

User Manual



Hand-held Fiber Laser Cleaning Machine LUX Series

LUX-3000C

MEGMEET

LUX-3000C Hand-held Fiber Laser Cleaning Machine

User Manual

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Megmeet Welding Technology Co., Ltd. provide customers with a comprehensive technical support. Users can contact with local distributors or Megmeet headquarters.

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Safety Precautions

Safety Definition

In order to use the hand-held laser cleaning machine safely and correctly, and prevent harm to you or others and property damage, this manual adopts various warning signs for instructions. Please follow strictly after full understanding.



CAUTION Please operate as required, otherwise it may result in death or serious injury.



DANGER Please operate as required, there is a risk of moderate injury, minor accidents or damage to objects in the event of misuse.



WARNING LASER This sign represents laser radiation. Please do a good job in laser protection.

Laser Precautions



WARNING LASER

- This series of laser cleaning machine output 1080 ± 10 nm wave band of laser;
- The output laser power density is large, resulting in the local high temperature to the irradiation site. Improper use may cause fire or personal injury;
- During laser cleaning, part of the laser energy is reflected, resulting in the damage to the reflection area and human eyes;
- Laser light on skin can cause burning, erythema, blister, pigmentation, and even completely destroy the subcutaneous tissue;
- When operating laser cleaning machine, select laser safety glasses according to laser wavelength output of laser machine, and ensure that the operator always wears them;
- The higher the optical density value of laser protective goggles, the better the laser protection;
- It is forbidden to look straight at the cleaning head or align at others with the tip of cleaning torch. Wear qualified and safe laser protective glasses before laser operations;
- The visible light transmittance of laser protective glasses is less than 20%, so they must be used in the environment with good lighting;
- The safety ground lock knob must be closed after the laser work is completed to prevent non-professionals from misuse and causing safety accidents.
- Set up a laser operation room, light barrier screen and curtain in the safety working area;
- Relevant operators shall be trained and assessed, familiar with and grasp conventional safety specifications of laser operation;
- Strictly control the areas involving laser radiation, and formulate the guidelines for laser safe operation.

Installation Precautions



- During the installation, repair and maintenance of laser cleaning machine, it is necessary to turn off the main power. Installation, repair and maintenance when the cleaning machine is powered on can have fatal consequences. For example, high-voltage electric shock can result in cardiac arrest, burn, or other serious injuries;
- Please install it on an incombustible object otherwise it may result in fire disaster;
- Do not place near combustible materials, otherwise it may result in fire disaster;
- Ensure that the area around the machine is clean, orderly and free of oil, and pile up workpieces, tools and wastes according to regulations;
- It is forbidden to install in an environment with explosive gases, otherwise it may result in explosion;
- Wiring must be done by professionals, otherwise it may result in electric shock;
- This equipment is powered by 3-phase 380 Vac. Please ensure that the input voltage phase sequence matches the instructions on the machine label and is connected to an effective protective ground. Otherwise, equipment damage and personal injury may occur;
- Ensure that input power is completely disconnected before wiring. Otherwise it may result in electric shock;
- Install the shell before powering on the device. Do not touch the terminal with hands, otherwise it may result in electric shock;
- Parts should be replaced by a professional. Do not leave thread ends or metal objects in the machine. Otherwise it may result in fire disaster;
- After replacing the control panel, it is necessary to set the parameters correctly before running. Otherwise it may result in the damage of property;
- Cables must be wrapped with insulating tapes and aren't allowed to expose. Otherwise it may result in electric shock;
- Keep the lighting in the operating room in good condition, and ensure no strong vibration, strong electromagnetic field equipment interference within 20m around the equipment.



- When handling, moving and maintaining this series of laser cleaning machines, do a good job of safety protection. For some parts with large weight and sharp edges and corners, pay attention to the risk of smashing or cutting caused by falling heavy objects;
- To ensure the security of laser cleaning, it is necessary to use proper external warnings, including but not limited to laser safety signs and interlocking devices;
- Do not install near to places where water droplets may splash. Otherwise it may result in property damage;
- Do not drop foreign matters such as screws, gaskets and metal rods into the cleaning machine. Otherwise it may result in fire disaster and property damage;
- Keep the working environment bright, turn on the light to prevent pupil dilation and avoid from increasing the risk of eye damage;
- The ambient temperature is required to be between -10 and 40° C to ensure that the laser cleaning machine is in optimal working condition and the room temperature is stable. Air conditioning should be installed and the relative humidity should be below 70% and relatively dry;
- To ensure the clean air of cleaning machine operating room, customer shall install the ventilation and smoke exhaust system according to the site conditions after installation and debugging of equipment.

Precautions for Use



- Operators must get pre-job training, grasp the structure and performance of this cleaning machine, be familiar with the operation procedures and obtain the license qualification, and understand the knowledge of safe operation and welding skills before cleaning;
- Wear labor protection articles according to regulations. Wear labor protective glasses when operating. Laser emission on non-processed products and human body isn't allowed.
- When the laser cleaning machine is turned on, the operator shall not leave the post without authorization or entrust someone with custody. If necessary, stop the machine;
- To ensure safety, the operator should be with knowledge of safe operation and welding skills.
- Before starting the cleaning machine for the first time, check whether there is water in the water cooler; check whether temperature and water pressure are abnormal. When the water amount is not enough, water should be added to the scale of the standard area of the water level line before it can be turned on to avoid the damage of the relevant equipment;
- It is prohibited to place paper, cloth or other flammable materials near unprotected laser beams. Please put fire extinguishers near the workbench;
- Operators must pay attention during the operation of equipment. It is strictly prohibited to chat, play, listen to music and other activities unrelated to work;
- If the equipment is not used for more than 30 minutes, please turn off the power supply of the laser equipment according to requirements;

- Do not remove the machine casing or cover plate during use to prevent electric shock or equipment abnormalities;
- Please use undamaged gloves with good insulation and use the sound insulation equipment to avoid noise;
- Pay attention to safety protection in high-place operation;
- When cleaning in a narrow or confined space, the cleaning personnel must accept the supervision of the inspectors and fully ventilate or use respiratory protection appliance, otherwise it may result in asphyxia due to lack of oxygen;
- Do not operate the laser device near combustible materials or in the vicinity of combustible materials;
- Emergency stop takes precedence over any other control operation, disabling laser, starting power, stopping the power supply of all system control and potentially dangerous functional components;
- In case of operational error, release the light release button of the hand-held cleaning torch immediately and press the emergency stop button immediately;
- Add antifreeze when weather is cold, and use pure water when weather is hot; be sure to drain the water if it is not used for a long time to prevent water inside from corroding the pipes after being unused for a long time and affecting the heat dissipation effect of the subsequent laser.



- The requirements of operational environment are as follows:
 Installation environment: smooth, no vibration and impact;
 Working environment temperature: -10 ~ 40°C;
 Transport and storage temperature: -20 ~ 60°C;
 Working humidity: <70%RH;
 The dust, metallic dust and corrosive gases in ambient air can't exceed normal content;
 Keep the working environment bright, turn on the light to prevent pupil dilation from increasing the risk of eye damage.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- The laser safety classification of this product is based on IEC 60825-1:2014.
- Maximum permissible exposure(MPE)
- Nominal Ocular Hazard Distance (NOHD)
- Nominal Ocular Hazard Distance (NOHD)
- Laser labels are posted in the following locations:
 Laser English warning labels are located on the front panel of the laser cleaning machine;
 Blue background safety labels are located on the cover of the laser cleaning machine;
 CE nameplate label is located at the back of the laser cleaning machine;
 Laser aperture label is located on the cleaning torch.

Contents

Chapter 1 Product Overview	1
1.1 Product Introduction for Cleaning Machine	1
1.2 Features of Laser Cleaning Machine	1
1.2.1 Unique Advantages	1
1.2.2 Product Performance	1
1.3 Diagram of Laser Cleaning Machine	2
1.4 System Composition	2
1.5 Model Explanation	2
1.6 Configuration Description	3
1.7 Specification and Dimensions	3
1.8 Electrical Parameters	3
Chapter 2 Installation and Wiring	5
2.1 Unpack Inspection	5
2.2 Installation Requirements	5
2.3 Electrical Connection Step	6
2.3.1 Protective Gas Hose Connection	6
2.3.2 Connection of Power Input Cable (380VAC)	6
Chapter 3 Function Description and Operation	8
3.1 Professional Cleaning System	8
3.1.1 Instructions for the Use of Cleaning Head	8
3.1.2 Interface Description of Home Page	8
3.1.3 Professional Cleaning Program Interface Description	9
3.1.4 Setting Interface Description	10
3.1.5 Monitoring Interface Description	13
3.2 Description on Water-cooling Functions	15
3.2.1 Display of Water-cooling Settings	15
3.2.2 Marking for Coolant Filling Scale	15
3.3 Operation Process	16
3.3.1 ON / OFF Process	16
3.3.2 Process Operation Regulations	16
Chapter 4 Error Diagnosis	17
4.1 Common Anomaly Analysis on Display Screen	17
4.2 Analysis on Digital Tube Errors for Water Temperature Settings	17
Chapter 5 Maintenance	18
5.1 Daily Inspection and Cleaning	18
5.2 Regular Inspection and Cleaning	18
5.3 Cleaning and Replacement of Laser Lenses	19
5.4 Red Light Correction	21
5.5 After-sales Service	22
Chapter 6 Warranty	23
6.1 Comprehensive Terms	23
6.2 Warranty limitation	23
6.3 Technical Support	24

Appendix I System Configuration Table25

Appendix II Electrical Connection Diagram 26

Appendix III Laser Cleaning Machine Structure Drawing.....27

Chapter 1 Product Overview

1.1 Product Introduction for Cleaning Machine

Megmeet hand-held fiber laser cleaning machine has integrated high-power fiber laser (generator), dual temperature and dual control cooling module, laser cleaning torch and control system, with stable output of 1080±10nm band laser. It is suitable for ships, auto repair, high-end machine tools, rubber molds, rail and environmental protection, etc. It can be used for pre-welding and post-welding laser cleaning of aluminum alloy, stainless steel and other materials and laser descaling of steel surfaces, which can effectively remove resin, paint, oil, stains, dirt, rust, coatings, plating and oxidation layer on the surface of welded parts.

1.2 Features of Laser Cleaning Machine

1.2.1 Unique Advantages

- Stability

1. The electric control solution of super-stable laser generator can bring super-stable laser power output with the jitter rate of less than 1.5%.
2. With electronic control design of industrial laser generator, laser attenuation is less than 4% per year.

- Consistence

1. It ensures consistent performance for each device in the case of large changes of the use environment (such as power grid fluctuations, temperature changes).
2. Unique hardware design and software control ensure that the output parameters are still accurate after the equipment has serviced for a long time.

1.2.2 Product Performance

- Superior performance

1. The maximum cleaning width can reach 300mm, the maximum working distance can reach 800mm, and cleaning working surface is 0 arc.
2. Supports a variety of focusing lenses such as F400, F600, and F800, which can be used for large-format cleaning or high-energy-density cleaning.
3. The cleaning trajectory is a straight line, and there are no corners missed by the arc trajectory.

- Simple operation

1. Industrial LCD screen, simple operation of touch screen, simple and efficient human-computer interaction.
2. Support 10 groups of parameter storage, support user-defined.

1.3 Diagram of Laser Cleaning Machine

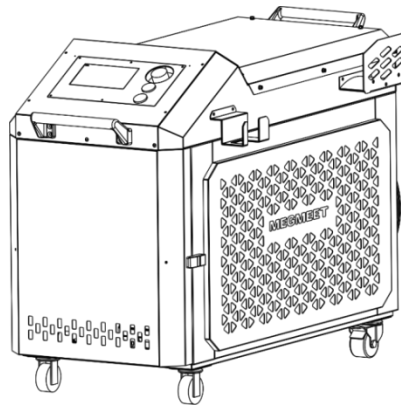


Figure 1-1 Diagram of laser cleaning machine

1.4 System Composition

Laser cleaning machine system consists of laser main machine, gas supply system, cleaning torch and combined control cable. As shown in Figure 1-2.

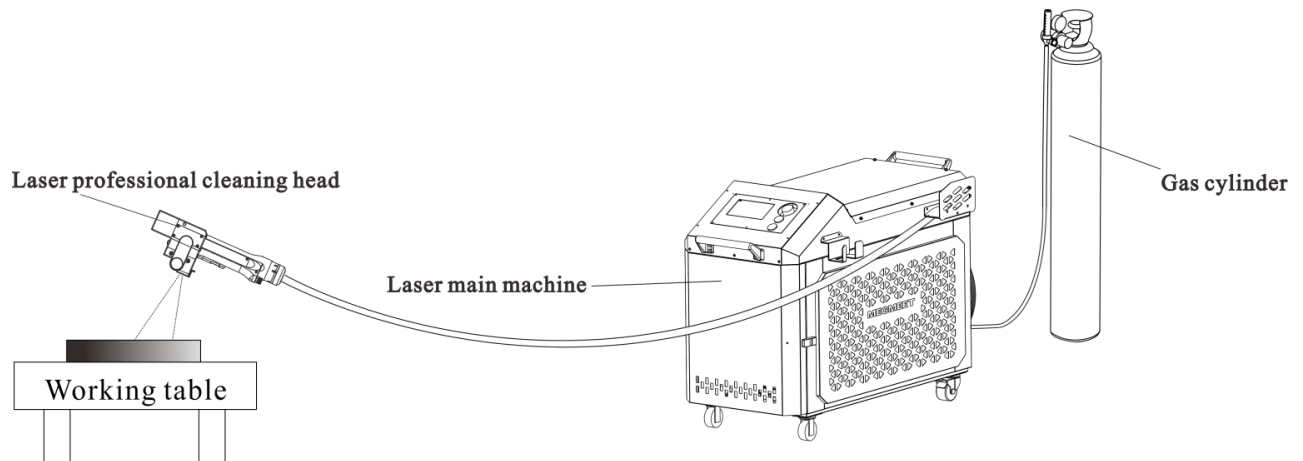


Figure 1-2 Connection diagram of hand-held fiber laser cleaning system LUX series

1.5 Model Explanation

The models of welding power source are shown in Figure 1-3.

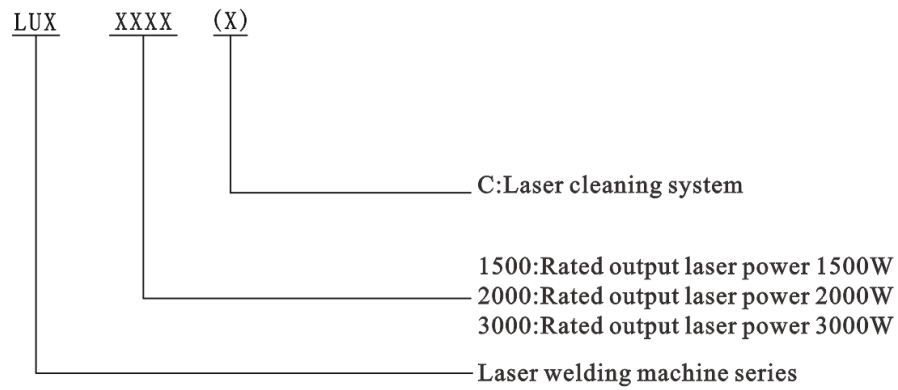


Figure 1-3 Diagram of welding machine models

* Note: The symbol in "()" is optional, indicating different types of welding machine.

1.6 Configuration Description

Refer to Appendix I System Configuration Table.

1.7 Specification and Dimensions

Dimensions of cleaning machine are shown in Table 1-1.

Table 1-1 Cleaning machine models and dimensions

Name	Model	Dimension (Length*width*height) mm	Net weight (kg)
Hand-held fiber laser cleaning machine	LUX-3000C	1215*530*860	160

The dimensions of cleaning machine are shown in Figure 1-4.

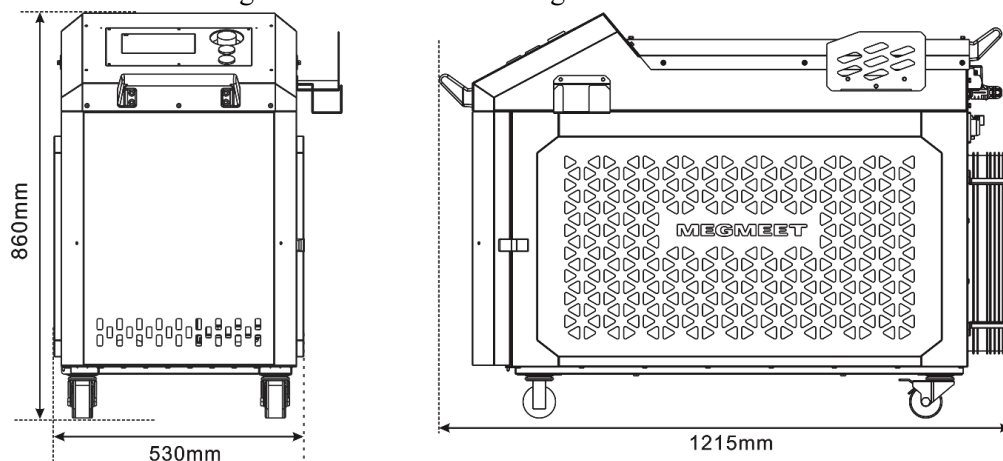


Figure 1-4 Dimensions of cleaning machine

1.8 Electrical Parameters

Electrical parameters of cleaning machine are shown in Table 1-2.

Table 1-2 Electrical parameters of cleaning machine

Model	LUX-3000C
Rated input voltage/phase number	Three phase 380VAC ($\pm 10\%$) + PE
Input power frequency	50/60Hz
Rated input power	13kW
Rated input current	22A
Rated output laser power	3000W
Output laser wavelength	1080 \pm 10nm
Operating ambient temperature	-10~40℃
Operating ambient humidity	<70% no condensation
Storage temperature	-20~60℃

Chapter 2 Installation and Wiring

The requirements, operation procedures, and precautions for cleaning machine installation are described in this chapter.

2.1 Unpack Inspection

1. Before unpacking, please confirm whether the outer packing is intact.
2. After unpacking, please confirm whether all components of cleaning machine are complete and their models are consistent with the order.
3. In case of missing or wrong parts, please contact with distributor in time.
4. Lifting with the front and rear handles of the machine is prohibited.

2.2 Installation Requirements

- Site requirements

Laser cleaning machine must be installed in an independent space of no less than 20m² (according to the actual configuration). The ground is horizontal, hard, anti-vibration, and laser protection signs are pasted on the door.

- Environmental requirements

1. Keep the lighting in the operating room in good condition, and ensure no strong vibration, strong electromagnetic field equipment interference within 20m around the machine;
2. The ambient temperature shall be between - 10 and 40℃ to ensure that the machine is in the best working condition. Keep the room temperature stable, install air conditioning;
3. Relative humidity should be below 70%, dry;
4. To ensure the clean air of the equipment operating room, the customer shall install the ventilation and smoke exhaust system according to the site conditions after installation and debugging of equipment.

- Power demand:

1. Power supply is three-phase 380V AC, please ensure that the power supply is connected to a safe, reliable and effective ground;
2. Rated maximum input current of 22A;

3. Input wiring is required to be wired according to U/V/W phase sequence, and the cable specification is required to be greater than or equal to $4 \times 4 \text{mm}^2$.

2.3 Electrical Connection Step

Steps

1. Protective gas hose connection (Refer to 2.3.1 Protective gas hose connection);
2. Connection of power input cable (Refer to 2.3.2 Connection of power input cable).

2.3.1 Protective Gas Hose Connection

Steps

Connect one end of gas hose to the gas hose connector on the fixed plate of cleaning machine, connect the other end to the gas hose interface of the gas meter end, and tighten the hose clamp of gas hose to complete the connection of gas hose. As shown in Figure 2-1.

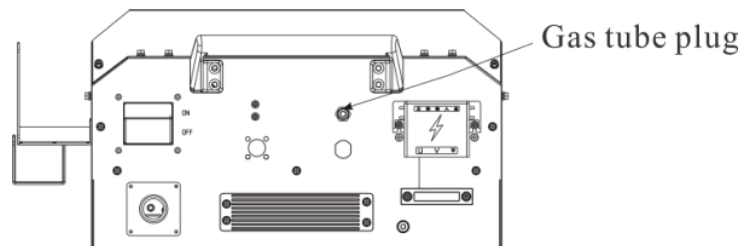


Figure 2-1 Diagram of gas hose connector



Note

The gas hose at the end of the cleaning machine and the gas meter must be tightened to avoid air leakage.

2.3.2 Connection of Power Input Cable (380VAC)

Steps

The input wiring of this product is required to be wired in accordance with U/V/W phase sequence. When using this product, please make sure that the machine is connected to a reliable and effective protective ground, as shown in Figure 2-2.

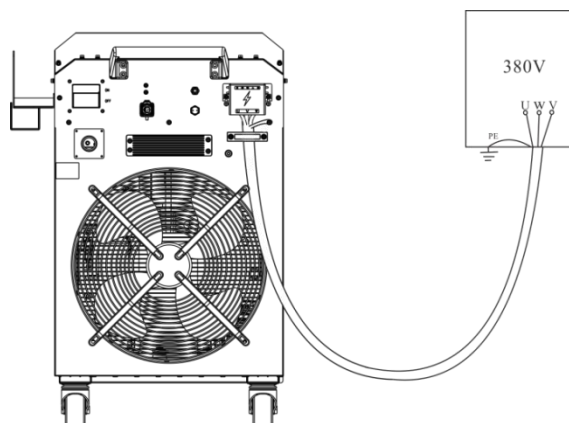


Figure 2-2 Diagram of the power connector of laser wire feeder

**Note**

1. It is a must to connect the grounding terminal to the earth, otherwise it fails to meet the safety regulations and poses certain safety risks.
 2. Input cable specifications are required to be greater than 4x4mm².
-

Chapter 3 Function Description and Operation

3.1 Professional Cleaning System

3.1.1 Instructions for the Use of Cleaning Head

SUP22C handheld laser cleaning head supports a maximum focusing lens of 800mm, and scanning width range can reach a maximum of 300mm. The torch body uses a safety lock design, which needs to be closed when not in use. The structure diagram of SUP22C handheld laser cleaning head is shown in Figure 3-1.

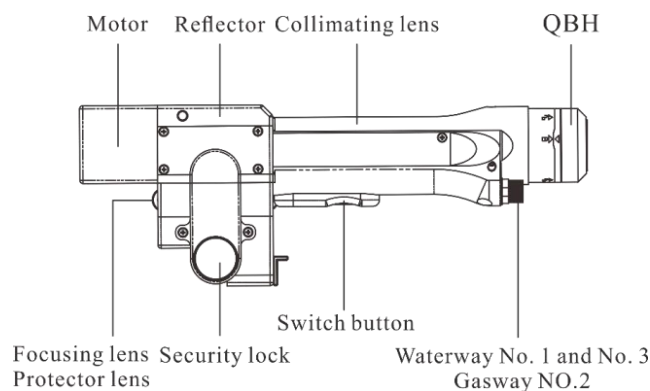


Figure 3-1 SUP22C hand-held laser cleaning head

- The focus needs to be confirmed before cleaning starts

Method: By moving the welding torch back and forth to the workpiece, the point with the loudest sound and the strongest sparks is the focus. At this time, cleaning should be carried out according to this distance. The gas used during cleaning is: 3-level or above filtered oil-free and water-free compressed gas of no less than 5KG or other inert gases.

3.1.2 Interface Description of Home Page

SUP22C hand-held Laser cleaning head is a single-motor swing scanning laser head for hand-held cleaning applications, which is matched with a professional laser cleaning system. Its scanning width is up to 300mm. The home page of cleaning system is shown in Figure 3-2.

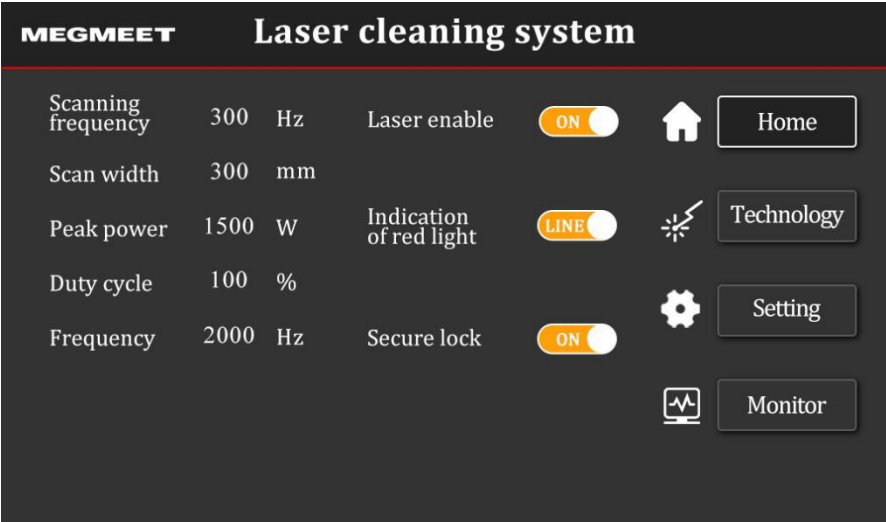


Figure 3-2 The home page of professional cleaning system

SUP22C is equipped with safety lock function. When the torch body safety lock is opened, the safety lock of system home page is displayed as orange (on) and light can be output normally at this time. When the torch body safety lock is closed, the safety lock of system home page is displayed as red (off) and the light cannot be output normally at this time. Turn-off optical mode is shown in Figure 3-3.

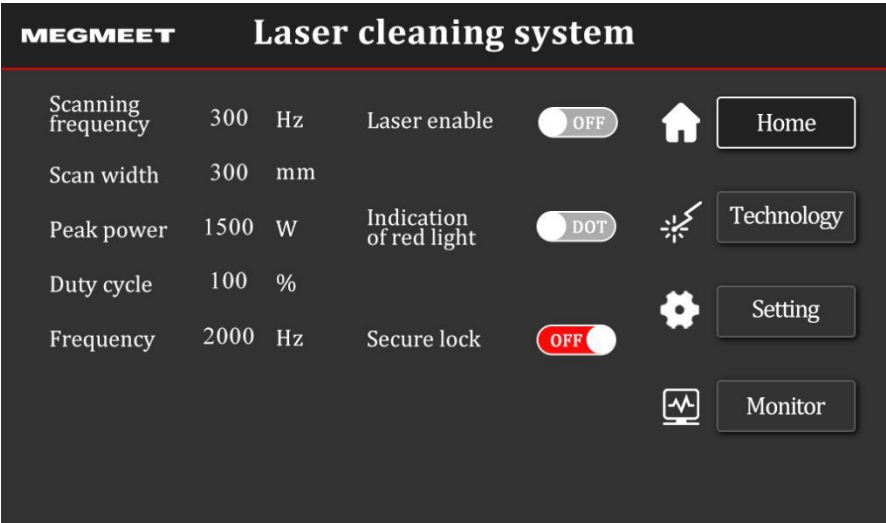


Figure 3-3 Home page of professional cleaning system- Turn-off optical mode

3.1.3 Professional Cleaning Program Interface Description

On the home page of laser cleaning system, click [Program] button to enter the program interface. The program interface provides self-editable parameters for users to save and call. Click [Value] to modify the program parameters. After modification, click [Save] in the shortcut [Program], a total of 3 groups, click [Import] when using. As shown in Figure 3-4. The function description is shown in Table 3-1.

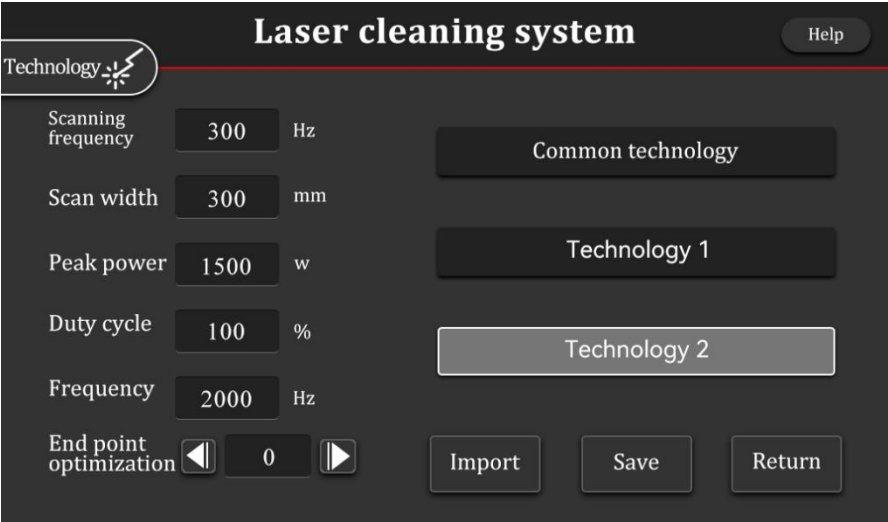


Figure 3-4 Program interface of cleaning system

Table 1-1 Description on program interface functions of professional cleaning system

Name	Parameter description	Notes	Default value
Scanning frequency	The number of laser beam scanning on the workpiece per second	Range: 10-100Hz	50
Scanning width	The width scope covered by the light spot in the scanning process	SUP22C focusing mirror F400 corresponding width range is 0-150mm, F600 corresponding width range is 0-225mm, and F800 corresponding width range is 0-300mm.	/
Peak power	The maximum instantaneous output power of the laser pulse	The peak power shall be smaller than the laser power on the setting interface	/
Duty cycle	The ratio of laser cleaning machine pulse duration to the pulse period in a certain amount of time	Range 0-100%	100%
Pulse frequency	The frequency of laser pulse repetition per second	Range 5- 5000Hz	2000Hz
Endpoint optimization	Remove uneven light output at two ends of the cleaning track	Range: -20~20. According to the specific condition, a decrease in the value may make the endpoint energy larger or smaller, and the same can be said for an increase in the value. Adjust to the ideal situation according to the actual condition.	0

3.1.4 Setting Interface Description

On the home page of home page, click [Settings]. On the password input page, click anywhere in the box to trigger the keyboard, and input the password 123456 to enter the setting interface.



Note

If the keyboard has been triggered, you must enter the password, otherwise click [Return], no response. Figure 3-5 and figure 3-6, the description of functions are shown in Table 3-2 and table 3-3.

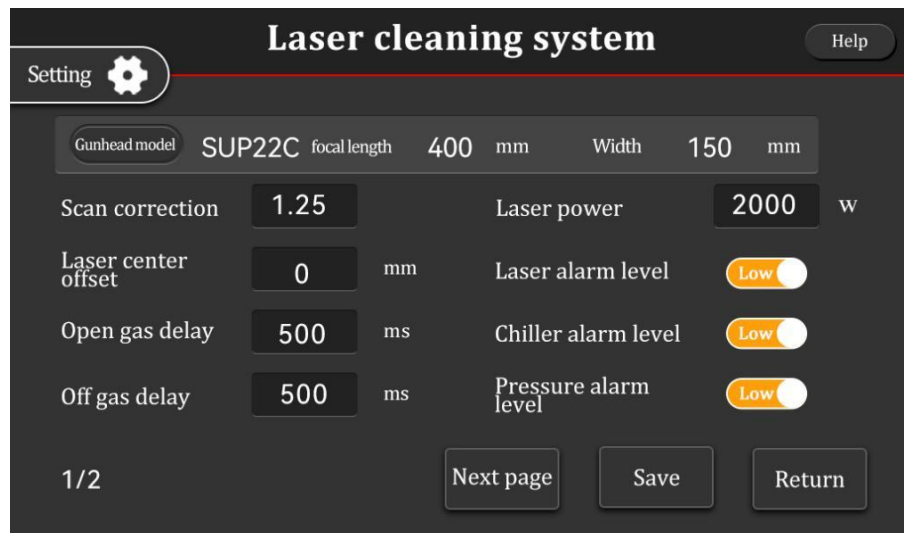


Figure 3-5 The professional cleaning system setting interface



Figure 3-6 Cleaning system setting interface


Table 3-2 Description on the functions of cleaning system setting interface

Name	Parameter description	Notes	Default value
Scanning correction	Adjust the scanning system of laser cleaning machine to achieve accurate cleaning path and scanning speed results.	Scope 0.01-4	1
Laser center bias	Deviation length of laser center position	The range: -75~75mm. The negative value moves to the left, and the positive value moves to the right, which is used to adjust the shaft red light center.	/
Pre-gas	Gas supplying is advanced.	Range 200-3000ms	200ms
Post-gas	Gas supplying time is delayed	Range 200-3000ms	200ms
Laser power	Maximum power of laser	Enter actual laser power here	/
Laser alarm level	During use, the laser automatically triggers the alarm under abnormal circumstances.	High settings of laser power, high laser temperature, and abnormal fiber connection can lead to laser alarm.	/
Alarm	During use, water-cooling machine	The damaged fan, too high water	/

level of water-cooling machine	automatically triggers the alarm under abnormal circumstances.	temperature, insufficient water flow, bent water pipe, and water leakage at the water tube junction cause the alarm of water-cooling machine.	
Barometric alarm level	During use, gas supply equipment automatically triggers under alarm abnormal circumstances.	Insufficient gas cylinder pressure, and gas pipe leakage will cause air pressure alarm.	/

Table 3-3 Description on the functions of cleaning system setting interface

Name	Parameter description	Notes	Default value
Turn-on optical power	Initial optical output power	The higher the power of laser, the lower the recommended turn-on optical power. The turn-on optical power should not exceed 50%. High turn-on optical power will greatly reduce the service life of lens.	20%
Turn-on optical progressive time	It indicates the time required from the turn-on optical power to the welding power.	/	200ms
Turn-off optical power	End optical output power	/	20%
Turn-off optical progressive time	It indicates the time required from the welding power to turn-off optical power	/	200ms
Trigger setting	Trigger conditions for optical output	Click to switch to double click optical output or single click optical output.	Double click
Temperature threshold of motor driver	It shows that the motor drive temperature has reached its maximum temperature.	Give an alarm when the measured temperature exceeds the set value. When the threshold is set to 0, no temperature alarm is detected.	65℃
Temperature threshold of protective lens	It shows that the temperature of protective lens has reached its maximum temperature.		
Temperature threshold of collimator lens	It shows that the temperature of collimator lens has reached its maximum temperature.		
Language	Show the language of system	Click to switch to another language	/

After entering the setting interface, click  to enter the focus lens selection interface. Different focal lengths of lens cleaning amplitude aren't the same, please select them according to actual situations. For example, for **800mm focal length - 300mm width**, you must replace the focus lens of cleaning torch head with the lens of focal length 800mm. At this time, the maximum scanning width of light spot 300mm. Please set the proper scanning width according to the actual focus lens model. As shown in Figure 3-7.

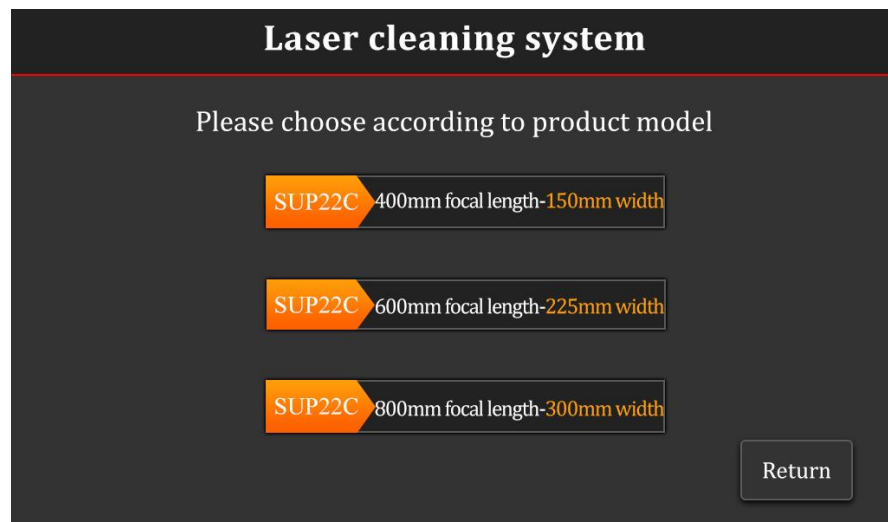


Figure 3-7 Focus lens selection interface

3.1.5 Monitoring Interface Description

Click [Monitor] on the home page of the cleaning system to enter cleaning mode monitoring interface. The status of each signal and device information are displayed on the interface. Monitor the high-low level status of laser/water-cooling machine/gas pressure alarm signal. The authorization status of current device is displayed by device authorization. When the device is used beyond its set time, the authorization termination is displayed. The system version is three groups of numbers, and the meaning is hardware version - single-chip microcomputer program version - touch screen version, see Figure 3-8. The description of functions are shown in Table 3-4.

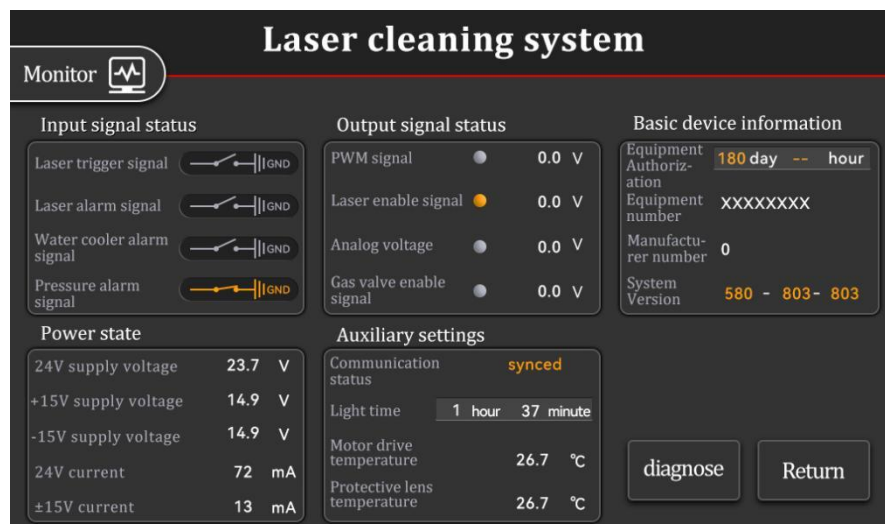


Figure 3-8 Monitoring interface of cleaning system

Table 3-4 Description on professional cleaning system monitoring

Name	Parameter description	Notes
Laser trigger signal	Switch button signal on the welding gun	After pressing the welding gun switch, the signal closes, and the state changes from dark to bright. Releasing the welding gun switch, the signal is disconnected, and the state changes from high light to dark.
PWM	Pulse width modulation	The output is 24V when working. This signal is a real-time monitoring signal and will fluctuate within a certain range, with an error of less than 0.3V.
Laser is enabled.	Control the working and non-working status of laser.	The output is 24V when working. This signal is a real-time monitoring signal and will fluctuate within a certain range, with an error of less than 0.3V.
Analog quantity	A quantity that varies continuously within a range	Output rated voltage control signal when working, 10V output at full power. This signal is a real-time monitoring signal and will fluctuate within a certain range, with an error of less than 0.3V.
The air valve is enabled.	Control the working and non-working status of air valve.	This signal is a real-time monitoring signal and will fluctuate within a certain range, with an error of less than 0.3V.
Communication status	It shows the communication between the touch screen and the main board.	If they are not synchronized, check the screen connection cable.
Optical output time	It shows the optical output time of the current device.	Click [Device Authorization], and enter "FFFFFFBB001" on the password page to start timing. Enter "FFFFFFBB000" to clear and stop timing.
Motor driver temperature	Measuring the real-time temperature of the motor driver	This temperature affects the motor swing performance. If the temperature rises abnormally, it will affect the laser scanning speed, resulting in the decrease of weld joint quality.
Temperature of protective lens	Measuring the real-time temperature of protective lens	The temperature of lens reflects the working status of lens. According to the temperature of lens, determine if the lens are damaged.
Temperature of collimator lens	Measuring the real-time temperature of collimator lens	

On the monitoring page, Click [Diagnosis] to enter the diagnosis page. The laser does not emit light on this page. PWM, laser enabling, air valve enabling and analog quantity is controlled by the button [Switch Control]. The test value is compared with the theoretical value to determine whether the function of the control box is normal. As shown in Figure 3-9.

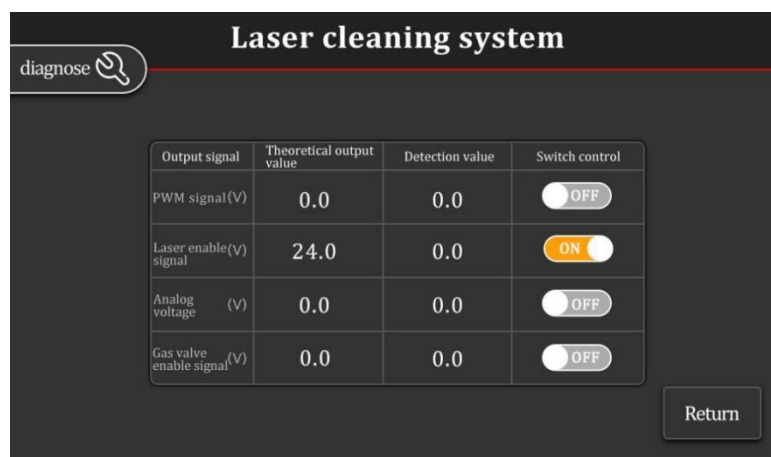


Figure 3-9 The diagnosis interface of laser cleaning system

3.2 Description on Water-cooling Functions

3.2.1 Display of Water-cooling Settings

Basic temperature and upper and lower limit temperature have been set before delivery. The alarm will be sent if temperature is out of range. Please pay attention to the value of the thermometer and the environment temperature.

Table 3-5 Description on water temperature settings of digital tube

Name	Parameter description
Real-time temperature (PV)	Indicates the current water temperature in the water tank
Set-temperature (SV)	Indicates the set temperature of low-temperature water

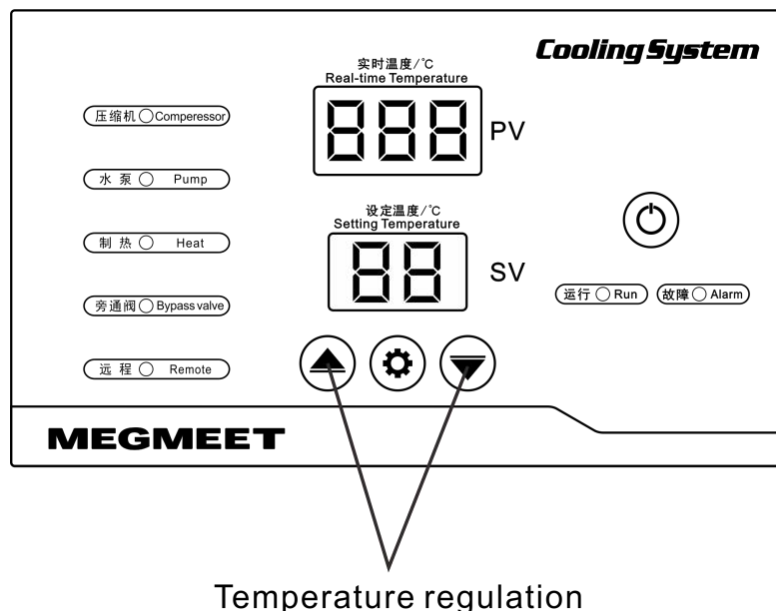


Figure 3-10 Water temperature settings

3.2.2 Marking for Coolant Filling Scale

Pay attention to the mark line when filling the coolant. The red area represents the water shortage area, the green area represents the standard area, and the yellow area represents the overflow area. Stop adding when the coolant is about to reach the standard area, turn on the laser power supply, turn off the laser power supply after the completion of water cycle, continue adding the coolant to the middle of the standard area scale line. The coolant added must be pure water or antifreezing solution. When environment temperature is below 5°C, antifreezing solution should be used. Do not change water temperature of factory setting at will.

3.3 Operation Process

3.3.1 ON / OFF Process

- Start-up process

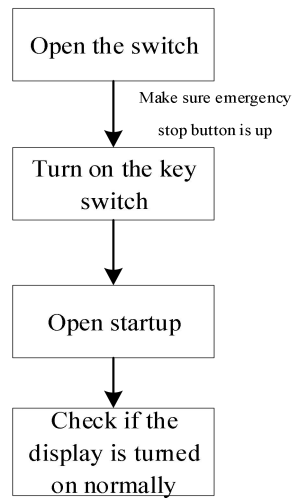


Figure 3-11 Startup flow chart

- Shut-down process

Just turn off the switch. In case of emergency, press the emergency stop button immediately to power off.

3.3.2 Process Operation Regulations

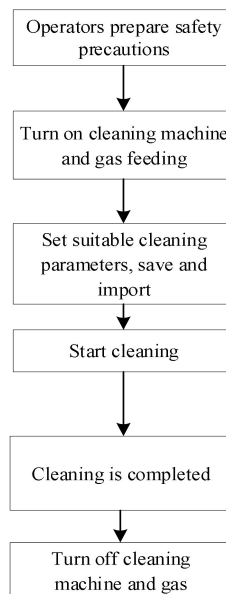


Figure 3-12 Process operation flow chart



Note

1. "Press" torch head button twice in a short period of time (do not "releasing" after the second "press"), the light will emit, and "release" the laser to stop (do not aim at people or flammable objects).
2. It is recommended to adjust the distance between cleaning torch head and the workpiece to near the focal length. At this time, the cleaning effect is best.

Chapter 4 Error Diagnosis

4.1 Common Anomaly Analysis on Display Screen

Table 4-1 Common anomaly analysis on display screen

Abnormal information	Description
Laser generator alarm	Please connect a mobile phone Bluetooth APP to view the warning reason. High settings of laser power, high laser temperature, and abnormal fiber connection can lead to laser alarm.
	If an alarm signal occurs before use, please change the corresponding alarm level on the screen settings.
Alarm from water-cooler	Damaged fan, too high water temperature, insufficient water flow, bent water hose, and water leakage at the water hose junction can cause the alarm of water-cooler. Specific errors are shown in Table 4-2.
	If an alarm signal occurs before use, please change the corresponding alarm level on the screen settings.
The screen does not light up/no response after clicking.	If the screen doesn't light up, operator must ensure that the controller is powered on, and check whether the voltage between the controller and the screen is 24V.
	If the screen doesn't respond after clicking, please check whether the TXD and RXD communication signal cables in the terminal between the control box and the screen fall off are worn.
	The newly installed device does not respond to the click, which may be caused by the mismatched system version. The operator must refresh the program. Please contact Megmeet the specific version.
No optical output/abnormal optical path	Please check whether the laser has an abnormal alarm.
	In case of an anomaly during welding, please check whether the laser trigger signal and safety lock signal on the monitoring page are normal, and whether the PWM, laser enabling and analog output are normal.
	Whether authorization is terminated
Overtime locking	If the machine has exceeded allowed usage time, please contact Megmeet after-sales personnel to unlock it.

4.2 Analysis on Digital Tube Errors for Water Temperature Settings

Table 4-2 Analysis on digital tube errors for water temperature settings

Abnormal information	Error code	Error name
Alarm of water-cooler	E01	Error of low temperature water probe
	E02	High temperature error of low temperature water
	E03	Compressor error
	E05	Flow alarm
	E06	Water level alarm
	E08	Low temperature error of low temperature water
	E09	Probe error of high temperature water
	E10	High temperature alarm of high temperature water
	E11	High temperature alarm of high temperature water
	E12	Probe error of ambient temperature
	E13	Error for too high ambient temperature

Chapter 5 Maintenance

5.1 Daily Inspection and Cleaning



Safety warning

Daily inspection must be conducted after turning off the power supply of user's distribution box and the power supply of laser welding machine to avoid personal injuries such as electric shock and burn. (For the appearance that doesn't contact with a conductor, daily inspection isn't required.)

- Notice for use
 1. Daily inspection is very important to keep the high performance and safe operation of the laser welding machine;
 2. Check the machine housing and cables daily, and clean or replace if necessary;
 3. To ensure the high performance of this product, please select the parts provided or recommended by the original manufacturer(Megmeet).

5.2 Regular Inspection and Cleaning



Safety Warning

1. Regular inspection must be performed by professionals to ensure safety;
 2. Regular inspection must be conducted after turning off the power supply of user's distribution box and the power supply of the device to avoid personal injuries such as electric shock and burn.
-

- Operating instruction
 1. In order to prevent semiconductor components and circuit boards from being damaged by static electricity, please wear anti-static devices or touch the metal parts of enclosure to remove static electricity before touching the conductors and circuit boards in the machine;
 2. Do not use solvents other than household neutral detergents when cleaning plastic parts.
- Regular inspection plan
 1. Regular inspection must be performed to ensure the long-term normal use of the equipment;
 2. Pay attention to regular inspection, including internal inspection and cleaning of the welding machine;
 3. In general, regular inspection is performed once every 6 months. If there is a lot of dust or oily smoke at the welding site, regular inspection must be performed once every three months;
 4. The recommended regular inspection plan is shown in Table 5-2.

Table 5-1 Regular inspection schedule(the year of XXXX)

No.	Scheduled inspection date	Actual inspection date	Inspector
1	XXXX-XX-XX		
2	XXXX-XX-XX		
3	XXXX-XX-XX		
...	...		

- Content of regular inspection

Table 5-2 Regular inspection and cleaning content

Item	Regular inspection and cleaning
Water-cooler	Regularly replace pure water or antifreezing solution in the water-cooling box, remove the seal cap before adding water.
Dust-proof net on a side cover	There is a dust-proof net on the side cover. Check the integrity of the dust-proof net and regularly clean dust to ensure ventilation and heat dissipation of the cabinet.
Fan/condenser	Remove dust and sundries regularly
Copper tip	Regularly clean the slag of the copper nozzle and replace the copper nozzle.
Guide tube nozzle	Check and replace the guide wire nozzle regularly.
Protective lens	Regularly check the protective lens of laser are dirty or damaged. If they are dirty, please clean them in time. If they are damaged, please replace them in time.

5.3 Cleaning and Replacement of Laser Lenses

- Cleaning laser lenses

In installation and cleaning process of lens, sticky matters, finger marks or oil droplets will affect the light transmittance of lens, reducing the service life and affecting the quality of laser processing, so following measures must be taken:

1. Do not install lenses with bare fingers. Wear powder-free finger stalls or rubber/latex gloves;
2. Do not use suction apparatus to avoid scratching the surface of lens;
3. Do not touch the film and mirror surface when picking up the lens. You should hold the edge of lens and put the lens on the lens paper;
4. Avoid talking over the lens, and keep all contaminants away from the work environment as much as possible;
5. The vinegar only dissolves dirt and cannot damage the lenses;
6. The lens shall be cleaned in a dust-free environment as much as possible.

- Main maintenance tools

Blowing balloons for cleaning, medical alcohol, cotton bud.

- Replacement of protective lens

According to the laser welding process characteristics, it is necessary to regularly maintain lenses. If the welding effect is poor, replace the protective lens as shown in Table 5-3.

Table 5-3 Protective lens replacement steps

Operating requirements and steps	Operating instructions
Preparation before operation	Prepare a dust-proof non-stick tape or textured paper, anhydrous absorbent cotton (fine cotton), anhydrous alcohol, finger stalls or rubber gloves, and lens wiping paper.
	Wash your hands with clean water and dry with an alcohol cotton, and wear gloves.
Environmental requirements	Relatively dusty places
Operation of lens removal	Unscrew the hatch cover of protective lens and pull out the support of protective lens, seal the protective lens bay with textured paper to avoid dust, remove the protective lens ring to replace them, and check the white seal ring under the protective lens.
Lens installation	Install the protective lens pressing ring, tear off the textured paper, wipe the inside of the hatch and cover with a cotton ball with alcohol, rapidly insert the protective lens support into the protective lens compartment, tighten the screw to complete the replacement of protective lens.



Note

1. If the protective lens are polluted, they must be wiped with the lens wiping paper dampened with anhydrous alcohol; if there are obvious burning points on surface of protective lens, they must be replaced directly;
2. If there is any scratch or deformation of pressing seal, it must be replaced immediately.

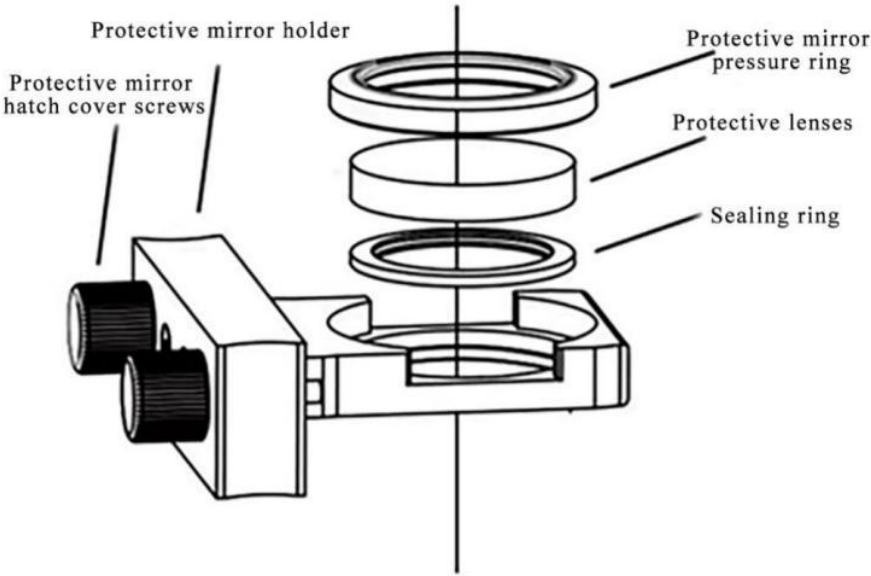


Figure 5-1 Protective lens diagram of welding torch

● Replacement of focus lens

If the welding performance is poor, check whether the protective lens are dirty, and replace the focus lens in time, as shown in Table 5-4.

Table 5-4 Replacement steps of focus lens

Operating requirements and steps	Operating instructions
Preparation before operation	Prepare a dust-proof non-stick tape or textured paper, anhydrous absorbent cotton (fine cotton), anhydrous alcohol, finger stalls or rubber gloves, and lens wiping paper.
	Wash your hands with clean water and dry with an alcohol cotton, and wear gloves.
Environmental requirements	Relatively dusty places
Operation of lens removal	Loosen the fixing screws, remove the dust cap, pull out the drawer of focus lens, cover with a textured paper to avoid dust, rotate to remove focus lens pressing ring, and replace the focus lens. Pay attention to the lens plane facing upward during installation, and check the white pressing seal ring under the protective lens.
Lens installation	Lock the pressing ring of focus lens, tear off the textured paper, put the focus lens drawer back into the lens compartment, reinstall the dust cap, lock the fixing screws to complete the replacement of focus lens.



Note

1. If focus lens are polluted, they must be wiped with the lens wiping paper dampened with anhydrous alcohol; if there are obvious burning points on the surface of focus lens, they must be replaced directly
2. If there is any scratch or deformation of pressing seal, it must be replaced immediately.

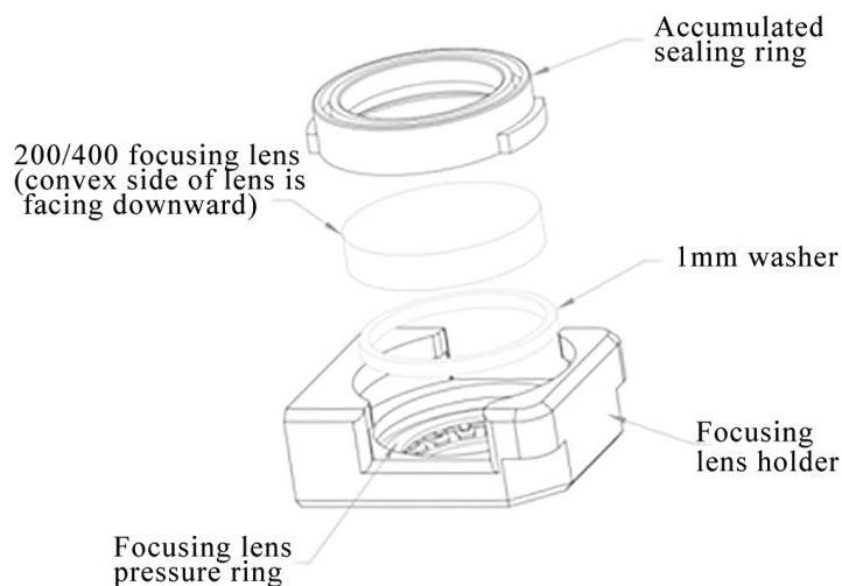


Figure 5-2 Focus lens diagram of welding torch

5.4 Red Light Correction

When the red light cannot emit from copper tip, do not output light to prevent burning out the copper nozzle, and adjust as follows:

1. Software fine tuning (left and right fine tuning)

Click to enter setting interface, change the laser center offset value, negative value to the right, positive value to the left. For the latest version, the maximum adjustable value is +3/-3. If the laser center offset value cannot be adjusted by this method, you shall use the mechanical adjustment.

2. Mechanical adjustment (up and down, left and right)

After removing the rear cover, you can see the adjustment screw, and adjustment is as follows:

C: The motor can be removed after loosening, and the left and right direction can be adjusted after loosening.

A: Including one screw on each side. The light goes down after tightening screws (loosen the screws on two sides first).

B: Including one screw on each side. The light goes up after tightening screws (loosen the screws on two sides first).

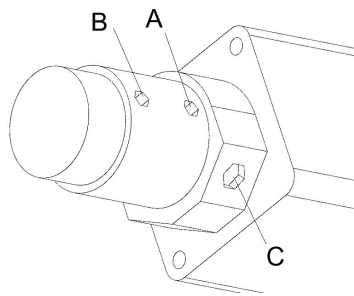


Figure 5-3 Schematic diagram of motor on the rear cover of welding torch

For example: If the red light cannot come out of the copper tip, please open the protective lens compartment to check the specific position of the red light, prioritize the adjustment [C] screw, and then adjust the upper and lower positions.

5.5 After-sales Service

● Warranty card

Each device has a warranty card. Please fill in the relevant content on the warranty card.

Please read the warranty card carefully and keep it properly.

● Maintenance

Please contact your local dealer in case of component repair or replacement. Please use parts and components provided by Megmeet Welding Technology Co., Ltd.

The warranty period of this product is one year, starting from the warranty card or purchase invoice.

Abnormal use and artificial damage isn't included in the free warranty coverage.

Chapter 6 Warranty

6.1 Comprehensive Terms

Megmeet will provide warranty services for products with defects caused by materials or production processes in the contract warranty period, and ensuring that the product meets the relevant quality and specification requirements specified in the document in normal use.

Megmeet shall provide maintenance and replacement services for products with defects caused by materials or production processes in the contract warranty period. The repair or replacement of product within the scope of warranty shall still be performed according to the remaining warranty period of the original product.

Megmeet has the right to selectively repair or replace any product with material or technical problems during the warranty period.

6.2 Warranty limitation

Machines and parts (including fiber optic connectors) are not covered by warranty in the following circumstances:

1. Damage to the machine and its parts (including optical fiber) which is caused by tampering, opening, disassembly, mis-assembly and modification by personnel not specified by Megmeet;
2. Laser generator damage which is indirectly caused by the failure of user software or interface;
3. Damage caused by misuse, negligence or incident;
4. The damage that is caused by misuse or failure to follow the information and warnings in the *User Manual*;
5. The damage that is caused by improper installation, maintenance, or other abnormal operating conditions not covered by this manual.

Within the scope of warranty, buyer must raise a claim in writing within 31 days from the date of discovery of problem. This warranty does not cover third parties (including specified buyer, final user or customer, and excluding the parts or other products not produced by Megmeet).



Note

Customers shall understand and comply with the operating instructions in user manual and operating

specifications. The damage caused by wrong operation is not covered by warranty term. Accessories and optical fiber and other parts are not covered by the warranty scope.

6.3 Technical Support

This product has no built-in accessories for user maintenance, so all maintenance shall be conducted by technical personnel specified by Megmeet.

If there is any fault in the use of this product, immediately notify Megmeet's technical personnel in time to deal with the problem.

All repaired or replaced products must be put in the original packaging box provided by Megmeet, otherwise, Megmeet has the right to refuse to repair any product damage arisen from this.

When receiving the products, user shall check whether the products are complete and intact in time. In case of any abnormal situation, please contact the carrier or Megmeet in time.

Megmeet will constantly develop new products. The product information listed in the manual may be changed without notice. For all technical parameters, the terms of the contract shall prevail.

The above warranty and service terms of our products are used for user reference only. For the formal service and warranty contents, the agreement in the contract shall prevail.

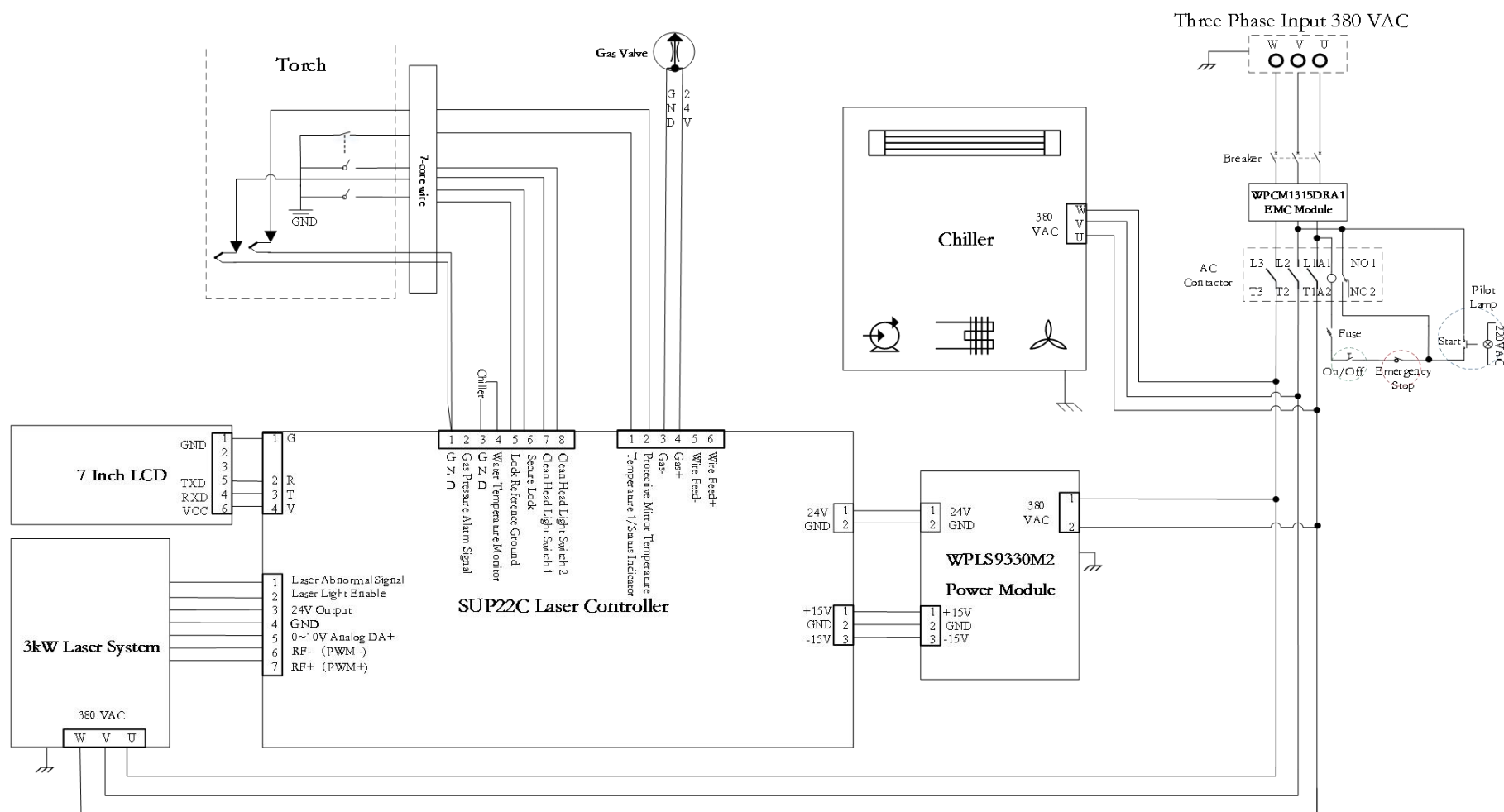
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Appendix I System Configuration Table

Configuration				Machine type
Name	Standard/ optional part	Qty	Notes	LUX-3000C
Laser cleaning machine	Standard	1	Includes cleaning torch, combined control cable	•
Protective lens	Standard	5	Spare part 5 PCS	•
Dust-free cotton bud/dust-free cloth	Standard	1		•
User Manual	Standard	1	User manual of laser cleaning machine	•
Welding gloves	Optional	1		○
Protective glasses	Optional	1		○
Focus lens	Standard	1	D20T3.5F400	•
Red light correction board	Standard	1		•
Calibrating collimator	Standard	1	D20T5F60	•

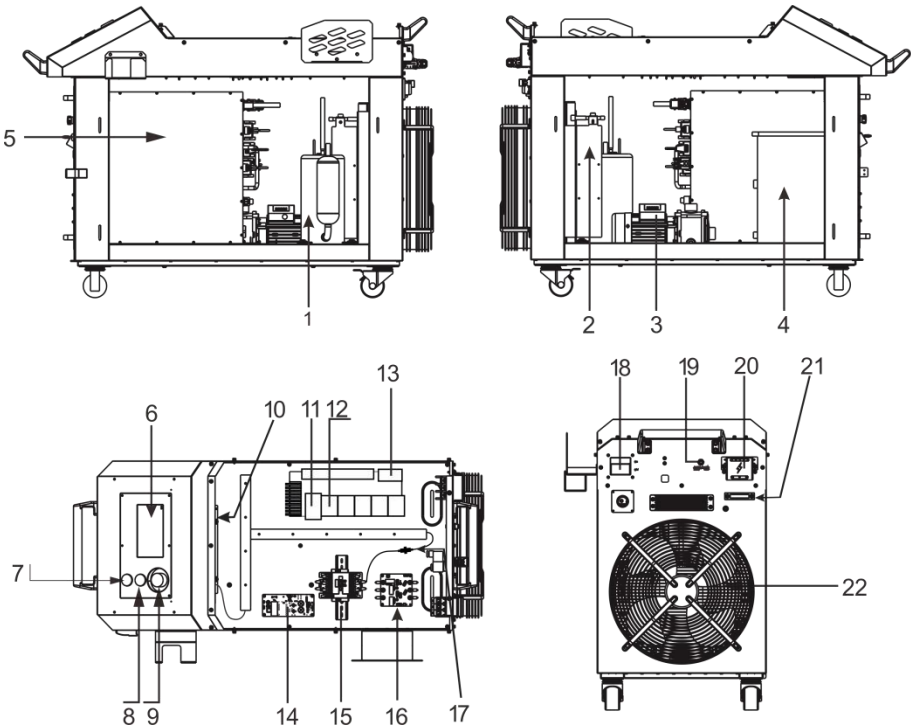
Notes: •Standard part ,○Optional part

Appendix II Electrical Connection Diagram



Attached figure 2-1 Electrical connection diagram

Appendix III Laser Cleaning Machine Structure Drawing



1	Compressor-3000W	R37060114	12	Auxiliary AC contactor	R34040009
2	Condenser-3000W	R37060116	13	Single phase transformer	R37060118
3	Water pump	R37060115	14	WPLS9330M2 Power Module	R111106J0
4-1	Water cooler	R37060036	15	Main AC contactor	R34040216
4-2	Water cooler cap	R37060037	16	Input EMC board	R111103SV
5-1	RFL laser 3KW	R37010011	17	Fuse	R27010253
5-2	FFRC laser 3KW	R37010012	18	Air switch	R34010077
5-3	BFL laser 3KW	R37010013	19	Gas hose joint	R29131737
6	LCD	R00200030	20-1	380V terminal block	30040907
7	Metal key switch	R34011161	20-2	380V terminal block cover	30040908
8	Metal button power switch	R34011160	21-1	Cable fixing holder	30040909
9	Emergency stop button switch	R34011159	21-2	Cable fixing plate	30040910
10	SUP22C control module	R37060087	22	Fan with cover	R37060117
11	Phase sequence detection switch	R37060119			

Attached figure 3-1 Laser cleaning machine structure drawing

MEGMEET Shenzhen Megmeet Welding Technology Co., Ltd.

Laser Welding Machine Warranty card

User company name:	
Detailed address:	
Zip code:	Contact person:
Tel.:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Date of purchase:
Service unit:	
Contact person:	Tel.:
Maintenance personnel:	Tel.:
Date of maintenance:	
User evaluation of service quality: <input type="checkbox"/> Good <input type="checkbox"/> Better <input type="checkbox"/> General <input type="checkbox"/> Poor Other opinions: User's signature: DD/MM/YYYY	
Return visit record of Customer Service Center: <input type="checkbox"/> Telephone follow-up <input type="checkbox"/> Letter follow-up Other: Signature of technical support engineer: DD/MM/YYYY	

Notes: This order is invalid when the user cannot be interviewed.

MEGMEET Shenzhen Megmeet Welding Technology Co., Ltd.

Laser Welding Machine Warranty card

User company name:	
Detailed address:	
Zip code:	Contact person:
Tel.:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Date of purchase:
Service unit:	
Contact person:	Tel.:
Maintenance personnel:	Tel.:
Date of maintenance:	
User evaluation of service quality: <input type="checkbox"/> Good <input type="checkbox"/> Better <input type="checkbox"/> General <input type="checkbox"/> Poor Other opinions: User's signature: DD/MM/YYYY	
Return visit record of Customer Service Center: <input type="checkbox"/> Telephone follow-up <input type="checkbox"/> Letter follow-up Other: Signature of technical support engineer: DD/MM/YYYY	

Notes: This order is invalid when the user cannot be interviewed.

Notice to users

1. Warranty scope refers to the laser welding machine.
2. **The warranty period for the whole machine is 12 months and for the laser generator is 24 months.** Under the normal use of the warranty period, the laser welding machine is faulty or damaged. We repair it free of charge.
3. The start time is the manufacture date of this machine. The code number of machine is the only basis to judge the warranty period. The equipment without the code of welding machine is treated out of warranty.
4. If any of the following conditions occur even during the warranty period, a certain maintenance fee will be charged:
 - The fault of machine is caused by failure to operate according to user manual;
 - The damage of machine is caused by fire, flood, voltage abnormality, etc.;
 - The damage of machine is caused by the use of abnormal function.
5. The service fee is calculated according to actual costs. If there is another contract, it must follow the principle of contract priority.
6. Please keep this card and show it to the maintenance unit during the warranty period.
7. In case of any question, please contact the agent or contact with our company directly.

Shenzhen Megmeet Welding Technology Co., Ltd.
Customer service center

Address: 4-5th Floor, Block 2, New Materials Industrial Park, No28, Langshan Road,
Nanshan District, Shenzhen, Guangdong Province, China
Postal code: 518057
Customer service hotline: 4006662163

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