



Please read the manual carefully before using the controller

- The manual is about system operation.
- Read the manual carefully to ensure the correct connection between gas and electricity.

RDWelder-SW

Handheld Laser Welding System User Manual

Shenzhen Ruida Technology Co., Ltd

Address: 202-203,B-Block,Technology Building, 1057 Nanhai Avenue,Nanshan District,, SHENZHEN, CHINA

Tel: 0755--26066687

Fax: 0755--26982287

E-mail: sales@rd-accs.com

Web: www.rd-accs.com



Copyright notice

Shenzhen Ruida Technology Co., Ltd. (hereinafter referred to as Ruida Technology) reserves all rights.

■ Ruida Technology has the patent copyright and intellectual property rights of this product, without the license and license of Ruida Technology, may not directly or indirectly copy, manufacture, process, use of this product and its related parts, otherwise Ruida Technology will be investigated for the relevant legal responsibilities in accordance with the law.

■ Regal Technologies reserves the right to modify documents such as products and product specifications in this manual without prior notice, and the right to modify any documentation that comes with this product.

■ Users should read this manual carefully when using the products described herein, and Regal Technologies shall not be liable for any direct, indirect, special, incidental or consequential loss or liability arising from the improper use of this manual or this product. Ruida Technologies does not assume any direct or indirect liability or loss as follows:

- The user uses this manual or this product incorrectly
- Losses caused by the user not following the relevant safety procedures

■ The loss caused by natural forces makes the machine in motion dangerous, the user is responsible for designing an effective error handling and safety protection mechanism in the machine, and Ruida Technology has no obligation or responsibility to be responsible for the consequential or corresponding losses caused by it.



CERTIFICATION STATEMENT

■ CE Certification statement

This product has passed the European Union CE (CONFORMITE EUROPEENNE) safety certification, has passed the corresponding conformity assessment procedures and the manufacturer's declaration of conformity, and complies with the relevant EU directives.

■ ROHS Certification statement

This product has passed the "Restriction of Hazardous Substances" safety certification established by EU legislation and complies with relevant EU environmental protection regulations.

■ FCC Certification statement

This product has passed the Federal Communications Commission safety certification and complies with relevant US electronic product safety regulations.



SAFETY INFORMATION

Please make sure that the operation is correct and the method is safe when using the system. Some signs or words will be used to remind you of dangerous matters and some important information.



Danger:

It indicates a serious danger. In the process of using, if improper operation or wrong usage method may cause serious injury or even death to the personnel, please do not use it easily until the operation method is correct and the usage

method is correct.



Warning:

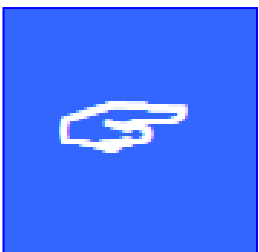
It indicates a serious danger. In the process of using, if improper operation or wrong usage method may cause injury to the personnel, please do not operate it until the operation method is correct and the usage method is correct.



Cautious:

It indicates potential product risk. In the process of using, if the use method is incorrect or the operation is improper, it may cause damage to the product or some parts. Please do not use it until it is ensured that the operation method is correct and the use method is correct.

Important:



It indicates important information that needs attention during the use of the product. Please do not ignore this information, it will provide effective operation assistance.



This mark indicates laser radiation, which is generally attached to products that output laser. When using such equipment, please be careful with laser and pay attention to safety.



Receiving, Unpacking, Inspection

The product is packed in an antistatic bag. If the package has any external damage, please check the goods and notify the carrier of the damage situation in written form.

Important:



After receiving the products, please check whether the outer packaging is in good condition, whether the product is complete after unpacking, and whether the parts are in good condition. If there is any damage, please contact RUIDA Technology.

Keep the packaging materials and wiring accessories when unpacking. Please be careful when disassembling the package. After unpacking the goods, please check if the parts are complete. If you find that the parts are missing or the parts are damaged, please contact Ruida immediately.

RDWelder-SW handheld laser welding system shipping list is shown below: (as the product is updated constantly, the accessories received may be different from this manual)

Component	Quantity	Description
RDWelder-SW-General-Welding mainboard	1	
LCD terminal-XRD-RD63X-T70-15R	1	
Touch screen fixed buckle (with screw)	4	
DB9 male-welding wire	1	
DB15-VGA case	1	
3.81MM-curved plug-KF-3P socket-Green	1	
3.81MM-curved plug-KF-4P socket-Green	1	
3.81MM-curved plug-KF-6P socket-Green	1	
Touch screen 4-core cable-1.5m-Black	1	



Contents

Chapter 1 Overview	7
1.1 HANDHELD LASER SYSTEM INTRODUCTION	8
1.2 MOUNTED DIMENSION	8
1.2.1 Touch Screen Dimension.....	8
1.2.2 Mainboard Mounted Dimension	9
Chapter 2 System Wiring.....	11
2.1 SYSTEM WIRING	12
2.2 POWER INTERFACE.....	13
2.3 HMI INTERFACE	13
2.4 LASER SOURCE INTERFACE	14
2.5 GALVANOMETER INTERFACE.....	15
2.6 DIGITAL IO INTERFACE	16
Chapter 3 HMI Operation Introduction	19
3.1 HMI FUNCTION INSTRUCTION	20
3.2 HMI OPERATION INTRODUCTION	21
3.2.1 Parameter Setting.....	21



Chapter 1 Overview

Main contents:

- Handheld laser welding system introduction
- Mounted Dimension



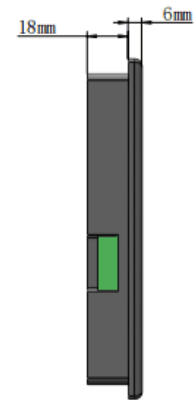
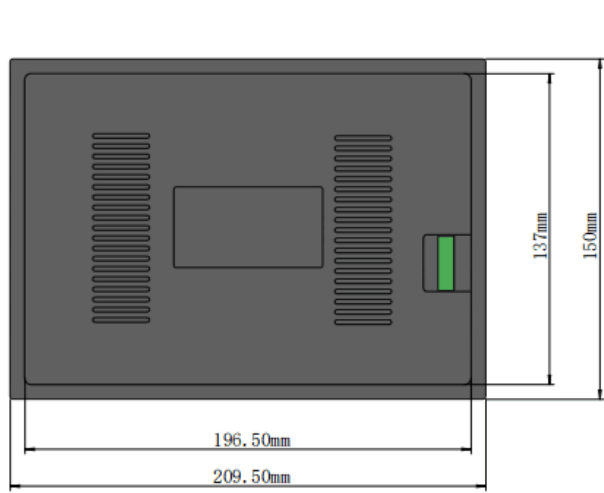
1.1 Handheld Laser System Introduction

The handheld laser welding system is a controller developed by Ruida Technology for fiber laser welding. It supports double galvanometer motor control, different swing types, automatic wire feeding, slow rise and fall of laser power, gas on in advance, gas off delay. The system is easy to operate and can display real-time input and output IO status, alarm information and motion status, etc.

1.2 Mounted Dimension

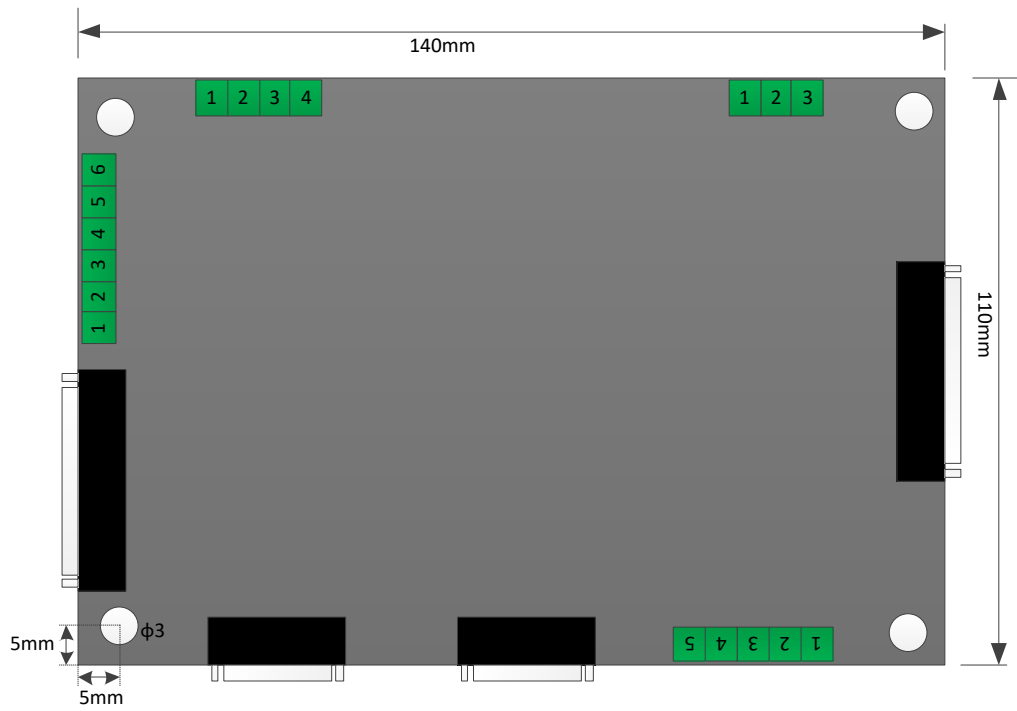
1.2.1 Touch Screen Dimension

The touch screen dimension is shown below:



1.2.2 Mainboard Mounted Dimension

The mainboard mounted dimension is shown below:



注：其他三个螺丝孔距离边界的距离均为5mm



Chapter 2 System Wiring

Main contents:

- System Wiring Instruction
- Power Interface Instruction
- HMI interface instruction
- Laser Source interface instruction
- Galvanometer Interface Instruction
- Digital IO Interface Instruction

2.1



2.1 System wiring

The following figure is the wiring diagram of the entire system. For system wiring, please refer to this diagram, and for detailed interface definitions, please refer to the relevant chapters.

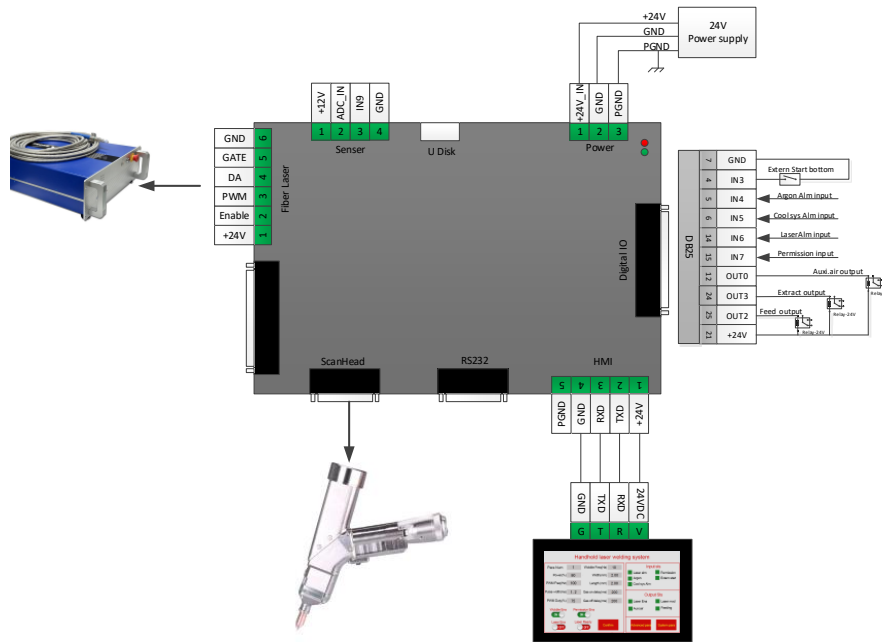
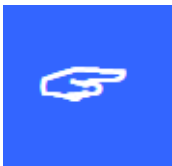


Figure 2.1 System wiring diagram



Important:

Do not wire the reserved pins on the mainboard



2.2 Power Interface

Power interface is a 3 PIN green terminal. It is a power interface supplied for the mainboard from the external with a voltage of DC 24V (DC 24V).

Chart 2.2 shows the definition of power interface.

Chart 2.2

PIN	Signal	Definition	Description
1	+24V_IN	Power input	+24V external power input, the power output current is more than 3A
2	GND	GND	—
3	PGND	External shield ground	Generally connected to ground or the case

2.3 HMI interface

HMI interface is a 5 PIN green terminal. The mainboard supplies power and communicates to HMI through this port.



Chart 2.3 shows the definition of HMI interface.

Chart 2.3

PIN	Signal	Definition	Description
1	+24V	Power supply, 500mA	Panel Power supply
2	TXD	HMI sending end	Serial communication TXD signal
3	RXD	HMI receiving end	Serial communication RXD signal
4	GND	GND	—
5	PGND	External shield ground	Generally connected to ground or the case

2.4 Laser Source Interface

Laser source interface is a 6 PIN green terminal.

Chart 2.4 shows the definition of laser source interface.

Chart 2.4

PIN	Signal	Definition	Description
1	+24V	+24V power output	HMI power supply, maximum output 500mA
2	Enable	Laser enable signal	24V level, high voltage is effective
3	PWM	Modulating signal	Duty cycle 1% to 99% adjustable, 24V
4	DA	Analog voltage output	0-10V analog voltage, for laser peak power regulation
5	GATE	Red light indicator	24V, low voltage is effective



		signal	
6	GND	GND	—

2.5 Galvanometer Interface

Chart 2.5 shows the definition of Digital IO interface.

Mainboard provides a galvanometer interface, compatible with the general digital galvanometer interface on the market. Chart 2.5 shows the definition of galvanometer interface.

Chart 2.5

PIN	Signal	Definition	Description
1	CLK-	Clock signal negative terminal	
2	SYNC-	Sync signal negative terminal	
3	XChannel-	Galvanometer X signal negative terminal	
4	YChannel-	Galvanometer Y signal negative terminal	
5	GND	GND	
6	CLK+	Clock signal positive terminal	
7	SYNC+	Sync signal positive	

		terminal	
8	XChannel+	Galvanometer X signal positive terminal	
9	YChannel+	Galvanometer Y signal positive terminal	

2.6 Digital IO Interface

The mainboard provides a general IO interface. OC output adopted in all output IO can directly drive the relay, and the maximum current can reach 500mA. The wiring diagram is shown as follows:

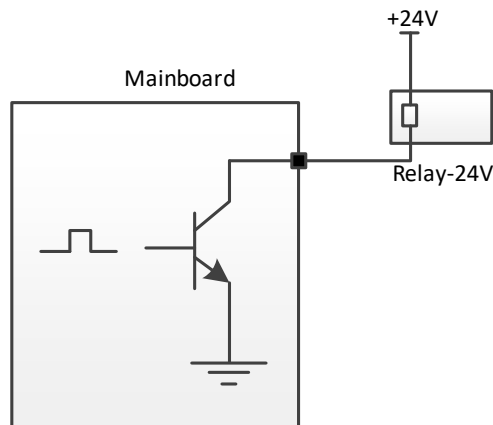


Figure 2.5 Output relay wiring diagram

Chart 2.6 shows the definition of Digital IO interface.



Chart 2.6

PIN	Signal	Definition	Description
1	RESERVE	Reserve	—
2	RESERVE	Reserve	—
3	RESERVE	Reserve	—
4	IN3	External start button input	Generally connected to the start button switch of the welding head
5	IN4	Argon alarm input	
6	IN5	Cool water flow alarm input	
7	GND	GND	—
8	RESERVE	Reserve	—
9	+5V	Motor wire feeding driver common anode	—
10	RESERVE	Reserve	—
11	RESERVE	Reserve	—
12	OUT0	Protective gas	For the gas blowing control of protective gas
13	OUT1	Modulation state output	For output laser PWM modulating signal state
14	IN6	Laser fault alarm input	
15	IN7	Safety lock signal input	The pin must be connected to the nozzle of the handheld head. Connect the welding metal materials to GND. During the welding, the nozzle should



			be in contact with safety clamp.
16	RESERVE	Reserve	—
17	DIR-	Motor wire feeding direction signal is negative	—
18	PUL-	Motor wire feeding pulse signal is negative	—
19	RESERVE	Reserve	—
20	RESERVE	Reserve	—
21	+24V	+ +24V power output	Maximum output current is 1A
22	RESERVE	Reserve	—
23	RESERVE	Reserve	—
24	OUT3	wire drawing control interface	For the control of automatic wire drawing of wire feeder
25	OUT2	Wire feeding control interface	For the control of automatic wire feeding of wire feeder



Chapter 3 HMI Operation Introduction

Main Contents:

- HMI Function Instruction
- HMI Function Instruction

3.1 HMI Function Instruction

Handheld laser welding control system operating panel (“HMI” for short) adopts a 7-inch configuration TFT touch screen with beautiful interface and convenient operation. It can set laser related parameters. On the main interface, the input and output IO status, alarm information and motion state can be displayed in real time. HMI main interface is shown in the figure below:

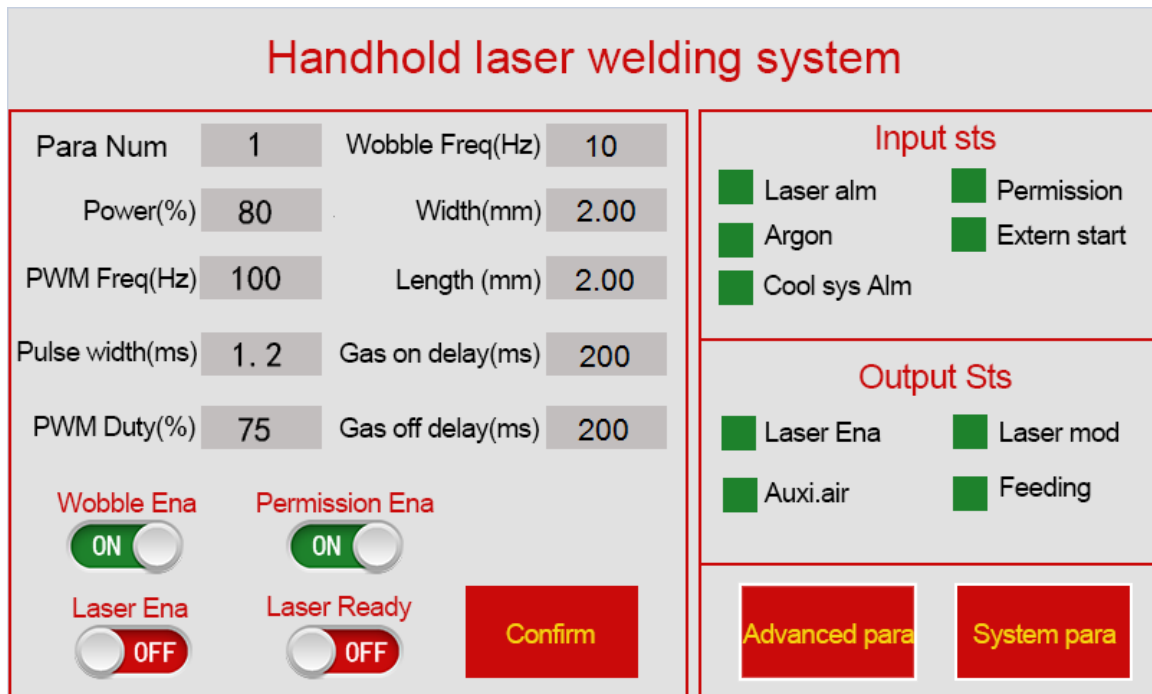


Figure 3.1 HMI main interface

Swing start: used to enable motor swing or stop it

Safety lock: it can be started or closed by the button. When the lock is enabled, during the welding, the laser will stop when the welding head does not touch the welding material.

Laser enable: Enable the laser before press processing on the gun head.

Light on/off: it can enable or close the laser. When it is enabled, GATE signal will be closed; when it is closed, GATE signal will be opened and PWM modulating signal output will be stopped.



3.2 HMI Operation Introduction

3.2.1 Parameter Setting

Parameter setting includes welding parameter, system parameter and advanced parameter.

Welding parameter: used to set the parameters related to laser and gas during welding.

Version No.: Different version can set multiple sets of welding parameters.

Power: Used to set the peak power of laser during welding

PWM frequency: used to set the frequency of laser PWM modulating signal

PWM pulse width: used to set the pulse width of laser PWM modulating signal

Duty cycle: used to set duty cycle of PWM signal with the range from 1% to 100%

Swing frequency: used to set motor swing frequency

Diameter: used to set the motor swing width

Gas on delay: when starting processing, users can set gas on delay. When the external start button is pressed, after blowing delay for some time, the laser can emit light.

Gas off delay: when stopping processing, users can set gas off delay. When processing is stopped, stop the laser first. After delay for some time, stop gas blowing.

System parameter: Used to set system parameter

Alarm signal enable: when it is enabled and the alarm is generated, welding will be stopped and the laser is closed; when the alarm signal is not enabled and the alarm is generated, the welding will go on.

PWM setting method: used to select whether the pulse width is effective or the duty cycle is effective in the welding parameter.

Wire feeding time: used to set the time of automatic wire feeding, which must be less than the gas on delay time

Wire drawing time: used to set the time of automatic wire drawing

Input port status: used to set the detection logic of various input IO in accordance with the actual situation of the machine. Otherwise, alarm will be triggered.



Advanced parameter: Used to set advanced parameter

Swing type: used to set swing types

Maximum frequency: set the maximum frequency of laser PWM signal. When PWM frequency set by welding parameter exceeds the maximum frequency, the frequency will be limited to the maximum value.

Maximum diameter: used to set the maximum diameter during swing. When the diameter set by welding parameter exceeds the maximum diameter, the diameter will be limited to the maximum value.

Diameter compensation: when there is a nuance in the length between the set diameter and the actual diameter, it can be modified by this parameter. When there is no need for compensation, it is usually set as 1.

Focal length: used to set the focal length of the welding head lens, which should be in line with the actual machine parameter. Otherwise, it will make the actual diameter incorrect.

Maximum deflection angle of galvanometer: used to set the range of deflection angle of galvanometer

Slow rise time: used to set the time that the laser analog voltage(0-10V) rises from 0 to the maximum power when the it is enabled.

Slow fall time: used to set the time that that laser analog voltage (0-10V) falls from the maximum power to 0 when it is stopped.

X axis offset: when there is a slight offset in the center of X axis, it can be modified by this parameter.

Y axis offset: when there is a slight offset in the center of Y axis, it can be modified by this parameter.

X axis correction coefficient: when there is a nuance in the length set by X axis and the actual length, it can be modified by this parameter. When there is no need for modification, it is usually set as 1.

Y axis correction coefficient: when there is a nuance in the length set by Y axis and the actual length, it can be modified by this parameter. When there is no need for modification, it is usually set as 1.

Straight line coefficient: it can adjust the swing speed at both ends and in the middle position when the straight line is swinging with the adjustable range from 0.01 to 1. When it is set to be 1, the speed at both ends is the same with that in the middle; when it is set to be as small as 0.01, the swing speed at both ends is quick, but slow in the middle.



Thank you for using Shenzhen Ruida Technology Co., Ltd. products!

All parts of this note, the property rights of the works belong to Shenzhen Ruida Technology Co., Ltd., without the permission of the Company, no unit or individual may reproduce, copy or disseminate the relevant contents of this product specification, without the permission of the Company

If the content information of this product is changed without notice.

If users have any comments and suggestions on the product and instructions during use, please call us for advice.

Contact: 0755-26066687

Fax: 0755-26982287

Address: 202-203, B-Block, Technology Building, 1057 Nanhai Avenue, Nanshan District,, SHENZHEN, CHINA