User Manual

Hand-held Fiber Laser Welding Machine LUX Series

LUX-3000

MEGMEET

LUX-3000 Hand-held Fiber Laser Welding 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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Preface

Thank you for buying LUX-3000 hand-held fiber laser welding machine (hereinafter referred to as laser welding machine) made in our company.

This manual provides the users with the instruction of installation and debugging, function setting, operation specifications, error diagnosis, and device maintenance. Please read this user manual carefully before installing, so as to ensure correct installation and operation for laser welding machine, and give full play to its superior performance. Please keep properly and send the manual to user.

Our company conducts product development and innovation continuously. If the contents, parameters and pictures in this user manual are inconsistent with the real object, the actual product shall prevail.We may make any change without prior notice.The Company has the right of final interpretation of the user manual.

Safety Precautions

Safety Definition

In order to use this hand-held laser welding 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.

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

Please operate as required, otherwise it may result in moderate or minor injury or damage to property.

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

Laser Precautions

- This series of laser welding machines output 1080±10nm 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 welding, 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 welding 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, the stronger the protective capability of laser protective glasses;
- It is forbidden to look straight at the welding head or align at others with the tip of welding 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;
- To ensure the safety use of torch. Laser is only output when torch is in contact with plate; When the torch leaves the welding surface, laser emission is automatically stopped.
- 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

DANGER

- During the installation, repair and maintenance of laser welding machine, it is necessary to turn off the main power. Installation, repair and maintenance when the welding 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 380VAC. When using it, please ensure the input power supply is connected to an effective protective ground, otherwise it may cause equipment damage and personal injury；
- Input cables must be connected in U/V/W phase sequence, and the cable specifications must be greater than or equal to 4x4mm^2
- 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.

CAUTION

- When handling, moving and maintaining this series of laser welding machines, to be careful with 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 welding, 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 welding 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 shall be between -10 and 40℃ to ensure that welding machine is in the best working condition. Keep the room temperature stable, install air conditioning. The relative humidity should be below 70%, dry;
- To ensure the clean air of welding 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

DANGER

- Operators must get pre-job training, grasp the structure and performance of this laser welding machine,
  be familiar with the operation procedures and obtain the license qualification, and understand the knowledge of safe operation and welding skills before welding;
- 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 welding 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 welding 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 welding in a narrow or confined space, the welding 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 weld pressure vessels such as gas pipes with gas,sealed tanks with gas. Do not weld near 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 welding gun immediately and press the emergency stop button immediately.

- The requirements of operational environment are as follows:

  Installation environment: smooth, no vibration and impact;

  Working environment temperature: -10 ~ 40℃;

  Transport and storage temperature: -20 ~ 60℃;

  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 welding machine;

  Blue background safety labels are located on the cover of the laser welding machine;

  CE nameplate label is located at the back of the laser welding machine;

  Laser aperture label is located on the welding torch.

Contents

Chapter 1 Product Overview

1.1 Product Introduction

Megmeet LUX-3000 hand-held fiber laser welding machine has integrated high-power fiber laser (generator), dual temperature and dual control cooling module, laser welding torch and control system, with stable output of 1080±10nm band laser. It is able to weld various metal materials, including carbon steel, stainless steel, high strength steel, galvanized sheet, corrugated plate, aluminum alloy, magnesium alloy, titanium alloy, etc. It is applied to sheet metal processing, auto parts, two/three wheeler, house appliances, hardware cabinets, handrails, doors and windows, Tableware, kitchenware, lamps and other industries.

1.2 Features of Laser Welding 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．With two modes of continuous and pulse, it is suitable for heat conduction welding of thin sheet, the deep fusion welding of medium and thick plate, with a large depth-to-width ratio;

2．With high efficiency, it saves time and labor, and the efficiency of one laser welding machine is equivalent to the efficiency of four units of TIG welding machines.

- 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, suitable for hand-held welding and robotic welding.

1.3 Diagram of Laser Welding Machine

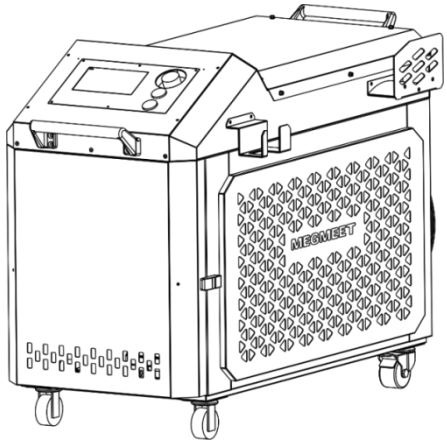


Figure 1-1 Diagram of laser welding machine

1.4 System Composition

Welding machine system consists of laser main machine, wire feeder, gas supply system, safety ground lock signal cable, wire feeding signal control cable, wire feeding spring tube, welding torch and combined control cable. As shown in Figure 1-2.

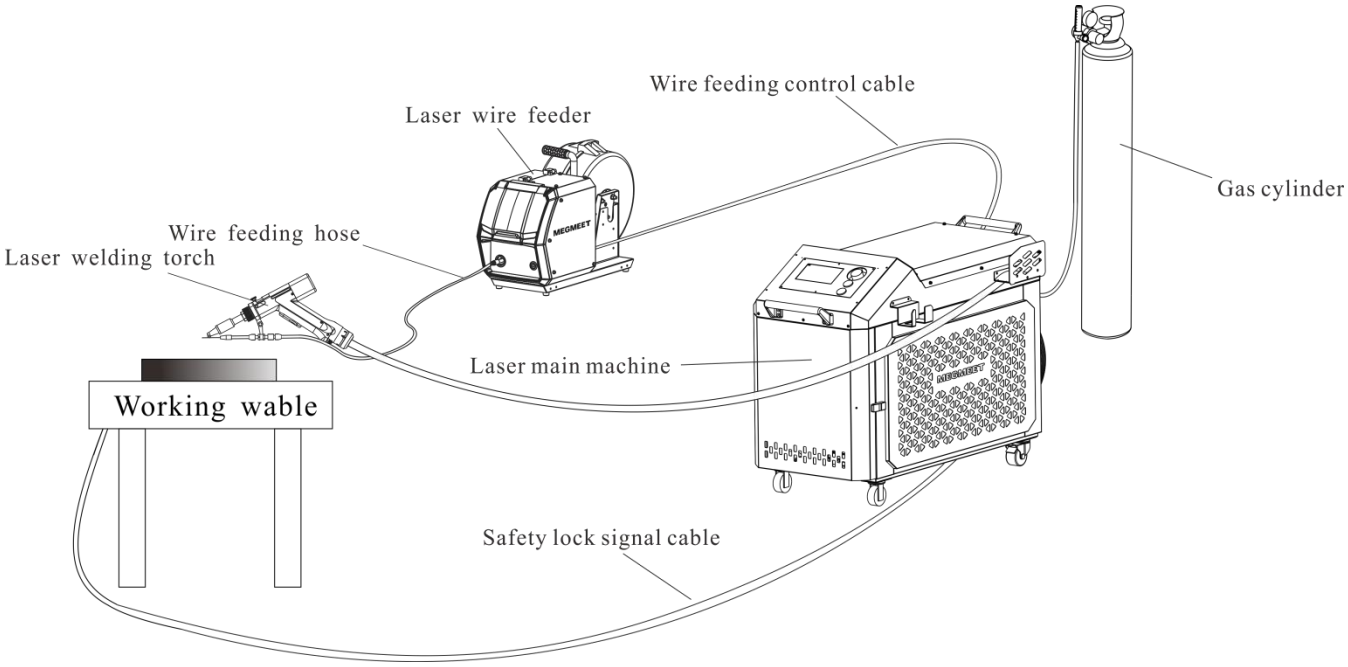


Figure 1-2 Connection diagram of Lux-3000 hand-held fiber laser welding system

1.5 Model Explanation

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

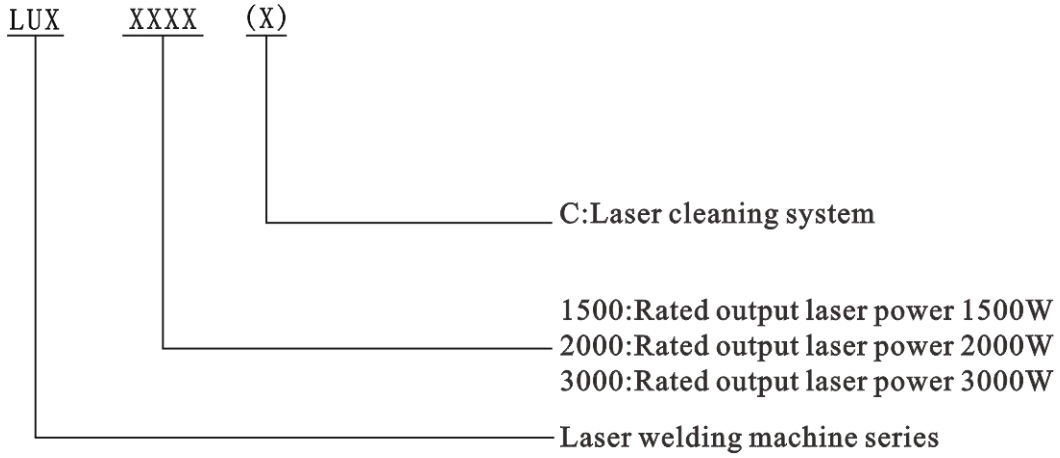


Figure 1-3 Diagram of welding machine models

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

1.6 Configuration Description

Refer to ☞Appendix I System Configuration Table.

1.7 Specification and Dimensions

Dimensions of welding machine are shown in Table 1-1:

Table 1-1 Welding machine models and dimensions

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

The dimensions of main machine are shown in Figure 1-3.

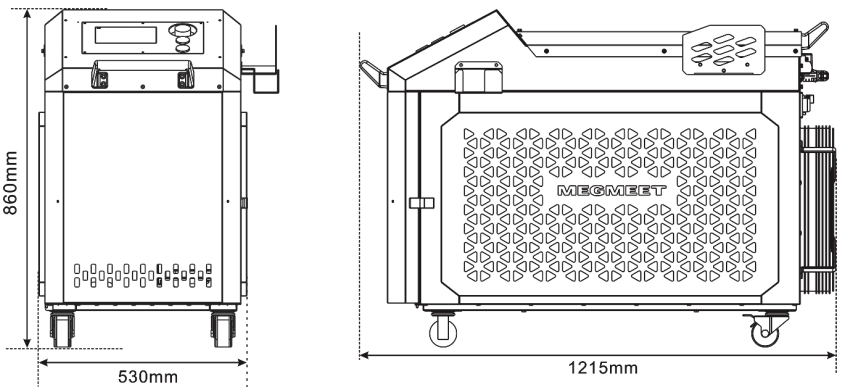


Figure 1-3 Dimensions of welding main machine

1.8 Electrical Parameters

Electrical parameters of welding machine are shown in Table 1-2:

Table 1-2 Electrical parameters of welding machine

Model	LUX-3000
Rated input voltage/phase number	Three phase 380VAC（±10%）+PE
Input power frequency	50/60Hz
Rated input power	13kW
Rated input current	22A
Rated output laser power	3000W
Output laser wavelength	1080± 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 laser welding 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 welding 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．Do not use front and rear handles of machine for lifting.

2.2 Installation Requirements

- Site requirements

Laser welding machine must be installed in an independent space of no less than 15m2 (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 welding machine;

2．The ambient temperature shall be between - 10 and 40℃ to ensure that the welding 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．The power supply is 3-phase 380VAC. When the device is in use, ensure that the device is connected to a valid protective place;

2．The rated maximum input current is 22A;

3．Input cables must be connected in U/V/W phase sequence, and the cable specifications must be greater than or equal to 4x4mm^2

2.3 Electrical Connection Step

Steps

1. Welding torch installation (Refer to ☞2.3.1 Welding Torch Installation);
2. The control cable connection of wire feeder (Refer to ☞2.3.2 Connection of wire feeder control cable);
3. Safety ground lock cable connection (Refer to ☞2.3.3 Safety ground lock cable connection)
4. Protective gas hose connection (Refer to ☞2.3.4 Protective gas hose connection);
5. Connection of power input cable (Refer to ☞2.3.5 Connection of power input cable).

2.3.1 Installation of welding torch

Steps

1. Pull out the black rubber plug of welding torch head, loosen the round nut, insert the calibration tube and tighten the round nut;
2. Align the copper welding tip with the calibration tube and tighten it;
3. Align the wire feeding bracket with the screw hole under the torch head, and use the hex screws to tighten;
4. Take out a nut and a patch at the outlet of wire feeding hose, and place the end of the wire outlet into the wire feeding bracket, and fasten with the newly removed patch and nut;
5. Tighten the wire nozzle and the straight tube of guide wire, string the lock nut and the straight tube of the wire guide into the end of the wire outlet, tighten the nut with a wrench until the straight pipe of the guide wire does not shake. As shown in Figure 2-1.

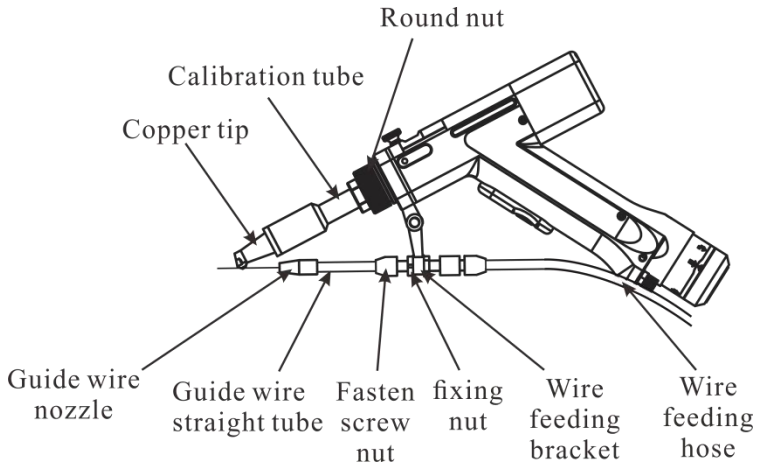


Figure 2-1 Installation diagram of welding torch

Note

1．When using or storing the welding torch, it must be handled gently to avoid impact and fall, causing damage to vulnerable parts such as motors and lenses;

2．Since the combination control cable of welding torch has optical fiber, it is necessary to avoid tying, bending, twisting, improperly pulling, or stepping on the cable. Otherwise, it will cause the damage of optical fiber;

3．If the welding torch is not used for more than 4 hours, the copper tip should be sealed with tape.

2.3.2 Connection of Wire Feeding Signal Cable

Steps

1. Connect the wire feeder signal control cable to the control cable connector and tighten it, as shown in Figure 2-2;

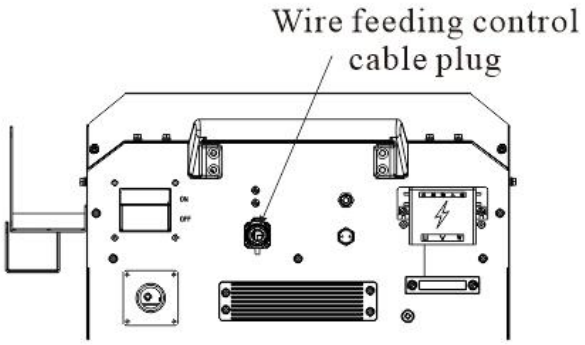


Figure 2-2 Connector for wire feeding signal control cable diagram

2. Insert the other end into the socket on the back side of wire feeder and tighten it. The wire feeder control cable is connected, as shown in Figure 2-3;

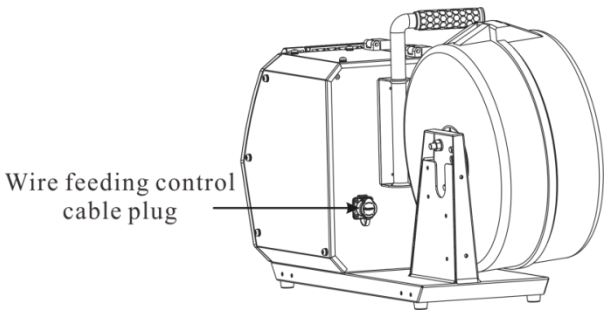


Figure 2-3 Diagram of back-side connector of wire feeder

2.3.3 Connection of Safety Ground Locking Cable

Steps

Fix one end of the safety ground lock cable to the safety ground lock cable connector of the welding machine, and connect the other end to the work-piece to complete the connection of the safety ground lock cable. As shown in Figure 2-4.

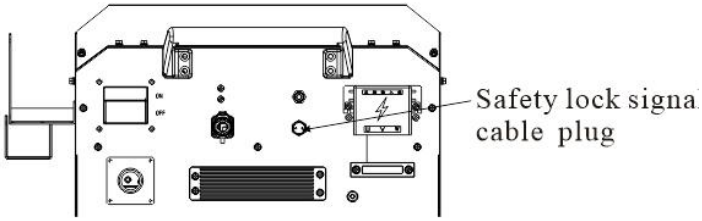


Figure 2-4 Diagram of safety ground lock cable connector

2.3.4 Protective Gas Hose Connection

Steps

Connect one end of the gas hose to the gas hose connector on the fixed plate of welding 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 2-5.

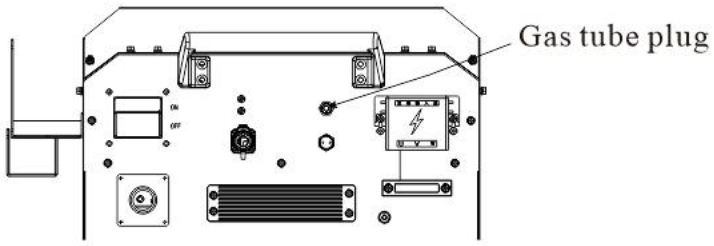


Figure 2-5 Diagram of gas hose connector

Note

1. Welding of carbon steel and stainless steel by nitrogen is better than argon (Do not use 100% CO_2 or 80% Ar+20% CO_2). Welding of aluminum alloy by pure argon is better than nitrogen;
2. The gas hose at the end of welding machine and the gas meter must be tightened to avoid air leakage.

2.3.5 Connection of Power Input Cable（380VAC)

Steps

1. The input wiring of this product requires wiring in U/V/W phase sequence. When using, please ensure that the machine is connected to a reliable and effective protective ground. The schematic diagram is shown in Figure 2-6.

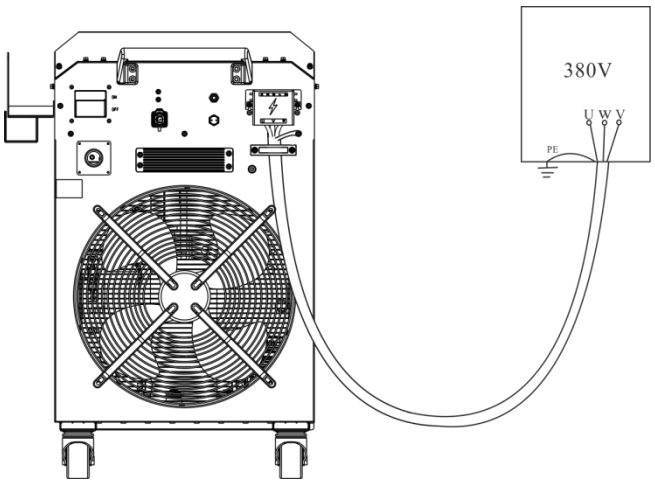


Figure 2-6 Power input connection diagram

Note： the cable specifications must be greater than or equal to 4x4mm^2

2. Connect the input power cable at the backside of the wire feeder to the power connector of the laser welding machine, and check whether it is tightened, as shown in Figure 2-7.

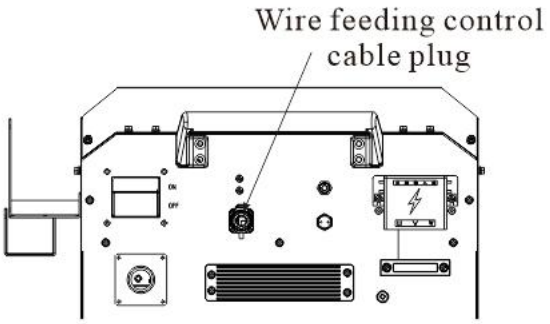


Figure 2-7 Diagram of the power connector of laser wire feeder

Chapter 3 Function Description and Operation

3.1 Laser Welding System

3.1.1 Home Page Interface

Home page functions of welding system control panel are shown in Figure 3-1 and Table 3-1.

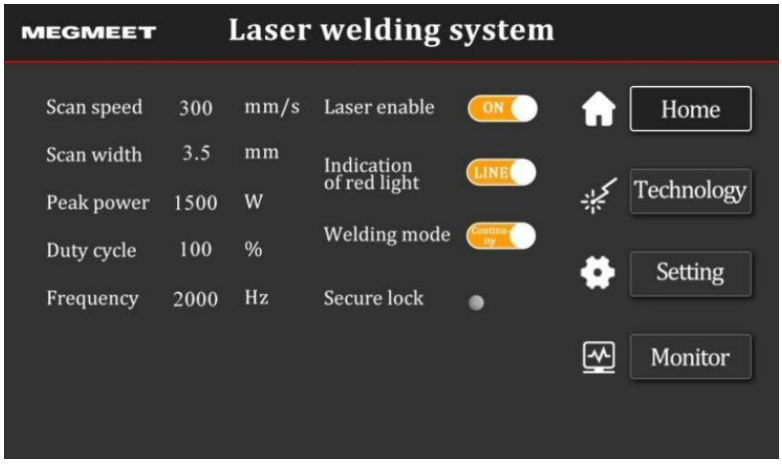


Figure 3-1 Home page on control panel

Table 3-1 Description on home page functions of control panel

Name	Parameter description	Notes	Default value
Scanning speed	The number of laser beam scanning on welding seam per second	Range: 2-6000mm/s	300mm/s
Scanning width	The width scope covered by laser beam in the welding process	Range is 0-6mm, commonly used for 2.5-4mm. If scanning width is set to 0, the machine will not scan (that is, point light source)	2.5mm
Peak power	Maximum instantaneous output power of the laser pulse	Peak power shall be smaller than the laser generator power on setting interface	/
Duty cycle	In a certain period of time, the time proportion of operation state of laser welding machine	Range 0-100%	100%
Pulse frequency	The frequency of laser pulse repetition per second	Range 5-100000Hz, Recommended value is 5-5000Hz	2000Hz
Laser is open	Laser light is open.	After turning off, no signal is sent to the laser generator, which can be used to test gas supplying.	/
Red indicating light	Indicate the red light shape from the copper tip, which is point or line.	When turning off the red indicating light, motor stops swinging, and the red light is a point for adjusting the center position.	/

Welding mode	It indicates the type of welding, which is spot welding or continuous welding.	If select spot welding, you must set the spot welding type on the setting screen.	/
Safety ground lock	It is a safety device that plays a protective role when the ground wire of laser welding machine is damaged or improperly grounded.	It is used to indicate whether light is output. The light is output when green light is on. The light cannot be output when gray light is on.	/

🕮 Note

The gas hose at the end of the welding machine and the gas meter must be tightened to avoid air leakage.Current process parameters (process cannot be modified on this interface) and real-time alarm information are displayed on this interface.

3.1.2 Welding program Interface

Current welding program interface provides self-editable process parameters for users to save and recall parameters, as shown in Figure 3-2.

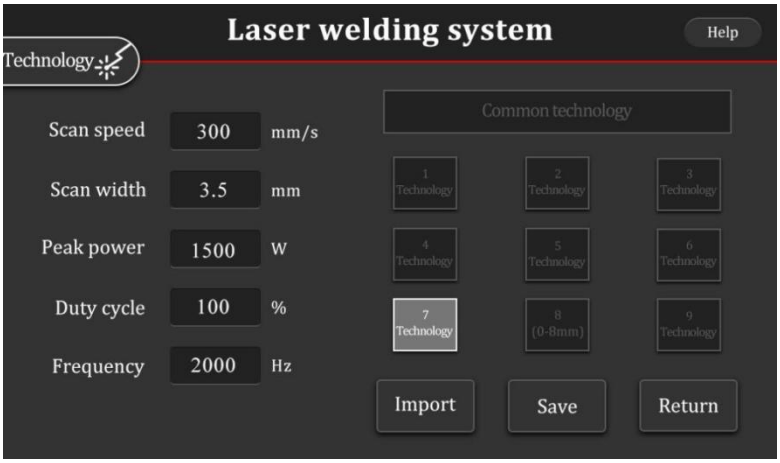


Figure 3-2 Process interface on the control panel

Click [Value] to change welding process parameters. After modification, click [Save] in the shortcut [Welding Process], a total of 10 groups, click [Import] when using.(Modify - Save - Import).

Example:scanning speed is 300mm/s, duty ratio is 100%, pulse frequency is 2000Hz , as shown in Table3-2.

Table 3-2 Welding process reference

Welding parameters reference of Ø1.0 carbon steel & stainless steel welding wire				Welding parameters reference of Ø1.0 aluminum alloy welding wire			
Thickness (mm)	Wire feeding speed (cm/min)	Scanning width (mm)	Peak power (W)	Thickness (mm)	Wire feeding speed (cm/min)	Scanning width(mm)	Peak power (W)
1	80-250	2	300-500	1	80-180	2	500-800
2	80-200	3	400-800	2	80-160	3	600-1000
3	80-150	3.5	800-1300	3	80-120	3.5	1000-1500
4	80-120	4	1200-1500	4	80-100	4	1300-1500
Welding parameters reference of Ø1.2 carbon steel & stainless steel welding wire				Welding parameters reference of Ø1.2 aluminum alloy welding wire			

1	80-250	2	400-500	1	80-180	2	500-800
2	80-200	3	500-800	2	80-160	3	600-1000
3	80-150	3.5	800-1300	3	80-120	3.5	1000-1500
4	80-120	4	1200-1500	4	80-100	4	1300-1500
Welding parameters reference of Ø1.6 carbon steel & stainless steel welding wire				Welding parameters reference of Ø1.6 aluminum alloy welding wire			
1	80-250	2	600-700	1	80-180	2	500-800
2	80-200	3	500-800	2	80-160	3	600-1000
3	80-150	3.5	800-1300	3	80-120	3.5	1000-1500
4	80-120	4	1200-1500	4	80-100	4	1300-1500

Caution

[Welding Process 8] scanning width range from 0 to 8mm, the maximum scanning width of other welding processes is 6mm.

3.1.3 Setting Interface

On the home page, click [Settings]. On the password input page, click anywhere to trigger the keyboard, and input the password 123456 to enter into setting interface. If the keyboard has been triggered, you must enter the password, no matter the password is right or wrong, otherwise click [Return], no response. Figure 3-3 and 3-4, the description of functions are shown in Table 3-2 and 3-3.

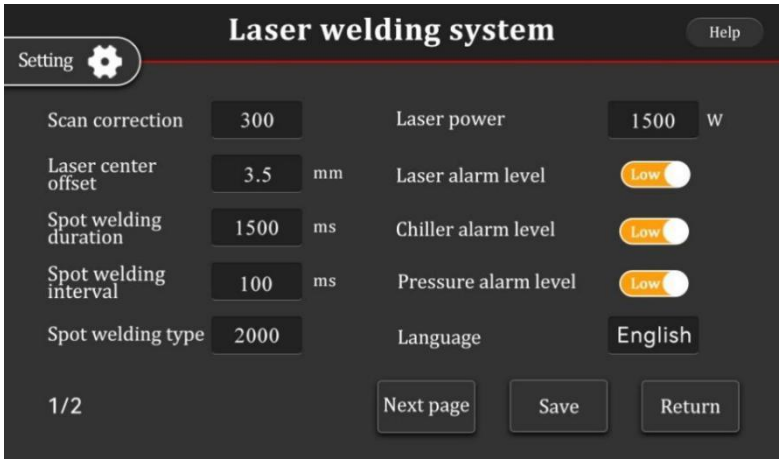


Figure 3-3 Control panel setting interface

Table 3-2 Setting interface function description

Name	Parameter description	Notes	Default value
Scanning correction	Adjust scanning system of laser welding machine to achieve accurate welding path and scanning speed results.	Range 0.01-4	1
Laser center bias	Deviation of laser center position	The range is -3 ~ 3mm, 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.	
Spot welding duration	Welding time per cycle	Used for spot welding mode	/
Interval time of spot welding	Dwell time per cycle	Used for spot welding mode	/
Type of spot welding	It shows the type of welding in spot welding mode.	Used for switching between "fish scale welding" and "intermittent welding" in spot welding mode.	/
Laser power	Maximum power of laser	Enter the actual laser power here	/
Language	Show the language of current system	Click to switch to another language	/
Laser alarm	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.	/
Water-cooling machine alarm	During use, the water-cooler automatically triggers the alarm under abnormal circumstances.	The damaged fan, too high water temperature, insufficient water flow caused by bent water pipe,-water leakage at the water pipe junction cause the alarm of water-cooling machine.	/
Barometric alarm level	During use, the air supply equipment automatically triggers under the alarm abnormal circumstances.	Insufficient gas cylinder pressure, and gas pipe leakage will cause air pressure alarm.	/

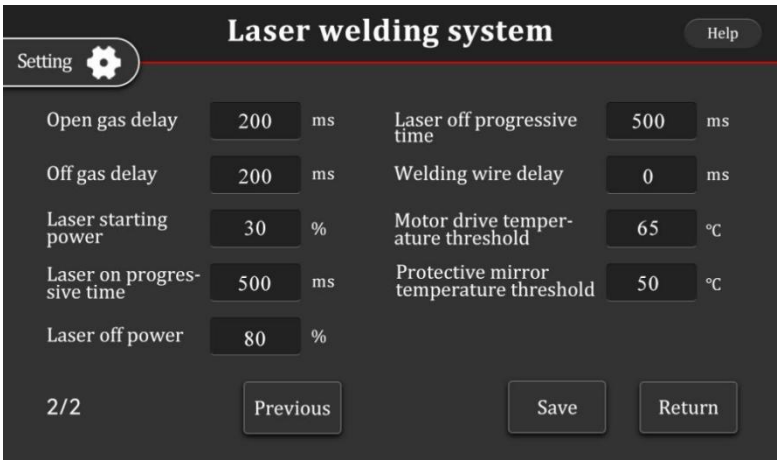


Figure 3-4 Control panel setting interface

Table3-3 Setting interface function description

Name	Parameter description	Notes	Default value
Pre Gas	Pre Gas Time	Range 0-3000ms, recommendation for 200-500ms	200ms
Post Gas	Post Gas time	Range 0-3000ms, recommendation for 200-500ms	200ms
Turn-on optical power	Initial optical output power	/	20%
Turn-off optical power	End optical output power	/	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 progressive time	It indicates the time required from the welding power to turn-off optical power	/	200ms
Wire feeding delay compensation	It refers to the wire feeding advance time relative to the optical output signal.	It can be used with the withdrawing function.	0

Motor driver temperature threshold	It shows that the motor drive temperature has reached its maximum temperature.	Alarm when the measured temperature exceeds 70℃. When the threshold is set to 0, no temperature alarm is detected.	70℃
Temperature threshold of the 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.		

📖 Note

At the time of optical output, the optical output power is progressive to the welding power. At the time of optical turn-off, the welding power is progressive to the turn-off optical power, as shown in Figure 3-5.

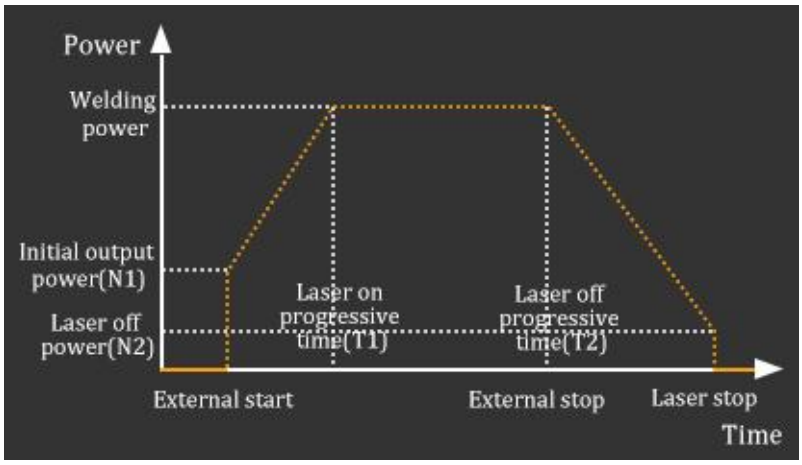


Figure 3-5 Sequence diagram of optical output control

3.1.4 Monitoring Interface

Status and device information of each signal are displayed on this interface, as shown in Figure 3-6.

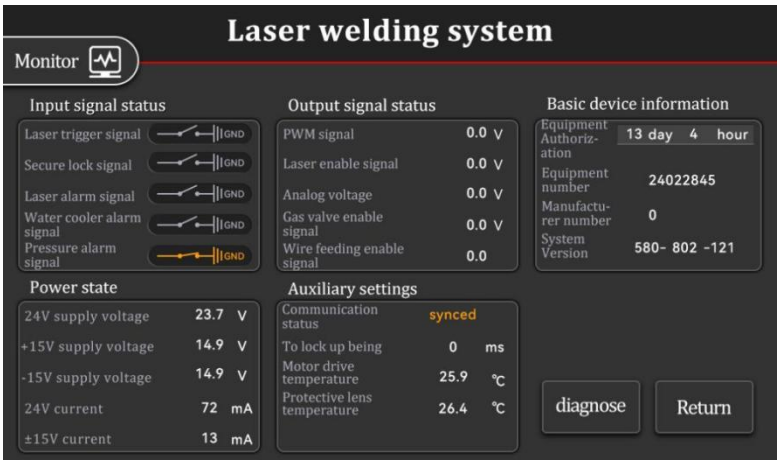


Figure 3-6 Monitoring interface on control panel

Table3-4 Status function description

Name	Parameter description	Notes
Laser trigger signal	Switch button signal on the welding torch	After pressing the welding torch switch, the signal closes, and the state changes from dark to bright. Releasing the welding torch switch, the signal is

		disconnected, and the state changes from high light to dark.
PWM	Pulse width modulation	24V output when working. If the output value is inconsistent with the test value, the load is abnormal.
Analog	A quantity that varies continuously within a range	Output of the rated voltage control signal when working, 10V output at full power. If the output value is inconsistent with the test value, the load is abnormal.
Gas valve is open.	It means that gas value is opened gas supply.	If the output value is inconsistent with the test value, gas leakage may occur.
Wire feeding is open.	It means the wire feeder is allowed to feed wires.	Observe the status of wire feeder to check whether wire feeding is normal.
Communication status	It shows the communication between touch screen and main board.	If they are not synchronized, check the screen connection cable.
Ground lock anti-shake	When the trigger signal is normal and the disconnection time of the safety ground lock signal is less than “n”, the light is emitted continuously.	It is used to handle the poor contact of safety ground lock, and the range is 0-300ms.
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 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 real-time temperature of collimator lens	

- Introduction on ground lock anti-shake

1．Click “Device Authorization “and set the parameter range on the password page. For example, set the password “ffffffaa300” on the password page. Among them, “ffffffaa” indicates ground lock anti-shake parameter and “300” indicates 300ms. As shown in Figure 3-7;

2．This effect is normal in the laser trigger signal. When the disconnection time of the safety ground lock signal is less than 300ms, the light is output continuously;

3．When it is used to handle the materials with poor surface properties, resulting in unsTable electrical conductivity (such as corrosion), the time is usually set to 0.

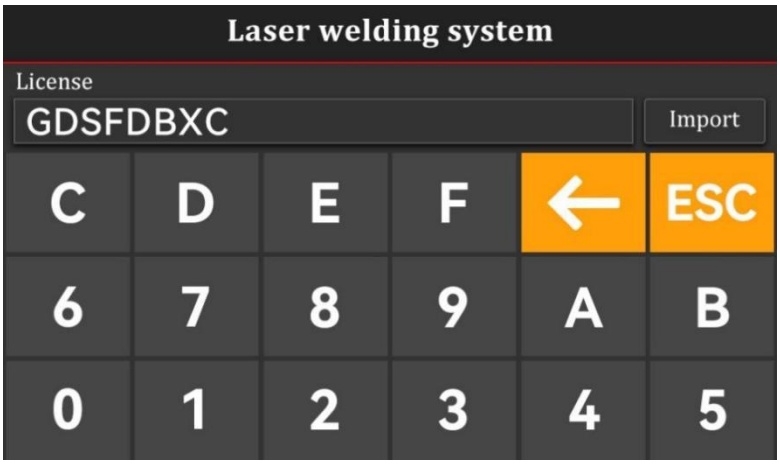


Figure 3-7 Monitoring interface - Auxiliary status bar - Ground lock anti-shake password

3.2 Laser Cleaning System

3.2.1 Interface Description of Home Page

Click on the home page of welding system control panel, power off and restart according to the prompt, and then switch to laser cleaning system. The home page of laser cleaning system panel displays the current process parameters (the parameters cannot be modified directly on this page); click again to switch to laser welding system. As shown in Figure 3-8.

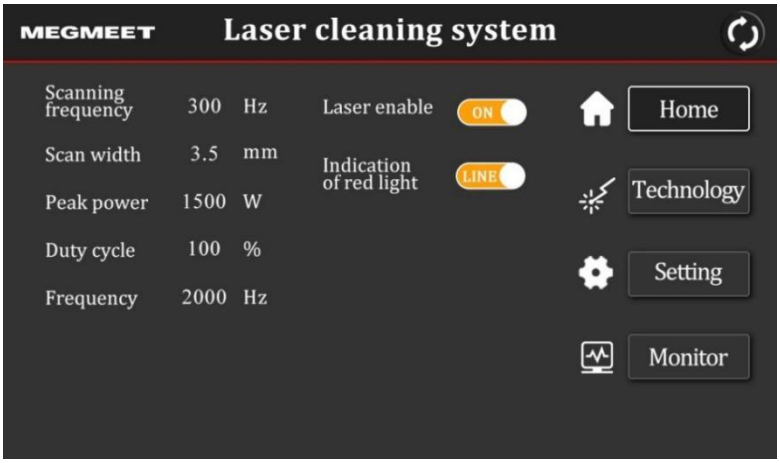


Figure 3-8 Home page of laser cleaning system

Table 3-5 Description on the home page functions of laser cleaning system

Name	Parameter description	Notes	Default value
Scanning frequency	The number of laser beam scanning on the work-piece per second	Range: 10-100Hz	50
Scanning width	The width scope covered by the light spot in the scanning process	For SUP23T focusing mirror, the width of F150 ranges from 0 to 30mm, and the width of F800 ranges from 0 to 130mm. Different types of welding ~~guns~~ torches and focusing mirrors correspond to different width ranges, ~~and~~ you can view them on the settings page.	/
Peak power	The maximum instantaneous output power of the laser pulse	Peak power shall be smaller than the laser power on the setting interface	/
Duty ratio	The ratio of laser welding 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
Laser is open.	Laser light is enabled.	After turning off enabling, no enable signal is sent to the laser, which can be used in the test of exhaust function.	/
Red indicating light	The red light shapes from the welding torch are divided into points and lines.	When turning off the red indicating light, the motor stops swinging.At this moment, the red light is a point for adjusting the center position.	/

3.2.2 Cleaning Program Interface Description

On the home page of laser cleaning system, click the "Process" button to enter the process interface. The process interface provides self-editable process parameters for users to save and recall. As shown in Figure 3-9.

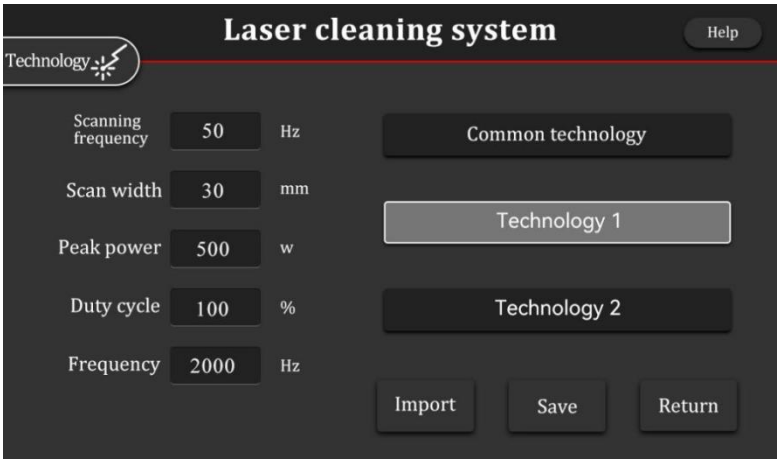


Figure 3-9 The process interface of cleaning system

Click [Value] to modify the welding process parameters. After modification, click [Save] in the shortcut [Process], a total of 3 groups, click [Import] when using.

3.2.3 Setting Interface Description

Click [Settings] on the home page of cleaning system. 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 awakened, the password must be entered, otherwise clicking [Back] is unresponsive.

Figure 3-10 and 3-11, the description of functions are shown in Table 3-6 and 3-7.

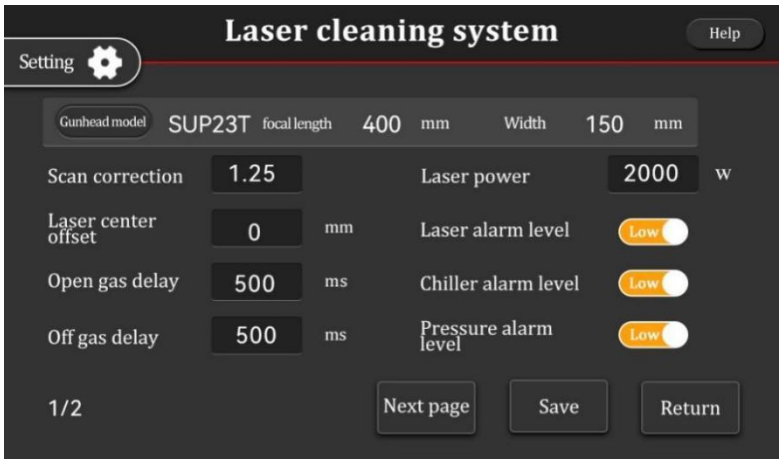


Figure 3-10 Setting interface of cleaning system

Table 3-6 Setting description of cleaning system

Name	Parameter description	Notes	Default value
Scanning correction	Adjust scanning system of laser welding machine to achieve accurate welding path and scanning speed results.	Scope 0.01-4	1
Laser center bias	Deviation length of laser center position	The value ranges from -3 mm to 3mm. Negative values shift left, positive values shift right, which are used to adjust the axis red light center. Cleaning mode displays the current offset only. If you want to adjust, it is necessary to switch to welding mode and replace with F150 focusing mirror.	/
Pre Gas	Pre Gas Time	Range 200-3000ms	200ms
Post Gas	Post Gas time	Range 200-3000ms	200ms
Laser power	Maximum power of laser	Enter the 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 level of water-cooler	During use, the water-cooler automatically triggers the alarm under abnormal circumstances.	Damaged fan, too high water temperature, insufficient water flow, bent water pipe, and water leakage at the water pipe junction cause the alarm of water-cooling machine.	/
Barometric alarm level	During use, the gas supply equipment automatically triggers the alarm under the abnormal circumstances.	Insufficient gas cylinder pressure, and gas pipe leakage will cause air pressure alarm.	/

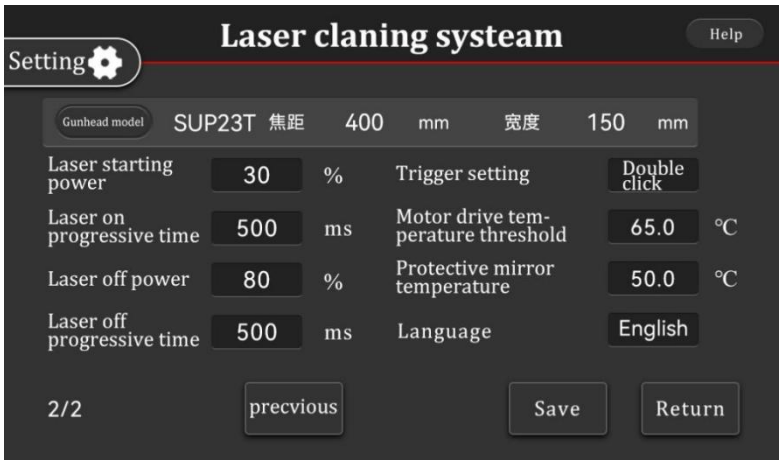


Figure 3-11 Setting interface of cleaning system

Table 3-7 Setting description of cleaning system

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
Motor driver temperature threshold	It shows that the motor drive temperature has reached its maximum temperature.	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 the 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 the current system	Click to switch to another language	/

After entering the setting interface, click Gunhead model to enter 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 150mm focal length - 30mm width, you must replace the focus lens of welding torch with the lens of 150mm focal length. At this time, the maximum scanning width of light spot 30mm. Please set the proper scanning width according to the actual focus lens model. As shown in Figure 3-12.

Figure 3-12 Focus lens selection interface

3.2.4 Monitoring Interface Description

Click [Monitor] on the home page of the cleaning system to enter the cleaning mode monitoring interface. The status of each signal and device information are displayed on the interface. Laser/water-cooling machine/air pressure alarm signal detects its set high and low level. 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, the meaning of which are：hardware version - single-chip microcomputer program version - touch screen version. As shown in Figure 3-13.

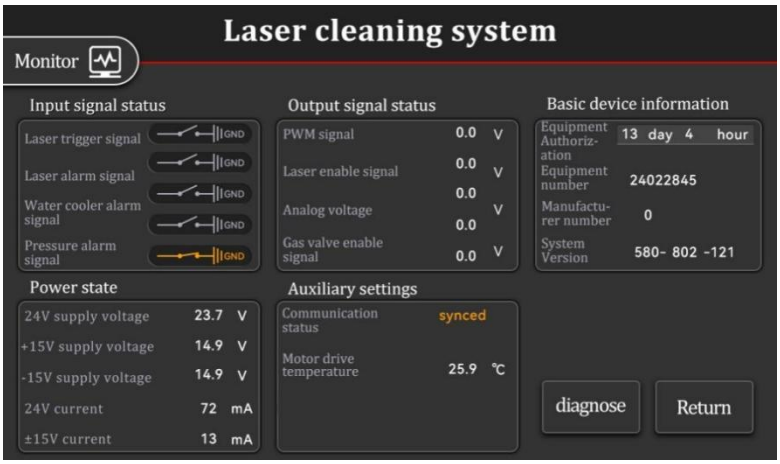


Figure 3-13 Monitoring interface of laser cleaning system

Table 3-8 Description on the cleaning system monitoring interface

Name	Parameter description	Notes
Laser trigger signal	Switch button signal on the welding torch	After pressing the welding ~~gun~~ torch switch, the signal closes and the state changes from dark to bright. Releasing the welding torch switch, the signal is disconnected and the state changes from high light to dark.
Power status	Current supply voltage and current value of the device	The supply voltage helps you troubleshoot power failures.
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 open.	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	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 gas valve is open.	Control the working and non-working status of gas 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.
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 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 real-time temperature of collimator lens	

On the monitoring page, Click [Diagnosis] to enter the diagnosis page. The laser does not output light on this page. PWM, laser open, gas valve open and analog are all 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 3-14.

Figure 3-14 The diagnosis interface of laser cleaning system

3.2.5 Preparation before Cleaning

For SUP20T welding torch, user can directly loosen the round nut, take out the chuck and replace it with a clear dust cover; for SUP23T welding torch, the operator shall loosen the right lock nut, remove the chuck and replace it with a clear dust cover. As shown in Figure 3-15.

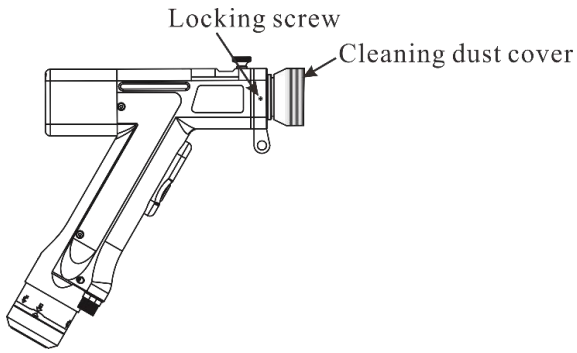


Figure 3-15 Diagram of cleaning SUP23T dust cover

- Confirm the focus point before cleaning

Method: By moving the welding torch back and forth to the workpiece in the sound of the largest, sparks the strongest point is the focal point .At this time, clean according to this distance. Oil-free, water-free compressed gas or other inert gases above 3KG are used to clean.

3.3 Description on Other Mode Functions

3.3.1 Weld Beam Cleaning

If use the weld cleaning function, please operate in weld mode. It must be replaced with [AS-2.0D] copper nozzle tip, and the copper tip opening is located above the weld beam to keep the safety ground lock smooth, and then starts the laser cleaning.

3.3.2 Cutting Mode

Set the scanning speed and scanning width to 0, replace with the copper nozzle tip [M8D1.5] for cutting to ensure the safety ground lock smooth, and then starts cutting operations. The parameters of cutting mode is shown in Figure 3-16.

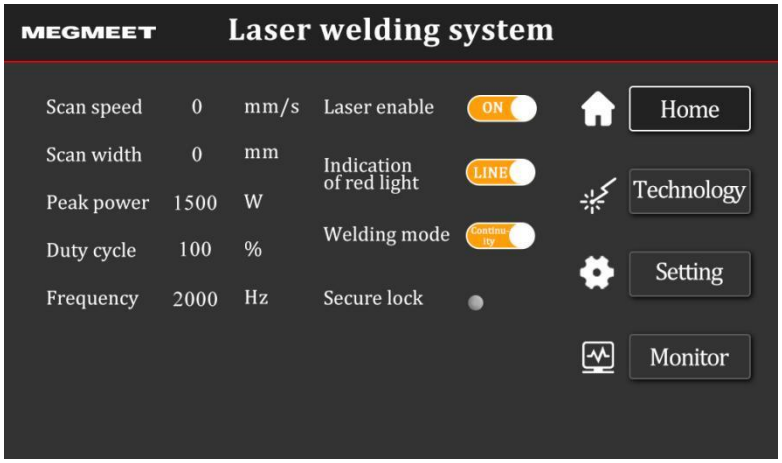


Figure 3-16 Parameters of the cutting mode

3.4 Description on Water-cooling Functions

3.4.1 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 3-13 Description on the water temperature settings of digital tube

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

* Notes: x is a specific number.

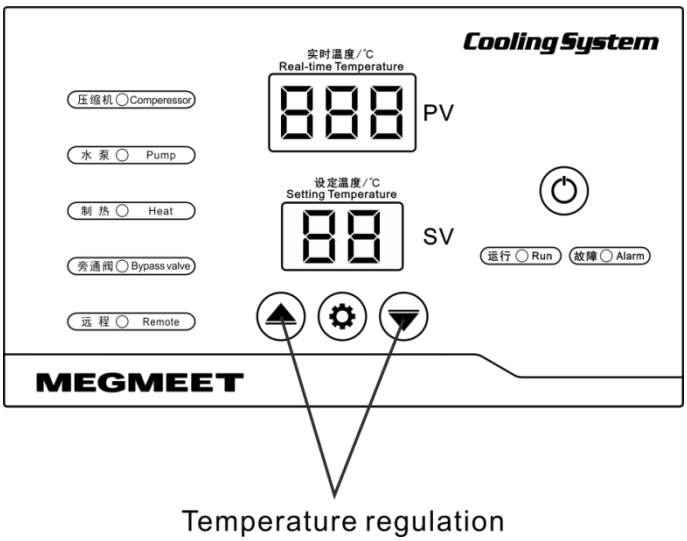


Figure 3-17 Water temperature settings

3.4.2 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 anti-freezing solution. When environment temperature is below 5℃, anti-freezing solution should be used. Do not change water temperature of factory setting at will.

3.5 Operation Process

3.5.1 On/OFF Process

- Startup process

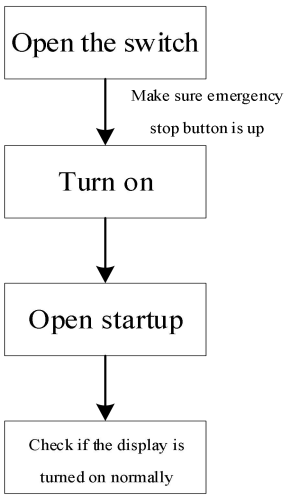


Figure 3-18 Startup flow chart

- Shutdown process

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

3.5.2 Process Operation Regulations

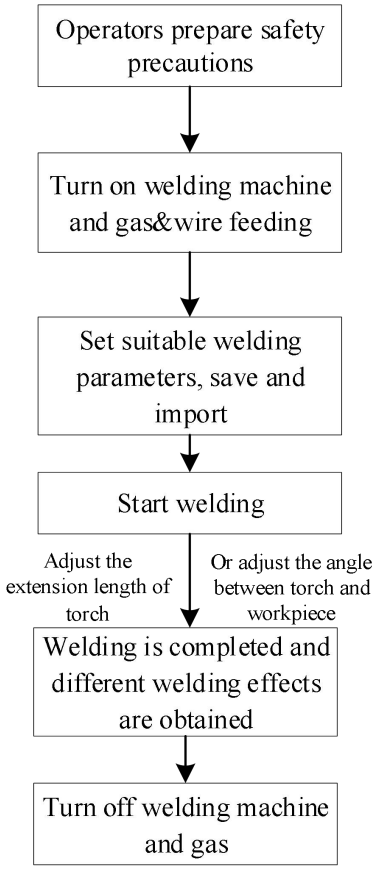


Figure 3-19 Process operation flow chart

Note

1. Click the hand-held torch head button“Press”to output light, and click “Release” to stop the laser. (Do not align at people or flammable materials);

2. For butt welding, the angle of welding torch shall be 45° ~ 60° with the surface of plate. (The red light indicates a 2mm line. When welding, the line segment shall be perpendicular to the welding direction to reach the ideal seam width);

3. For right-angle weld joint, welding torch shall be 45° with the vertical plate. The angle between two plates is used as support to push forward or pull back at a constant speed;

4. When the work-piece is inserted into torch nozzle, the focal length has a few millimeters of deviation. It is necessary to adjust the extension length of nozzle accordingly.

Chapter 4 Error Diagnosis

4.1 Common Anomaly Analysis on Display Screen

Table4-1 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 the alarm signal is not used, an alarm is given. Please change the alarm level on the screen settings page.
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 the alarm signal is not used, an alarm is given. Please change the alarm level on the screen settings page.
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

Table4-2 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
	E04	Phase sequence 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	Low temperature alarm of high temperature water

Chapter 5 Maintenance

5.1 Daily Inspection and Cleaning

🕮 Safety warning

Daily inspection must be conducted after turning off the power supply of the 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 the welding machine, 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 the 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 welding machine;

2．Pay attention to regular inspection, including internal inspection and cleaning of the welding machine;

3．In general, regular inspection is performed once every six 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.

Table5-1 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

Table5-2 Regular inspection and cleaning content

Item	Regular inspection and cleaning
Water-cooler	Regularly replace pure water or anti-freezing solution in the water-cooling box, remove the seal cap before adding water.
The 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 wire 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 of 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.

Table5-3 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.

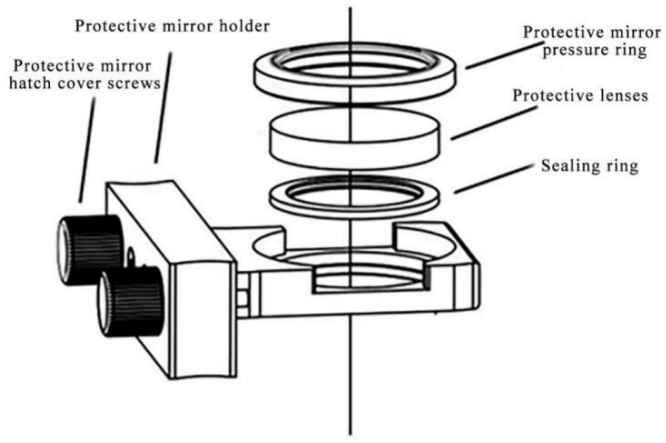


Figure 5-1 Protective lens diagram of welding torch

- 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.

Table5-4 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.

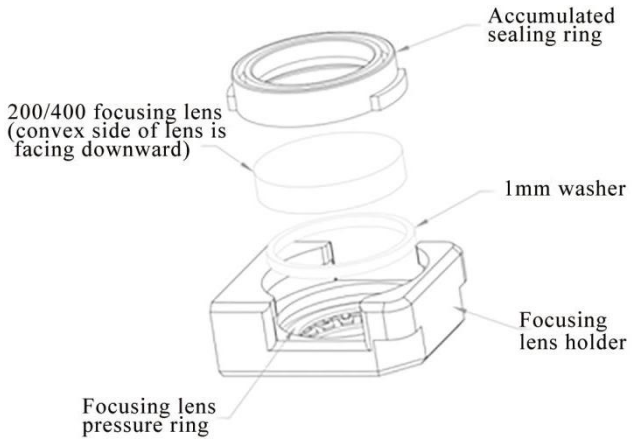


Figure 5-2 Focus lens diagram of welding torch

5.4 Red Light Correction

When the red light cannot emit from copper nozzle, 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).

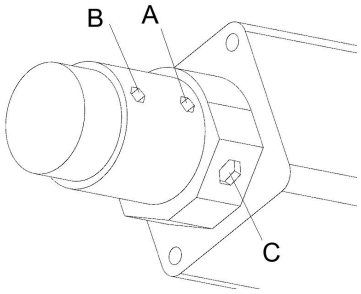


Figure 5-3 Schematic diagram of motor on the rear cover of welding torch

For example: If the red light cannot come out of the copper nozzle, 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 12 months, 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 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 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, misassembly and modification by professionals 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．Use beyond the specification range, wrong installation and maintenance;

5．The damage that is caused by misuse or failure to follow the information and warnings in the ***User Manual***;

6．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.

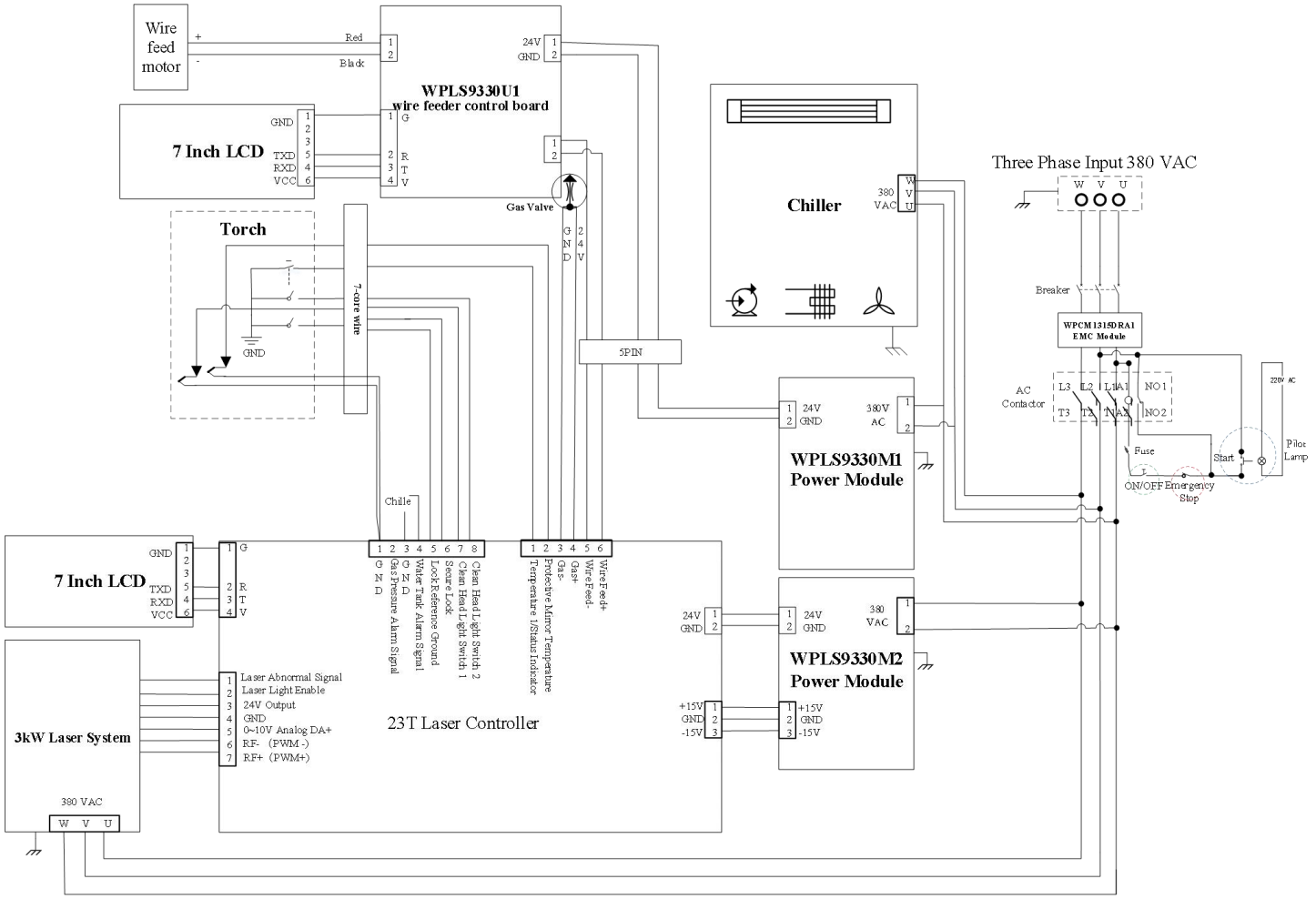
The above warranty and service terms of our products are used for user reference only. For the formal service and warranty contents, the agreement in the contract shall prevail.

Appendix I System Configuration Table

Configuration				Machine type
Name	Standard/ optional part	Qty	Notes	LUX-3000
Laser welding machine	Standard	1	Includes welding torch, combination control cable, and power cable	•
Wire feeder	Standard	1		•
Control cable of wire feeding signal	Standard	1	5m	•
Wire feeding hose	Standard	1	5m, including installation tools	•
Wire feeding roller	Standard	2	Optional (0.8/1.0)V/U,(1.2/1.6)V/U	•
Safety ground lock cable	Standard	1	5m	•
Protective lens	Standard	5	Spare part 5 PCS	•
Copper tip	Standard	8		•
Graduated tube	Standard	1		•
Dust-free cotton bud/dust-free cloth	Standard	1		•
User Manual	Standard	2	User manual of laser welding machine and wire feeder	•
Welding gloves	Optional	1		○
Protective glasses	Optional	1		○
Focus lens set	Standard	1		•
Cleaning dust cover	Standard	1		•

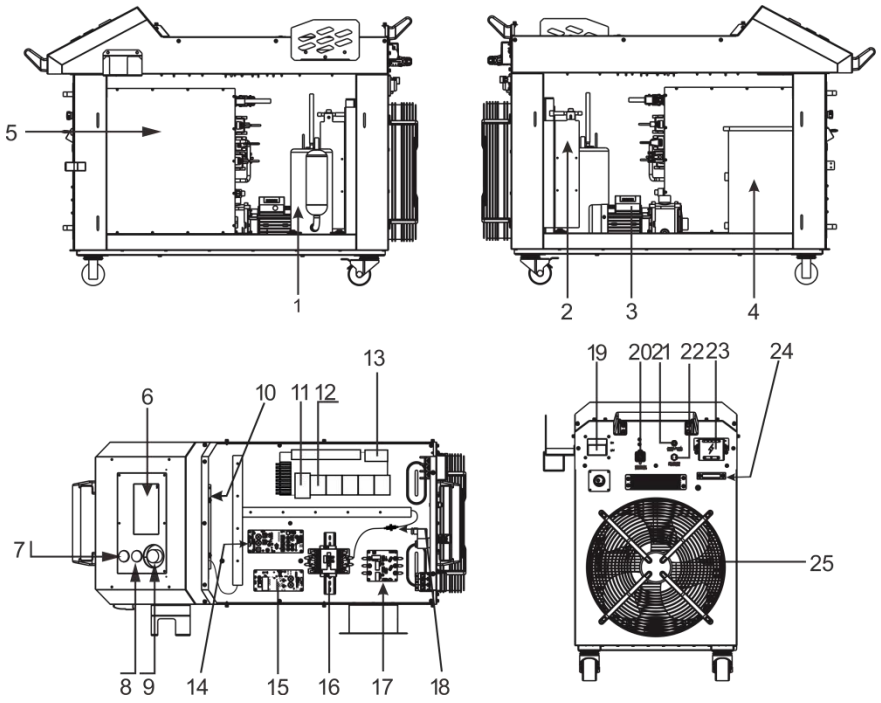
Notes: ●Standard part ,○Optional part

Appendix II Electrical Connection Diagram



Attached figure 2-1 Electrical connection diagram

Appendix III Laser Welding Machine Structure Drawing



1	Compressor-3000W	R37060114	13	Single phase transformer	R37060118
2	Condenser-3000W	R37060116	14	WPLS9330M1 Power Module	R111106HY
3	Water pump	R37060115	15	WPLS9330M2 Power Module	R111106J0
4-1	Water cooler	R37060036	16	Main AC contactor	R34040216
4-2	Water cooler cap	R37060037	17	Input EMC board	R111103SV
5-1	RFL laser 3KW	R37010011	18	Fuse	R27010253
5-2	FFRC laser 3KW	R37010012	19	Air switch	R34010077
5-3	BFL laser 3KW	R37010013	20	Connector for wire feeder control cable	R30041847
6	LCD	R00200030	21	Gas hose joint	R29131737
7	Metal key switch	R34011161	22	Safety lock connector	R3004003F
8	Metal button power switch	R34011160	23-1	380V terminal block	30040907
9	Emergency stop button switch	R34011159	23-2	380V terminal block cover	30040908
10	SUP23T control module	R34040148	24-1	Cable fixing holder	30040909
11	Phase sequence detection switch	R37060119	24-2	Cable fixing plate	30040910
12	Auxiliary AC contactor	R34040009	25	Fan with cover	R37060117

Attached figure 3-1 Laser welding 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: □ Good □ Better □ General □ Poor Other opinions: User's signature: DD/MM/YYYY	
Return visit record of Customer Service Center: □ Telephone follow-up □ 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: □ Good □ Better □ General □ Poor Other opinions: User's signature: DD/MM/YYYY	
Return visit record of Customer Service Center: □ Telephone follow-up □ 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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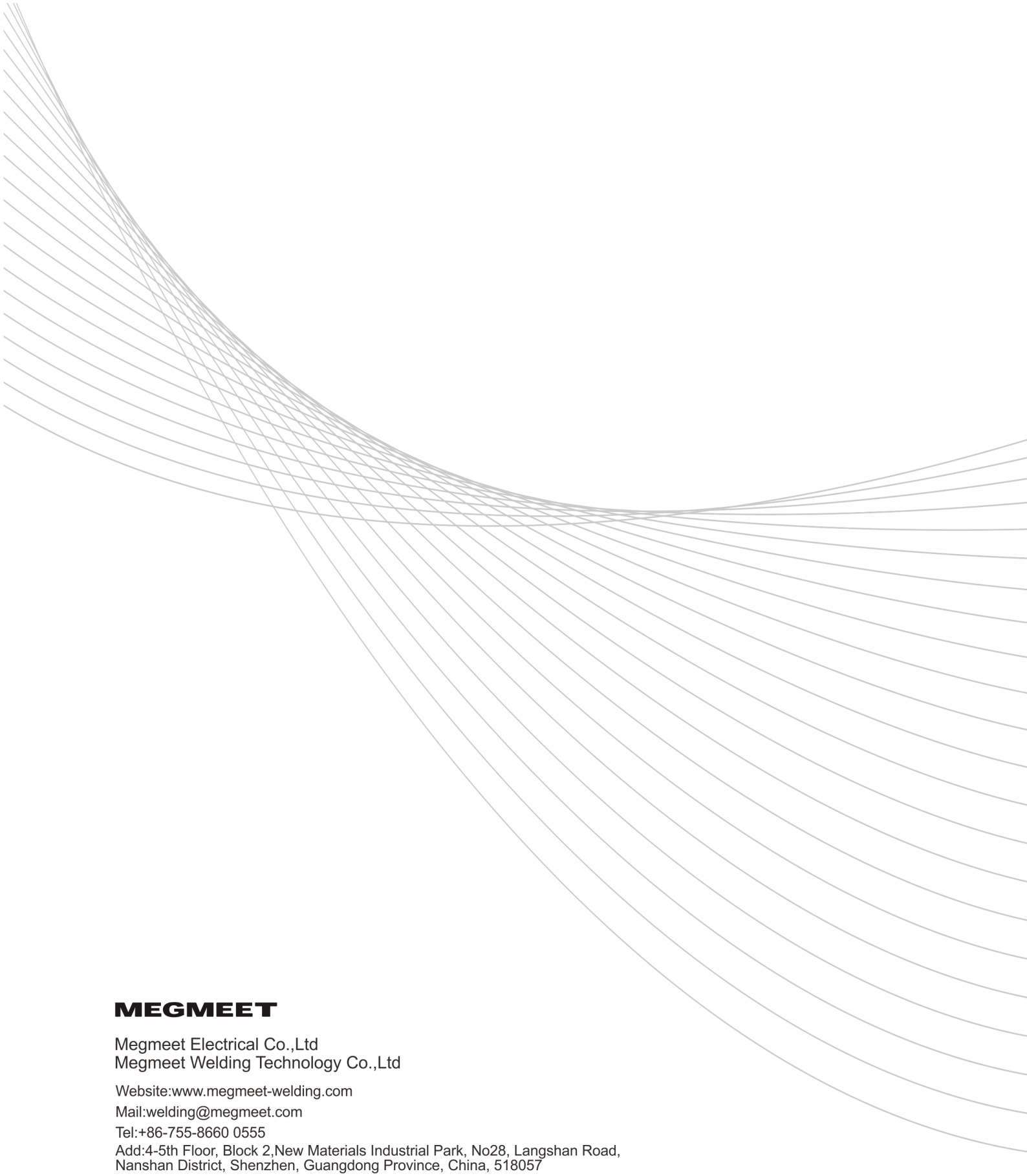

MEGMEET

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