

Quick Start Guide - FL-CLC-1500W Laser Cleaning Machine

RSD-SUNMAX Series
SUNMAX LASER

About this document: This is an English translation of the Japanese original prepared by SUNMAX LASER for reference purposes. In case of any discrepancy, the Japanese original shall prevail. Specifications are subject to change without notice.

Quick Start Guide — FL-CLC-1500W Laser Cleaning Machine

- Read this guide only after you understand the basic operation of the machine.
- Always read the instruction manual.
- For basic operating procedures, refer to the instruction manual.

Important Information

Incorrect use can damage the fiber laser machine and can be dangerous to people.

Carry out the following steps before using the machine.

① Make sure the water temperature is correct before turning on the power

Turn on the power of the laser source only after the water temperature has reached the proper range. If the water temperature is not in the proper range, the laser source becomes unstable. The water chiller automatically adjusts the temperature to 22–26°C. Allowable operating temperature: 20–30°C.



Proper temperature: 20–30°C

If the water temperature is below 20°C, let the machine warm up. If it is above 30°C, allow time for cooling. The chiller brings the water to the proper temperature automatically.

- If the water temperature is too high, alarm "E02" or "E10" appears. If this happens, wait until the water temperature goes down.
- If the water temperature is too low, alarm "E08" or "E11" appears. If this happens, wait until the water temperature goes up.

Check the value shown on the "L.00.0" display.

② Make sure assist air is flowing properly

If you process without assist air, rust dust and smoke produced during processing can damage the lens. For work that produces a lot of smoke, such as laser removal of paint coatings, set the air pressure higher or use a fan as a countermeasure.

Recommended air pressure: 0.4–0.8 MPa (set the pressure higher when a lot of smoke is produced or when working in an enclosed space).

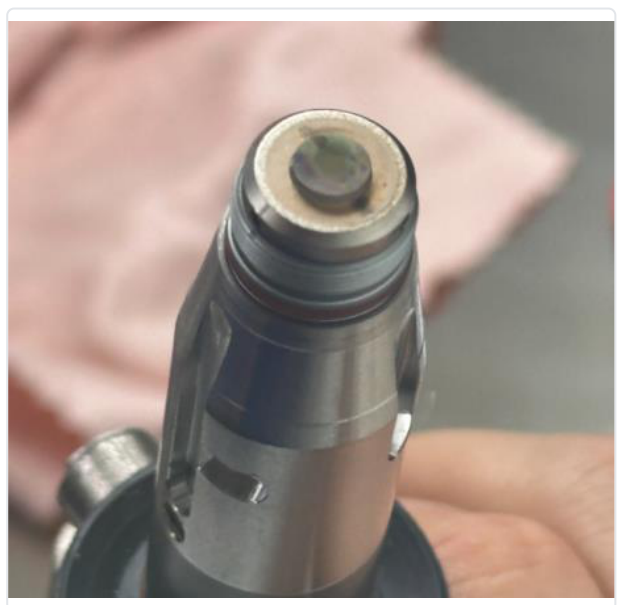


Photo: crystal section of the laser source destroyed by reflected laser / Photo: oil on the protection lens

Caution! When using air, first remove moisture, oil, and dust with a filter and an air dryer. In particular, oil or water on the protection lens reflects the laser. If the reflected laser reaches the laser source, it can destroy the lens inside the laser source.

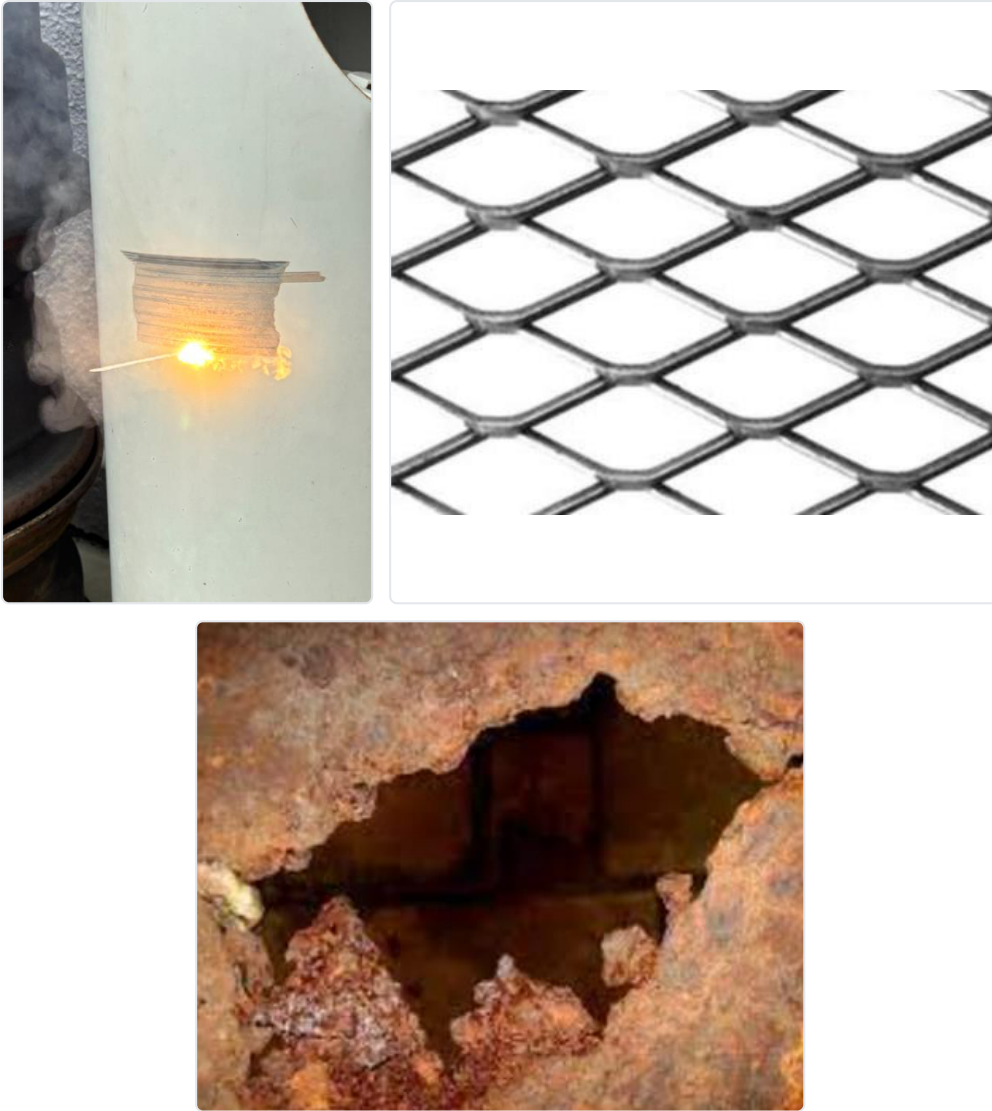
When a lot of smoke is produced, use a fan or similar to keep rust dust and smoke away from the laser gun. This also lets you work with less gas and air consumption.

Harmful gases such as fumes may be generated during processing. Provide ventilation equipment.

③ Beware of highly reflective materials

When the laser hits a mirror-finished surface or an aluminum material, the laser may be reflected. Check carefully that there are no flammable materials or people near the point where the laser hits before you start work.

Mirror-finished aluminum and stainless steel have especially high reflectivity — take extra care. The laser operator must always wear laser safety glasses. Check carefully that there are no people or hazardous materials in the surrounding area before working.



Laser beam / Reflected beam — Dangerous if flammable materials are nearby!

④ Beware of the laser passing through the workpiece

With expanded metal, or when the workpiece has holes, the laser can pass straight through it. Even a laser that has passed through can cause damage, depending on the distance. Place a steel plate or similar shielding behind the workpiece.

If the workpiece has holes, the laser passes through it — this is dangerous!

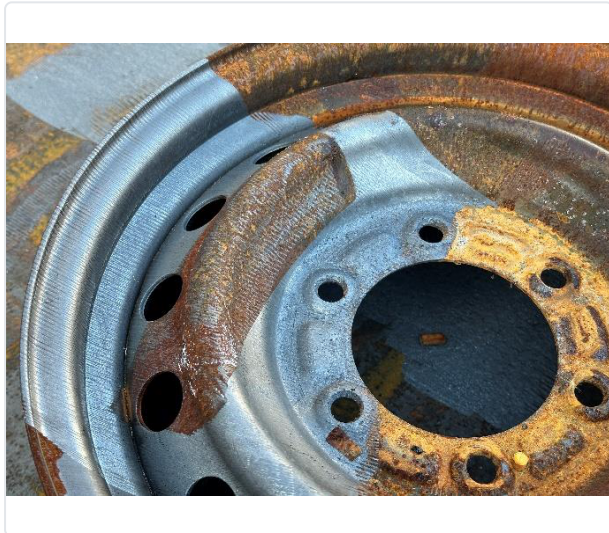
⑤ Shielding (masking) measures

① Shielding material: aluminum tape

Reason for selection: Aluminum tape diffuses laser light and effectively protects the parts of the workpiece outside the irradiated area.

Managing reflection risk: Aluminum tape with an embossed (textured) surface disperses the laser energy and reduces the risk of burns to the operator. However, do not use aluminum tape with a smooth or

mirror-finished surface — the energy tends to concentrate at one point, and reflections can cause accidents.

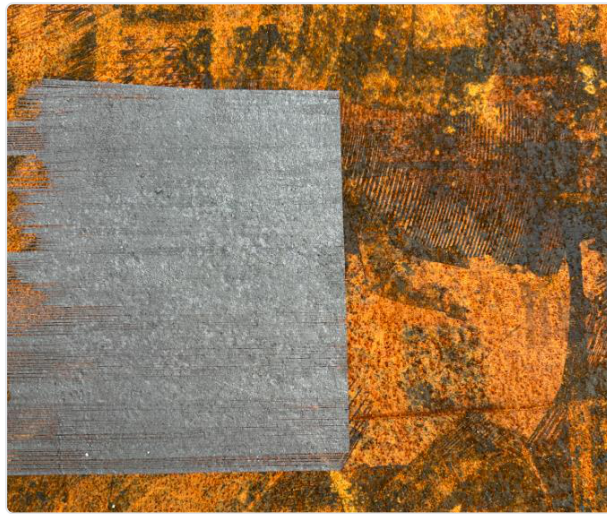


Where the laser hit strongly, the aluminum layer has peeled off and laser marks remain. When operating at maximum output, use three or more layers of tape.

② Shielding material: Galvalume steel sheet

Reason for selection: Galvalume steel sheet is a composite sheet of zinc-coated (galvanized) steel and aluminum. It can effectively protect a wide area of the workpiece.

Managing reflection risk: Because the surface is zinc-coated and aluminum-treated, it disperses the laser energy and reduces the risk of burns to the operator.



③ Replace the lens carefully

Take the greatest care when replacing a lens. During replacement, dust can stick to the lens, or dust can get inside the laser gun and damage the internal lenses.

Follow these precautions:

- Replace the lens in a place with no airborne dust and no wind.
- As soon as you pull out the lens holder, cover the opening so that no dust can enter the inside of the gun.
- Before installing a lens, check that no dust is stuck to it.
- If dust sticks to the lens, remove it with an air duster or similar.
- Do not touch the lens surface — hold the lens by its edges.



When you remove the protection lens or the internal lenses of the laser gun, always seal the openings with masking tape or similar so that no dust can get inside.

④ Always wear laser safety glasses and protective equipment

In any area where the laser is emitted, always wear laser safety glasses, heat-resistant gloves, and long sleeves. Even laser light produced by reflection can burn the retina or, in the worst case, cause blindness if it enters the eyes directly.

⑤ Wear a dust mask

Depending on the material being irradiated, metal fumes and harmful substances may be generated. Provide ventilation equipment, and always wear a dust mask during work.

⑥ Open the shutter only during laser emission

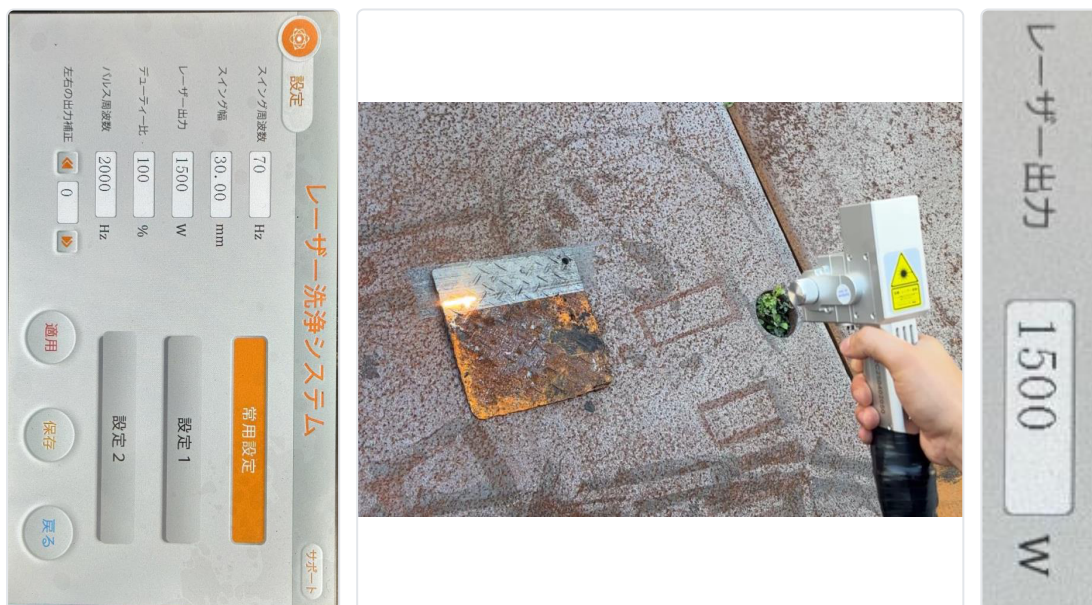
While the safety shutter is closed, no laser is emitted — even if the button is pressed by mistake, nothing is emitted. When you finish laser emission, always close the safety shutter, and open it only when emitting the laser. Keeping the safety shutter closed also helps prevent dust from settling on the protection lens.



Complete all of the checks above before starting processing.

Settings

The settings for rust removal are simple, and not as difficult as those for welding. The parameters you operate are: focal length, laser power, swing frequency, and swing width.



Focal length

The focal length is the distance from the laser gun to the surface where rust is being removed. If the distance is not correct, the machine cannot deliver its full rust-removal performance. The optimal focal

length is the distance at which the sparks are largest and the sound is loudest. Also, aiming the laser while keeping it clear of the smoke from vaporized material makes removal more efficient.

Hold the laser gun about 75 cm away from the base material while emitting the laser. If the gun is too close or too far, the laser effect becomes weak.

Note: The focal length and swing width differ depending on the lens type.

Laser power

The higher the laser power value, the stronger the laser that hits the workpiece — best for stubborn rust and mill scale. If high power is applied to thin sheet material, distortion may occur.

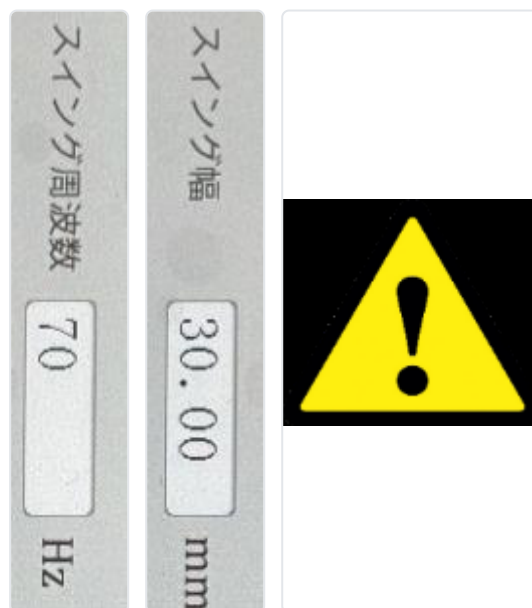
Swing frequency

The swing frequency is the speed of the laser's side-to-side sweep. With a higher value, the beam moves faster, so zebra lines (rust-removal marks) are less visible even when you move the laser gun fairly quickly. Set the frequency value according to the condition of the rust you want to remove.

- Thin rust: set the frequency high (60–100 Hz)
- Thick rust or paint: set the frequency low (30–50 Hz)

Swing width

The swing width is the width of the laser sweep. Change it according to the area you want to clean. When the swing width is wide, the laser is spread over a larger area, so the heat input is lower than when the swing width is narrow.



Air pressure

Set the air pressure according to the amount of dust produced during rust removal. If the air pressure is too low, smoke enters through the emission opening of the laser gun and damages the protection lens. Use at least 0.4 MPa. If a large amount of smoke is produced, use a fan or similar to keep smoke from entering the inside of the laser gun.

Air pressure: 0.4–0.8 MPa

Rust removal generates a large amount of smoke. Do not work in poorly ventilated places. Always wear a dust mask and laser safety glasses during work.

DANGER! Handle with care!

Never point the laser gun at people during rust removal!

Never irradiate highly flammable objects such as gasoline tanks!