



INDUSTRIAL EQUIPMENTS PVT. LTD.

LaserVibe

Q10 | Q15 | Q20 | Q30

Handheld Fiber Laser Welding Machines

4-in-1: Laser welding • Cutting • Cleaning • Weld-seam cleaning



USER MANUAL

Read this manual completely before installing or operating the machine. Keep it with the machine.

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This manual covers the installation, factory settings, operation and maintenance of the Cruxweld **LaserVibe Q10, Q15, Q20 and Q30** handheld fiber laser welding machines. The four models share the same handheld welding head, control system and touch-screen interface; they differ in the power of the fiber laser source.

1 Overview

Thank you for choosing a Cruxweld LaserVibe handheld laser welding machine. This manual gives you important information on safety, installation, operation and maintenance. Please read it carefully before using the machine, and follow all precautions and warnings so that the machine works safely and at its best.

The LaserVibe is a 4-in-1 handheld laser system: with the same handheld head you can **weld**, **cut**, **clean** surfaces and **clean weld seams**. The head uses a single-motor scanning (wobble) mirror that swings the laser beam across the joint, which gives wide, smooth welds with good gap tolerance. The system consists of:

- a fiber laser source (1000 W to 3000 W depending on the model),
- a water chiller that cools the laser source and the welding head,
- the control box with touch screen, which controls the laser, the scanning motor, the shielding gas and the wire feeder,
- the handheld welding head with its connecting cables and hoses, and
- an automatic wire feeder (for welding with filler wire).

The handheld head has multiple safety alarms and an active safety interlock (the laser is only released when the earth clamp is on the workpiece and the nozzle touches the work). Its optical and water-cooling design allows long, stable operation up to 3000 W, and in cleaning mode the cleaning width reaches up to 120 mm with the appropriate focusing lens.

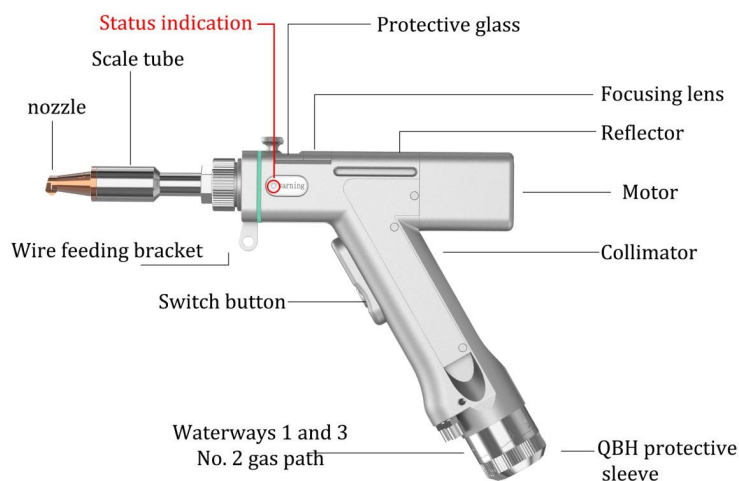


Fig. 1.1 Handheld laser welding head

Product features

- **Designed for welding up to 3000 W:** own control system and structural design, multiple safety alarms and status indicator lights, instant response to abnormal conditions. The head weighs only 0.75 kg and is easy to handle.
- **Stable machine operation:** all parameters are visible and the state of the whole machine is monitored in real time, so problems can be avoided in advance and faults are easy to trace.
- **Integrated structure:** the main body of the head is designed and machined as one integrated part, which greatly reduces the failure rate and makes maintenance easier.
- **Repeatable parameters:** stable nozzle pressure and lens condition – as long as the laser power is stable, the process parameters can be repeated exactly, saving set-up time and improving efficiency.

1.1 Models and technical data

Model	LaserVibe Q10	LaserVibe Q15	LaserVibe Q20	LaserVibe Q30
Fiber laser output power	1000 W	1500 W	2000 W	3000 W
Functions	Laser welding Cutting Surface cleaning Weld-seam cleaning			
Laser wavelength	1064 nm (± 10 nm)			
Welding head / controller	Common to all models – see the table below			
Laser source and chiller supply	As stated on the rating plate of the machine (see 2.6)			

Handheld welding head and controller - operating environment and main parameters

Controller input voltage	220 V AC ± 10 %, 50/60 Hz
Installation	Level surface, free from vibration and impact
Working temperature	10 – 40 °C
Working humidity	< 70 % (non-condensing)
Cooling of the head	Water cooling (from the machine chiller)
Applicable laser wavelength	1064 nm (± 10 nm)
Applicable laser power	≤ 3000 W
Collimating lens	D16 x 4.5 mm, F60
Focusing lens	D20 x 4.5 mm, F150
Reflector (scanning mirror)	30 x 14 x T2 mm
Protective window (protective lens)	D18 x T2 mm
Maximum gas pressure	15 bar
Vertical focus adjustment range	± 10 mm
Scan width - welding	0 – 8 mm
Scan width - cleaning	F150 lens: 0 – 30 mm F400 lens: 0 – 60 mm F800 lens: 0 – 120 mm
Net weight of the handheld head	0.75 kg
Control panel	Touch screen, 19 operating languages including English

Cruxweld improves its products continuously; the rating plate on the machine is binding.

1.2 Laser safety and precautions

▲ DANGER - CLASS 4 LASER RADIATION

The LaserVibe emits invisible infrared laser radiation (1064 nm) of up to 3000 W. Direct or scattered (reflected) radiation can cause permanent eye damage and severe skin burns, and can ignite materials. Avoid eye or skin exposure to direct or scattered radiation.

- Everyone in the working area must wear **laser safety goggles for 1064 nm** with a suitable optical density (OD 6+ or as specified by the goggle manufacturer for the laser power). Ordinary welding helmets do not protect against the laser beam.
- Wear flame-retardant clothing, leather gloves and closed shoes. Do not weld with bare arms.
- Work in a screened area: use laser-safe curtains or partitions and warning signs, and keep unauthorised persons out.
- Never point the head at people, at reflective surfaces or into the open air. Only press the trigger when the nozzle is in contact with the workpiece.
- Remove flammable materials from the working area and keep a fire extinguisher at hand.
- Provide fume extraction; welding and especially cleaning produce metal fumes and particles.
- Take extra care with highly reflective metals (aluminium, copper, brass): reflected radiation is stronger.
- Switch off the laser (enable OFF) before changing nozzles, lenses or the protective window.
- Only trained and authorised persons may install, operate and service the machine.
- Never bend the fiber cable more tightly than its minimum bending radius and never step on it.

Attention before use

1. Make sure the machine is reliably **earthed** before switching on the power supply.
2. The laser output head (QBH) of the fiber is connected to the handheld head. Carefully check the QBH output end for dust or other contamination before connecting it, and clean it only with special lens paper.
3. If the equipment is not used as described in this manual, it may work abnormally and be damaged.
4. When replacing the protective window, protect the open lens chamber against dust.
5. When switching on for the first time: if the red aiming light does not come out of the copper nozzle, **do not emit the laser** – check the beam path first.
6. **Status indicator on the head:**
 - **Red, flashing** – chiller alarm, laser alarm or air-pressure alarm. The laser cannot be emitted.
 - **Red, steady** – protective-window over-temperature alarm or motor-driver over-temperature alarm. The laser can still be forced on, but the equipment is in an abnormal state: stop and inspect it.

Safety interlock (earth clamp)

The laser is released only when the metal earth clamp is fixed to the workpiece and the copper nozzle of the head touches the workpiece; the “secure lock” indicator on the screen then turns green. This prevents the laser from being fired into the air. In cleaning mode the safety lock is not evaluated – take particular care.

2 Installation and connection

2.1 Controller interface definition

The controller of the handheld head has five connectors: the power supply terminal, the LCD screen terminal and signal interfaces 1, 2 and 3. Table 2.1 lists all pins.

Connector	Pin	Definition	Type	Description
Power supply (5-pin)	1	–15 V	Input	From V2 of the ± 15 V switching power supply (–15 V)
	2	GND	Reference	From any COM terminal of the ± 15 V switching power supply
	3	+15 V	Input	From V1 of the ± 15 V switching power supply (+15 V)
	4	GND	Reference	From –V of the 24 V switching power supply
	5	+24 V	Input	From +V of the 24 V switching power supply
LCD screen (4-pin)	1	G	Reference	Ground
	2	R	Transmit	Data from controller to LCD screen
	3	T	Receive	Data from LCD screen to controller
	4	V	Output	24 V supply for the LCD screen
Signal interface 1 (8-pin, inputs)	1	GND	Reference	Signal ground
	2	Air-pressure alarm	Input	Polarity set on the Settings page; set to “low” level alarm when not used
	3	GND	Reference	Signal ground
	4	Chiller alarm	Input	Polarity set on the Settings page; set to “low” level alarm when not used
	5	Safety-lock reference (earth clamp)	Isolated	Connected to the metal earth clamp
	6	Safety lock	Input	7-core cable, blue wire (marked “safety lock”). Not evaluated in cleaning mode
	7	Head trigger switch 1	Input	7-core cable, black wire (marked “light switch 1”)
	8	Head trigger switch 2	Input	7-core cable, brown wire (marked “light switch 2”)
Signal interface 2 (6-pin)	1	Temperature 1 / status indicator	Input	7-core cable, yellow wire; drives the status lamp (loop with GND)
	2	Temperature 2	Input	7-core cable, red wire; protective-window temperature (loop with GND)
	3	Gas valve –	Reference	Signal ground (reference for pins 2 and 4)
	4	Gas valve +	Output	Valve open: 24 V output; valve closed: no output
	5	Wire feed –	Output	2-core cable, brown wire (marked wire –)
	6	Wire feed +	Output	2-core cable, blue wire (marked wire +)
Signal interface 3 (7-pin, to laser)	1	Laser fault	Input	Alarm signal from the laser source
	2	Laser enable	Output	Enable signal to the laser source
	3	24 V output	Output	Direct 24 V output
	4	GND	Reference	Common ground (reference for pins 1, 2, 3, 5)
	5	Analog 0 – 10 V	Output	Analog power command to the laser (DA+)
	6	RF– (PWM–)	Output	Laser pulse-width-modulation signal –
	7	RF+ (PWM+)	Output	Laser pulse-width-modulation signal +

Table 2.1 Controller interface definition

2.1.1 Power supply terminal

The power terminal is a 5-pin connector. A 24 V switching power supply and a ± 15 V switching power supply are supplied with the machine.

- The ± 15 V power supply has polarity: **V1 = +15 V, V2 = -15 V**. Any COM terminal of the 15 V supply is connected to pin 2 (GND).
- The switching power supplies **must be earthed**.

2.1.2 LCD screen terminal

The LCD screen cable is supplied with the machine and plugs in directly. See Table 2.1 for the pin definition.

2.1.3 Signal interface 1 (inputs)

Pin	Signal	Function
1	GND	Air-pressure alarm input. If used (wired), set the “pressure alarm level” on the Settings page to match the alarm level of the actual pressure switch.
2	Air-pressure alarm signal	
3	GND	Chiller alarm input. If used (wired), set the “chiller alarm level” on the Settings page to match the alarm level of the actual chiller.
4	Chiller alarm signal	
5	Safety-lock reference	Connected to the metal earth clamp.
6	Safety lock	7-core cable, blue wire (marked safety lock). Not evaluated in cleaning mode.
7	Head trigger switch 1	7-core cable, black wire (marked light switch 1).
8	Head trigger switch 2	7-core cable, brown wire (marked light switch 2).

The output ports described below deliver their signals only when there is no alarm and the safety-lock and trigger signals are shown **green** on the Monitor page.

2.1.4 Signal interface 2

Pin	Signal	Function
1	Temperature 1 / status indicator	Controls the status indicator lamp; forms a loop with GND.
2	Temperature 2	Protective-window temperature sensor; forms a loop with GND.
3	Gas valve –	Gas valve open: gas valve + outputs 24 V. Gas valve closed: no output.
4	Gas valve +	
5	Wire feed –	Start signal for the wire feeder; wire according to the wire markings.
6	Wire feed +	

2.1.5 Signal interface 3 (laser)

Pin	Signal	Function
1	Laser fault	If used (wired), set the “laser alarm level” on the Settings page to match the alarm level of the laser source.
2	Laser enable	Enable +, connected to the enable + input of the laser.
3	24 V output	Direct 24 V output.
4	GND	Common ground (reference for pins 1, 2, 3, 5).
5	Analog +	Analog output, 0 – 10 V by default (laser power command).
6	RF– (PWM–)	PWM modulation signal –.
7	RF+ (PWM+)	PWM modulation signal +.

The wiring to the laser source depends on the interface of the laser used; Cruxweld service can provide the wiring logic for your laser.

2.2 Terminal diagram of the controller

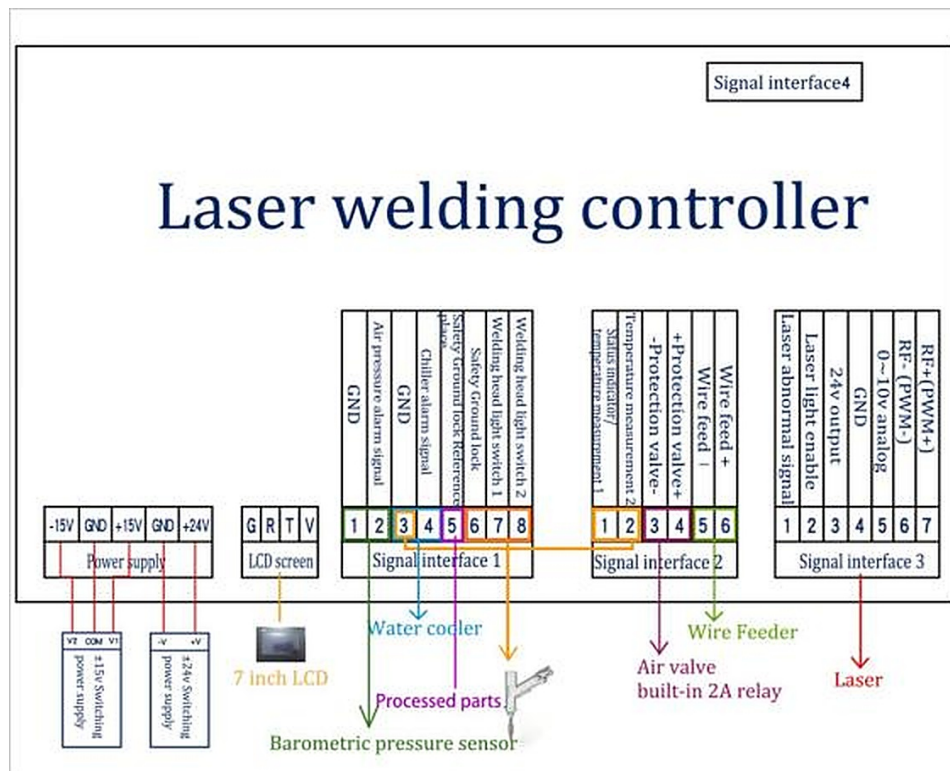


Fig. 2.1 Terminal diagram of the controller

▲ Note

The earth wire of the switching power supplies must be effectively earthed. Both the COM terminal of the ± 15 V switching power supply and the $-V$ (0 V) terminal of the 24 V switching power supply must be connected to GND, and the housings of the switching power supplies must be connected to earth. Otherwise the laser may not emit or other faults may occur.

2.3 Fiber input (QBH) connection

The handheld head accepts the QBH fiber connector used by practically all industrial fiber laser sources. The optics must be kept perfectly clean: remove all dust before connecting, and hold the head horizontally while connecting so that no dust can fall into the interface.

1. Switch off the laser source.
2. Remove the protective caps from the QBH connector and from the head; inspect the fiber end face with a lamp. Clean it with lens paper and alcohol only if necessary.
3. Insert the QBH connector into the head, align the red marks and turn the locking sleeve until it clicks into place.
4. Keep the removed caps clean for later storage.

2.4 Shielding gas and cooling water connection

The water and gas connections of the head accept hoses of **6 mm outer diameter / 4 mm inner diameter**. The water inlet and outlet may be connected in either direction.

The cooling circuit of the welding head and the cooling circuit of the fiber (QBH) head are connected **in series**, as shown below: the room-temperature water outlet of the chiller feeds the fiber head, then the welding head, and returns to the chiller; the low-temperature circuit of the chiller cools the laser source.

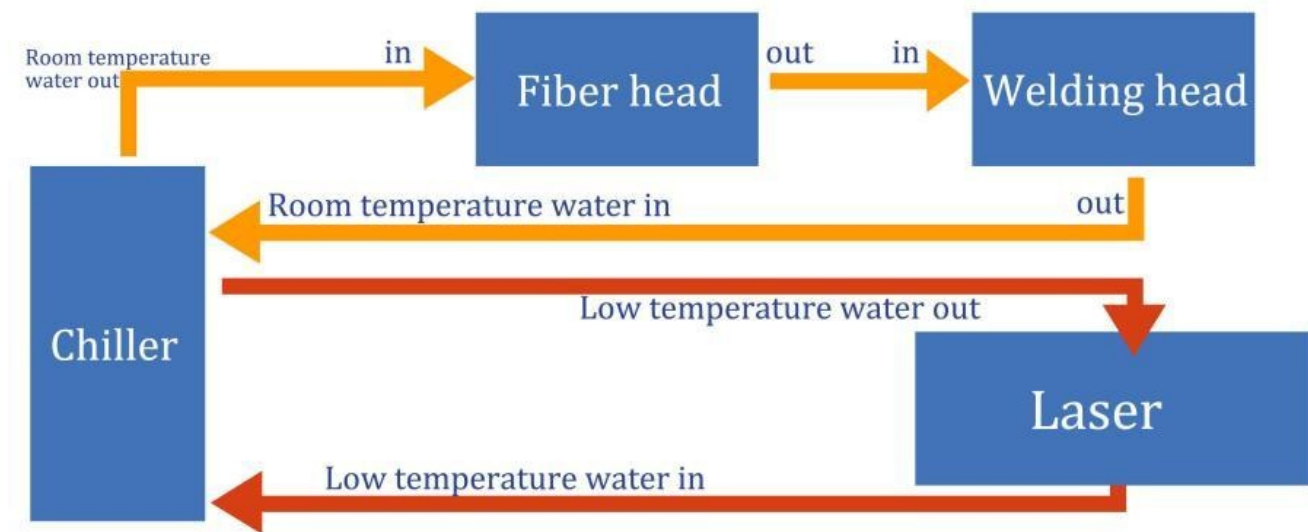


Fig. 2.2 Cooling water circuit of the welding head and fiber head

- Use clean, dry shielding gas (argon or nitrogen, depending on the material); the gas pressure at the head must not exceed 15 bar.
- Fill the chiller with distilled or deionised water only. In freezing conditions use the anti-freeze recommended by the chiller manufacturer or drain the system.
- Start the chiller and check all water connections for leaks before emitting the laser.

2.5 Connecting the welding head to the control box

The handheld head is connected to the control box by the multi-function connecting cable set. At the head end the connectors are aviation plugs (female), at the control-box end aviation plugs (male).

- **7-core cable:** trigger switches, safety lock, status indicator and temperature monitoring of the head.
- **2-core and 5-core cables:** control of the scanning (wobble) motor.

Plug in each connector by its key, tighten the locking rings by hand and route the cables without sharp bends or tension.

2.6 Mains power connection

The diagram below shows the reference connection of the machine to a three-phase five-wire supply (L1, L2, L3, N, PE). Whether the laser source and the chiller need a single-phase or a three-phase supply depends on the laser source and chiller fitted – see the rating plates – not on the number of wires in the harness. The connection must be made by a qualified electrician.

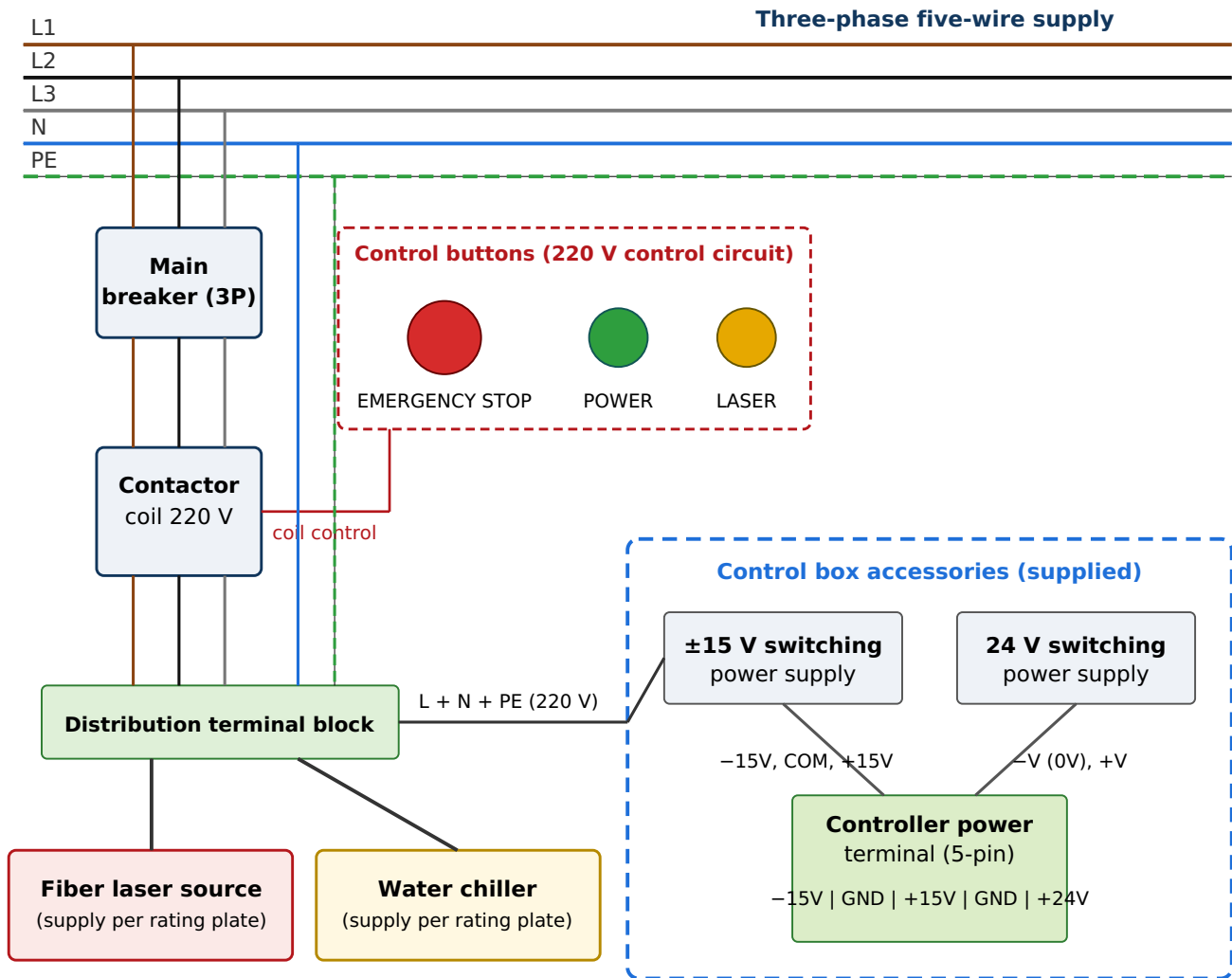


Fig. 2.3 Reference mains connection

- Install the machine on a dedicated circuit with a correctly rated breaker and a residual-current device, as specified by the electrician for the total load.
- The **EMERGENCY STOP** button de-energises the contactor and switches off the laser source and chiller immediately.
- Switch on the chiller first and wait until the water temperature is in the normal range before switching on the laser source. Switch off in the reverse order.

3 Control panel operation

The touch-screen control panel shows the version number of the panel software on the Monitor page; the screens in this manual are for reference and may differ slightly from your machine. The panel supports 19 operating languages:

English	Simplified Chinese	Traditional Chinese	Korean	Japanese
Russian	German	French	Italian	Spanish
Portuguese	Turkish	Greek	Czech	Slovak
Polish	Thai	Vietnamese	Romanian	

To change the language, open **Setting** (password 123456), touch the **Language** field and choose the language from the list.

3.1 Welding mode

Home page

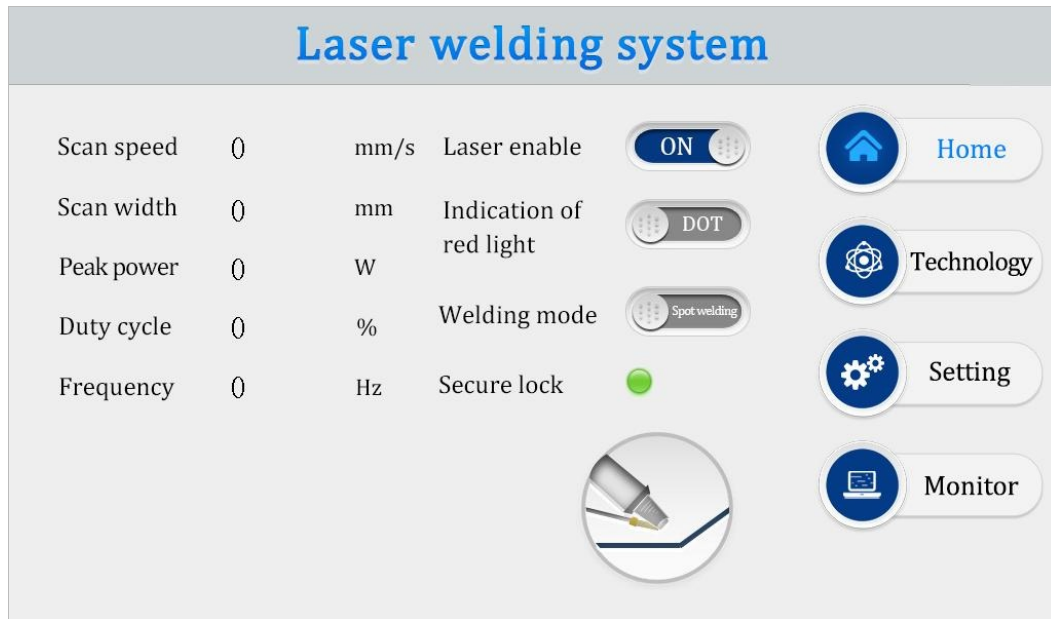


Fig. 3.1 Home page of the control panel (welding mode)

- 1 The home page shows the current process parameters (they cannot be changed here) and any active alarm.
- 2 **Laser enable** is ON by default; **Indication of red light** is LINE by default; the **welding mode** is continuous. With laser enable OFF, no enable signal is sent to the laser – use this to test the gas and wire functions without emitting. Switching the red light to DOT stops the scanning motor, and the red light becomes a point for adjusting the centre position. The welding mode can be continuous or spot welding; for spot welding, set the spot-welding type on the Setting page.
- 3 **Secure lock** is grey or green. When the earth clamp is on the workpiece and the copper nozzle touches the workpiece, pins 5 and 6 of signal interface 1 are connected and the indicator turns green – the laser can now be triggered.
- 4 Touch the mode button at the upper right to change to cleaning mode.

Process (Technology) page

The process page holds 10 process memories for the user. The parameters and their ranges are described below.

Fig. 3.2 Process page

- 1** Touch a box to change a value, touch OK, save it in one of the process memories and then touch **Import** (modify → save → import).
- 2** **Scan speed** 2 – 6000 mm/s; **scan width** 0 – 8 mm. The scan speed is limited by the scan width (the oscillation frequency, scan speed ÷ (2 × scan width), cannot exceed the limit of the scanning motor); a value above the limit is automatically reduced to the limit. With scan width 0 the beam does not oscillate (point source). Most commonly used: scan speed 300 mm/s, scan width 2.5 – 4 mm.
- 3** **Peak power** must be less than or equal to the laser power entered on the Setting page (for a 1000 W laser, not more than 1000 W).
- 4** **Duty cycle** 0 – 100 % (default 100, normally not changed).
- 5** **Pulse frequency**: recommended 5 – 5000 Hz (default 2000, normally not changed).
- 6** Touch **Help** at the top right for more explanations of the parameters.
- 7** After changing parameters, check on the home page that the import was successful.

Please note:

- Some lasers do not emit below 10 % of their power. If the peak power on the process page is less than 10 % of the laser power on the Setting page, all output signals are normal but the laser may not emit.
- With duty cycle 100 % the pulse frequency has no effect. If you use pulsing, set it according to the requirement. Example: peak power 300 W, duty cycle 50 %, frequency 1000 Hz – the cycle is 1 ms, with 0.5 ms at 300 W and 0.5 ms off. A crackling sound at the weld is normal in this case. The actual result depends on the laser.
- Reference process parameters for common materials and thicknesses are available from Cruxweld service.

Setting page

Touch **Setting** on the home page and enter the password **123456** in the pop-up window.

Fig. 3.3 Setting page (welding mode)

- 1 Laser power:** the rated power of the laser fitted (Q10: 1000 W, Q15: 1500 W, Q20: 2000 W, Q30: 3000 W). Enter it correctly.
- 2 Gas delay:** default 200 ms, range 0 – 3000 ms.
- 3 Ramp:** at the start the power rises from N1 % of the process power to 100 %; at the end it falls from 100 % to N2 % (Fig. 3.4). Usual presets: start/stop power 20 %, ramp time 200 ms.
- 4 Wire delay compensation:** advance time of the wire feed relative to the laser signal; used together with the wire-retract function. Not set by default.
- 5 Temperature alarm thresholds:** maximum 70 °C. With the value 0 the temperature is not monitored; above the set value the buzzer sounds.
- 6 Scan correction coefficient** = target line width ÷ measured line width; range 0.01 – 4, normally 1.
- 7 Laser centre offset** –3 to +3 mm: decrease to move left, increase to move right; used to centre the red aiming line.
- 8 Air-pressure / chiller / laser alarm level:** the alarm signals are low-level by default. When an alarm signal is used, set the level here to match the alarm level of the external equipment.
- 9 Spot welding:** spot duration is the emission time of each cycle, spot interval is the pause of each cycle.
- 10** Touch **Help** at the top right for more explanations.

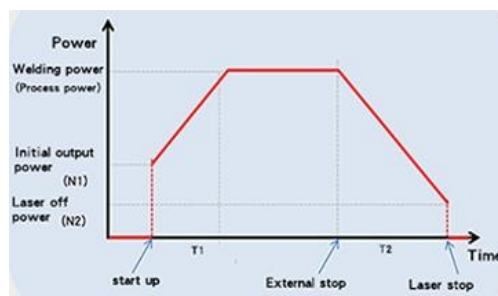


Fig. 3.4 Power ramp at start (N1) and stop (N2)

Monitor page

This page shows the state of every signal and the device information.

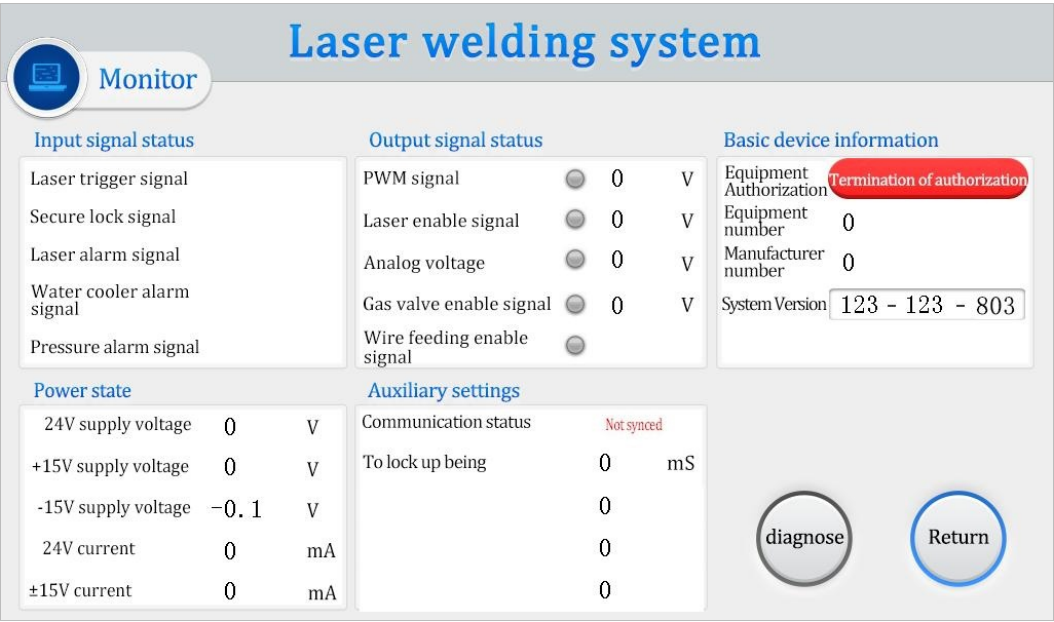


Fig. 3.5 Monitor page

1 Input signal status

- **Laser trigger signal:** changes from grey to green when pins 7 and 8 of signal interface 1 are connected (trigger pulled).
- **Secure lock signal:** changes from grey to green when the lock circuit is closed.
- **Laser / chiller / pressure alarm signal:** shows the real-time level of these inputs.

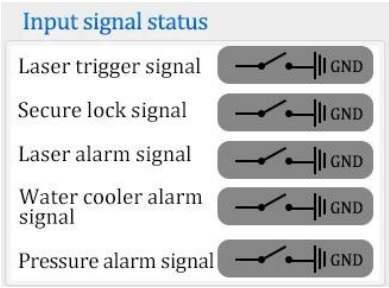


Fig. 3.6 Input signal status

2 Output signal status

When a signal is output, this area changes immediately. The values are measured in real time; they fluctuate within a small range and may differ from the final output by less than 0.3 V.

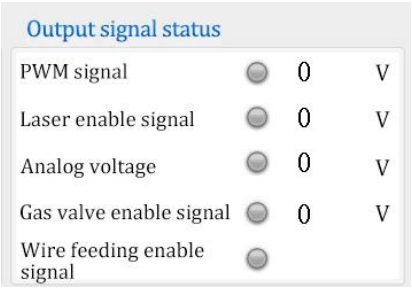


Fig. 3.7 Output signal status

3 Basic device information

Equipment authorization: can limit the operating time of the machine; when the set time has expired, the authorization ends and the system stops working. The factory setting is long-term valid. For authorization settings contact Cruxweld service.

System version: three groups of numbers – hardware version, controller program version and touch-screen version.

Basic device information	
Equipment Authorization	Long term validity
Equipment number	0
Manufacturer number	0
System Version	123 - 123 - 803

Fig. 3.8 Basic device information

4 Power state

Shows the real-time supply voltages and currents of the controller. Small differences between software versions are normal. The values mainly help service staff to check the power supplies.

Power state		
24V supply voltage	0	V
+15V supply voltage	0	V
-15V supply voltage	-0.1	V
24V current	0	mA
±15V current	0	mA

Fig. 3.9 Power state

5 Auxiliary settings

- **Communication status** shows the communication between touch screen and main board. If it is not synchronised, check the screen cable.
- **Lock anti-shake** compensates poor contact of the safety lock, range 0 – 300 ms. Touch the device authorization box and enter the code on the password page (Fig. 3.10): the code is **ffffffaa** followed by the time in ms, e.g. **ffffffaa300** for 300 ms ("ffffffaa" identifies the parameter and cannot be changed). With 300 ms, a break of the safety-lock signal shorter than 300 ms is ignored while the trigger is pressed. Use it for materials with poor surface conductivity (e.g. rust); normally set 0.
- **Motor drive temperature** and **protective lens temperature** show the measured temperatures. A high motor-driver temperature (poor environment) reduces the scanning speed and therefore the weld quality. The lens temperature shows the condition of the protective window and helps to detect a damaged lens.

Laser welding system					
License					Import
C	D	E	F	←	ESC
6	7	8	9	A	B
0	1	2	3	4	5

Fig. 3.10 Password page (anti-shake code)

Auxiliary settings		
Communication status	Not synced	
To lock up being	0	mS
Motor drive temperature	0	°C
Protective lens temperature	0	°C

Fig. 3.11 Auxiliary settings

6 Diagnose

Touch **diagnose** to open the diagnostic page. It checks whether each signal port really delivers its output: normally the theoretical output value and the detected value agree. If they differ, the load is abnormal. When the laser does not emit, measure the port with the laser's monitoring software or a multimeter to see the real signal.

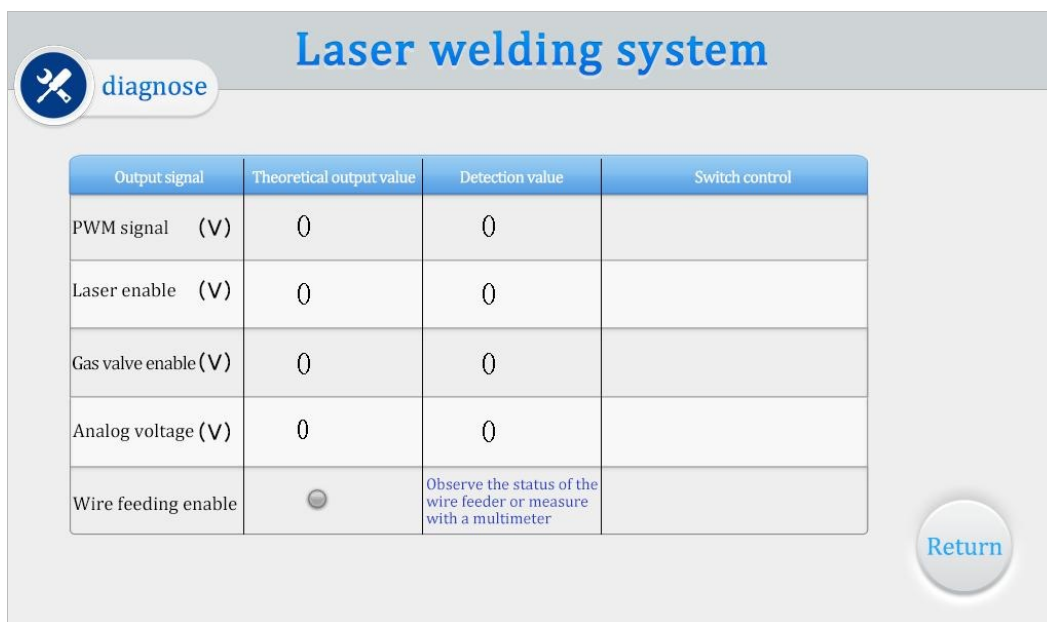


Fig. 3.12 Diagnostic page

3.2 Cutting mode

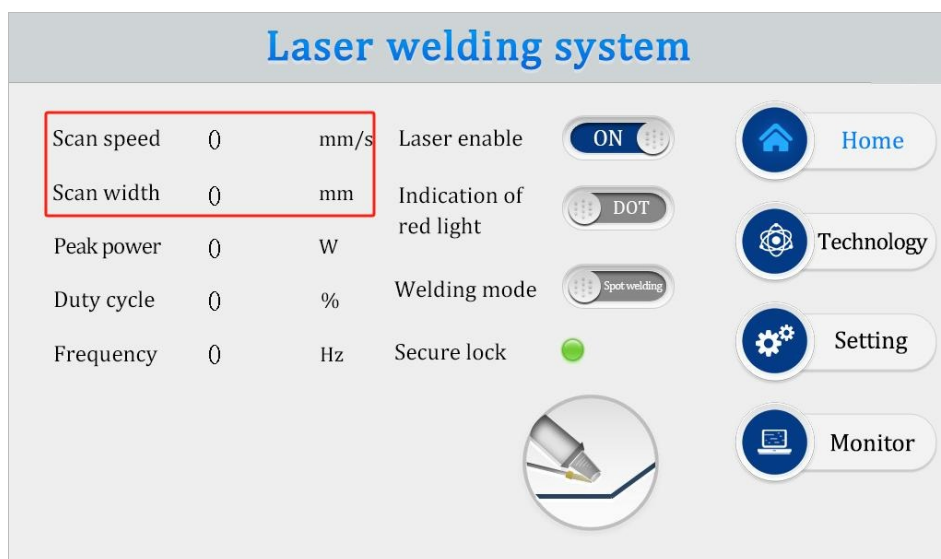


Fig. 3.13 Cutting set-up

Set the **scan width to 0** and fit the cutting copper nozzle: the head now cuts. The safety lock (earth clamp) must be connected. Use the peak power and gas suitable for the material and thickness.

3.3 Cleaning mode

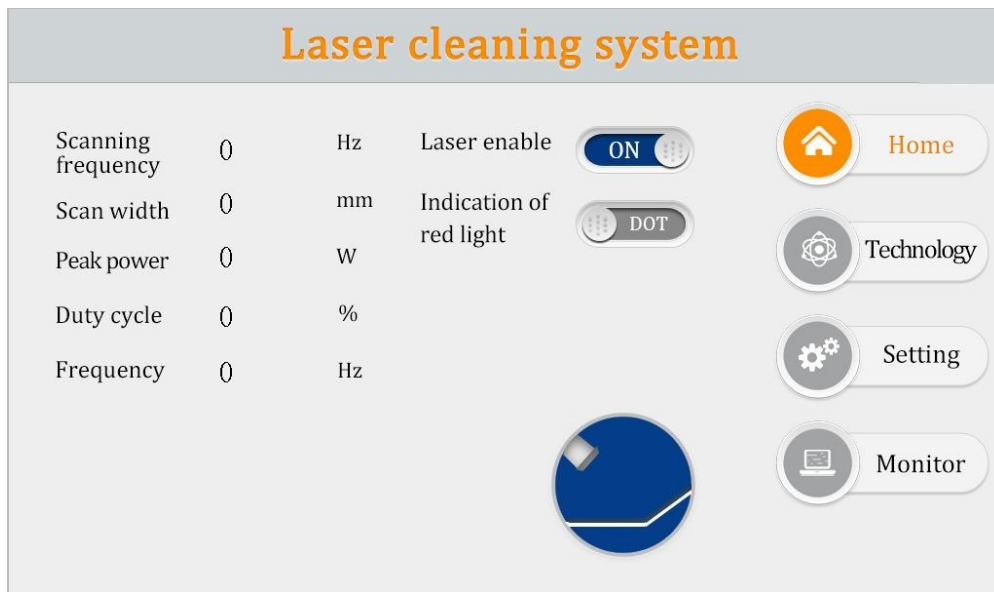


Fig. 3.14 Home page (cleaning mode)

- 1 The home page shows the current process parameters (not editable here) and any active alarm.
- 2 Laser enable is ON by default and the red light is LINE by default. With laser enable OFF, no enable signal is sent to the laser (for testing). Switching the red light to DOT stops the motor, and the red light becomes a point for centring.
- 3 Touch the mode button at the upper right to change back to welding mode.



Fig. 3.15 Process page (cleaning mode)

- 1 Touch a box to change it, touch OK, save it in a process memory and touch Import (modify → save → import).
- 2 **Scan frequency** 10 – 100 Hz; **scan width** 0 – 30 mm with the F150 lens (up to 120 – 130 mm with the F800 lens).
- 3 Peak power ≤ the laser power on the Setting page.
- 4 Duty cycle 0 – 100 % (default 100). 5 Pulse frequency 5 – 5000 Hz recommended (default 2000).
- 6 Touch Help for explanations; after changes, check the import on the home page.

Setting page (cleaning mode)

Password: **123456**.

Fig. 3.16 Setting page (cleaning mode)

- 1 Laser power:** the rated power of the laser fitted; enter it correctly.
- 2 Gas delay:** default 200 ms, range 200 – 3000 ms.
- 3 Ramp** from N1 % to 100 % and from 100 % to N2 % (see Fig. 3.4). The higher the process power, the lower the start power should be. The start power should normally not exceed 50 %; too high a start power greatly reduces the life of the lenses.
- 4 Temperature alarm threshold:** maximum 65 °C; 0 = not monitored.
- 5 Scan correction coefficient** 0.01 – 4 (target width ÷ measured width), default 1.0.
- 6 Laser centre offset:** in cleaning mode the current offset is only displayed. To adjust the centre, change to welding mode and fit the F150 focusing lens for accuracy.
- 7 Pressure / chiller / laser alarm level:** low level by default. If an external pressure switch with a high-level signal is fitted, change the setting to high, otherwise a false alarm occurs; set the other alarms to match their devices in the same way.
- 8 Language:** touch to choose one of the 19 languages.
- 9 Help** (upper right) opens the help page of the Setting page. Long-press **Restore factory settings** to reset the parameters to the factory state; long-press **Save as factory settings** to store the current parameters as new factory settings.
- 10 Gunhead model:** select the focusing lens fitted, which sets the maximum scan width (Fig. 3.18).

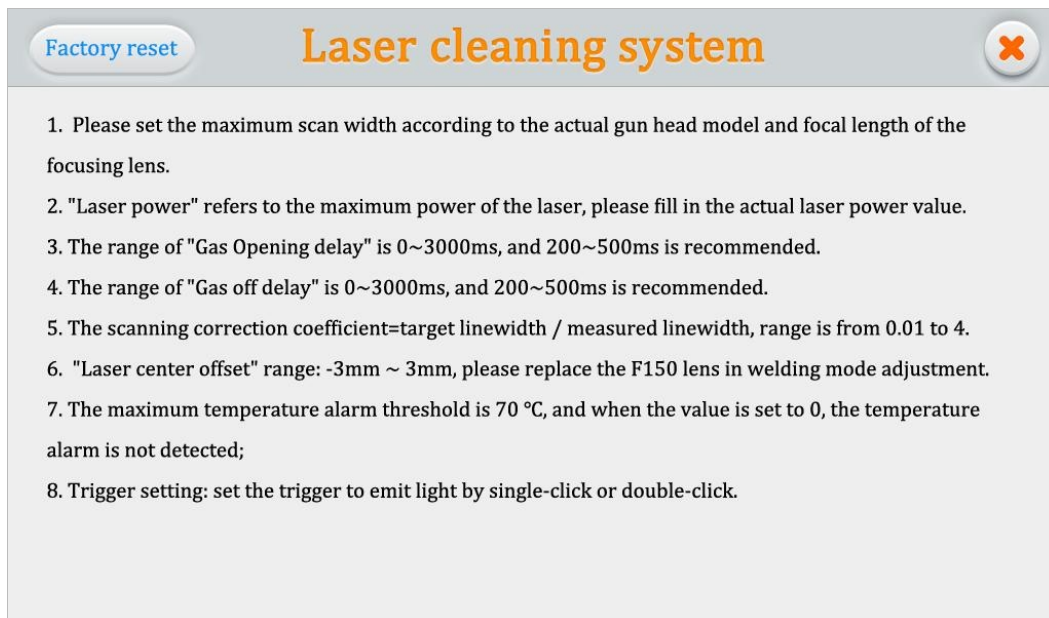


Fig. 3.17 Help page of the Setting page (factory reset)

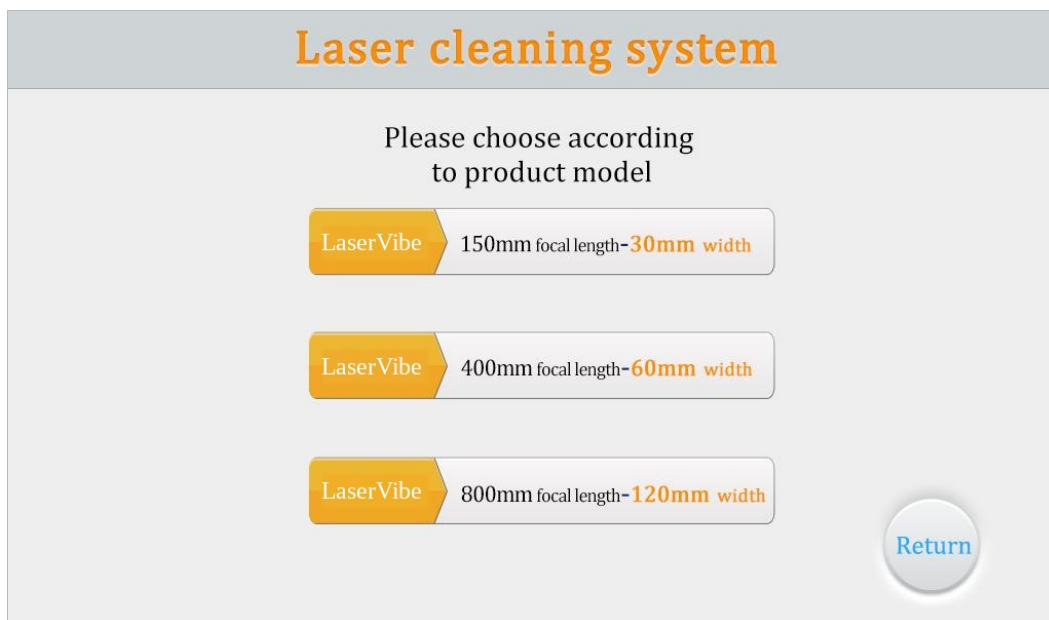


Fig. 3.18 Choosing the focusing lens: F150 - 30 mm, F400 - 60 mm, F800 - 120 mm maximum cleaning width

Monitor and diagnostic pages (cleaning mode)

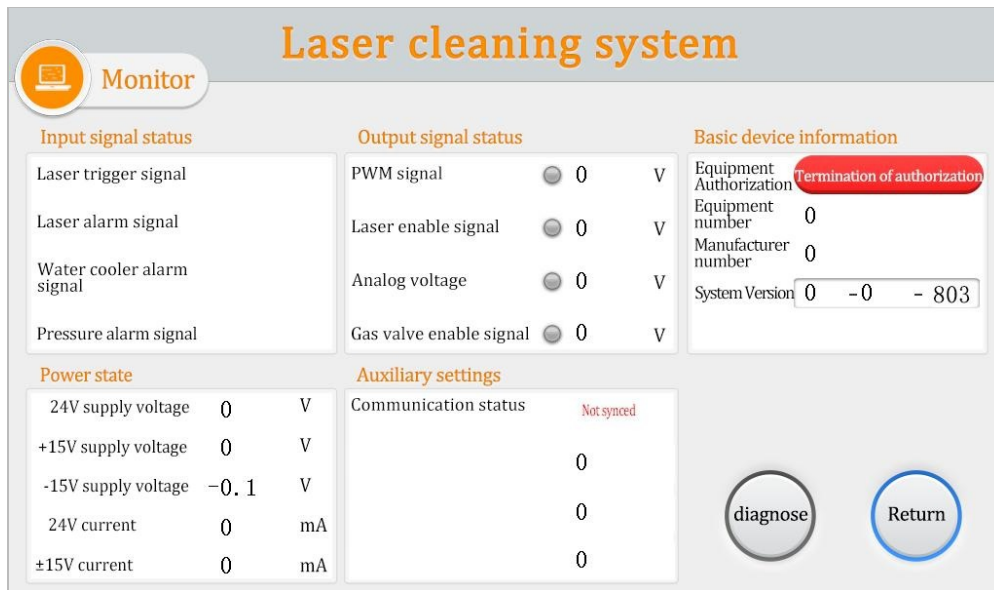


Fig. 3.19 Monitor page (cleaning mode)

- **Laser trigger signal:** changes from grey to green when the trigger is pulled.
- **Laser / chiller / pressure alarm signal:** shows their set high or low level.
- The output signals are shown in the middle of the page, green when a signal is being output.
- **Equipment authorization** and **system version:** as in welding mode.



Fig. 3.20 Diagnostic page (cleaning mode)

Touch **diagnose** to open the diagnostic page. On this page the laser does not emit. With the switches you can operate the PWM, laser-enable, gas-valve-enable and analog outputs individually and compare the detected value with the theoretical value to check that the control box works correctly.

3.4 Weld-seam cleaning

In welding mode, fit the **AS-2.0D** copper nozzle for weld-seam cleaning and select a suitable seam-cleaning process. Cruxweld service can provide reference parameters and a demonstration.

4 Maintenance

Protective window (protective lens) - inspection and replacement

- 1 Switch the laser off. Wash and dry your hands, then wipe your fingers with a cotton swab dipped in alcohol (or wear clean finger cots).
- 2 In a place as dust-free as possible, open the cover of the protective-window drawer and pull out the lens holder. Immediately cover the open chamber (for example with masking tape) to keep dust out. Check the protective window: if the surface shows obvious burn marks, replace it.
- 3 Check the white sealing ring under the lens. If it is damaged, replace it at once.
- 4 Wipe the chamber opening and the inside of the cover with a cotton swab dipped in alcohol, quickly insert the lens holder into the chamber and tighten the screws.

Regular care

Interval	Task
Every shift	Check the protective window and the copper nozzle; replace a burnt or spatter-covered nozzle. Check that the earth clamp and cables are in good condition. Check the chiller water level and temperature.
Weekly	Check water and gas hoses and all connectors for leaks and damage. Clean the dust filters of the chiller and the control box.
Monthly	Check the fiber cable for sharp bends or damage. Check the earthing of the switching power supplies and of the machine.
Every 3 months	Replace the chiller water with distilled or deionised water (more often in dusty or hot conditions).
Storage	Fit the protective caps to the QBH connector and the head. In freezing conditions drain the water from the chiller, the fiber head and the welding head.

▲ Note

Never touch the lens surfaces with bare fingers, never blow on them and never use compressed air containing oil. Clean optics only with lens paper and optical-grade alcohol.

5 Troubleshooting

Problem	Check / remedy
5.1 Laser / chiller / air-pressure alarm	1. If the alarm input is not used (not wired), change the corresponding alarm level on the Setting page. 2. If the alarm input is used, check whether the device really has an alarm and whether the high/low alarm level is set correctly.
5.2 Screen stays dark / does not respond to touch	1. Screen dark: make sure the controller is powered. Check that the 4-core screen cable is connected correctly and that there is 24 V between pins 1 and 4. 2. Screen does not respond in normal use: check whether the machine temperature is too high. 3. Input not accepted: check the wiring between controller and screen and the signals on pins 2 and 3 (see 2.1.2). 4. A newly installed unit does not respond: the system versions may not match; the program can be updated with an SD card – contact Cruxweld service for the correct version.
5.3 No laser output	1. Check the home page for an alarm and that laser enable is ON. 2. Check on the Monitor page that the trigger signal and the safety-lock signal turn green while welding. 3. Check on the Monitor page that PWM, laser enable and analog output are normal while welding. If all of these are normal, check the laser source for an alarm. Example: gas and wire are supplied but there is no laser – laser fault or laser wiring error. If neither gas nor wire is supplied, an input signal may be missing – see 2.1.3 Signal interface 1.
5.4 Laser suddenly stops during work	Check the safety lock (earth clamp) and the other alarms on the Monitor page. Clean the contact point of the earth clamp; for rusty or poorly conducting workpieces set the lock anti-shake time (see 3.1, Auxiliary settings).
Weld is weak, dark or porous	Check the shielding gas (flow, purity, hose leaks), the protective window (burnt or dirty), the focus position and the nozzle. Check that the laser power entered on the Setting page matches the laser fitted.
Red aiming light off-centre	Adjust the laser centre offset (–3 to +3 mm) in welding mode with the F150 lens fitted.
Status lamp on the head red	Flashing: chiller, laser or pressure alarm. Steady: protective-window or motor-driver over-temperature – stop and let the head cool, check the water flow and the protective window.

If a fault cannot be cleared, note the alarm message, the software version (Monitor page) and the settings, and contact Cruxweld service. Do not open the laser source or the controller yourself.

6 Warranty and service

Cruxweld warrants the LaserVibe against defects in material and workmanship for the period stated in the sales contract, from the date of invoice. The warranty does not cover:

- consumables: copper nozzles, protective windows, sealing rings, focusing and collimating lenses damaged by contamination, cables and hoses damaged by use;
- damage caused by incorrect installation or supply voltage, poor earthing, contaminated or frozen cooling water, lack of maintenance, dropping or collision of the head, bending or crushing of the fiber cable;
- repairs or modifications by persons not authorised by Cruxweld.

Model	☐ LaserVibe Q10 ☐ Q15 ☐ Q20 ☐ Q30
Serial number	
Invoice no. / date	
Customer	
Dealer stamp	

For service, spare parts, consumables and reference process parameters please contact:

Cruxweld Industrial Equipments Pvt. Ltd.

5, Sector 29, Faridabad - 121008 (Haryana), India

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Cruxweld improves its products continuously. The technical data in this manual may change without notice.