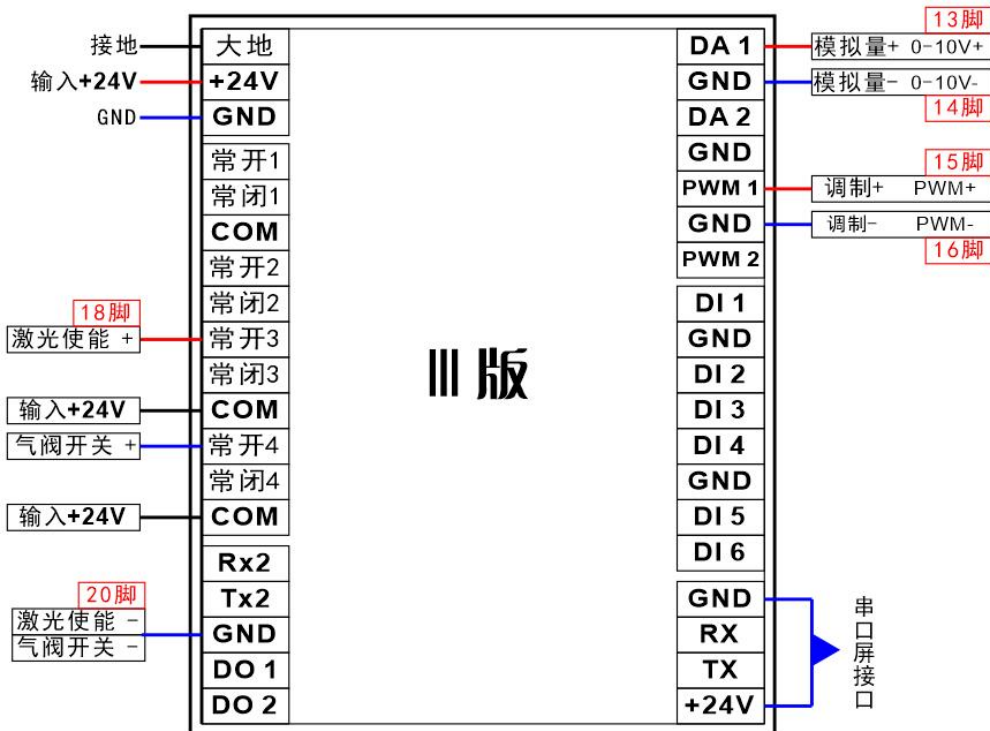
The following figure shows the wiring methods of various brands of lasers. Ruike laser now has many versions. If the Ruike laser you purchased is not the following two versions, please refer to this manual and Ruike laser manual for wiring. If the wiring method is still uncertain, please contact Xinghong photoelectric after-sales personnel.



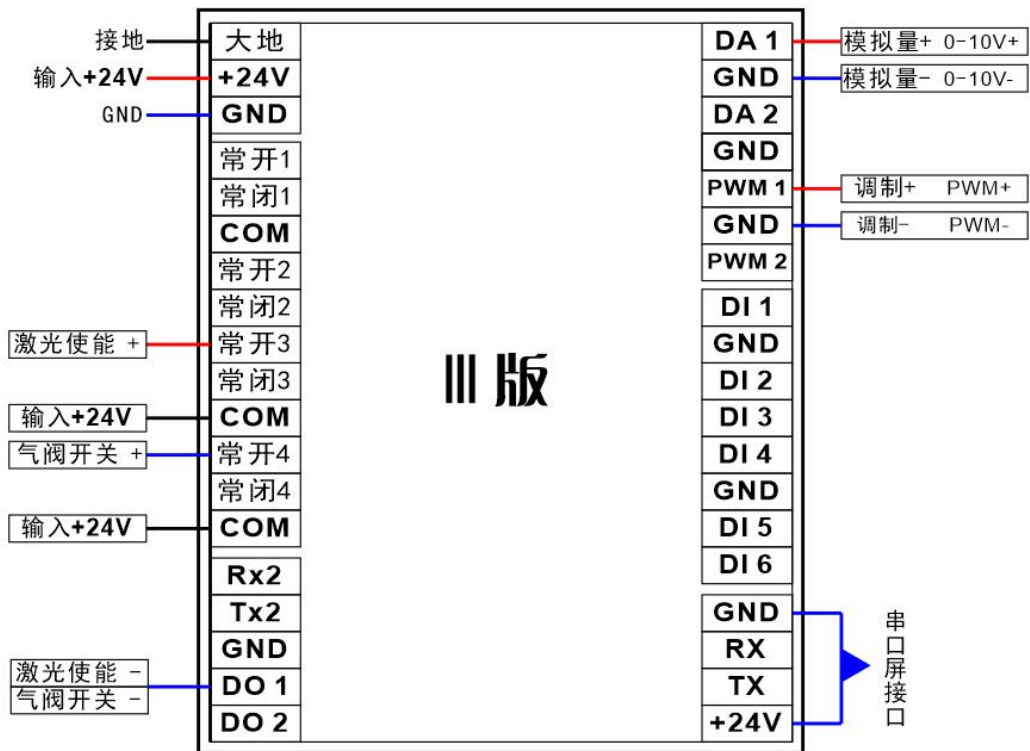
锐科激光器(版本I)接线图



锐科激光器(版本 II)接线图

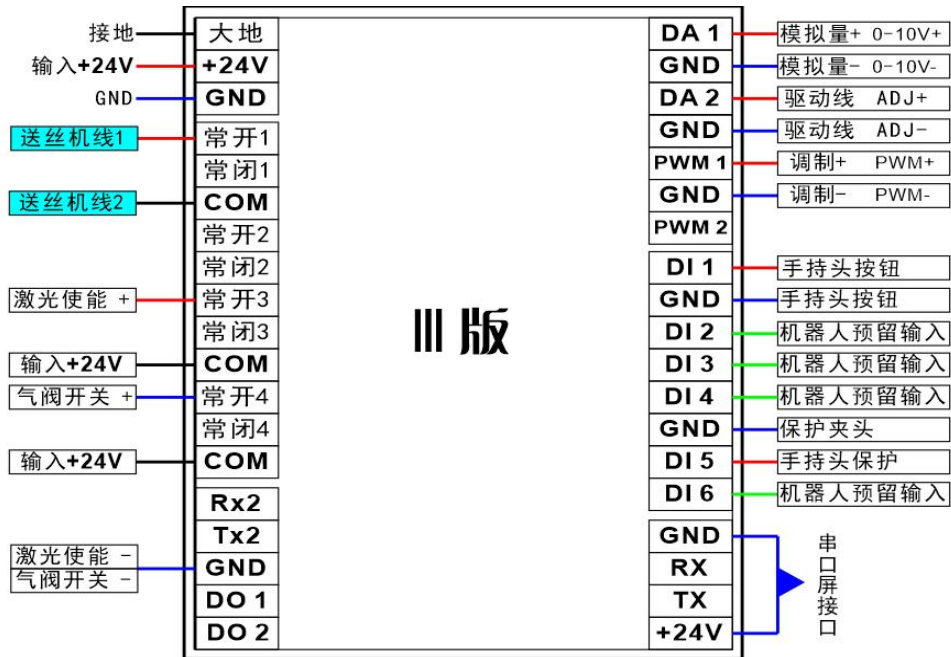


JPT激光器接线图

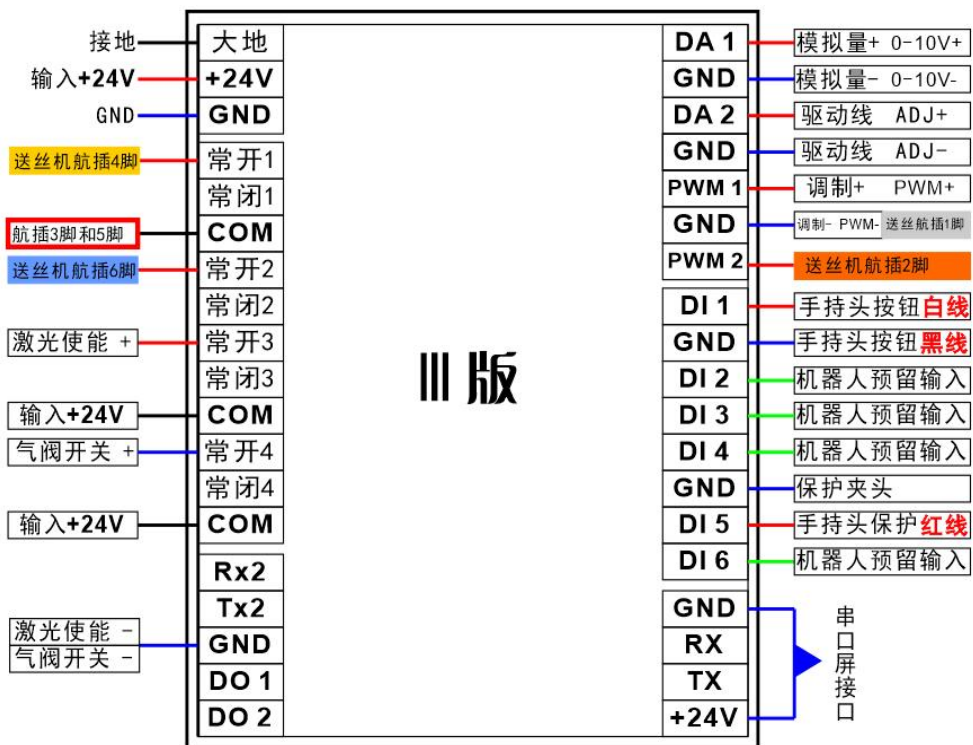


创新激光器接线图

3.Wiring diagram of swing wire feeding welding joint



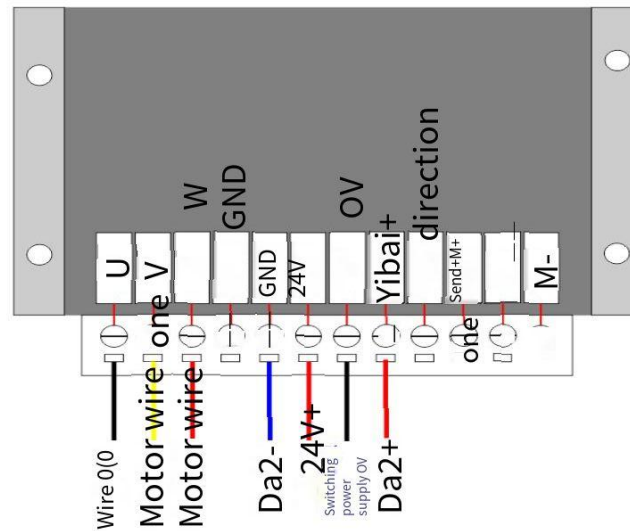
手持摆动**常规送丝机**接线定义图



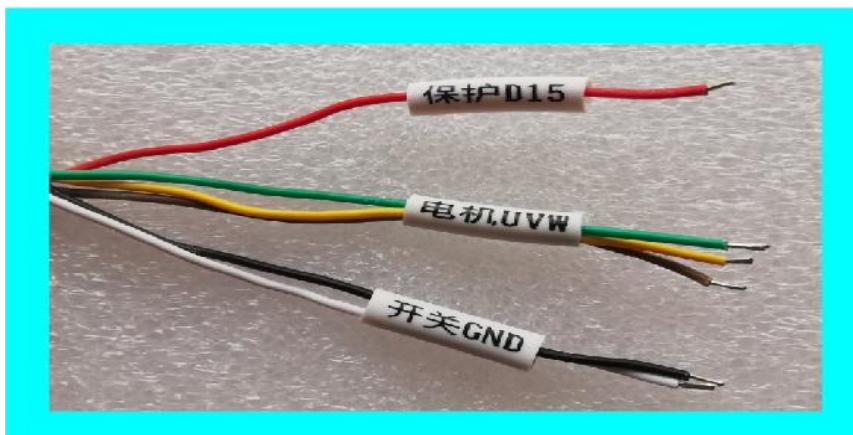
手持摆动**定制送丝机**接线定义图

The figure above is the wiring diagram of the second generation hand-held swing wire feeding welding joint. Please carefully look at the diagram and define the wiring. After the wiring is completed, check it against the figure above. After confirmation, it can be powered on normally.

4. Definition of driver wiring

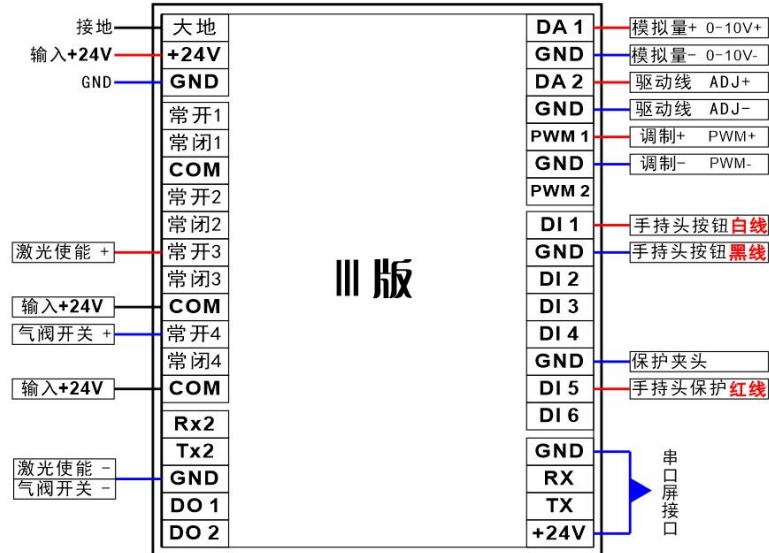


Drive port diagram



The three u \ V \ w wires on the handheld head correspond to the U \ V \ w on the driver, and there is no sequence requirement.

5. Safety protection wiring mode



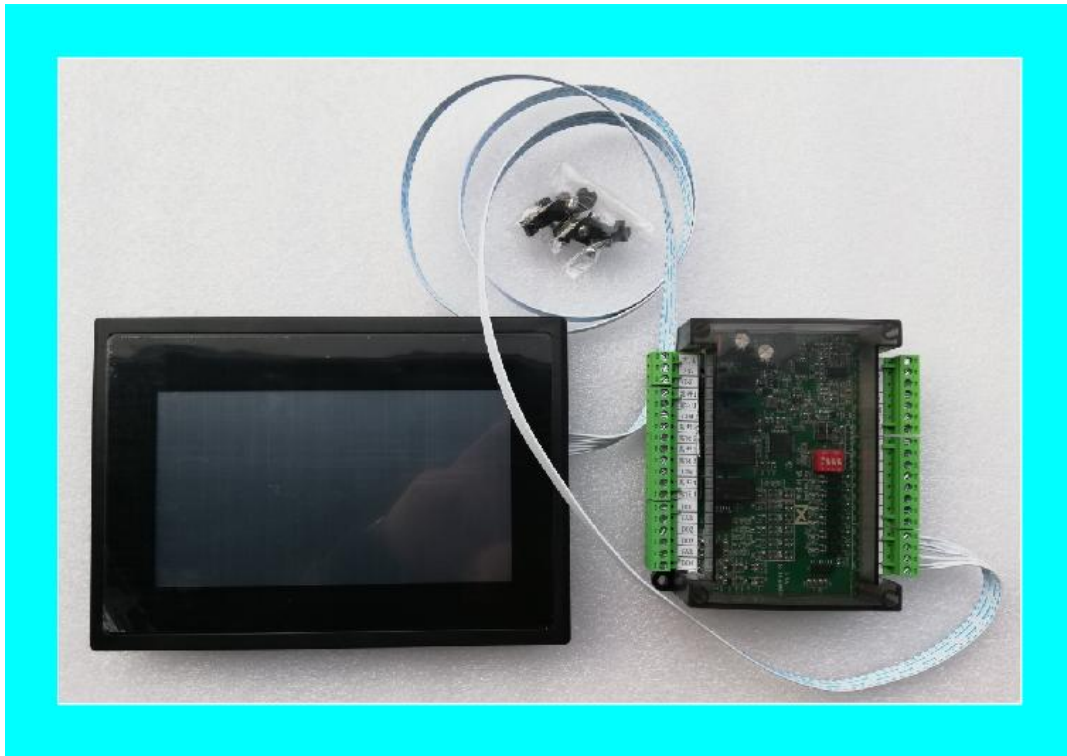
手持摆动定制送丝机接线定义图

For the wiring mode of safety protection, please turn on the safety protection in the software setting and set the port as di5

Chapter V introduction to controller functions

1. Description of main interface of controller

Connect the laser according to the above steps, and then connect the connecting line between the touch screen and the controller. Check whether all lines of the equipment are connected correctly, and whether the waterways and circuits of the chiller are connected correctly. Power on after confirming that everything is normal.



Connection diagram of touch screen and controller

The operation and setting of the controller are all completed on the touch screen. The interface is simple and clear, including home page, setting and configuration. After power on, first enter the startup screen. When the connection and communication between the touch screen and the controller are normal, enter the main interface after initialization.

The home page displays the PWM frequency (Hz), PWM duty cycle (%), laser power (%), power ramp up time (MS), power ramp down time (MS), blowing delay before light out (MS), blowing delay after light off (MS), parameter serial number, working mode and wire feeding speed of the current output laser (as shown in the figure below).



Main interface display rendering

The homepage interface includes the following contents:

- Parameter serial number: the controller supports multi-channel configuration of different parameters,
 Di1 corresponds to the parameters of all serial numbers. Multiple groups of parameters can be set. When it is necessary to switch parameters, you can manually click to switch parameters on the touch screen;
 Di2 corresponds to serial number 2, and there is and only corresponds to serial number 2;
 Di3 corresponds to serial number 3, and there is and only corresponds to serial number 3;
 Di4 corresponds to serial number 4, and there is and only corresponds to serial number 4;
 Di5 does not correspond to any set of parameters. Di5 is a special port for security protection;
 Di6 corresponds to serial number 6, and there is and only corresponds to serial number 6;
- PWM duty cycle (%): the proportion of high level in the whole cycle in a pulse cycle;PWM
- frequency (Hz): the number of times the signal returns to high level from high level to low level every second;

- laser power (%): the laser power output by one laser during operation;
- power ramp up time (MS): the time taken to trigger the processing signal laser PWM duty cycle and laser power from 0% to the set value for the first time (it is recommended to set it to 0 for handheld welding);
- power slow down time (MS): the duration of laser PWM duty cycle and laser power from the set value to stop light output after disconnecting the trigger processing signal (it is recommended to set it to 0 for handheld welding);
- blowing delay before light on (MS): the time required for the first time to trigger the processing signal to start blowing and light out; (hand held welding is recommended to be started for less than 200ms or set to 0);
- blowing delay after light off (MS): the duration of blowing after disconnecting the trigger processing signal; (recommended setting for hand-held welding is 0);
- working mode: switching between continuous mode and dotting mode. The dotting mode sets the dotting time and dotting time interval on the setting page;
- language cutting: support Chinese (zh) / English (EN) / Korean (KO) / Turkey (TR). If the equipment is exported to the country with the corresponding language, please switch to the corresponding language after the debugging is normal. After the switching, the system will record this switching, and the next startup will directly display the language version before the last shutdown;
- air valve switch: the air valve switch can test whether the air valve is normal and whether the air outlet is normal before welding;
- wire feeding speed: the speed of 1-30 gears can be selected for wire feeding speed, and relevant gears can be matched according to the needs of welding wire filling;
- wire feeding switch: the wire feeding switch must be turned on when the wire feeding function is enabled;
- start switch: when the start switch is clicked, the equipment enters the

standby state; The motor inside the handheld head starts to rotate in standby;

2. Set page function

Parameter setting content:

Click the menu "setting interface" at the bottom of the main interface, click the parameter box after the setting item according to the requirements of welding products, then enter the number in the setting table on the right side of the interface, and click OK to confirm. Click save after all settings are completed. Select return to main interface in the pop-up dialog box.



Display diagram of setting interface

Click the parameter to be modified, enter the required value in the value input pop-up on the right, and click "OK" to confirm.



The adjustment of various parameters needs to be adjusted according to the material, welding penetration, speed and process requirements.

The working mode is divided into continuous mode and dot mode. In the continuous mode, start the equipment, press the start button, and the laser will continuously light out until the button is released; The pulse time needs to be set in the dot mode. The pulse time is calculated in milliseconds (1s = 1000ms). Press the button, and the light output time is the pulse time, and then stop the light output.

If the ramp up time and the duty cycle time are set to be from 0 to 1000 milliseconds, then the ramp up time and the duty cycle time will be calculated in milliseconds. The ramp down is different. If the ramp down time is 1000 milliseconds, the laser will continue from the normal working laser power and duty cycle to 0 for 1 second after the button is released.

The blowing time before light out and after light off shall be set according to the process requirements. It is recommended to open it for no less than 50ms. Early and delayed blowing is conducive to protecting the welding joint, lens and welding seam.

3.Configure page functions

The connection ports need to be matched after the connection is normal. Click "port" to enter the following interface, and we will match the ports according to the above laser connection methods (as shown in the figure below):



After configuring the port selection, enter the administrator login interface. After entering **0000** (four zeros), you can see the following option menus "port setting" and "motor setting":



First, enter the port parameter configuration, as shown in the figure below:



Default port settings refer to figure

Set according to the requirements of the wiring port. Click Save after all the settings are completed. Select return to main interface in the pop-up dialog box.



If the following conditions occur, it indicates that the port has duplicate settings. Please check carefully. Unused ports can be closed and saved again.



Setting Description: the output port on the controller provides four solid-state relays for use, such as KA1 in the port configuration corresponding to the first group of relays (normally open 1, normally closed 1, COM); Ka2 in the port configuration corresponding to the second group of relays (normally open 2, normally closed 2, COM); KA3 in the port configuration corresponding to the third group of relays (normally open 3, normally closed 3, COM); The fourth group of relays (normally open 4, normally closed 4, COM) corresponds to ka4 in the port configuration;

Safety protection: the default open port of safety protection is di5. The wiring diagram of this instruction is also connected to di5. Please do a good job when connecting and matching. There is no trivial matter of safety. Please put the safety of the customer's life in the first place. Then enter the motor setting, as shown in the figure below:



The motor parameter configuration includes: "motor standby speed" and "motor working speed". Please turn it on when swing welding is used. The recommended parameter setting is "motor standby speed" 4000 rpm; "Motor working speed" 7000 rpm. If you need to turn off the swing welding function, set the values of "motor standby speed" and "motor working speed" to "0".

The wire feeding speed refers to the wire discharging speed of the welding wire in normal operation, which is divided into 0-30 gears. This speed is synchronized with the wire feeding speed of the main interface and changes together. Please match the reasonable speed during wire feeding welding.

The wire drawing time refers to the moment when the wire feeding welding is completed. In order to prevent the wire from cooling and adhering to the welding plate quickly when the laser stops, the welding wire needs to be pulled back quickly when the light stops to reach the state of separation from the welding plate.

The small red dots of wire feeding and drawing are used during debugging and testing, and have the same functions as the wire feeding and drawing on the wire feeder.



After configuration, click "save" and select "return to main interface" in the pop-up dialog box

After all settings are completed, you can return to the home page interface, click "start" to enter the standby mode, and then you can start working normally.



4. Main interface status description



Standby mode diagram



Working state diagram

If you stop working at 0:00, please click "stop" to enter the standby mode, or if you stop working after work, please click "stop" to enter the standby mode and turn off the equipment.

修订记录

date	Revised content	Version number
2019.06.02	First edition (First Edition)	V1.0
2019.06.26	Second Edition (optimize interface UI and increase swing standby speed)	V1.1
2019.06.28	Third Edition (open swing standby speed, increase the number of working revolutions to 8000 rpm, optimize the size of swing weld spot and optimize the gas circuit structure)	V1.2
2019.07.18	Fourth Edition (optimize the gas circuit structure, solve the problem of blowing white and burning protective mirror, increase the swing working speed to 10000 rpm, and provide spot diameters of 1.2, 1.5, 1.8 and 2.0 for selection)	V1.3
2019.09.16	Fifth Edition (optimize the internal structure, solve the problem of high speed of internal motor, up to 22000 rpm, optimize the connecting wire and optimize the welding copper nozzle)	
2019.10.02	In the sixth edition, the wire feeding function is added and optimized, and the customized anti-interference touch screen is replaced	
2019.11.18	The second generation controller of the seventh edition has been tested and shipped in batches, which improves the working stability and anti-interference ability, adds some new functions, and customizes the hand-held welding wire feeder for formal equipment shipment.	
2020.03.08	The eighth edition of the second generation touch screen updates the new UI interface V3. one	V3.1
2020.05.08	In the ninth edition, the automatic wire drawing and feeding action at the end of work is added, the corresponding interface settings are added in the UI, and the new drive is replaced.	

2021.1.20	The Tenth Edition newly adds the application of handheld gun head.	
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