Contents

Tips:

Before using this product, please be sure to read this manual and confirm its content!

Please keep this manual properly for future operation and maintenance!

1. Product description

1.1. Product structure

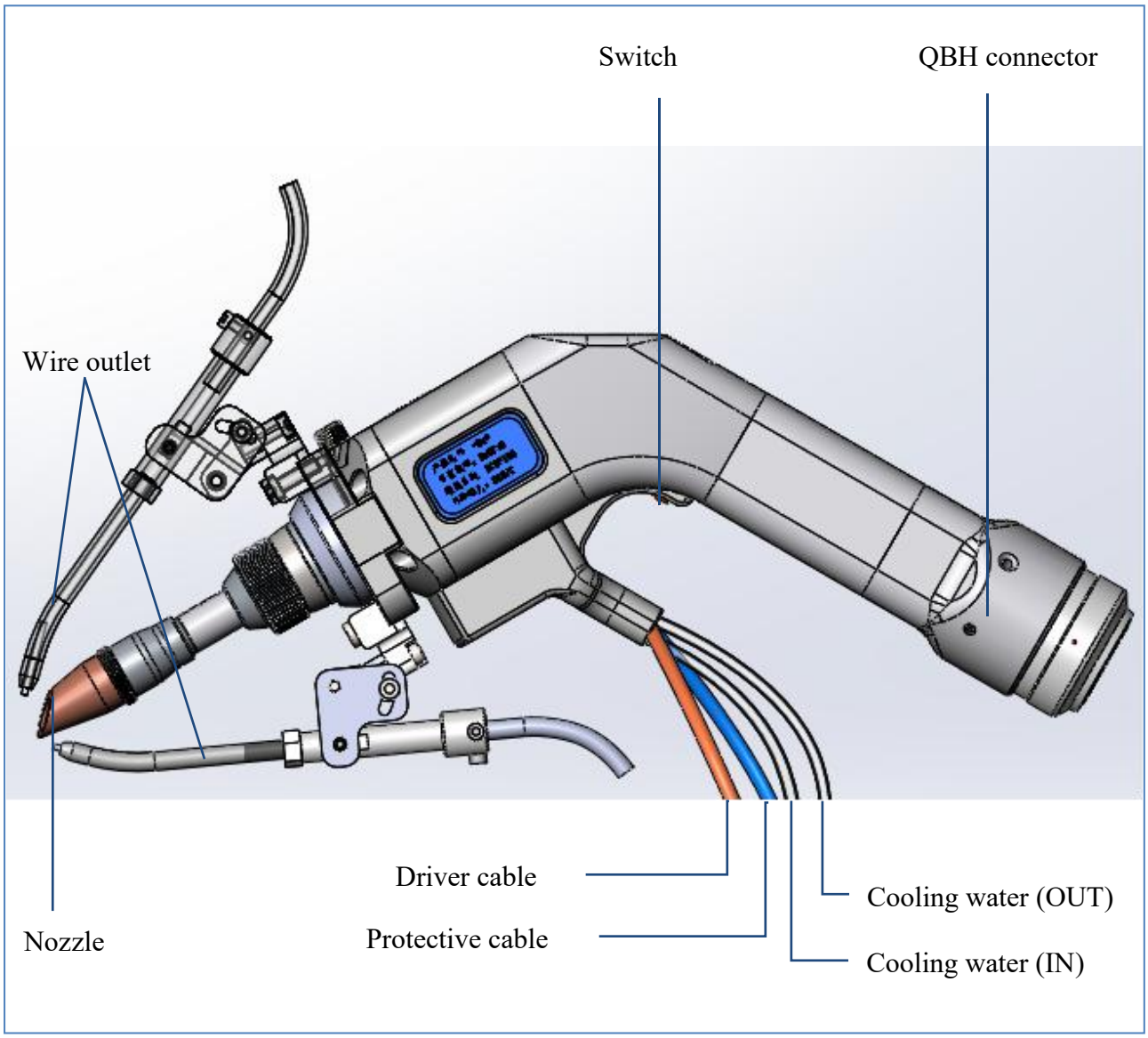
Model-Type A（Hand-held welding head）

Note：

1.Cooling water quantity must be sufficient, the water pressure should be above 0.4MPa；

2.Please keep the bending radius of the connected air pipe not less than 30mm.

Model type-B（Hand-held welding head with wire feeder）



Note：

1.Cooling water quantity must be sufficient, the water pressure should be above 0.4MPa；

2.Please keep the bending radius of the connected air pipe not less than 30mm.

3.The wire outlet part can be adjusted according to the use scene.

1.2. Main function

1.2.1. Design and function

1.Smart internal design and interactive control system expand the tolerance range and welding width of the processing parts, and solve the disadvantage of minor laser welding spot, and

provide better welding forming.

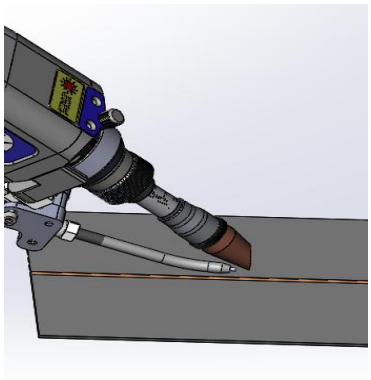
2.Light shape, Ergonomic design, advanced structure, and reliable performance ensure comfort grip and simple operation.

3.With multiple safety alarms, the laser will be locked automatically when the workpiece is removed.

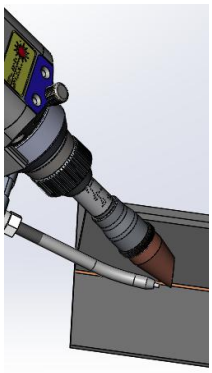
4.Nice welding seam, fast welding speed, no consumables, no welding marks, no discoloration, no later polish.

5.This head could be equipped with a variety of angular nozzles to meet the welding needs of different products.

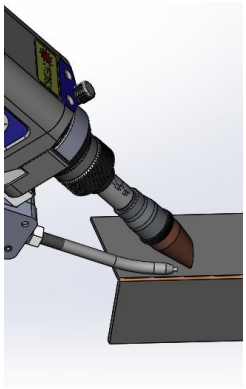
Schematic diagram of different angle nozzle welding situation



Nozzle 1（Planar welding）



Nozzle 2（Internal angle welding）



Nozzle 3（External angle welding）

1.2.2. Auxiliary Medium Protective gas

In order to protect the welding position from oxidation, the protective gas should not have any harmful chemical reaction with welding material.

The protective gas must meet the Standard of ISO 8573-1:2010, Class 2.4.3 without impurity particles, water and oil. High purity protective gas will prolong the lifespan of protective window.

2. Technical Specifications

Connector Type：QBH

Laser Incident Mode：Coaxial

Max Power：1500W

Laser Wavelength Range：1070±20

Collimating Length：50mm

Focusing Length：120mm/150mm

Protective Gas：Nitrogen

Weight：0.9 kg

Circle diameter：1.5mm/2.0mm（Choose one specification for each welding head）

3. Installation and connection

3.1. Safety Instructions

Any maintenance or fault survey should be conducted by professional trained personnel who must have got safety training and be aware of the possible danger and safety measure. Users should learn the related safety knowledge and prepare necessary safety devices before using.

	Copper nozzle part with voltage, do not touch directly !
	High Pressure! The gas pressure inside some laser head component can reach to 2.5MPa.
	Pinching Hand! During maintenance and repair, do not put hands or any other body parts under the laser head or forward direction of the moving axis.
	Laser! The ground wire of the AC access interface must be connected to the AC grid and connected to the ground wire end of the power supply ;The laser machine will generate level 4 laser while working.

	Keep the eyes or skins from being directly shot or scattered by laser. Do not look directly into the laser beam even if wearing eye protecting equipment. Please wear the goggles which meet the standard of DIN EN 207 & BGV B2.

3.2. Unpacking check

3. 2. 1. Unpacking check

1. Intact box;

2. The signage should be clear with conformity mark and accord with the purchased models;

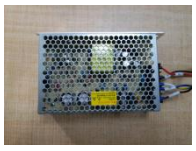
3. The upper and lower opening tear-proof seals are not broken or disassembled;

4. If the above does not match, contact the seller.

。

3.3. Items list of two models of welding heads

Items list						
No.	Items	Model & specification	Qty	Photo	Type-A	Type-B
1	Hand-held welding head	ND19	1		√	√
2	Switching power	±24V,4A	1		√	√
3	Gas pipe connector	Ø4 to Ø6	3		√	√
4	Display + Four-core shielded wire	7.0 inch+4 core 4 pin 2.54mm 4 core 8 pin 2.0mm	1		√	√
5	Display installation buckle	/	4		√	√
6	DC power cable	ND19-DCPOWER-A-2 M/T	1		√	√
7	Control box	/	1		√	√

8	Speed control cable	ND19-SDKZ-A-0.5M/T	1		√	√
9	Driver	DC 12V-24V 15A	1		√	√
10	Switch & safety lock lead cable	ND19-DJKYC-A-10M/T	1		√	√
11	Lock ring wrench	ND18-117T	1		√	√
12	Step wire feeder system	BJSSJ1-KZB01-V1.00	1		-	√
13	Wire feeder power cable	WSX-SSJBJ-DY001	1		-	√
14	Wire outlet part	ND18-CSZ-001	1		—	√
15	Step wire feeder	SX-005	1		—	√
16	Wire feeder power	HF150W-SE-24	1		—	√
17	Wire feeder diver	M542C	1		—	√
18	Step motor extension cable	WSX-SSJBJ-YC001	1		—	√

19	Wire feeder power connecting cable	WSX-SSJBJ-DY00 1	1		—	√
20	Step drive control cable	6 pin power cable, 24AWG 2m	1		—	√

3.4. Preparation for installation

3.4.1. Preparation

1. A set of metric hexagonal handle;

2. One bag of clean rod, one bottle of anhydrous ethanol(500ml), one package of clean gloves;

3. Clean and dust-free working environment.

3. 4. 2. Preparation of installation personnel

1. Read this manual carefully;

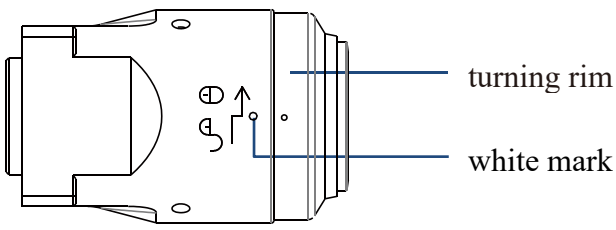
2. Wash hands with soap;

3. Wear dust-free gloves;

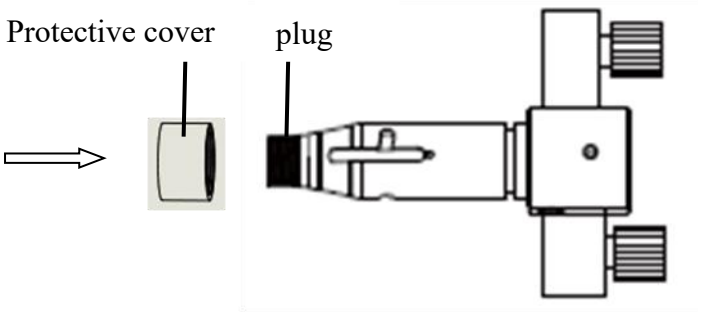
4. Wear a mask if necessary.(Note - Dust removal is of utmost importance)

3.5. QBH and fiber connection

Step one: Before turning the rim as below, make sure the red marks are aligned to the white marks.

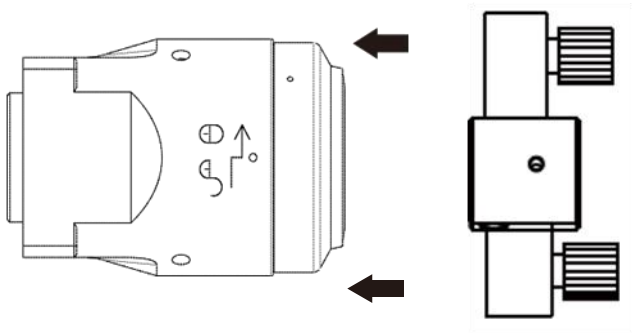


Step two： Remove the dust cover of fiber rod, clean the fiber rod with anhydrous ethanol. Before installing, check the protective cover of fiber plug to see if it is locked, avoid the cover from loosening and effecting the welding performance or burning the fiber and welding head.



Step three： Remove the dust cover from QBH, place the clean fiber rod and the QBH co-axially, make sure the white mark on the QBH is aligned with the locating slot (long slot on fiber rod), insert the fiber rod into QBH gently, until the fiber rod joints the QBH contact surface.

Step four： After inserting the fiber rod into QBH, press the rim gently and turn it about 15 degree along the arrow on the rim. Then pull the rim until its underside is parallel with the top of QBH, turn the rim at the same direction till the limit.



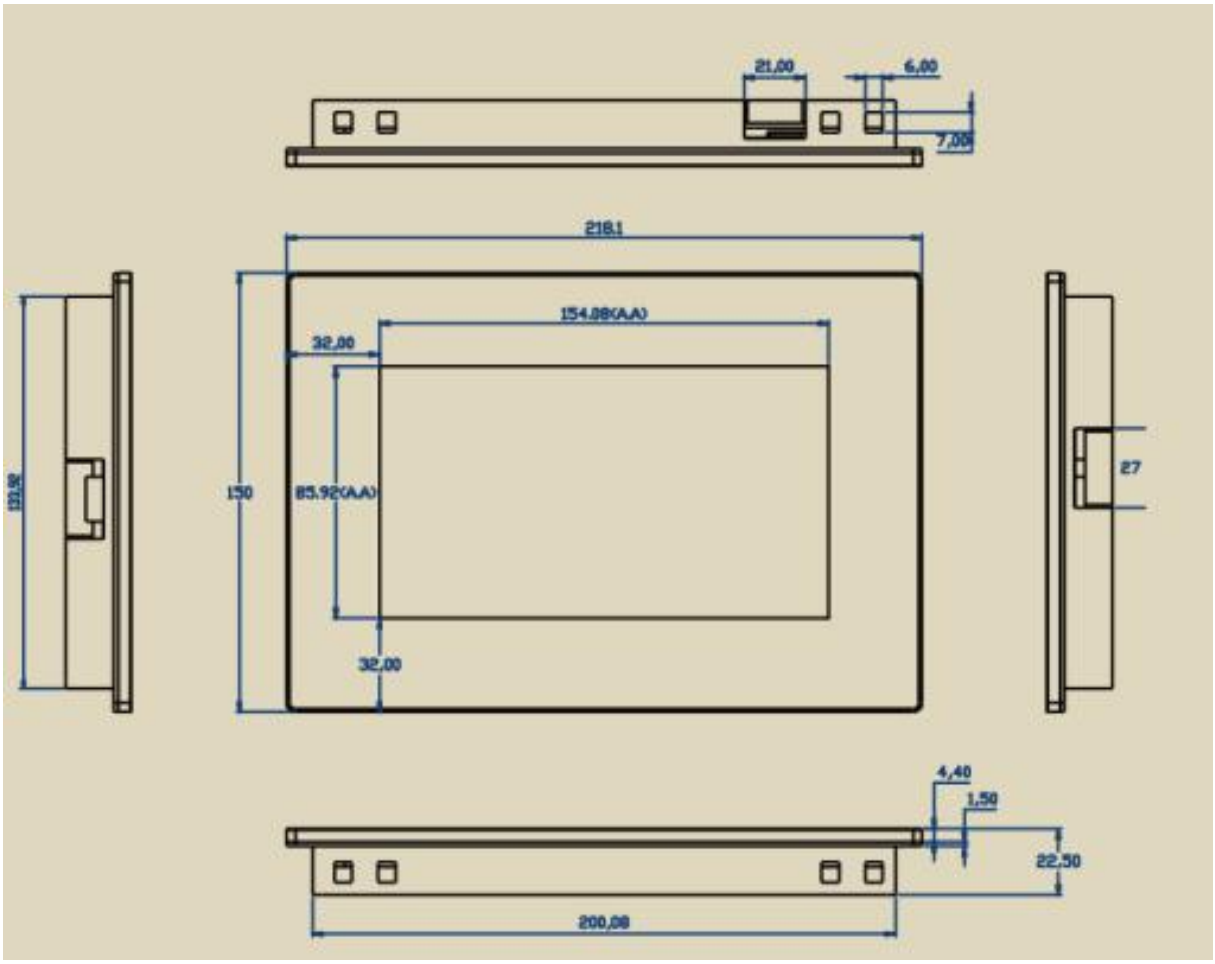
Note: 1. Insert or pull out the fiber rod gently;

2. When inserting or pulling out, QBH and fiber rod should be co-axially;

3. The operation should be kept as dust-free as possible.

3.6. Structure and dimension

Dimension of display



4. Maintenance

Clean and dust-free working environment is required.

Any laser circuit equipment fitted with a laser head must be carefully dedusted.

Assembly or replacement of lens or other components must be conducted in clean working environment.

Prepare new lens component before removing the old one.

Users could purchase spare lens components from us.

In case that user could not meet the above requirements, it is advised to use nonstick protective film to seal the opening after the removing of the lens immediately.

Minimize the time of laser path being exposed to the air to prevent the dust and dirt entering into the laser head.

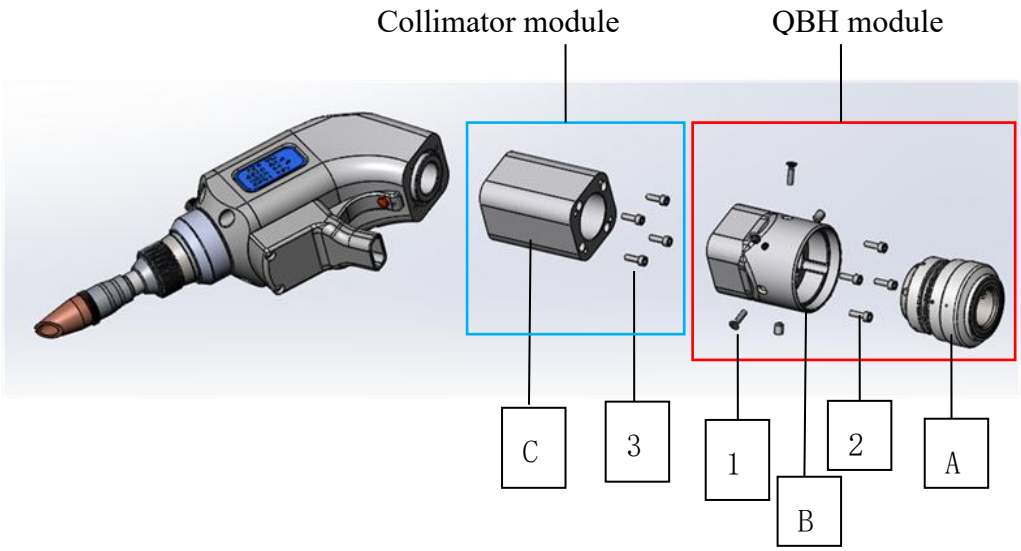
If any safety or protection device has been removed, it must be reinstalled before the equipment being operated or debugged and checked whether the device could run well.

4.1.Maintenance of QBH and fiber

1、Use self-adhesive paper to cover the junction of QBH and fiber connector to prevent dust from entering the gap;

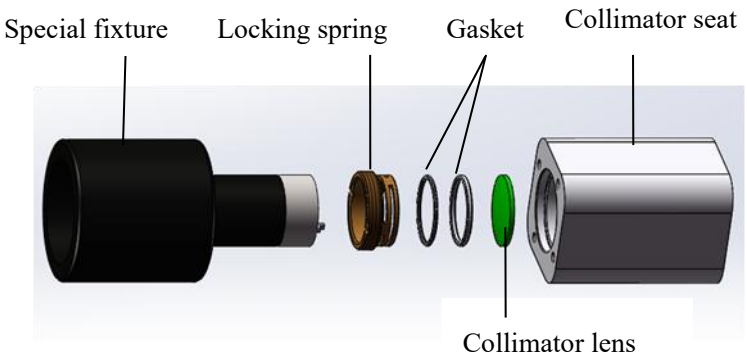
2、Fiber connector water cooling pipe must be connected well to prevent leaking. If QBH has water inside accidentally, please stop using immediately and send it to the factory to handle with.

4.2. Replace of collimating lens



Step 1：

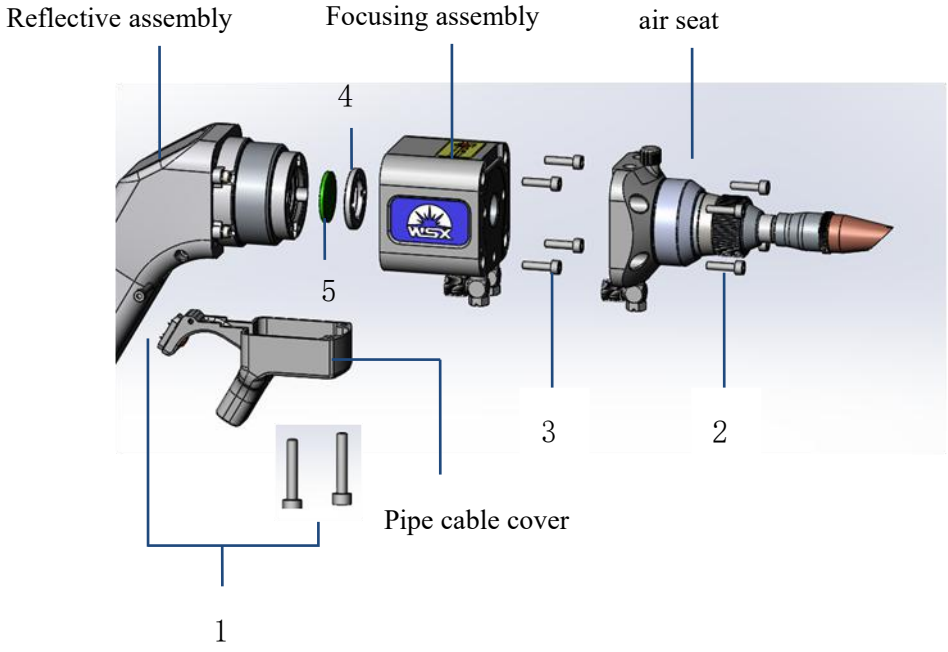
1. Remove the screws(1) and take off QBH module(A);
2. Remove the four M2.5 screws (2) in the QBH converter seat and separate the entire QBH assembly from the head (B);
3. Remove the four M2.5 screws (3) in the collimator seat, separate the entire collimator assembly from the head (C), and quickly seal the reflective assembly with adhesive paper to avoid dust entering.



Step 2：

1. Remove the lock ring with a special fixture in dust-free environment；
2. Take the gasket out of the collimator seat (record the thickness of the gasket), then take out the lens and replace it with a new,clean one, then put in the gasket, lock with the locking spring, turn back 1/5 circle.
3. Reverse the steps of disassembly and install it back.

4.3. Replacement of focusing lens

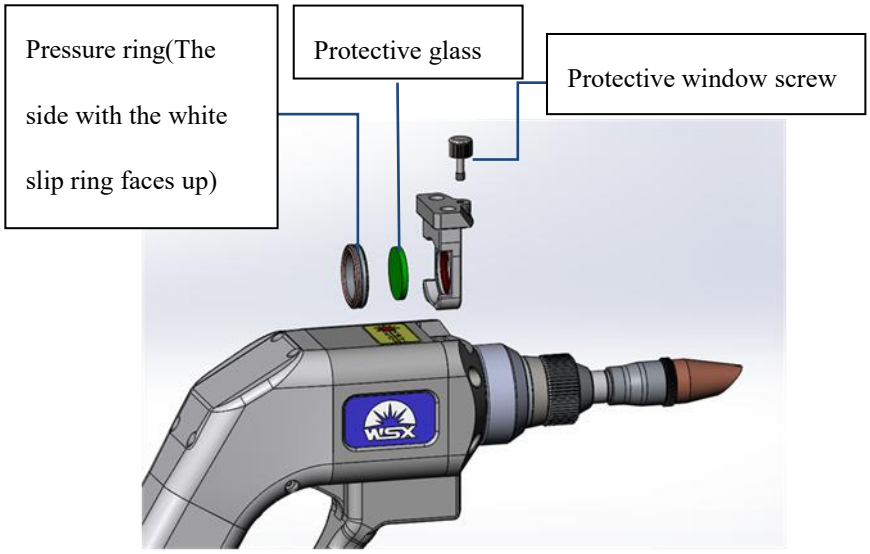


Step 3：

1. Remove three M2.5 screws (1) and four M3 threads (2) with a hexagonal wrench and slowly remove the pipe cable cover and air seat assembly;

2. Remove the screw (3) with a hex wrench and slowly remove the focusing assembly;
3. Use the fixture to rotate the lens locking ring (4) and slowly remove it;
4. Then take out the lens, put on a new, clean focus lens, lock with the lock ring,turn back 1/8 circle;
5. Reverse the steps of disassembly and install it back.

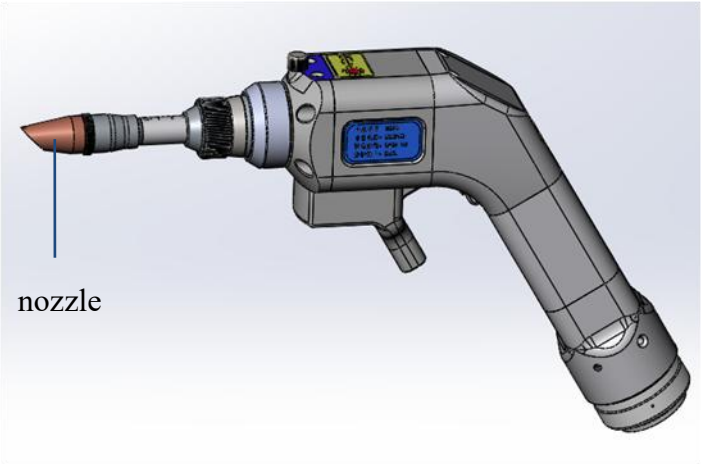
4.4. Replacement of protective window



Step four:

1. Loosen the screws and remove the protective window assembly;
2. Remove the pressing ring;
3. Remove the protective glass (D18*2) and replace a new one;
4. After the protective glass is placed in the protective window seat, press the pressure ring on the glass, the protective glass should be pressed into the groove of the ring;
5. Install the protective window module back into the hand-held welding head and tighten the screw.

4.5. Replace nozzle



Step 5：

1. Take the nozzle off the connecting pipe;
2. Tighten the new nozzle clockwise onto the connecting pipe.

4.6. Regular maintenance

1.Check the protective glass for contamination and replace it in time (daily inspection)；

2.Regular inspection of ceramic ring for damage (daily inspection)；

3.Check QBH plug regularly for loosening (every 3 days)；

4.Do not let water into the connection line, pay attention to protect interface section; check the interface (e.g. aviation plug) for water drops when the wobble lens is abnormal.

Electric Chapter

5. Electric chapter

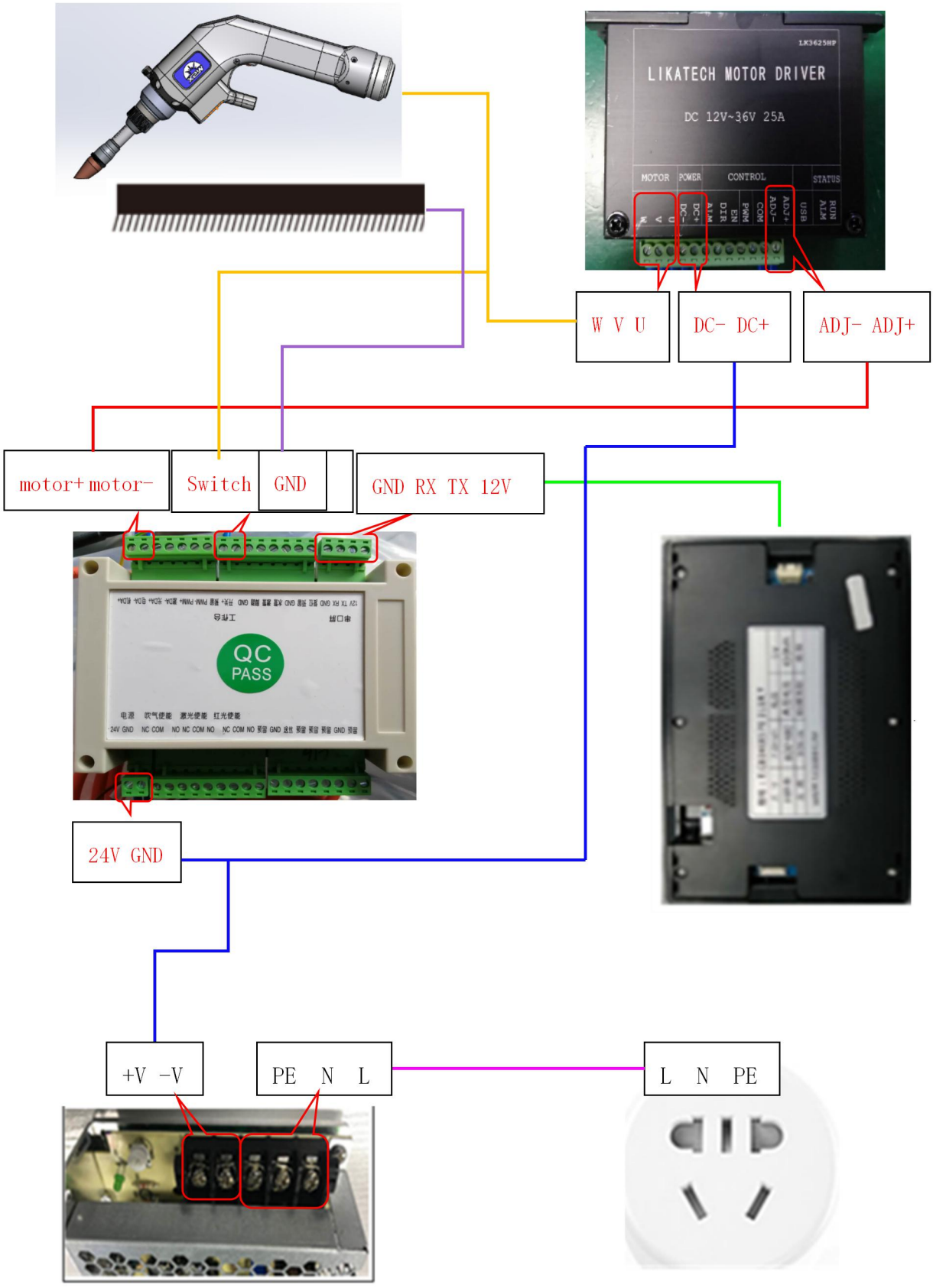
5.1. Power supply installation

This hand-held welding head power line is single-phase line: L fire line, N zero line, PE ground line.

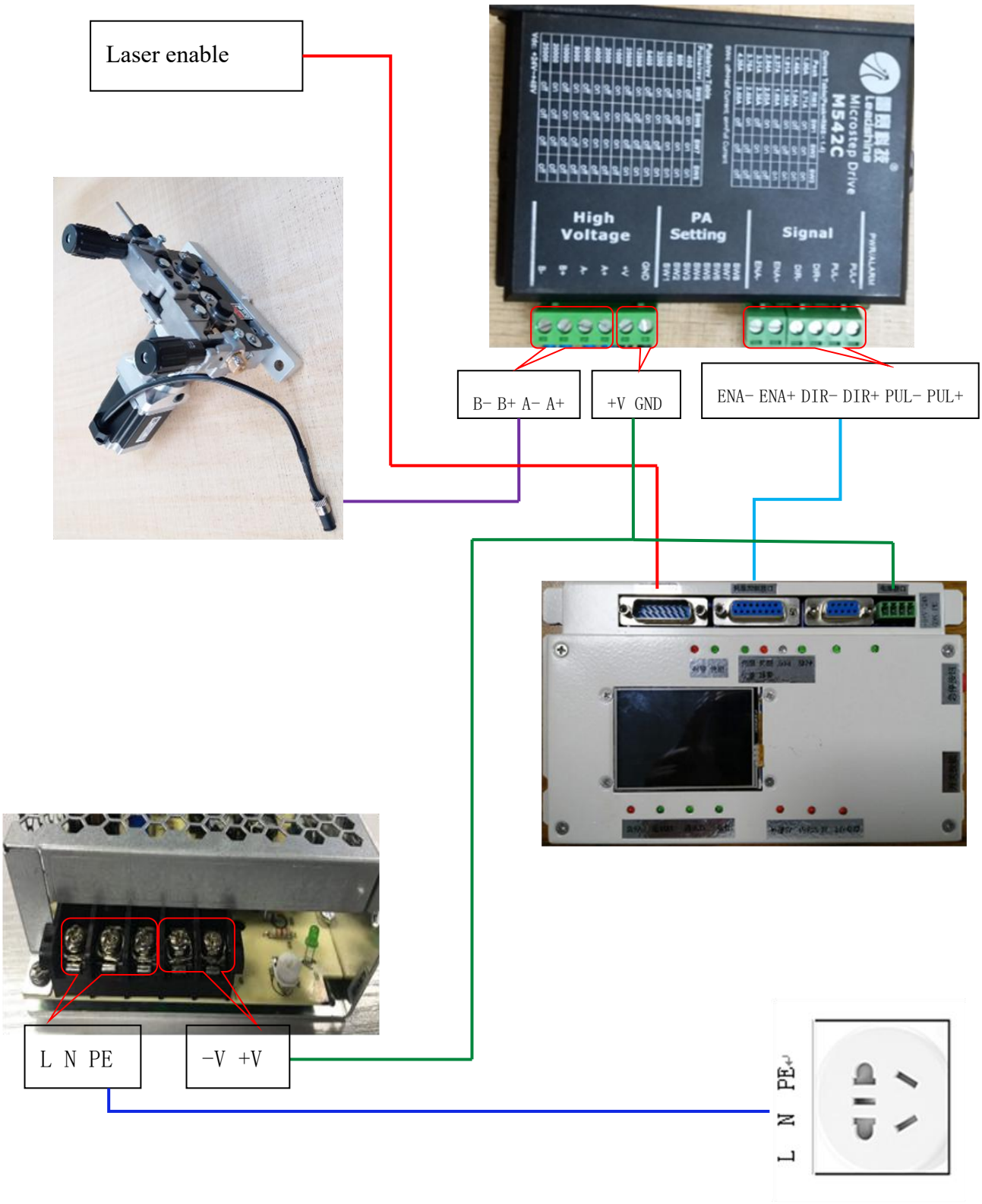
Note: The ground wire of the AC socket must be connected to the ground of the AC grid and connected to the ground wire end of the power supply;

5.2. Connection diagram

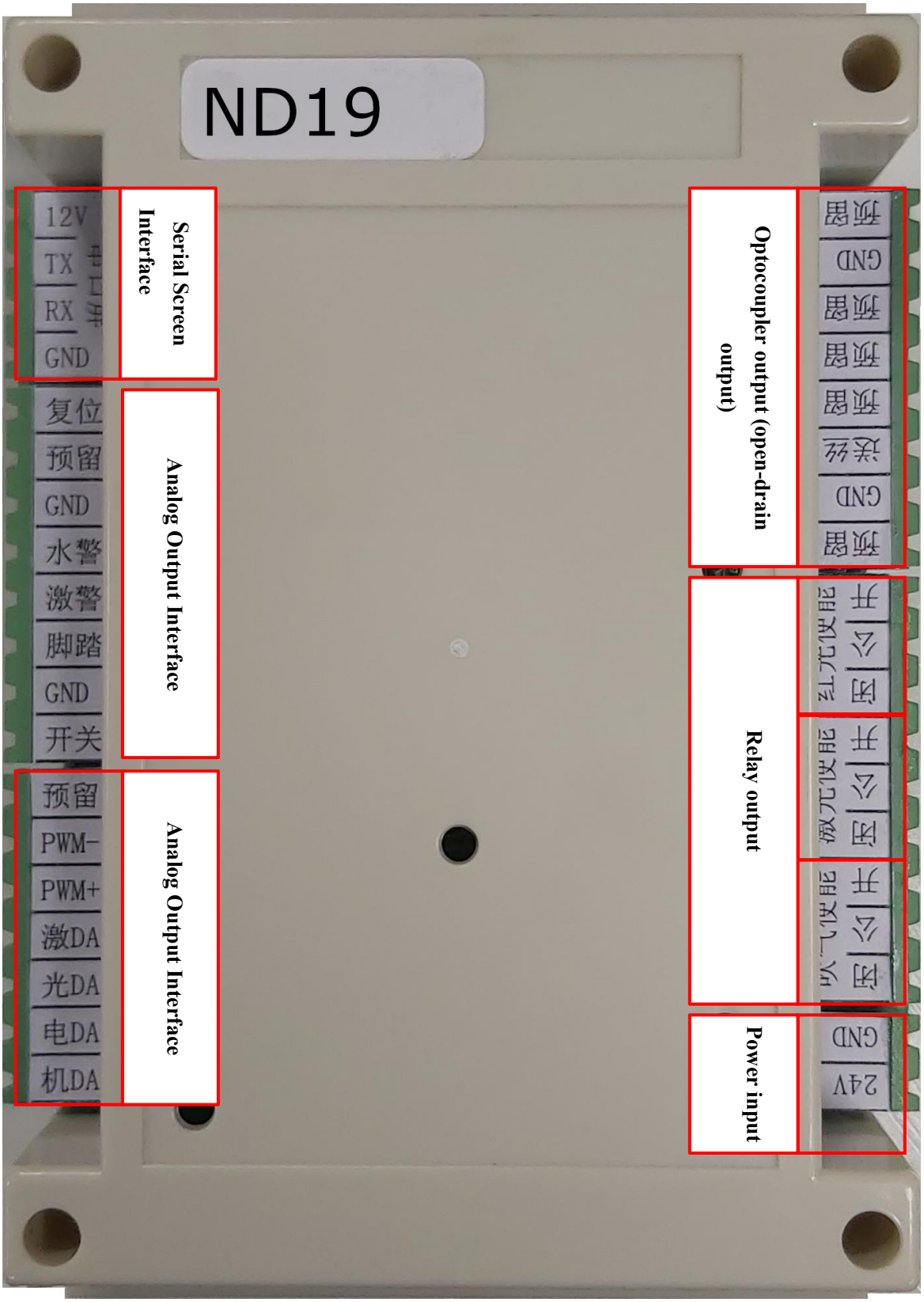
ND19 hand-held welding head connection



Step wire feeder connection



5.3. Wiring Diagram



6. Software Status:

Idle state	When all input ports are high level / dangling (invalid level), the system enters idle state and the system will wait for the next trigger to arrive.
Welding status	When the welding torch switch is triggered in idle mode, the system enters the welding mode. At this mode the protection gas output is effective, the laser enable output is effective, the laser PWM output is effective, and the laser DA output is effective; The welding state is divided into five stages: opening delay -> slow rise -> normal operation -> slow drop -> delay closing.
Spotting state	In idle mode, when the foot switch is triggered or spot mode is enabled and the welding head switch is triggered, the system enters spot mode. At this mode, protective gas output is effective, laser PWM out is effective, laser DA output is effective. Laser enabling output varies according to time. The spotting state is divided into four stages: gas-on delay -> laser on -> laser off ->gas-off delay
Abnormal state	When the output light is turned off, the laser alarm input is valid, and the water cooling alarm input is valid, the system enters the abnormal state. Under the abnormal state, all the output ports will become invalid, and the welding head switch / foot switch input is invalid.

6.1. Input control port:

When all input ports are connected to low level (0~0.7 V), it is the input valid signal. High level 24 V or suspended, access signal is invalid.	
laser head switch	Idle state: Enter welding state or spotting state when input valid signal, it will not respond invalid signal. Welding state: Enter idle state when input invalid signal, in will respond to valid signal. Spotting state: If the welding head switch triggers to enter the spotting state, enter the idle state when inputting invalid signal; otherwise, it does not respond to welding head switch signal. Abnormal state: Not responding to invalid signal; not responding to valid signal.
GND	Input common ground (valid level when the input port is short-connected)

Foot switch	Idle state: Enter spotting state when input valid signal, it will not respond invalid signal. Welding state: Not responding to invalid signal; not responding to valid signal. Spotting state: If the welding head switch triggers to enter the spotting state, enter the idle state when inputting invalid signal; otherwise, it does not respond to welding head switch signal. Abnormal state: Not responding to invalid signal; not responding to valid signal.
laser alarm	Laser alarm signal input from this interface, low level as an effective signal; When effective, the system enters the abnormal state, and all the output ports will become invalid until the laser alarm signal is restored to the invalid signal.
water cooling alarm	Water cooling system alarm signal from this interface input, low level as an effective signal; When effective, the system enters the abnormal state, and in the abnormal state, all the output ports will become invalid until the water cooling alarm signal is restored to the invalid signal.
GND	Input common ground（short connection between the input port is a valid level）
reserved	No functional definition
reset input	If the system needs to be reset, the interface input low level, keep low level 5 s, the system parameters will be restored to factory state.

6.2. Output control port：

Gas enable	Gas enable is controlled by relay , please choose the wiring according to the actual situation (often open, tap, often closed) When entering welding state / spotting state, enable; exit welding state / spotting state, disenable.
Wire feeding enable	Logic is same with laser enable in welding state, is open-drain output (PNP connect method).
GND	Output common ground（Forming loop with output port）.
Reserved	No function, please suspend
Motor DA+	Motor driver control signal, output 0-5 V corresponding motor 0-250 r/s (adjust output voltage by adjusting screen mirror speed parameter).
Motor DA-	DA ground,（Forming circuit with motor DA+ only）.

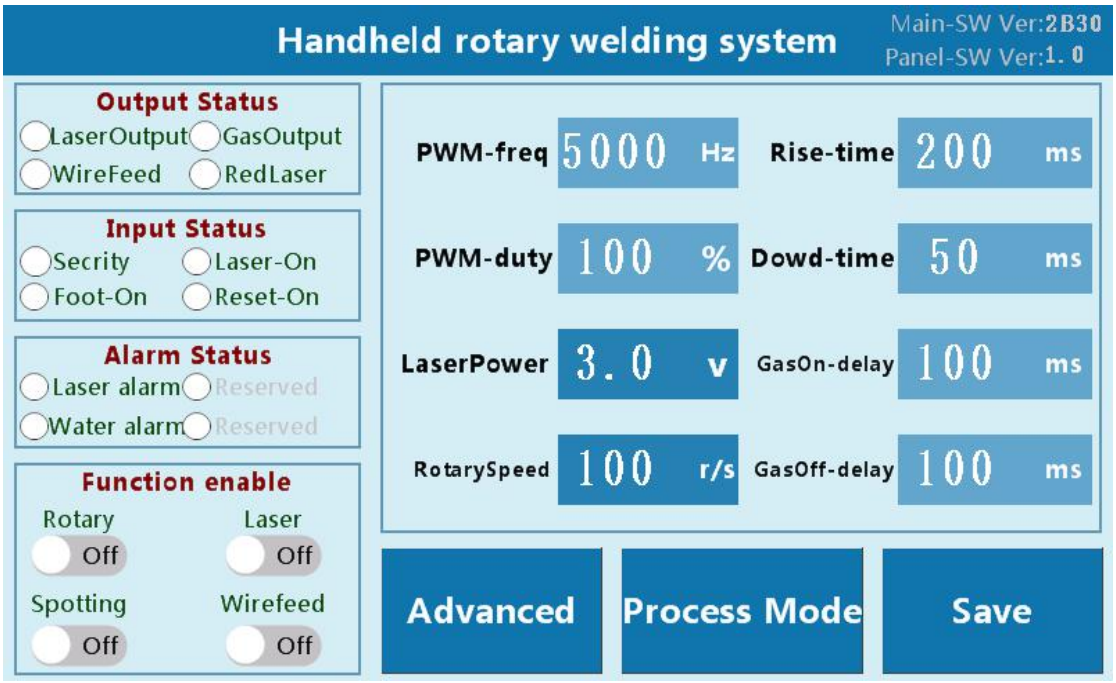
6.3. Laser control port：

Laser PWM+	When the welding state / spotting state is triggered, the PWM signal of 5 V/24V(through the internal jumper) is output. The frequency duty cycle is set by the display screen, and the maximum frequency is 10000 Hz.
Laser PWM-	Digital ground,（only used to form loops with laser PWM+）
Laser DA+	When the welding state / spotting state is triggered, a voltage signal 0-10V (the output voltage is adjusted by adjusting the laser power parameters of the screen) is output.
Laser DA-	DA ground,（only used to form loops with laser DA+）
Laser enable	Laser enable is controlled by relay, please select the wiring according to the actual situation (open, tap, close); Enable after gas-on delay in welding state, disenable after down time, control by welding head switch; Enable after gas-on delay / spot interval in spotting state, disenable after spotting, control by welding head / foot switch; When laser alarm / water cooling alarm, the laser enable port will be closed.
Red light enable	Laser enable is controlled by relay, please select the wiring according to the actual situation (open, tap, close); Set turn on/off through output1 in the screen advanced parameter, this is normal output (often on / off).

7. User interface

7.1. Main interface：Chinese interface：

Corresponding English interface：



7.1.1. Function instruction

Output port state

Laser enable： When the laser enable pin is effective, the indicator light is on

Protective gas output： When the gas enable pin is effective, the indicator light is on

Wire feeding enable： When the wire feed pin is effective, the indicator light is on

Red light output： When the red output is valid, the indicator light is on

Output port state

Safety lock： When the safety lock+ is low, the indicator light is on

Laser switch： When the laser switch+ is low, the indicator light is on

Foot switch： When the foot switch+ is low, the indicator light is on

Reset input： When the reset input+ is low, the program reset after 5s.

Alarm status

Laser alarm： when the laser alarm+ is low, this light is on

Galvanometer alarm： When the galvanometer alarm+ is low, this light is on

Water cooling alarm： When the water cooling alarm+ is low, this light is on

Stop work if one alarm is valid.

Function Enable

Rotary： Turn on galvanometer, the galvanometer rotates at the set speed; turn off galvanometer, the galvanometer enters standby state; when laser welding is triggered, the galvanometer accelerates to set speed; after welding, the galvanometer enters standby state again.

Laser： turn on to enable laser welding

Spotting： turn on to enter laser spot mode

Wirefeed： turn to enable wire feeding function

7.1.2. Parameter instruction：

PWM-Freq(Hz)： Display set laser PWM frequency

Laser duty(%)： Display set laser PWM duty cycle

Laser power(V)： Set laser DA voltage

Motor speed(r/s)： Set rotary speed of galvanometer

Rise time（ms）： Display the time required from starting welding to set laser power.

Down time（ms）： Display the time required from turning off welding to laser power is 0.

Gas on delay（ms）： Display the time delay from turning on protective gas to laser enable.

Gas off delay（ms）： Display the time delay from laser disenable to turning off protective gas.

7.1.3. Main interface button description：

Advanced parameter： Click to enter the password interface, enter the password correctly and enter the advanced parameter setting interface

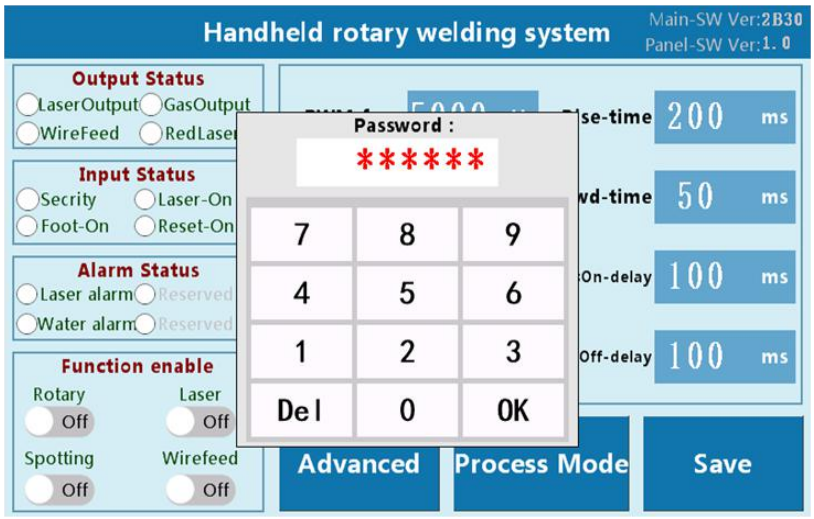
Process mode： Click to enter the process mode parameter setting interface (you can save 9 sets of parameters to switch)

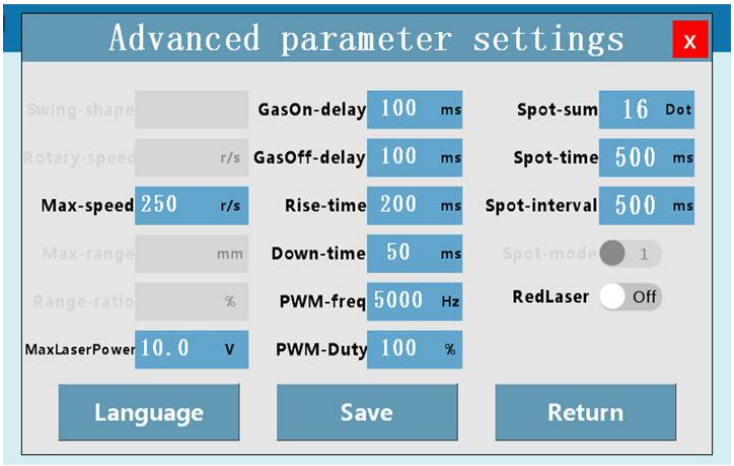
Save parameter： Click to save current settings

7.2. Advanced Parameter Interface and Password Interface：

Chinese interface：（Password：666666）

English interface：（Password：666666）





7.2.1. Advanced parameter menu

Enter advanced parameter interface: Click the "Advanced parameters" button in the main interface, enter the password input interface, enter the correct password and enter the advanced parameter interface. (Password :6666666)

Exit advanced parameter interface: At the advanced parameter interface, click the return button or the x" button in the upper right corner to exit the interface. (exiting interface does not save the settings parameters, please save as required before exiting, click Save parameters to save)

7.2.2. Advanced parameter interface

Swing shape： lens swing shape, simple hand-held welding only one form: round

Swing speed(Hz)： To set the speed of the wobble motor, which does not exceed the max swing speed

Max speed(Hz)： To set max speed limit for wobble motor, up to 250Hz

Max laser power(V)： To set max voltage limit for laser power up to 10V

Gas on delay(ms)： To set the delay time of protective gas turning on to laser enable, up to 60000ms

Gas off delay(ms)： To set the delay time of protective gas turning off to laser disable, up to 60000ms

Rise time(ms)： Set the delay time between the opening laser (the laser power is 0) and the laser reaching the preset power, up to 6000ms;

Down time(ms)： Set the delay time to turn off the laser until the laser power is 0, up to 6000ms;

PWM-Freq(Hz)： Set the laser frequency, up to 10000Hz

PWM-Duty(%)： Set the laser duty cycle, Range: 0~100%

Spot-sum(点)： Set the number of laser spot， up to 1000

Spot-time(ms)： Set the length of time the light is emitted, up to 6000ms

Spot-interval(ms)： Set point to spotting light interval, up to 6000ms

Output port1： Set the red light output level, the red light relay is open and closed with the common end, close and close with the common end

7.2.3. Advanced parameter button description

语言/Language： For switching interface language, automatically save after selection, re-power will maintain the language interface, the

interface is as follows

Chinese English

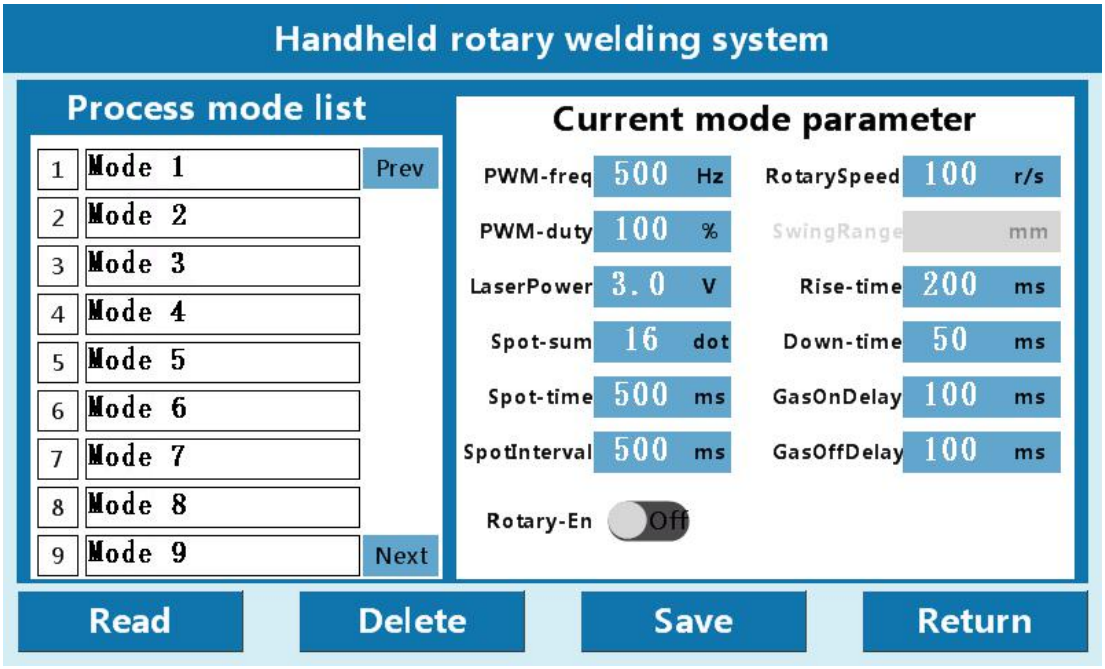
Save parameter：Click to save the parameters and take effect at the next welding start

Return：Exit the advanced parameter interface and return to the main interface (when pressing this button, if the setting parameter is not saved, it will be lost).

7.3. Process Mode Interface

Chinese Interface

English Interface



7.3.1. Process Mode Menu:

Enter process mode interface: Click the "process mode" button in the main interface to enter the process mode interface. Select Model in the mode list, the current mode parameter configuration to mode1 configuration, and the parameters will not take effect in practical application.

Exit process mode interface: Click the "return" button in the process mode interface, exit the process mode interface, return to the main interface (exit interface does not save settings parameters, please save according to the requirements before exiting, click "save mode" to save).

7.3.2. Process Mode Interface

Process Mode List: Displays the selection for the current process mode

Current Mode Parameter Configuration: Used to Display and modify parameters for selected mode

7.3.3. Process Mode Button Description：

Prev: Process mode cursor moves to previous box, the parameter in the parameter bar on the right is updated to the parameter of the current mode;

Next: Process mode cursor moves to next box, the parameter in the parameter bar on the right is updated to the parameter of the current mode;

Read: Read the current mode parameter, and update to display screen; This parameter takes effect at the next welding

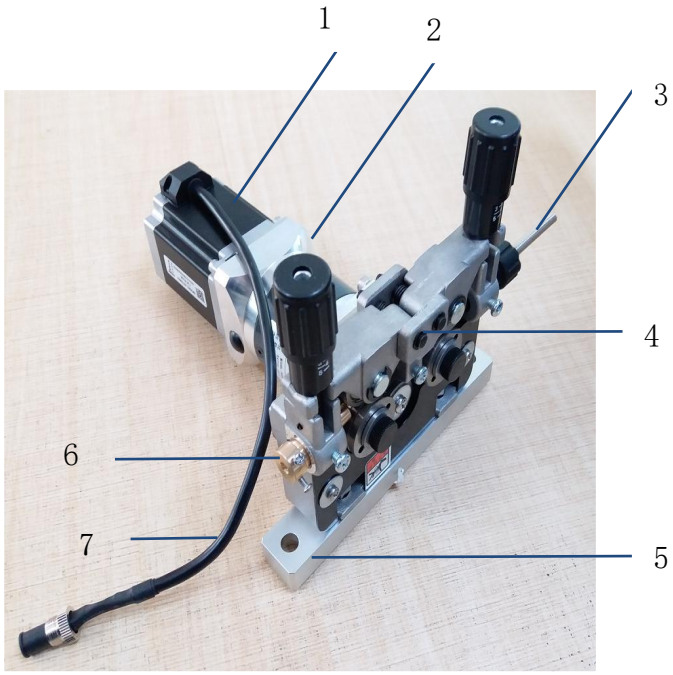
Delete mode： Used to delete the current mode, after deleting the mode, the mode setting value will be restored to the default value

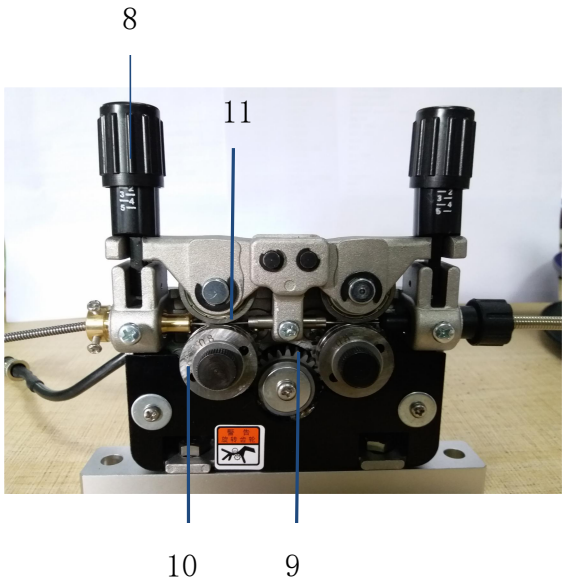
Save mode： Used to save the current schema parameter, can be saved for a long time (save only will not take effect in the application)

Return： Exit the process mode interface and return to the main interface (when you press this button, you will lose the set parameter if the set parameter is not saved)

8. Wire feeder

8.1. Schematic diagram





No.	Parts
1	Stepper motor
2	Reducer
3	Wire feeding tube
4	Bracket
5	Mounting plate
6	Motor cable
7	Connector for Wire Out
8	Adjustable preload pressure bar
9	Driving gear
10	Wire feeding wheel
11	Wire pressing wheel

8.2. Main Function Introduction

8.2.1. Design and Function

1. This wire feeder is an automatic drive mechanized wire feeder.
2. Light in shape and easy to operate.
3. Mainly used for automatic wire feeding of laser handheld welding.
4. The system is controlled by microcomputer and driven by stepping reduction motor, with high wire feeding accuracy and good repeatability.
5. It can transfer steel wire and copper wire with specifications of 0.8mm and 1.0mm.

8.2.2. Working Principle

The wire feeding machine generally has a control section to provide parameter settings. The driving section performs wire feeding drive under the control of the control section, and the wire outlet nozzle sends the welding wire to the welding gun position.

8.2.3. Technical Parameters

Motor type: stepper motor

Wire feeding speed: 0-80mm / min

Wire feeding length: 5 meters

Wire feeding diameter: 0.8mm, 1.0mm

Wire wheel diameter: 200mm

8.3. Installation and Connection

8.3.1. Safety Instructions

Any repairs or accident investigations that require specialized knowledge must be performed by trained personnel! Trained professionals must be trained in safety, understand the dangers that can occur, and be familiar with safety measures to deal with them. In addition to the safety regulations required by laws and regulations, the safety regulations specified by the manufacturer must also be complied with. You need to know the relevant safety equipment and have the necessary safety equipment before use.

	**Caution-High Voltage** During equipment maintenance and repairs, the power must be turned off and prevented from being turned on during this time.
	**Caution – Prevent injuries to rotating moving parts!** 1. Do not place fingers, hair, clothes, etc. near rotating parts such as wire feed wheels. 2. When feeding the welding wire, do not place the end of the welding gun close to the eyes, face and body, otherwise the welding wire may hurt people.
	**Caution- high temperatures!** 1. The motor generates heat during operation. Do not touch it with your hands. 2. Welding wire produces high temperature, please do not touch it with your hands directly.
	**Knocking is strictly prohibited!**

8.3.2. Preparation before installation

Preparation tools

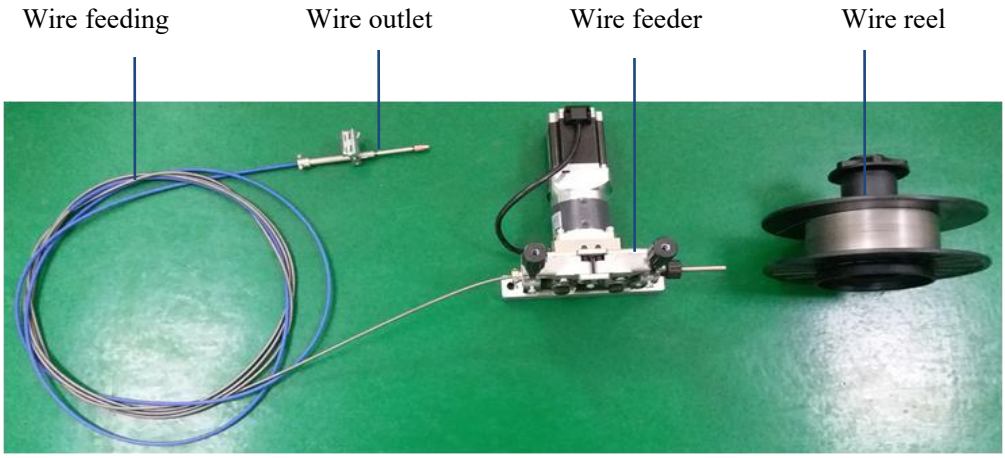
1. A set of metric hexagon socket handles;
2. A large Phillips screwdriver;
3. A pair of protective gloves.

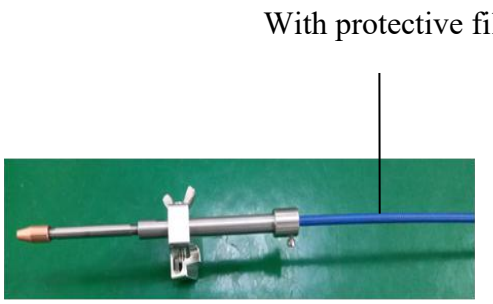
Installation personnel preparation

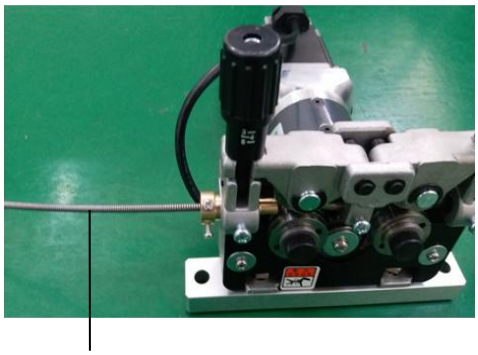
1. Read this manual carefully;
2. Put on protective gloves.

8.3.3 Wire Feeder Connection

Step 1: Connect the main body of the wire feeder and the wire outlet with a wire feeding tube, and install a suitable wire reel, as shown in the figure below.





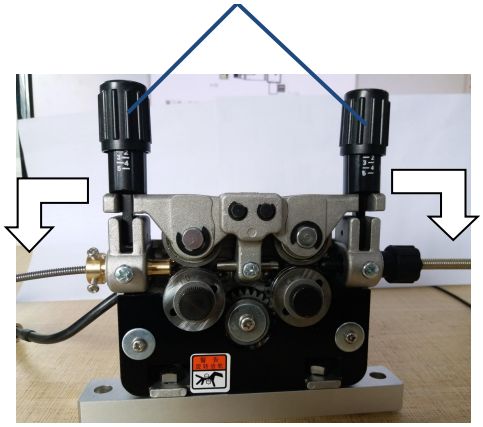


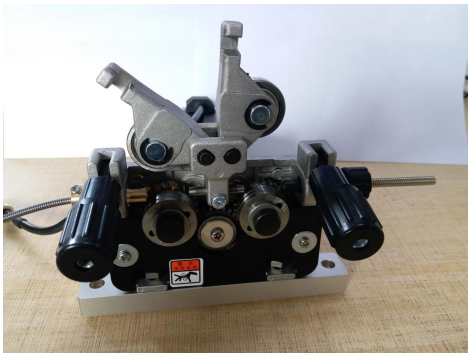
Note:

1. Connect one end of the wire feeding tube with the protective film to the wire outlet, and the other end without the protective film to the wire feeder.
2. The welding wire must be used smoothly and without knotting.
3. Please keeps the bending radius of the wire feeding tube not less than 30cm.

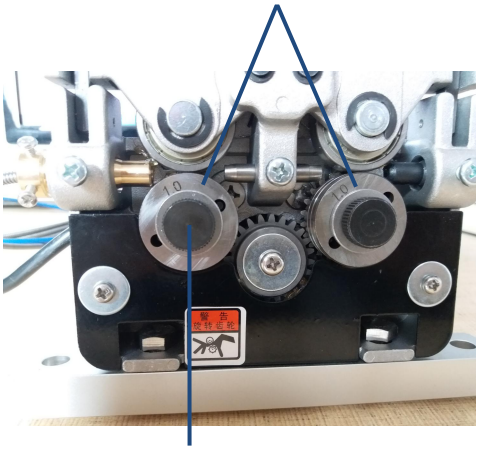
Step 2: Install the appropriate wire feeding wheel according to the wire diameter.

Preload Pressure





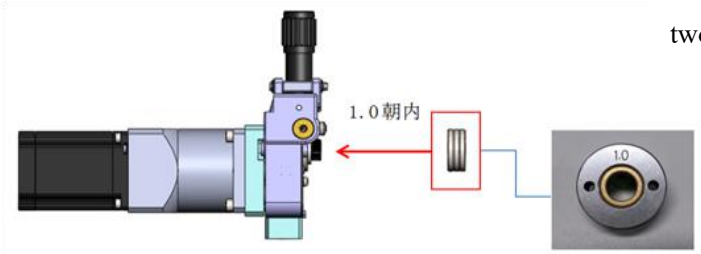
Wire-feeding Wheel



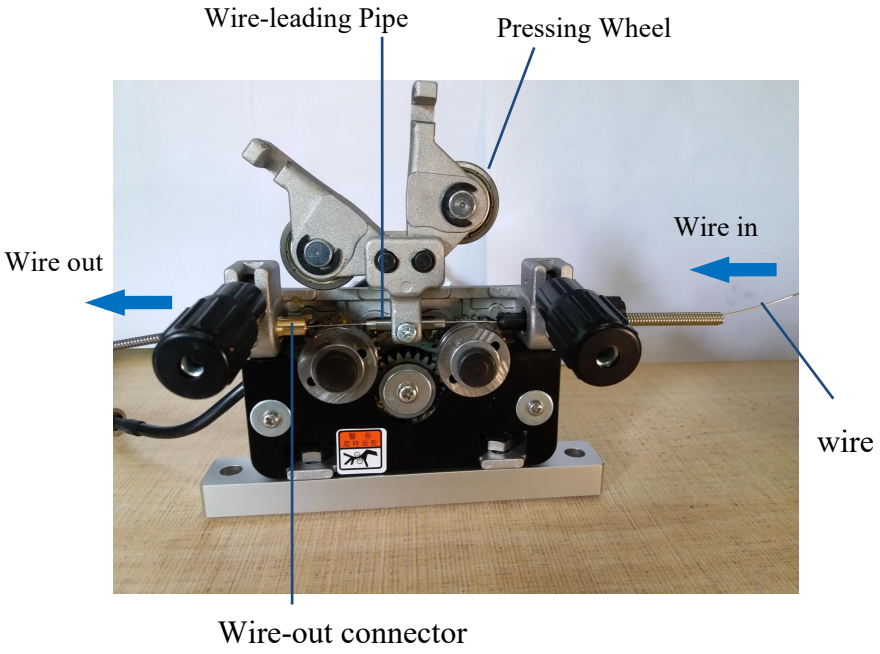
Screw

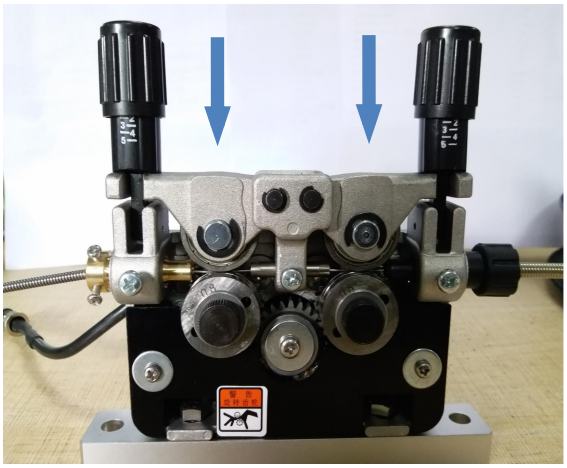
Steps for installing the wire feed wheel:

1. First loosen the two adjustable Preload Pressure Bar, as shown above
2. Then loosen the two screws and remove the wire feed wheel;
3.Replace with a suitable wire feeding wheel, turn the side of the wire feeding groove corresponding to the specification and model to the inside, and then tighten the screw. As shown in the figure below, if you want to send 1.0 wire, turn the 1.0 side inward and the two wheels are the same.



Step 3: Thread the wire and connect the wire reel.

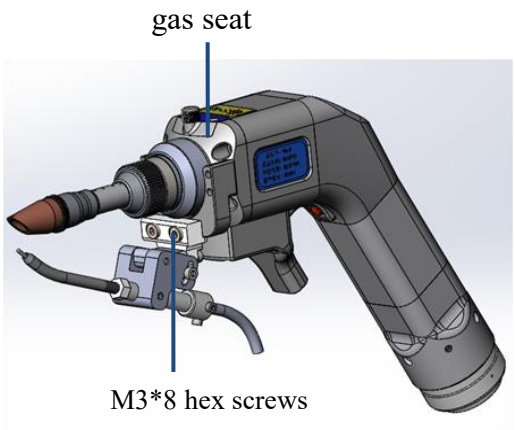




Threading operation steps:

1. First loosen the two adjustable pre-load pressure bars, and then pop open the wire roller, as shown above.
2. Withdraw the welding wire from the wire reel, insert the welding wire from the wire tube according to the direction shown in the figure, pass through the middle guide wire tube, and exit from the wire tube joint direction.
3. Press the welding wire into the wire feeding slot of the wire feeding wheel, press the wire pressing wheel, lock the pre-load pressure bars, and press the welding wire tightly, as shown on the right.
4. Connect the power plug and turn on the power switch to adjust the wire feed speed to the fastest. Click the wire feed switch on the control panel to make the welding wire reach the wire outlet as soon as possible. Stop the wire feeding when the welding wire passes through the nozzle.

8.3.3. Connect wire outlet to handheld welding head



1，First, use two M3 * 8 hex screws to connect the wire outlet module to the gas seat of the handheld welding without locking;

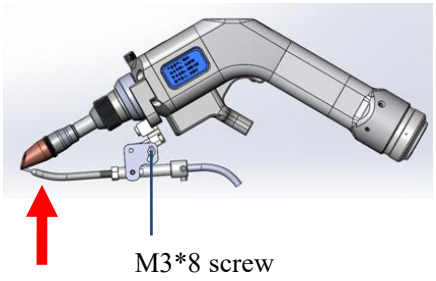
2，Adjust the wire nozzle assembly left and right so that the welding wire is in the red light center, and then tighten the screw.

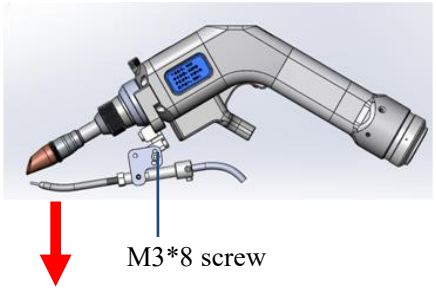
8.4. Adjustment

8.4.1. Adjusting the angle and length of the wire outlet

Angle adjustment:

Loosen screws M3*8 you can adjust the angle of the wire mouth up and down, as shown on the right.





Length adjustment:

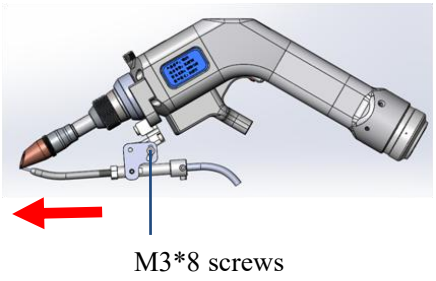
Loosen screws M3*8

you can adjust the angle of

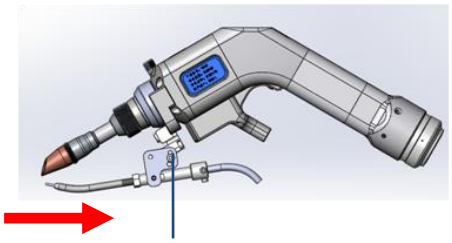
the wire mouth forth and

back, as shown on the

right.



M3*8 screws

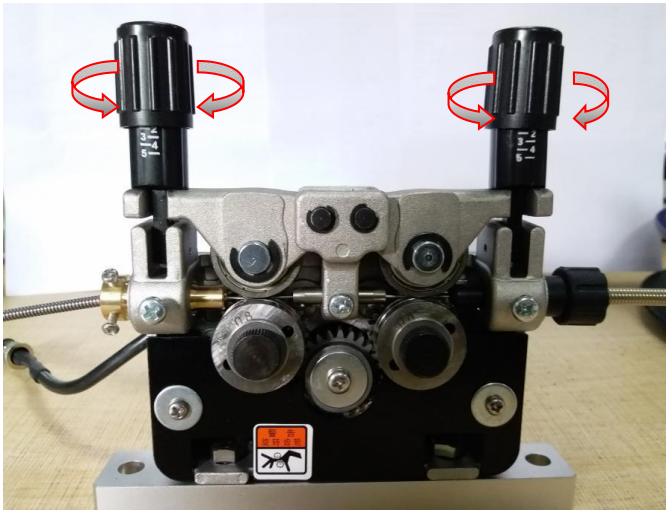


M3*8 screws

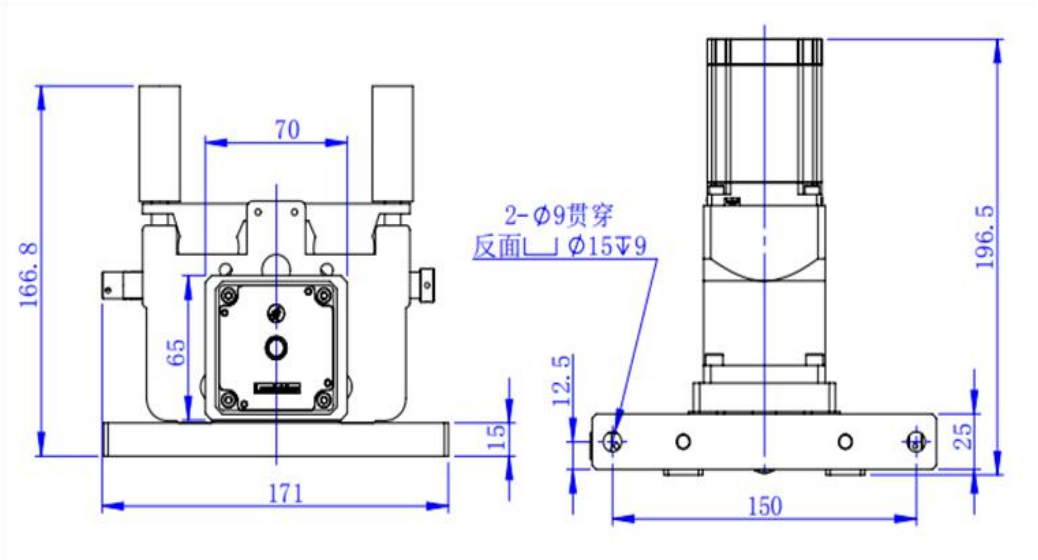
8.4.2. Pressing force adjustment

Adjustment method:

According to the tightness of the wire feeding, turn the two adjustable pre-tightening pressure lever rotation sleeves left and right until the clamping force is appropriate.



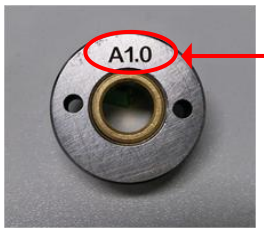
8.5. Appearance and installation dimensions



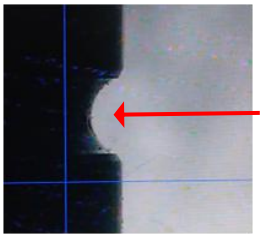
8.6. Difference between aluminum wire feeding and steel wire feeding

The differences are the wire-feeding wheel, the middle guide wire tube, and the wire-feeding nozzle.

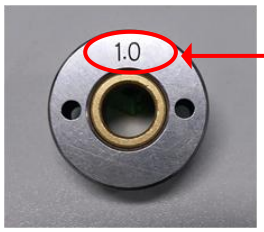
wire-feeding wheel



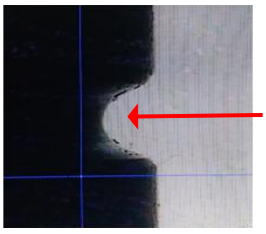
With A



U-shaped wire groove is not so deeper.



Without A



V-shaped wire groove is rather deeper.

the middle guide wire tube

Aluminum Wire

material:nylon

Steel wire

material: stainless steel

the wire-feeding nozzle

Aluminum Wire

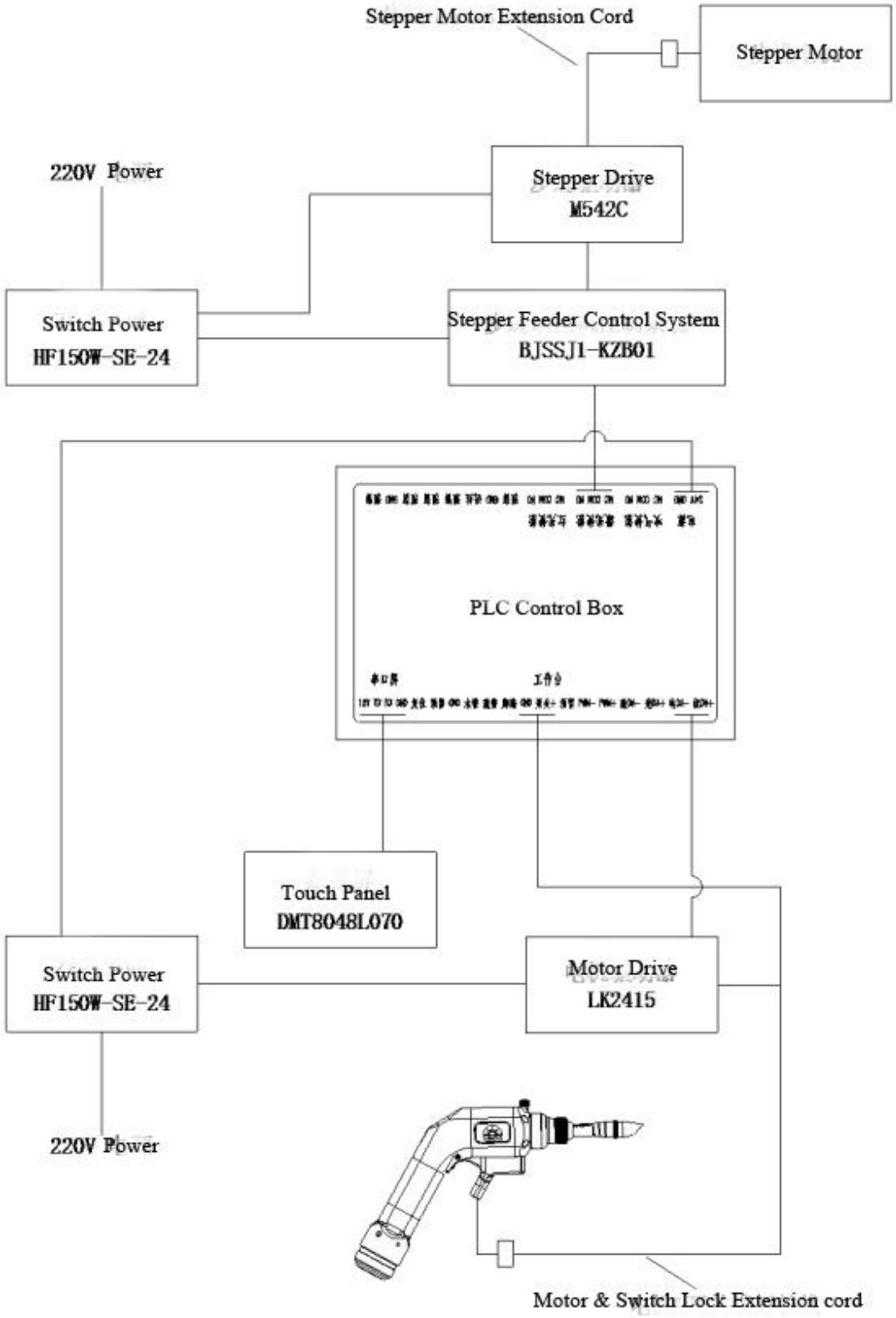
nylon tube

Steel wire

spring tube

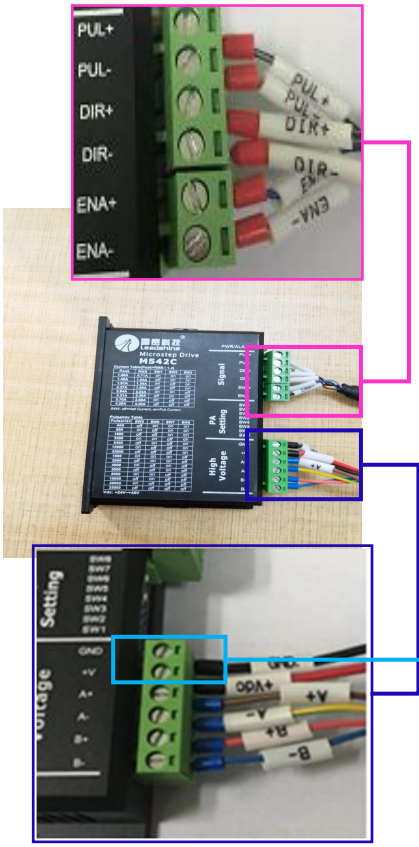
Note: When using steel wire wheels and aluminum wire wheels, the corresponding middle guide wire tube and wire-feeding nozzle should be equipped.

8.7. Wire feeder electrical wiring diagram



8.7.1. wiring picture show:

1.stepper drive and wiring diagram

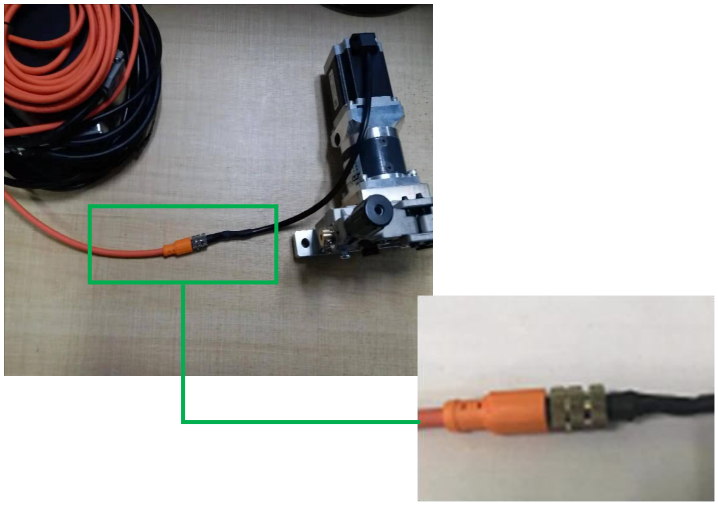


stepper motor

control cable

stepper motor

power cable



2.stepper switch power and wiring diagram