MODEL: SHE-MSS002-X

Laser Art 10 Hz- Laser for Cleaning or Artworks

Instruction Manual

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1. GENERAL NOTES

1.1 Machine Description

The Laser Art 10 Hz is primarily designed for the cleaning of artwork surfaces. It effectively removes various types of dirt and contaminants. The high-energy pulses of the Nd:YAG laser can selectively remove the unwanted layer, restoring the artwork's original appearance. The use of extremely short pulses is crucial, as it allows for the removal of dirt with minimal impact on the substrate, preserving the integrity of the artwork.

1.2 Who Can Operate Machine

Warnings: To avoid potential hazards (scald; injury to eyes; fire; unfavorable treatment results, etc.), the machine is intended to be used exclusively by professionals or trained operators

1.3 Warnings

- This laser contains precise optical equipment. The shock-absorbing package provided must be used during transport, otherwise, the laser system may get out of adjustment, affecting the laser output.
- During operation, pay attention for overheating of the laser cavity. If the operation time is too long, the gun body will feel warm to the touch. Please stop the equipment to allow for it to cool down.
- The laser cavity, with all its fragile equipment, is located in the laser cavity handle. Please manage the handle with care.

2. SAFETY PRECAUTIONS

- Maintain and inspect the Laser periodically.
- Do not apply the laser beam to combustible materials.
- Protective gear must be worn at all times during laser operation.
- Do not cover the Laser with a blanket, cloth, etc. while you are using it. The cover may be heated and burn.

Important! Read the manual before using the laser device. The mechanical laser beam dump must be removed before switching on.

General remarks

This manual is an important part of the laser. It has to be stored with the laser and has to be supplied to the laser operators at the place of the operation of the laser.

The laser has been manufactured according to the technical state of the art and fulfills the current safety regulations. Because of the residual risks it is indispensable that every person, working with the laser has to be informed about possible dangers and has to be instructed on how to safely operate the system.

In this context it is especially important to strictly keep to the safety rules given in section 2 of this manual. Missing compliance with these instructions may lead to the loss of liability and guaranty claims against the laser manufacturer.

Do not start to operate the laser if you did not read and fully understand the safety information in section 2 of this manual.

Classification of Laser safety

Lasers are categorized according to their safety hazards into different classes. In the United States of America the classification is given by the American National Standards for the safe use of Lasers ANSI Z 136.1 – 2014. FDA 21CFR 1040.10 and 1040.11 and IEC 60825. According to these standards, Laser Art is a class 4 (high-power) laser and therefore has to be seen as a potential hazard to the operator and a potential fire hazard. The safety rules given in section 3 of this manual have to be strictly followed.

Safety symbols used

During installation and modifications of the laser, the laser has to be fully disconnected from the electrical power supply network,

The laser head and the power supply must only be opened by persons of Onteko or persons, who have been put in charge for this by Onteko,

The laser head has to be properly electrically grounded.

Danger, laser beam

The Laser Art is a class 4 laser, emitting visible or invisible radiation, depending on the model. This radiation may cause hazards, especially danger to the eye of the operator, if the laser is improperly used. When using or integrating the laser into a laser device or assembly (the existing safety regulations explained in section 3 have to be strictly followed. This means for instance:

laser radiation always has to be shielded properly, so that no hazard of the operator can occur,

when it is unavoidable to work with unshielded laser systems, protective eyewear is mandatory,

it has to be made sure, that only authorized and trained personnel will work with the laser.

Attention High Voltage

In the laser head high-voltage is generated. In normal operation, with all covers properly closed, this high-voltage is safely shielded from the user. If the covers are opened or if the laser head is not properly grounded and internal cables are damaged, parts with high voltage may be open or may become in contact with the operator. In order to avoid such hazards, the safety regulations have to be strictly followed. This includes in particular:

installation and modifications of the laser are restricted to trained personnel, who are aware of high-voltage hazards and who have training on how to avoid these hazards.

During installation and modifications of the laser, the laser has to be fully disconnected from the electrical power supply network,

the laser head and the power supply must only be opened by persons of Onteko or persons, who have been put in charge for this by Onteko,

the laser head has to be properly electrically grounded.

The laser head is supplied from the rear with electrical power, signals and cooling water, the laser is emitted from the aperture at the front of the laser head, indicated with the sign shown at the left.

Warning: Never look into the laser beam!

Always make sure, that no laser radiation will get into your eyes. This not only applies to laser radiation, coming directly from the laser head but as well for laser radiation, which might be reflected by obstructions in the beam path or by the work piece itself! Please comply strictly to the safety instructions in section 2.

The mechanical beam blocker is included for protection of the laser aperture while transportation and provides an additional safety feature in order to avoid accidental emission of a laser beam, for instance during maintenance and service. The aperture of the laser head, where the laser beam is leaving the head, can be safely screwed down with the provided massive knob. Please pay attention to remove the knob before putting the laser in operation! If the laser beam is turned on with the knob screwed to the aperture the laser head may be seriously damaged.

Warning: If the laser head is opened, the user may get in contact with extremely dangerous high voltage. Maintenance and repair is therefore strictly restricted to personnel with appropriate qualifications. When working on electrical components with high voltage all relevant safety regulations have to be observed.

2.1 Laser Safety

The Laser Art is a class 4 laser product, emitting pulsed or continuous infrared, green or UV laser radiation with high power.

Warning: The Laser Art emits high power laser radiation which may cause considerable damage of the eyes and skin!

Due to the high output power of several 10 Watt (averaged) the laser may cause damages by harming the eye, by burning of the skin or by burning of inflammable materials. Laser radiation, which falls directly or indirectly into the eye, is focused by the eye lens to the retina, thus leading to burning of retina tissue and subsequent reduction or loss of sight.

This hazard is not restricted to the case when the user looks directly into the beam path, it may as well be caused by laser radiation, which is directly or diffusely reflected into the eye by obstacles in the beam path or by the work piece.

Safety Directives

The area, in which the laser beam is propagating open, which means without hermetically sealed radiation-safe covers, is called the "laser area". This laser area has to be clearly marked and delimited in a way that it is impossible, that direct or reflected laser radiation may leave this laser area and hit the user or other people. Technical means include, for instance, but are not restricted to radiation sealed fire-proof covers and tubes, cabins or movable walls.

With appropriate safety circuits and contacts, it has to be

ensured that the laser is switched off, if delimiting elements such as covers and doors are opened. The personnel safety interlock, integrated into the power supply, should be used for this purpose.

The bridging of protection circuits is not permitted! If this should be inevitable, for instance in case of service or maintenance, the work may only be carried out by qualified and authorized experts.

If the laser is operating, this has to be signalized by appropriate signs and/or signal lamps.

If it is inevitable to work with an open laser beam without covers or shielding, for instance during service or maintenance, appropriate protection eye ware is mandatory. This holds for every person, who might be hit by direct or reflected laser radiation.

Before using the protection eye ware it has to be made sure by the user, that the glasses do not have apparent defects. The spectral protection range of protection glasses is quite narrow. The user therefore has to check in advance that the used glasses are approved for the laser wavelength and power level.

The customer, using the laser, has to adhere to all national and local laser safety rules and regulations.

Measures if Accidents happen

In case of accidents, the following rules apply:

switch off the laser immediately,

inform the supervisor in charge, the company medical officer and the safety officer,

provide first aid until professional aid has arrived.

Electrical Safety

If the laser head, the power supply or the cooling system is opened, the user may come into contact with high-voltage. The operation of the laser therefore is only permitted with properly closed covers and duly installed and shielded connection lines between laser head and supply units.

When working on electrical components of the laser and the supply units all national and local electrical safety rules and regulations have to be adhered, in particular:

- ✓ Installation, modifications and repairs may only be performed by qualified and instructed personnel.
- ✓ All contacts of the laser device, which are connected to high voltage, are properly shielded by covers. Before opening or removing these covers, the laser and the supply units have to be completely disconnected from the electrical supply net. Furthermore, it has to be made sure by protection devices and/or appropriate labels, that the power supply cannot be reconnected accidentally or deliberately with the electrical supply net.
- ✓ As high-power capacitors are discharging relatively slowly, the respective contacts have to be grounded, and one has to wait some minutes before the contact may be

touched.

- ✓ Before starting to work at open electrical contacts, it has to be made sure with appropriate measuring devices, that the contacts are voltage-free.
- ✓ If it is inevitable that measurements or maintenance work has to be carried out at the power supply in operation, it has to be made sure that appropriate safety distance to parts which high voltages are adhered.

Further Safety Directions

Fire Prevention

Due to the high output power of a class 4 laser, materials being hit by laser radiation may be inflamed and may cause a fire. Therefore, appropriate fire prevention measures have to be taken, in particular:

in the vicinity of the laser beam or at places, which may be hit by reflected laser radiation, easily inflammable materials such as paper, tissue or thin wood sheets must not be used,

in the working area of the laser beam it is not permitted to store bins with highly inflammable gases or liquids like solvents or cleaning fluids.

Pollutants caused by laser materials processing

During the processing of materials with laser radiation pollutants may be created, being dangerous to health. These pollutants may be either solid (smoke) or gaseous and can be absorbed by the user via skin or breathing. In

order to protect the user from such pollutants, appropriate measures have to be taken, for instance by suction cleaning and subsequent filtering of the exhaust. The integrator and user of the Laser Art device is responsible for the determination and the adherence of all safety rules and regulations in this context.

Transport and Storage

The laser includes sensitive optical elements. During transportation the laser therefore has to be appropriately packed and shielded against shock and humidity.

In order to avoid electrostatic damage of the diode lasers the provided short-circuit clips have to be put on the connectors labeled "Laser" on the rear side of the laser head, if the laser head is disconnected from the power supply.

Do not transport or store the laser head with a screwed-out drying cartridge!

Before transport or storage all cooling water has to be completely taken out of the laser head and the cooling unit. It is recommended to remove the water by blowing the units out with compressed air with pressure below 3bars. This is particularly important, if the laser is transported or stored at temperatures below the freezing point 0° C. Freezing of residual water in the cooling system, but in particular in the diode lasers may lead to serious damage in the cooling system or may even completely destroy the diode lasers!

If the laser head or the supply unit are transported or stored at temperatures below 15° C all laser units have to be stored at an appropriate period of time at room

temperature, until all components have reached room temperature. Otherwise, compensation water may cause damage to components

2.2 Instructions for Connecting the Interlock System

1. Ensure Compliance with Class IV Laser Safety Standards
2. Before setting up the interlock, review all relevant safety standards for Class IV lasers, including ANSI Z136.1 and IEC 60825, to ensure proper installation and usage in a controlled environment.
3. Turn off the laser and disconnect it from the power supply before beginning the interlock installation. This prevents accidental activation during setup.
4. Locate the interlock connection port on the laser system. This port is designed for external control systems and should be used specifically for interlock connections.
5. Attach the interlock wiring to the door of the room or laboratory where the laser is used. This connection should be set up so that the circuit is completed when the door is closed. If the door is opened, the circuit will break, deactivating the laser automatically.
6. Test the interlock by opening and closing the door to ensure the laser shuts off immediately upon the door opening. The system should prevent the laser from operating unless the door is securely closed.
7. Clearly label the interlock setup and provide warning signs at the door indicating that opening the door will deactivate the laser. This alerts personnel to the interlock function and reinforces safety precautions.
8. Schedule regular inspections to check the interlock functionality and ensure all connections remain secure and functional. Record each inspection in the maintenance log

2.3 Operator Safety

1. To avoid electric shock caused by the improper operation of the machine, please keep power cord connector and the interior of machine dry.

2. Light output by the machine may cause irreversible injury to eyes. Before turning on the machine, please ensure that both the operator and all personnel present in the room wear protective eyewear.
3. To avoid danger caused by high laser energy/high power machine, please make sure that there is no inflammable material surrounding machine.
4. To avoid danger caused by laser reflection, please remove/shade reflective objectives nearby before treatment.

3. NOTES FOR USE

3.1 Environment for Use

Working Environment:

- ✓ Environmental Temperature: Treatment shall be performed at a room temperature of about 25 ° C, and the room temperature shall not be too low or too high
- ✓ Relative Humidity: ≤80 %
- ✓ Atmospheric Pressure Range: 860hPa～1060 hPa
- ✓ Power Supply: 110～220V+10%，50/60 Hz

Transportation & Storage:

- ✓ Temperature Range: -20℃～60℃
- ✓ Relative Density Range: ≤100%
- ✓ Atmospheric Pressure Range：500hPa～1060 hPa

3.2 Notes Before Use

Water tank must be filled before you turn on the machine.

Check the buttons (parameter keys) to make sure that they can work properly.

When the water temperature is lower than 8 ℃, the water temperature protection system will start when the machine is turned on, and the machine will run for several minutes until the water temperature is higher than 8 ℃; if the machine works

continuously and the water temperature is higher than 55 ℃, the water temperature protection system will also start , then turn off the machine and wait until the water temperature is lower than 55 ℃.

Please keep CPC Part inserted into Overflow all the time when you use the machine.

Every time when you change water in water tank, please drain a small amount of water from Water Output to avoid overfilling.

Keep laser beam away from inflammables and explosives.

3.3 Notes When Using

Please wear protective glasses to protect your eyes when operating machine.

Start with low energy to avoid damage and gradually find the suitable energy level for treatment to achieve the desired results on the cleaning of artwork.

Make sure that the laser output part is not blocked during treatment.

The touch screen is a capacity screen, please touch it with fingers (fingernail touch does not work). The speed of clicking on screen shall not be too fast, it needs to be adjusted slowly.

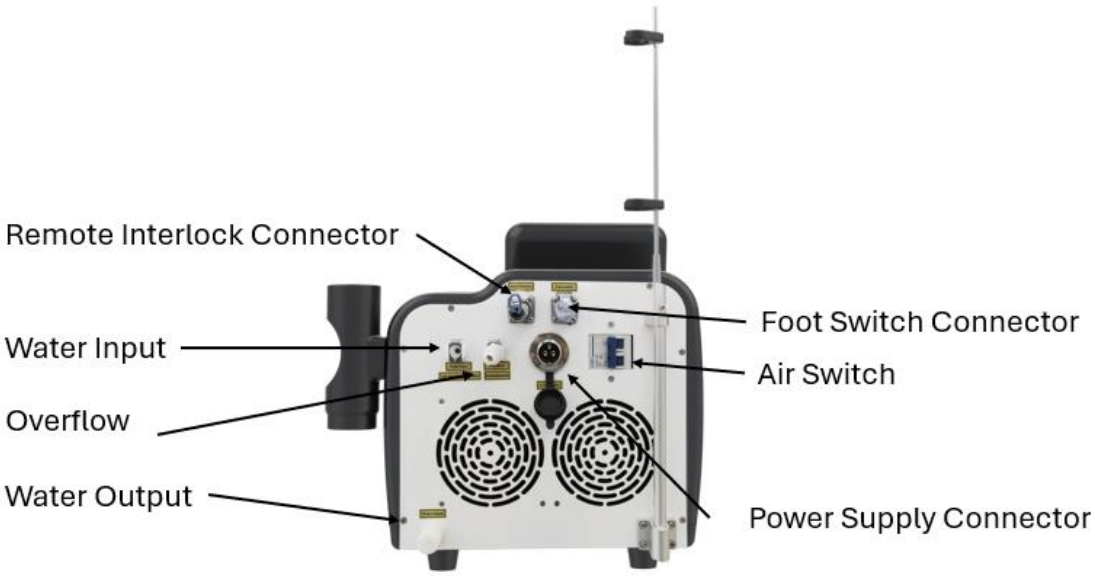
Avoid eyes or skin hurt by laser beam reflected by mirror or reflective objects (stainless steel, etc.).

3.4 Notes After Use

- ✓ Please do not turn off the machine when the laser head is working.
- ✓ Clean the laser head with alcohol cotton stick after each treatment.
- ✓ Turn off the machine before replacing the lens.
- ✓ Renew water every three months, only distilled water is allowed.

4. OVERVIEW OF MACHINE

4.1 Machine Structure

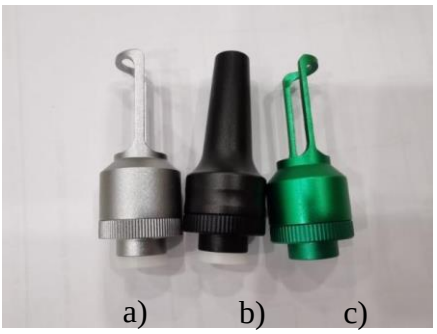


4.2 Accessories

Product Name	QTY	Unit	Product Name	QTY	Unit
Treatment Head	1	Piece	Laser Protective Glasses	1	Piece
Lens Tip-1064	1	Piece	Foot Switch	1	Piece
Lens Tip-532	1	Piece	Power Cord	1	Piece
No lens Tip	1	Piece	Funnel (for Water Input) & CPC Parts	1	Group
Laser Head Holder	1	Piece	Remote Interlock Connector	1	Piece
Laser Head Support	1	Piece	Keys	2	Piece
Screws	3	Piece	Manual	1	Piece

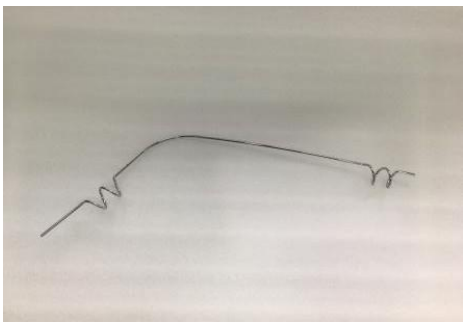
Below are the accessories with their corresponding images

Laser Head



a) Lens tip-1064; b) No lens tip; c) Lens tip-532

Laser Head Holder



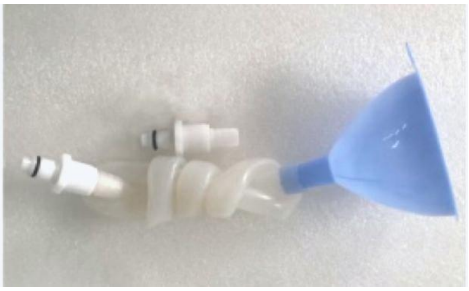
Laser Head Support

Laser Protective Glasses & Eyeshade

Keys, Screws & Photographic Paper (depending of laser model)

Foot Switch Power Cord

Power supply cable



Funnel (for Water Input) & CPC Parts

Remote Interlock Connector

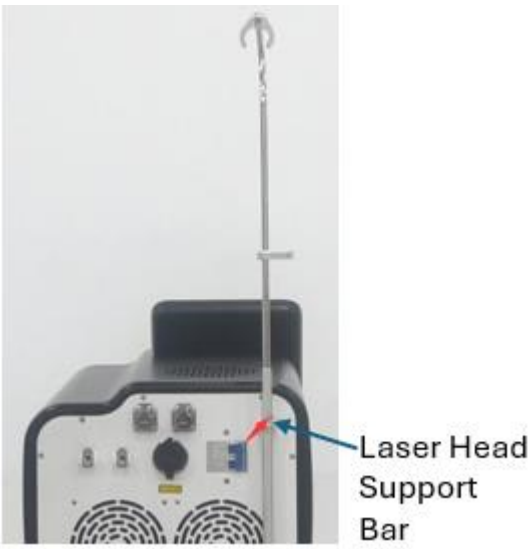
4.3 Assembly

Take out the accessories from the crate.

Step ①: Install the Laser Head Support Bar as shown in the picture.

- ✓ Loosen the screw.
- ✓ Then insert the longer part of support bar into machine main body and tighten screw to fix the bar on machine.

Step ②: Install the Laser Head Holder as shown in the picture.



Step ③: Install the Laser head. Align the laser head connector with the part of machine, then turn the plastic key (horizontal) until it is fastened.

Step ④: Install foot switch, remote interlock and power cord.

Step ⑤: Insert CPC part in Overflow as shown in the picture below. Then add water. Fill the tank with 3 liters purified water; a little water will flow out from Overflow when the water tank is filled. Keep the CPC inserted into Overflow.

4.4 Technical parameters

Machine Power	600 W
Laser Wavelength	1064 nm, 532 nm
Output Power	100-2000 mJ
Pulse Duration	1064 nm 4.5ns；532 nm 4ns
Frequency	1-10 Hz Adjustable
Red Laser	650 nm
Cooling System	Condenser + Cooling Fan
Power Supply & Voltage	AC 220 V±10% 50 Hz AC 110V±10% 60Hz
Dimension of Machine	40*55*115 cm
Overall Dimension (Including Machine & Packing)	69*52*123 cm
Net Weight of Machine	30 Kg
Gross Weight	45 Kg

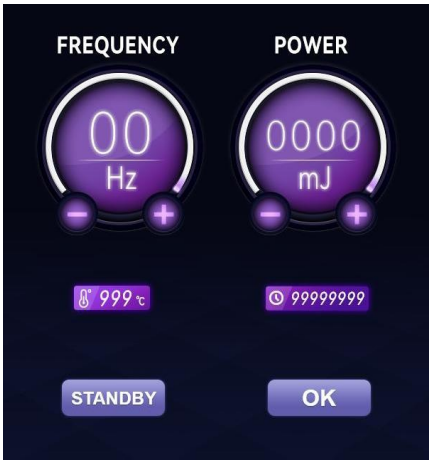
5. SYSTEM INTRODUCTION

5.1 Start-Up Screen

Turn on machine. Wait for a few seconds. Then Choose Language

5.2 Parameter Screen

See parameter screen.



You can adjust Frequency from 1-10 Hz.

You can adjust Energy (Power) from 100-2000 mJ.

Limits Between Frequency & Power

Power (Energy)	Frequency
100-1000	1-10 Adjustable
1100-1500	1-9 Adjustable
1600-2000	1-8 Adjustable

Display Real-Time Temperature of Machine

It is to show the quantity of present laser shots inthe current treatment. Click to display the total laser shots since the first use of machine.

Click "STANDBY", and the machine is initially ready to work.

Click "OK", and the Laser head can emit laser energy by pressing foot switch.

After treatment, click "OK" and "STANDBY" again to stop laser output, then turn off machine.

(1)  is for water running (water circulation) speed, not adjustable.

(2)  is red laser pointer. Click it and the pointer light is ON; Click again to turn off

(3) Click  to turn on the sound, click again to turn off the sound.

6. OPERATION

1. Prior to start analyze the piece to be cleaned. There are different types of surfaces in artworks. Dark contaminants on light backgrounds are generally easier to remove, and the energy can be adjusted over a wide range. For more delicate or darker-toned surfaces, lower energy is required to avoid damage. The machine should be operated with extra caution on particularly fragile surfaces or those with very dark colors.
2. Connect power line to 110-127 V through the power supply.
3. Turn on the rear panel Main On/Off front switch.
4. Turn on the front panel On/Off front switch.
5. In the touchscreen Select the language
6. Select the wavelength.
7. Select the Frequency
8. Select the Energy
9. Click "Standby" and the machine will be ready to work.
10. Click "OK", and the Laser head can emit laser energy by pressing foot switch.
11. Activate the red pointer and target the treatment area
12. When ready, press the Foot Switch and the laser will fire.
13. Shutting down the laser

- Turn off the **On/Off** switch on the front panel.
- Turn off the main switch on the rear panel.

7. MAINTENANCE SCHEDULE

The following maintenance tasks should be performed at specified intervals to ensure optimal performance and longevity of the Nd:YAG laser system.

Maintenance Task	Interval	Instructions
Lens Cleaning	Every 4 hours of use	Clean the lens with a cotton swab and isopropyl alcohol to maintain clarity and performance.
Cooling System Inspection	Monthly	Check cooling system connections and ensure there is no leakage.
O-Ring Replacement	Only if leakage is detected	Inspect the cooling system connections for leaks and replace O-rings if needed.
Cooling Water Replacement	Every 3 months	Drain and refill the cooling system with 3 liters of distilled water.
General Cleaning	Weekly	Power off and unplug the machine. Wipe the exterior with a soft cloth or non-corrosive cleaner.

Note: All other parts can only be replaced by the supplier upon request from the client.