Full Spectrum LASER

PRE-INSTALLATION MANUAL FOR 5X10 LASER

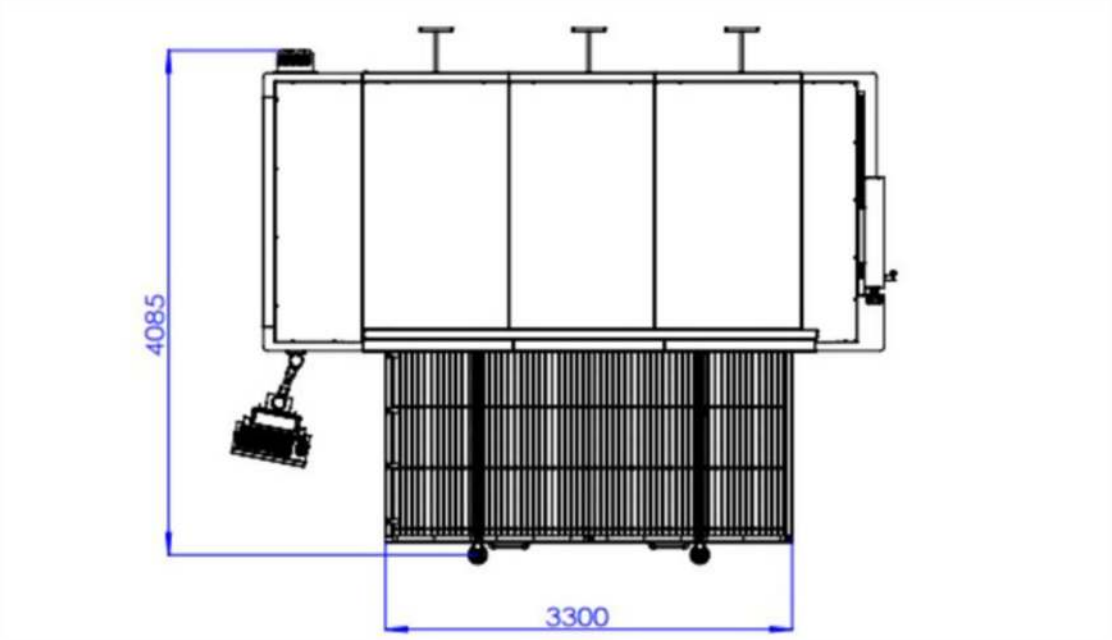
1 . Preparation materials before installation

item	name	Specification	unit	Quantity	Note
1	Deionized water / distilled water / purified water	18 liters / barrel	liter	4	1. 1500W: 40 liters 2. 2000W-3000W: 70 liters 3. 6000W: 160 liters
2	Nitrogen	Nitrogen purity ≥99.9%	Batch	1	Not less than 4 bottles
3	oxygen	Oxygen purity ≥99.9%	Batch	1	Not less than 2 bottles
4	circuit breaker	4P/AC380V/63A	piece	1	Machine main power
5	circuit breaker	3P/AC380V/50A	piece	1	Chiller
6	circuit breaker	3P/AC380V/32A	piece	1	Exhaust fan
7	Power Supply	20KVA~100KVA AC380V	set	1	Laser cutting machine power input ①、500W-750W:20KVA ②、1000W-1500W:30KVA ③、2000W-3000W：50KVA ④、4000W：80KVA. ⑤、6000W：100KVA.
8	Air compressor	Need to remove oil and remove water	set	1	Output pressure ≥ 2Mpa
9	Dryer	High precision oil water separator	set	1	
10	Ground pin	Copper or galvanized, length > 1.5 m, diameter > 15 mm	piece	3	The machine host needs 2 pieces; Laser source need 1 piece.
11	Vaporizer	meter / minute, Withstand voltage 4.0 MPA	piece	2	Used in combination with liquid nitrogen and liquid oxygen
12	Nitrogen pressure reducing valve (used abroad)		piece	1	Enter: >=15MPa, Output: 0.2~3.0MPa.
13	Oxygen		piece	1	Enter: >=15MPa,

	pressure reducing valve (used abroad)				Output: 0.05~1.5MPa.

"Note: The circuit breakers listed above are recommended for use without leakage protection. If the leakage protection function is provided, the rated leakage protection current shall not be less than 300mA, and it is recommended to be 500mA or more. A rated leakage protection current of less than 300 mA may cause leakage protection to trip.

2. Workshop site preparation before installation



Note: The flatness of the site surface should not vary more than ±10mm and can withstand more than 6 tons of heavy objects. The thickness of the concrete on the entire installation surface of the bed and the table legs shall not be less than 200mm, the compressive strength shall not be less than 30N/mm2, and the load shall be greater than 30KN/m2. Installation of the foundation requires no large vibrations around the ground. If so, you need to drill a shock ditch. According to the machine floor size map, the steel plate is embedded at the ground level. The thickness of the steel plate is 20mm or more, and the size is 250mm*250mm.

3. Circuit inspection and transformer / voltage regulator installation.

We provide each machine with approximately 70 feet of cable, usually wrapped with red nylon tape, which can be connected to the factory's main power supply using a three-phase connection and to the input of a Transformer/voltage regulator.

****Fix Base:** Secure the transformer/voltage regulator's base in the selected location, ensuring it is stable and secure.**

****Install Main Body:** Place the transformer/voltage regulator main body on the base and secure it with screws. Pay attention to the installation orientation and ensure the input and output interfaces are correctly positioned.**

****Connect Power Supply:** Connect the power cord to the voltage regulator's input terminals according to the wiring diagram. Ensure the wiring is correct, secure, and complies with safety regulations. Connect the wires according to the color coding of the input terminals: yellow, green, red, and blue.**

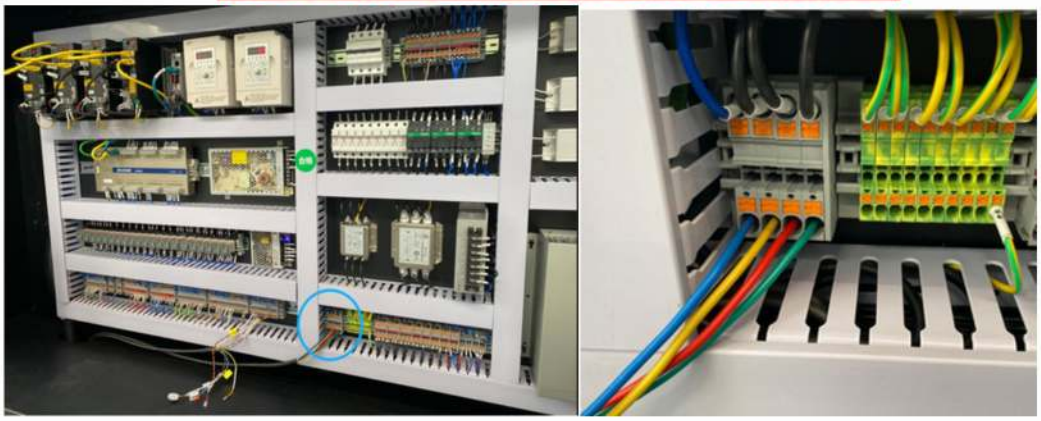
****Connect Load:** Connect the device requiring stable voltage to the voltage regulator's output terminals. Again, ensure the wiring is correct, secure, and meets the device's requirements.**

****Check Grounding:** Ensure the voltage regulator's grounding wire is correctly connected for safe operation.**

Tips：USA Low-VoltageSystems(120/208/240VAC)
These systems are prevalent in commercial buildings and offices. For three-phase, four-wire Wye or Delta configurations utilizing these voltages, the standard color practice dictates:

L1 (Phase 1): Black.
L2 (Phase 2): Red.
L3 (Phase 3): Blue.
Neutral: White or Gray.
The Chinese standards for three-phase AC supply align with the principles of the IEC (specifically the former IEC 60446, now merged into 60445) and utilize a fixed color sequence for the phase conductors of their standard 380V system.
L1 (Phase 1): Yellow.
L2 (Phase 2): Green.
L3 (Phase 3): Red.
Neutral (N): Light Blue or Black.

5X10 FT LASER main power cable connected as below



4. Gas inspection and installation.

The method for connecting gas to a laser cutting machine varies depending on the gas type and supply method. Below are common connection methods:
1. Canned Gas (Oxygen, Nitrogen) Connection

Materials needed: Gas canister, high-pressure gas hose, pressure reducing valve, hose clamp or Teflon tape, corresponding connector.
Connection steps:
1. Place one end of the high-pressure gas hose onto the outlet of the gas canister and secure it with a hose clamp or Teflon tape, ensuring a leak-free seal.
2. Install the pressure reducing valve onto the gas hose, usually via a threaded connection, and tighten it clockwise.
3. Connect the other end of the gas hose to the corresponding gas interface on the laser cutting machine (e.g., "Oxygen" or "Nitrogen/Air"), ensuring a proper fit and tightening.
4. Open the gas canister valve and slowly adjust the pressure reducing valve to bring the gas pressure to the range required by the laser cutting machine (e.g., oxygen pressure 0.3-0.8 MPa, nitrogen pressure above 1 MPa).
2. Compressed Air Supply Connection

Materials needed: Air compressor, compressed air hose, filter, dryer, pressure regulating valve, laser cutting machine gas interface.
Connection Steps:

1. Connect the air compressor outlet to the filter inlet via a compressed air hose. The filter removes impurities and oil from the air.
Connect the filter outlet to the dryer inlet. The dryer removes moisture from the air, ensuring the gas is dry.
Connect the dryer outlet to the pressure regulating valve inlet and adjust the pressure to the range required by the laser cutting machine (typically 0.6-1.5 MPa).
Connect the pressure regulating valve outlet to the laser cutting machine's "high pressure Air" or "Nitrogen/Air" port via a compressed air hose.
3. Nitrogen Generator Supply Connection
Materials Needed: Nitrogen generator, nitrogen hose, pressure regulating valve, laser cutting machine gas port.
Connection Steps:
Connect the nitrogen generator outlet to the pressure regulating valve inlet via a nitrogen hose.
Adjust the pressure regulating valve to bring the nitrogen pressure to the range required by the laser cutting machine (typically above 1 MPa).
Connect the other end of the nitrogen hose to the "Nitrogen" or "Nitrogen/Air" port on the laser cutting machine.
Precautions:
Before connecting, ensure the gas type matches the requirements of the laser cutting machine to avoid incorrect connection.
Avoid bending or squeezing the gas hose to ensure smooth gas flow.

5. Connecting the Water Chiller and Laser source

Connecting the water chiller and laser equipment requires following specific steps and specifications. The following are the detailed connection methods and precautions:

Connection Steps:
****Confirm Equipment Location** Place the water chiller and laser equipment in suitable locations, ensuring sufficient distance between them for water pipe connection**

and adequate surrounding space for operation. It is recommended to secure the laser equipment to prevent loosening or damage to the water pipes during later movement.
****Prepare Water Pipes** Use dedicated pressure-resistant water pipes (such as pagoda-type flexible hoses), ensuring the pipes are of sufficient length and free from damage or bends. The pipe material must meet the requirements of both the laser equipment and the water chiller, typically food-grade or industrial-grade rubber hoses, PVC pipes, etc.**
****Connect the Water Chiller and Laser Equipment****
****Outlet Connection:** Connect the water chiller's outlet to the laser equipment's inlet (usually marked "IN" or "WATER IN") using a water pipe. Ensure the connection is secure and leak-free.**
Return Water Connection: Connect the laser equipment's outlet (marked "OUT" or "WATER OUT") to the water chiller's return water inlet via a water pipe, forming a closed-loop system.
Check Connection Secureness: After connection, manually check that all joints are tightened and the water pipes are securely fixed. Gently pull on the water pipes to confirm there is no loosening or detachment.
Add Coolant: Add an appropriate amount of coolant (such as distilled water, deionized water, or dedicated antifreeze) to the water chiller's tank. The level must be above the minimum water level specified by the water chiller. Note: The choice of coolant must be determined based on equipment requirements and ambient temperature. Tap water or ordinary purified water is strictly prohibited.

Power-On Test: Ensure the power plugs of the water chiller and laser equipment are correctly connected and properly grounded. Turn on the water chiller first, and after it

stabilizes, start the laser equipment. Observe the water temperature display, water flow status, and laser equipment operation to confirm that the cooling system is working properly.

Congratulations! Your installation is now 90% completed !

Now you can try powering on the machine. The power-on steps are as follows:

Step 1: Start the main power supply and regulated power supply (check the three-phase voltage balance);

Step 2: Open the main cutting gas valve (check for leaks in N2 and O2);

Step 3: Turn on the chiller. (Check if the water temperature and pressure are normal; the laser water temperature should be around 25℃, and the fiber optic and cutting head water temperature around 28℃);

Step 4: Turn on the machine tool power (button switch);

Step 5: Start the laser. (Laser power on, high voltage on, green indicator light on);

Step 6: Power on the system host, enter the system desktop, start the operating software system, and return the machine tool to zero;

Step 7: Adjust the focus position and replace the nozzle according to the corresponding material. (For example, replace the double-layer nozzle for carbon steel positive focus;
replace the single-layer nozzle for stainless steel negative focus);

Step 8: Move the machine tool cutting head above the material; the cutting head sensor will automatically or manually calibrate. (Upon daily startup, the machine tool must be
zeroed, and the cutting head sensor must be calibrated automatically or manually);

Step 9: Manually test N2 and O2 to confirm that the gas (air) pressure is normal

Step 10: Confirm that the cutting program is compatible with the material;

Step 11: Retrieve the processing program and load the cutting parameters in the (automatic interface);

Step 12: Start the program, follow the outline, and check the size and position of the cutting file (whether it is within the material's effective range);

Step 13: Begin processing. During processing, pay close attention to the cutting situation. If the cutting head may collide or pass through a void, pause immediately and eliminate the fault before continuing cutting.

A . Review of Foundation Plan

1 Metal shims, up to 1/2"may be needed for proper leveling, spacer plates should be prepared in advance.2 Rigging equipment and/or personnel should be available to position machine.

Size of the door opening(s)
Overhead clearances.
Plant obstructions enroute to machine foundation.
Capacity of cranes or other lifting devices. (>5 TONS)
Capacity of rigging, if used.
Internal personnel or professional riggers.
Code requirements for all services (electrical, etc.)
Location of equipment within plant to allow efficient operation and disassembly if necessary.

3 Determine exact location for machine, and referencing foundation print, accurately mark floor for anchor locations.

4 Proper electrical service and appropriate disconnects should be installed Anticipated location of the machine should be reviewed to insure that space is available to perform required maintenance and repairs if necessary. Incoming power connections should enterthemachinefromthefloortoallowaccessfor Maintenance.

B . Gas Source Preparation

Provision should be made for a safe gas cylinder rack near the machine for cylinders in use. This rack should be easily accessible for replacement of spent cylinders.

CAUTION: The very low temperature of cryogenic gas supplies may cause hoses in the Laser System to fail when high assist gas flow rates are used. An external vaporizer may reduce this effect. Refer to your gas supplier for additional information.

Regulators, hoses, and fittings should be acquired and prepared for connecting assist

gas supply to laser system inlet port. The assist gas hoses must be high purity, medium pressure, preparation kit is available from FULL SPECTRUM LASER in the package that includes all necessary regulators, hoses and fittings.

CAUTION: Ensure that the gas supply piping is blown out / cleaned prior to connecting piping to machine inlet. Failure to remove debris in the gas lines may result in failure of the gas regulation components that may not be covered by warranty.

The first laser premix gas cylinder must be certified.

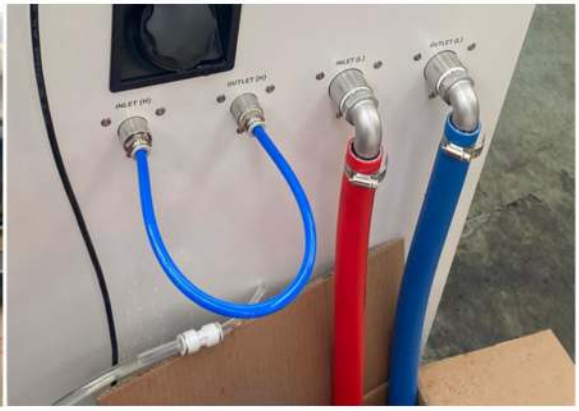
DANGER - Conventional high-pressure gas cylinders must be secured to prevent falling over. When cylinders of this type fall and break off the valve, they can rocket through concrete block walls, and other sturdy structures, and cause injury or death.

C. Chiller Requirements

The additive is specifically chosen to minimize corrosion, build up, and blockage. Problems often occur if coolant mix quality is not maintained. Repairs needed due to poor coolant quality may not be covered under warranty. To prevent clogging of cooling passages do not use automotive type anti-freeze. （In summer, you can add purified distilled water, but mineral water is strictly prohibited.）

Chiller reservoir capacity is listed on the foundation print. Please have adequate

quantities on hand. Depending on container size, a funnel and /or a pump may be needed. After the reservoir if filled the first time, additional coolant will be required during startup, as coolant will be pumped into empty hoses and passages, etc.

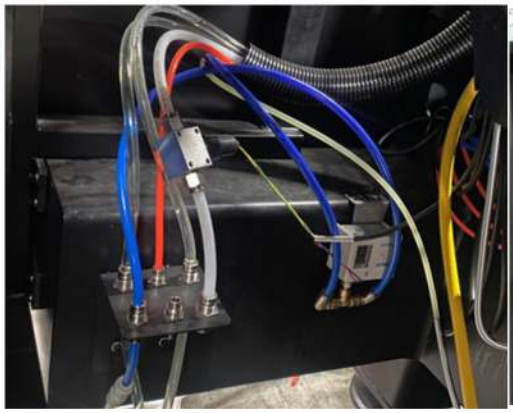


D. Compressed Air Connections.

The machine requires a constant flow of compressed air connected to one to three inputs, depending on model and options. Beam purge uses very clean dry air at high volume, moderate pressure. Additional pre-filters and / or refrigerated dryers are sometimes required prior to the included membrane type air dryer.

Poor air quality can lead to cutting failures due to contamination of the laser optics. For this reason, filtration solutions are needed to ensure that that the air circulating within the machine is free of contaminants. Contaminants like adhesives, paints, cleaners, and petrol products can be detrimental to beam quality and result in costly repairs. To ensure optimal operation and longevity of the machine, a pre-air filter is vital to meet air quality standards.

Rapid pierce uses moderately clean, moderate pressure and low volume.



- **Blue Pipe Usually Is For Oxygen**
- **White One Is For Nitrogen**

E. Networking

The PC based controls has Windows Embedded as the operating system with WIFI

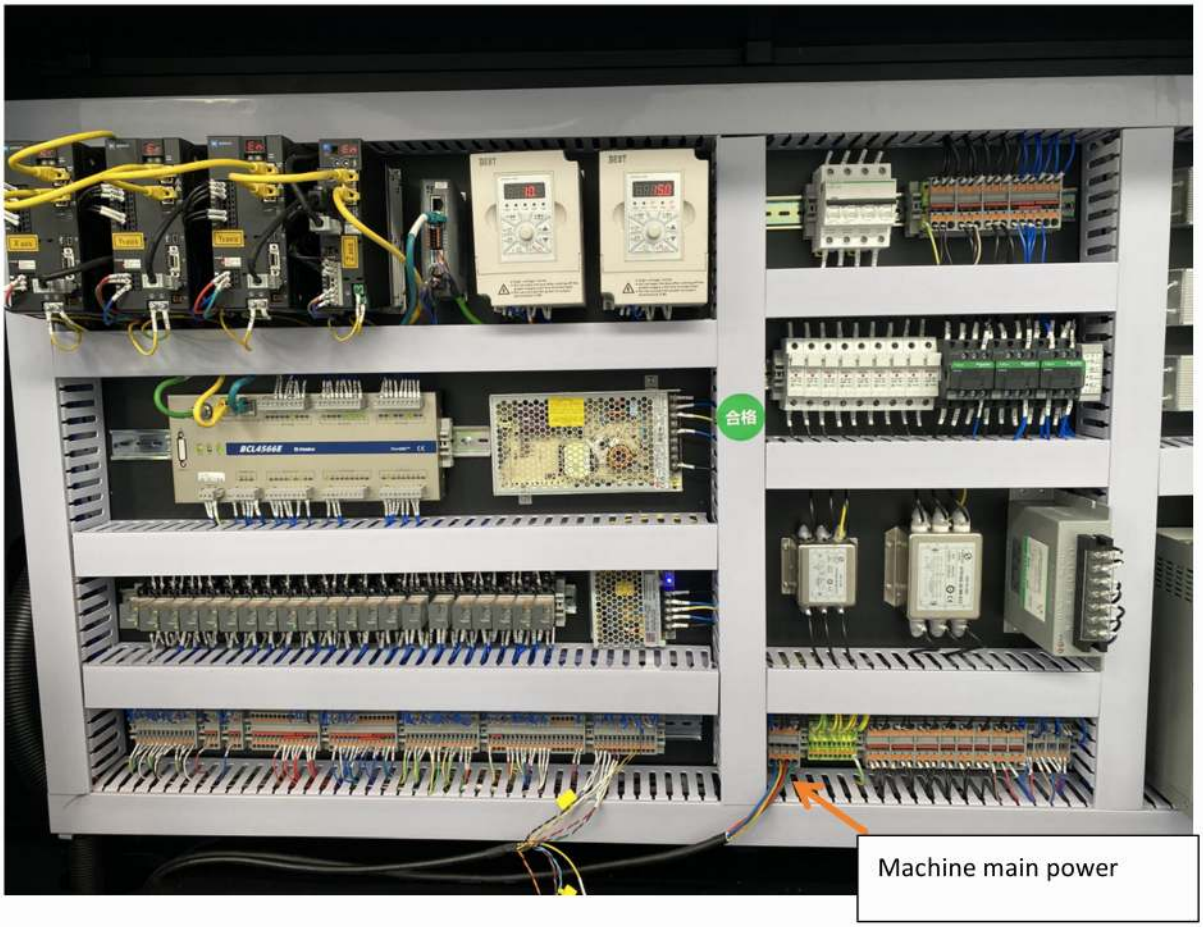
F. Fume Collection

All FULL SPECTRUM LASER CNC Laser Systems are equipped with a fume collection plenum. FULL SPECTRUM LASER can supply an optional blower capable of removing typical cutting fumes.
Refer to foundation print for airflow and pressure requirements, and for flange details.
To determine the proper fume collection specifications for your installation the supplier/contractor may need the following information.

- **Production rate. (Hours per day / Days per week)**
- **Materials to be cut. (Types and thickness)**
- **Normal material condition. (Oil, Scale, Other coatings)**
- **Cut coolant use (yes or no) (typically no longer used)**
- **Dimensions of production room.**
- **Location of collection unit. (Distance from machine, Type of environment)**

Make up air may be needed if building is fairly airtight, to allow the optional fume fan to move enough air volume to extract the fumes and dust created by cutting.

H Electrical Reference



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Product and Technical Support:

Support Hours: M-F 8am-5pm PST, excluding holidays

Request Assistance 24/7:

Live Support Chat available during business hours

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