

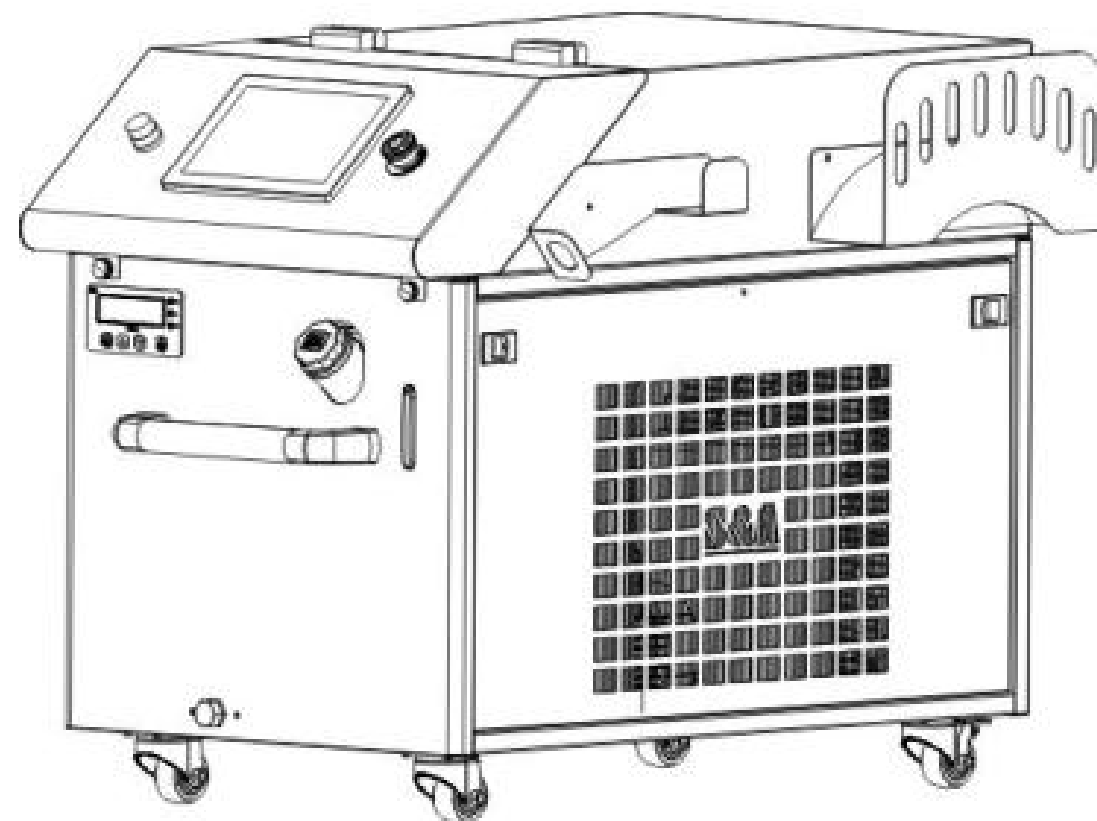
Installation Instruction for Three in One Welding Machine

- 1 Host
- 2 Laser Welding Wire Feeder
- 3 Smart Single Pendulum Hand Welding Head
- 4 Smart single pendulum handheld welding head is switched to handheld cleaning head
- 5 Handheld welding process parameters
- 6 Matters needing attention

Cautions

- Note: conventional gas: compressed air (it needs to have oil and water filtration) And after drying
- Do not use too viscous liquid for cooling water medium
- Air pressure Cutting: 0.8–1.0 Mpa, Cleaning/Welding: 0.2–0.3 Mpa, Gas: argon/nitrogen/compressed air , Drying and Oil-water filtration is required
- For replacing lense, under Dust-free environment. Keep lens clean and clear. $\geq 95\%$ alcohol for cleaning lens.
- 1kw/1.5kw/2kw Voltage 220v $\pm 10v$ 60hz single phase
- water cooler 220v $\pm 10v$ single phase 60hz
- 3000w Voltage 380v $\pm 10v$ 60hz Three-phase electric
- L connects live wire, N connects neutral wire, PE ground wire
- Before adding water, please check and ensure all connections fasten.

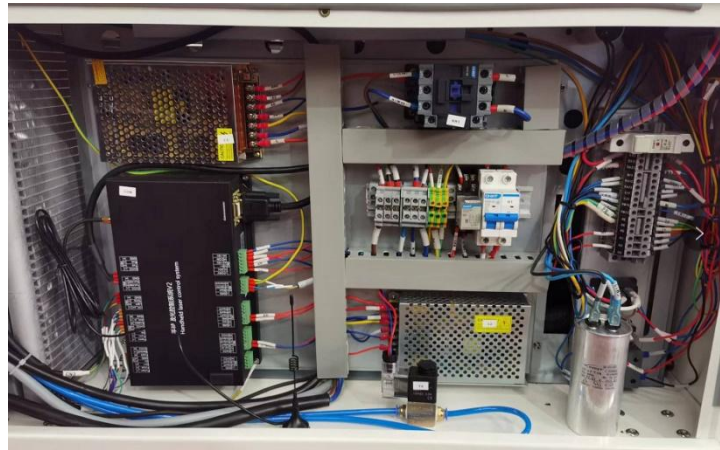
1. — Host



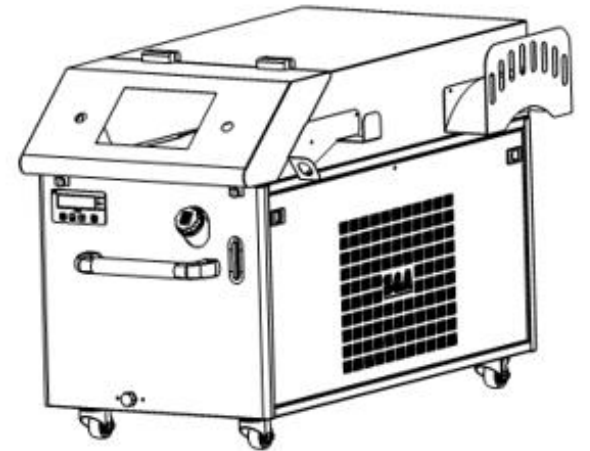
1.1 Composition of host



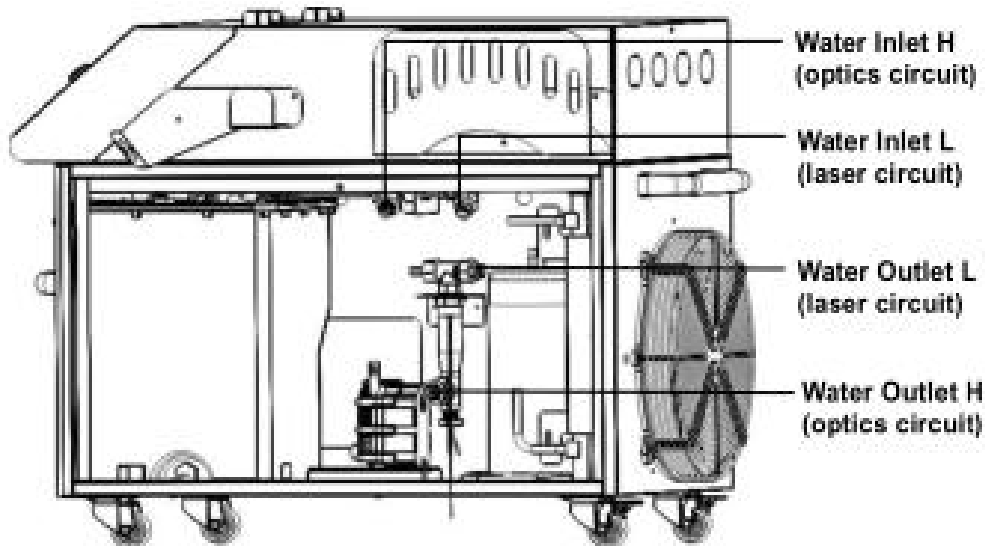
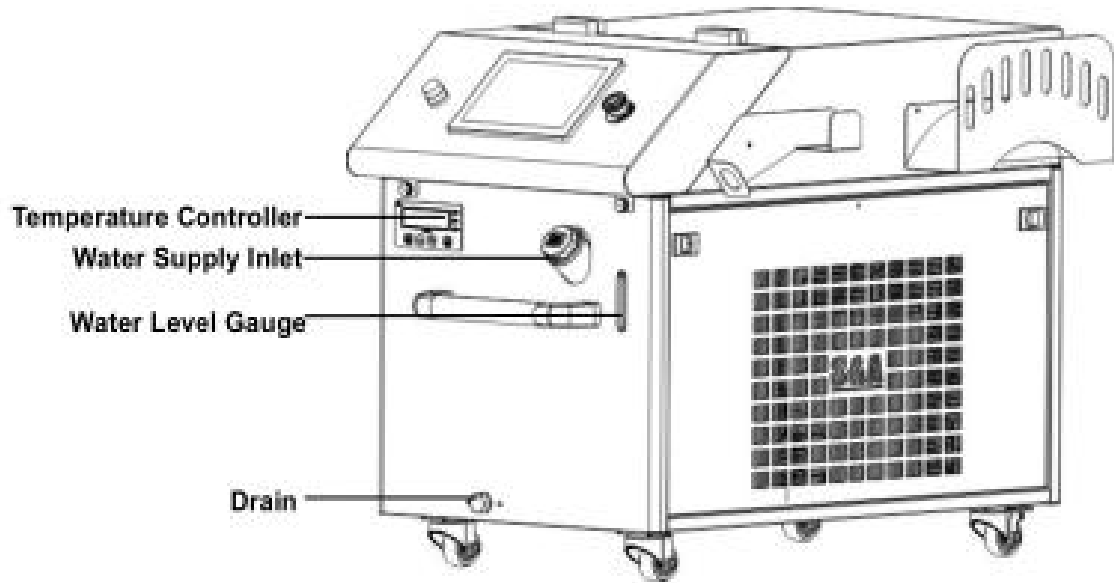
1 LASER (RAYCUS SAMPLE)



2 CONTROL PANEL



3 CHILLER AND ITS COMPONENTS



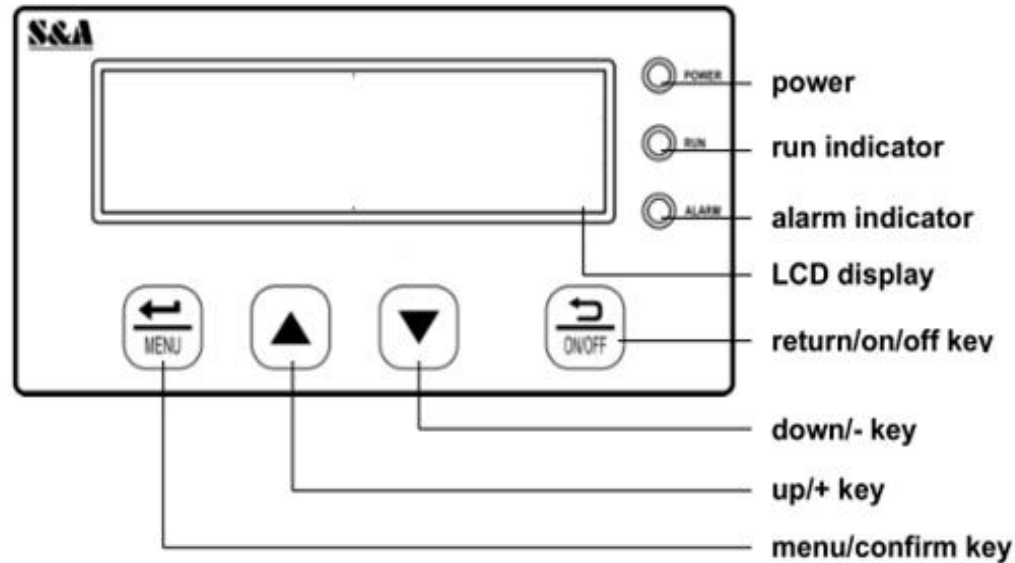
1 Go to handheld welding

2 Cooling fan

3 Laser head cutting gas and Laser Welding Wire Feeder control signal

4 Main incoming PS cable

1.2 Temperature control panel introduction



1. Power on / off operation

When the system is powered on, the power indicator is on, and press "on/off" to control the system on and off. Press "on/off" to start the machine. Press "on/off" for 5 seconds to turn off the machine.

2. Parameter setting

After pressing "menu" in the main interface, enter the main menu interface, press "up" and "down" to select the sub-menu, press "menu" to enter the sub-menu, and press "on/off" to return to the upper menu. After entering the root menu, press "up" and "down" to adjust the parameter value, and press "menu" to save the parameter. If the key is not pressed within 10 seconds during the setting process, it will automatically return to the main interface.

Parameter category	Order	Parameter name	Range	Unit	Factory setting
User Parameter	1	Setting temperature of low temperature circuit	2.0~50.0	℃	25.0
	2	Setting temperature difference of low temperature circuit	0.1~8.0	℃	2.0
	3	Setting temperature of high temperature circuit	5.0~60.0	℃	28.0
	4	Setting temperature difference of high temperature circuit	0.1~8.0	℃	0.1

VIII. Simple Troubleshooting

Failure	Failure Cause	Approach
<p>Machine turned on but unelectrified</p>	<p>Power cord is not plugged in place</p>	<p>Check and ensure the power interface and the power plug is plugged in place and in good contact.</p>
	<p>Fuse burnt-out</p>	<p>Open the electric box cover, check the fuse and replace with a spare one if necessary. Check whether the power supply voltage is stable; Check and ensure the power interface and the power plug are in good contact.</p>
<p>Flow Alarm, Use a water pipe to directly connect to the water outlet and inlet but still without water flowing</p>	<p>Water level in the water tank is too low</p>	<p>Check the water level gauge display, add water until the level shows in the green area; And check whether water circulation pipe leaks.</p>
<p>Flow alarm occurs while chiller is connecting to other equipment, but there is water flowing and no alarm when a water pipe is directly connected to the chiller water outlet and inlet.</p>	<p>Water circulation pipes are blocked or a pipe bending deformation.</p>	<p>Check water circulation pipe</p>

<p>Ultrahigh water temperature alarm(temperature controller displays E2)</p>	<p>Blocked dust gauze, bad thermolysis</p>	<p>Disassemble and clean the dust gauze regularly</p>
	<p>Poor ventilation for air outlet and inlet</p>	<p>To ensure a good ventilation for air outlet and inlet</p>
	<p>Voltage is extremely low or unstable</p>	<p>To improve the power supply circuit or use a voltage regulator</p>
	<p>Improper parameter settings on thermostat</p>	<p>To reset controlling parameters or restore factory settings</p>
	<p>Switch the power on and off frequently</p>	<p>To ensure there is sufficient time for refrigeration (more than 5 minutes)</p>
	<p>Excessive heat load</p>	<p>Reduce the heat load or use other model with larger cooling capacity</p>
<p>Serious problem of condensate water</p>	<p>Water temperature is much lower than ambient temperature, high humidity</p>	<p>Increase water temperature or to preserve heat for pipeline</p>
<p>Water drains slowly from drain port during water changing</p>	<p>Water supply inlet is not open</p>	<p>Open the water supply inlet</p>
<p>Startup flow alarm</p>	<p>Bubble in the water pipe</p>	<p>Exhaust the air</p>

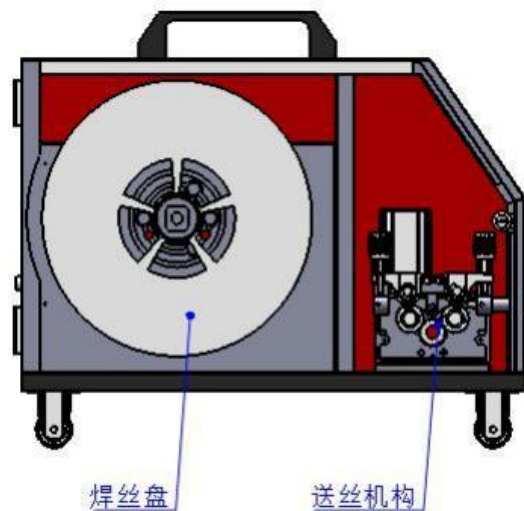
2. — Laser Welding Wire Feeder



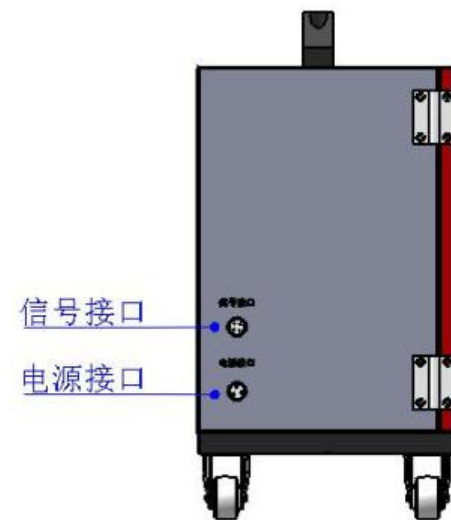
2.1 Structure and Feature



开关: Switch
出丝口: Welding wire outlet



焊丝盘: Wire reel
送丝机构: Wire feeding mechanism



信号接口: Signal interface
电源接口: Power interface

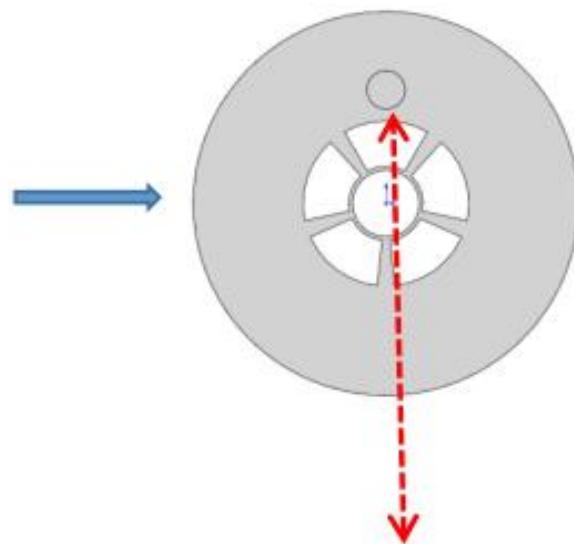
2.2 Material List

序号Number	名称Name	物品Material	规格Specification	数量Number	单位Unit
1	送丝机Wire feeder		SS-A-001	1	PCS
2	送丝轮Wire feed roll		SXLZJ-001	2	PCS
3	送丝管组件Wire feeding pipe accessory		SXGZJ-001-5m	1	PCS
4	电源插头线组件Power plug cable accessory		DYCTXZJ-001-2m	1	PCS
5	送丝信号控制线Wire feeding signal control cable		SS-KZX-5m	1	PCS

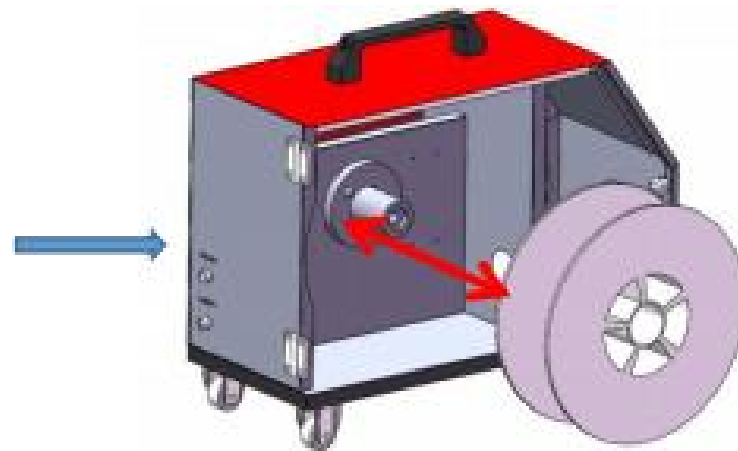
2.3 Wire Reel Assembly



松开螺帽
Loosen the nut

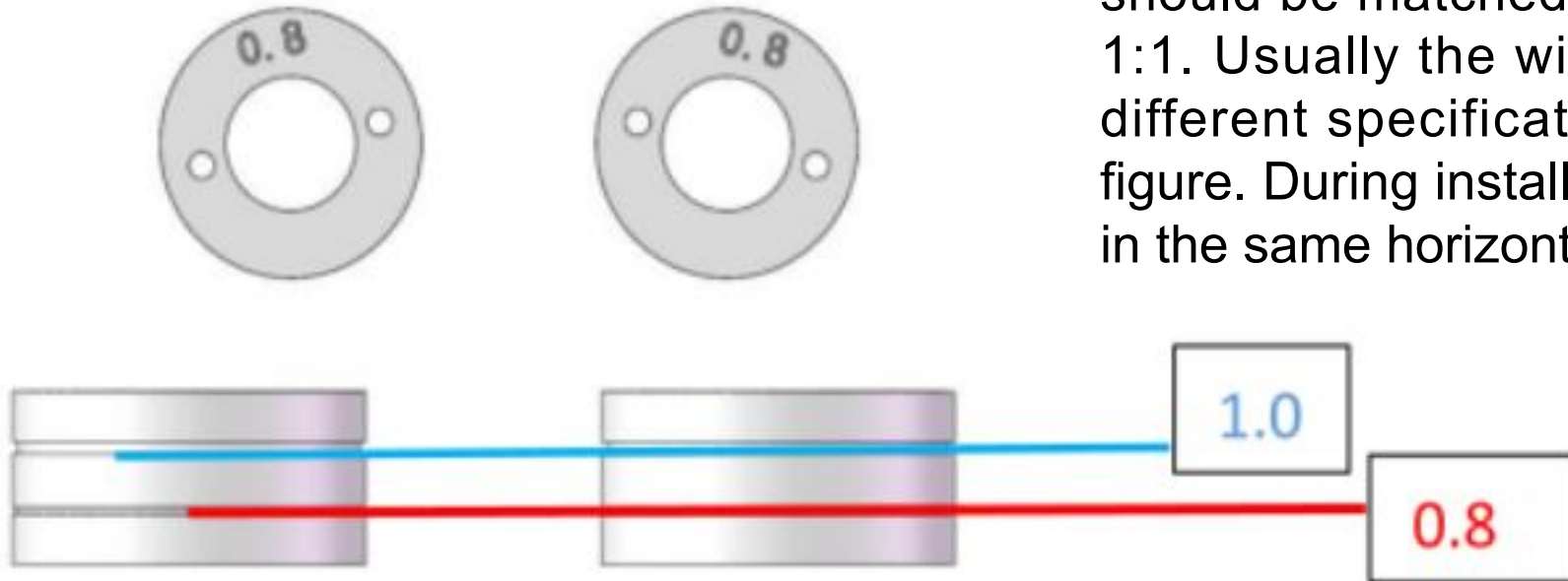


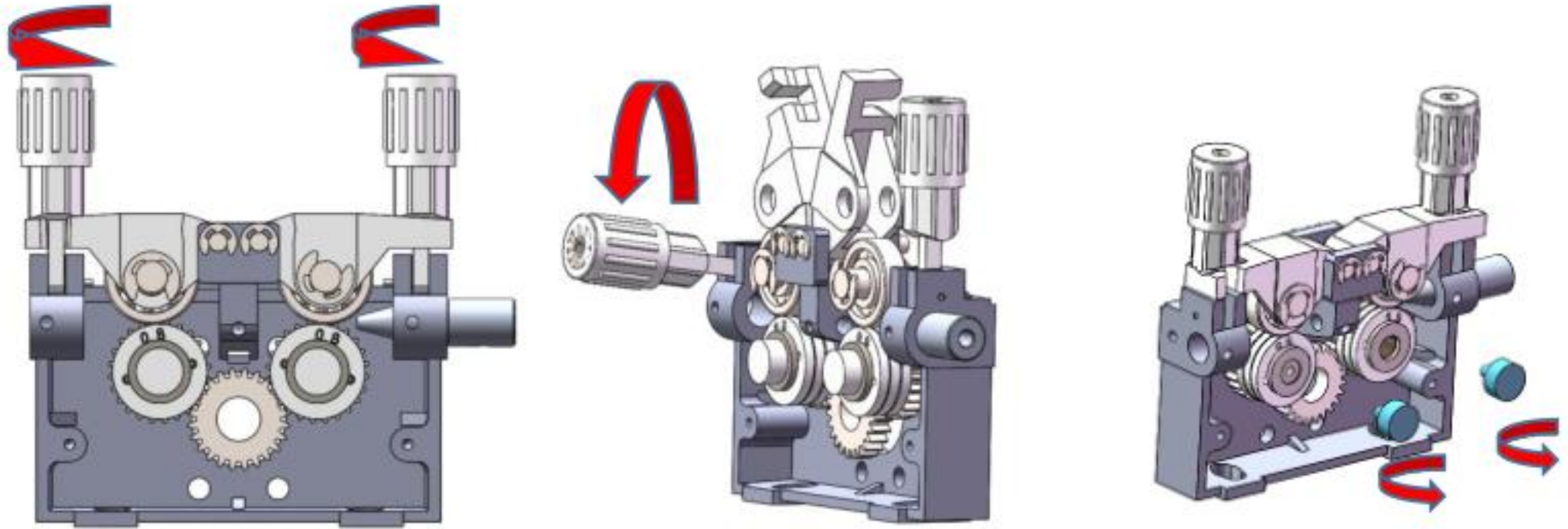
对准插销孔
Align with the bolt hole



2.4 Assembly of Wire Feed Roll

There are two feed wheels in one set. There are two slots on the wire feed roll, which should be installed one by one. The wire core diameter should be matched with the width of the slot by 1:1. Usually the wire feed roll has two slots of different specifications shown in the following figure. During installation, the two slots should be in the same horizontal line



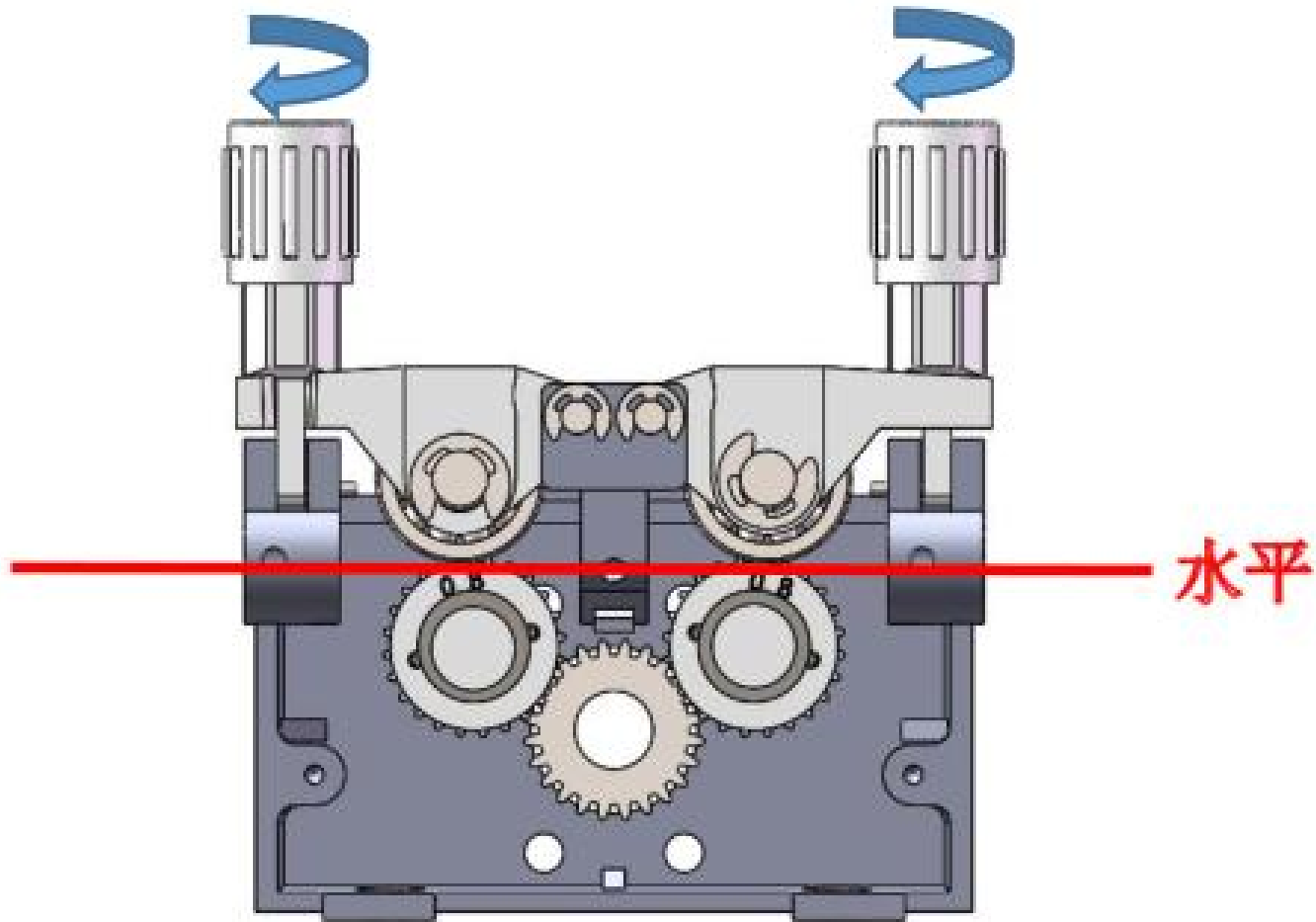


Change wire feed roll

Step 1: rotate and loosen two handles locking the wire feed roll

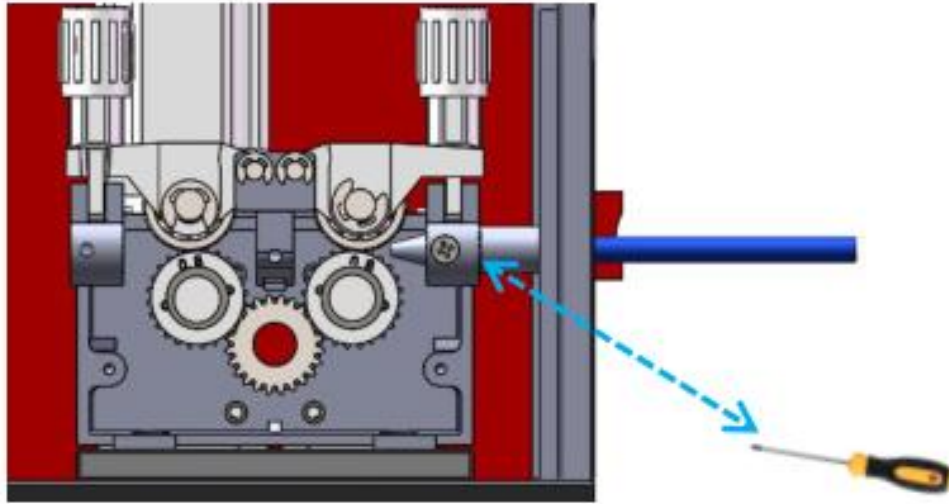
Step 2: swing forward 90° and loosen it downward

Step 3: rotate and loosen the nut locking the wire feed roll and change it



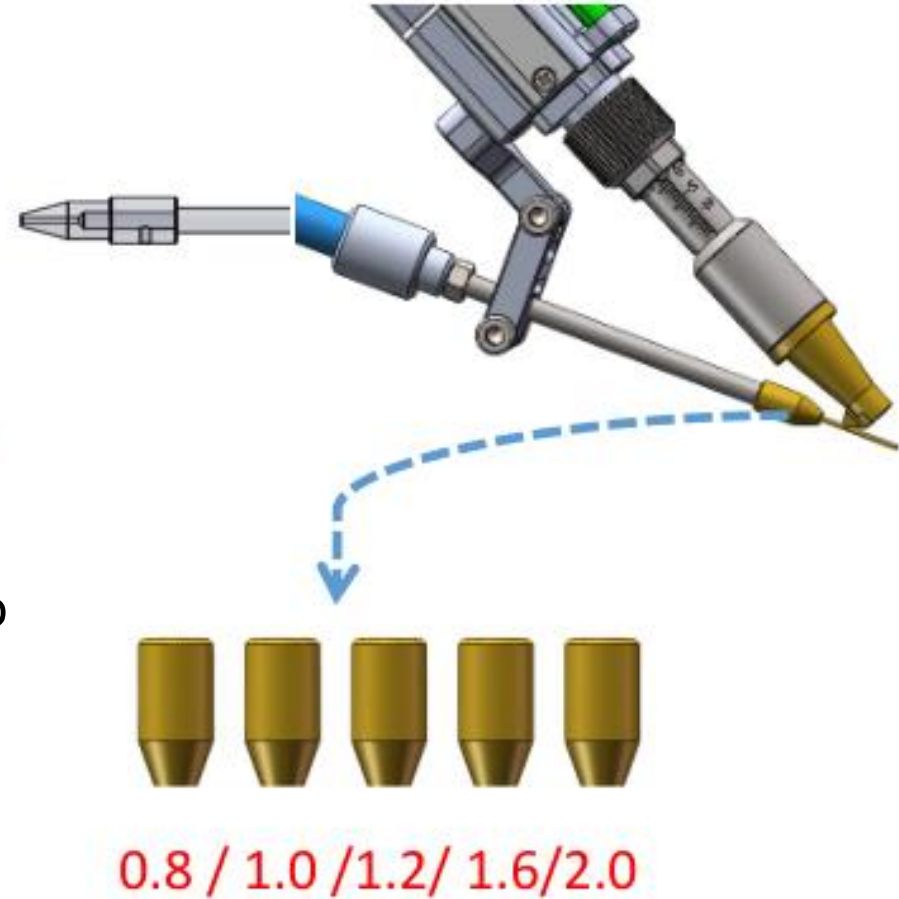
Rotate the the handle on the wire pressing wheel. The scale on the handle can help to adjust wire feeding to make the wire feeding on the same horizontal line.

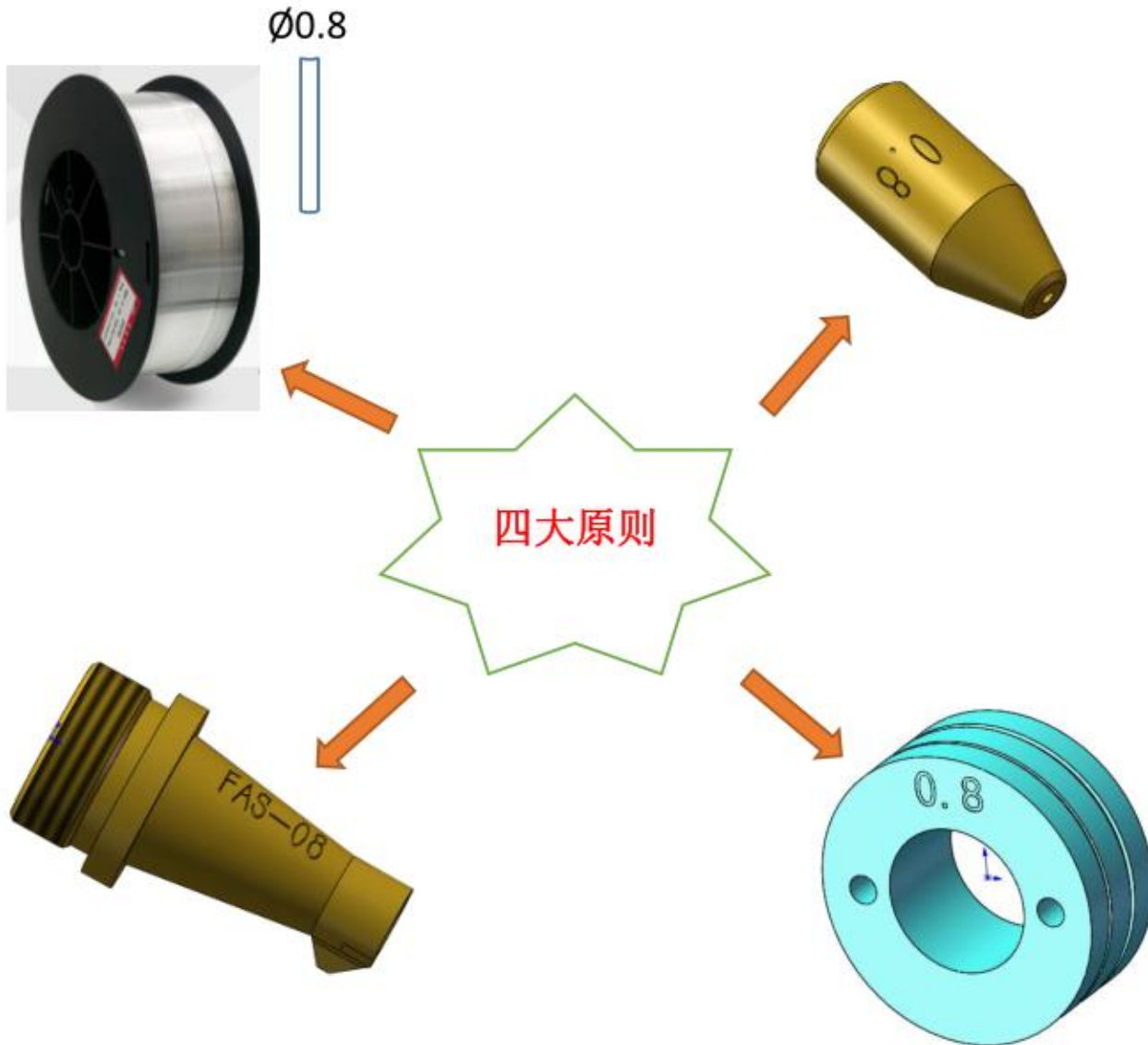
2.5 Assembly of Wire Feed Tube



Step 1: align the wire tube with the wire nozzle to stall it. Tight the screw to fix it.

Step 2: the wire nozzle should be matched with copper nozzle by 1:1 according to the size of the wire core diameter selected by customers.

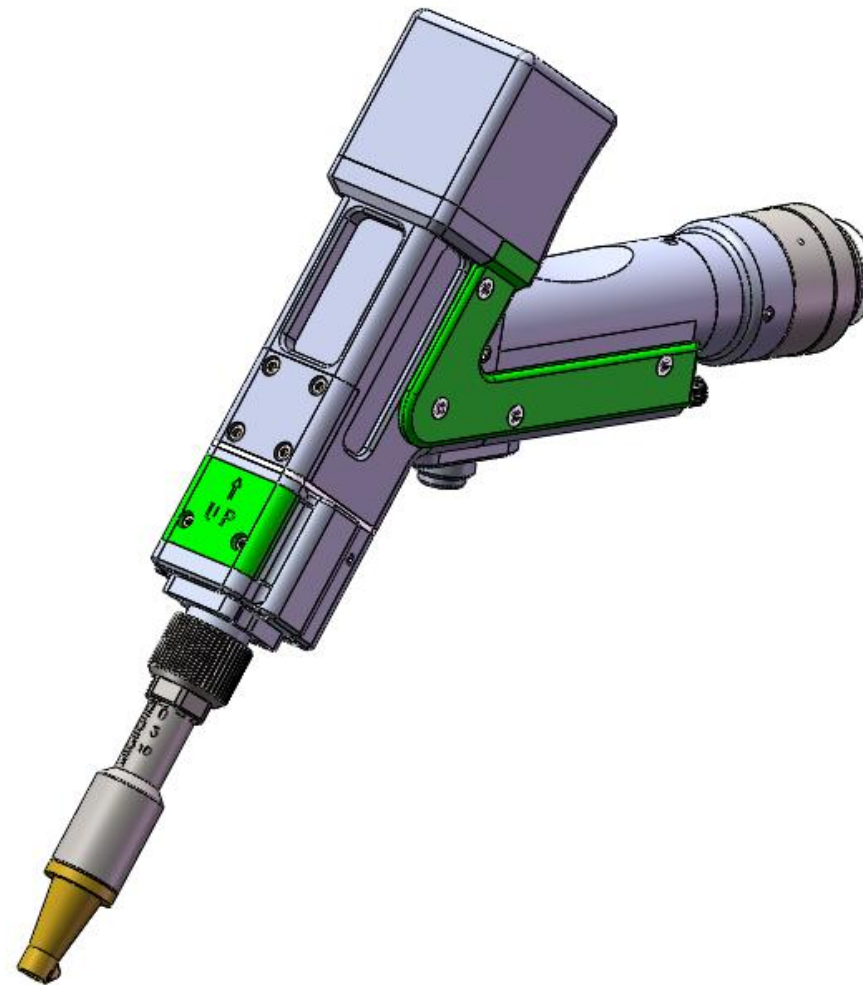




Type of wire nozzle

First, it depends on the customer's application scenarios. Four principles should be followed according to the proportion 1:1: wire core diameter, wire nozzle hole diameter, copper nozzle guide wire slot diameter and the wire feed roll slot diameter.

3. — Smart Single Pendulum Hand Welding Head



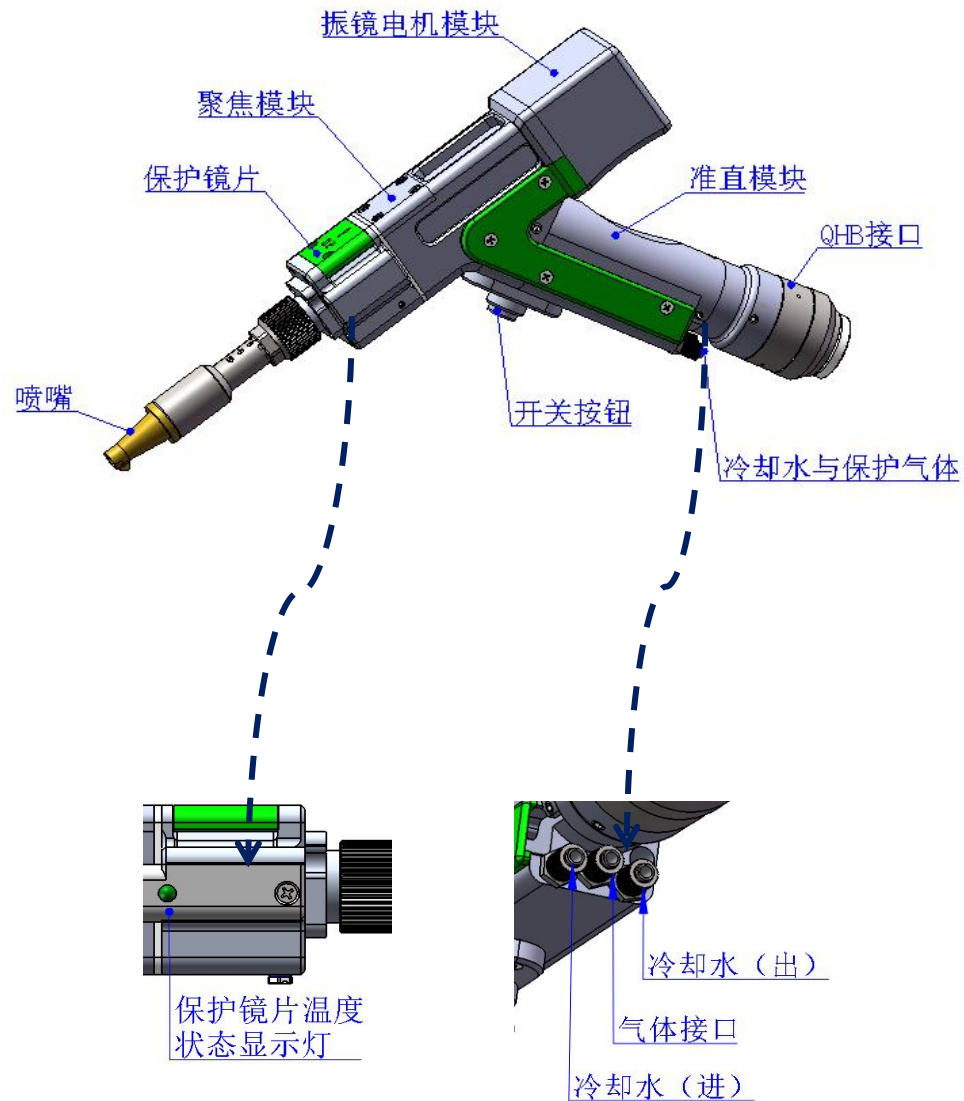
3.1 Overview

Name	Smart Single Pendulum Hand Welding Head
Model	FWH20-S10A
Optical Fiber Interface	QBH
Wavelength Range	1070±20nm
Rated Power	≤3000W
Collimating Focal Length	50mm
Focal Length	150mm
Focus Adjustment Range	-10mm~+10mm
Facula Adjustment Range	0~5mm
Auxiliary Air Pressure	≤1Mpa
Weight	0.72Kg

※To ensure personal safety, please wear special optical fiber laser protective glasses before operation.

※Keep the product clean and prevent coolant, condensate or other foreign matters from invading the cavity; otherwise it will cause functional pollution and functional impact of relevant parts.

3.2 Structure of



保护镜片 Protective lens

喷嘴 Nozzle

准直模块 Collimation module

QHB接口 QHB interface

开关按钮 Switch power button

冷却水与保护气体 Cooling water and protective gas

保护镜头温度 Temperature

状态显示灯 Protective lens temperature status
indicator

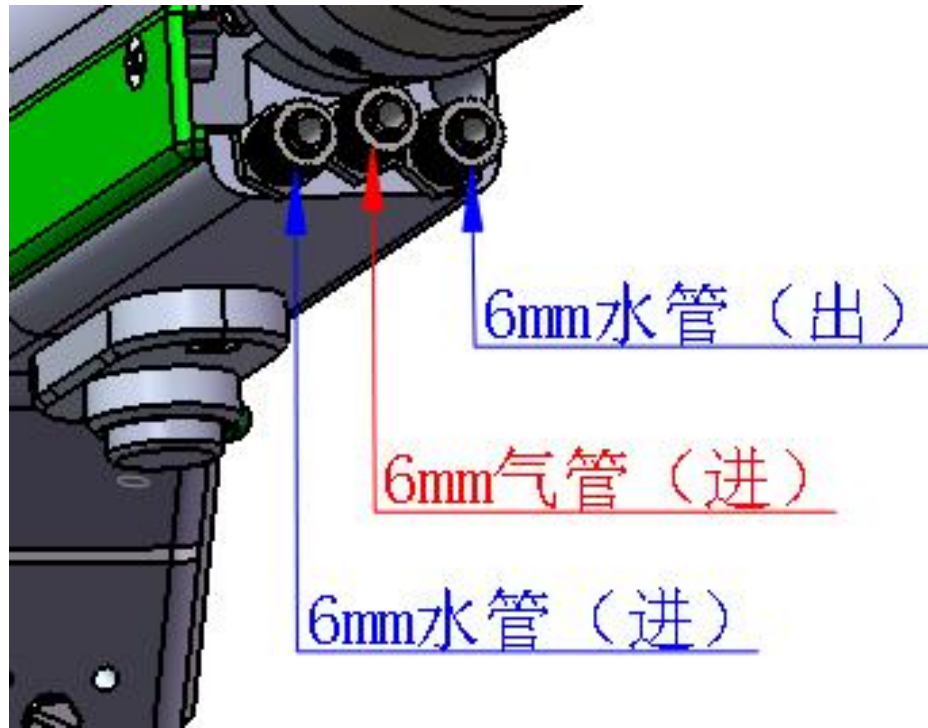
冷却水（出） Cooling water (outlet)

气体接口 Gas interface

冷却水（进） Cooling water (inlet)

振镜电机模块 Galvanometer motor module

焦距模块 Focal length module



6mm水管 (出) 6mm water pipe (outlet)

6mm气管 (进) 6mm gas pipe (inlet)

6mm水管 (进) 6mm water pipe (inlet)

Connection between cooling water and protective gas, and requirements for use:

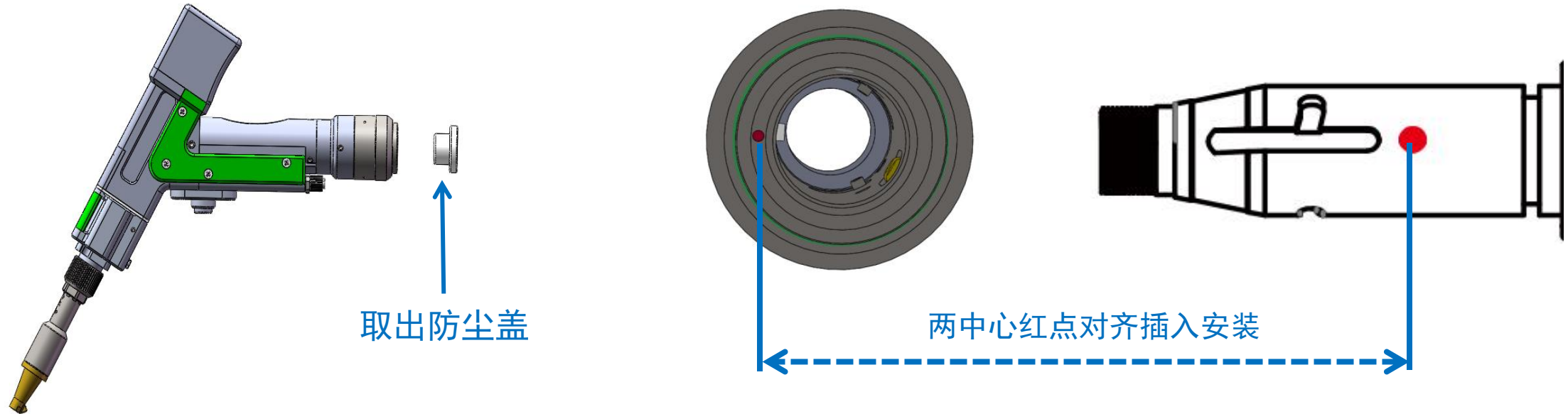
Note: conventional gas: compressed air (it needs to have oil and water filtration) And after drying

The commonly used gases include argon, nitrogen and compressed air (oil-water filtration is required). And after drying

Cooling water: Connect the 6mm gas pipe, which is mainly used to generate heat in the optical path in the cavity. Through the water path of the internal structure, the cooling takes away the excess heat to ensure the welding performance. The cooling water pipeline is required to be connected in series and connected with an inlet and an outlet water circulation.

Protective gas: Connect 6mm gas pipe for butt welding gas protection, and the input pressure is less than 1MPa.

3.3 Installation of



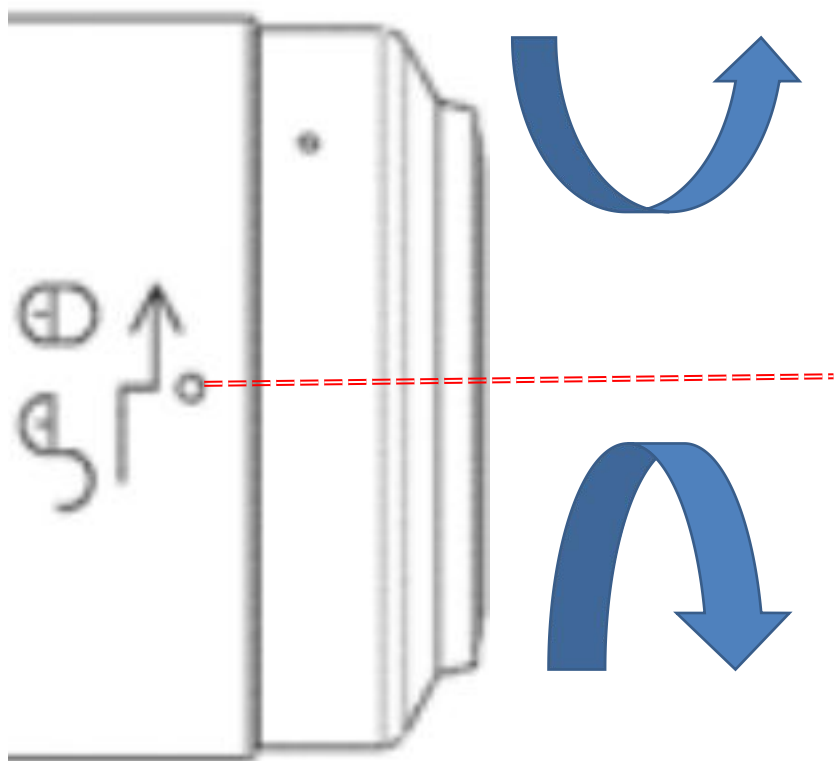
取出防尘盖 Take the dust seal cover out.

两中心红点对齐插入安装

The red dots of the two centers are aligned and inserted for installation.

※ Align the red dot on the optical fiber head with the QBH red dot, and slowly insert the optical fiber head into the QBH.

※ Screw QHB to the locking state: Turn it clockwise to the limit position (you can hear a “click”), lift up the rotating jacket, and turn it clockwise again until the optical fiber head is pressed.



顺时针为锁紧方向

逆时针为松开

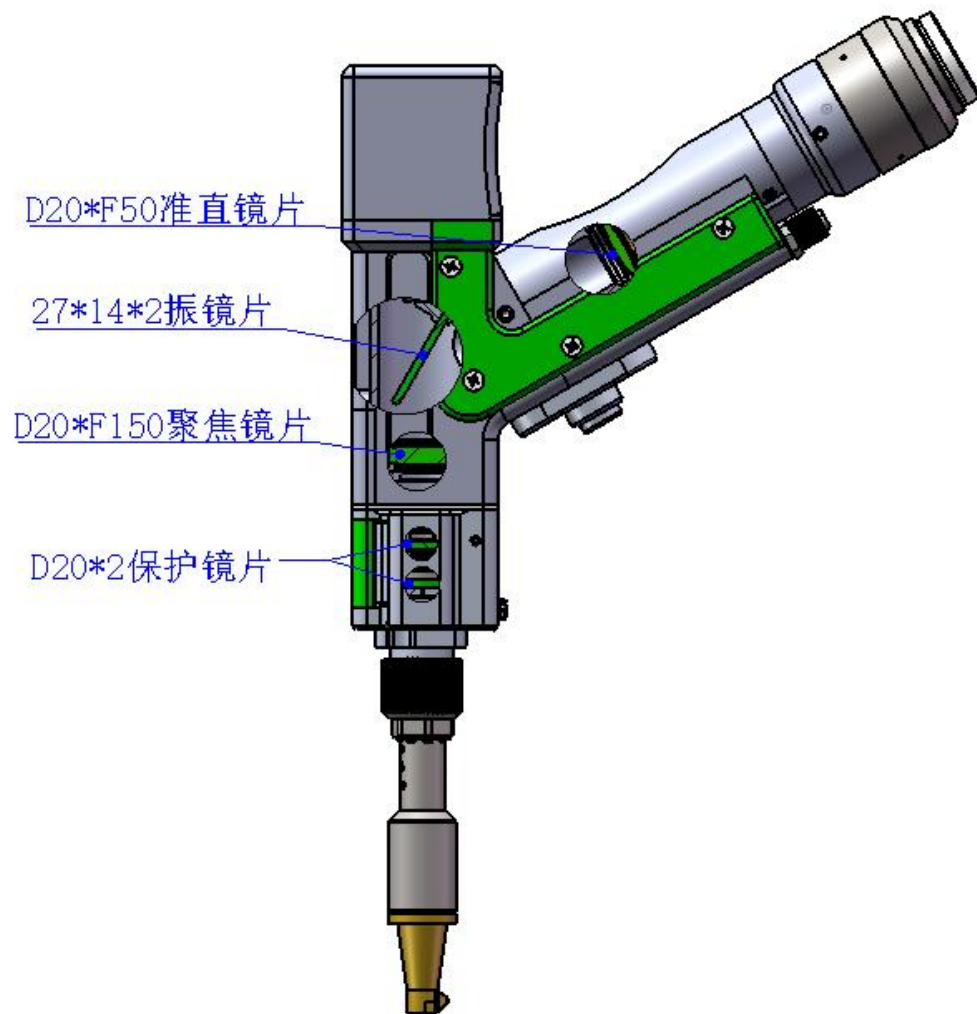
顺时针为锁紧方向

Clockwise is the locking direction

逆时针为松开

Counterclockwise is release

3.4 Repairs and Maintenance



D20*F50准直镜片 D20*F50 Collimating lens

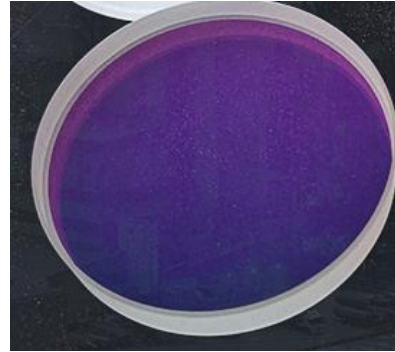
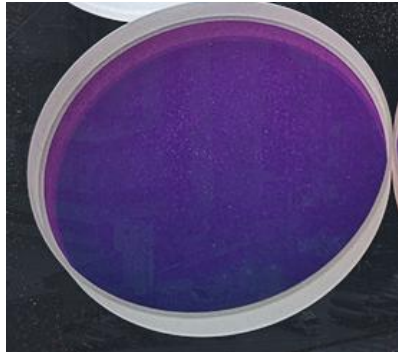
27*14*2振镜片 27*14*2 Galvanometer

D20*F150聚焦镜片 D20*F150 Focusing lens

D20*2保护镜片 D20*2 Protective lens

Optical lens structure

※ The replacement parts are assembled in the dust-free workshop. Except for the protective lens drawer, disassembly of other modules is prohibited in principle. If you have to check collimating lens, focusing lens and galvanometer, please dismantle the lens when the product is put in a clean environment.

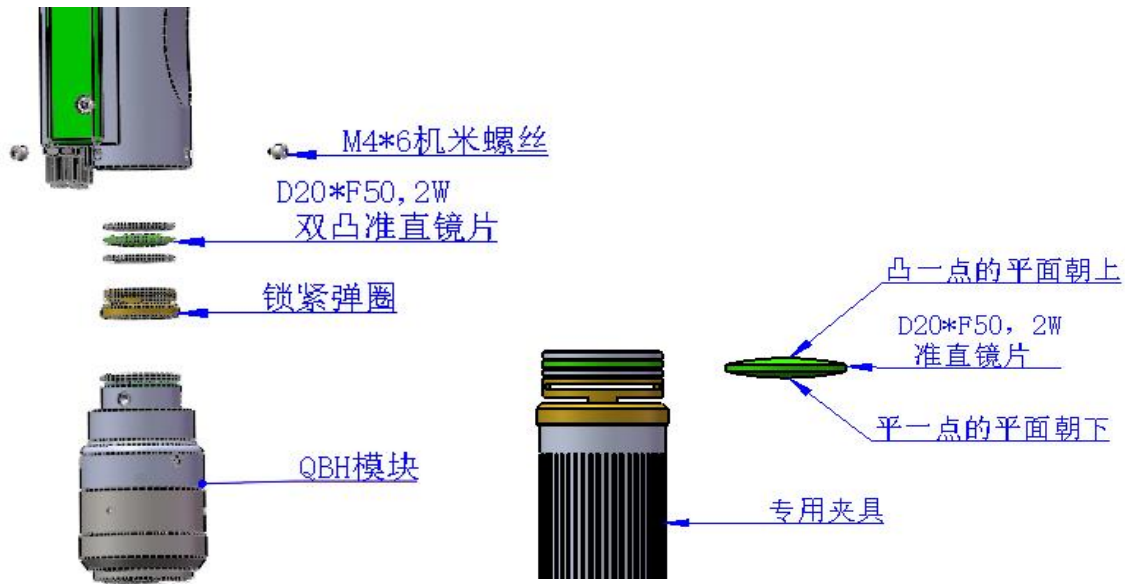


Optical lens cleaning

※ Operation and precautions for cleaning the optical lens:

※ Tools: Dust-free gloves or finger cots, dust-free wiping cotton swabs, isopropanol, filled dry and pure compressed air.

※ Spray isopropanol onto the dust-free wiping cotton swab; the lens is facing both eyes; the left thumb and index finger gently pinch the side edge of the lens; the right hand holds the dust-free wiping cotton swab to gently wipe the front and back sides of the lens from bottom to top or from left to right in a single direction (do not wipe back and forth, so as to avoid secondary contamination of the lens) and blow the lens surface with filled dry and pure compressed air to confirm that there is no foreign matter on the lens surface after cleaning.



M4*6机米螺丝 M4*6 set screw
 D20*F50, 2W 双凸准直镜片 D20*F50, 2W Biconvex collimating lens
 锁紧弹圈 Locking spring ring
 QBH模块 QBH module
 凸一点的平面朝上 The convex plane is upward
 D20*F50, 2W 双凸准直镜片 D20*F50, 2W Biconvex collimating lens
 平一点的平面朝下 The flat plane is downward
 专用夹具 Special fixture wrench

Collimating lens removal and installation

Tools: 2mm hexagonal wrench, special fixture wrench, dust-free cotton swab, alcohol

※ The removal and installation process needs to be completed in a clean place. When removing and installing lenses, you must wear dust-free hand dust or dust-free fingertips.

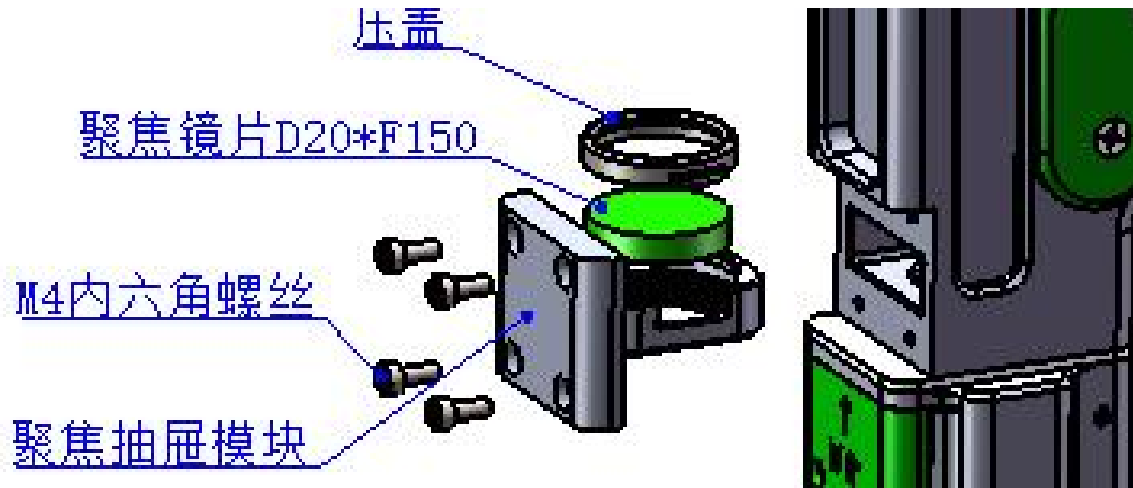
※ Steps of removal and installation:

Step 1: Clean all the dust on the surface of the laser head.

Step 2: Loosen the 3-M4*6 set screw in the figure with a 2mm hexagonal wrench.

Step 3: Take out the QBH module and seal the port with masking paper to prevent dust from entering the cavity.

Step 4: Rotate counterclockwise with the special removal and installation lens barrel clamp to loosen the locking spring ring, and slowly take out the welding joint downward. Seal the port with masking paper to prevent dust from entering the cavity, and replace the collimating lens. (Pay attention to the placement position and thickness of the gasket, which will affect the optical path. After removal and installation, record the thickness of the gasket.)



压盖 Gland
 聚焦镜片D20*F150 Focusing lens D20*F150
 M4内六角螺丝 Hexagon socket head cap screws
 聚焦抽屉模块 Focus drawer module
 凸一点的面朝上 The convex plane is upward
 D20*F50,2W 聚焦镜片D20*F150,2W Focusing lens
 平一面的面朝下 The flat plane is downward

Focusing lens removal and installation

Tools: 2mm hexagonal wrench, dust-free cotton swab, alcohol, masking tape

※ The removal and installation process needs to be completed in a clean place. When removing and installing lenses, you must wear dust-free hand dust or dust-free fingertips.

※ Steps of removal and installation:

Step 1: Loosen M4 screws with 2mm hexagonal wrench.

Step 2: Pull out the focusing module directly in the horizontal direction.

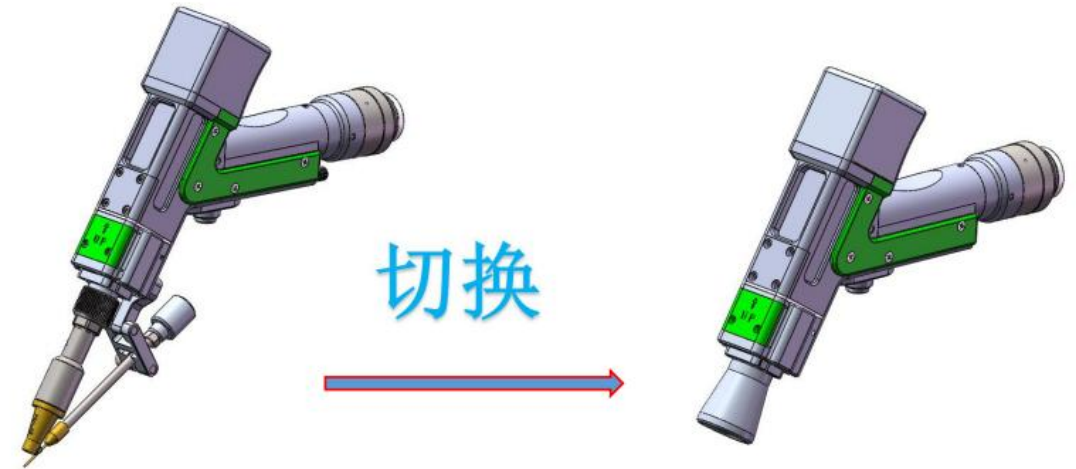
Step 3: Seal the port with masking paper to prevent dust from entering the cavity and being polluted.

Step 4: Press the gland down gently and rotate it by 90 ° ; align the two bosses with the left and right openings; take out the gland upward, and then replace the focusing lens.

(Notice: The concave convex direction in the installation of lens faces)

4. —

Smart single pendulum handheld welding head is switched to handheld cleaning head

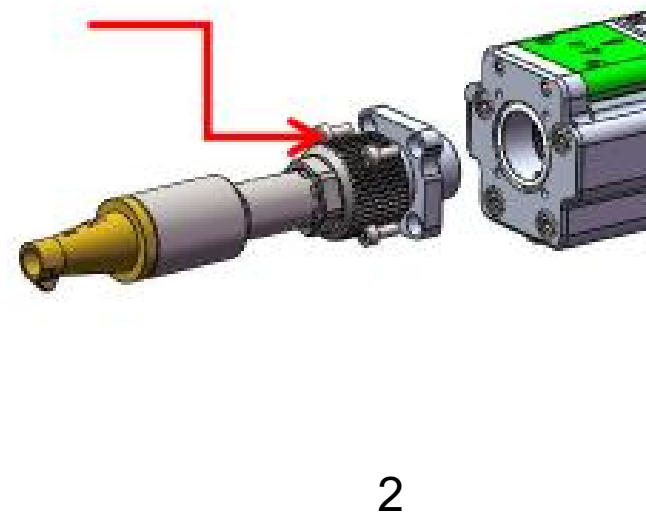
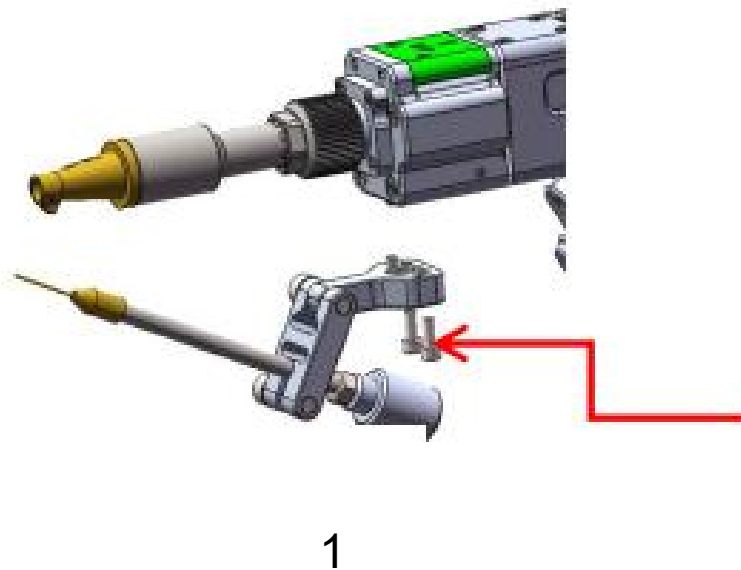
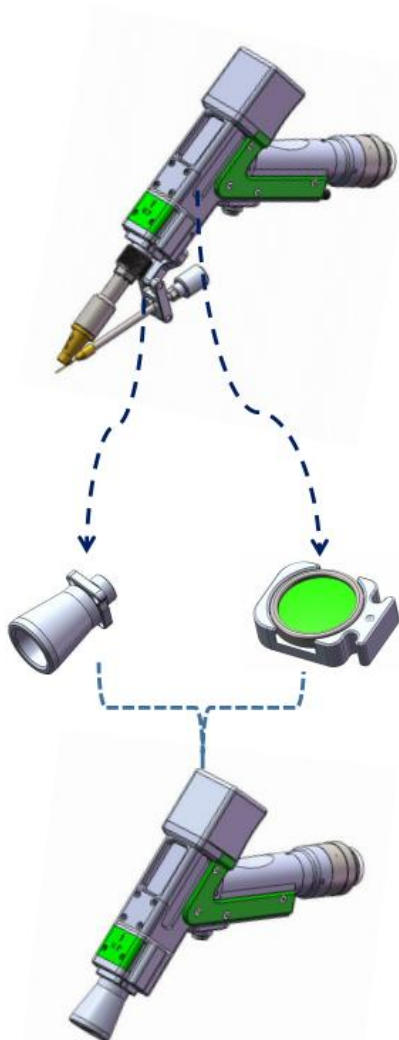


Focusing lens : F150

Focusing lens : F600

Be careful not to confuse the models of these two types of focus lenses

4.1 Module conversion



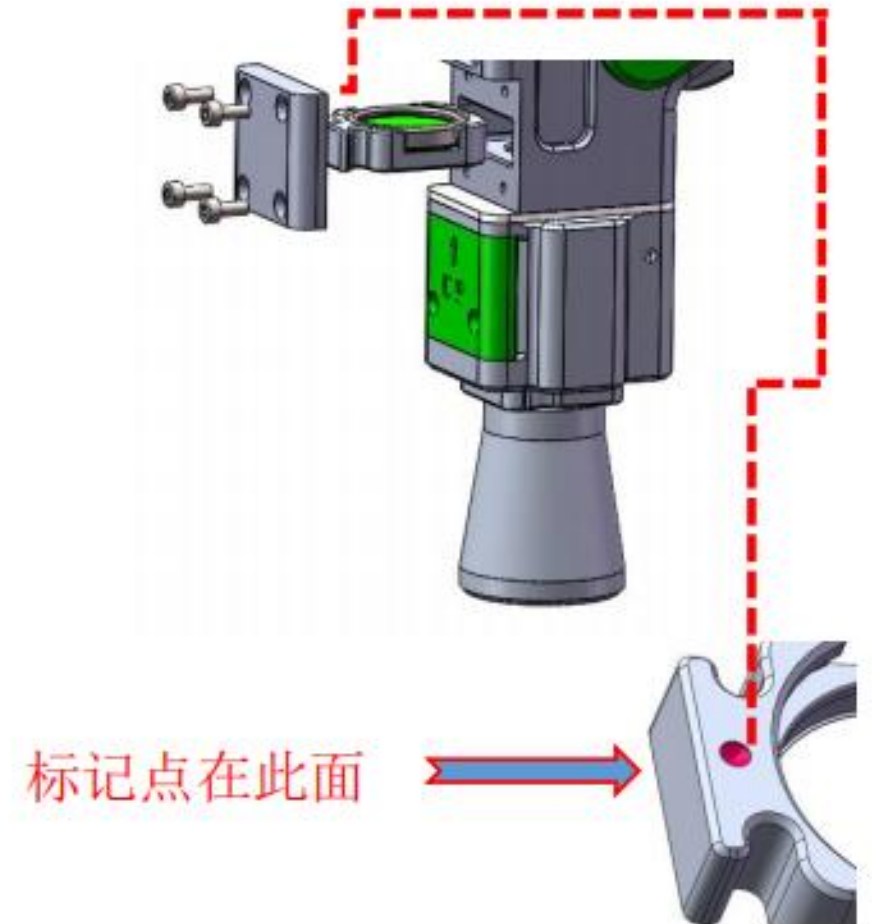
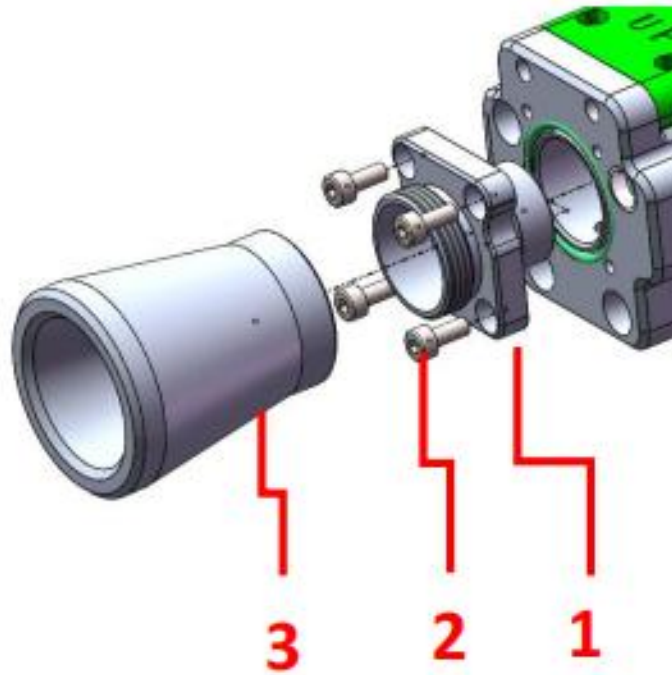
【Wire feed bracket module】 : Loosen the 2-M3 screw, 1

【Brass nozzle connection seat】 : Loosen the 4-M2.5 screws, 2

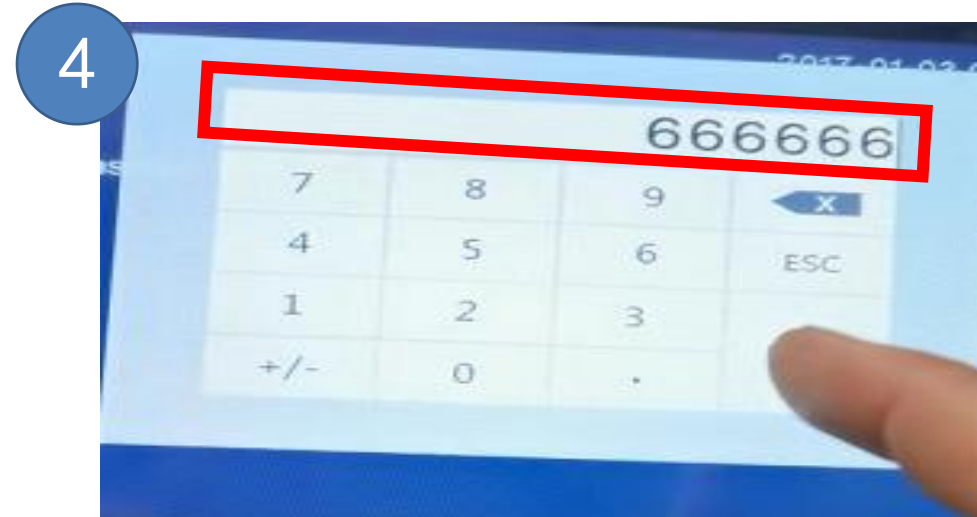
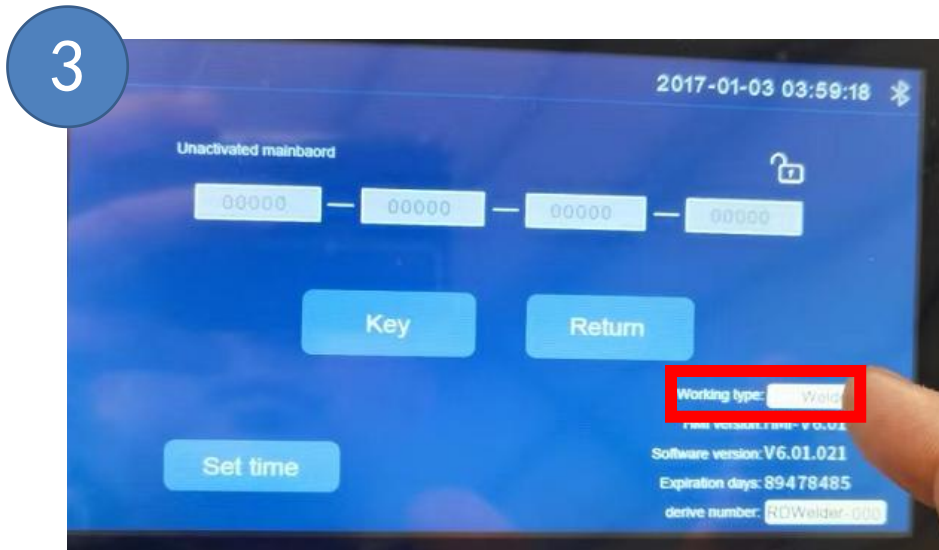
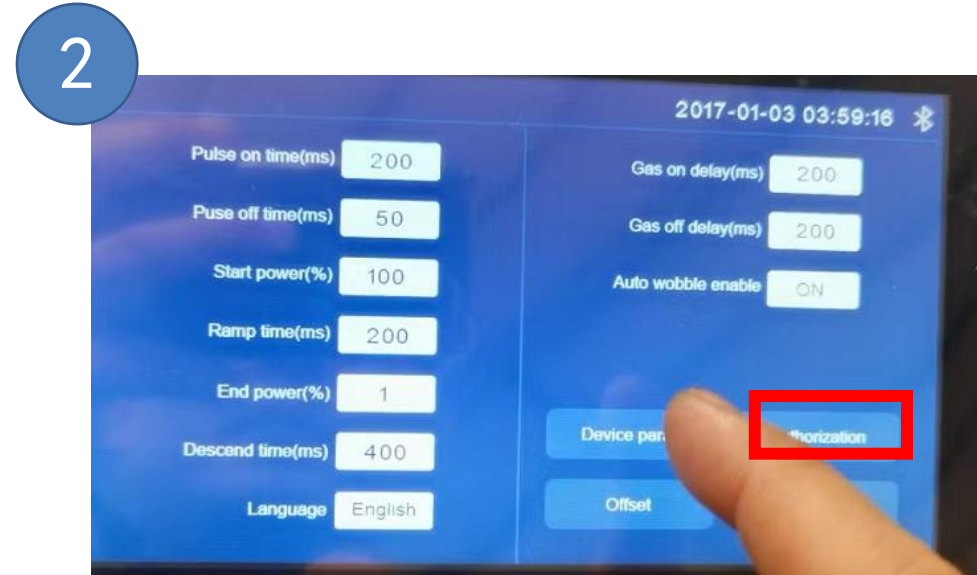
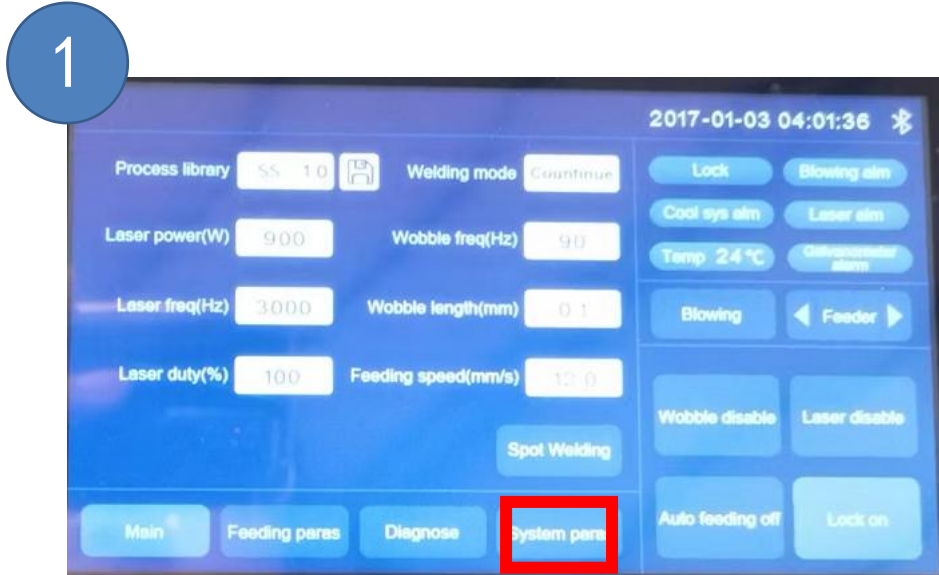
4.2 Install the

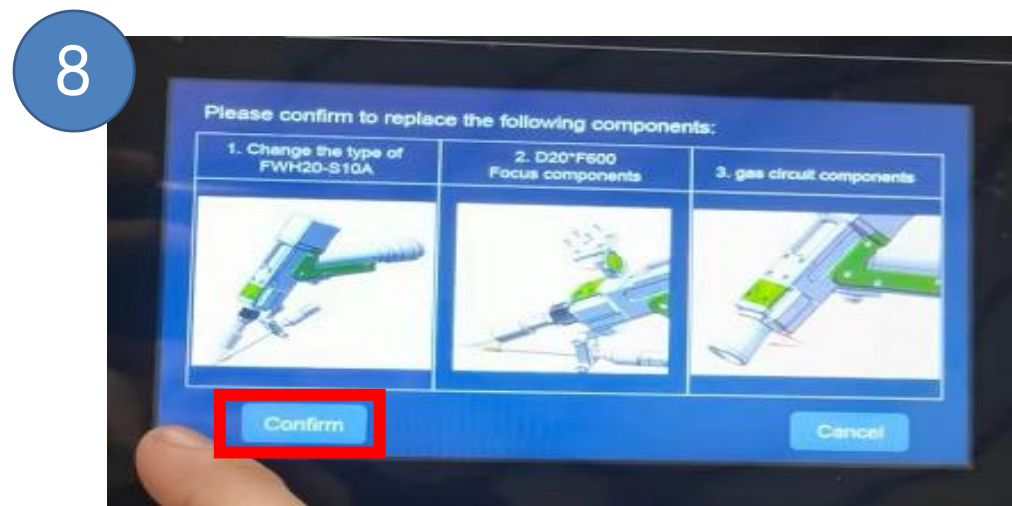
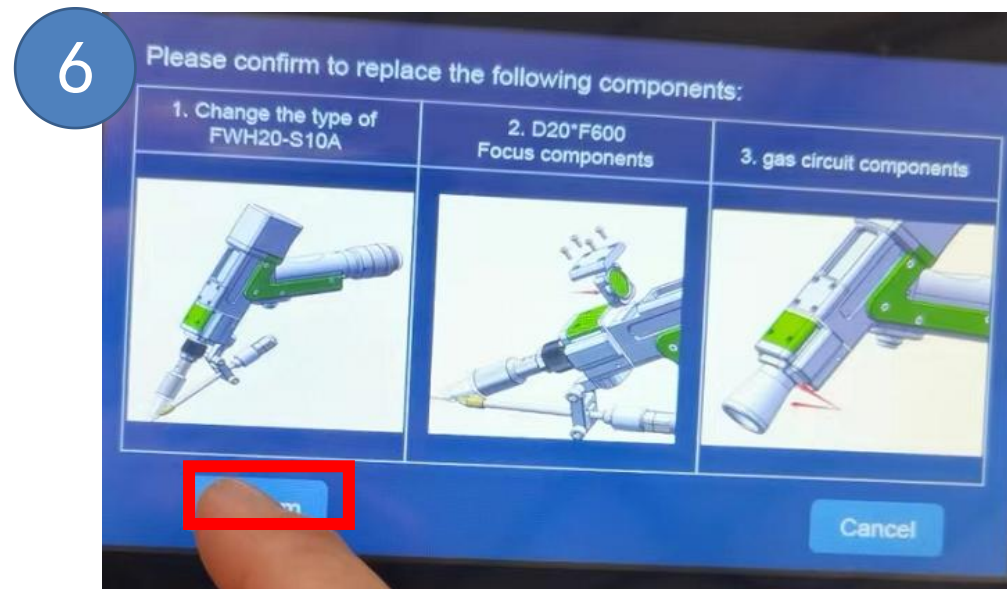
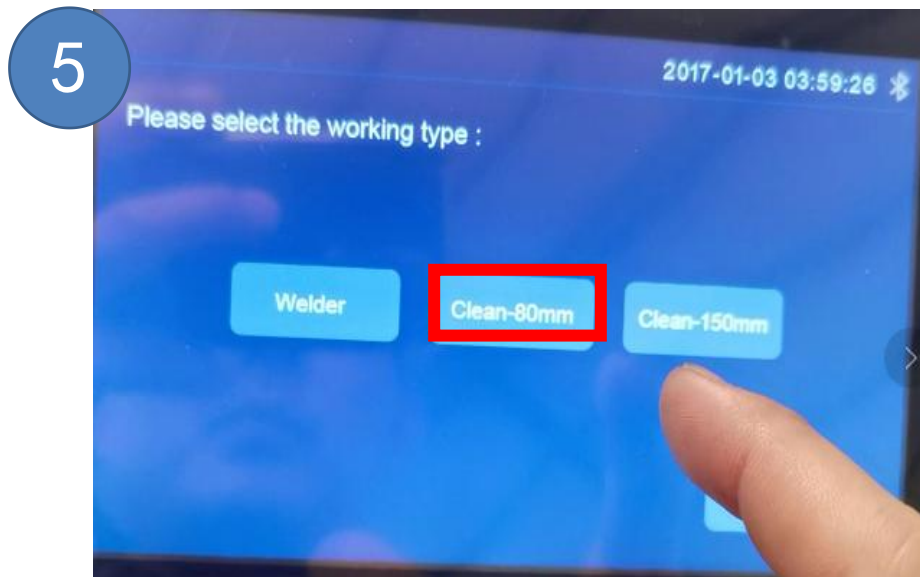
【Sheath installation】： Install in sequence 1, 2, and 3.

【Focus drawer installation】： Loosen the 4-M2.5 screw and pull out the focusing module directly. When replacing the cleaning focus module, the small point in the middle of the injection space is on the top. The replacement welding focus module is placed with good dust protection for easy replacement

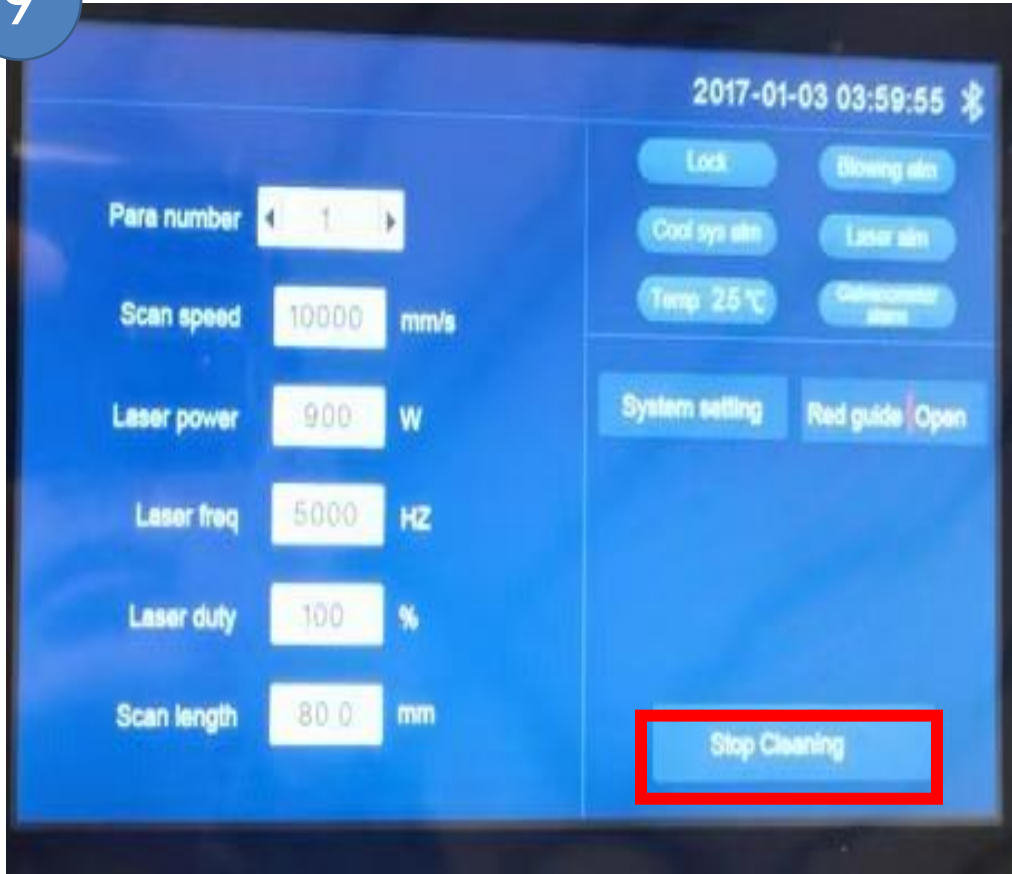


4.3 Machining mode switching





9



Taking the switching from welding mode to 80mm cleaning mode as an example, follow the [System Parameters 1] ->[Authorization 2] ->[Processing Type 3], click [Processing Type] You will be prompted to enter the password 666666. 4 When the password is entered correctly, you will enter the system classType selection interface, Select [cleaning - 80mm 5] ->[Confirm 6] System prompt power on again -> Press [Emergency stop 7] Wait for 30s > rise [Emergency stop] ->[Confirm 8] selection mode again ->click [stop cleaning] -> Double click continuously Single Pendulum Hand Welding Head start button

If the cleaning mode is changed to the welding mode, the reverse order can be followed

5. —

Handheld welding process parameters

— Stainless Steel									
Mat and thick.(mm)	Laser power(W)	Laser freq (HZ)	Duty cycle (%)	Wobble freq (HZ)	Wobble length(mm)	Feeding speed(mm/s)	Type	Angle	form
SS 1.0	500	3000	100	60	2	12	ER304.0.8	Plane	P
SS 1.0	450	3000	100	60	2	12	ER304.0.8	Inter	W
SS 1.0	500	3000	100	60	2	12	ER304.0.8	Exter	75%P
SS 1.5	550	3000	100	60	2	12	ER304.0.8	Plane	P
SS 1.5	500	3000	100	60	2	12	ER304.0.8	Inter	W
SS 1.5	550	3000	100	60	2	12	ER304.0.8	Exter	80%P
SS 2.0	1000	5000	100	60	2.5	12	ER304.1.0	Plane	P
SS 2.0	800	5000	100	60	2.5	12	ER304.1.0	Inter	W
SS 2.0	1000	5000	100	60	2.5	12	ER304.1.0	Exter	70%P
SS 2.5	1200	5000	100	50	2.5	12	ER304.1.0	Plane	P
SS 2.5	1000	5000	100	50	2.5	12	ER304.1.0	Inter	W
SS 2.5	1200	5000	100	50	2.5	12	ER304.1.0	Exter	80%P
SS 3.0	1600	5000	100	40	3	12	ER304.1.2	Plane	P
SS 3.0	1350	5000	100	40	3	12	ER304.1.2	Inter	W
SS 3.0	1400	5000	100	40	3	12	ER304.1.2	Exter	85%P
SS 3.5	1800	5000	100	30	3	12	ER304.1.2	Plane	P
SS 3.5	1500	5000	100	30	3	12	ER304.1.2	Inter	W
SS 3.5	1600	5000	100	30	3	12	ER304.1.2	Exter	85%P
SS 4.0	2700	5000	100	20	3.5	12	ER304.1.6	Plane	P
SS 4.0	2000	5000	100	20	3.5	12	ER304.1.6	Inter	C
SS 4.0	2500	5000	100	20	3.5	12	ER304.1.6	Exter	90%P
SS 5.0	3000	5000	100	15	4.0	12	ER304.2.0	Plane	P
SS 5.0	2200	5000	100	15	4.0	12	ER304.2.0	Inter	C
SS 5.0	2500	5000	100	15	4.0	12	ER304.2.0	Exter	85%P

P: Penetration W:WHITE 75%P:75% Penetration C: colour Y: Yellowish

二. carbon steel									
Mat and thick (mm)	Laser power (W)	Laser freq (HZ)	Duty cycle (%)	Wobble freq (HZ)	Wobble length (mm)	Feeding speed (mm/s)	Type	Angle	form
CS 1.0	500	3000	100	60	2	12	ER304.0.8	Plane	P
CS 1.0	450	3000	100	60	2	12	ER304.0.8	Inter	W
CS 1.0	500	3000	100	60	2	12	ER304.0.8	Extex	70%P
CS 1.5	550	3000	100	60	2	12	ER304.0.8	Plane	P
CS 1.5	500	3000	100	60	2	12	ER304.0.8	Inter	P
CS 1.5	550	3000	100	60	2	12	ER304.0.8	Extex	85%P
CS 2.0	700	3000	100	60	2.5	12	ER304.1.0	Plane	P
CS 2.0	600	3000	100	60	2.5	12	ER304.1.0	Inter	W
CS 2.0	700	3000	100	60	2.5	12	ER304.1.0	Extex	80%P
CS 2.5	850	3000	100	50	2.5	12	ER304.1.0	Plane	P
CS 2.5	750	3000	100	50	2.5	12	ER304.1.0	Inter	W
CS 2.5	750	3000	100	50	2.5	12	ER304.1.0	Extex	85P
CS 3.0	1300	3000	100	40	3.0	12	ER304.1.2	Plane	P
CS 3.0	1100	3000	100	40	3.0	12	ER304.1.2	Inter	W
CS 3.0	1300	3000	100	40	3.0	12	ER304.1.2	Extex	75%P
CS 3.5	1650	5000	100	30	3.0	12	ER304.1.2	Plane	P
CS 3.5	1200	5000	100	30	3.0	12	ER304.1.2	Inter	W
CS 3.5	1500	5000	100	30	3.0	12	ER304.1.2	Extex	85%P
CS 4.0	2400	5000	100	20	3.5	12	ER304.1.6	Plane	P
CS 4.0	1800	5000	100	20	3.5	12	ER304.1.6	Inter	Y
CS 4.0	2000	5000	100	20	3.5	12	ER304.1.6	Extex	85%P
CS 5.0	2700	5000	100	15	4.0	12	ER304.2.0	Plane	P
CS 5.0	2100	5000	100	15	4.0	12	ER304.2.0	Inter	C
CS 5.0	2300	5000	100	15	4.0	12	ER304.2.0	Extex	80%P

P: Penetration W:WHITE 75%P:75% Penetration C: colour Y: Yellowish

三. Galvanized sheet

Mat and thick (mm)	Laser power (W)	Laser freq (HZ)	Duty cycle (%)	Wobble freq (HZ)	Wobble length (mm)	Feeding speed (mm/s)	Type	Angle	form
GS 1.0	540	5000	100	50	2	12	ER304.0.8	Plane	P
GS 1.0	540	5000	100	50	2	12	ER304.0.8	Inter	W
GS 1.0	540	5000	100	50	2	12	ER304.0.8	Exter	70%P
GS 1.5	690	5000	100	50	2	12	ER304.0.8	Plane	P
GS 1.5	660	5000	100	50	2	12	ER304.0.8	Inter	W
GS 1.5	690	5000	100	50	2	12	ER304.0.8	Exter	75%P
GS 2.0	1200	5000	100	40	2.5	12	ER304.1.0	Plane	P
GS 2.0	1200	5000	100	40	2.5	12	ER304.1.0	Inter	W
GS 2.0	1200	5000	100	40	2.5	12	ER304.1.0	Exter	85%P
GS 2.5	1500	5000	100	30	2.5	12	ER304.1.0	Plane	P
GS 2.5	1500	5000	100	30	2.5	12	ER304.1.0	Inter	W
GS 2.5	1500	5000	100	30	2.5	12	ER304.1.0	Exter	80%P
GS 3.0	1900	5000	100	30	3.0	12	ER304.1.2	Plane	P
GS 3.0	1700	5000	100	30	3.0	12	ER304.1.2	Inter	W
GS 3.0	1900	5000	100	30	3.0	12	ER304.1.2	Exter	85%P

四. aluminium alloy

Mat and thick (mm)	Laser power (W)	Laser freq (HZ)	Duty cycle (%)	Wobble freq (HZ)	Wobble length (mm)	Feeding speed (mm/s)	Type	Angle	form
AA 1.0	600	5000	100	60	2	15	ER5356.0.8	Plane	DS
AA 1.0	500	5000	100	60	2	15	ER5356.0.8	Inter	SW
AA 1.0	550	5000	100	60	2	15	ER5356.0.8	Exter	75%P
AA 1.5	750	5000	100	60	2.5	15	ER5356.0.8	Plane	DS
AA 1.5	650	5000	100	60	2.5	15	ER5356.0.8	Inter	SW
AA 1.5	700	5000	100	60	2.5	15	ER5356.0.8	Exter	75%P
AA 2.0	1050	5000	100	60	2.5	15	ER5356.1.0	Plane	DS
AA 2.0	900	5000	100	60	2.5	15	ER5356.1.0	Inter	SW
AA 2.0	950	5000	100	60	2.5	15	ER5356.1.0	Exter	85%P
AA 2.5	1260	5000	100	60	2.5	15	ER5356.1.0	Plane	DS
AA 2.5	1000	5000	100	60	2.5	15	ER5356.1.0	Inter	SW
AA 2.5	1100	5000	100	60	2.5	15	ER5356.1.0	Exter	80%P
AA 3.0	1300	5000	100	60	3.0	15	ER5356.1.2	Plane	DS
AA 3.0	1050	5000	100	60	3.0	15	ER5356.1.2	Inter	SW
AA 3.0	1200	5000	100	60	3.0	15	ER5356.1.2	Exter	80%P

P: Penetration W:WHITE 75%P:75% Penetration C: colour Y: Yellowish DS: Double sided SW : silvery white

6. —

Matters needing attention

- When the allowable capacity of the equipment is reached after injecting the condensate, check the inlet and outlet pipes inside the host and on the welding gun after operation to see if there is water leakage
- Gas for cutting, welding and cleaning: dry compressed air, argon and nitrogen after oil-water separation
- Cutting: 0.8–1.0 Mpa air pressure
- (Cleaning) Welding: 0.2–0.3 Mpa air pressure
- The power cord has been labeled, and LN is connected to the power supply and PE is connected to the ground wire