

NEROFORCE[®]

THE POWER OF GERMAN ENGINEERING



*NF-LD20E Evo / NF-LD30E Evo
NF-LD20E-B Evo / NF-LD30E-B Evo*



NF-L530 Sirius / NF-L532 Sirius / NF-L533 Sirius

NeroForce Handheld Laser Marking Systems

Operation Manual

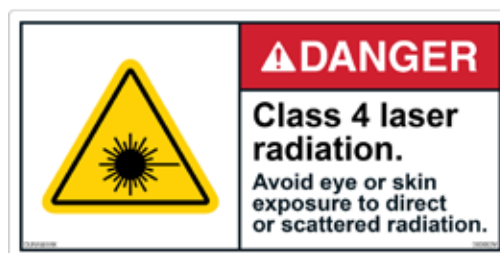
NF-L20E / NF-L20E-B

NF-L30E / NF-L30E-B

NF-L20E Evo / NF-L20E-B Evo

NF-L30E Evo / NF-L30E-B Evo

NF-L530 Sirius / NF-L532 Sirius



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1 INTRODUCTION

Please read these instructions carefully before you install and operate the **NeroForce** L-series Hand-held Laser Marking System (hereafter referred to as **L-series Laser**). If there are any questions regarding the contents of this manual, please contact **NeroForce** directly.

The manual is an integral part of the product, so please read this manual carefully before operation.

This manual describes how to use the L-series Lasers correctly and safely. Please follow the safety instructions as stated in this manual, as well as any local accident prevention regulations and general safety regulations applicable to the area of use. Before starting to use this product, please ensure that you have read and fully understood the manual, especially the section “Safety Information“ and the corresponding safety guide.

Please keep and backup this manual properly to avoid loss of the original document. In case of loss, please contact **NeroForce** immediately.

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The information, figures, tables, specifications, part numbers, images and graphics contained in this manual are subject to change without notice. **NeroForce** makes no warranties or representations, express or implied, with respect to this document. In no event will **NeroForce** be liable for any direct, indirect, special, incidental or consequential damages arising from any mistakes in this document. If you have any questions, please contact **NeroForce**.

1.1 WORDS AND SYMBOLS IN THIS MANUAL

In this manual the following safety symbols have been used to alert the users to the text of the safety instruction next to it.



CAUTION

This symbol is intended to alert the operator about serious dangers, hazardous radiation, vapor hazard and reflective dangers. These are potential and imminent hazards which, if not avoided, could result in death or serious injury.



DANGER

This symbol is intended to alert the operator about the danger of exposure to hazardous visible and invisible laser radiation.



DANGER

This symbol is intended to alert the operator about the presence of dangerous voltages within the product enclosure, that may be of sufficient magnitude to constitute a risk of electric shock.



IMPORTANT

This symbol is intended to alert the operator about the presence of additional information; information that the user must observe or understand when using the product in order to avoid process interruption or malfunction.

1.2 Manufacturer and Customer Service

NeroForce GmbH

Benzstr. 18

89079 Ulm

Germany

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info@neroforce.com

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1.3 Shipping Contents

Each L-series Laser shipment contains the following items:

- 1 x Laser Marking Head
- 1 x Control Unit
- 1 x Tool Kit and Bolts
- 1 x USB Flash Drive (Stick)
- 2 x Touch Pen
- 4 x White Plastic Focal Length Spacers and Connecting Rod
- 1 x Power Adapter (Battery version only)
- 1 x Power Cable

1.4 Product Warranty

This is to certify that the L-series Lasers are guaranteed by **NeroForce** to be free of all defects in materials and workmanship for a period of one year from the date of shipment. The maintenance and service of the product must be performed by professionals of **NeroForce**, and no one is allowed to disassemble or repair the laser device without permission. The following situations will cause the product to be out of warranty:

- Unauthorized disassembly, modification or repair of this product.
- Product damage due to improper handling, operation or cleaning.
- Damage caused by exceeding the laser power threshold.
- The product warranty label is torn or damaged, or there are obvious signs of disassembly.
- Exceeded the warranty period.

1.5 Transport, Handling and Storage

1.5.1 Transport

- Switch off the laser system before transport and disconnect the power connection!
- Please make sure that the supply line connecting marking unit and control unit is not bent!
- Do not use the laser scanner supply line to carry the laser system!



CAUTION

The laser system is a precision-made instrument and includes numerous electronic and optical components. Please avoid any mechanical stress (shock, vibrations, etc.) to the laser system!

1.5.2 Handling

- The equipment must be handled appropriately and carefully.
- The control unit is to be specifically protected during assembly.



CAUTION

Do not use the cable between the laser marking head and the control box to handle or move the laser system which may cause broken parts or other potential damages!

1.5.3 Storage

- Store the laser system in a horizontal position and protect it against dust and humidity.
- Never expose the laser system or one of its components to direct sunlight!
- The following conditions are necessary for operation and storage of the laser marking system:
 - Temperature +5°C to +40°C
 - Max. 50% relative humidity - non-condensing

2 SAFETY

This section must be reviewed thoroughly before operating the L-series Laser unit. Safety instructions in this manual must be followed carefully.

2.1 Classification of Laser Systems

Every laser system is assigned to a laser class, which must be specified at the output location of the laser beam.

Class	Description
1	The accessible laser radiation is not dangerous and eye-safe.
1M	Exposure to this radiation is harmful to the eyes if optical instruments are used to reduce the cross section of the laser beam. If this is not the case, this laser radiation is not harmful and eye-safe.
2	The laser radiation is in the visible spectral range of 400 nm to 700 nm. Short exposure time less than 0.25s are not dangerous to the eyes.
2M	The laser radiation is in the visible spectral range of 400 nm to 700 nm. Exposure to this radiation is harmful to the eyes if optical instruments are used to reduce the cross section of the laser beam. If this is not the case, exposure to this radiation for less than 0.25s is not harmful to the eyes and is eye-safe.
3R	The laser radiation is in the wavelength range of 302.5 nm to 10 nm and is dangerous to the eyes.
3B	The laser radiation is dangerous to the eyes and in some cases also to the skin.
4	The laser radiation is very dangerous to the eyes and to the skin. Stray radiation can also be dangerous. The laser radiation can cause fire and explosion.

2.2 HAZARDS

2.2.1 Laser Hazards



DANGER

The NeroForce L-series Lasers are Class IV products which are dangerous to the eyes and skin. Avoid eye or skin exposure to the laser radiation.

NeroForce L-series Lasers should be only installed and operated by trained personnel who have been instructed by the laser protection officer and are sufficiently qualified to perform the laser work. Due to the risks and hazards associated with the installation and operation of the laser, the operator must follow product warning labels and instructions to ensure laser safety.

- Always wear safety glasses or protective goggles with side shields to reduce the risk of damage to the eyes when operating the laser.
- A fiber laser is an intense energy source and will ignite most materials under certain conditions. Never operate the laser near combustible or explosive materials, gases, liquids or vapors.
- Exposure to direct or diffuse fiber laser radiation can seriously burn human or animal tissue, which may cause permanent damage. Do not place your body or any combustible object in the path of the laser beam.
- Appropriate protection mechanisms must be used to avoid laser radiation outside of the expected working area.

2.2.2 Electrical Safety



WARNING

To avoid potentially fatal electrical shock hazards from electrical equipment, the rules for electrical safety must be strictly followed. Failure to do so can result in the exposure to lethal levels of electricity.

The **NeroForce** L-series Lasers use AC voltages. The maximum operating voltage is the connected main voltage, which is shown on the name plate.

All works on the open laser housing, especially electrical components, must only be performed by specially trained personnel!

In case of a defective power supply, operation of the laser marking system is to be stopped immediately and is only to be repaired by authorized personnel.

2.2.3 Other Hazards

The following hazards are typical for this product family when incorporated for intended use:

- Risk of injury when lifting or moving the unit
- Risk of exposure to hazardous laser energy through unauthorized removal of access panels, doors, or protective barriers
- Risk of exposure to hazardous laser energy and injury due to failure of personnel to use proper eye protection and/or failure to adhere to applicable laser safety procedures
- Risk of exposure to hazardous or lethal voltages through unauthorized removal of covers, doors, or access panels
- Generation of hazardous air contaminants that may be noxious, toxic, or even fatal during laser processing.

2.3 COMPLIANCE

NeroForce L-series Lasers are designed, tested, and certified to comply with United States (U.S.) and European Union (EU) regulations. These regulations impose product performance requirements related to electromagnetic compatibility (EMC) and product safety characteristics for industrial equipment.

2.3.1 RoHS Compliance

NeroForce L-series Lasers meet the requirements of the European RoHS Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment that establish maximum concentration values for certain hazardous substances in electrical and electronic equipment.

2.3.2 FCC Requirements

NeroForce L-series Lasers are designed to meet the FCC Rules. The purpose of the design is to prevent harmful electromagnetic interference. The FCC warns the user that changes or modifications of the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



CERTIFICATE

Certificate No: BGTCTMVX13092021

Applicant: NEROFORCE GmbH
Name, address: Benzstr. 18, 89079 Ulm - Germany
Manufacturer: NEROFORCE GmbH
Name, address: Benzstr. 18, 89079 Ulm - Germany
Product: Handheld Laser Marking Machine
Type / Models: NF-L20E / NF-L20E-B / NF-L20E Evo / NF-L20E-B Evo / NF-L20E Evo II / NF-L20E-B Evo II / NF-L30E / NF-L30E-B / NF-L30E Evo / NF-L30E -B Evo / NF-L30E Evo II / NF-L30E -B Evo II / NF-L50E / NF-L50E-B / NF-L50E Evo / NF-L50E-B Evo / NF-L50E Evo II / NF-L50E-B Evo II / NF-L60E / NF-L60E -B / NF-L60E Evo / NF-L60E B Evo / NF-L60E Evo II / NF-L60E B Evo II / NF-L100E / NF-L100E-B / NF-L100E Evo / NF-L100E-B Evo / NF-L100E Evo II / NF-L100E-B Evo II / NF-L530 Sirius / NF-L532 Sirius / NF-L533 Sirius
Trademark: Neroforce
Related Directives and Annex: Directive 2006/42/EC (Machinery) / Directive 2014/30/EU (Electromagnetic Compatibility)
Related Standards: EN ISO 12100:2010, EN 60204-1:2018, EN 61000-3-3:2013+A1:2019, EN IEC 61000-6-1:2019, EN IEC 61000-6-3:2021, EN IEC 61000-3-2:2019+A1:2021, EN ISO 11553-1, EN ISO 11553-2
Technical file Comments: QCT-E210810529, QCT-E210810529 / August 30, 2021

This certificate is provided to the applicant on the basis of the information provided by the manufacturer or the applicant, and it gives to the applicant the right to use and affix the ECTI CERT Mark on their products accordingly to the ECTI CERT regulation for voluntary certification about its release and its use. The latest revision of the Regulation is available and can be downloaded from the website www.ecti-bg.com. Therefore, it does not imply any assessment on the safety and compliance of the product, or the production process of this product by ECTI CERT.



13.09.2021
Date of Issue

Manager

CE marking is only used on the product if all the relative EU Directives or Regulations are complied with. EC Declaration of Conformity and the technical documents are prepared by the manufacturer or its applicant who puts the product on the market.

The validity of this certificate (4 years from the date of issue) can be checked on the ECTI CERT Homepage.

Any alteration or duplication of this document in parts is subject to approval by ECTI CERT Ltd.

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Use of the laser marker can cause serious injury if the unit is not used as instructed. Please follow the operating instructions carefully and be extremely careful when directing the laser beam. NeroForce GmbH accepts no liability for self-inflicted or negligent injuries.

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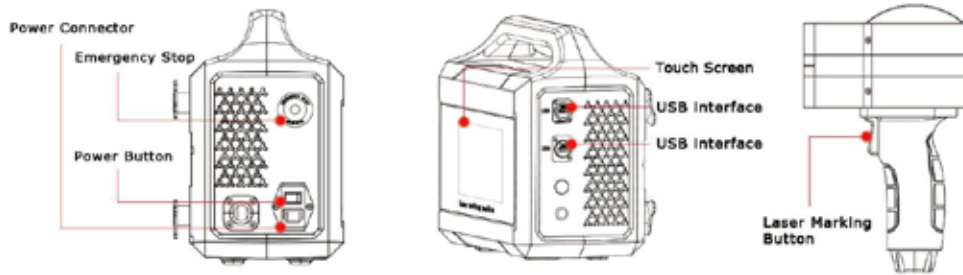
3 PRODUCT DESCRIPTION

3.1 General Description

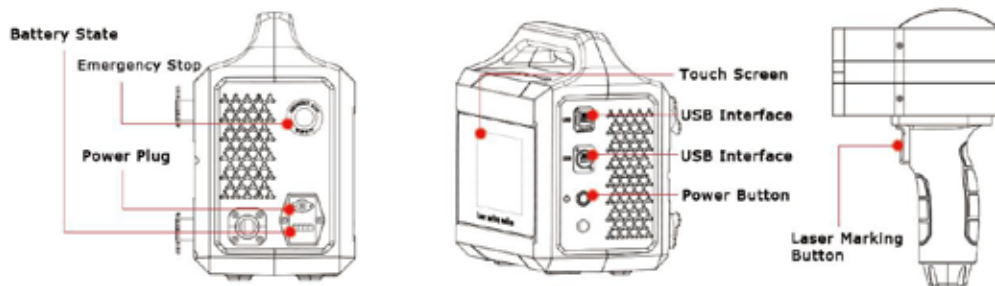
NeroForce L-series Lasers are high performance laser marking devices which have been developed and produced by a professional team based on many years of experience in laser development, production and service.

The laser marking device contains two parts: the laser marking head and the control unit. The control unit is a highly integrated industrial computer system, mainly used for marking, inputting and editing information, and applying a fast and precise control of the laser and galvanometers.

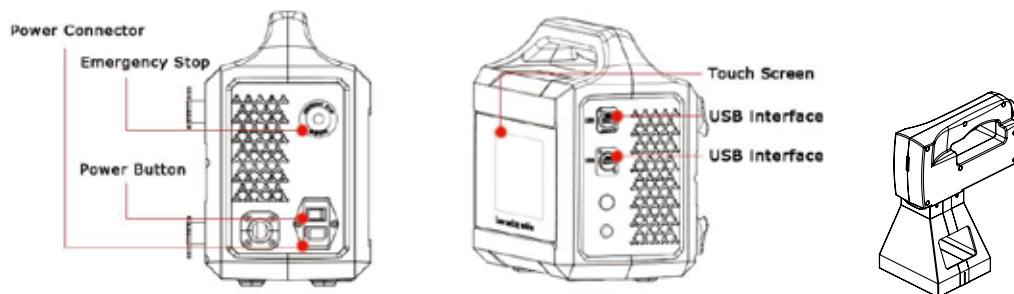
3.1.1 Description of the Functions



Plug-in version of L-series Evo Lasers



Battery version of L-series Evo Lasers



Plug-in version L-series Sirius Lasers

3.1.2 Laser Marking Head

The laser marking head is connected to the control unit and cannot be removed. The laser marking head contains the galvo scan head and f-theta lens. The beam is deflected by the 2-dimension galvanometers and focused by the f-theta lens on the working surface with an appropriate focal length.



CAUTION

- **Avoid touching the mirror with skin as fingerprints contain aggressive substances that can damage the optical surfaces.**
- **The lens of the laser machine should be kept safe from smoke, dust, water, oil, scratches and fingerprints. Keep it clean at all times.**

3.1.3 Control Unit



CAUTION

Do not to use a sharp hard object to operate the touch screen. This may damage the screen and affect the touch sensitivity, also may void the warranty due to such improper use.

3.1.4 Emergency Stop Button (not available for Gen. I)

Use the red Emergency Stop button to stop the laser in an emergency situation. When the button is pushed down, the laser will stop. It will disconnect the PWM signal input to the laser. During the stop period the software will still operate but with no laser output.

When the button is slightly turned and released, it will jump back. The PWM signal will then connect again and the laser is turned on. Be sure to operate the Emergency stop button according to the following procedures to ensure the safety of users and operators:

1. Press the Emergency stop button to interrupt the laser;
2. Click **Stop Mark** on the touch screen to close the marking process;





DANGER

When the laser is restarted by slightly turning and releasing the Emergency button, avoid eye or skin exposure to the laser radiation.



CAUTION

The Emergency button is for emergency use only. When restarting the laser, the lasering process may be interrupted.

3.1.5 Battery Information

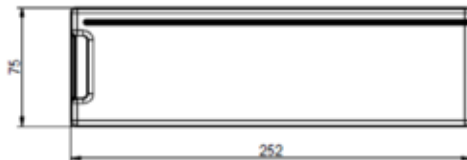
The L-series Laser provides a battery version for easy operation without AV power. The battery of the L-series Evo is easy to remove which is convenient for users when replacing or charging the battery.



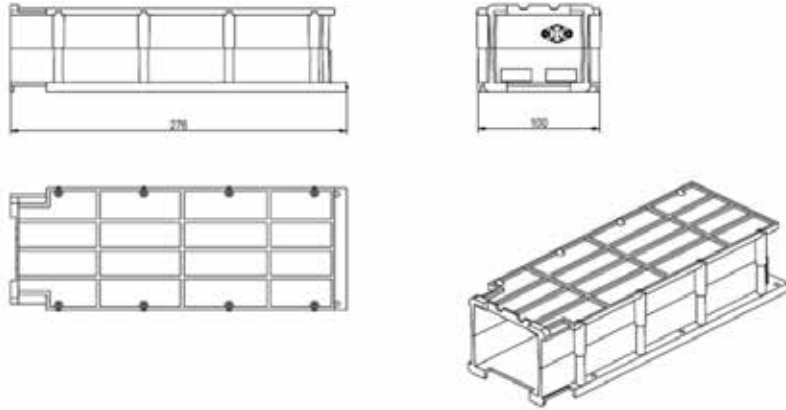
CAUTION

Make sure that the device power is turned off when you take the battery out.

Description	Rechargeable Li-ion Battery
Voltage	21.6V
Rated Capacity	12.8Ah/276.48Wh
Max Charge Voltage	25.2V
Max Charge Current	6.7A
Charging Temperature	0° ~+45°
Working Temperature	-20°C ~+45°C

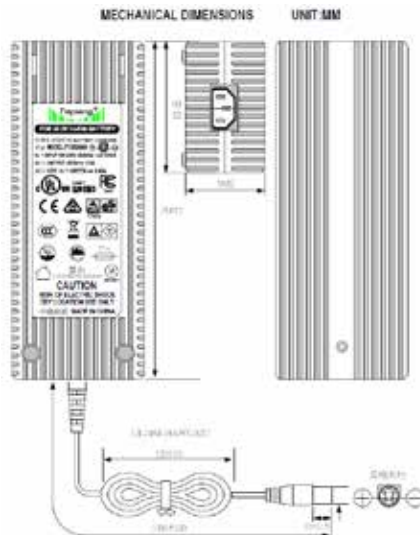


Dimensions: Battery of L-series Laser



Dimensions: Battery Compartment of L-series Evo Laser

Description	Battery Adapter
Input Voltage	100V~264VAC 50/60Hz
Max Charging Voltage	25.5±0.2V
Min Charging Voltage	17.5VDC
Charging Current	4.5±0.45A
Input Power	No load 0.5w max. at input 100-240vac 50/60Hz Loading 113w max. at rated ouput
Efficiency	89% Min. at rated input and output
Temperature Rising	case 75° Max. for rated output
Insulation Resistance	500VDC 10MΩ Min
Dielectric Withstand Test	5mA 1500 VAC for 60 seconds
Inrush Current	Peak in rush current shall be limited 120A for a cold start
Power Factor	0.85 min.
Operating Temperature	-29° ~+45.5°
Storage Temperature	-40° ~+75°



Battery Power Adapter of L-series Evo Laser

3.2 Technical Information

3.2.1 General Specifications NF L-series Laser Gen.I

	NF-L20E	NF-L30E	NF-L20E-B	NF-L30E-B
Case material	Anodized aluminum structure			
Laser type	Fiber laser			
Laser power	≥20W	≥30W	≥20W	≥30W
Wave length / mode	1064nm - pulse			
Pulse energy, duration & repetition rate	0.8 mJ / 200ns / 1-600 kHz			
Beam diameter	(optical) (1/e) with min. divergence M2 = <1.5			
Scan method	High-precision two-dimensional			
Marking speed	≥7000mm/s			
Control system	<i>Integriertes Motherboard, 7-Zoll-Touchscreen, Linux-System /</i> Integrated motherboard, 7-inch touch screen, Linux system			
Cooling system	<i>Luftgekühlt /</i> Air cooled			
Type of marking line	<i>Punktmatrix und Vektor /</i> Dot matrix and vector			
Reflector size	Standard 8.5mm			
Marking range	50 x 50mm or 100 x 100mm			
Position method	Red light positioning			
Lines of marking	Any number of lines within the marking range			
Speed	650 characters/sec (depending on product material and printing contents)			
Fonts	Arabic numerals and other standard font libraries such as English, Korean, Russian, Simplified Chinese, Traditional Chinese			
File format	BMP/DXF/HPGL/JPEG/PLT			
Code types	CODE39, CODE128, CODE126, EAN13, PDF417, 01CODE, QR, AZTECCODE, DM, GS1DM, DOTCODE, HANXINCODE, etc.			
Power	230V		Battery 12000mAh	
Battery run time	-		At 22°C 5.5 hrs	
Full charge time	-		4 hours	
Weight	12.0kg		12.8kg	
Menu languages	English, German, French, Italian, Spanish (further languages on request)			
Working temperature	0-40°C			

3.2.2 General Specifications NF L-series EVO

	NF-L20E EVO	NF-L30E EVO	NF-L20E-B EVO	NF-L30E-B EVO
Case material	Industrial plastics			
Laser type	Fiber laser			
Laser power	≥18-20W	≥30W	≥18-20W	≥30W
Wave length / mode	1064nm - pulse			
Pulse energy, duration & repetition rate	0.8 mJ / 200ns / 1-600 kHz			
Beam diameter	(optical) (1/e) with min. divergence M2 = <1.5			
Scan method	High-precision two-dimensional			
Marking speed	≥7000mm/s			
Control system	Integrated motherboard, 7-inch touch screen, Linux system			
Cooling system	Luftgekühlt / Air cooled			
Type of marking line	Dot matrix and vector			
Reflector size	Standard 8.5mm			
Marking range	50 x 50mm or 100 x 100mm			
Position method	Red light positioning			
Lines of marking	Any number of lines within the marking range			
Speed	650 characters/sec (depending on product material and printing contents)			
Fonts	Arabic numerals and other standard font libraries such as English, Korean, Russian, Simplified Chinese, Traditional Chinese			
File format	BMP/DXF/HPGL/JPEG/PLT			
Code types	CODE39, CODE128, CODE126, EAN13, PDF417, 01CODE, QR, AZTECCODE, DM, GS1DM, DOTCODE, HANXINCODE, etc.			
Power	230V		Battery 12000mAh	
Battery run time	-		At 22°C 5.5 hrs	
Full charge time	-		4 Std. / 4 hours	
Weight	9.0kg		9.8kg	
Menu languages	English, German, French, Italian, Spanish (further languages on request)			
Working temperature	0-40°C			

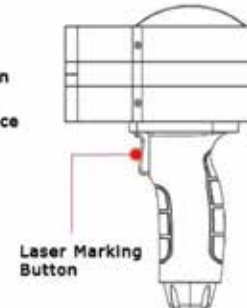
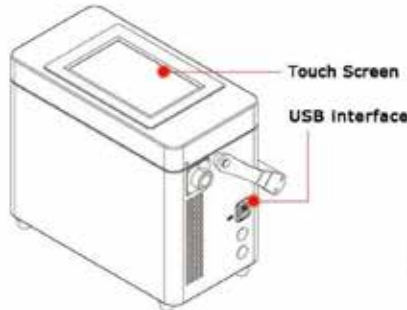
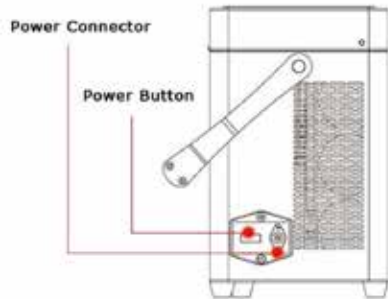
3.2.3 General Specifications NF L-series Sirius

	NF-L530 Sirius	NF-L532 Sirius
Case material	Engineering plastic	
Laser type	Solid State laser source	
Laser power	≥10W	
Wave length / mode	450nm	
Frequency range	0.2 - 10 kHz	
Beam diameter	(optical) (1/e) with min. divergence M2 = <1.5	
Scan method	High-precision two-dimensional	
Marking speed	≥7000mm/s	
Control system	Integrated motherboard, 7-inch touch screen, Linux system	
Cooling system	Air cooled	
Type of marking line	Dot matrix and vector	
Reflector size	Standard 8.5mm	
Marking range	50 x 50mm or 100 x 100mm	
Position method	Red light positioning	
Lines of marking	Any number of lines within the marking range	
Speed	650 characters/sec (depending on product material and printing contents)	
Fonts	Arabic numerals and other standard font libraries such as English, Korean, Russian, Simplified Chinese, Traditional Chinese	
File format	BMP/DXF/HPGL/JPEG/PLT	
Code types	CODE39, CODE128, CODE126, EAN13, PDF417, 01CODE, QR, AZTECCODE, DM, GS1DM, DOTCODE, HANXINCODE, etc.	
Power and consumption	230V - ≤150W	Battery - ≤150W
Battery run time	-	At 22°C 5.5 hrs
Full charge time	-	4 hours
Weight	5.8kg	6.4kg
Menu languages	English, German, French, Italian, Spanish (further languages on request)	
Working conditions	10-42°C - 30 - 85% rel. humidity	

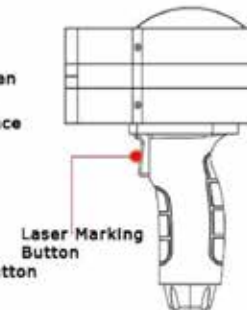
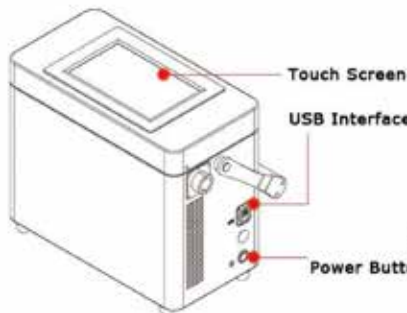
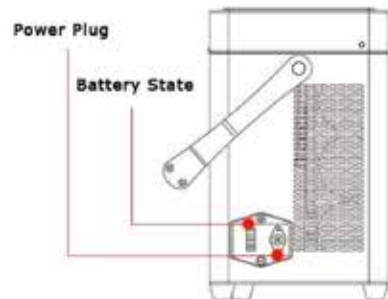
3.2.4 Mechanical Layout and Dimensions

Lasermarker Gen I NF-L20E / 30E / 20E-B / 30E-B

Plug-in version

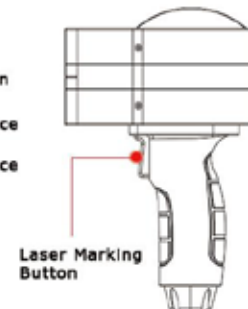
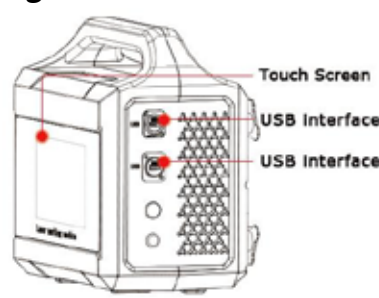
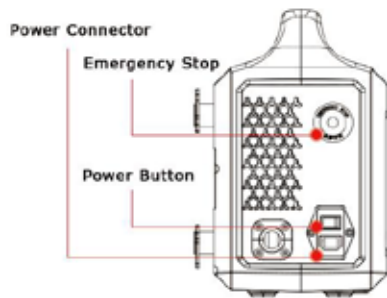


Battery version

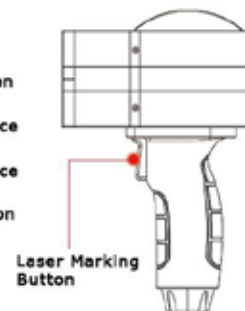
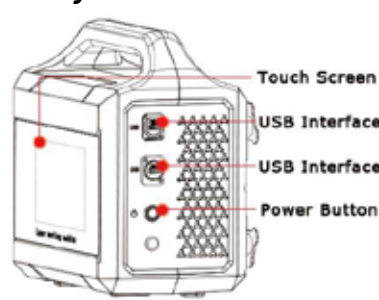
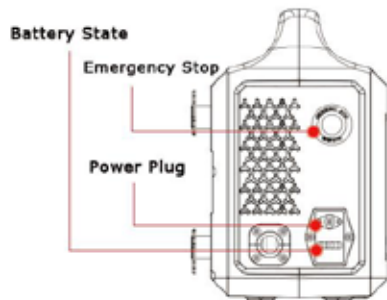


Evo-Series NF-L20E / 30E / 20E-B / 30E-B

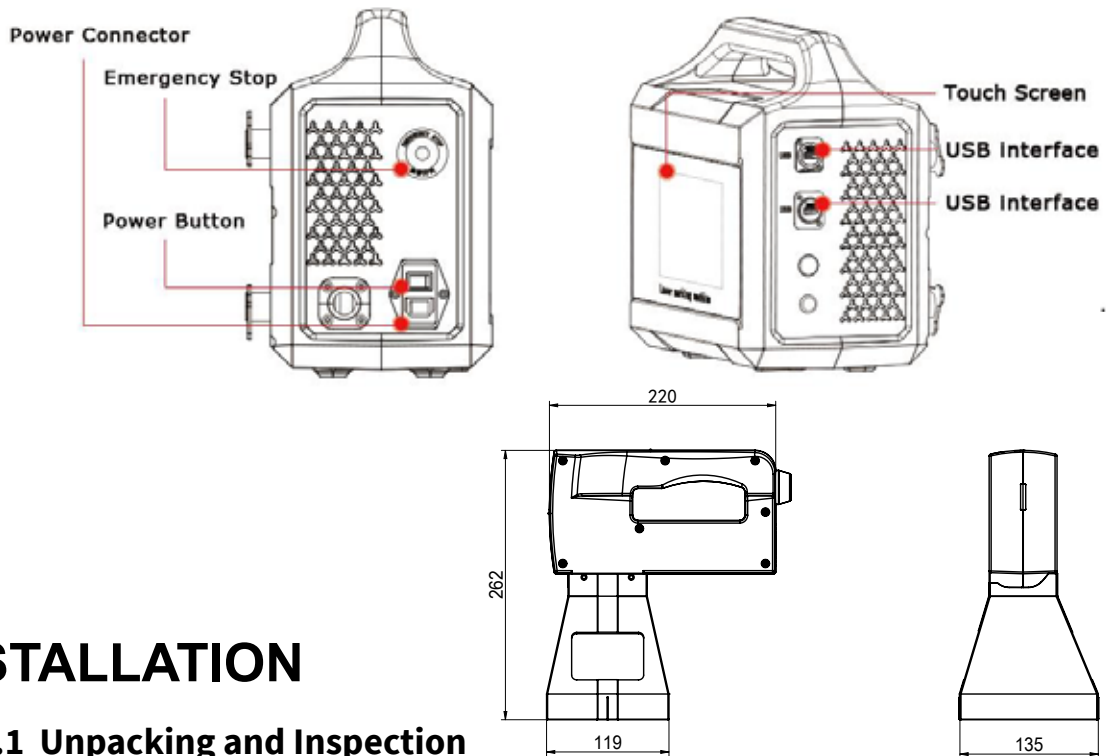
Plug-in version



Battery version



Sirius Lasermarker NF-L530 / L532



4 INSTALLATION

4.1 Unpacking and Inspection

Before unpacking, inspect the shipping carton for evidence of rough handling and note any damage. If you notice any damage to the laser from shipping, document the damage with a photograph, then immediately inform the shipping carrier and **NeroForce**.

After unpacking, review the shipping contents listed in section 1.3 to ensure all components are enclosed.

Save all of the laser's original packaging in case of relocation or shipping .

Protect the laser system and all components from dust and humidity until installation.



CAUTION

The Lasers must be installed and operated by authorised and specifically trained personnel only. The installation of the laser marking system has to comply to IEC 60825-1.

4.2 Air Cooling

NeroForce L-series Lasers are cooled by air. The internal cooling system is designed to supply sufficient cooling. Make sure that the cooling air flow is maintained at all times and that there is sufficient air exchange at the installation site to ensure heat dissipation.

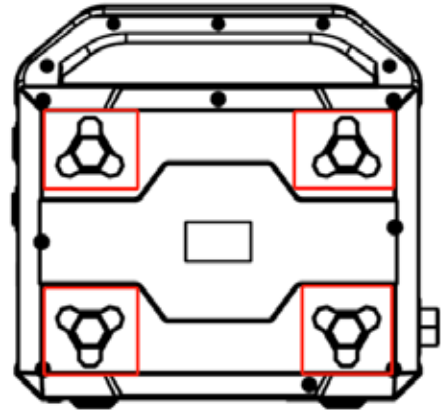


CAUTION

Keep the air inlet and outlet clean, otherwise it will affect the working efficiency of the laser device.

4.3 Placement and Operation

NeroForce L-series Lasers have 4 brackets for placement, so that it can be placed in different postures, which is convenient for users when operating.



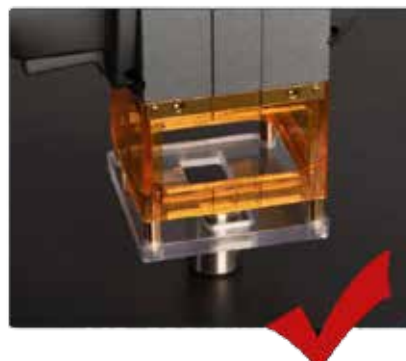
4.4 Change Focal Length Spacers

For products with a small volume and a height above 3mm, or if an improper focal length spacer is used, the marking plane will deviate from the focal length, causing the laser to fail when operating on the surface of the product. In order to solve the problem of marking small products, L-series Lasers provide users with 4 pieces of practical focal length spacers with different window sizes. Placing the marking object at the bottom of the respective spacer will correct the laser marking. The specific replacement steps are as follows:



Focal Length Spacer

1. Loosen the screws at the bottom of the focusing hood and remove the bottom half.
2. Use the connecting rod to connect focusing hood and the space.
3. Tighten the screws.



4.5 Install and Change Focusing Hood

NeroForce L-series Lasers provide two marking ranges for users to choose: 50x50mm and 100x100mm. When switching to the other marking field, users need to replace the corresponding focusing hood and field lens.

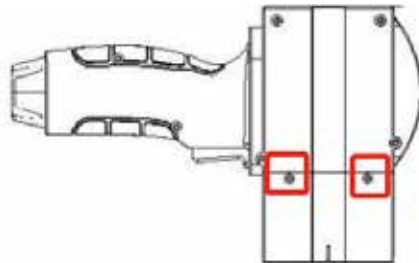
Specific steps of changing the focusing hood are as follows:



CAUTION

- **Avoid touching the mirror as fingerprints contain aggressive substances that can damage the optical surfaces.**
- **The lens of the laser devices should be kept safe from smoke, dust, water, oil, scratches and finger prints. Keep it clean at all times.**

1. Loosen the connecting screw between scan head and the focusing hood, then remove the focusing hood.
2. Unscrew the field lens and replace the field lens with the desired range.
3. Replace the corresponding focusing hood and tighten the connecting screws.



Remove screws of Focusing Hood



5 START-UP AND OPERATION

5.1 Checking the Installation

Before start-up and operation of the L-series laser, carefully check the following:

- Are the specifications correct?
- Are all mechanical installations complete and correct?
- Are all electrical connections complete and correct?
- Are all optical components clean and free of dust?

5.2 Safe Start-up and Shutdown Sequences

To assure safety during start-up, proceed exactly as follows:

1. Ensure that all personnel in the area are wearing protective eyeglasses;
2. Remove protective cover on the beam exit hole;
3. Connect the AC power (For plug-in version only);
4. Turn the Emergency button slightly and release it, in case it was used before or pressed accidentally;
5. Press the Power button;
6. Wait 3 minutes to enter the system and software interface.

When shut down, please turn off the system exactly in reverse order.

5.3 Complete Shutdown Operation (Battery Version Only)

The battery version of the L-series Laser provides a Reset button (Power button), which can disconnect the power supply of the battery to the system completely, so as to avoid excessive discharge of the battery and affect the battery lifetime.

1. Press and hold the Power button for 5 seconds;
2. The machine will produce a buzzing sound and the power button light goes off;
3. Release the button and the machine shuts down completely.



Shutdown Operation of L-series Lasers



CAUTION

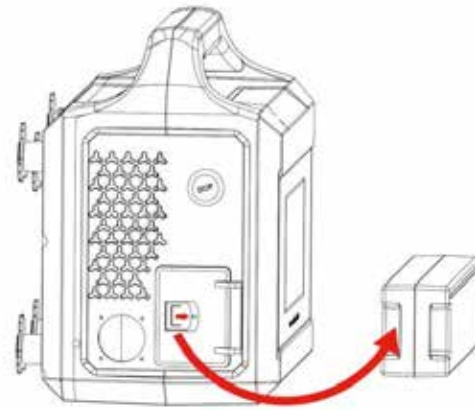
If the machine is not used for a short period of time or after using it for the day, it is necessary to use the reset switch to completely shut down and power off the device. This will avoid excessive discharge of the battery, shortening of the battery lifetime, or unnecessary safety hazards.

5.4 Replacing and Charging the Battery

5.4.1 Replacing the Battery

The L-series Lasers have an easy-to-remove battery, which is convenient for users when replacing or charging the battery. Specific steps are as follows:

1. Open the battery compartment door;
2. Take out the battery;
3. Put the new battery in the compartment;
4. Close the battery compartment door.



How to remove the Battery from the L-series Lasers

5.4.2 Charging the Battery

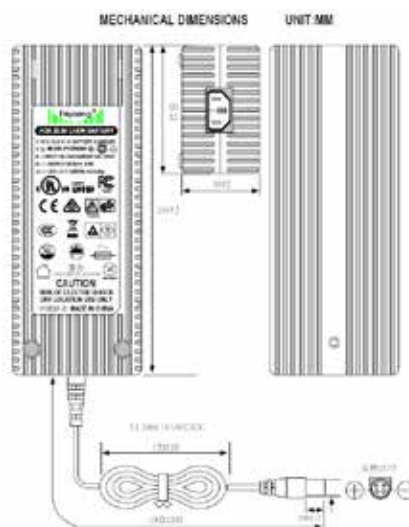
The battery must be taken out for charging to avoid unnecessary risks caused by using the device during the charging process. Specific steps are as follows:

1. Open the battery compartment door;
2. Take out the battery;
3. Use the battery adapter to charge.



DANGER

To charge the battery, the adapter needs to be connected to 230V or 110V power supply. In order to avoid a potential danger of electrical shock, the electrical safety rules must be followed strictly.



Battery Power Adapter of the L-series Lasers

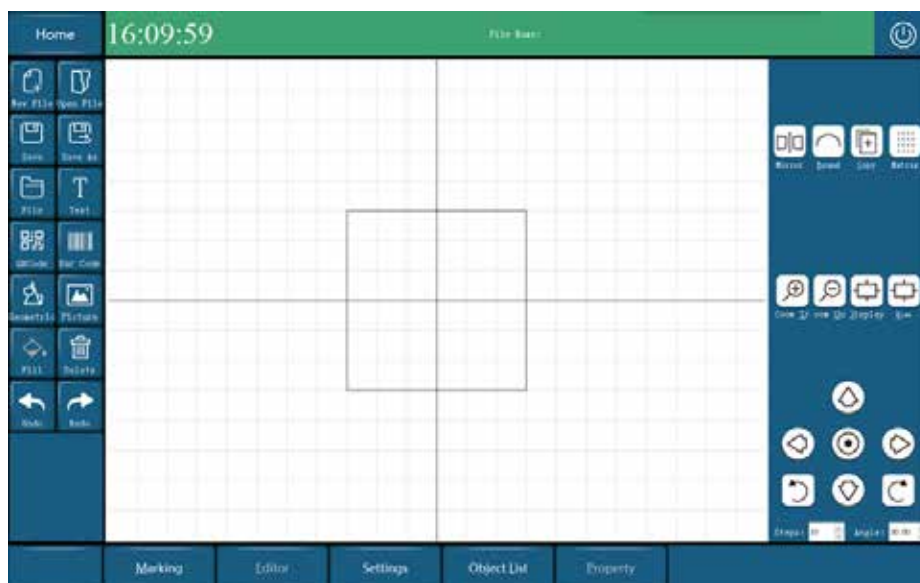
5.5 Power on

5.5.1 Startup of the System

Turn the emergency stop button slightly to release it (in case it was pressed before) and press the Power button to boot up the system. Refer to section 5.2 for detail procedures. The system will be up and running within a few seconds. The initial screen and home screen are shown as below:



Startup Interface of L-series Laser Software

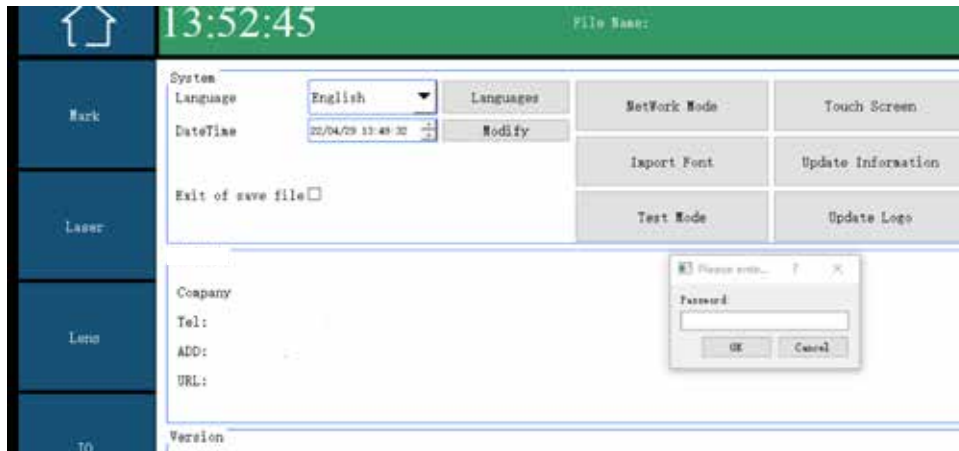


Home Interface of L-series Laser Software

5.6 Setting a password (Code)

With this function you can prevent unauthorised usage of the Laser device.

Go to **Setup - System - Test Mode**



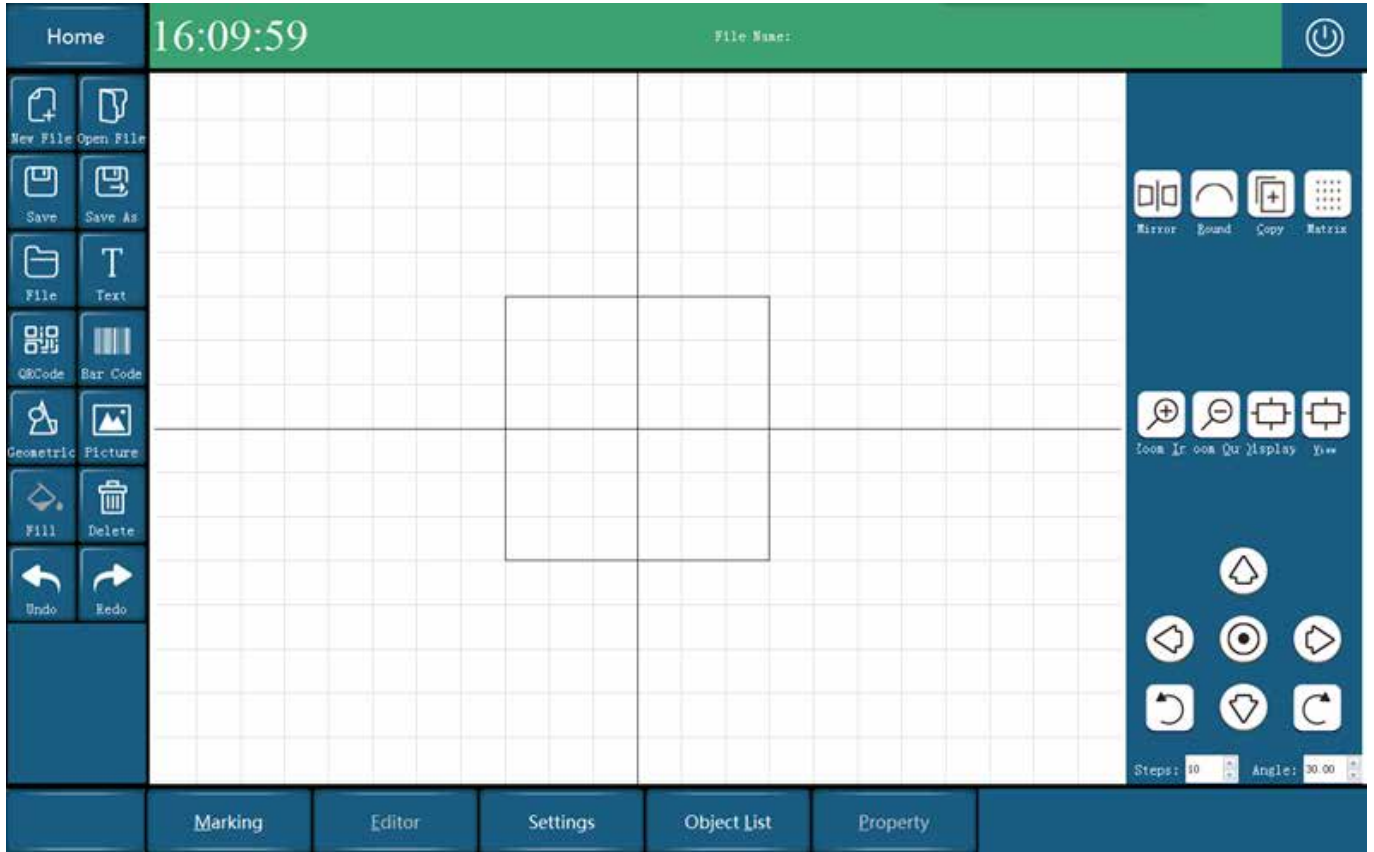
A new window will open. Enter "1" to open an input window.















Now you can check or uncheck the checkbox **login before power on**. When checked, the system will request a password when starting the system. In the input fields below you can insert your password.

6 SOFTWARE SYSTEM

6.1 Home Screen



Home Screen Interface

- | | | | | | |
|---|------------------|---|------------------|---|----------------------------------|
|  | Turn off |  | Add text |  | Barcode |
|  | Add new file |  | Add new picture |  | Save |
|  | 2D Code/ QR Code |  | Geometric shapes |  | Filling
(function not active) |
|  | Mirror |  | Text Arc Layout |  | Display object |



Zoom out



Zoom in



Matrix
Array setting



View



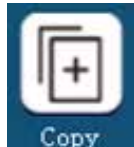
Rotate 30° to the left



Rotate 30°
to the right



Delete



Copy



Center
object



Battery



Object up



Undo



Object left



Object right



Redo



Object down



Open File
Open file



Save As
Save as ...



Return
to Home



Distance
moved



Angle of
rotation



Marking



Object
list



Settings



Edit object





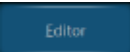
Property

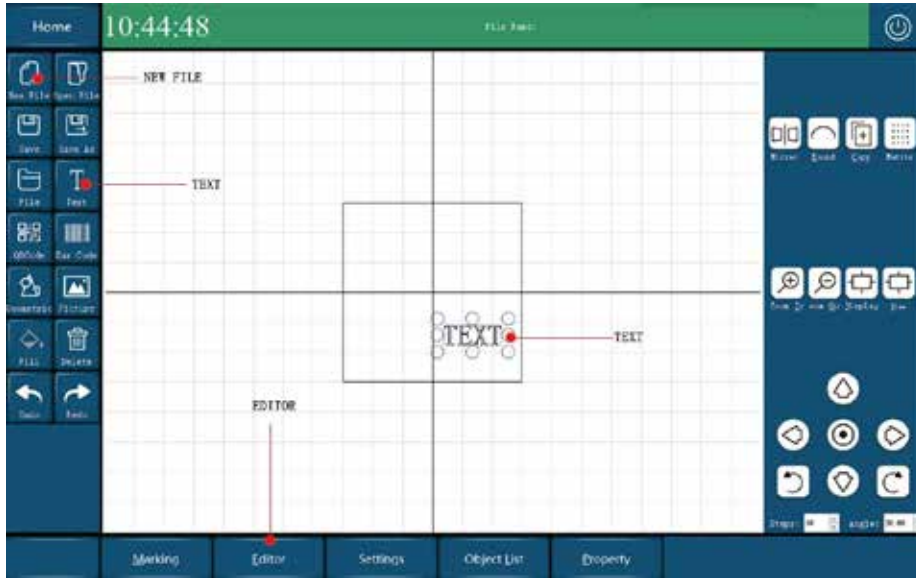


Real time

Buttons of Software

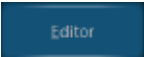
6.2 Add a New Text

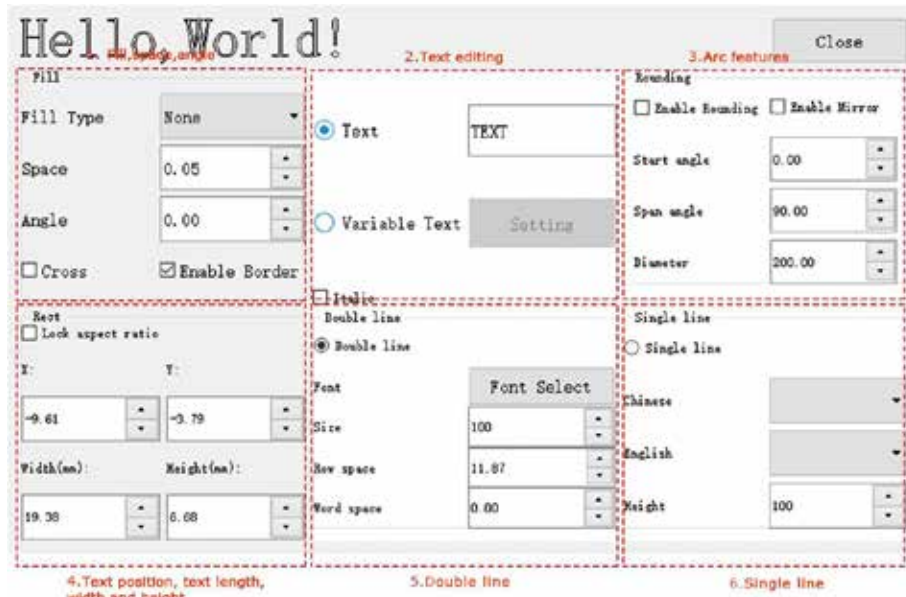
Add New File  → Text  , click the text element on the screen, and then select  at the bottom of the screen to edit the text, as shown below:



Creating a new message

6.3 Editing a Message



Click  to enter the interface as shown below, edit the text and select the features for the text:

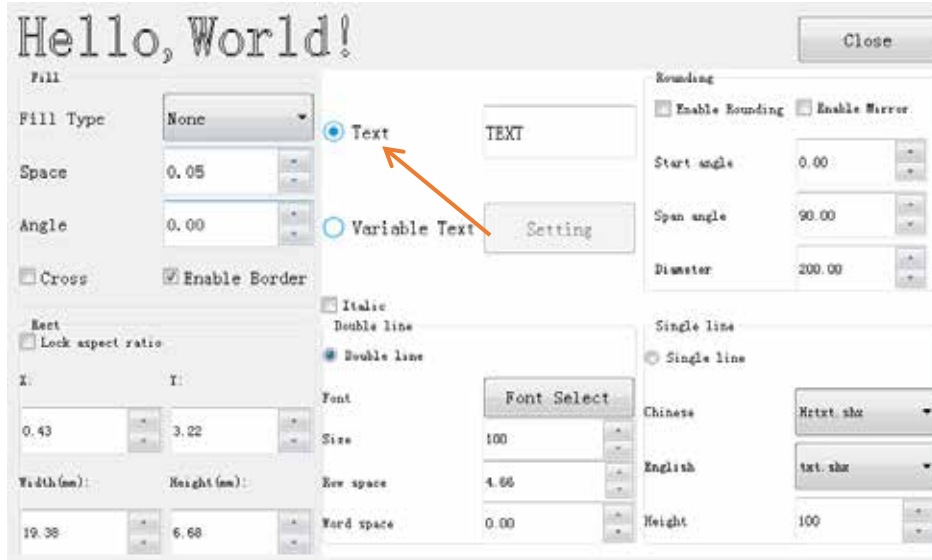


How to edit the message

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Fill type, space, angle 2. Text editing 3. Arc features | <ol style="list-style-type: none"> 4. Text position, text length and height 5. Double line font 6. Single line font |
|--|--|



6.4 Add a new fixed message

Select  →  and enter desired text, as shown below:

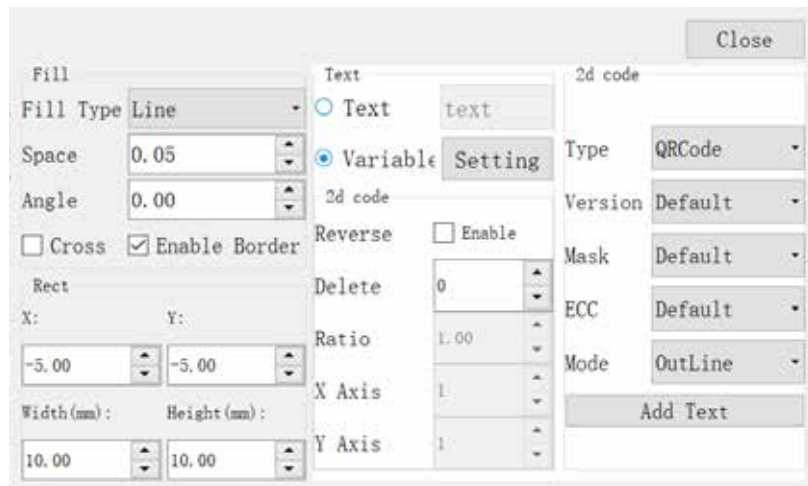


Add Fixed Message

6.5 Add a 2D Code and Barcode

Click  or  on the home screen to create a QR code or Barcode, select the generated QR code or Barcode, and click Editor  to enter the editing interface.

6.5.1 QR Code



Setting of a QR Code

1. Filling

- **Fill Type:** None, Line, Uline
- **Space:** Space between filling lines
- **Angle:** Angle of filling lines
- **Cross:** Two fills with different angles
- **Enable Border:** Overall frame

2. Rect

The position and dimension coordinates of the QR code

3. Text

- **Text:** Fixed text, directly inputs the content of the QR code
- **Variable:** The content is variable (serial number, date and time are variables), see section 6.6 for details.

4. QR Code

- **Reverse:** Invert the QR code
- **Ratio:** The spot size of the QR code
- **X axis and Y axis:** Multiple spots on the X and Y axis
- **Delete:** Generate a blank area in the center of the QR code. When it is 0, it will not be generated by default. The larger the value, the larger the area.

- **Type:** supports QR Code, DataMatrix, GS1-DataMatrix, Aztec Code, HanXin Code and DotCode
- **Mode:** Fill mode, including outline, rectangle, ellipse, point and line

6.5.2 Barcode

1. Filling

- **Fill Type:** None, Line, Uline
- **Space:** Space between filling lines
- **Angle:** Angle of filling lines
- **Cross:** Two fills with different angles
- **Enable Border:** Overall frame

2. Rect

The position and dimension coordinates of the barcode




3. Text

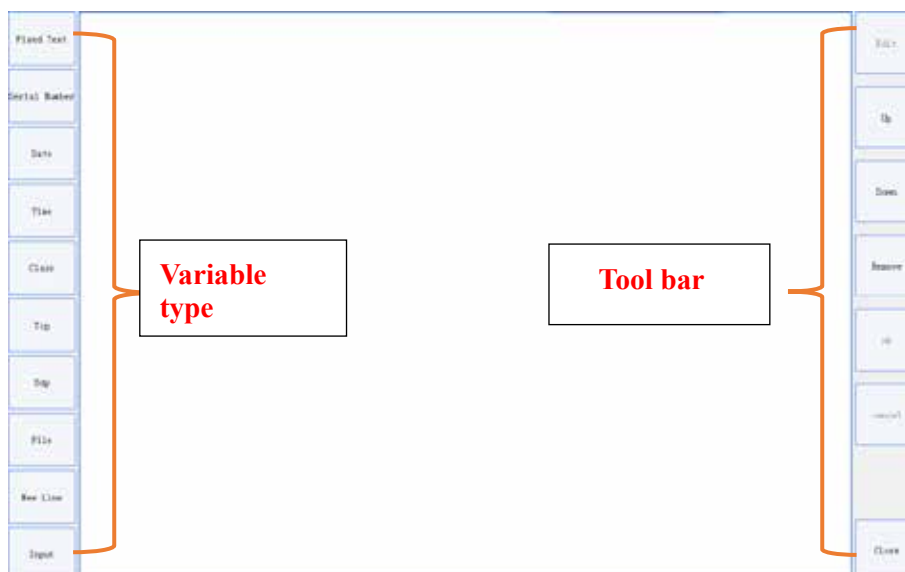
- **Text:** Fixed text, directly input the content of the barcode
- **Variable:** The content is variable (serial number, date and time are variables), see section 6.6 for details.

4. Barcode

- **Barcode Type:** 128CodeAuto/A/B/C, 39code, 93code, EAN13code, PDF417code **and** 01code
- **Height:** Height of the barcode
- **Module Width:** Width of single module
- **Font Size:** The font size of the displayed content
- **Display Text:** Displays the text of the barcode

6.6 Add a New Variable

Select → ,  click **Variable Text** and select **Settings**  as shown below:



6.6.1 Set Serial Number

- **Begin Num:** Set the starting value of the serial number
- **Current Num:** Set current serial number to be marked
- **End Num:** Set the last serial number (Up to 18 digits)
- **Increment:** Increment value
- **Repeat:** Repeated marking times for the same serial number
- **Number Base:** Set the number base for serial number with decimal, lowercase hexadecimal or uppercase hexadecimal
- **Leading Zero:** Display zeros in front of numbers

- **Loop:** After all serial numbers are marked, start marking again from the first serial number (if Loop is not checked, the last serial number will be marked repeatedly after marking the last value)

For example, if the serial number to be set from 1 to 100, set the Begin Num at 1 and the End Num at 100. The default increment is 1, the current value will be +1 after marked. If the increment is set to 2, the current value will be +2 after marking. If the Leading Zero is checked, the digits of the serial numbers will contain a 0 in front of the serial number. For example, if the End Num is 100 and the Leading Zero is checked, the serial number will be 001, 002...099, 100.

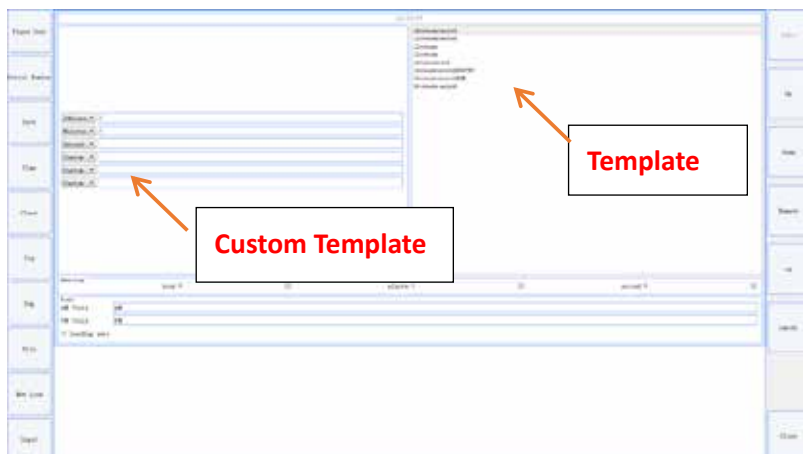
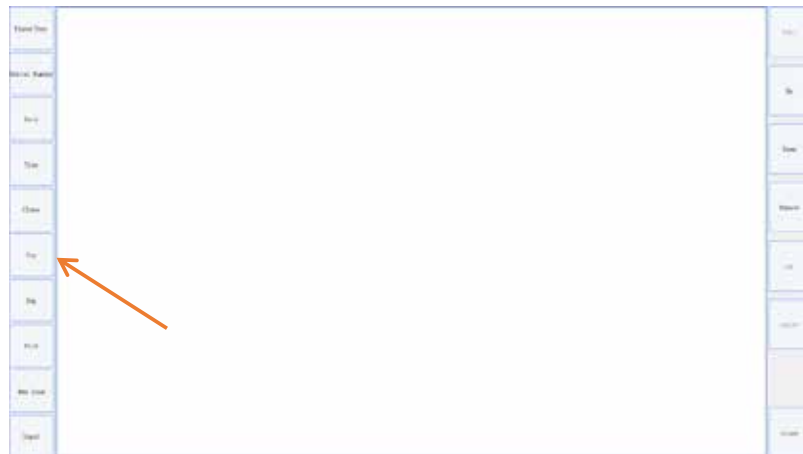
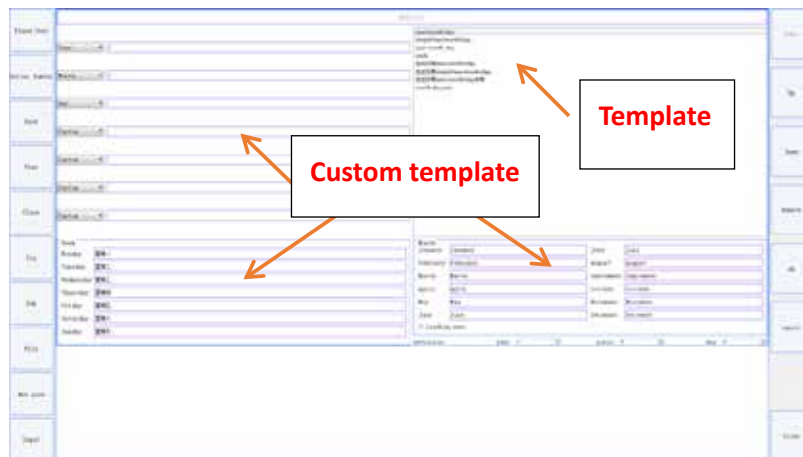
6.6.2 Setting Date and Time

The screenshot displays a software interface for setting serial numbers. On the left, a vertical menu contains options: Fixed Text, Serial Number, Date (indicated by an orange arrow), Time, Class, Top, Stop, File, New Line, and Input. On the right, there are buttons for Edit, Up, Down, Remove, and Close. Below the menu, a form contains the following fields and controls:

- Begin Num: []
- Current Num: []
- End Num: [100]
- Increment: []
- Repeat: []
- Number Base: [Dec]
- Leading zero
- Loop

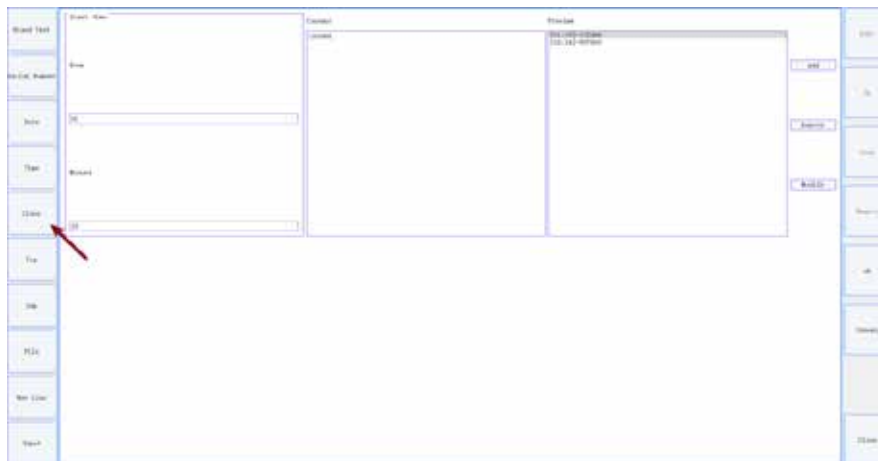
Setting of serial number

- **Template:** The system provides fixed and custom templates for users to choose from. Users can choose the format for month, week, date and time.
- **Deviation:** Set date and time based on actual date or time.
- **Leading Zero:** Display zeros in front of date or time. For example, the default date and time is 2021-7-1 10:5:4. If Leading Zero is checked, the value will become 2021-07-01 10:05:04.



6.6.3 Set Class (Work Shift)

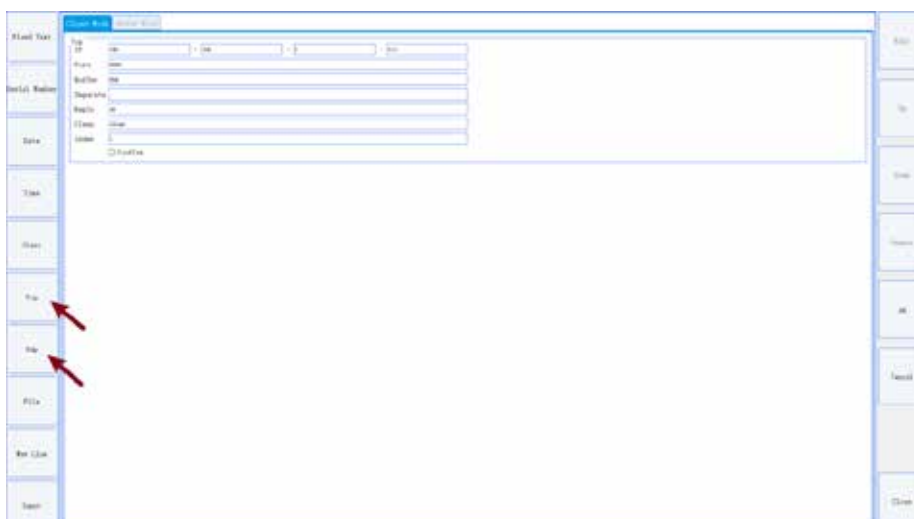
- **Start Time:** Set the start time of the shift
- **Content:** Marking of the corresponding contents
- **Preview:** Display the added shift time and content
- **Add:** Add the setting work shift and content, after setting the start time and content, click the **Add** button. Users can add more shifts, if needed
- **Remove:** Remove the selected shift
- **Modify:** Modify the selected shift. Select the work shift in Preview and modify the start time and content, then click **Modify**, the message will be changed.



Setting of Class (Work Shift)

6.6.4 Set TCP and UDP

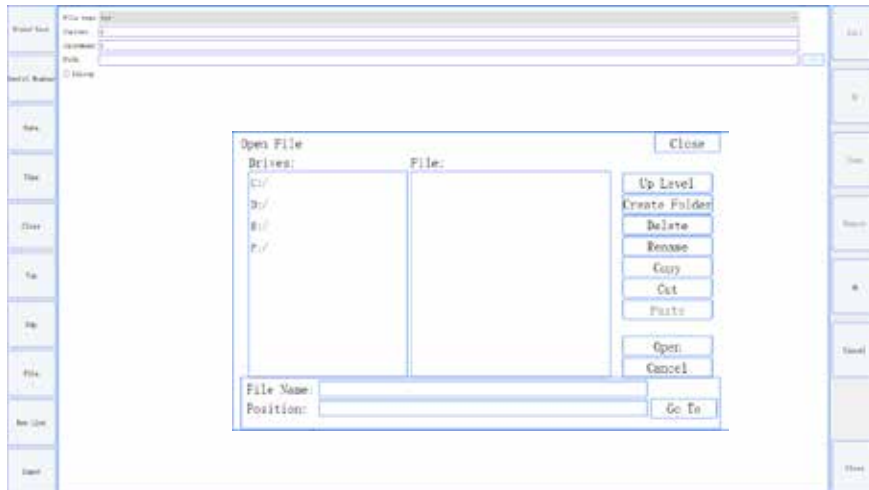
- **Client Mode:** Actively connect to receive text data from the server. The IP needs to be set to the server IP and the port must be set to the respective server port. The server must be set up and running before the client can connect.
- **Server Mode:** Passive connection, receiving text data sent by the client. The IP defaults to the local IP and the port must be set to the client port. The server must be set up and running first before the client can connect.
- **UDP:** Bidirectional connection, either side can be opened first.
- **IP:** IP address, the default is the same as the IP set in the network mode.
- **Port:** Default is "8080".



Setting of TCP and UDP

6.6.5 Import Data via Files

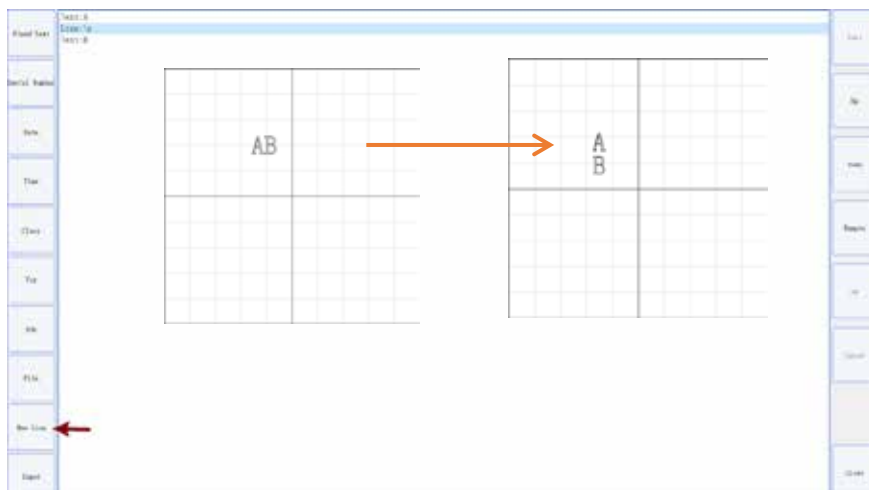
- **File Type:** Only supports TXT and Excel files (the system only recognizes one data per line in TXT and Excel files)
- **Current:** The current data ready to be marked
- **Increment:** Incremental value
- **Path:** File location
- **IsLoop:** Mark the data in the file cyclically



Importing data via files

6.6.6 Add New Line of Message

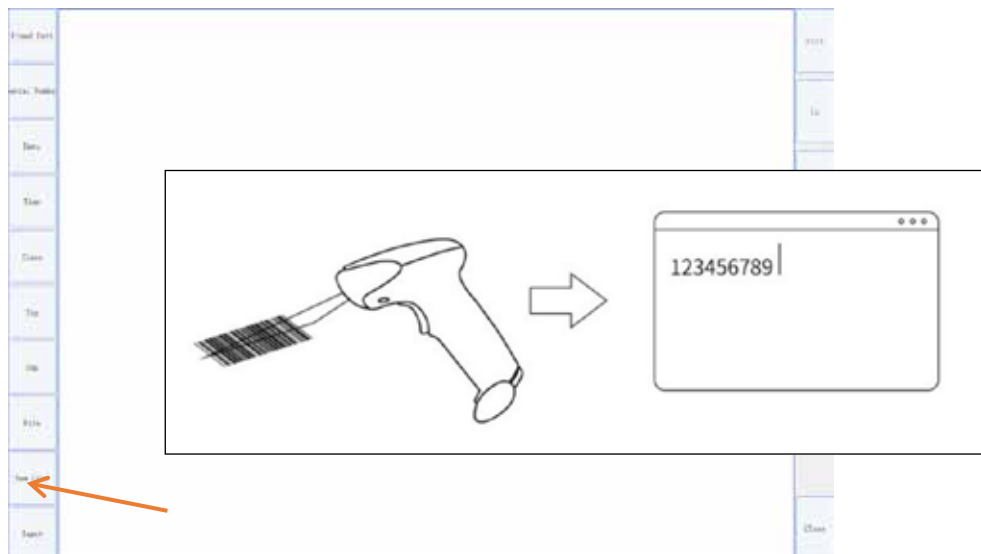
Insert New line between two texts or variable texts, the result will be as follows:



Adding a new line of message

6.6.7 Add Data via a Barcode Scanner

Any barcode scanner can be used to quickly import Barcodes, QR codes or other information as required.



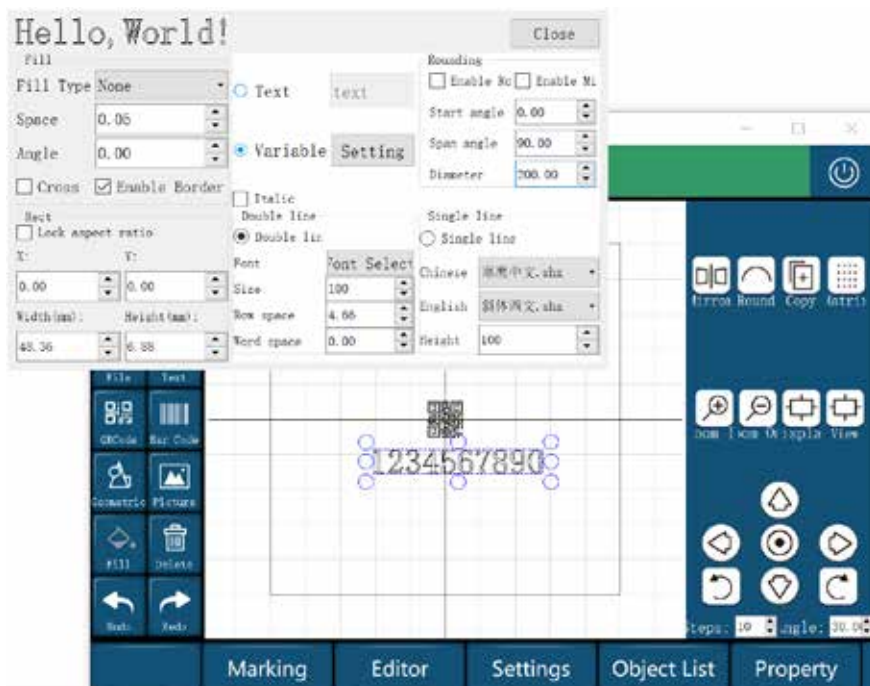
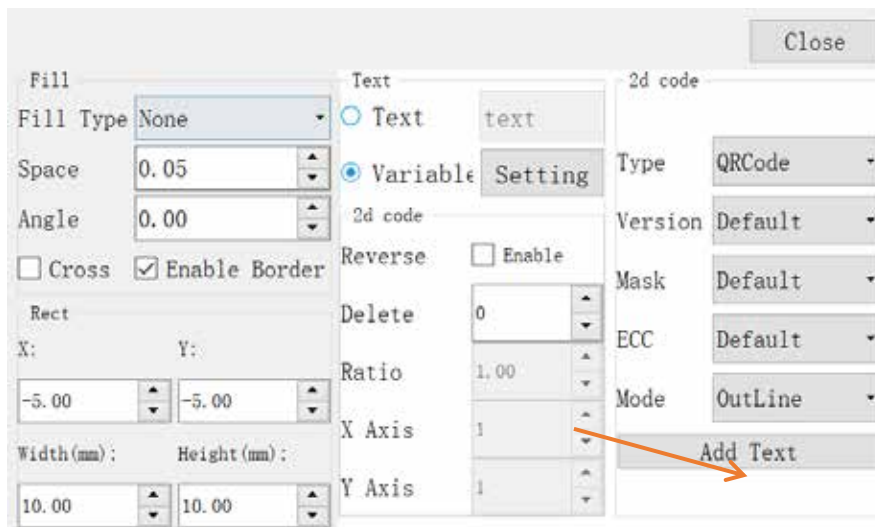
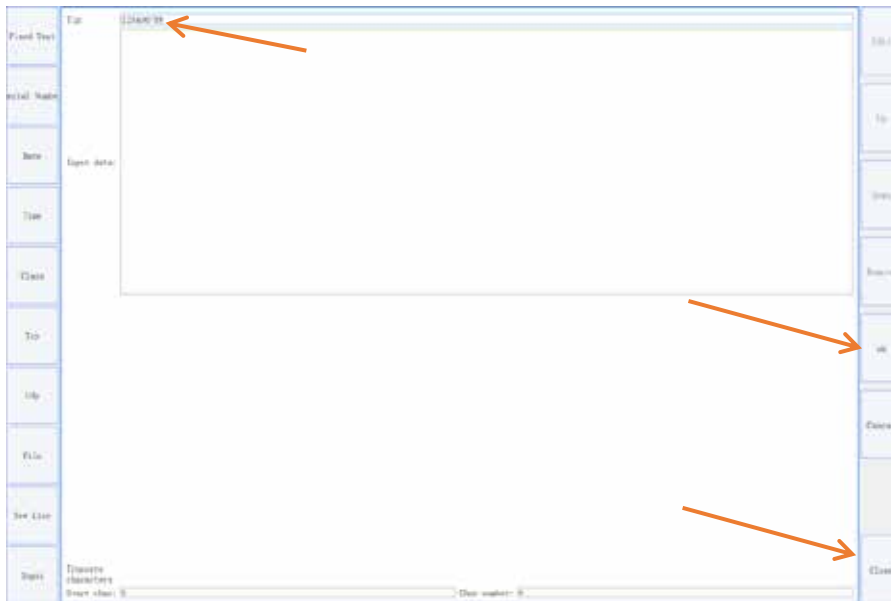
Import Data via Barcode Scanner

1. Connect the Barcode scanner to the L-series Laser via the USB port.
2. Click on the **QR code** (Barcode or Text) icon on the Home screen. Refer to section 6.5 for detailed operation.
3. Select the object and click **Editor**, then click **Variable Setting**.
4. Click **Input**, use the barcode scanner to scan the QR code (or Barcode). When information is displayed on the screen, click **OK**, then click **Close**.
5. User can also click text to display the contents of the QR code (or Barcode) on the Home screen.
6. Click **Marking**, then click **Start Mark**, press the button on the handler and the system will mark the information entered.
7. If the information needs to be changed, just scan another QR code or barcode, then run Step 6 again.



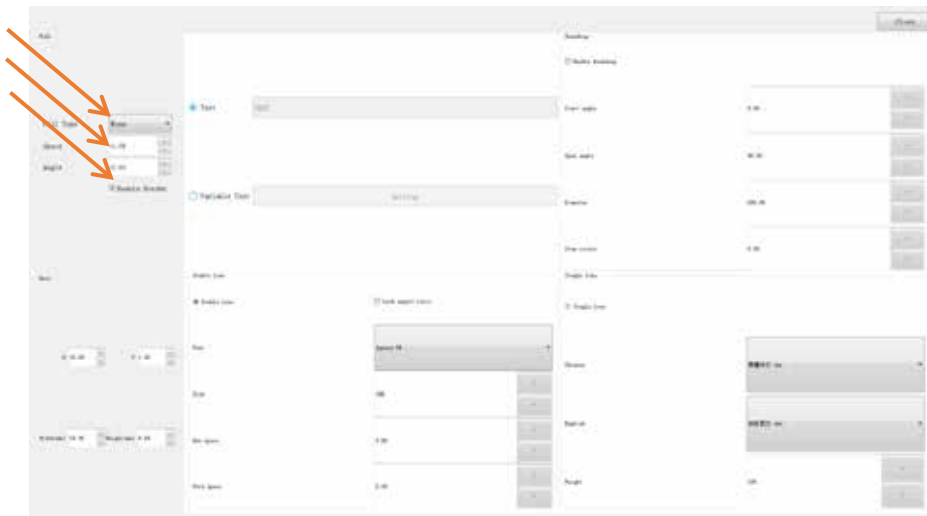
DANGER

**Avoid exposure of the laser radiation to eyes and skin.
Do not direct the laser at people to avoid very serious injuries.**



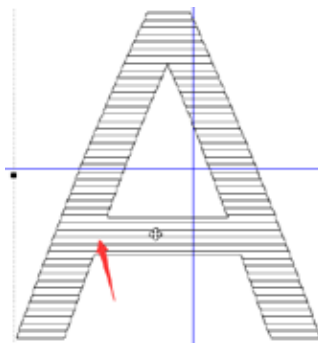
Importing Data via Barcode Scanner

6.7 Filling



Filling the Message

- **Fill Type:** None, Line, Uline
- **Space:** Spacing between filling lines
- **Angle:** Angle of filling lines
- **Cross:** Two fills with different angles
- **Enable Border:** Overall outline



Space: the spacing between filling lines

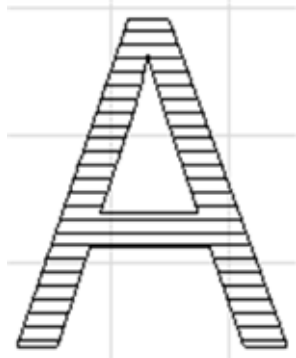


Angle: 0

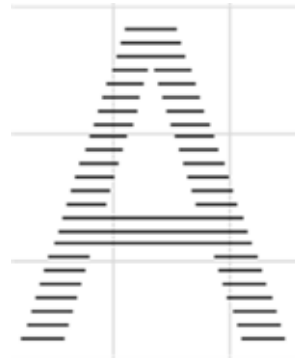


Angle: 30

Description: Filling Angle

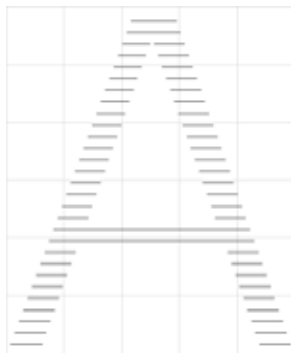


With boarder outline

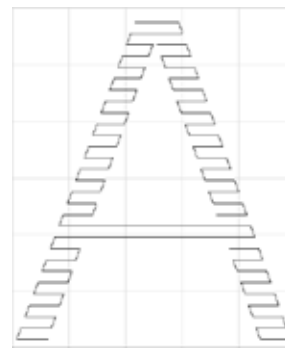


Without Boarder outline

Border (Outline)

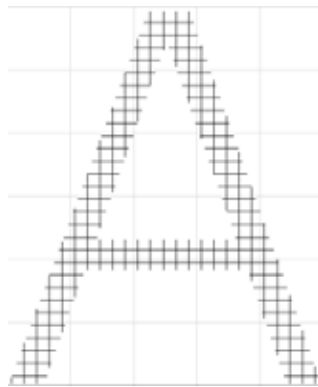


Fill type: Line



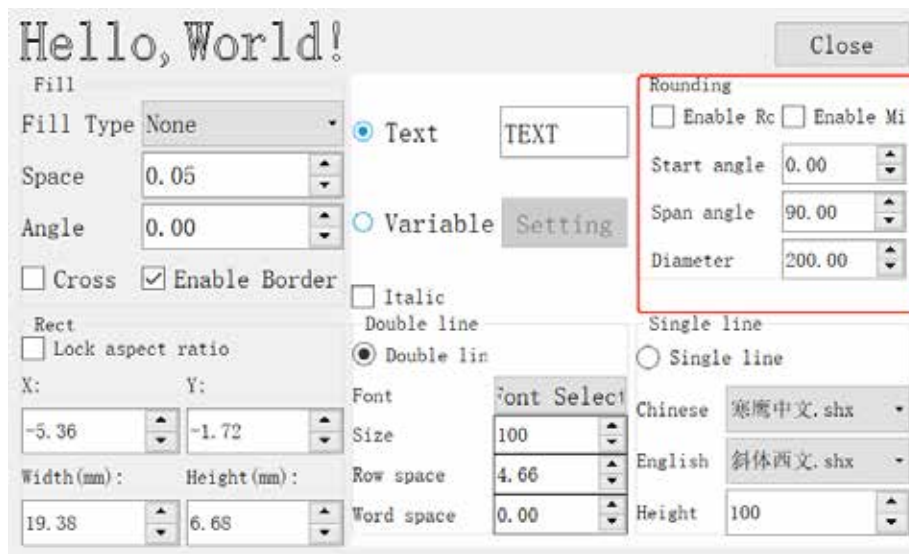
Fill type: Uline

Fill type



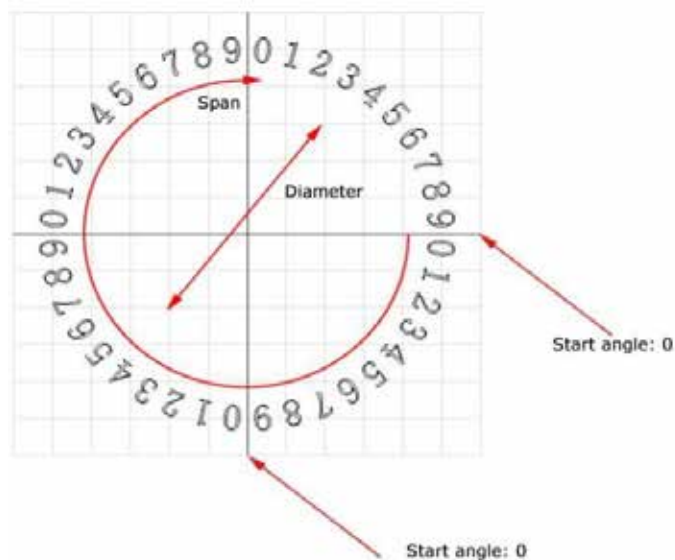
Fill type: Cross filling

6.8 Text on a round path



Setting Text on a round path


- **Enable mirror:** Mirror reverse.
- **Start angle:** Start angle.
- **Diameter:** The diameter of the circle.
- **Span angle:** Describes the portion of the arc on which the text runs (90° = 1 quarter circle, 180° = half circle, 360° = full circle)



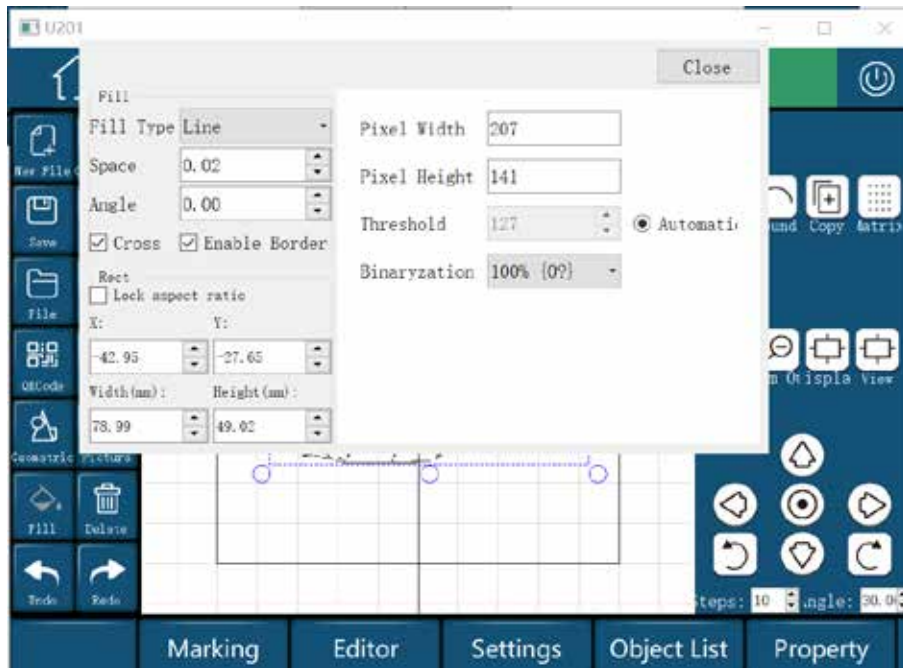
Text Rounding

6.9 Add an Image



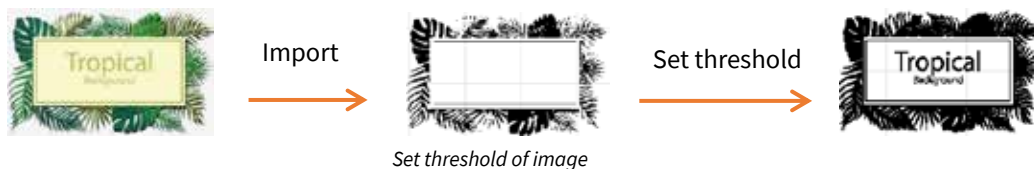
Click  on the Home screen and import the image. NeroForce L-series Lasers only support following picture formats: PLT, PNG, JPG, JPEG, BMP, GIF, PBM.

Note: PLT format is recommended.



Adding an image

- **Fill:** When in image mode, this parameter is not available. If the image format is PLT, it will fill the image object.
- **Rectangle:** X and Y describe the position of the image. Height and width determine the size of the image.
- **Threshold:** Default auto setting. The threshold is used to determine the contrast of the colours in the picture and defines whether a colour is displayed white or black.



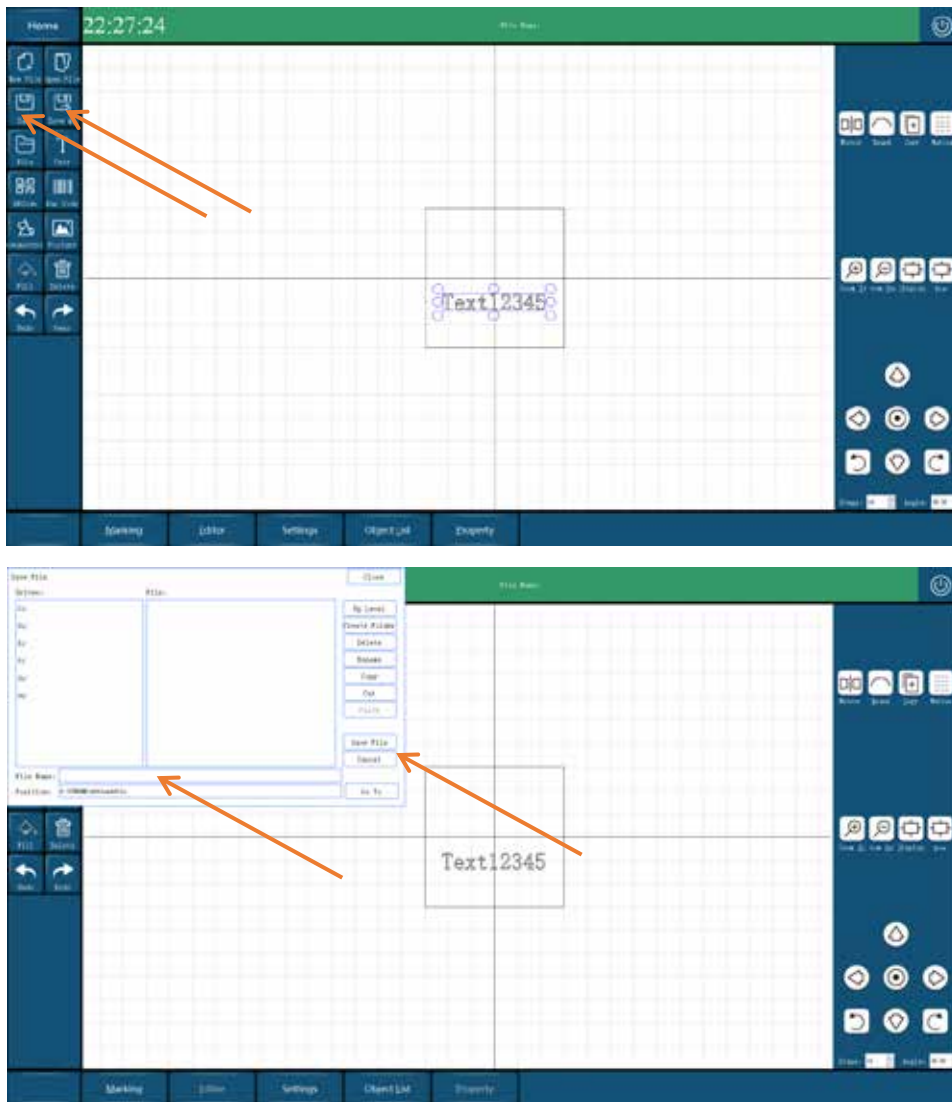
- **Binarization:** Image binarization is the process of taking a grayscale image and converting it to black-and-white, essentially reducing the information contained within the image from 256 shades of gray to 2 colours: black and white, a binary image.



6.10 Save File




Select **Save** to save the current message, enter the file name and then click **Save File**, as shown below:

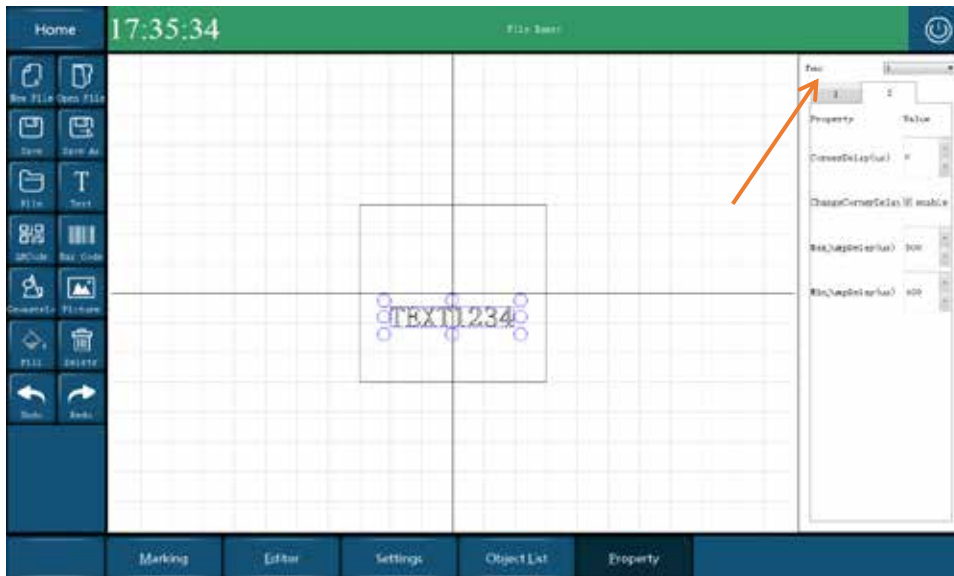
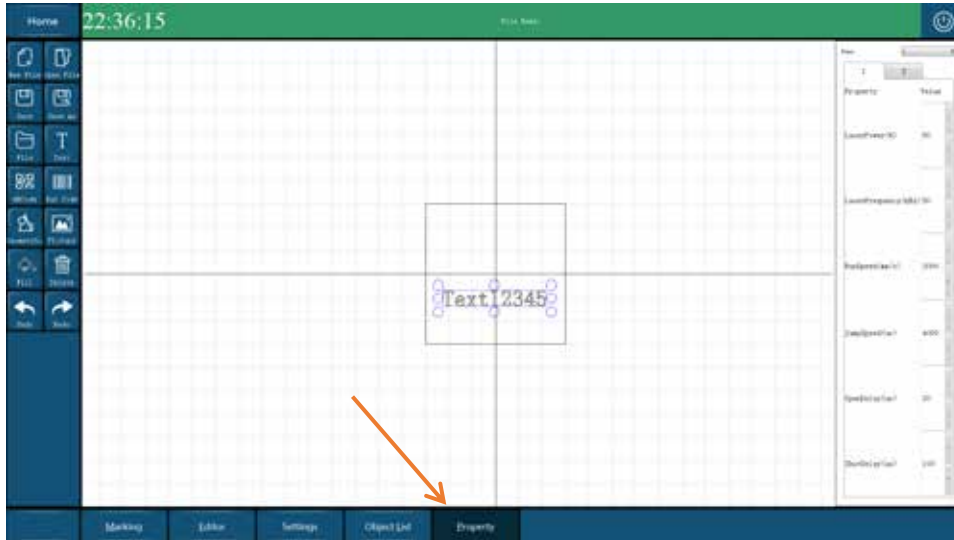


Save file operation

6.11 Properties and Parameters

Select your text, logo or barcode which you want to mark. Then select  on your home screen.

Now you can adjust power, time, etc. of your mark. With the PENS function you can allocate a certain setting to the different contents of your mark. For example, if you want to apply an other setting (power) to the marked logo than for the text. If PENS is active, you see different colours of your content.



Properties of message

6.11.1 Laser Power

Unit: %

Within this section the percentage for the optical output of the laser can be set. The power range is from 0% to 100%. By default, the value is set to 30%. The higher the value, the deeper the marking. However, do never set 100 % to avoid shortening the lifetime of the laser source. It is recommended to set a maximum value of 95 %.

6.11.2 Laser Frequency

Unit: kHz

Set the repetition rate of the laser, the value range is from 1kHz to 100kHz.

The initial value is set to 30kHz at 20W or 37kHz at 30W .

The larger the value and the more the number of light spots are arranged in the unit length, the tighter the mark appears. Appropriate spot spacing is conducive to the adjustment of the effect.

6.11.3 Run Speed

Unit: mm/s

Draw line speed. Sets the speed to be used during marking, the speed range is from 1 to 5000mm/s. The higher the value, the faster the marking time; the lower the value, the longer the marking time. If the mark appears to be faint, reduce the value. When adjusting the speed, pay attention to the corresponding relationship between the power and the frequency. The faster the speed, the higher the frequency must be set.

6.11.4 Jump Speed

Unit: mm/s.

The jump speed is the speed at which the laser jumps from one vector to the next vector. If an object consists of many short polygon strokes, then a large value will make the mark appear distorted.

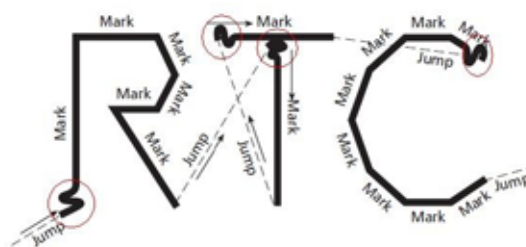
6.11.5 Jump Delay

Unit: ms.

Jump delay is the time for the laser to jump from one character to the next character.

The value range is 1-1000.

The initial minimum value by default is set to 400ms, maximum value is set to 500ms. If the Jump-Delay is too short the galvanometer is not yet stable and there will be a flutter phenomenon within a short period of time after the jump, as shown below.



Jump-Delay too short

If the Jump-Delay is too long it has no negative effect on the visible scanning result.

The marking time will take longer.

6.11.6 Laser-On Delay

Unit: μs

Initial value: 20 μs

Delay time for the laser to start before moving to the correct position.

Laser-On-Delay too short: Burn-in effects at the starting point

Laser-On Delay too long: The vector is not marked from the starting point

6.11.7 Laser-Off Delay

Unit: μs

Initial value: 100 μs

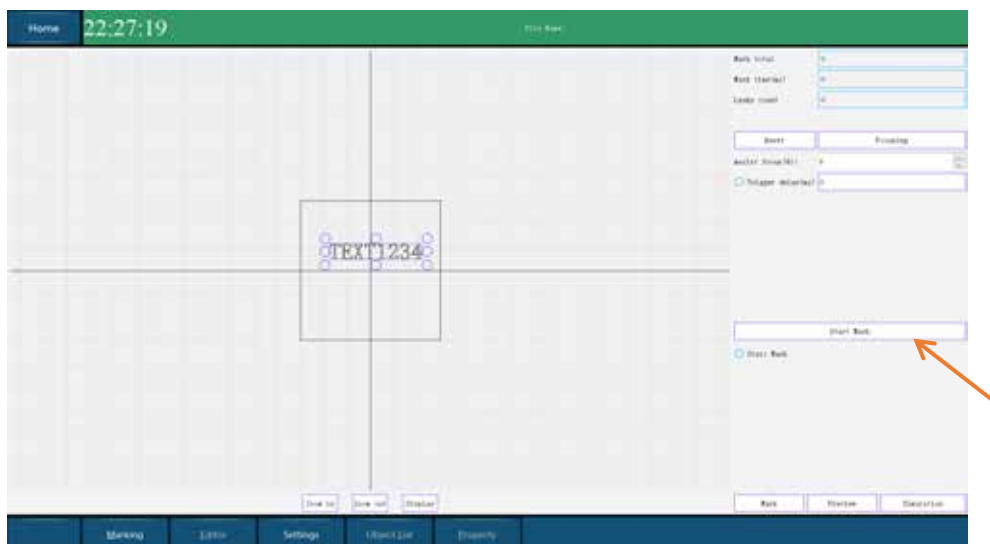
Delay time for the laser to stop before moving to the default position.

Laser-Off Delay too short: The vector is not marked completely

Laser-Off Delay too long: The vector is not marked from the starting point

6.12 Marking

Select **Marking** on the Home screen. Then click **Start Mark**, press the button on the handler and the laser unit will start marking.



Description: Mark & Stop Marking



DANGER

The laser radiation is dangerous to the eyes and skin. Avoid eye or skin exposure to the laser radiation. Do not point the laser at people to avoid accidental laser injury.

6.13 Settings

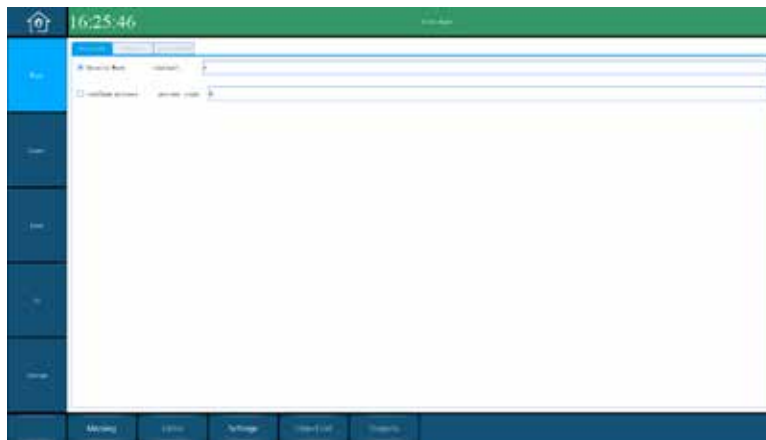
Click **Settings**  on the Home screen.



IMPORTANT

**All the settings are factory set before shipment.
Do not change the settings unless necessary.**

6.14.1 Mark



Setting Mark

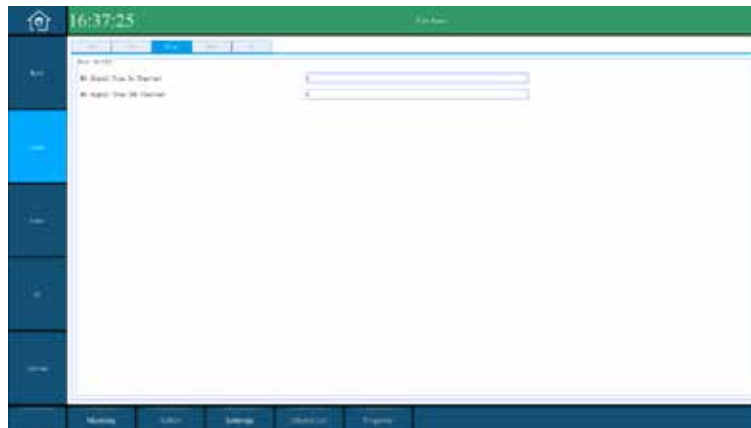
Recycle Mark: For debugging. No need to check.

Time: The pause time for each marking, used in conjunction with continuous marking. The default is 0.

Continue process: Mark multiple times per trigger. No need to check.

Process count: The number of markings per manual and marking trigger.

6.14.2 Laser



Setting Laser

Password: laser

The default option is **Fiber**, do not select other options, otherwise the laser might not work.

NO Signal Turn On Time: Laser gate signal, default is 8000

NO Signal Turn Off Time: Laser gate signal, default is 8000

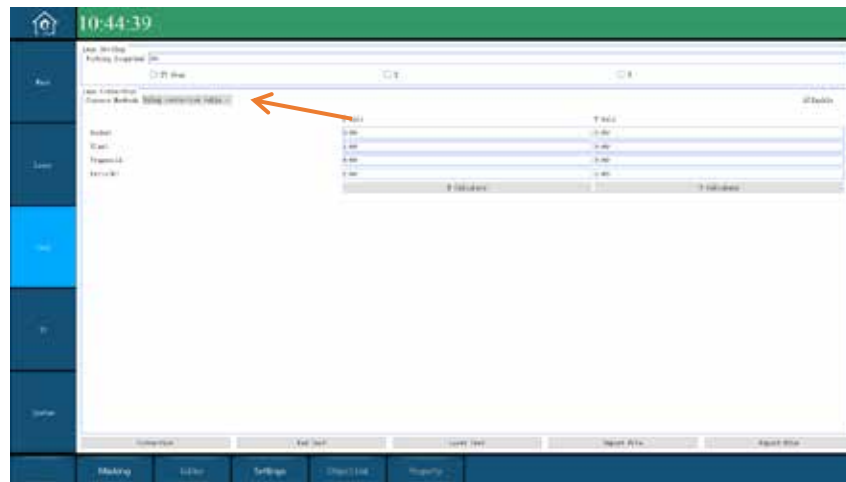
6.14.3 Lens Correction

Password: lens

The lens parameter setting has been done before shipment. Users do not need to correct it after receiving the device.

Select **Settings** Settings on the home screen. Then select **Lens** and enter 100 in the **Working Scope** field. When the machine's working area is 100, click **Enable**.

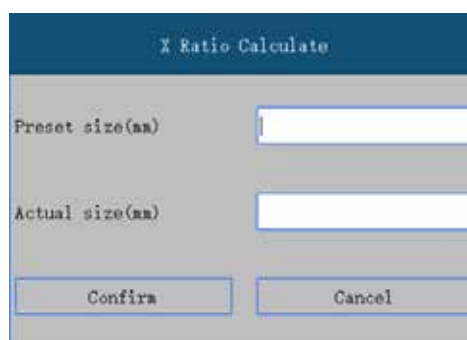
Note: If the Mark field of the machine is 50mmx50mm, enter 50.



Set Working Scope

6.14.3.1 Correction Method #1: Correction Table

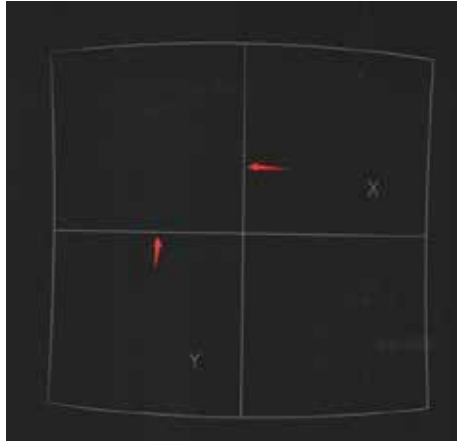
1. First enter the **Working Scope** and go back to the home screen to refresh, and then go back to the interface as shown above.
2. Do not click the **XY Swap**, **X** or **Y** radio button before correction.
3. Click the **Enable** button, then click **Laser test** and the machine will print a '田' shape.
4. Use a straight edge to measure 4 sides, check whether the sides are aligned with the straight edge and the 4 corners are 90° right angles. If there is a deformation, you need to enter the corresponding parameters.
5. Measure the length of the XY axis, click **X Calculate** and **Y Calculate** to input preset size and actual size. The actual size is the measured size, the preset size is always the same as Working Scope (100).

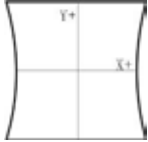
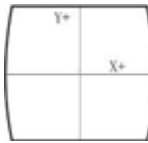
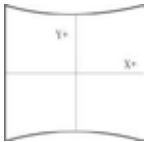
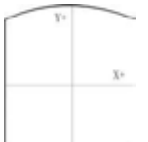






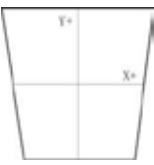
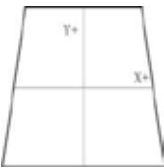
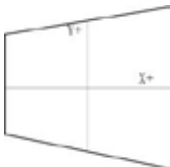
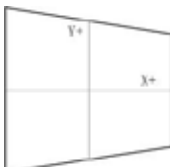
6. Click the **Correction** button and type “laser” in the pop-up window to save the correction.

„Bucket“, „Slant“, „Trapezoid“ Param

The XY axis is shown in the figure below:



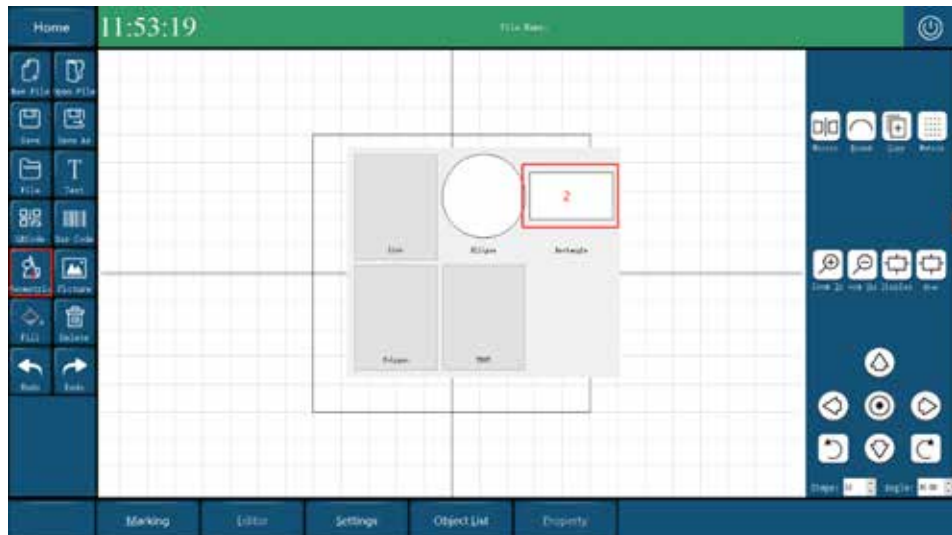
Target Effect		
X-axis bucket deformation correction		Decrease the bucket correction value of the X axis, which can be a negative value
		Increase the bucket correction value of the X axis, which can be a negative value
Y-axis bucket deformation correction		Decrease the bucket correction value of the Y axis, which can be a negative value
		Increase the bucket correction value of the Y axis, which can be a negative value

X-axis Slant deformation correction		Decrease the Slant correction value of the X axis, which can be a negative value
		Increase the Slant correction value of the X axis, which can be a negative value
Y-axis Slant deformation correction		Decrease the Slant correction value of the Y axis, which can be a negative value
		Increase the Slant correction value of the Y axis, which can be a negative value
X-axis trapezoid correction		Decrease the trapezoid correction value of the X axis, it can be a negative value
		Increase the trapezoid correction value of the X axis, it can be a negative value
Y axis trapezoid correction (Trapezoid)		Decrease the trapezoid correction value of the Y axis, it can be a negative value
		Increase the trapezoid correction value of the Y axis, it can be a negative value

6.14.3.2 Correction Method #2: 9 Points Correction

1. Steps to start 9-points correction

- 1) Create a square on the screen.

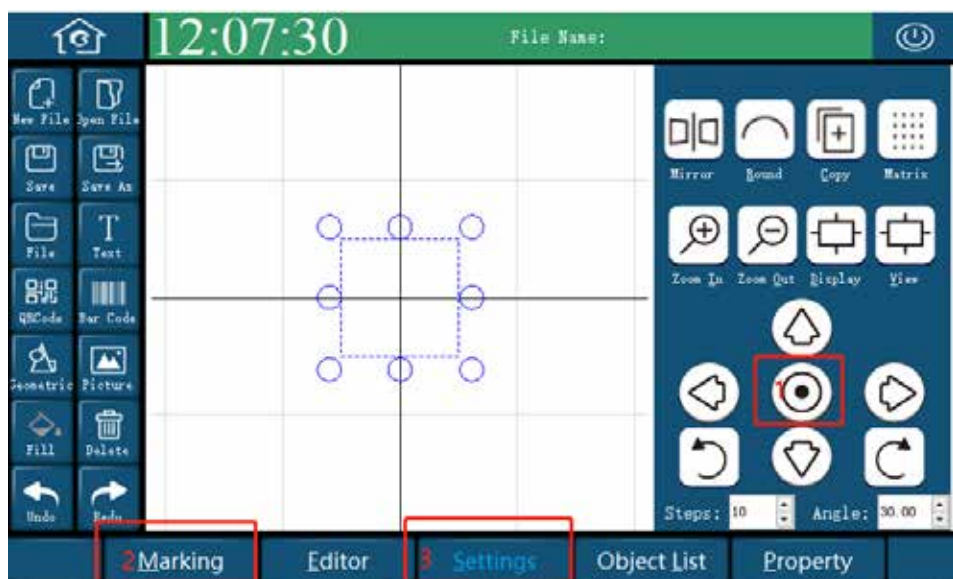


- 2) Center the square, click **Marking**, then click **Settings**

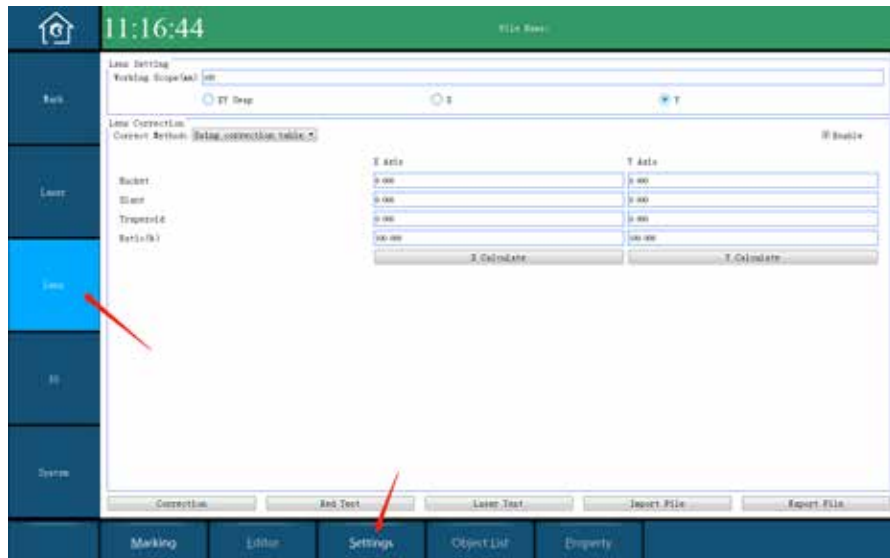


IMPORTANT

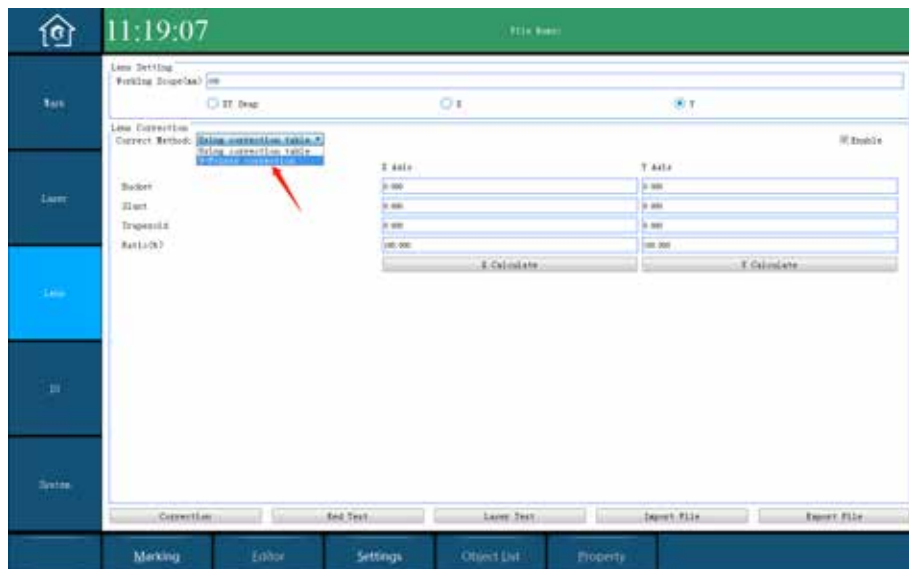
Pay attention to the sequence of steps, do not omit any one of them, otherwise the laser marking may not work properly.



- 3) After clicking **Settings**, enter the setting screen. Click **Lens** and enter the calibration settings. Password is “lens“.



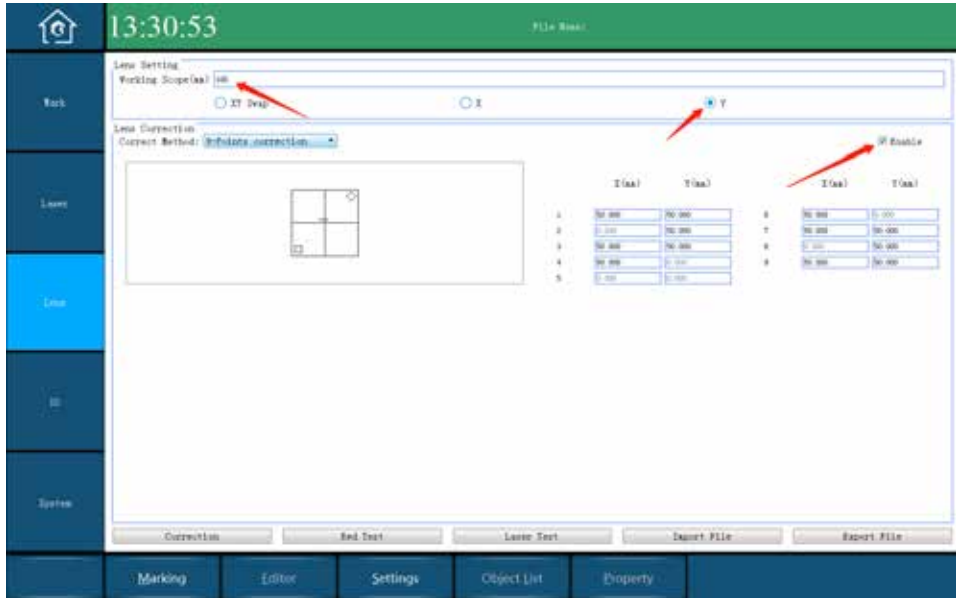
- 4) Select **9-points correction**



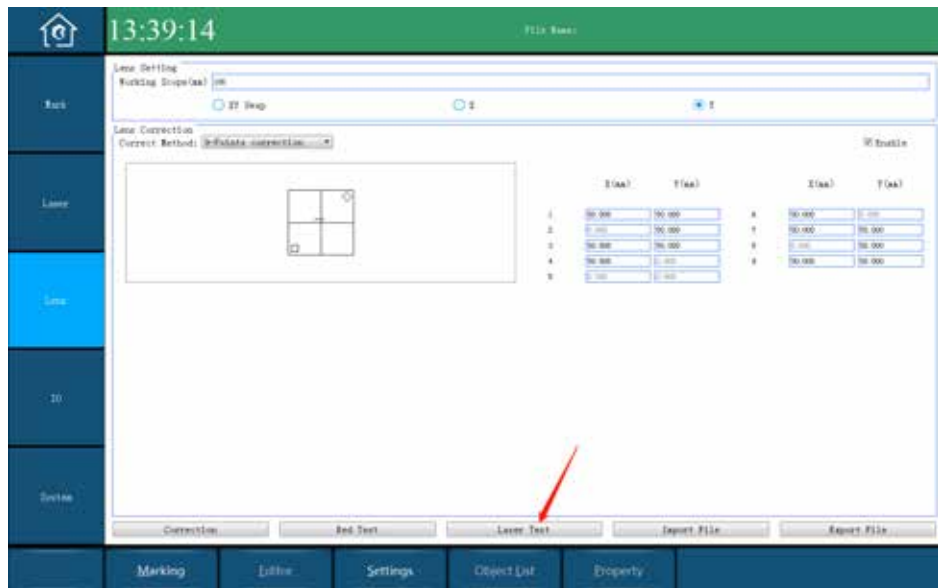
2. Perform the 9-points correction

Note: The more accurate the measured value, the higher the accuracy.

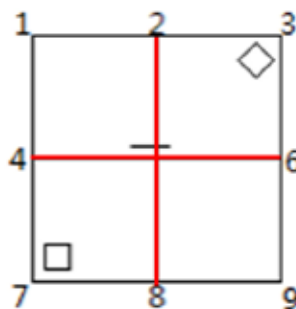
- 1) Enter the marking field parameters 100 or 50
- 2) Check the **Y** and **Enable** checkbox.
- 3) Return to the Home screen, then go back to Lens setting



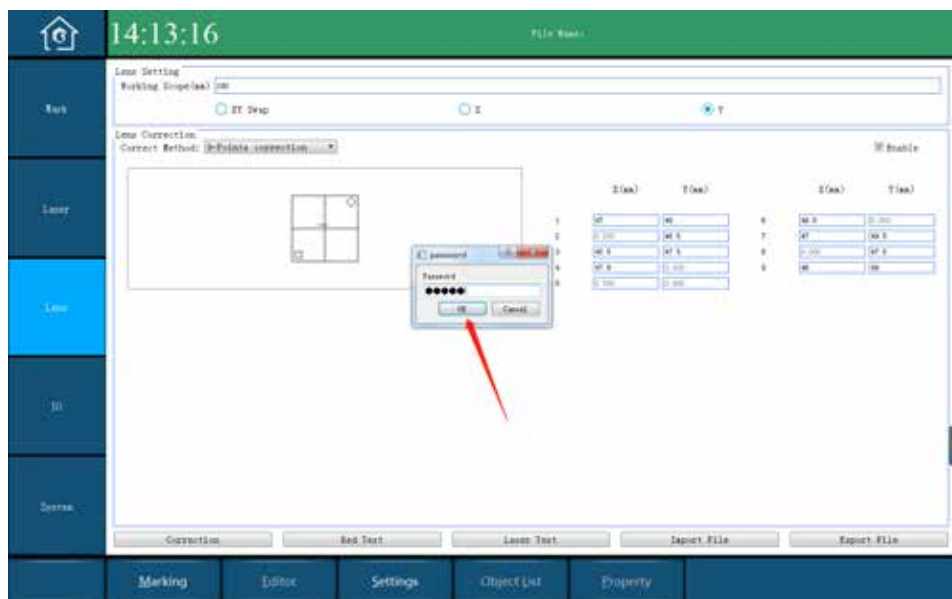
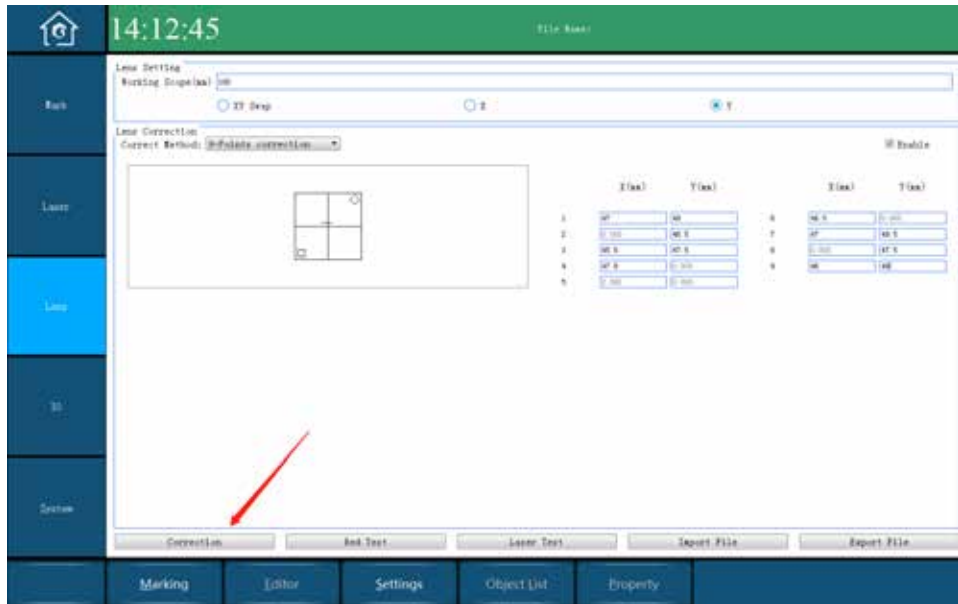
4) Press **Laser Test**, then press the button on the laser head, it will mark a graphic like '田':



5) Get a ruler to measure the XY length of the graphic 田, then enter the length value into the corresponding blank fields.



6) Press **Correction** and enter password “laser“ to save the values.



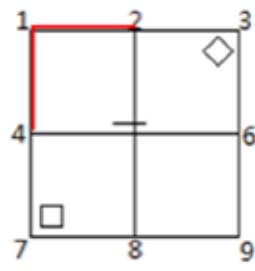
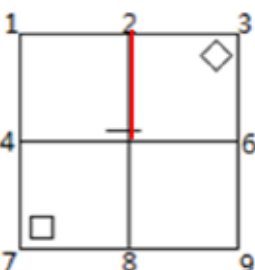
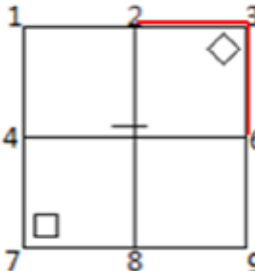
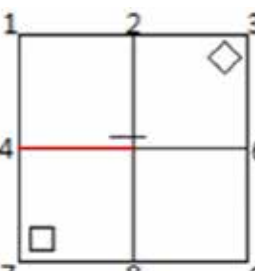
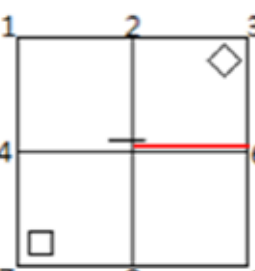
3. Description of 9-points correction

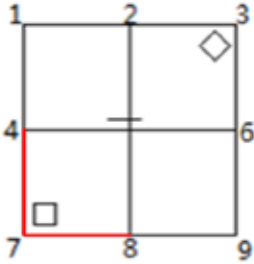
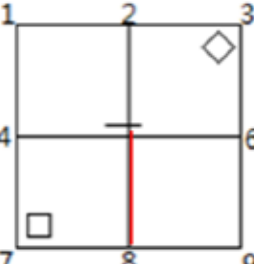
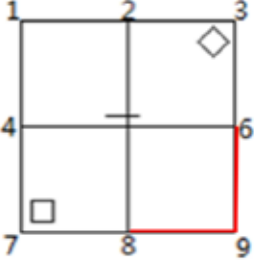
The X axis is the abscissa (horizontal) and the Y axis is the ordinate (vertical). The coordinate length of 9 points is measured based on the cross line in the middle.

Nine-point correction is to measure the X and Y lengths of each point (2, 4, 6, 8 are only a single coordinate. Point 5 is the center, its X and Y coordinate positions are all 0 by default).

All calibrated points can be calibrated twice, the larger the value, the smaller the compensation value.

Tips for second correction: Increase the value first in a larger step, then slowly decrease the values with smaller steps.

<p>Point 1 XY Length</p>	
<p>Point 2 Y Length</p>	
<p>Point 3 XY Length</p>	
<p>Point 4 XY Length</p>	
<p>Point 6 X Length</p>	

Point 7 XY Length	 <p>A 3x3 grid with points labeled 1 through 9. A red path is drawn from point 4 to point 7, then from point 7 to point 8. A small square symbol is at point 7, and a diamond symbol is at point 3.</p>
Point 8 Y Length	 <p>A 3x3 grid with points labeled 1 through 9. A red vertical line segment is drawn from point 4 to point 8. A small square symbol is at point 7, and a diamond symbol is at point 3.</p>
Point 9 XY Length	 <p>A 3x3 grid with points labeled 1 through 9. A red path is drawn from point 8 to point 9, then from point 9 to point 6. A small square symbol is at point 7, and a diamond symbol is at point 3.</p>

6.14.4 I/O

Enable Beep: Set the beep sound when marking (default) and beep time.

The system provides four trigger modes:

Rising Edge: Buzzer sound before manual trigger

Falling Edge: Buzzer sound after manual trigger

Press and hold: User needs to press and hold the button on the handler till the marking is completed

Normally open: This function is used for laser cleaning mode. After clicking **Start Mark** on the screen, a single pressing of the handler button will make the laser start and it will not stop until the button is pressed a second time.

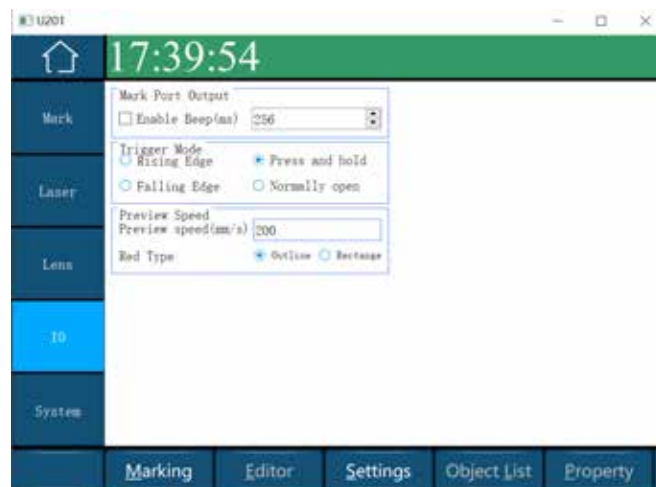


DANGER

The “Normally open” function is designed for laser cleaning mode only, it is dangerous and only to be used by professional personnel. Do not use this function if the machine is used for laser marking.

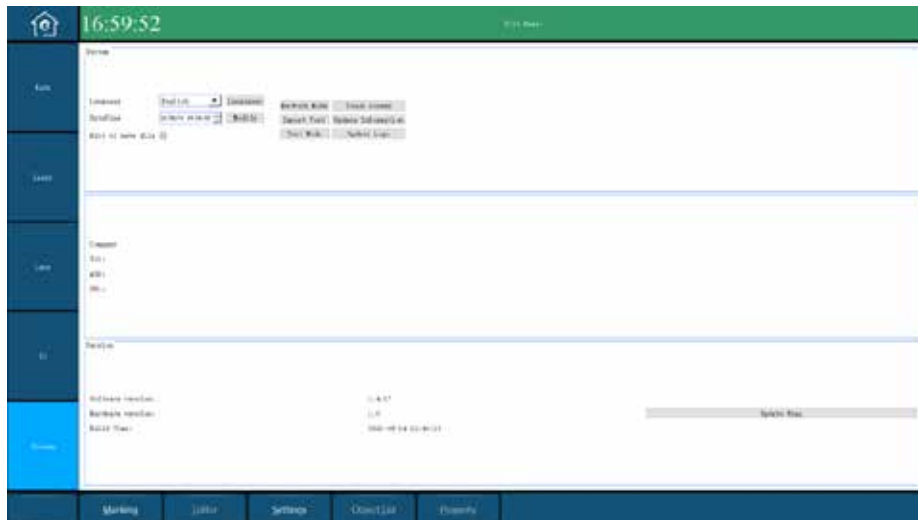
Preview Speed: The red light preview speed. Default value is 200mm/s.

Red Type: Red light preview mode.



Setting I/O

6.14.5 System



Setting System

1. Language Language

Change the language of the software. English, German, Spanish, Italian and French are included by default.

2. Datetime DateTime

The current date and time of the system. User can change the date time. Click **Modify** and click **Exit** to save the changes and let it take effect.

3. Network Mode

View and modify IP address for LAN connection.



Set Network Mode

4. Touch Screen

Touch Screen

Calibrate the touch accuracy of the screen.

Click the **Touch Screen** button Touch Screen and follow the instruction sequence by clicking the 4 crosshairs with the pencil. When finished clicking the last crosshair, the calibration interface exits

5. Import Font

Import Font

Import different fonts from a USB device. The format of the font files is .ttf or shx. Click **Import Font** to find the folder where the fonts are stored in the “Devices“, select the font to be imported, and click **Import**. Click **Exit** to save the changes.



Import Fonts

8. Update Logo

Update Logo

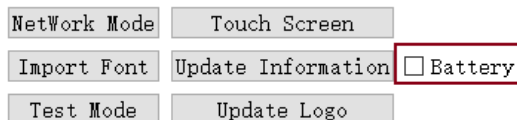
Users can copy and import image files (PNG, JPG, JPEG, BMP) from USB devices. On the Home screen click the **Update Logo** button and enter the password “logo“ to modify the system startup screen logo. Select the logo, then click **Import logo** button.

9. Test Mode

Test Mode

Click the **Test Mode** button and test different functions with the corresponding passwords.

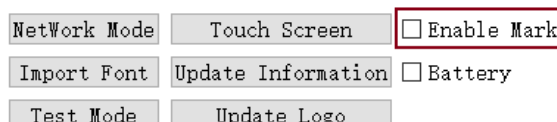
1) Password “power“: Shows battery icon on the upper right corner of the screen.



Test Mode: Power

The battery version is checked by default.

2) Password “mark“: Enables marking function, checked by default.



Test Mode: Mark

3) Password “laser“: Continuous laser output, can be used to test the laser power.



Test, Mode: Laser



DANGER

- **This function is for NeroForce professional personnel only. Do not use this function without permission.**
- **The laser will restart if the emergency button is released. This can be dangerous to the eyes and skin. Avoid eye or skin exposure to the laser radiation.**

First of all, it is mandatory to wear the protective glasses before starting the process. Now the lens can be removed. Open the red light to aim the center surface of the power meter. Now click **Start** then click **OK** in the pop-up window to start the laser. Do not move the head and make sure that eyes and skin are not exposed to the laser radiation.

7 MAINTENANCE

7.1 General Notes

Prior to any operation, the user should read these instructions carefully. The laser system is designed in a way that maintenance can be performed safely.

In order to achieve the best marking results and prevent damage, the regular maintenance of the laser system is very important. It is necessary to establish a maintenance schedule for the laser marking system depending on the working intensity of the equipment and the characteristics of the marked products.



CAUTION

The laser marking system must be installed and operated by authorised and specifically trained personnel only.



DANGER

Before performing any maintenance on the laser marking system, ensure that the system is completely shut down by disconnecting from the power supply.

7.2 Maintenance Procedures

7.2.1 General Maintenance Procedures

1. Disconnect from the main power.
2. Clean the lens when finished using the laser marking system, then cover the lens. Remove dust on the surface of the lens by blowing air with a rubber squeeze bulb (refer to 7.2.2).



CAUTION

In any case, the lens of the device should be protected from smoke, dust, water, oil, scratches and fingerprints. Always keep the device clean.

3. Clean up the dust accumulated on the air vents and the surface of the machine housing weekly.
4. If the device will not be used for a long period of time, first of all, make sure that the device is switched off. Secondly, it is important to cover the laser head and the control unit with a cover cloth to avoid dust accumulation. Store the device in a dry area.

7.2.2 Clean the Lens



DANGER

Ensure that the system is completely shut down by disconnecting from the power supply.

Note that any dirt, dust or other contaminants on the surface of the beam exit can absorb laser energy and burn into the surface. This can cause damage to the optical elements. The warranty does not cover any damage due to improper use, cleaning or handling.

1. Before cleaning, ensure that the laser system is shut down and can not be turned on accidentally.
2. Use clean gloves or finger cots. Avoid touching the mirror with fingers as fingerprints can contain aggressive substances that can damage the optical surfaces.
3. If dust particles are on the mirror, remove them by blowing air on the mirror surface with a rubber squeeze bulb.
4. If the lens surface is still not clean, use a cotton ball or swab with high-purity isopropanol or acetone to uniformly clean the surface. Don't use too much solvent, otherwise drying marks might appear.
5. If the dust cannot be removed by air, or if there is a more serious contamination, contact **NeroForce** for guidance. In extreme cases, the lens must be replaced.

NeroForce recommends to clean the lens by blowing air not less than once per day. Obviously, the cleaning frequency depends on the specific environmental conditions of the production site. If there is a lot of smoke and particles on the production site, the lens will get dirty faster, which requires more frequent cleaning. Each user should establish corresponding cleaning requirements in line with the production situation.

8 TROUBLESHOOTING

If any problem occurs while using the device, verify that all operating instructions have been adhered to. After that, carry out following troubleshooting procedures:

NO.	Problem	Possible cause & Remedy
1	The equipment does not start when powered on	<ul style="list-style-type: none"> • Check whether the circuit is short-circuited. • Check whether the circuit is loose. • Check whether the battery (power supply) is powered.
2	Laser does not emit light	<ul style="list-style-type: none"> • Check whether the laser is switched on successfully. • Check whether the focal length is correct. • Check whether the laser lens is blocked by foreign matters or remove the dust protection cap. • Check whether the system control line is loose. • Check whether the laser control line is loose.
3	The galvanometer does not swing	<ul style="list-style-type: none"> • Check whether the motor on the galvanometer vibrates. • Check whether the two motors on the galvanometer are tight.
4	Screen problem	<ul style="list-style-type: none"> • If the screen is not lit, check whether 24V power supply is connected. • Check whether the cable is loose or broken. • Check whether the screen is cracked. • If the touch screen is not effective, check if the touch cable has deep creases and whether it is loose or broken. • If the screen is black and only the cursor is visible, upgrade the software again • If the touch screen does not work, the software will re-calibrate the screen
5	The software control does not emit light	<ul style="list-style-type: none"> • Check whether the pen number parameters are normal (power, frequency). • Check whether the laser drive is selected normally • Click Settings > Laser (pw: laser). Check whether “Fiber” is selected.
6	Font printing broken and has deformation	<ul style="list-style-type: none"> • Adjust the frequency and scoring speed. • Check whether the galvanometer correction is normal. If not, correct it again.

9 APPLICATION AREAS



Hardware



Pharmaceutical



Cosmetics



Domestic appliances



Electronics



Tyres



Conveyor belts



Tools

10 MARKING TYPES



Logos



Dates



Barcode



QR code



Graphics

11 MARKING MATERIAL

Fiber Laser



Copper



Aluminum



Rubber

Solid State Laser



Wood



MDF



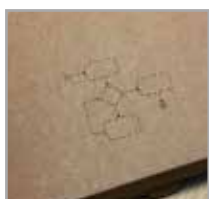
Leather



Stainless Steel



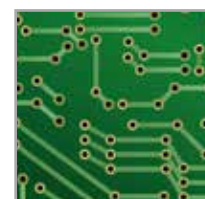
Industrial plastics



Printed carton



Ceramics



PCB



Lacquered components

12 ACCESSORIES

Stand (table version)

The stable, high-quality design allows precise labelling of smaller workpieces.

Safety goggles (L-PG.3.0)

The safety goggles reduce the risk of eye injury due to reflective rays. However, they do not guarantee 100% protection from the laser radiation, which is why **we strongly advise against looking directly into the laser beam** (even with protective goggles).



Safety glasses according to DIN EN207 / 2017LB Protection values: 190-420&850-1300&10600mm - OD7+ / CE Certified

Battery for battery models

Lens & Cover Kit 50 & 100

To ensure the performance and safety of the laser, the lens and protective cover should be replaced regularly.

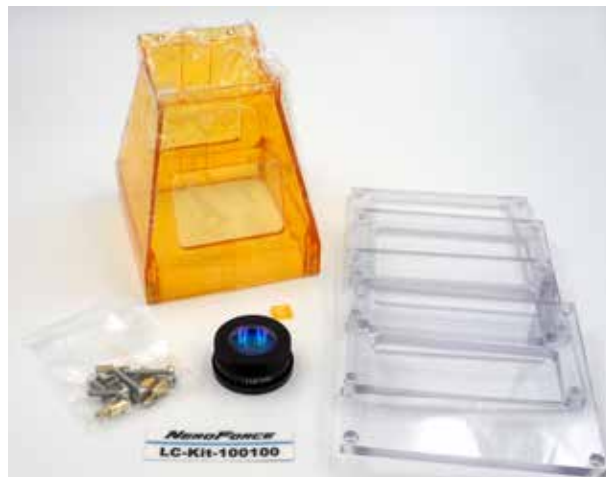
Scope of delivery:

Protective cover

4 pcs. stencils

Lens for focal length (50 or 100)

Screw set



WARNING

Use of the laser marker can cause serious injury if the unit is not used as instructed. Please follow the operating instructions carefully and be extremely careful when directing the laser beam.

NeroForce GmbH accepts no liability for self-inflicted or negligent injuries.

Please note:

- Laser class 4 product
- High power material processing laser
- Country-specific safety regulations must be observed. (Germany: When operating laser equipment of class Class 3R and higher, the operator must appoint qualified persons as laser safety officers in accordance with the safety officers in accordance with the Occupational artificial optical radiation.





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