# Handheld Laser Rust Removal Welding and Cutting 3-in-1 User Manual

**dp-chq1000/1500/2000-sc-w-cx/rk/kpl**


DP-CHQ1000/1500/2000/-SC-W-CX/RK/KPL palm type laser welding and cutting three in one series

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## I: Safety precautions

### 1.1 Safety indication mark

According to Chinese national standard GB7147.1-2001 (IEC60825-1:1993) for the classification of laser products


This product belongs to the four types of laser products, can produce diffuse reflection, may cause personal injury or fire, in the use of

Before using the machine, please read the safety precautions carefully to ensure that you can operate the machine correctly and safely.

# DANGER

**不可觸摸機箱內部。**
機器供市電200V/380V，機箱內有高壓，開機狀態下不可觸摸機器內部。

**不准私自拆卸、安装、改装焊接机。**
以上行为可能引起触电或起火，禁止任何操作手册规定以外的行为。

**不要窺視或触摸激光。**
窺视和让激光直射皮肤是高度危险的。激光直射入眼睛可能导致失明。

**請佩戴防護眼鏡。**
使用焊接機前確保佩戴防護眼鏡。即使佩戴了防護眼鏡，若鐳射直射眼鏡仍可導致失明。


**禁止鐳射直射皮膚。**
直射可導致皮膚嚴重燒傷。


**不要觸摸正在焊接或者剛焊接完的工件。**
工件在上述情況下很燙。

**禁止用戶更改產品功能設計結構。**

出於機器操作安全和使用壽命考慮，用戶禁止自行更改本產品的各項功能、結構設計和選用的材料，若必須要更改，請聯繫我們公司。

**若機器出現非正常情況，請立即關機停止使用。**

若機器出現燒焦、怪叫、過熱或冒煙等事故，請立即關機停止使用，否則可能觸電或引起火災。若出現上述情況，請立即聯繫我們公司。

**戴心臟起捕器的人嚴禁靠近焊接機。**

沒有醫生的許可，戴心臟起搏器的人嚴禁靠近工作狀太的焊接機或在焊接機周圍活動。焊接機工作的時候會產生磁場，可能影響到起搏器的正常工作而危害患者的生命。

**1.2 Precautions for use in the field**

1.2.1 Configure the person responsible for

It is required to have personnel with laser and welding related knowledge and experience. And when handing over other personnel to operate, they must be trained to operate safely. To do safety first!

1.2.2 Set up a special laser cleaning and rust removal area and carry out labeling

Protective fences and other devices can be used to distinguish from other areas, and set up signs such as "No Idle Persons Allowed"

1.2.3 The machine must be used in an environment where the ambient temperature is 5-30 degrees and the humidity is not more than 85%.

1.2.4 Strictly prohibit paint thinners from rubbing the surface of the equipment

1.2.5 Strictly prohibit sharp objects from touching the display to avoid permanent damage to it.

1.2.6 The air used for blowing must be pure, free of water and other impurities. (Air compressor needs to be equipped with a dryer) to avoid damage to the lens

1.2.7 In the process of use, it is best to place a large fan in the direction of the cleaning of the light to clean the foreign objects blow away to prevent foreign objects into the scanning lens

Inside, causing damage to the lens

1.2.8 In use, try to control the cleaning in the downward 70 to avoid slag or dust falling into the lens, resulting in lens burns

1.2.9 When replacing the lens, be careful not to run water or debris or dust onto the lens to avoid damage.

1.2.10.1 The fiber optic cable is strictly forbidden to be stepped on and folded, so as not to break the fiber optic cable, and the personnel are strictly forbidden to enter the area around the laser operation.

To avoid unnecessary harm.

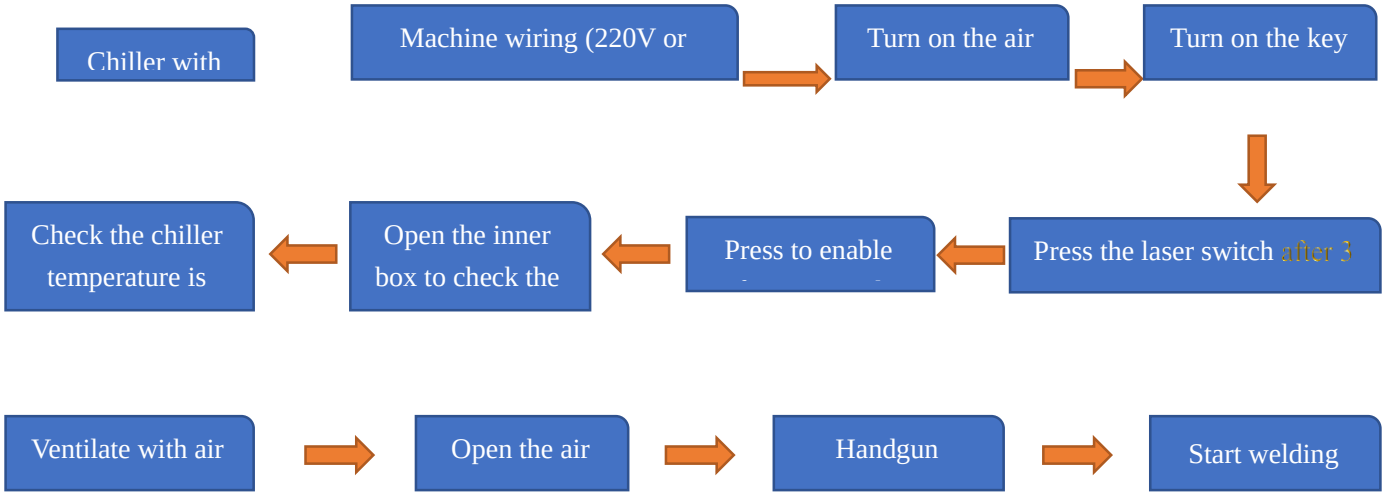
1.2.10.2 If there is any problem with the equipment, please scan the QR code and give us the relevant information. Our after-sales staff will follow up and deal with the problem in time, 2 hours to respond, and usually deal with it remotely, if the problem cannot be solved remotely, our after-sales engineers will come to the site to solve it.

## 2: Machine specifications

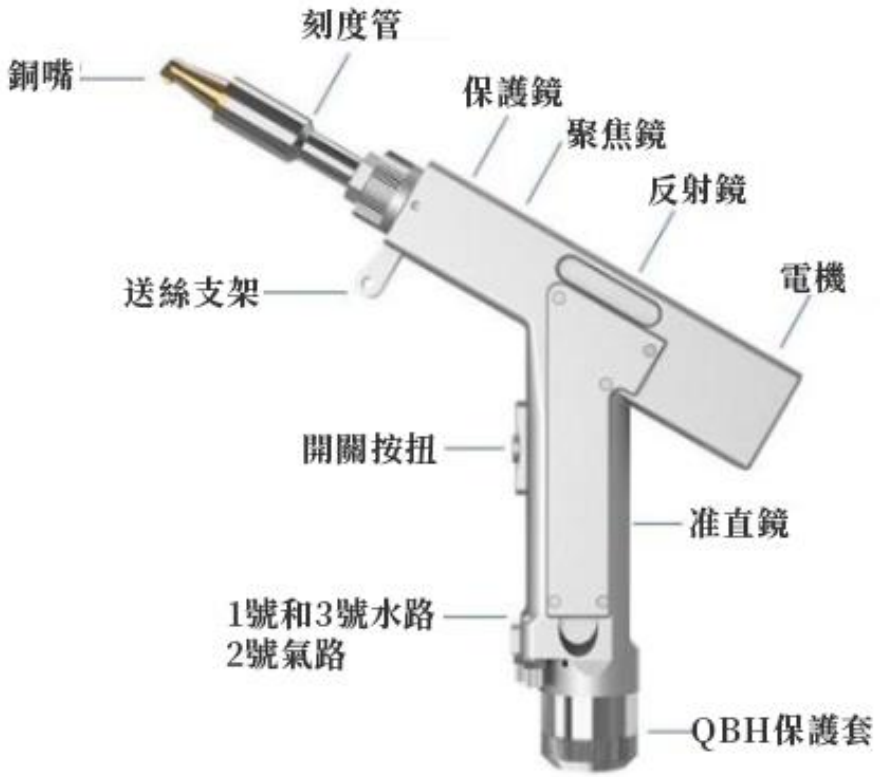
### 2.1 Overview of Equipment Principles

The light from the laser is transmitted from the optical fiber to the handheld laser cleaning gun and the laser is transmitted to the surface of the carrier for melting and vibrating effect using the high frequency laser to impact the surface of the cleaned material, the beam rotates into sound waves and returns from the lower surface, interfering with the incident waves, thus resonating and breaking the pollutant; the thermal expansion effect uses the substrate and the surface pollutant to absorb laser energy of a certain wavelength. The thermal expansion effect makes use of the difference between the substrate and the surface pollutant for a certain wavelength of laser energy absorption coefficient, so that the pollutant absorbs the laser energy and thermal expansion instantaneously, forming a great acceleration of detachment, overcoming the adsorption force of the substrate on the pollutant and shedding; molecular photolysis and phase change can make the pollutant molecule vaporize instantly, decompose and evaporate. (Chiller water flow to the laser and handheld cleaning head for temperature cooling constant temperature, thus playing a role in protecting important components.)
Note: The picture size appearance will vary according to the company's equipment update.


## 2.2 Equipment start-up




**Schematic diagram of welding gun function**




## Rust gun operating environment and parameters

**Option 1.**

**This 3-in-1 system provides the following matching options according to the different application requirements of customers.**

**Solution 1: Handheld laser welding head (SUP20T) + 3-in-1 system control box + display screen.**

**This is a combination of welding, cleaning and cutting directly with a handheld laser welding head (SUP20T). The advantage of this solution is its affordability and ease of use.**

**The disadvantage is that the light output is limited and the scanning width is small.**

**As shown in Table 1.1, the operating environment requirements and main functions of the handheld laser welding head (SUP20T) are as follows.**

**Table 1.1 Scheme 1 operating environment requirements and main parameters**

| | |
|---|---|
| Supply voltage (V) | 220V±10% AC 50/60Hz |
| Placement Environment | Smooth, vibration and shock free |
| Operating ambient temperature (℃) | 10~40 |
| Operating ambient temperature (%) | <70 |

| | |
|---|---|
| Cooling method | Water cooling |
| Applicable wavelength | 1064nm(±10mm) |
| Applicable Power | ≤2000W |
| Quasi-straight | D20*5/F60 |
| Spotlight | D20*4.5/F150 |
| Reflection | 30*14 T2 |
| Protective Mirror Specifications | 18*2 |
| Maximum support air pressure | 10Bar |
| Focal point vertical adjustment range | ±10mm |
| Spot adjustment range (handheld welding mode) | 0~6mm |
| Spot adjustment range (cleaning mode) | 0~20mm |
| Weight | 0.8kg |

**Option 2: Replacement of aggregation mirror F400**

**This solution is: directly use the handheld laser welding head (SUP20T) to achieve welding, cleaning, cutting, but when used for cleaning, the SUP20T comes with the F150 focus lens more**

**The F400 focus lens was replaced. The advantage of this solution is that it is more economical and convenient, and the scanning width can reach 50mm when cleaning, which is more efficient than the first solution.**

**The operating environment requirements and main parameters of this scheme are shown in Table 1.2.**

**Table 1.2 Operating environment requirements and main parameters of Scheme 2**

| | |
|---|---|
| Supply voltage (V) | 220V±10% AC 50/60HZ |
| Placement Environment | Smooth, vibration and shock free |
| Operating ambient temperature (℃) | 10~40 |
| Operating ambient temperature (%) | <70 |
| Cooling method | Water cooling |
| Applicable wavelength | 1064nm(±10nm) |
| Applicable Power | ≤2000W |
| Quasi-straight | D20*5/F60 |
| Focusing (handheld welding mode) | D20*4.5/f150 |
| Spotlight (cleaning mode) | D20*4.5/F400 |
| Reflection | 30*14 T2 |
| Protective Mirror Specifications | 18*2 |
| Maximum support air pressure | 10Bar |
| Focal point vertical adjustment range | ±10mm |
| Spot adjustment range (handheld welding mode) | 0~6mm |
| Spot adjustment range (cleaning mode) | 0~50mm |
| Weight | 0.8kg |

**(1) Connecting and energizing.**

Power line access to 220 or 380V power supply. 220V three wires, 380V five wires, pay attention to zero / fire / wire ground do not connect the wrong oh

**2) Turn on the air switch**

**3) Turn on the emergency stop and key switch.**

After the welding machine is powered on, the cooling fan and chiller will run automatically and the operation panel will show the power-on status.

(not running then check if the emergency stop and key switch is open)

If the chiller is not filled with water, it will report an alarm, fill the chiller with distilled water to the **green normal area.**

If the alarm is still on, please run the chiller again and make sure the working area on the display of the chiller is running.

**4) Turn on the laser button after 3 minutes.**

Note that you must wait for the chiller to run normally (22-26 degrees), wait for the chiller to control the water temperature at the set temperature, and wait for more than 3S

There will be a "drop" sound inside the device, then you can open the enable button, otherwise it is ineffective.

Laser indicator light: ALARM green ACTIVE red POWER green, only normal.

**5) Gas access.**

Filtered, dry air (free of impurities and water) must be injected before using the fiber optic handheld welding machine, with a protective air interface (PM8) at the end of the device

Adjust the gas level according to the welded product (not less than 0.15MPa).

**6) Panel parameter setting and adjustment: adjust the red light focal length**

7) Adjust the process parameters in the operating system of the equipment, click on the gas button to adjust the gas size, after the adjustment, open the light gate.

8) Please note: When using for the first time, when the red light is not visible, be sure not to light

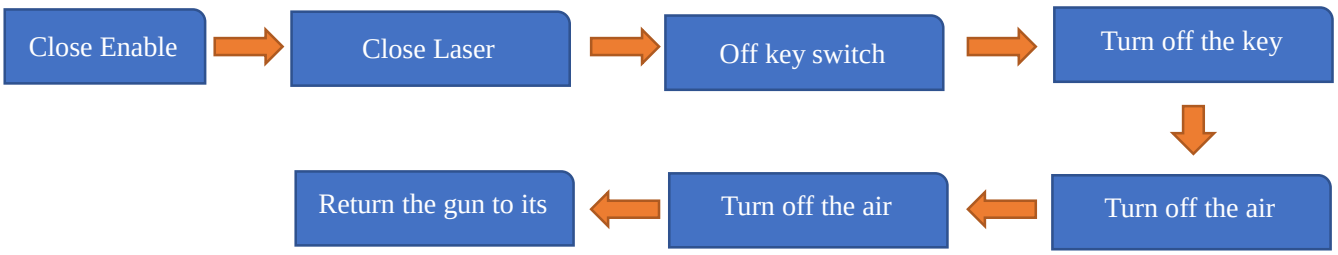
When replacing the protective mirror, please ensure that it is well protected.

Ensure reliable grounding before supplying power.

The laser output head is connected to the welding head, please check the laser output head carefully to prevent dust or other contamination, and use special lens paper when cleaning the laser output head.

## 2.3 Equipment shutdown

The reverse order of the boot sequence, first off the enable, then off the laser, then off the key, and finally off the air switch and off the air pressure. (Each off a stop 3 seconds before closing the next)




## 2.4 Operation panel.

1 ) Craft library: The system can be used according to customer requirements for different materials or thicknesses, and customers can save the best tuning results for crafting.

2 ) Laser power %: according to the power size can choose the appropriate power percentage, such as 1000W, choose 50%, that is, 500W power cleaning

3）Pendulum style: can be adjusted according to customer requirements, choose the appropriate effect of customer needs for more equipment, the company provides video operation to your company.

**Three-in-one system control**

Panel version number 532, you can check the system version through the monitoring page, the last three digits indicate the control panel version.

**I. Welding mode**

**（1）Home**

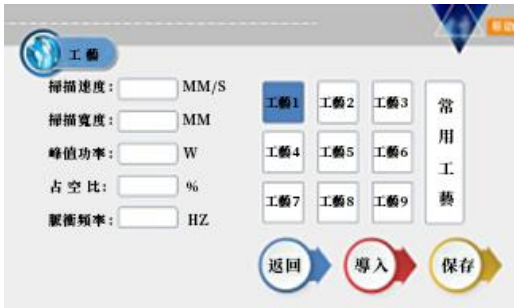

①This interface allows you to see the current process parameters (process cannot be modified on this page) and real-time alarm information.

②Enable default is ON when power on, red light default is LINE, and welding mode is connected. When turn off the enable, will not send the enable signal to the laser, can be used to test the air out function. Turn off the red light indication, the motor stops swinging, the red light is a point, used to adjust the center position. Welding mode is divided into continuous and spot welding, when you choose the spot welding, you need to set the type of spot welding in the setting page.

Safety ground lock is divided into gray and green, when the signal interface 1 pin 5, 6 short, the display is green, then you can control the signal pin "weld head light switch 1, 2" to make it out of light.

The orange button in the upper right corner is the switch button, click it to switch to the cleaning mode selection interface.

**（二）Craft Page**




Scanning speed range: 2~6000mm/s;

Peak power range: 1W~xW, x is the laser power of the setting page;

Duty cycle range: 0~100%, default setting 100%, usually do not need to change;

Pulse frequency range: 5~100000Hz, 5~5000Hz recommended;

**Caution.**

The craft interface contains the craft parameters for debugging, and a total of 10 crafts can be saved in this version.

The parameters of the craft page can be modified by clicking on the input box, clicking OK after the modification, and then saving.

When the peak power of the craft page is less than 10% of the maximum power of the set page laser, all output signals are normal, but no light may be emitted.

The dot-to-air ratio is 100% by default and usually does not need to be changed, as the pulse frequency does not work at this point. If you need to use, please adjust according to the actual demand. The peak power is 300W, the duty cycle is 50%, the pulse frequency is 1000Hz, and the light cycle is 1ms, 0.5ms at 300W, 0.5ms at no light, and the cycle is repeated, at which time the air bursts at the welding area and produces a strange noise as a normal phenomenon. The actual situation is based on the parameters of the laser.

Click the "Help" button at the top right of the screen to get more explanations of the parameters.

For more reference crafts, you can view the crafts in the WeChat applet.

(3) Set page

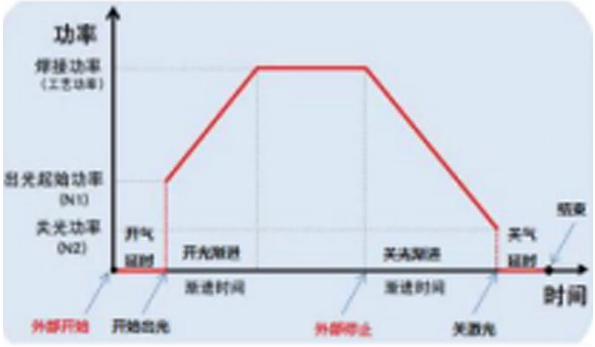

Home Click "Settings" and enter the password 123456 in the password input page of the pop-up window to enter the settings page.

The power of the laser is the maximum power of the laser manufacturer, please fill in correctly.

On-off delay time default 200ms, range 0ms~3000ms.

Example: Set the opening delay time to 1000ms, closing delay time to 500ms. the actual effect is, press the board, the air will continue for 1000ms before the light. Release the board, the laser stops the light after 500ms and then stop the air. Reasonable setting of the on/off delay time can well protect the melt pool from oxidation and prevent the return of slag damage to the lens.

When opening the light from the process power of N1 percent, gradually to 100%; when turning off the gas from the process power of 100%, gradually to N2; (as shown in the figure below).



General default switch light power 20%, switch light progressive time 200ms;

The wire feed delay compensation is the advance time of the wire feed relative to the light output signal, which can be used with the pull-back function and is not set by default;

The maximum temperature alarm valve value is 65℃, when the value is set to 0, the temperature alarm is not detected;

Scan correction factor = target line width/measurement line width, range 0.01~4. Generally set to 1;

Laser center offset -3~3mm, decrease to the left, increase to the right, apply to adjust the red light center of the axis;

The alarm level signal of pneumatic/water cooler/laser is considered as low level by default, when using this alarm signal, it is necessary to set the alarm level of this place and the alarm level of external equipment as the same;

The spot welding duration is the light out time in each cycle of the spot welding mode, and the spot welding interval is the light out time in each cycle of the spot welding mode;

Click the "Language" box in the lower right corner to switch the interface language, the current version supports Chinese, English, Korean and Russian. Click the "Help" button at the top right to get more information about the parameters.

Figure 3.1.5 Monitoring page

This page shows the status of each signal and the device information. Please note that this monitoring interface is only displayed if the setting interface is in Chinese, otherwise it is the monitoring page of other versions.

①Input signal status

Laser trigger signal: press the handheld welding trigger, the signal interface 1 pin 7, 8 on, this state from gray to green effective.

Safety ground lock signal: When the safety ground clamp is on the workpiece and the brass nozzle of the snatcher touches the workpiece, the status changes from gray to green and takes effect.

Laser/water cooler/air pressure alarm signal: Monitor the real-time level status of these interface inputs.

Figure 3.1.6 Monitoring Page - Input Signal Status Bar

② Output signal status

When the signal is output, the signal in this area changes immediately and can be visualized. The monitoring signal is a real-time detection circuit signal that fluctuates in a certain range and has an error of less than 0.3V from the final output signal.


Figure 3.1.7 Monitoring Page - Output Signal Status Bar

③Equipment Basic Information

Device authorization: The device can be authorized for the duration of use. When the device is used for more than the set time, the authorization will be terminated. The factory default authorization is valid for a long time, please contact us for encryption.

System version: three groups of numbers, the first group is the hardware version, the second group is the program version of the microcontroller, and the third group is the touch screen version.

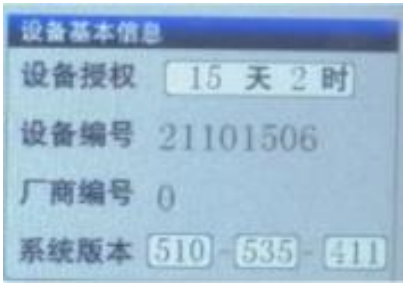



Figure 3.1.8 Monitoring page - set the basic information column

④ Power Status

The actual supply voltage and current of the device are displayed.

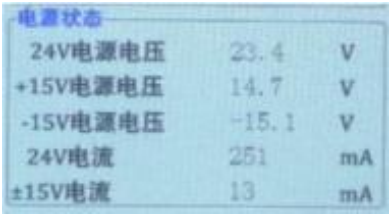



Figure 3.1.9 Monitoring Page - Power Status Bar

⑤ Communication Status

The communication between the touch screen and the motherboard is displayed. If there is no synchronization, check the screen connection cable.


Figure 3.1.10 Monitoring Page - Communication Status Bar

Diagnosis

Click the "Diagnostic" button on the monitoring interface to enter the diagnostic interface. At this time, there will be no light, used to measure whether the actual output of each signal port, usually the output value and the detection value are consistent. When inconsistent, the load is abnormal, such as when the laser does not light, by switching the single port with the use of laser monitoring software or multimeter measurement, can be a true response to whether the signal issued.

Figure 3.1.11 Diagnostic page

Figure 3.1.12 Diagnostic page usage effect

## 二，Mode Switching


Figure 3.2.1 Welding Home Page Figure 3.2.2 Switching Pages

Click the toggle button on the solder joint home page to enter the transition page. Click "Continue" and follow the system prompt to power off and restart to switch to cleaning mode.


Figure 3.2.3 Prompt page Figure 3.2.4 Cleaning page

The same method can be used to switch from cleaning mode back to soldering mode.

Three, cleaning mode

(1) Home page

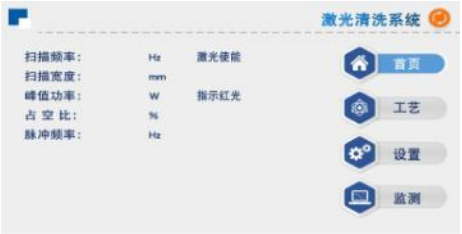



Figure 3.3.1 Cleaning mode home page

①This interface allows you to see the current process parameters (process cannot be modified on this page) and real-time alarm information.

When turn on, the enable signal will not be sent to the laser, so it can be used to test the outgoing air function. Turn off the red light indication, the motor stops oscillating, the red light is a dot at this time, used to adjust the center position.

③This mode no longer detects the safety ground lock signal, so there is no need to modify the wiring after switching modes.

④ The orange button in the upper right corner is the switch button, click it to switch to the welding mode interface.

**（2）Craft Page**


Scan frequency range: 0~100Hz;

Scanning width range: 0~20mm/50mm/150mm, the maximum width is selected according to the gun body and focus lens model. See the model selection page for details.

Peak power range: 1W~xW, x is the setting page set laser power;

Duty cycle range: 0~100%, default setting 100%, usually do not need to change;

Pulse frequency range: 5~10000Hz, 5~5000Hz recommended;

Caution.

①The process interface contains the process parameters for debugging, and this version can save a total of 3 processes.

②2 × scan frequency × scan width = actual scan speed. Maintaining the same scanning frequency ensures a relatively uniform scanning trajectory for different scanning widths.

Click the input box to modify the parameters on the process page, click OK after modification, and then save.

④ Some lasers cannot output light at less than 10% power when the peak power of the craft page is less than 10% of the maximum power of the laser setting the page. All output signals are normal, but the light may not come out.

⑤ The duty cycle is 100% by default, and it is usually not necessary to change it, as the frequency of fat shocks does not work at this time. If you need to use it, please adjust it according to the actual demand. Example: Peak power 300W, duty cycle 50%, duty cycle 50%, pulse frequency 1000Hz.

At this time the light cycle is 1ms, 0.5ms to 300W light, 0.5ms no light, cycle and repeat, at this time the air burst at the welding place, produce strange sound for the normal phenomenon, the actual situation to the parameters of the laser is accurate.

(6) Click the "Help" button at the top right of the screen to get more explanations about the parameters.

(7) For more reference crafts, you can check the crafts in the WeChat applet.

**（3）Set Page**


First click "Settings", in the pop-up window of the password input page to enter the password 123456, you can enter the settings page, cleaning mode settings page compared to the welding mode deleted some of the parameters not useful for cleaning, adding the "gun head model" and The setting page of cleaning mode has deleted some parameters that are not used for cleaning, and added "head model" and "trigger setting" two parameters that are dedicated to cleaning.

①The laser power is the maximum power that the laser manufacturer has specified, please fill in correctly;

②Switch gas delay time default 200ms, range 0ms~3000ms;

③ Scan correction default is 1, range 0.1~4. "Scan correction" × "Scan width" of the process page = actual scan width at the focal point (±3mm);

④The laser center offset is 0mm by default, range -75mm~+75mm, decrease to the left, increase to the right, applied to adjust the red center of the axis;

⑤ The temperature alarm valve value is 65℃ by default, and the alarm is invalid when set to 0℃.

(6) Trigger setting: Press the trigger twice in a row when you choose to double-click to prevent inadvertent touch. When you choose single click, press the trigger once to emit light.

(7) The alarm level signal of air pressure/water cooler/laser is regarded as low level, when using this alarm signal, it is necessary to set the alarm level here and the alarm level of external equipment to be the same;

Click on the orange area to enter the model selection page, and select the corresponding scanning width according to the specific model. If the width does not match the model, it may cause the laser to hit the inside of the gun and damage the product.

（4）**Scan width selection page**

①"SUP20S-150mm focal length-20mm width" corresponds to the factory default configuration of the 20S model handheld welding gun. When this model is selected, the maximum cleaning width of 20mm can be used by simply removing the front end of the gun and the related firmware.

② "SUP20S-400mm focal length and 50mm width" is an extended configuration for the 20S model handheld torch. When you select this model, you need to remove the front system tube and replace the focus lens with the D20-F400 lens. The maximum cleaning width is 50mm at this time.

③ "SUP20C-400mm focal length-150mm width" corresponds to 20C model cleaning gun standard, need to replace the whole gun body to 20C cleaning gun. At this time, the control box and screen do not need to be replaced, the maximum cleaning width of 150mm.


Figure 3.3.4 Purging system selection page

（5）Cleaning the monitoring page


Figure 3.3.5 Cleaning system monitoring page

This page shows the status of each signal and the device information. Please note that this monitoring interface is only displayed if the setting interface is in Chinese, otherwise it is the monitoring page of other versions.

①Input signal status

Laser trigger signal: press the handheld welding trigger, the signal interface 1, pin 7, 8 on, this state from gray to green effective.

Security ground lock signal: Purge mode This signal is useless.

Laser/water cooler/air pressure alarm signal: Monitor the real-time level status of these interface inputs.

Figure 3.3.6 Monitoring Page - Input Signal Status Bar

② Output signal status

When the signal is output, the signal in this area changes immediately and can be visualized. The monitoring signal is a real-time detection circuit signal that fluctuates in a certain range with an error of less than 0.3 V. Compared to the soldering mode, the cleaning mode does not output a wire feed signal.


Figure 3.3.7 Monitoring Page - Output Signal Status Bar

③Equipment Basic Information

Equipment authorization: The equipment can be authorized to use the length of time, when the equipment exceeds its set time, the authorization will be displayed to terminate, the factory default authorization is valid for a long period of time, if you need to encrypt and decrypt, please contact our company to ask.

System version: three groups of numbers, the first group is the hardware version, the second group is the program version of the microcontroller, and the third group is the touch screen version.

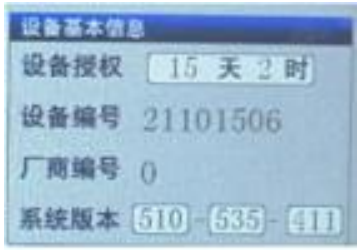



Figure 3.3.8 Monitoring page - set the basic information column

④ Power Status

The device's real-time supply voltage and current are displayed.


Figure 3.3.9 Monitoring Page - Power Status Bar

⑤ Communication Status

The communication between the touch screen and the motherboard is displayed. If there is no synchronization, check the screen connection cable.

Figure 3.3.10 Monitoring Page - Communication Status Bar

Diagnosis

Click the "Diagnostic" button to enter the diagnostic interface. At this time, there will be no light, used to measure whether the actual output of each signal port, usually the output value and the detection value are consistent. When inconsistent, the load is abnormal, such as when the laser does not light, by switching the single port with the use of laser cry monitoring software or multimeter measurement, can be a true response to whether the signal issued.


Figure 3.3.11 Purging the touch screen diagnostic page

## 四、Cutting function

This system does not have a professional cutting mode. Due to the actual power of the laser, the welding mode can be used for thin board cutting. When you need to use the cutting function, please change the cutting brass nozzle and set the scanning width to 0mm.

## 4. Maintenance

Maintenance and replacement of protective lenses.

Before operation, clean your hands and dry them, then wipe them again with alcohol on cotton.

Remove the screw of the protective lens cover in a relatively dust-free place, pull out the protective lens holder, make a good protection (cover with paper), check the protective lens, and if there are obvious burning spots on the surface of the protective lens, you should replace it directly.

③ Then check the white accumulator seal under the protective lens. (If there is any scratch or deformation of the accumulator seal, it cannot be used and must be replaced immediately.)

④Wipe the inside of the compartment and the lid with a cotton ball dipped in alcohol, quickly insert the protective lens holder into the protective lens compartment and tighten the screw.

## 5. Common Exception Handling

5.1 Indication of laser/water cooler/air pressure alarm

①If the alarm signal is not used, please change the alarm level on the screen setting page.

② If the alarm signal is used, check whether the alarm or alarm signal of the corresponding equipment is set at the wrong high or low level.

5.2 Screen does not light up/no response when clicked

① screen does not light up, ensure that the controller has been energized, check whether the four-core wire between the controller and the screen is wired correctly, and whether the 24V voltage at pin 1 and pin 4 is normal.

②If the click does not work in normal use, check whether the machine is too high temperature.

③ click can not be input, check whether the controller and the screen four-core wire is wired correctly. Pin 2 and pin 3 is normal, see 2.1.2 controller display screen end.

④No response on the newly installed device may be due to system version mismatch, use SD card to re-flash the program.

5.3 No light

①Check whether there is a warning prompt on the home page and whether the laser enable is ON;

Check whether the trigger signal and safety ground lock signal on the monitoring page are green when welding;

③Check the PWM, laser enable and analog output of the monitoring page when soldering to make sure they are normal.

If all the above states are normal, the laser is faulty or the laser is wired incorrectly. If neither the air nor the wire is fed, it is possible that the input signal is missing, see: 2.13 Controller Signal Interface1.

5.4 Sudden stoppage of light during processing

Check the monitoring interface security ground lock and other alarms are normal.

Usually power applications in 70%, such as 1000W of power, it is recommended that the best open 700W or within 70%, special circumstances 80% or better is not recommended for long-term use.

Oscillation frequency can be understood as the number of times the light comes out in a unit of time, the same power conditions, the greater the frequency relatively speaking, the smaller the amount of single light, and the more times the light flashes.

The scanning width is between 1000-2000 oscillating diameters. It can be adjusted by yourself, but the maximum width is not recommended for long-term equipment.

Oscillating pattern, customer can adjust according to their own product requirements

## 3：Repair and maintenance

Note: Before maintaining the machine, please disconnect the laser power and chiller power.

### 4.1 Welding head

Maintenance and replacement methods for protective lenses.

① Before operation, wash your hands dry with detergent and wipe your hands dry again with a cotton sticky with alcohol.

② Remove the protective mirror bin cover screws in a relatively dust-free place, pull out the protective mirror holder, protect it well (cover it with American paper), and check the protective lens (if there are obvious burn spots on the surface of the protective lens, it should be replaced directly.)

③ Then check the white accumulator seal under the protective lens. (If the accumulator seal is scratched or deformed in any way, it cannot be used and must be replaced immediately.

④ Wipe the inside of the compartment opening and cover with a cotton ball dipped in alcohol, quickly insert the protective mirror holder into the protective mirror compartment and lock the screw.

## 4.2 Chiller

(1) The chiller liquid level must be in the green area of the tank level indication mark.

(2) After the first filling or renewal of water, the air in the pump should be exhausted.

Operation method: slowly loosen the air vent plug below the water inlet. When there is water flowing out, then tighten it. It is recommended to change the water once a quarter (1 month).

(3) Winter frost protection

A. When the new equipment is transported or not used for a long time, the water in the tank should be drained through the sewage

B. If the ambient temperature is lower than 2℃ at night, customers are recommended not to stop/add antifreeze to the car.

C. When the average daily temperature is higher than 5℃, replace the water containing antifreeze with purified water.

(4) summer dust prevention: summer about a month to chillers cold suspect filter to clean.

(5) fault code: the product label has a fault code, can be viewed

Before using the equipment, please check if the protective gas is turned on, wear protective glasses when using the equipment, the muzzle of the gun is forbidden to aim at human beings or animals, and please turn off the energy when you leave temporarily.

1. Continuous interruption of power supply will cause damage to the welding control system, please provide continuous and reliable power supply

2. The external safety lock is 24V high level, please do not short-circuit with the system set of aviation plug GND casing or do not pay attention to collide with each other when installing, otherwise short-circuit may burn the power supply or the main control board, the gun aviation plug should be wrapped with insulating tape after docking the insulating place

3. The control circuit should pay attention to the 24V input and 15V input must be supplied to the welding system at the same time, otherwise it may lead to signal transmission error.

4. When installing the QBH, pay attention to the cleanliness of the surrounding environment, turn off the fan, no flying dust, the QBH must be wiped clean before inserting the gun body, otherwise it will burn the collimator lens!

## 4.3 Common Problems and Solutions

**(1) Laser head status is not displayed**

Check whether the X.Y motor cable is loose, the 15V power input is interrupted or the motor is damaged.

**(2) Gas cannot be controlled**

The touch screen gas button is not closed, the gas delay is set too high, or the positive and negative terminals of the valve are reversed.

**(3) Easy to burn the protective lens**

The gas is not pure (with water impurities more) or no air pressure, broken seals, focus position, water circuit damage and other factors

**(4) Cleaning head overheating**

It is caused by the burned lens or the non-conductivity of the water circuit of the chiller loop or the oversized fiber diameter of the laser.

(5) Rust removal head and system problem solving

5.1. Prompt laser/water cooler/air pressure alarm

① If the above alarm occurs without using the alarm signal, please change the alarm level.

② If the alarm signal is used and the above alarm occurs, check whether the alarm or alarm signal high or low level of the corresponding device is set incorrectly.

5.2. The screen does not light up / click no response

①The screen is not lit, if the controller is energized (the fan is spinning), check whether the four-core wire between the controller and the screen is wired correctly, and whether the 24V voltage of the first pin and the fourth pin is normal.

②If the click does not work in normal use, check whether the whole machine is too high temperature caused.

③ Click can not be input, check whether the controller and the screen of the four-core wire is wired correctly, the second pin and the third pin is normal, see 2.1.2 controller LCD end

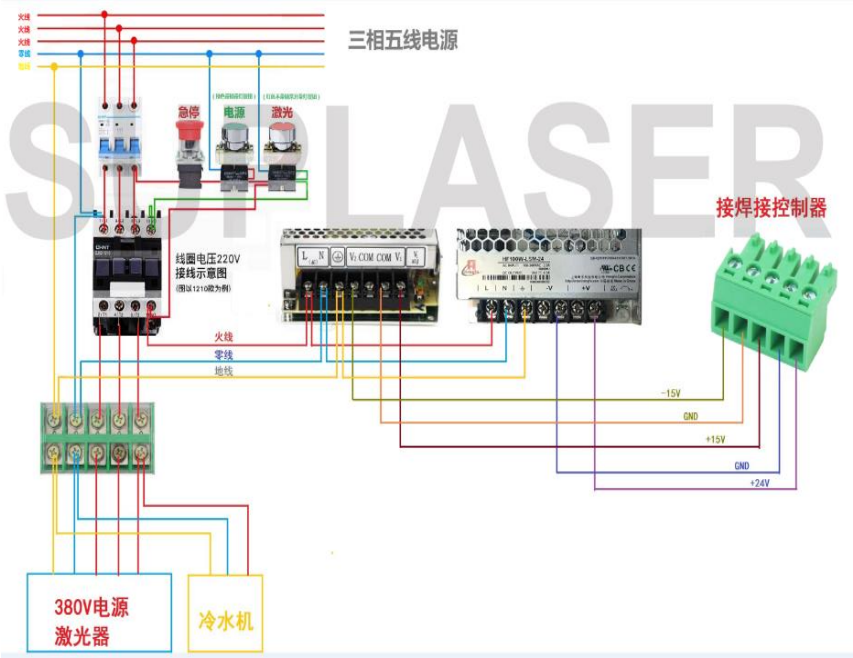
④Newly installed devices with no response may be the system version does not match, re-brush the program can be, SD card, please ask our company

5.3. Suddenly stop the light when processing

Monitoring interface to check whether the trigger button and other alarms are normal

Reference of three-phase power supply wiring for laser welding machine

Note: Two-phase or three-phase power depends on the power supply required by the laser and chiller, not the beam volume.




## Four: Electrical safety and warranty matters

### 4.1 Electrical Safety

( 1 ) Only formally trained personnel with professional knowledge are allowed to perform electrical repairs and troubleshooting
( 2 ) Before starting, please read the manual and familiarize yourself with the safety operation procedures.
( 3 ) Before troubleshooting, the power must be disconnected
( 4 ) Pay attention to whether there is water or moisture on the ground to prevent electric shock
( 5 ) Check whether the ground wire is safely grounded
( 6 ) Do not modify the circuit or disassemble the electrical components unless authorized by our professional staff.
( 7 ) Do not point your handgun at people or animals, or at flammable or explosive materials.

### 4.2 Warranty

( 1 ) Without our permission, private changes to the appearance, structure, electrical wiring or disassembly of core components such as laser optical components are not covered by the company's warranty, and we will not assume any responsibility for indirect losses caused by this.
( 2 ) Human damage caused by non-compliance will not be covered by the warranty
( 3 ) The double swing welding head optical lens are consumables (collimation, focus, protection lens) if damaged, no warranty, the company promises to repair wearable parts of the product please send back
( 4 ) Handheld laser welding gun has built-in available parts, all repairs should be carried out by our professionals, please do not damage the label and uncover the cap of the welding gun, otherwise any damage to the product will not be guaranteed by our company

### 4.3 Pre-sales, in-sales and after-sales services

(1) Pre-Sales Service

Before signing the contract, the company can provide customers with free product samples and technical and price consultation answers.

(2) In-Sales Service

If any technical problems arise during the installation process, you can contact your local regional manager or after-sales technician at any time, and if you need on-site technical support, you can communicate with your local sales manager to be coordinated by our company.

(3)After Sales Service

Response time for customer service within 24 hours, within the warranty period of the contract

We provide efficient technical service support for free during the warranty period and still provide software and hardware support after the warranty period expires, and enjoy free software system upgrades for life.

**Statement.**

The copyright of this document belongs to Shenzhen Dapeng Laser Technology Co. Without our permission, no organization or individual may use, copy, modify or transmit part or all of the contents without our permission. We are not responsible for any direct or indirect losses caused by reference to this article.

Before using our equipment, you must read the safety precautions carefully and be trained by our staff before operating.

This instruction manual is subject to change without notice.

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