DENALIWELD

BF330-2S Wobble welding held User Manual

1 Overview

This manual covers the BF330-2S and the corresponding controls for an overview.

In the field of laser welding, the welding speed of swing laser welding is fast, the surface forming is good, the weld is white, the radiation is small, the health and environmental protection, and it is used in the welding field of thin plate stainless steel, iron plate, galvanized sheet, copper plate, aluminum alloy plate and other metal materials;

1.1 Product Introduction

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Compared to traditional (laser) welding methods, welding with a swinging laser welding head can improve the stability, repeatability and appearance of the welding process. The oscillating head widens the weld seam in a controlled way, allowing for high-quality welding, even if there is a gap between the welded workpieces. At the same time, thanks to its flexibility (oscillation mode, amplitude and frequency adjustable), welding parameters can be easily optimized for dissimilar materials and welded workpiece shapes.

1.1.2 Product Advantages

Lightweight design, the overall weight is 5.8kg, which greatly reduces the load of the manipulator, the integrated design of motor and drive control, and the wiring is simple

■ 8 swing modes, with display screen, easy to operate, and can run automatically offline

■Built-in motor driver, avoid interference due to the external drive, the signal line between the drive and the motor is too long, and the operation is more stable

■ Through IO control start-stop and program selection, the control is simple and easy to integrate

■Built-in CCD camera mechanical fully enclosed design

■Fully enclosed dustproof design to avoid dust contamination of the optical part

■The whole body is water-cooled, and the water connection is simple

1.2 Product Performance

1.2.1 Product Parameters

The relevant parameters of BF330-2S oscillating laser welding head are shown in Table 1.1

Model	BF330-2S
Maximum laser power (W)	2000
Collimating focal length (mm)	100
Focus Focal Length (mm)	200
Scan range	X:0~5mm; Y:0~5mm
Maximum Frequency (Hz)	500
Clear Aperture(mm)	20
Interface form	QBH

Table 1.1

1.2.2 Swing Mode

■Eight swing modes are supported, as shown in Figure 1.2 :

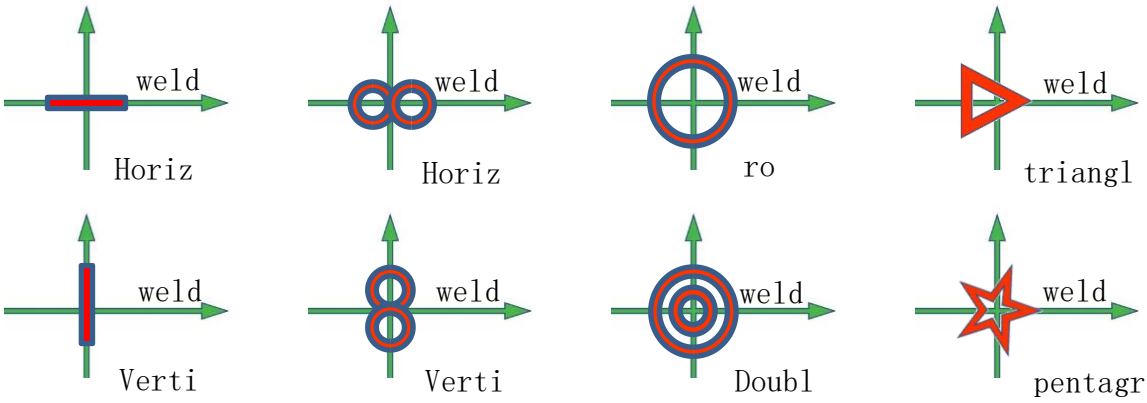


Figure 1.2

■In addition to the swing mode, the swing frequency and swing amplitude can also be adjusted to optimize the welding process.

Note: The highest frequency is inversely proportional to the amplitude of the swing.

2 Installation structions

2.1 Mechanical Assembly

2.1.1 Installation instructions for the whole head

The whole head fixing method of the swinging laser welding head is shown in Figure 2.1 below

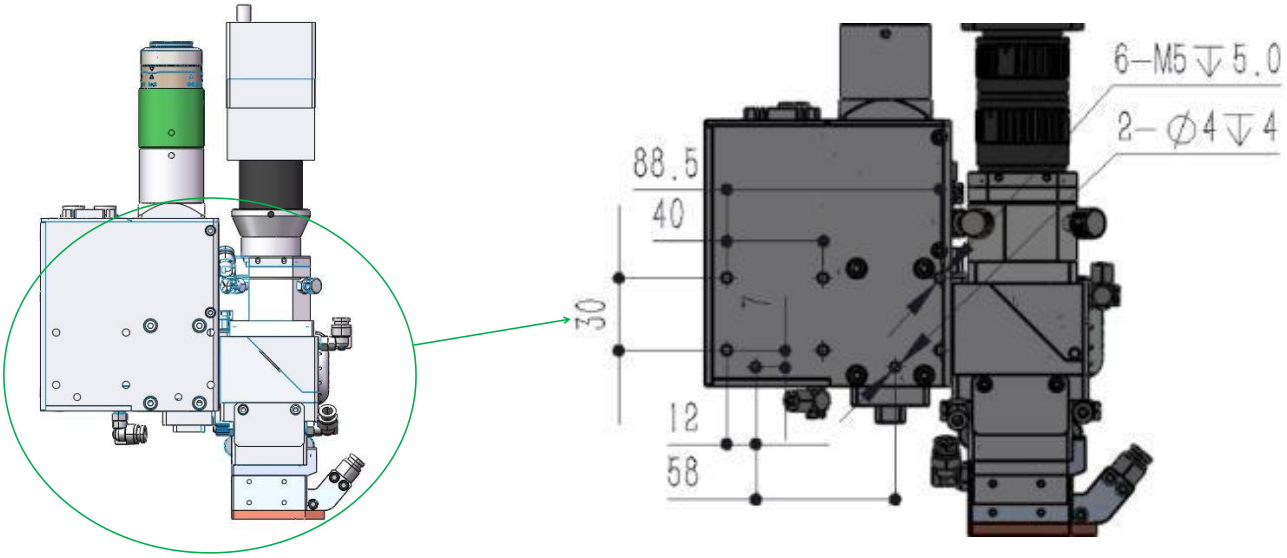
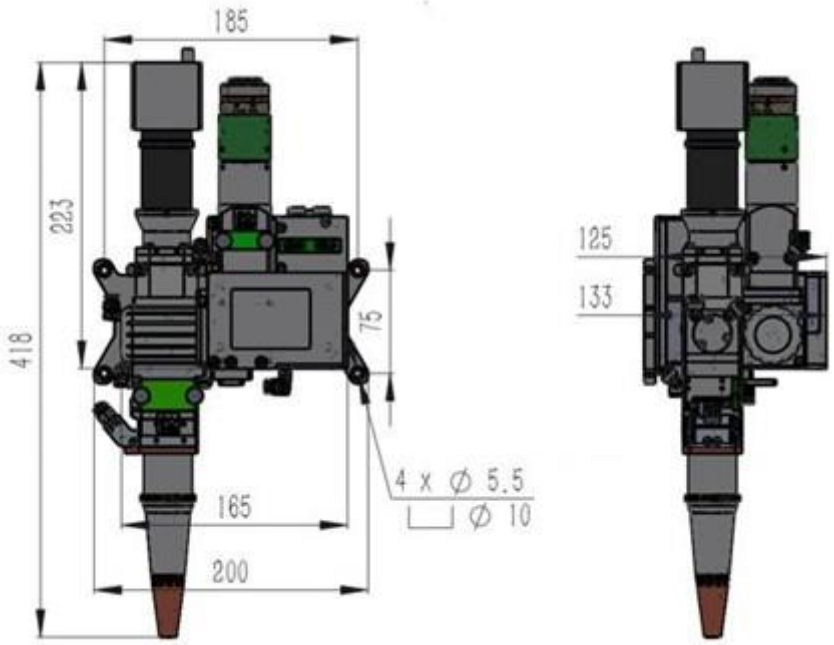


Figure 2.1

There is also an easy-to-install version with hole sizes shown in Figure 2.2 below



2.1.2 Fiber Connection Instructions

The oscillating laser welding head adopts the dustproof design of the whole body, and the connection between the CBH connector and the optical fiber needs to be operated according to the following requirements.

1. The structure of the swinging laser welding head is QBH connector.

2. Remove the optical fiber dust cover and check whether the protective cap protecting the optical fiber crystal head is locked. Check whether the optical fiber crystal head has dirt such as gray layer, and clean the optical fiber head with dust-free cotton swab and anhydrous ethanol.

3、 Place the swinging laser welding head horizontally, and then align the red mark at the output end of the fiber with the QBH red mark (the red dot is on the outside), and insert it straight to the bottom.

4、 QBH connector operation guide: Take out the sealed transparent protective sleeve (Fig. 2.5), rotate and loosen the steel sleeve counterclockwise (Fig. 2.6) so that the indicator ring can be adjusted to the "Unlock" state, and after

inserting the fiber head, adjust the locking indicator ring to the "Lock" state (Fig

2.7), and then turn the steel sleeve clockwise to the end (Fig. 2.8). The diagram only shows the status of the steel jacket.

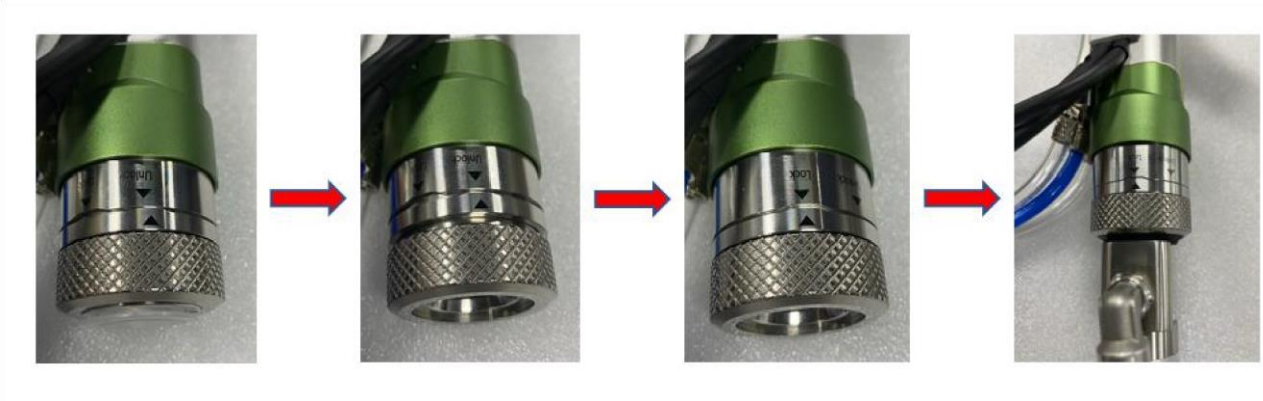


fig 2.5 fig 2.6 fig 2.7 fig 2.8

2.2 Water and gas connection

2.2.1 Waterway connection

The oscillating laser welding head adopts the water-cooled design of the whole body, and the water connection is required to dissipate the heat inside the oscillating head during operation. The internal water-cooled related connection has been strictly connected and the protective pipe cover is added, the user is simple to connect the water, only need to connect a water inlet interface and a water outlet interface.

2.2.2 Pneumatic connection

The protective gas of the swinging laser welding head adopts the direct blowing method, which protects the light cavity against slag and smoke during the light process, and the direct blowing head needs to be connected to the relevant protective gas. The interface is shown in Figure 2.11:

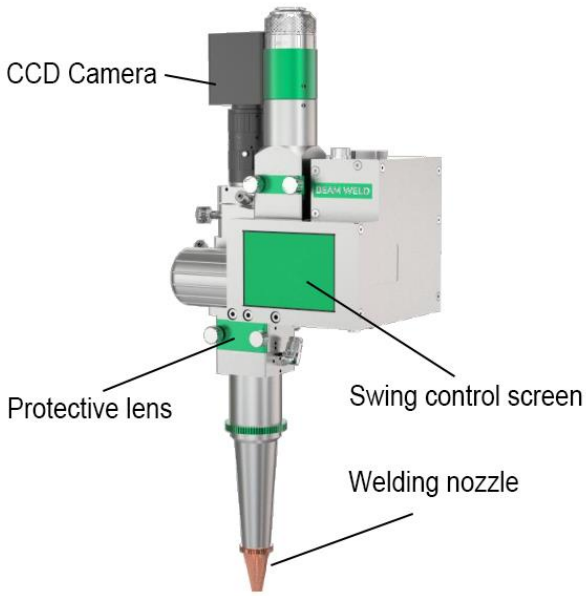


Figure 2.11

2.3 Harness connection

2.3.1 General Description

The electrical interfaces of the BF330-2S swinging laser welding head are all located on the upper panel, and the main interfaces are: control Power interface, external control interface and host computer interface.

2.3.2 Description of the external control IO interface

If customers need external control of the optical output, they can prepare the DB9 cable by themselves, and we reserve the external control interface pins of the DB9 male as defined in Table 2.2

External control interface (DB9 male).			
1	VCC_24V	I	Optocoupler power supply +24V
2	IN0	I	initiate
3	IN1	I	Procedure 1
4	IN2	I	Procedure 2
5	IN3	I	retain
6	GND24	I	Optocoupler power supply GND24
7	OUT0	Or	ready
8	OUT1	Or	run
9	OUT2	Or	retain

Table 2.2

2.3.3 Monitoring Connection Instructions

1. The swing laser welding head is equipped with the function of real-time monitoring of the welding process, and the camera wiring is shown in Figure 2.13 below

Figure 2.13

2. The complete wiring of the swing laser welding head monitoring system is shown in Figure 2.14

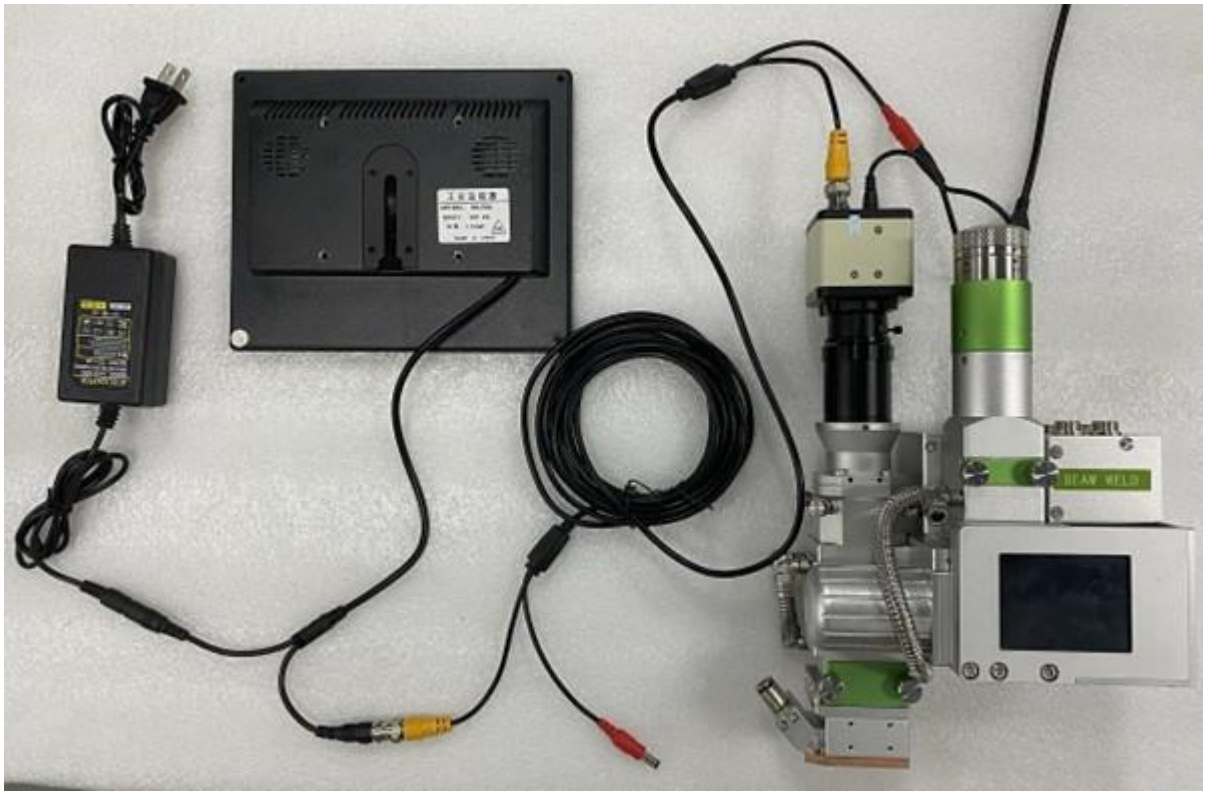


Figure 2.14

2.4 Monitoring Reconciliation Instructions

This oscillating laser welding head provides customers with a high-quality optical solution with optional CCDs, industrial lenses, monitors, and blue light sources, and optical solutions optimized for monitoring, making the welding process clearly visible. Both the camera and the industrial lens are mounted and centered on the soldering head at the factory. To provide the blue light source, the customer needs to install and wire it (12-24V).

3 Display operating instructions

The oscillating head developed by our company is controlled by a unified interface, which can be controlled by the touch screen of the oscillating head. The swing touch screen can adjust the working state of the swing head, and after adjusting the parameters, it can realize offline work, and the operation is stable and reliable. The touchscreen can be embedded in the oscillating head.

3.1 External control display, if the touch screen is in external control mode.

3.2 Main Interface

The touch screen of BF330-2S swinging laser welding head has three interfaces, which are the main interface, the system parameter interface, and the process parameter interface. After turning on the power switch, the touch screen enters the main interface.

The main interface displays the current parameter number (0~3), control mode (internal control, external control), and switch button (start/stop).

"System Parameters" button, "Process Parameters" button.

3.3 System Parameters

The system parameters interface is mainly used to set various system parameters and display the current version number.

The specific significance and adjustment range of the parameters are shown in Table 3.1 below:

parameter	significance	range
Welding head version number	Displays the weld head version number	Welding joint version control
Touchscreen version number	Displays the touchscreen version number	Touchscreen program control
X offset	X offset (Unit: 0.1mm).	-100~+100
and 偏移	and 偏移 (Unit: 0.1mm).	-100~+100
X gain	X gain factor	0.2~1.99
Y gain	Y gain factor	0.2~1.99
Control mode	Switch between internal and external controls	Internal/External Control
Main interface	Go back to the main interface	
apply	Apply the parameters that you set	

Table 3.1

3.4 Main process parameters

The oscillating head can save 4 sets of program numbers, which are 0~3. Click the parameter number to select one of the set of parameters to set.

The 4 sets of parameters can be set independently, and can be switched on the screen for actual use, or selected with external IO.

Select the swing trajectory by directly clicking on the corresponding graph, and currently supports 8 swing tracks, which are ○, ▬, and |、8、∞, ◎, △, ☆ The scan size can be entered by the keyboard, and the range is between 0~5mm.

The swing frequency can be input by the keypad and ranges between 1~500Hz. The actual oscillation frequency depends on the size of the scan, with a maximum frequency of 500Hz for sizes less than or equal to 1.5mm and a maximum frequency of 300Hz for diameters greater than 1.5mm.

4 Safety Instructions and Maintenance Overhaul

4.1 Safety Instructions

This product belongs to Class 4 laser control products, improper use will cause damage to the eyes and skin, please follow the EU EN60825-1 standard for safety protection.

1. Do not use in a humid environment, the electrical part may cause electric shock or short circuit when encountering water, when there is an abnormal phenomenon such as scorching odor, abnormal sound, abnormal heating, smoke, etc., please turn off the power to stop running, otherwise it is easy to cause electric shock, fire and other dangers.

2. After the indicator light is turned on, it is strictly forbidden to expose the eyes to the indicator light to avoid injury.

3. The laser is infrared invisible light, after the laser is turned on, it is strictly forbidden to expose any part of the body to the laser to avoid personal injury.

4. In laser processing, it is recommended that laser protective glasses must be worn. Please choose protective glasses according to the wavelength range

of the shield, and it is strictly forbidden to hold the muzzle of the gun at any part of the human body. After the processing is terminated, the welded workpiece is still in a high temperature state, please do not touch the workpiece to prevent high temperature burns.

5. Please make sure that the PE wire of the power cord is reliably grounded to avoid losses.

6. Please do not damage the tamper-evident label on the controller shell to avoid losing the warranty right.

4.2 Maintenance and Overhaul

Protective lens cleaning or replacement:

1. As shown in Figure 4.1, the collimation protective lens and the focusing protective lens should be regularly checked for dirt before the first use every day, and if dirty, they should be cleaned or replaced; when the power is weakened during use, or the effect is not good, check whether the two protective lenses are dirty, damaged, etc., and then clean or replace.

2. Manually loosen the screw of the protective mirror, after the screw is detached from the cavity. Pull out the protective mirror drawer. The connection part with the drawer is sealed with masking paper to prevent dust from entering, and then remove the pan plug seal, and carefully take out the protective lens to clean or replace.

3. After cleaning or replacement, put the protective lens into the protective lens drawer, then press it into the pan plug seal, then tear off the masking glue, insert the drawer into the cavity, and finally lock the protective lens screw.

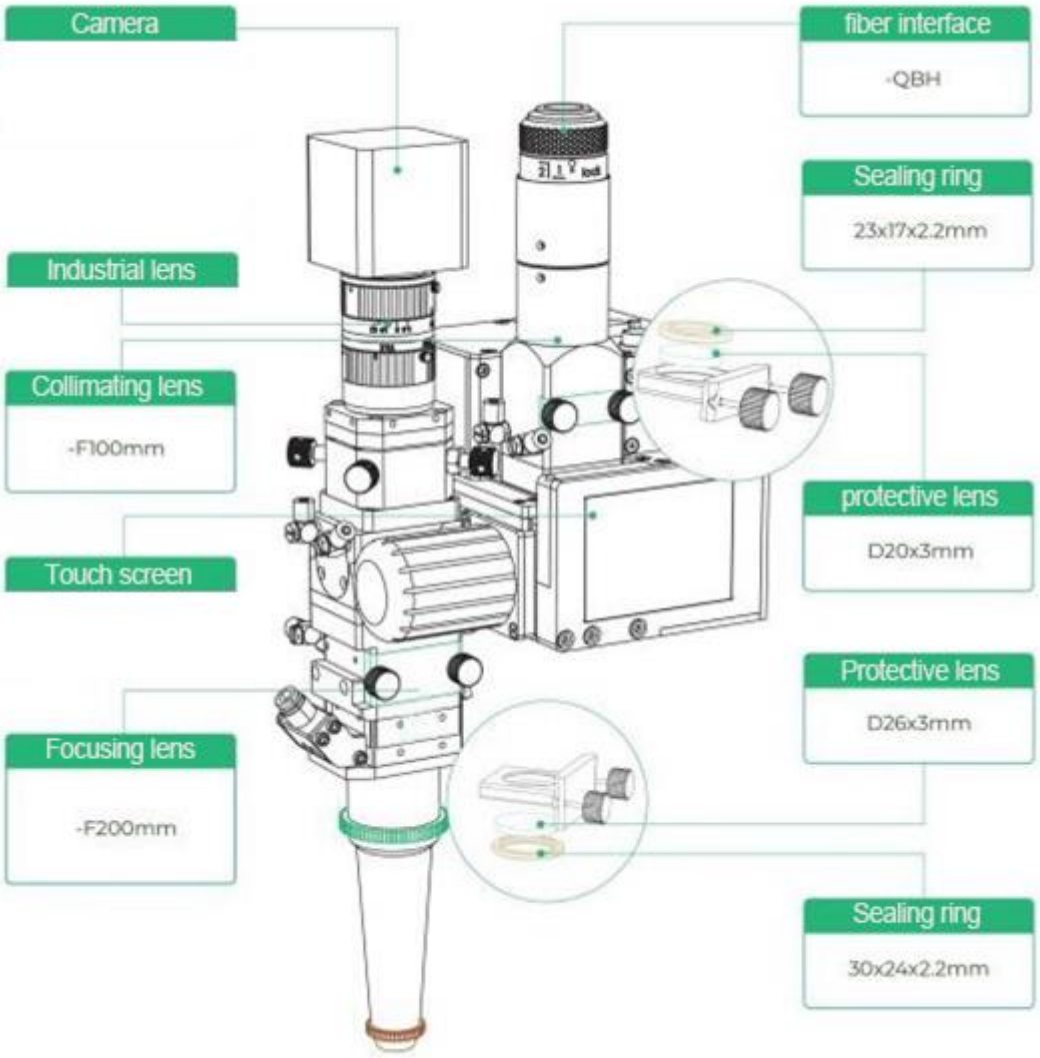


Figure 4.1

Alarm Information:

When the power is turned on, the touch screen will read the current status of the oscillating head, and if there is an alarm message, it will be displayed. If there is a report

alarm information, please contact our after-sales personnel to solve.

Notes:

1、When plugging and unplugging the connector, please turn off the power first, and prohibit live plugging and unplugging.

2、If the current status cannot be displayed on the main interface, the communication connection is unsuccessful. At this point, you should check that the oscillating head is connected to the controller

Whether the cable is connected, power it on again and try to connect again.