Dynalasers

User Manual

Shenzhen Dynalasers Technology Co., Ltd.

Introduction

Welcome to use the handheld laser welding products developed and produced by Shenzhen Dynalasers Technology Co., Ltd. We have organized personnel to compile this document in order to facilitate the better use and maintenance of your laser equipment. If you have any comments and suggestions during use, please feel free to give us your advice to help us continuously revise and improve. Thank you again for using Dynalasers' products!

Before using this product, please carefully read the User Manual for Handheld Laser Welding Machine provided by Dynalasers to familiarize yourself with the operation and maintenance of this equipment. We strongly recommend that operators read Chapter 2 Safety Information of this manual before operating the equipment.

This Manual will be provided with the machine to provide important operation, safety and other information for our existing or potential customers.

Please be sure to read the User Manual carefully to prevent unnecessary risks.

Disclaimers

Dynalasers strives to provide accurate and reliable user manual. However, Dynalasers makes no express or implied warranties or representations for this manual document, including but not limited to any implied warranties of merchantability or fitness for a particular use, purpose or application, whether alone or with any other device or equipment, material or process, the user must bear all responsibilities and application of any product. Dynalasers assumes no responsibility for any incidental, consequential, indirect or special damages, including but not limited to loss of profits, loss of production costs or similar damages. The information contained in this document may infringe the patents or other rights of a third party. Dynalasers shall not be liable for errors in statements or omissions in this document or any incidental consequential, indirect or special damages.

Company Profile

Shenzhen Dynalasers Technology Co., Ltd. is located in Shenzhen City, focusing on the research and development, production and sales of laser intelligent equipment, lasers and related core components, intelligent automation equipment, computer software, hardware and control systems, and artificial intelligent robots. Based on the matching technologies of electronics, mechanics, optics and control systems, the company provides complete solutions according to the needs of the market and customers, involving IT manufacturing, new energy product manufacturing, instrumentation, computer manufacturing, mobile communications, home appliances & kitchen appliances, auto parts, precision equipment, building materials, hardware tools, urban lighting, food and medical industries, etc.

Dynalasers adheres to the people-oriented principle and takes the advantages of technological innovation. It introduces industry elites from home and abroad, invests a lot of money in the field of research and development, and has won many industry technology patents. The company has independent R&D, design, quality, operation and sales teams. The R&D team has a working background in cross-industry and large enterprises such as consumer and industrial industries. The quality management team and operation management team are from well-known companies.

Dynalasers is committed to providing customers with stable, reliable and high-quality products and equipment, perfect customer service, and creating greater value for global customers!

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Chapter 1 Feature Description

The S series is a high-efficiency, high-reliability, maintenance-free high-power laser series developed by Dynalasers. It adopts phase change heat dissipation, with a wave length ranging 1070nm~1090nm and a laser efficiency >35%.

Dynalasers D series lasers are Class 4 laser products with safety taken into consideration in its design and testing.

Lasers are unique and may cause some safety hazards, so they cannot be simply regarded as other light sources. All personnel operating or approaching lasers must pay attention to these special hazards.

Dynalasers recommends strictly abiding by all warnings and safety tips in this manual to ensure safe operation and optimal performance. During the operation, maintenance and service of this equipment, do not disassemble the equipment without authorization in order to ensure the safety of operators.

Chapter 2 Safety Information

1 - Safety Regulations

As shown in the table below, safety warning signs (not limited to the signs on the laser body) during the operation of the handheld laser welding machine include:

Safety marking	Name	Description
	Electrical Danger	Warning: Text marked with an electrical warning symbol indicates potential personal danger. Failure to follow certain process operations may cause certain or fatal harm to you or others.
	WARNING	Notes: Text with a warning symbol indicates potential product hazards. It requires an operating procedure that, if not followed correctly, it can cause damage or destruction to the product or components.
	Laser Radiation Hazard	Notes: Text with a laser radiation warning symbol indicates potential personal danger.

2- Laser Protection

1. Requirements of Laser Safety Glasses

When operating this device, please wear safety glasses. Choosing appropriate laser safety

glasses requires the end user to accurately identify the wavelength range emitted by the product. If the device is a tunable laser or Raman product, it will emit laser in a certain wavelength range. The end user should confirm that the laser safety glasses used can prevent the laser emitted by the device over its entire wavelength range. Please check the safety label on the product and verify that personal protective equipment (goggles) is sufficient for the output power and wavelength range.

3 - Reference Standards

Electromagnetic compatibility immunity:
ENIEC 61000-6-4:2019
EN IEC 61000-6-2:2019
Electrical safety:
ISO 12100:2010
ISO 11553-2017
EN 60204-1:2018
Laser safety:
EN 60825-1:2014+A11:2021 CDRH 21 CFR 1040.10
Power supply safety:
EN 62368-1:2014+A11:2017
Please be aware:
◎ According to EU and national standards and requirements, lasers must be classified by their output power and laser wavelength. All high-power D series laser products are Class 4 products (according to EN 60825-1)

4 - Welding Feature Safety

1. Optical Safety

Warning:

◎ Provide a housing for the laser beam.

◎ Do not look at the output port when the laser is powered.

◎ Avoid positioning the laser and all optical components at eye level.

◎ Avoid using the laser in a dark environment.

Warning:

◎ The laser output is delivered through a window. First make sure the window is clean, any dirt at the end of the head assembly risks burning the window and damaging the machine. Check the quality of the spot emitted from the laser output at low power levels, and then gradually increase the output power.

Do not look directly at the welding tip when the equipment is powered on. When operating the product, always wear safety glasses and a helmet with protective functions. People nearby must also wear the same safety equipment. Make sure that all personal protective equipment is suitable for the output power and wavelength range listed on the laser safety label attached to this product.

Warning:

◎ Do not install or terminate the laser output tip when the laser is activated. When the machine is performing a task, make sure the switch is in the "OFF" position and the unit is disconnected from the AC power supply.

2. Equipment and Solvents

Warning:

◎ Photosensitive components in the equipment, such as photodiodes, can also be damaged by laser exposure. The intensity of the laser is enough to burn the skin and ignite clothing and paint. Lasers can cut and weld metals. The laser can ignite volatile substances such as alcohol, gasoline, ether and other solvents. When installing and using this equipment, exposure to solvents or other flammable materials and gases must be avoided.

3. Electrical Safety

Warning:

◎ Before supplying power to the unit, all electrical equipment and welding gas must be connected. Before starting the equipment, first check that the gas cylinder is sufficiently filled. In addition, if applicable, all connections must be secured with screws to ensure proper function. All parts of electrical cables, connectors or equipment housings should be considered hazardous.

◎ Before supplying power to the unit, all electrical and welding gas connections must be secured. In addition, if applicable, all connections must be secured with screws to ensure proper function.

◎ Ensure electrical safety: Ensure that the equipment is properly grounded through the protective conductor of the AC power cable. Protect the grounding terminal, any interruption may cause personal injury.

◎ Before supplying power to the equipment, make sure that the correct AC power voltage is used. Failure to use the correct voltage may cause damage to the laser. For the correct power connection, refer to the marking on the product model.

◎ There are no operator-serviceable parts inside, and all services require consultation with Dynalasers after-sales personnel. To prevent electric shock, please do not remove the protective cover, and any tampering with the product will invalidate the warranty.

◎ Connection of external circuits other than power connections: The external connection between this product and other external equipment is PELV (Protected Extra Low Voltage) defined by IEC 61140. The non-power outputs of other devices connected to this product should also be PELV or SELV (Safety Extra Low Voltage).

4. Environmental Safety

Warning:

◎ Electronic equipment must be disposed of in accordance with regional directives on the disposal of electronic and electronic waste.

◎ Make sure all personal protective equipment is suitable for the output power and wavelength range listed on the safety label attached to the laser.

◎ Please be careful when operating the device, or it may cause laser damage.

For more information, please refer to the product specification. This device is not used in places where unprotected people or children may be present. Keep away from shock or vibration sources. Appropriate enclosures should be used to ensure a safe working area for the laser. Do not operate the output welding tip at eye level.

Humidity requirements: Do not expose the device to high humidity environments (> 85% humidity).

This laser device is air-cooled, and operating at higher temperatures will accelerate aging, increase threshold current, and reduce slope efficiency. If the device overheats, stop using it and call

Dynalasers for help.

Please ensure proper ventilation when working. Whenever a laser beam reacts with the material being welded, fumes, steam, sparks, and particle fragments are produced. Fumes produced during laser processing are often toxic and may pose additional safety hazards.

For general information about laser products, please visit Dynalasers' official website!

5. Gas Cylinder Safety

Warning:

◎ Gas cylinders may explode if damaged or placed near the welding area. Gas cylinders should be placed where they cannot be hit or damaged. Keep away from heat, sparks, or flames. Gas cylinders must be stored upright and secured to the cylinder stand. A working regulator suitable for the required gas and pressure is required. All hoses and fittings should also be suitable and maintained in good working condition.

6. Radiation Hazards

Visible and invisible radiation is generated during welding. The interaction between the high-power laser beam and the material being welded may produce a plasma that produces ultraviolet radiation and "blue light" that may cause conjunctivitis, photochemical damage to the retina, or a sunburn reaction to the skin. Welders exposed to invisible UV light without proper protection may suffer permanent eye damage, so always wear safety gear during welding.

7. Skin Hazards

Exposure to infrared and UV radiation during welding can damage the skin. Infrared and UV light can cause skin burns, increasing welders' risk of skin cancer and accelerated signs of skin aging. Welding sparks can also cause burns. Laser material processing can transfer a lot of energy into the part. Parts can be very hot to the touch even after the cutting process is completed. Make sure to use appropriate personal protective equipment to prevent potential burns. Take precautions to prevent skin damage by wearing protective clothing such as flame-resistant gloves, hats, and leather aprons.

8. Fire Hazards

The heat and sparks generated during welding can cause fire or explosion if flammable or combustible materials are close to the welding area. Laser welding can only be performed when there are no flammable materials in the area. Never weld containers containing flammable or combustible materials. If the contents of the container are unknown, it should be assumed that they are flammable or combustible. Fire extinguishers should be located nearby and easily accessible.

9. Fumes Hazards

Welding "fumes" can consist of very fine particles and gases. Welding fumes and gases come from a combination of the welding materials or any filler materials used, the shielding gases used, paints, coatings, chemical reactions, and air pollutants. Welding fumes can adversely affect the lungs, heart, kidneys, and central nervous system.

(1) Keep your head away from the fumes while welding. Always weld in an area that is adequately ventilated to ensure safe breathing air.

(2) Respirators may also be required in confined spaces and other situations.

(3) Routine air monitoring should be performed to determine hazardous fume levels in the welding area.

(4) Use a fume extraction system to remove vapors, particles, and hazardous debris from the welding process area.

10. Safety Instructions

To ensure safe operation and optimize the performance of this product, please strictly follow the following warnings and important instructions, as well as other information contained in this manual.

Warning:

The output connector of this product is connected to the handheld welding connector by a fiber optic cable. Please use the handheld welding connector with caution.

Warning:

When using this product, please ensure that you use a properly grounded power supply.

Warning:

Users are not allowed to open any parts inside this product for repair. If necessary, please contact Dynalasers technicians for repair services. Any unauthorized changes to this product will

invalidate the warranty.

Warning:

If this product is not operated in accordance with the instructions in this manual, The protection mechanism provided by this product may be affected. This product must and can only be used under normal conditions.

Important:

When operating the laser welding output connector (such as installing optical cable connectors, using optical instruments to detect connector end faces, filling wires, etc.), please be sure to keep the AC power off.

Warning:

Never look directly at the fiber output connector, and make sure to wear appropriate protective goggles when using laser products to avoid injury.

Important:

Operation or adjustment outside the scope of this manual may cause radiation damage.

11. Laser Output Safety Indicators

Important:

◎ When the power is activated, the laser is in a dangerous state. All precautions must be taken.

Take precautions to prevent accidental exposure to direct and reflected beams. Diffuse and specular reflections can cause severe retinal or corneal damage, leading to permanent eye damage. Class 4 laser beams also have potential fire and skin damage hazards when operating or near the equipment. When operating, all personnel must wear all recommended PPE, including safety glasses and helmets with masks. To ensure that the information on laser safety is known to you, please use the laser control measures correctly to adjust or control the execution of the program, or you may be exposed to harmful radiation environments.

12. Welding Protection and Prevention of Welding Process Hazards

Warning:

◎ Personal protective equipment must be worn during welding to avoid exposing eyes to dangerous environments! Wear masks, gloves, welding helmets and laser safety glasses. To avoid the influence of equipment wind speed noise, please wear noise-proof earplugs when welding, which can provide the best protection during laser welding. Welding helmets can also protect welders from injuries caused by hot spatter, metal particles and sparks. All personnel working near the laser welding area must also wear personal protective equipment.

Warning:

◎ If there are flammable or combustible materials near the welding area, the heat and sparks generated during welding may cause fire or explosion. Laser welding should only be performed in areas free of flammable materials. Never weld on containers that contain flammable or combustible materials. If the contents of the container are unknown, it should be assumed that they are flammable or combustible. Fire extinguishers should be near the welding area and welders should be trained in the use of professional fire extinguishers.

13. Hazards of Reflected Beams during Welding

Warning:

◎ A large number of secondary laser beams can usually be generated at different angles near the laser output aperture. These beams are called "specular reflections" and are generated when the laser is reflected from the surface where the main beam is incident. Laser welding systems may produce specular reflections due to the interaction between the laser beam and the processed parts. Although the power of these secondary beams is not as high as the total power emitted by the laser, their intensity is sufficient to cause damage to the eyes, skin, and materials around the laser.

Highly reflective metals, such as aluminum and copper, may cause part of the beam energy to be reflected from the target weld site and require additional precautions. Specular reflections may also be dangerous to the operators if any part of the beam is reflected from multiple surfaces. Take precautions to understand the expected specular reflection cone for each processed part and do not attempt to view the part or place any part of the body within the expected specular reflection cone.

Warning:

◎ Operators and observers must also be aware of reflections at all times. If the laser parameters are not set properly to achieve melting of the target part, more reflections may occur.

To achieve safe operating conditions: 1. Select the appropriate mode according to the material and thickness; 2. Appropriate nozzle selection based on the joint geometry.

Warning: ◎ For safety reasons, Dynalasers recommends that equipment operators only use Dynalasers nozzle tips.

5 - General Safety Instructions

1. Specular Reflection

A secondary laser beam may be generated at the output port of the handheld laser welding machine and radiate outward at multiple angles. This phenomenon of divergent beams generated after the main beam of the handheld laser welding machine is reflected on a flat surface is called specular reflection. Although the energy of the secondary laser beam is much smaller than that of the main laser beam, this intensity may also cause damage to people's eyes, skin or some material surfaces. Pay special attention when welding highly reflective materials, and make sure that there is no persons and no flammable objects opposite when welding.

Warning:

◎ Since the laser radiation light is invisible, you must operate with extreme caution to avoid or reduce specular reflection.

2. Accessory Safety Instructions

The photosensitive components integrated in the optical accessories of the handheld laser welding machine may be damaged by laser exposure, so please pay attention to the protection of related devices.

Warning:

◎ The output laser intensity of Dynalasers handheld laser welding machine is enough to weld metal, burn skin, clothing and paint, and ignite volatile substances such as alcohol, gasoline, ether, etc. Therefore, during operation, please be sure to isolate flammable items around the handheld laser welding machine.

3. Optical Operation Instructions

Dynalasers strongly recommends that you read the following key notes for operation before operating the handheld laser welding machine:

(1) Do not look directly at the laser outlet of the handheld laser welding machine;

(2) Avoid placing the handheld laser welding machine and related optical output devices at the same level as your eyes;

(3) Reasonably select safety protection equipment according to the output power and wavelength requirements of the handheld laser welding machine to ensure the safety of the operator;

(4) Warning signs must be posted in the area where the handheld laser welding machine is placed to limit the safe area for operating the handheld laser welding machine;

(5) Do not use the handheld laser welding machine in a dark environment;

(6) Please ensure that the protective lens, copper nozzle, and wire feeding structure are installed and cleaned under the condition that the handheld laser welding machine is turned off and the power is disconnected;

(7) When performing commissioning, calibration and focusing, please perform them without laser emitting. After commissioning is completed, turn on the laser;

(8) Please strictly follow the instructions in this document to operate the equipment, or the protective device and performance of the equipment will be weakened, for which Dynalasers will not provide any warranty.

Notes:

◎ The optical output of the handheld laser welding machine will be connected to the lens with anti-reflective coating and then emitted. Before using the handheld laser welding machine, please strictly check the output lens and the rear lens of the handheld laser welding machine to ensure that there is no dust or any other debris on the lens. Any attachment visible to the naked eye will cause serious damage to the lens, resulting in burning of the handheld laser welding machine or any rear optical path equipment.

◎ Please refer to the *Fiber Optic Connector Inspection and Cleaning Guide* and follow the lens cleaning inspection process.

◎ Please be careful of the hot or molten metal particles that may be generated during the cleaning operation of the handheld laser welding machine.

◎ When commissioning and calibrating the output of the handheld laser welding machine, it is required to set the handheld laser welding machine to detect the quality of the laser output spot through the indicator red light without laser output, and then turn on the laser after there is no abnormality.

Warning:

◎ Reasonably select safety protection equipment according to the output power and wavelength requirements of the laser.

◎ Do not look directly at the gun tip, and make sure to wear safety glasses during each operation.

4. Electrical Operation Instructions

Dynalasers strongly recommends that you read the following key notes for operation before operating the handheld laser welding machine:

(1) Make sure that the equipment housing is well grounded. Interruption at any point in the grounding loop may cause personal injury;

(2) Before using the power supply connected to the equipment, please make sure that it is connected to the protective ground;

(3) To reduce the risk of fire, when necessary, replace the circuit fuse with the same type and grade, and do not use other fuses or materials instead;

(4) Ensure that the input AC voltage of the handheld laser welder is the normal municipal AC voltage, and the wiring is correct. Any incorrect wiring method could potentially cause harm to people or damage to equipment.

(5)Under the AC 220V mains power environment:The live wire (L) identification line of the equipment is connected to the live wire terminal on the junction box;The neutral wire (N) identification line of the equipment is connected to the neutral wire terminal on the junction box;The ground wire (PE) identification line of the equipment is connected to the ground wire terminal on the junction box.

(6)Under the AC 110V mains power environment:The live wire (L) marked on the equipment should be connected to the live wire terminal on the junction box.The neutral wire (N) marked on the equipment should be connected to either of the other two live wire terminals in the junction box as selected.The ground wire (PE) marked on the equipment should be connected to the ground wire terminal on the junction box.

(7) Except for the gun tip consumables, this product does not require the user to repair parts, components or assemblies by themselves. All maintenance work must be completed by Dynalasers personnel;

(8) It is strictly forbidden to disassemble or assemble the handheld laser welding machine without authorization and damage the relevant labels, or there will be a risk of electric shock or burns;

(9) There must be no flammable materials near the welding area. The heat and sparks generated during the welding process may cause fire or explosion. Laser welding can only be performed in areas without flammable materials.

(10) Never weld on containers that contain flammable or combustible materials. If the contents of a container are unknown, you should assume that they are flammable or combustible. Fire extinguishers should be nearby and easily accessible, and the personnel should be trained in the use of fire extinguishers.

(11) Any product that has been disassembled or assembled without permission will no longer be covered by the warranty.

Warning:

◎ The input voltage of the handheld laser welding machine is single-phase AC (200 - 240VAC), which poses a risk of electric shock. All related cables and connecting wires are potentially hazardous.

5. Operating Environment Requirements for Handheld Laser Welding Machine

The equipment is commonly used in: (1) Environmental pollution degree 2; (2) Dry location; (3) Altitude below 2000 meters; and (4) Class II overvoltage. For more information, please refer to the product specifications.

Humidity: It is strictly forbidden to expose the equipment to high humidity environments (>85% humidity)

Cooling and temperature: The laser device is cooled by air. Operating at higher temperatures will accelerate aging, increase threshold current and reduce slope efficiency. If the device overheats, do not use it and call Dynalasers for help. When the laser temperature is too high, the device will trigger an alarm and stop emitting light.

To ensure the safety of the laser working area, the interaction between the laser and the work surface will produce gas, sparks and debris due to high temperature, which may pose additional safety hazards. The corresponding operators are required to undergo certain assessment and training, and be familiar with and master the general safety regulations for laser operation.

Dynalasers recommends that you follow the following measures to extend the service life of the handheld laser welding machine:

(1) Please ensure that the working area is properly ventilated and place the handheld laser welding machine in a dry, cool and clean environment. Do not expose the handheld laser welding machine to high temperature, high humidity or water ingress.

(2) When the handheld laser welding machine is in operation, ensure that there is no foreign object blocking the air intake at the bottom of the laser, and that there is no debris within 1 meter around that affects the smooth air intake; ensure that the top air outlet is smooth within 1M height;

(3) It is necessary to ensure that no debris (including liquid) enters the laser from the top, or it will damage the laser and cause personal injury;

(4) Operating the equipment at high temperatures will accelerate aging, increase the current threshold, and reduce the sensitivity and conversion efficiency of the handheld laser welding machine. If the equipment overheats, please stop using it and seek help from Dynalasers.

Notes:

◎ Please operate the equipment with caution to avoid accidental damage to the equipment.

◎ The filter at the bottom of the laser needs to remove dust and dirt from the air inlet from time to time.

Chapter 3 Product Description

1 - Introduction to Features

The handheld laser welding machine integrates the laser, handheld welding gun tip and control system. Compared with traditional handheld welding equipment, it features simple configuration, high integration, small size, simple operation and high intelligence.

Main features:

(1) Stable output power and good consistency;

(2) Accurate power regulation, linear stepless power regulation;

(3) Split-linkage safety mechanism, offering higher security.;

(4) Overall high-level protection;

(5) Modular components, building block-style replacement and repair;

Application areas:

Widely used in hardware, building materials, kitchenware, aerospace, automobile, shipbuilding, medical and other industries.

2 - Module Configuration

Dynalasers provides many configurable modes. This manual will explain all modes in detail. Please refer to Chapter 6 *User Guide*.

3 - Laser Model Description and Functional Safety

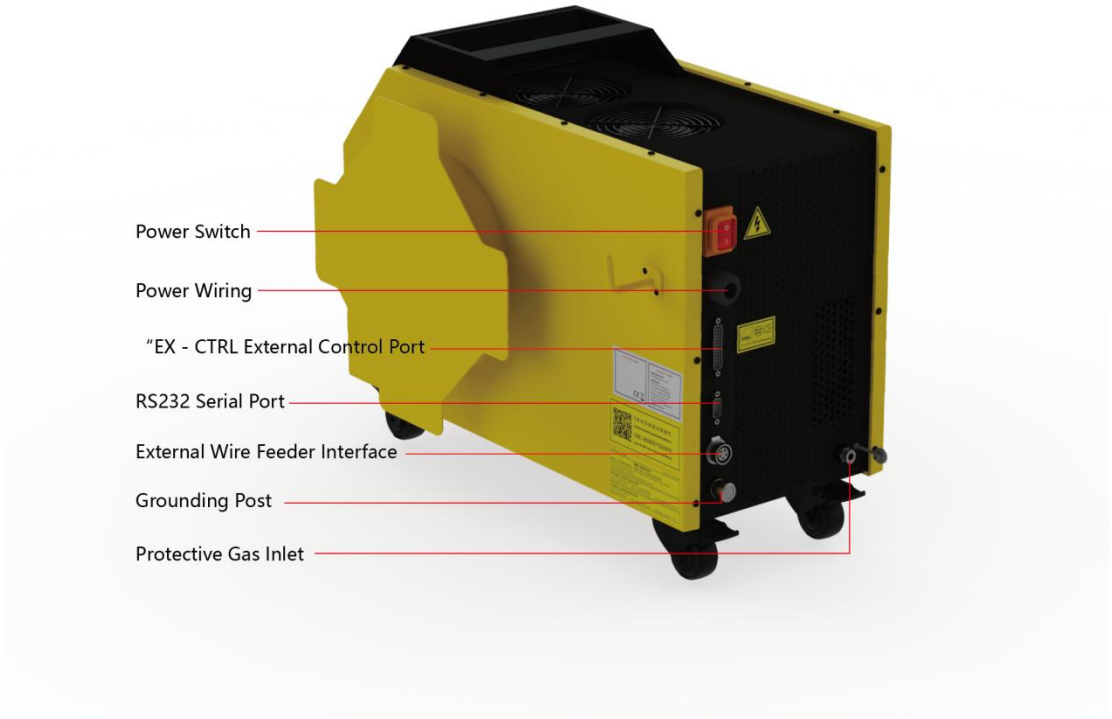
Model naming	Model implication
S30/S40	Numbers indicate Dynalasers handheld laser welding penetration
Product Functional Safety	
Electrical safety	ISO 12100:2010 ISO 11553-2:2015 EN 60204-1:2018
Laser safety	EN 60825 - 1:2014+All: 2021 CDRH 21 CFR 1040.10

4 - Certificate

Dynalasers guarantees that this product has been fully tested and inspected before packaging and transportation, and complies with published standards and procedures. After receiving this product, please check the packaging for any signs of external damage. If the equipment has any damage, immediately notify the carrier and Dynalasers's after-sales personnel; when you take out this product from the packaging box, you must be particularly careful to ensure that the fiber optic cable is not broken or damaged; please check the attached packing list. Once you receive the product, check all items against this list. If any items are missing or the equipment is obviously or suspected of damage, do not attempt to install or operate the laser equipment under any circumstances.

5 - Description of the Front and Rear Panels of the Laser Welding Machine

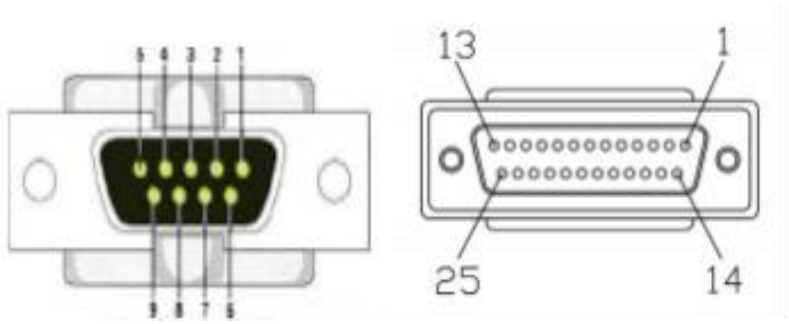
Front panel name	Function description
ACTIVE/ALARM	Normal laser emitting state: Green light, standby state: Yellow light Alarm state: Red light
E-stop switch	Stop laser emitting
Safety key	Lock the device and prohibit use (it is recommended to remove the key when the machine is stopped)
LOOP	Safety loop circuit line interface
Laser outlet	Armored cable



Rear panel name	Function description
ON/OFF	200 - 240VAC AC power switch
External control I/O	Interlock emergency stop alarm and external control laser emitting protection
GAS_IN	Shielding gas inlet interface
POWER	200 - 240VAC AC power switch
RS232	Welding platform RS232 interface
FEEDER	Wire feeder interface

Pin#	Description
1	N/A
2	RxD serial port data input
3	TxD serial port data output
4	N/A
5	GND
6~9	N/A

This laser welding machine has an external control port of RS232 Interface (DB9), interface definition as shown in the table above. Definition of RS232 interfaces



Definition of external control I/O interfaces

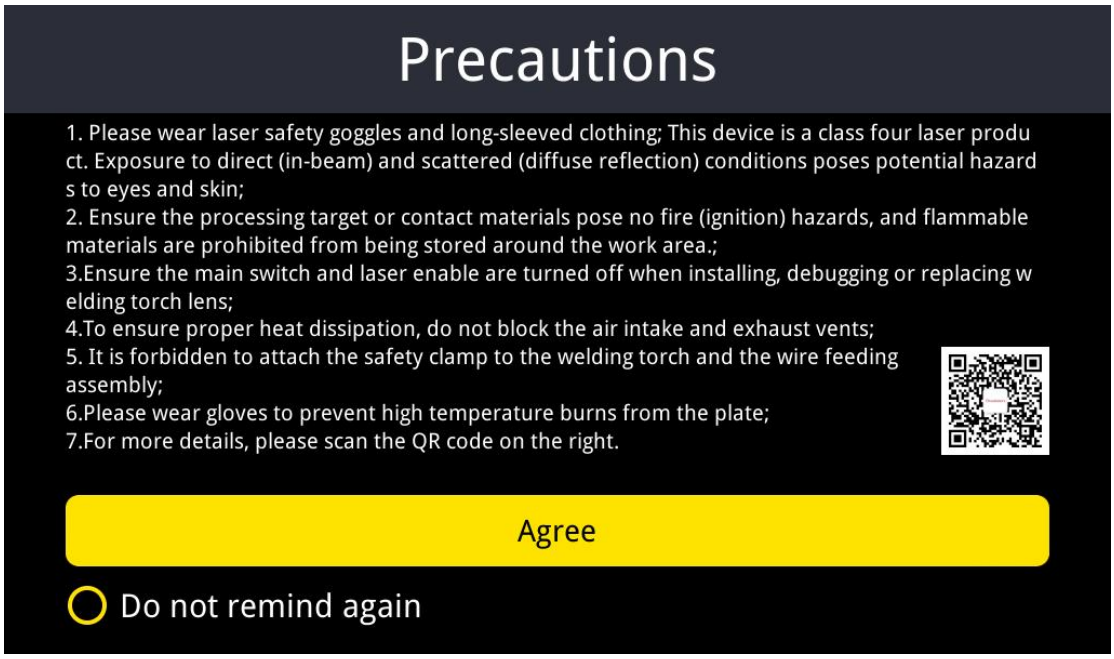
DB25 pinout	Description	Definitions
1	ERROR2	Fault Output 2 (No actual function at present)
14	ERROR1	Fault Output 2 (No actual function at present)
3	EXTERNAL LASER OUTPUT-	External Light Emission - (Currently No Actual Function)
16	EXTERNAL LASER OUTPUT+	External Light Emission + (Currently No Actual Function)
5	EMISSION ENABLE INPUT-	Enable input-
18	EMISSION ENABLE INPUT+	Enable input+
6	EMG_OFF_EN1-	Emergency stop -
19	EMG_OFF_EN1+	Emergency stop +
7	EX_LOCK1-	Interlock -
20	EX_LOCK1+	Interlock +
8	EMG_CHECK-	Emergency stop monitoring -(Currently No Actual Function)
21	EMG_CHECK+	Emergency stop monitoring +(Currently No Actual Function)
9	EX_LOCK_CHECK-	Interlock Monitoring-
22	EX_LOCK_CHECK+	Interlock Monitoring+

6 - Operation Panel Description

This machine comes with a 7-inch industrial screen, which is connected to the host through a serial interface to realize device control and status monitoring functions. The connection with the device must be carried out when the machine is powered off to prevent surge damage.

1. Power-on Safety Instructions

The detailed safety instructions page will be displayed when the machine is powered on for the first time. Please read and study the safety instructions carefully. After reading, click the "Agree" button to enter the operation interface.



If you click "No more tips", the safety instructions page will be skipped every time you power on the machine afterwards and jump directly to the operation interface.

2. Operation Interface

The operation interface has 2 operation modes, namely simplified mode and professional mode.

(1) Simplified mode

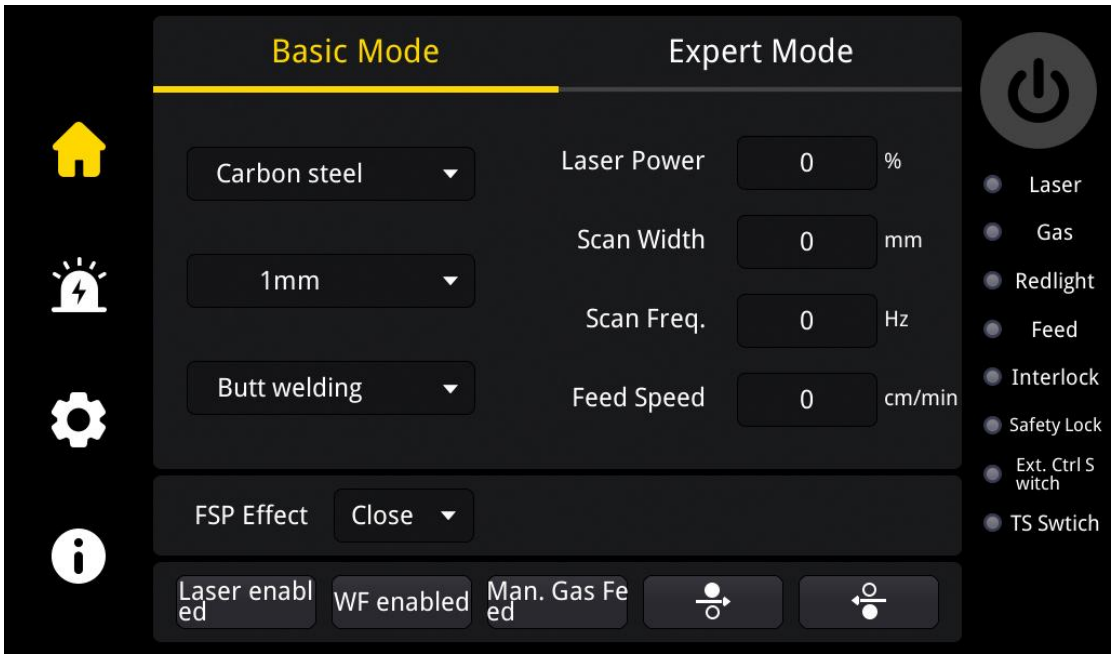
The simplified mode is easy to operate. You only need to select the corresponding material, plate thickness, and welding method, then click the "Laser Enable" switch button in the lower left corner of the interface, and click the main switch button in the upper right corner of the interface. If all parts of the machine are working properly, you can start welding.

After selection, the wire feeding is enabled by default; there is no need to turn on the wire

feeding button separately. If you do not need to use wire feeding, you can cancel the wire feeding enable. Click the fish scale effect button below to enable fish scale effect welding.

Switch to the professional mode interface to make some more professional and detailed operation settings. After we configure all the parameters, click the laser start button and the main switch button to start laser welding.

The simplified mode operation interface is as follows:



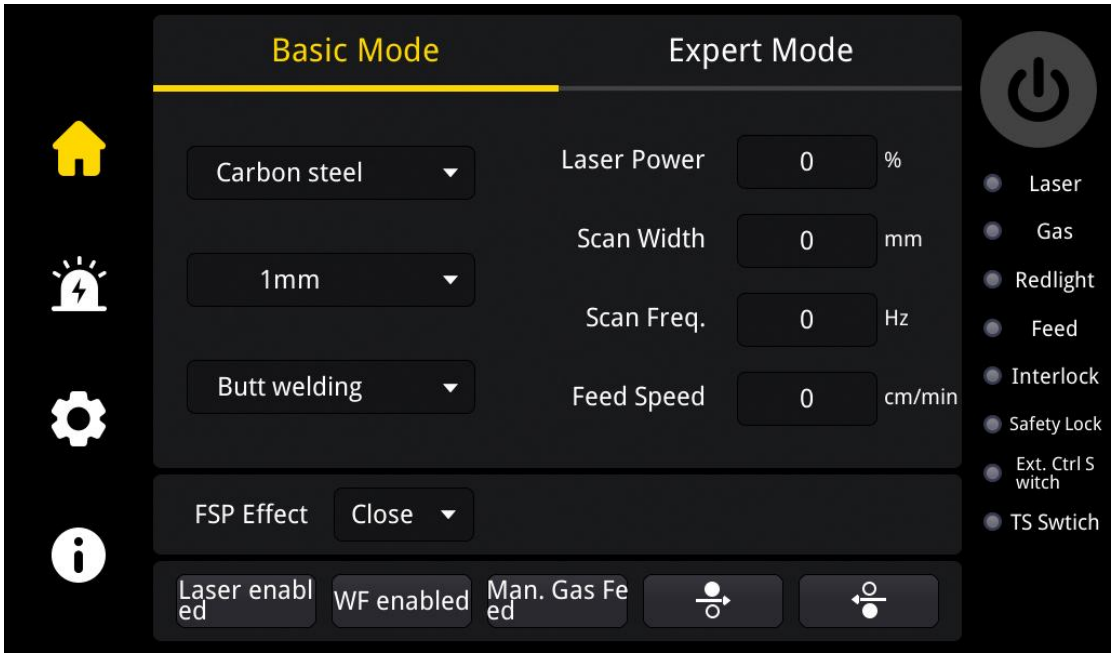
(2) Professional mode

The professional mode operation interface allows making some professional welding settings.

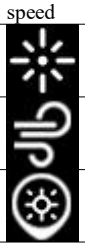
Click the icon at the top of the interface to switch to professional mode.

◎ Main interface

The main interface is divided into four sub-interfaces: homepage, alarm, setting, and information.



●Home page: laser power, scanning amplitude, scanning frequency and wire feeding speed can be set.

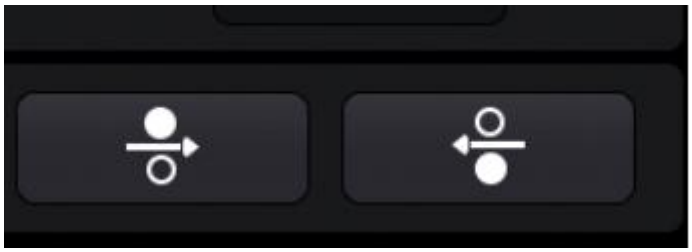
Function classification	Function description	Remarks
Operating button	Laser start	Laser start button, used to start laser welding. Yellow laser starts, gray laser turns off.
	Laser enable	Working laser is enabled, mainly used to adjust the machine when the laser is not emitted. Yellow enables laser, gray turns off.
	Wire feeding enable	Wire feeding can be enabled or disabled. Yellow enables wire feeding, gray turns off.
	Manual air supply	Manual air supply can be enabled or disabled. Yellow enables manual air supply, gray turns off.
	One-key wire feeding	Wire feeding can be enabled or disabled. Yellow enables wire feeding, gray turns off. Hold for 3s and release to automatically feed wire
	One-key wire retraction	Wire retraction can be enabled or disabled. Yellow enables wire retraction, gray turns off.
Setting items	Laser power	10~100% adjustable, 100% power setting is the nominal maximum power of the machine.
	Scanning frequency	Laser reciprocating scanning frequency, the maximum scanning frequency is 220Hz under full amplitude state, and the scanning frequency can be increased accordingly under small amplitude.
	Scanning amplitude	Adjustable from 0 to 4mm.
	Wire feeding speed	Adjustable from 0 to 300cm/min.
Figure Caption		This icon represents "laser"
		This icon represents "Blowing"
		This icon represents "Red Light"

		This icon represents "wire feeding"
		This icon represents "interlock"
		This icon represents a "safety lock"
		This icon represents "External Control Switch"
		This icon represents "Welding Gun Switch"

●Status bar:

Function classification	Function description	Remarks
Enable status	Laser	Green: Laser emission, gray: Standby state
	Red light	Green: Red laser emission, gray: Standby state
	Blow	Green: Shielding gas output, gray: Standby state
	Wire feeding	Green: Wire feeding, gray: Standby state
	Safety lock	Green: Safety lock closed, gray: Safety lock open
	Welding gun switch	Green: Gun tip switch pressed, gray: Gun tip switch not pressed

●Wire feeder settings



●Manual wire feeding button

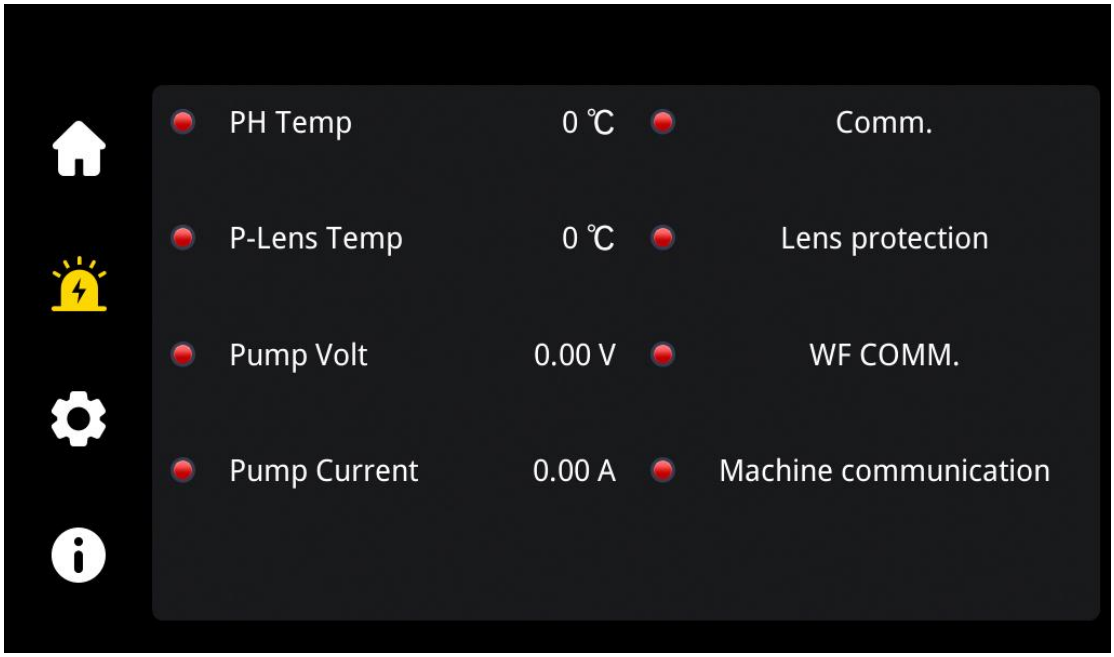
represents the manual wire feeding button, which is usually used for daily debugging. When the button is pressed, the green light will light up to indicate that the wire is being fed. Pressing it continuously for 3S will trigger the continuous wire feeding function. Pressing it again will stop feeding the wire.

●Manual retraction button

represents the manual wire drawing button, which is usually used for daily debugging. When the button is pressed, the green light will light up to indicate that the wire

is being retracted. The manual retraction button adopts a jog design. Pressing it once will draw it once, and pressing it continuously will draw it continuously.

Alarm interface: Displays some alarm information of the machine.



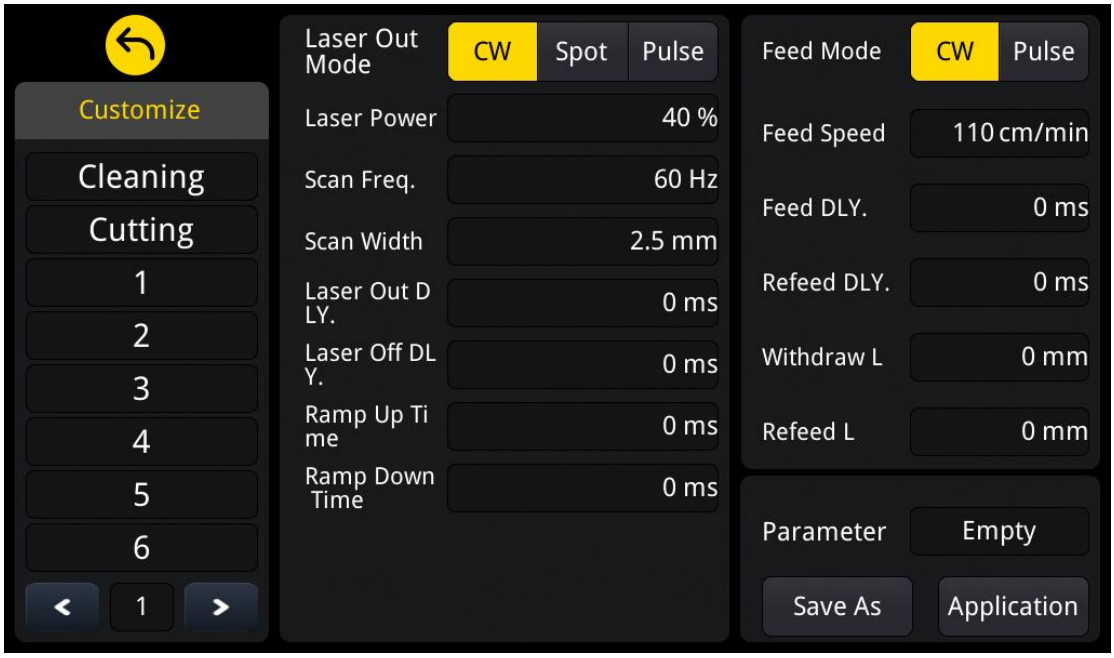
Function classification	Function description	Remarks
Laser use alarm	Protective lens	If the protective lens is abnormal, please contact after-sales service.
	Lock machine	If the machine is locked, please contact after-sales service.
	Ground wire abnormal	If the ground wire connection is abnormal, the machine will alarm. If it is confirmed that there is no abnormality in the grounding, but the machine still alarms, please contact after-sales service.
	Optical fiber abnormal	If the fiber is abnormal, please contact after-sales service.
	Welding gun communication	The communication between the laser and the handheld welding gun tip is abnormal. Please check whether the connection is abnormal and contact after-sales service after confirmation.
	Wire feeding communication	The communication with the wire feeder is abnormal; if the external control line is confirmed to be connected, but the machine still alarms, please contact after-sales service.
	Key	Alarm if the key is not turned on; if the key is confirmed to be turned on, but the machine still alarms, please contact after-sales service.
	E-stop	Laser emergency stop alarm, please check whether the e-stop switch is turned on, and contact after-sales service after confirmation.
Temperature alarm	Protective lens temperature	If the protective lens temperature is abnormal, please check: 1. Whether the protective gas is turned on and the pressure is normal; 2. Whether the protective lens is dirty; 3. Contact after-sales service after confirmation.
	Pump source shell temperature	If it alarms because the temperature exceeds the threshold value, please check whether the air outlet is blocked, whether the filter is dirty, and clean the air outlet and filter; do not work for a long time in a place with high ambient temperature; check whether all fans are running normally, if there is any abnormality, please
	MOS overheating	

	Pump source shell temperature	contact after-sales service.
Current Alert	Power supply communication	If it alarms because the current exceeds the threshold value, please restore the factory settings and try again. If the fault still exists, please contact after-sales service.
	Pump source current	
Voltage alarm	Pump source voltage	If it alarms because the voltage exceeds the threshold value, please restore the factory settings and try again. If the fault still exists, please contact after-sales service.
	PD voltage	

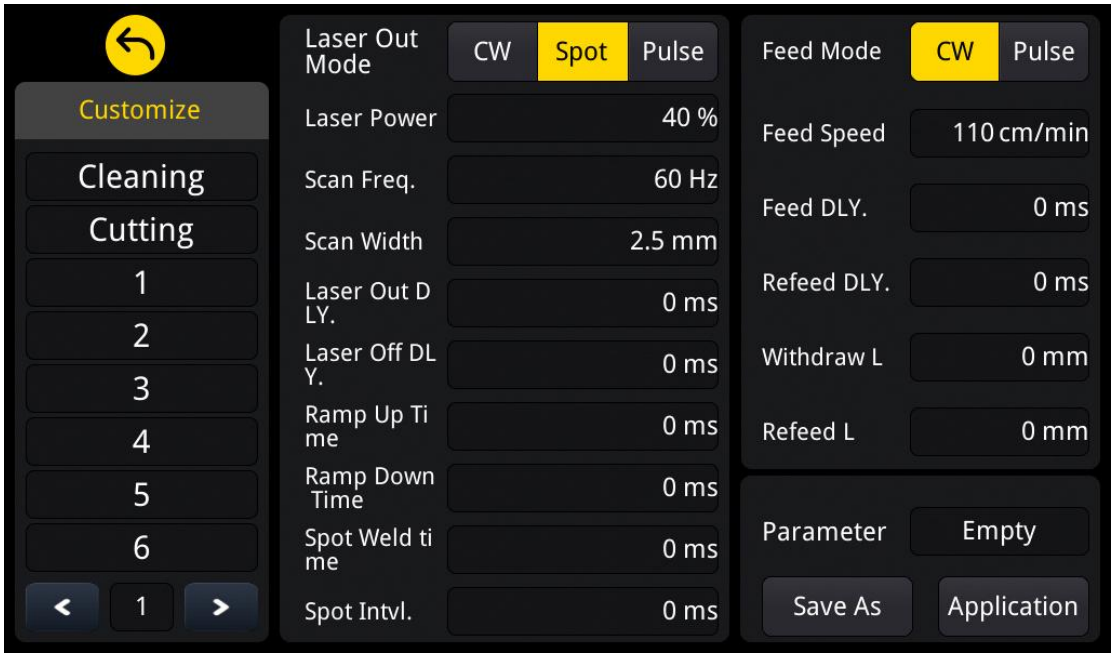
●Professional mode interface: Displays the detailed parameters of the current professional mode settings; and the function of modifying parameters.

Note: The laser power, scanning frequency, scanning amplitude, and wire feeding speed in this interface are consistent with the values of the main page!

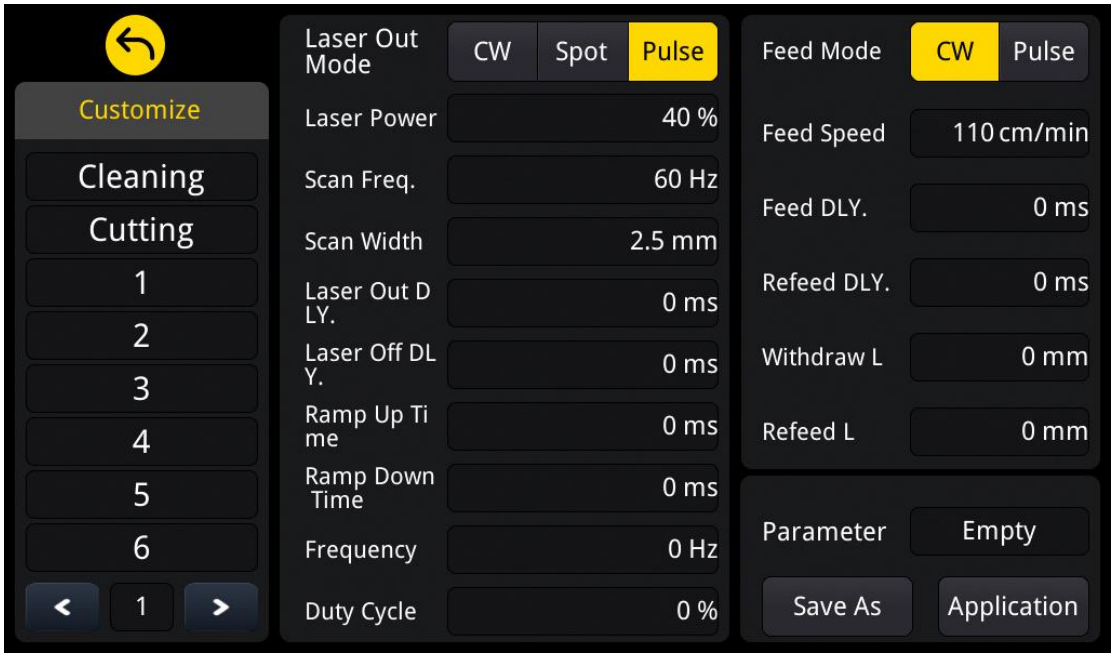
Adjustable parameters for continuous laser output mode:



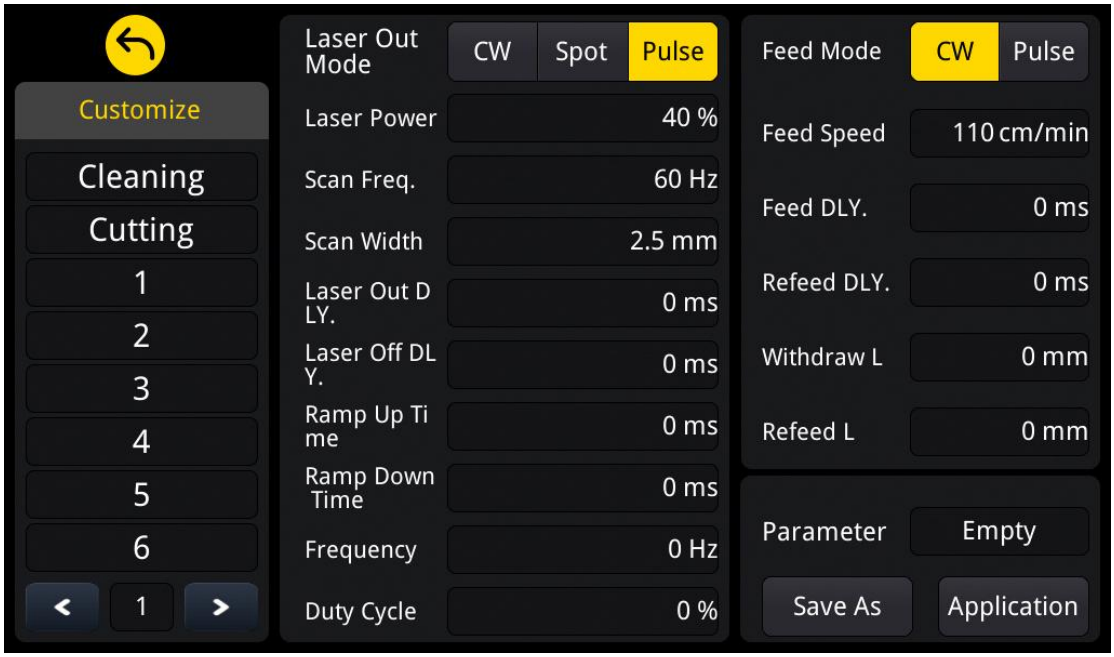
Adjustable parameters for burst laser output mode:



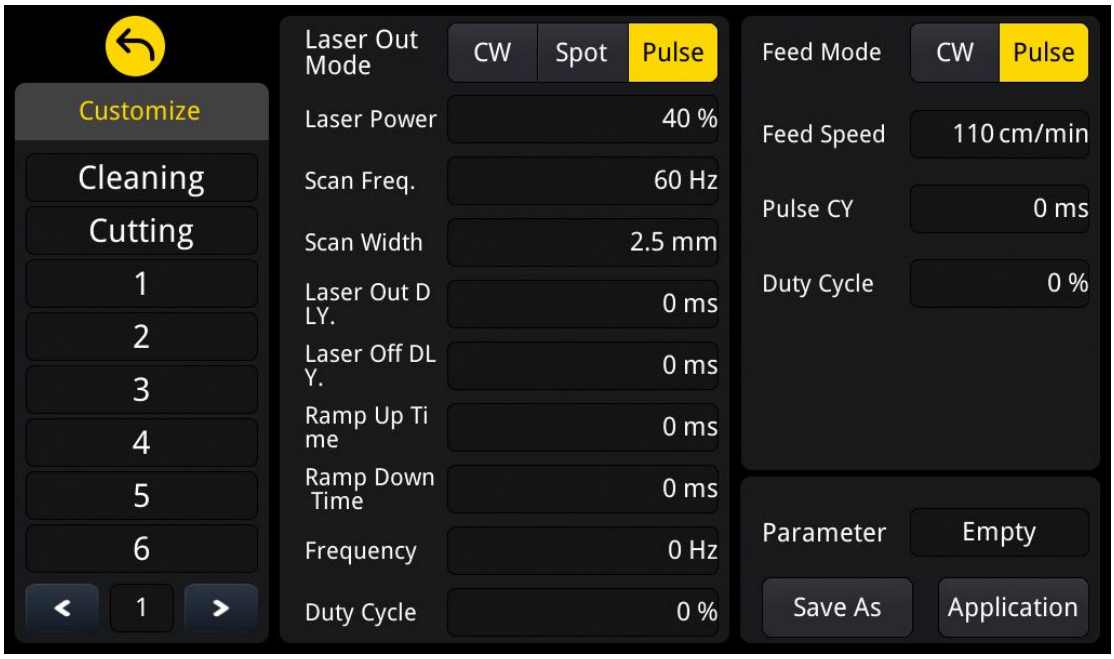
Adjustable parameters for pulse laser output mode:



Adjustable parameters for continuous wire feeding mode:



Adjustable parameters for pulse wire feeding mode:



Function classification	Function description	Remarks
Mode adjustment	Laser output	Laser output mode includes: continuous, burst, and pulse.

	mode	Continuous: Continuously output laser at the set power. Burst: Single laser output when bursting. Pulse: Continuously output pulse laser according to the set duty cycle.
Current machine parameters	Laser power	Set the laser output power.
	Scanning frequency	Set the laser scanning frequency
	Scanning amplitude	Set the laser scanning amplitude
	Laser output delay	Set the advance time before the laser is emitted.
	Air shut-off delay	Set the delay time for gas-off after the laser is turned off.
	Laser shut-off delay	Set the delay time from stopping wire feeding to turning off the laser, which is used to cut the welding wire.
	Slow rise duration	Set the slow rise time of laser.
	Slow fall duration	Set the slow fall time of laser.
	Laser frequency	Set the laser frequency
	Duty cycle	Set the laser output duty cycle in pulse mode.
	Burst duration	Set the duration in burst mode.
	Burst interval	Set the interval in burst mode.

Function classification	Function description	Remarks
Wire feeding parameter setting	Wire feeding mode	Continuous: continuous wire feeding Pulse: intermittent wire feeding according to the set pulse cycle
Wire feeding parameter setting - continuous wire feeding mode	Wire feeding speed	Set the wire feeding speed (this function only works for the built-in wire feeding head)
	Wire feeding delay	Set the wire feeding delay
	Wire filling delay	Set the wire filling delay; prevent secondary wire sticking, indicating the waiting time between retraction and wire filling
	Retraction length	Set the retraction length; the length of the wire retracted after welding is completed.
	Wire filling length	Set the wire filling length; indicates the length from wire filling to the red light position.
Wire feeding parameter setting - pulse wire feeding mode	Pulse cycle	Set the pulse cycle; fish scale overlap rate, reflecting the size of a single fish scale, the larger the value, the larger the fish scale.
	Wire feeding speed	Set the wire feeding speed
	Duty cycle	The percentage of the wire feeding speed in the pulse cycle.

Wire Feeder Software Operation

Continuous mode:

When the continuous mode is selected, this button will be displayed in orange, and the non-selected mode will be displayed in black, and click the button to switch modes, so as to distinguish between continuous/pulse mode.

1. Wire feeding speed:

Controls the speed of wire feeding during welding. Range 0 - 300cm/min, you can click "number" to enter directly from the numeric keyboard.

Note: All parameters on this page can be made by directly clicking on the value, the same below.

2. Wire feeding delay:

Controls the delay time of the wire feeder after pressing the welding gun trigger. Range 0~10000ms, usually set to 0.

3. Wire filling delay:

Controls the interval time between wire filling and wire retraction when wire breaks, which is used to improve the wire breaking effect due to premature wire feeding compensation, resulting in the welding wire sticking to the welded seam for the second time. Range 0~10000ms. Usually set to 100ms.

4. Retraction length:

Controls the length of the wire feeder to retract the broken wire when the wire is broken, which is used to help break the wire; the range is 0~100mm, usually set to 20mm, and can be appropriately increased according to the thickness of the welding wire and the length of the wire feeding tube on site.

5. Wire filling length:

Controls the length of the wire feeder to compensate for the wire feeding after retraction when the wire is broken, which is used to compensate for the influence of the "retraction length" and maintain the consistency of the joint during the next welding. Range 0~100mm, usually set to 18mm.

Pulse mode:

When the pulse mode is selected, this button will be displayed in orange, and the non-selected mode will be displayed in black, and click the button to switch modes, so as to distinguish between continuous/pulse mode. The pulse mode mainly adjusts the pulse cycle, wire feeding speed, and duty cycle to achieve fish scale welding.

1. Pulse cycle:

The pulse cycle refers to the time taken for the wire feeding motor to rotate and the motor to stop as a set of actions, and mainly controls the size of a single fish scale. The larger the cycle, the larger the single fish scale. Range 0 - 10000ms, usually set to 250ms.

2. Wire feeding speed:

The speed of wire feeding in pulse mode, which controls the speed of wire feeding during welding. Range 0 - 300cm/min, you can click "number" to enter directly from the numeric keyboard, usually set to 110cm/min.

3. Duty cycle:

The percentage of the wire feeder rotation time to the pulse cycle time (rotation + stop). Range 0 - 99%, usually set to 50%.

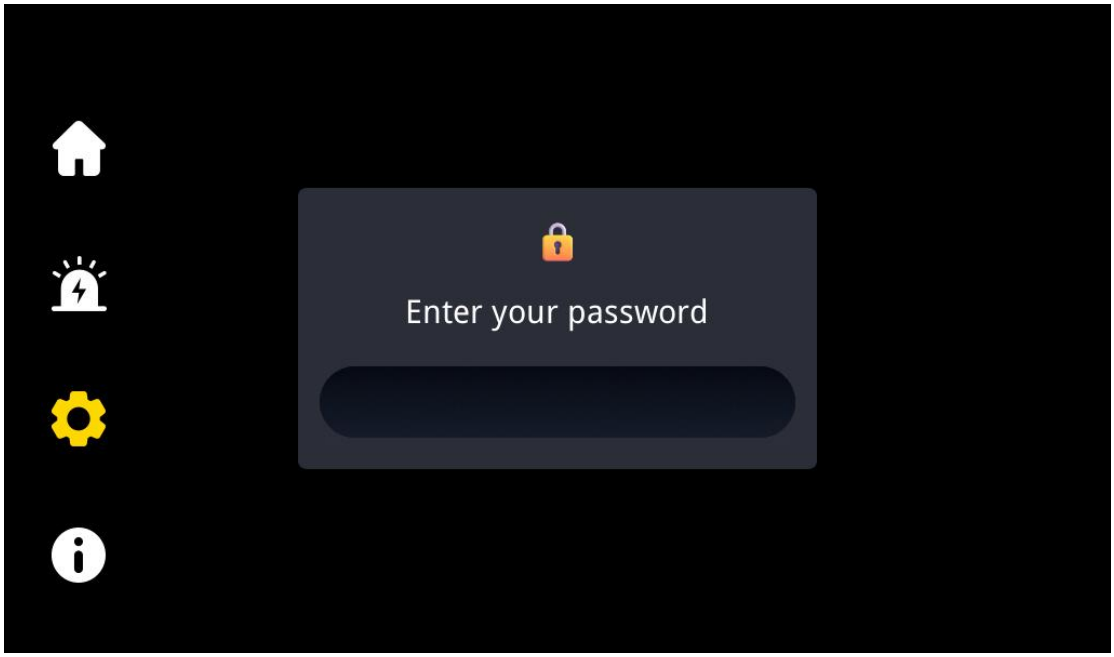
In summary, "Pulse Mode" is mainly used for fish scale welding. The above parameters are reference values. In actual use, it is necessary to adjust appropriately according to the welding wire material, welding wire model, laser power, and weld width to obtain the ideal effect. Other buttons and parameters are the same as those in continuous mode. (The parameters of automatic retraction speed, retraction length, automatic wire filling speed, wire filling length, wire feeding delay, and wire filling delay in pulse mode are the same as those in continuous mode.

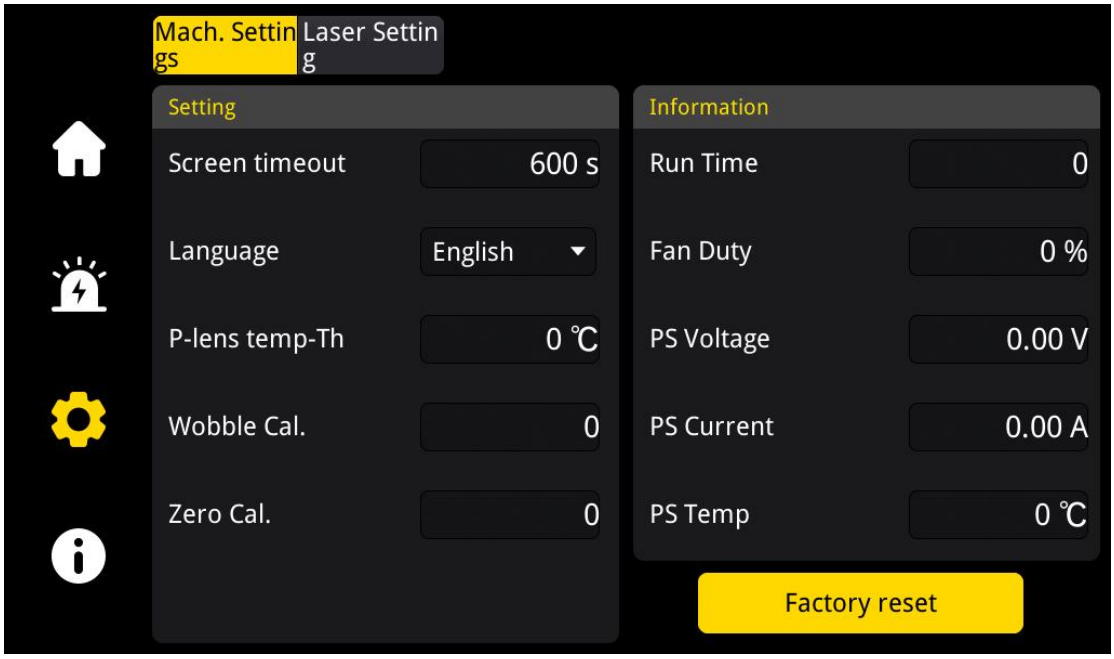
(4) Setting interface

First, click the setting interface, and an input box will pop up. You need to enter the password.

1. You can enter the setting interface only after the password is successfully entered.

2. If the password is entered incorrectly and it prompts: Wrong Password, please re-enter. The setting interface contains two sub-interfaces: machine setting and laser setting.



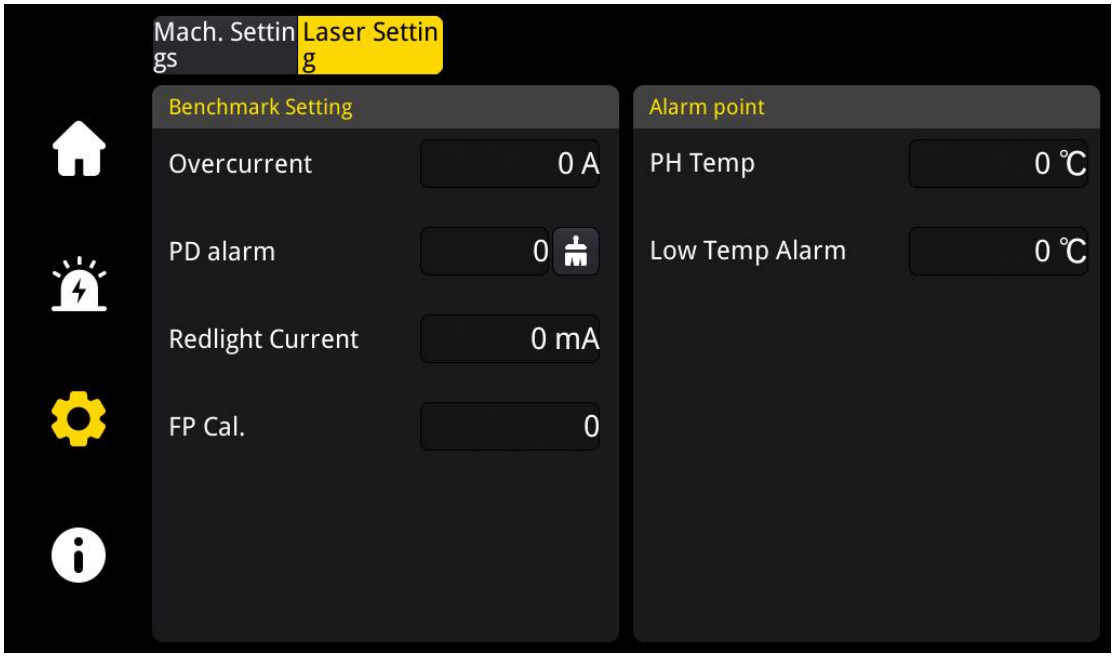


● Machine setting: It includes the functions of viewing reference point and alarm point information and restoring factory settings.

Function classification	Function description	Remarks
Vendor settings	Screen saver time	Users can customize the screen saver time, the parameter value range being: 5 - 60000s, so that it can enter the standby state when not in use.
	Zero point calibration	Users can customize the zero point correction value. The parameter setting range is: -500 ~ 500; Note: Clicking the button to restore to factory settings cannot reset this data.

	Galvanometer full swing calibration	Users can customize the galvanometer full swing correction value, and the parameter setting range is: -100-100; Note: Clicking the button to restore to factory settings cannot reset this data.
	Protective lens temperature threshold	Users can customize the protective lens temperature threshold, and the parameter setting range is: 35 - 55℃; This parameter value is associated with the alarm interface value. Note: Clicking the restore factory setting button cannot reset this data.
	Language settings	Users can customize the language. Note: Clicking the restore factory setting button cannot reset this data.
Power & fan status	Running time	Unit: 10 minutes. This value shows the total usage time of the machine.
	Current power supply voltage	Shows the current power supply voltage of the machine.
	Current power supply current	Shows the current power supply current of the machine.
	Current power supply temperature	Shows the current power supply temperature of the machine.
	Fan duty cycle	Displays the current machine fan duty cycle. The larger the value, the faster the fan.
Others	Restore Factory setting	Click Restore Factory setting to reset the machine data and restore to factory settings

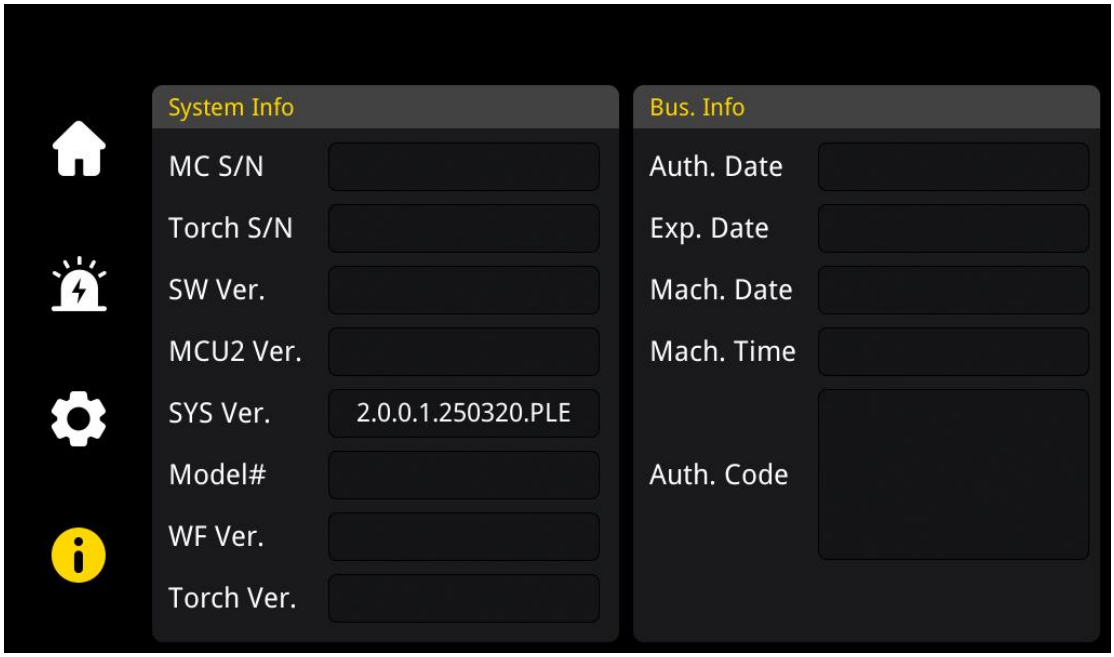
●Laser settings: This interface contains a series of information settings for reference points and alarm points.



Function classification	Function description	Remarks
Reference point setting	Overcurrent	Users can customize the overcurrent reference current value, and the setting range is 0 - 45A. Note: Clicking the button to restore to factory settings cannot reset this parameter value.
	PD alarm	Users can customize the PD alarm count value, and the setting range is 0 - 3. Note: Clicking the button to restore to factory settings cannot reset this parameter value.
	Restore PD alarm	Restore the PD alarm count.
	Red light current	Users can customize the red light current, and the setting range is 0 - 300mA. Note: Clicking the button to restore to factory settings cannot reset this parameter value.
	Full power calibration	Users can customize the full power calibration value, and the setting range is 0 - 120. Note: Clicking the button to restore to factory settings cannot reset this parameter value.
Alarm point setting	Low temperature alarm	Users can customize the low temperature alarm, and the setting range is -20-0. Note: Clicking the button to restore to factory settings cannot reset this parameter value.
	Pump source shell temperature	Users can customize the pump source board temperature alarm value, and the setting range is 40 - 65. Note: Clicking the button to restore to factory settings cannot reset this parameter value.

(5) Information interface

The information interface contains machine information and business information.



The device authorization code is about to expire, and the system will pop up a box to remind you. In this case, please contact the manufacturer to release the authorization code again to ensure that the machine can be used normally.

Function classification	Function description	Remarks
Machine information	Machine model	Machine model
	Hardware version	Machine hardware version number
	Software version	Machine firmware version number

	Gun S/N	Gun tip serial number (unique number for each gun tip)
	Master S/N	Machine serial number (unique number for each host)
	Welding gun version	Welding gun firmware version number
	System version	Display firmware version number
	Wire feeder version	Wire feeder software system version number
Business information	Authorization date	Machine authorization date
	Machine date	Current date of the machine's built-in clock
	Machine time	Current time of the machine's built-in clock
	Date of maturity	Expiration lock warning time
	Authorization code	Valid date for logging in and unlocking the machine with the authorization code If the authorization code is entered incorrectly and the system pops up a prompt: Authorization code error, please check and try again

7 - Welding Tip Description

The indicator light on the welding gun can show different working states. When the welding gun and the laser communicate successfully and the working state of the equipment is normal, the indicator light is yellow; when the safety lock and the copper nozzle are in contact with the material to be welded at the same time, the safety lock is turned on. At this time, hold the gun tip and press the laser trigger button to emit laser, and the indicator light is green; when the welding tip or laser is abnormal, the indicator light is red.

Notes:

◎ The copper nozzle is the contact part of the welding operation. When using it, the copper nozzle of the welding gun is in direct contact with the workpiece and a loop must be formed before welding can be performed.

Description of welding tip indicator light:

Indicator light color	Explanation
Green	Laser emitting
Red	Fault alarm
Yellow	Standby

Chapter 4 Detailed Specifications

1 - Optical Characteristic Parameters

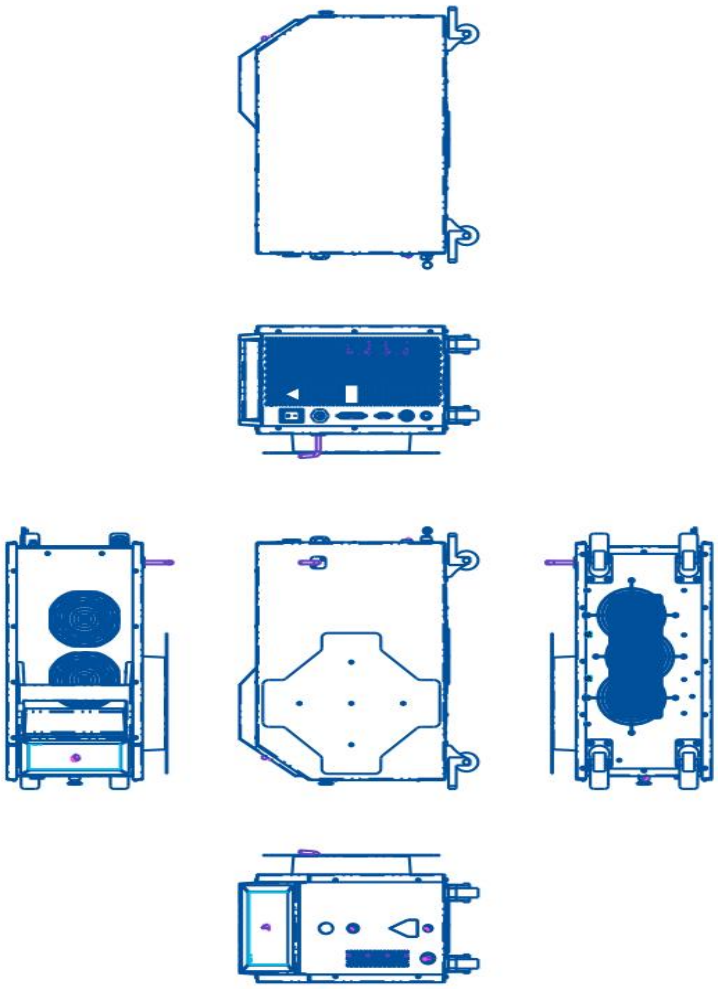
S/N	Characteristic parameter	Test conditions		Minimum value	Typical value	Maximum value	UNIT
1	Operating mode	Continuous/Pulse	Ambient temperature 25℃				
2	Polarization state	Random					
4	Power adjustment range	1% tier		10		100	%
5	Center wavelength	100% Continuous			1080		nm
6	Electro-optical efficiency of the whole machine	10 - 100% linear fit			27		%
7	Spectral bandwidth (3dB)	100% Continuous		3		5	nm
8	Short-term power stability	100% continuous >1h			2		%
9	M2	100% Continuous		1.1			
10	Laser on time	10% → 90% output		50	100	us	us
11	Laser off time	90%→10% output		50	100	us	us
12	Indicator red light power	100% output		300		1000	uw
13	Fiber armored cable length			5			M
14	Fiber armored cable bending radius			135			mm
15	Output mode	QBH					

2 - General Characteristic Parameters

S/N	Characteristic parameter	Test conditions	Minimum value	Typical value	Maximum value	UNIT
1	Operating Voltage		200	220	240	VAC
2	Input power	100% output			3	KW
3	Ambient temperature for operating		-15		40	℃
4	Working environment relative humidity		10		85	%
5	Laser cooling method	Phase change heat dissipation				
6	Gun tip cooling method	Nitrogen, argon gas cooling				
7	Storage temperature		-20		85	℃
8	Dimension of the whole machine	507*230*349			mm	
9	Weight of the whole machine	≤ 22			kg	

3 - Structural Layout

Laser three-view (unit: mm)



Chapter 5 Disassembly and Assembly Guide

1 - Shipping Box Unpacking Instructions

If the package shows any signs of external damage, check the device for damage and notify the freight forwarder immediately. When removing the device from the package, special care must be taken to ensure that the fiber optic cable is not broken or damaged.

The device is in a foam-insulated wooden box with foam shock absorbers and shock indicators to help fix and ensure safe handling during transportation. It is recommended to be particularly careful for the software package when unpacking the package for shipping. In order to minimize the risk of damage to the device, Dynalasers recommends that you read this instruction in detail.

2 - Delivery and Transportation

The shipping package is labeled with the carrier and carrier information. However, these markings may not be the correct information. Please check whether the outside of the crate has obvious damage during transportation.

• Labels - The packaging label is affixed to the top panel of the wooden crate to: identify the manufacturer's name, address and telephone number; provide general product information such as model, model code, serial number; indicate the date of shipment (month/day/year).

• Impact indicators - The following labels and indicators are affixed to the side panels or ends of the wooden crate to help provide guidance for proper handling.

Lift the box vertically →

Take out the welding tip and accessories →

Note:

◎ Do not use the accessory optical cable to lift or position the equipment.

3-Accessory List

Material name	Usage	UNIT
Laser Safety Glasses (Domestic Version)	1	pcs
Round tip cotton swab	1	Packet
Masking tape	1	Roll
Welding copper nozzle 1.0	1	pcs
Welding copper nozzle 1.2	1	pcs
Air hose adapter 10 to 6	1	pcs
Air hose D10	0.1	m
Protective lens	5	pcs
Single-head open-end wrench 21	1	pcs
Air hose	5	m
External corner welding copper nozzle 1.0	1	pcs
External corner welding copper nozzle 1.2	1	pcs
Cutting copper nozzle	1	pcs
Gun barrel assembly	1	set
External safety grounding wire	1	pcs
External safety return line	1	pcs

Chapter 6 User Guide

1 - Notice

Notes:

◎ Please refer to Chapter 4 *Detailed Specifications* to select the appropriate power supply.

◎ Please refer to Chapter 2 *Safety Information* to check whether the peripheral working configuration environment of the laser meets the requirements.

◎ Please wear the noise-isolating earplugs provided before performing laser welding operations.

2 - Power Connection

1. The laser power input line needs to be connected to single-phase AC (220VAC), and the power supply cable diameter should be no less than 4 square millimeters copper core wire (current carrying capacity should be no less than 30A).

2. It is forbidden to connect the power cord directly to the household power strip;

3. Connect the power cord to the specified voltage and phase, L=220VAC, N=0VAC, PE= ground. Make sure the wiring is correct before turning on the machine, and PE is not allowed to be missed.

To ensure safety features, Dynalasers strongly recommends that you connect a 32A circuit breaker (air switch) in series between the power supply unit and the laser.

If you still have other questions about the power connection, please refer to Chapter 4 *Detailed Specifications* to determine the electrical specifications. The electrical connection should be operated by personnel familiar with electrical safety and wire connection, and the wiring should comply with all national and local regulations.

3 - Static Grounding Connection

The grounding nut of the laser housing must be reliably connected to the ground using a grounding wire to avoid potential damage to the laser caused by static electricity.

Wiring is as shown:

Insert the wire into the grounding wire post hole and tighten the grounding wire post nut.

Lock one end of the grounding wire on the grounding stud.

Clamp the other end of the grounding wire reliably on the outdoor grounding post.

4 - Safety Ground Lock Connection

Before turning on the laser, the safety ground lock must be connected to the laser loop interface. When preparing to emit laser, the other end of the safety ground lock (crocodile clip) needs to be clamped on the workpiece to ensure that the crocodile clip and the welding tip form a loop before the laser can be emitted.

The safety clip can only be clamped on the welding workpiece. It is strictly forbidden to clamp the safety clip to the gun tip to prevent the risk of accidental laser emission.

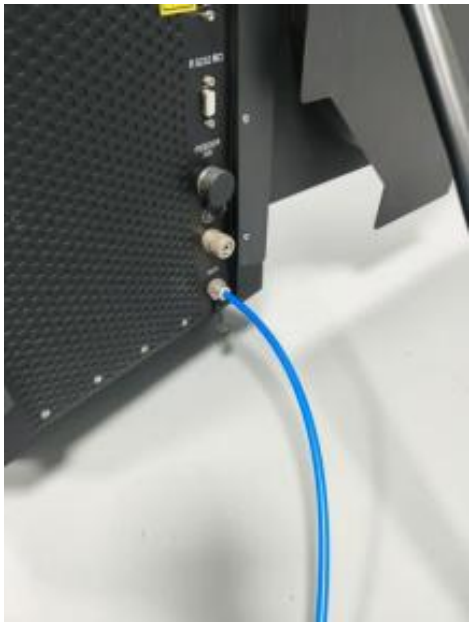
5 - Gas Connection

The welding tip uses inert gas cooling. The gas purity and gas pressure must be ensured. Generally, nitrogen and argon are used as protective gas. The purity of the protective gas must meet 99.99%, and the input gas pressure must be greater than 80Kpa and less than 500Kpa.

In order to ensure the welding effect, a pressure reducing valve with a flow meter (nominal flow 25L/min) is required to accurately control the gas flow.

Connect the 6mm outer diameter air hose to the Gasin port and adjust the gas flow rate to 15 - 20L/min. Select the normally open gas valve mode (in the advanced settings interface) to adjust the gas flow rate.

Equipment connection diagram:



6- Wire feeder connection

The wire feeder operates on 24V DC power supply. It is necessary to securely connect the quick-plug of the wire feeder cable to the rear socket of the welding machine (as shown in the figure below).

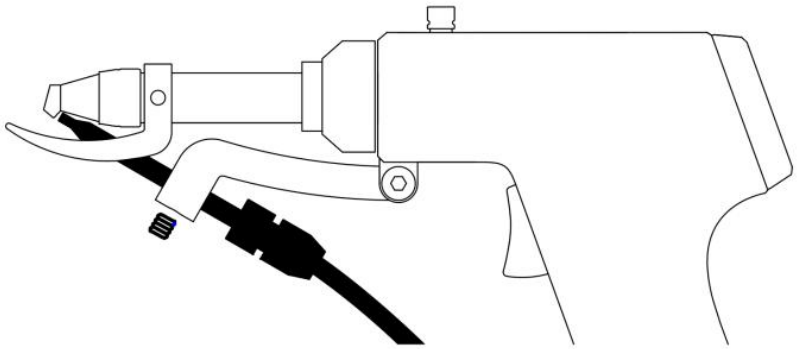
Equipment Connection Diagram：

7 - Connection between the Wire Feeding Bracket and the Welding Gun

Overall assembly diagram

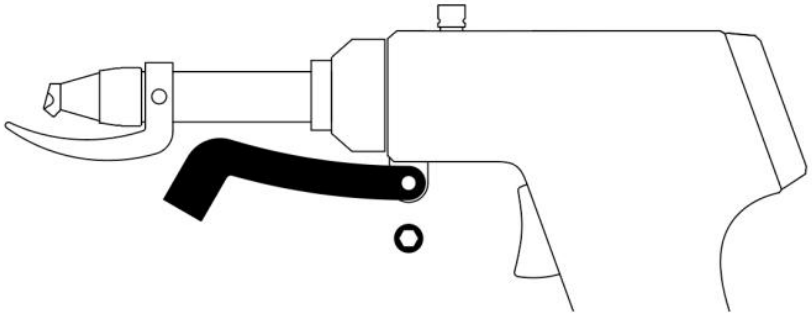
(1) Fix the wire feeding tube

Feed out the welding wire and install the wire feeding copper nozzle.



Wire feeding tube assembly diagram

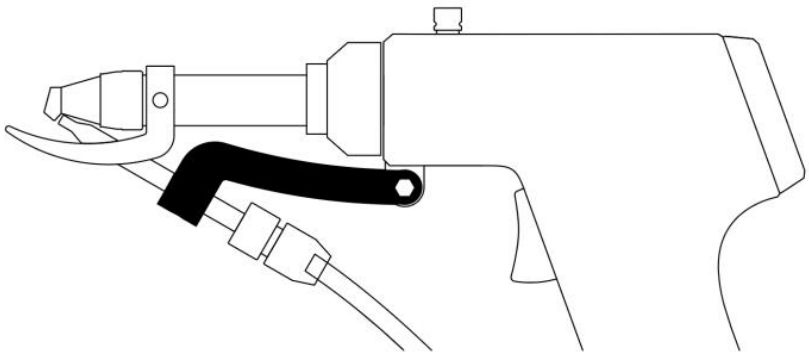
(2) Fix the wire feeding rack



Wire feeding rack assembly diagram

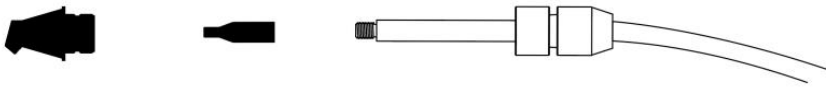
(3) Adjust the position of the wire feeding rack

Adjust the welding wire into the wire groove of the copper nozzle and tighten the machine screw and hexagonal three-in-one screw.

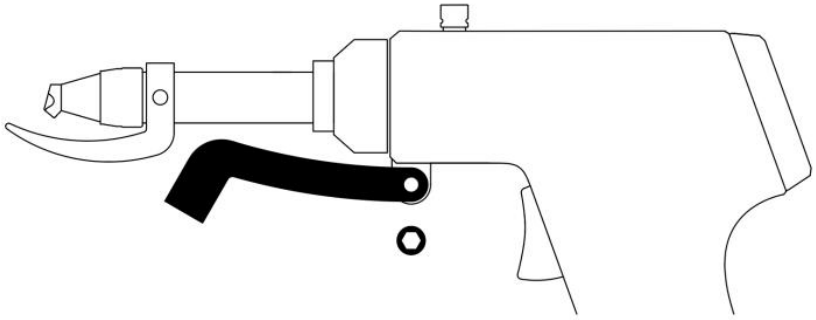


8 - Installation Guide for Special Wire Feeding Nozzle

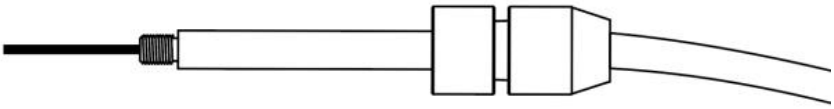
I. Prepare the wire feeding nozzle, wire feeding bracket (integrated with the wire feeding tube), and nozzle.



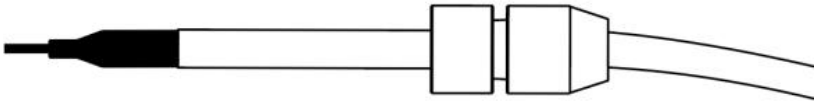
II. Install the wire feeding bracket on the welding gun.



III. Install the wire feeding tube and manually feed the wire so that the welding wire passes through the wire feeding bracket.



IV. Install the wire feeding nozzle on the wire feeding bracket.



V. Install the wire feeding bracket with the wire feeding nozzle installed on the welding gun and tighten the screws to start welding.

9 - Routine Maintenance

(1) Inspection of wire feeding wheel and clamping wheel:

Check the wear of the wire feeding wheel groove and clamping wheel, and check whether there are impurities in the groove. If the wear is serious, it needs to be replaced in time.

(2) Inspection of wire feeding tube:

Check whether the joints at both ends of the wire feeding tube are loose, whether the stainless steel tube (graphite tube) is blocked, and a small amount of metal chips can be cleaned with compressed air. If the blockage is serious, the wire feeding tube needs to be replaced.

(3) Motor inspection: Check whether the motor is making any abnormal noises. The fixing screws and washers of the wire feeder may experience friction during use. Prolonged operation can cause the washers to wear down over time, so lubricating oil should be applied as necessary. The frequency of oiling depends on the usage intensity and operating environment, but it is generally recommended to apply lubricant every 1 to 2 months. If wire feeding becomes difficult, you can apply oil manually at that time.

(4) The equipment needs to be purged and cleaned at least once a month.

Figure 6-1

1.0 Welding Copper Nozzle 1.2 Welding Copper Nozzle External angle welding copper nozzle 1.0 External angle welding copper nozzle 1.2 Cutting copper nozzle

Cutting copper nozzle: suitable for cutting copper nozzles

1.0 Copper nozzle: Suitable for 0.8mm-1.0mm welding wire

1.2 Copper nozzle: Suitable for 1.2mm welding wire

0.8 wire feeding nozzle: Suitable for 0.8mm diameter wire

1.0 wire feeding nozzle: Suitable for 1.0mm diameter wire

1.2 wire feeding nozzle: Suitable for 1.2mm diameter wire

10 - Startup Steps

Warning:

◎ Make sure all electrical connections (including shielding gas and ground wire) are connected before use. If conditions permit, all connectors must be tightened and fixed with screws.

◎ When operating the laser, do not look directly at the laser output port. Be sure to wear safety glasses, noise-isolating earplugs, and masks before operating.

◎ When performing wiring operations, please turn off all power switches of the laser first.

The startup process is as follows:

(1) Connect the power input to the air switch;

(2) Connect the safety lock to the loop interface;

(3) Connect the protective air hose (outer diameter 6mm) to the air hose interface and open the air valve;

(4) Turn on the power switch on the rear panel of the laser;

(5) Release the e-stop switch on the front panel of the laser and turn on the key;

(6) Click the touch screen to enter the software interface and adjust the corresponding parameters (laser power, swing amplitude, swing frequency, air blowing and air shut-off delay, power ramp up and down, laser output mode, etc.);

(7) Adjust the air valve mode to normally open and adjust the protective gas flow rate to 15-20L/min;

(8) Clamp the crocodile clip on the workpiece to be welded;

(9) Turn on the display main switch and laser enable switch;

(10) Press and hold the gun tip switch to emit laser.

11 - Welding Process Parameters

Select material in the simplified interface

Select thickness

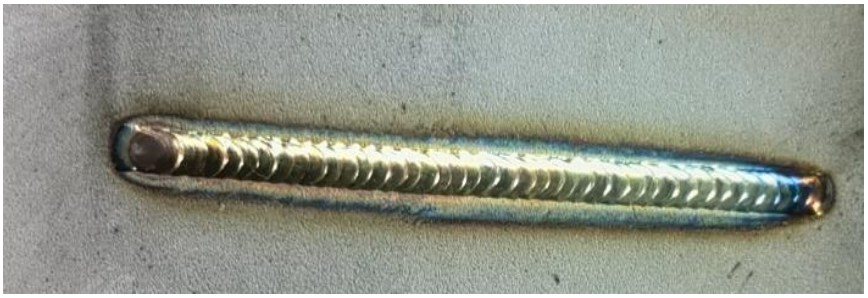
Select welding method

12 - How to Use the Fish Scale Function

Method 1: Enable the fish scale mode on the homepage

The fish scale mode has two default parameters. Select one of them according to the welding effect

Method 2: Enter the professional mode and switch the wire feeding to pulse mode. Adjust the pulse period and duty cycle to debug the fish scale effect



13 - Product Accessories Inspection and Cleaning Guide

1. Product accessories inspection

To clean the protective lens window of the gun tip, you need the following equipment:

(1) Lint-free fiber cleaning cloth and cotton swab

(2) Anhydrous ethanol

(3) Masking tape

Notes:

◎ Before using this product, please check the cleanliness and damage of the protective lens. Using dusty or damaged protective lenses will damage the welding gun tip (focusing lens, extension tube, etc.) and affect the welding effect.

◎ Unauthorized disassembly of the gun tip and laser products are no longer covered by the warranty of Dynalasers.

◎ Please wear powder-free gloves or finger cots and clean the product in a dust-free environment. Dynalasers will not provide warranty service for damage to the gun tip due to improper operation or incorrect cleaning procedures.

◎ When cleaning, the concentration of anhydrous ethanol must be greater than 99.5%.

2. Operation steps

Please clean and maintain the laser welding machine according to the following process:

(1) Turn off the laser switch and cut off the power supply;

(2) Rotate the locking screw on the protective lens housing from the gun tip and pull out the protective lens holder (the protective lens drawer position is sealed with clean masking tape to prevent dust from entering), then use an optical cleaning cloth dipped in alcohol and wipe the entire protective lens window surface;

(3) Hold the window piece with your left hand and place it under a microscope (magnification is 20 times);

(4) Adjust the focal length of the microscope with your right hand so that the protective lens surface can be clearly imaged under the microscope;

(5) Carefully observe the surface of the protective lens. If dust or tiny particles are found, clean with a cotton swab.

The steps are as follows:

① Dip a cotton swab in enough alcohol and shake off the excess alcohol;

② Through the microscope, place the cotton swab on the dusty part of the protective lens;

③ Gently wipe the dust with the cotton swab and move it to the edge of the protective lens. The cotton swab should be replaced in time after use;

④ After wiping off all the dirt, put it under the microscope for observation for the last confirmation.

(6) Install the wiped protective lens into the protective lens holder;

(7) Insert the protective lens holder into the gun tip lens cavity holder and tighten the locking

screws on the lens holder shell to prevent the protective lens holder from loosening and affecting use.

Important:

◎ Do not reuse lint-free cotton cloth or cotton swabs.

◎ Do not touch the protective lens of the welding gun tip with your fingers.

◎ Do not blow the dirt on the surface of the protective lens directly with your mouth, which may cause new dirt.

◎ Do not touch the tip of the cleaning cotton swab with your fingers.

◎ Do not forget to clean the protective cover and sleeve when you replace them.

◎ When using compressed air, do not blow dirt directly from the front, but blow from the side to prevent dirt from penetrating the surface.

◎ If the protective lens holder cannot be immediately installed on the optical component, please seal the lens cavity shell with masking tape

① Unscrew the protective lens screw

② Remove the protective lens holder

③Use masking paper to prevent dust

④ Replace the protective lens and install it

3. Operation steps for replacing the focusing lens

Please follow the following process to clean and maintain the gun tip focusing lens of the laser welding machine:

(1) Turn off the laser switch and cut off the power supply;

(2) Remove the focusing lens from the gun tip (see the figure below for the disassembly steps), then use an optical cleaning cloth dipped in alcohol and wipe the entire focusing lens surface;

(3) Carefully observe the surface of the focusing lens. If dust or tiny particles are found, use a cotton swab to clean it. The steps are as follows:

① Dip a cotton swab in enough alcohol and shake off the excess alcohol;

② Use a cotton swab to gently wipe the dust and move to the edge of the protective lens. The cotton swab should be replaced in time after use. It can only be wiped in one direction, not back and forth;

(4) Install the cleaned focusing lens into the gun tip.

Important:

◎ Do not reuse lint-free cotton cloth or cotton swabs.

◎ Do not touch the focusing lens of the welding gun tip with your fingers.

◎ Do not blow the dirt on the surface of the focusing lens directly with your mouth, which may cause new dirt.

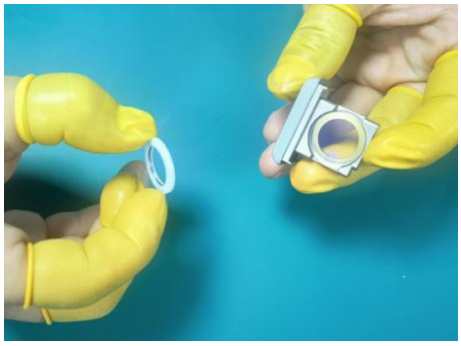
◎ Do not touch the tip of the cleaning cotton swab with your fingers.

◎ Do not forget to clean the protective cover and sleeve when you replace them.

◎ If the focusing lens cannot be immediately installed on the optical component, please seal the lens cavity shell with masking tape. When installing the focusing lens, make sure the convex surface faces the gun muzzle.

14 - Cleaning Steps for Focusing Lens

① Use a screwdriver to remove the focusing lens seat screws *2, and then remove the focusing lens seat.



② Use masking tape to seal the focusing lens cavity to prevent dust from entering.

③ Use a dust-free cotton swab or dust-free cloth dipped in alcohol to wipe the front and back of the focusing lens, install the pan seal, and tighten the screws.

Chapter 7 Service and Maintenance

1 - Maintenance Instructions

Notes:

◎ This product has no user serviceable parts, components or assemblies. All maintenance work must be completed by Dynalasers personnel.

◎ To protect your rights, please be sure to contact Dynalasers or the local representative as soon as possible after discovering the fault and apply for product repair or replacement service. After authorization by Dynalasers, please send the warranty products in matching packages back to Dynalasers.

◎ If any damage is found after receiving the products, you must keep the certification documents so that you can claim your rights from the carrier. Important:

◎ Do not send any product back to Dynalasers without communication and confirmation.

◎ If the product is not within the warranty period or warranty coverage, please be responsible for the product repair costs. Changes:

Dynalasers reserves the right to make changes to any design or structure of the product without prior notice.

2 - Service Statement

For problems related to safety, setting, operation or maintenance of Dynalasers products, please read this manual carefully and strictly follow the operating instructions to solve them.

If you have any questions, please call Dynalasers Customer Service: 400 - 000 - 3207

After the problem you reported is confirmed by Dynalasers Customer Service Department, it will be followed up by the technical support team. If your problem cannot be solved after communicating with the technical support team, you may need to send the product back to Dynalasers for further investigation.

Chapter 8 Warranty Statement

1 - General Terms

Shenzhen Dynalasers Technology Co., Ltd. provides warranty services for products with defects caused by materials or production processes during the contract warranty period, and guarantees that the products meet the relevant quality and specification requirements mentioned in the document under normal use.

Shenzhen Dynalasers Technology Co., Ltd. provides repair or replacement services for products that fail due to materials or production processes during the contract warranty period. The repair or replacement of products within the warranty scope shall still be guaranteed according to the remaining warranty period of the original product.

2 - Warranty Limitation

Products, components (including fiber connectors) or equipment is not covered by the warranty in the following cases:

(1) Tampered, opened, disassembled or modified by personnel other than Dynalasers;

(2) Damaged due to improper use, negligence or accident;

(3) Used beyond the scope of product specifications and technical requirements;

(4) Indirect damage to the laser caused by failure of user software or interface;

(5) Used under improper installation, maintenance or other abnormal operating conditions not

included in this manual;

(6) Accessories and fiber connectors are not covered by the warranty.

The customer is responsible for understanding the above information and operating in accordance with the user manual, or the product failure caused thereby will not be covered by the warranty.

Important:

◎ Within the warranty scope, the customer must provide feedback within one month of discovering the failure.

◎ Dynalasers does not grant any third party or individual the authority to repair or replace our products.