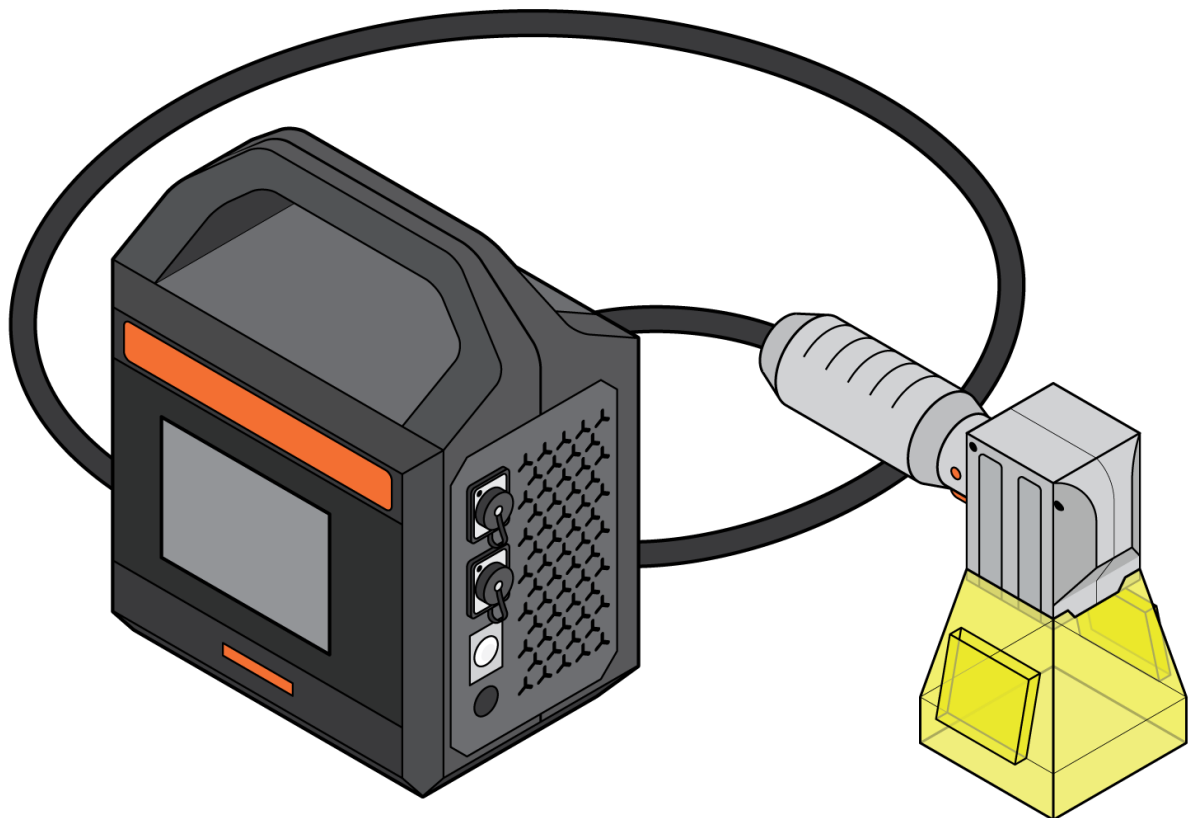




Cougartron MK300

Hand-held Laser Marking Machine

User Guide



Original instructions

Read this guide before using the equipment

Retain this guide for future use

Published on: 26 September 2024

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Purpose of manual

This manual enables safe and efficient use of Cougartron MK300 laser marking machine. This manual is part of the device and must be stored where it is always accessible to operating personnel.

The operating personnel must carefully read and understand this manual prior to beginning any work. The basic prerequisite for safe work is compliance with all safety instructions and operating instructions in this manual.

The local occupational safety regulations and general safety regulations for the area of application of the device also apply.

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Contact address

Cougartron ApS.

Brydehusvej 23

2750 Ballerup, Denmark

sales@cougartron.com

+45 4346 2010

Contents

1 Safety information	5
1.1 Safety notices	5
1.2 Intended use	6
1.3 Safety symbols	6
1.4 Associated safety labels and warnings	7
1.5 Laser safety requirements	7
1.6 Other requirements	9
1.7 Residual risks	10
1.7.1 Fire Risk	10
1.7.2 UV radiation	10
1.8 Responsibility of the owner	11
1.8.1 Owner responsibilities	11
2 Hardware description	13
2.1 Overview	13
2.2 Main parts	14
2.3 Dimensions	15
3 Getting started	17
3.1 Unpacking the device	17
4 Software and operating instructions	19
4.1 Home screen	19
4.2 Keys and functions	22
4.2.1 Creating new text	22
4.2.2 Editing a message	22
4.2.3 Add a new fixed message	23
4.2.4 Add a new variable	24
4.3 Filling	28
4.3.1 Types of filling	28
4.4 Creating QR codes	29
4.4.1 QR code direction settings	30
4.4.2 Displaying bar code text (this function is not available for QR codes)	30
4.4.3 QR code filling	31
4.5 Saving file	32

5 Operating properties and parameters	35
6 Initiate marking	37
7 Lens correction	39
8 Machine specifications	41
Index	43

1 Safety information

Welcome to the MK300 laser marking machine user manual.

Before operating the laser equipment, please read this manual thoroughly to fully understand the hardware and software operations, precautions, and daily maintenance requirements for the laser marking system. In the event of technical issues during daily operations, please refer to the manual for quick troubleshooting. If you have any questions, do not hesitate to contact our technical staff

This section provides an overview of all safety aspects for the protection of people as well as safe and uninterrupted operation. Other task-related safety instructions are included in the specific sections.

1.1 Safety notices

The following safety notice formats are used in this manual. Safety notices are used at the start of sections or embedded in operating instructions.

Ensure you fully understand and comply with the notices in this manual.



DANGER

Risk of death!

Indicates a hazardous situation which, if not avoided, will almost certainly result in death or serious injury.



Caution

Risk of injury!

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



WARNING

Risk of serious injury or death!

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Additional information relating to the current section.

**Notice**

Indicates an important situation which, if not avoided, may seriously impair operations.

1.2 Intended use

This system is a high-performance laser marking solution, developed by our team of industry experts. It features an attractive design, comprehensive functionality, reliable quality, stable performance, and ease of use, all of which will enhance your work efficiency and provide significant commercial benefits.

1.3 Safety symbols

To draw attention to special hazards, the following symbols are used in this manual.




Table 1 - Safety symbols

Symbol	Meaning
	Electrical hazards and electrical shock hazards
	General warning
	Heavy objects or equipment
	Fire hazard
	Corrosive substance
	Trip hazard
	Hot surface
	UV radiation

1.4 Associated safety labels and warnings

To draw attention to special hazards, the following symbols are used in this laser equipment.

Table 2 - Safety labels and warnings

Symbol	Meaning
	Avoid eye or skin exposure to direct or scattered radiation
	<p>Class 4 Laser product DANGER - Invisible Laser radiation Avoid eye or skin exposure to direct or scattered radiation Class 4 Laser product</p>
	<p>Avoid exposure Invisible Laser radiation is emitted from this aperture</p>

1.5 Laser safety requirements

You must adhere to the Laser safety requirements mentioned below:

- The laser beam must be used in a controllable area.
- The laser beam must terminate on a diffuser—a reflective material with an appropriately colored surface to minimize the risk of radiation exposure.
- If the above requirements cannot be met, wearing glasses for protection from laser radiation is a must.



The MK300 is equipped with a Class 4 laser. Both direct and indirect contact with the laser beam, including reflection off surfaces, as well as uncontrolled or faulty diffusion mechanisms, can result in personal injury or even fire. The following rules and regulations must be strictly observed.

- The laser equipment must be installed, maintained, and operated by trained authorized personnel.
- The place where the laser marking system is operated must be marked with warning signs.
- Operating the laser device with any parts removed or broken, or with the surface detection system disabled, can be extremely hazardous.

- All eyewear should be properly certified and have a minimum optical density of 4.1 at 1064 nm (marked as 1064 D LB7). Wearing protective goggles with appropriately filtering optics is always recommended to shield your eyes from reflected or scattered laser light, as well as from direct exposure to the laser beam in case of an emergency.
- When using the laser on glass, be aware that the beam passes straight through the material.
- Carbon plates or other refractory materials of sufficient thickness should be placed where the laser beam ends. However, it should be noted that the surface of some materials may be vitrified by long- term irradiation, which may cause false reflection.

1.6 Other requirements

Apart from the Laser safety requirements mentioned above, you must be careful about the other requirements mentioned below:



WARNING

Danger due to misuse!

Misuse of the device can result in hazardous situations.

- The laser marking machine must have a proper grounding protection. The MK300 is delivered with a standard three-prong plug (live, neutral, and ground), ensuring optimal safety. Avoid using two-prong adapters or plugs, as this can lead to insufficient grounding and increase the risk of electrical hazards, especially in case of a fault.
- The laser marking machine generates heat when working, please use it in a well-ventilated place.
- Do not use the laser marking machine in a closed environment or a place without any ventilation devices.
- To reduce the risk of fire, electric shock and damage, please do not expose the laser marking machine to rain, and protect it from damp and splashing water. Ensure that no objects containing liquids are placed on the laser marking unit.
- The laser marking machine should never be used on highly reflective objects, such as mirrors, metals with polished surface, etc.
- Never look directly at the laser beam.
- Avoid direct exposure of your skin to the laser beam, as it can cause serious burns.
- Machine operators must conduct necessary training and guidance.
- Before working in front of the laser, use an infrared detector or energy detector (IR viewer) to verify that the laser beam is off.
- Never block the output beam or its reflection with any part of your body.

1.7 Residual risks

The device incorporates the latest technology and complies with current safety requirements. Nevertheless, there are some residual risks that require your attention. The following section lists the residual risks and the measures that result from them.

1.7.1 Fire Risk



WARNING

Risk of fire or flammable materials!

- For a Class 4 laser, even the reflected beam constitutes a fire risk.
- It is recommended to have a procedure to ensure that no flammable materials are present within a distance from the laser where accidental exposure to the class 4 emissions could occur during laser operation.
- For the marking laser, we would recommend including a warning that the laser must not be used in the vicinity of flammable materials, and that any smaller items to be marked must be placed on a suitable, nonflammable and heatproof surface.

1.7.2 UV radiation



WARNING

Risk of UV radiation!

Heating certain materials during the marking process can potentially generate both UV and intense visible light. However, this light is diffused and follows the principles of Lambertian distribution. The small size of any potential gaps below the shield should ensure that any escaping UV light does not pose a hazard for short-term, accidental exposure. Nonetheless, stray UV radiation may still be present, so avoid direct viewing of the marking process.

1.8 Responsibility of the owner

The owner is the person who operates the device for commercial or business purposes or allows a third party to use the device and bears legal responsibility for the product during operation for the protection of the user, personnel or third party. Note the device is not designed for use on power generators or step down transformers.

1.8.1 Owner responsibilities

The device is used for commercial purposes. The owner of the device is therefore subject to the legal responsibilities for occupational safety.

In addition to the safety instructions in this manual, the applicable safety regulations as well as occupational safety and environmental regulations must be implemented for the area of application of the device.

This applies to the following:

- The owner must be informed of the applicable occupational safety regulations and conduct a risk assessment to identify any additional risks that may arise due to the special working conditions at the device location.
- This information must be implemented in the form of operating instructions for the operation of the device.
- During the entire period of device use, the owner must ensure that the operating instructions created reflect the current state of policy and adjust them if necessary.
- The owner must clearly regulate and define the responsibilities for operation, troubleshooting, maintenance and cleaning.
- The owner must ensure that all persons who work with the device have read and understood this manual.
- The owner must also train and inform personnel of hazards at regular intervals.
- The owner must provide personnel with the required protective equipment and must ensure that personnel wear the required protective equipment.
- The owner must ensure adequate ventilation of the installation site around the device and work area.
- The owner is also responsible for ensuring that the device is always in good working order. The following therefore applies:
 - The owner must ensure that the maintenance intervals described in this manual are observed.
 - The owner must ensure that the required fire protection measures are always compliant and functional.

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2 Hardware description

To operate the Cougartron MK300 laser marking machine (device), you should be familiar with the descriptions of the machine parts and systems.

2.1 Overview

The MK300 is a compact and portable laser marking machine suitable for off- and on-site work. Equipped with an advanced JPT laser generator, it provides consistent, and high-resolution marking results on a variety of surfaces.

2.2 Main parts

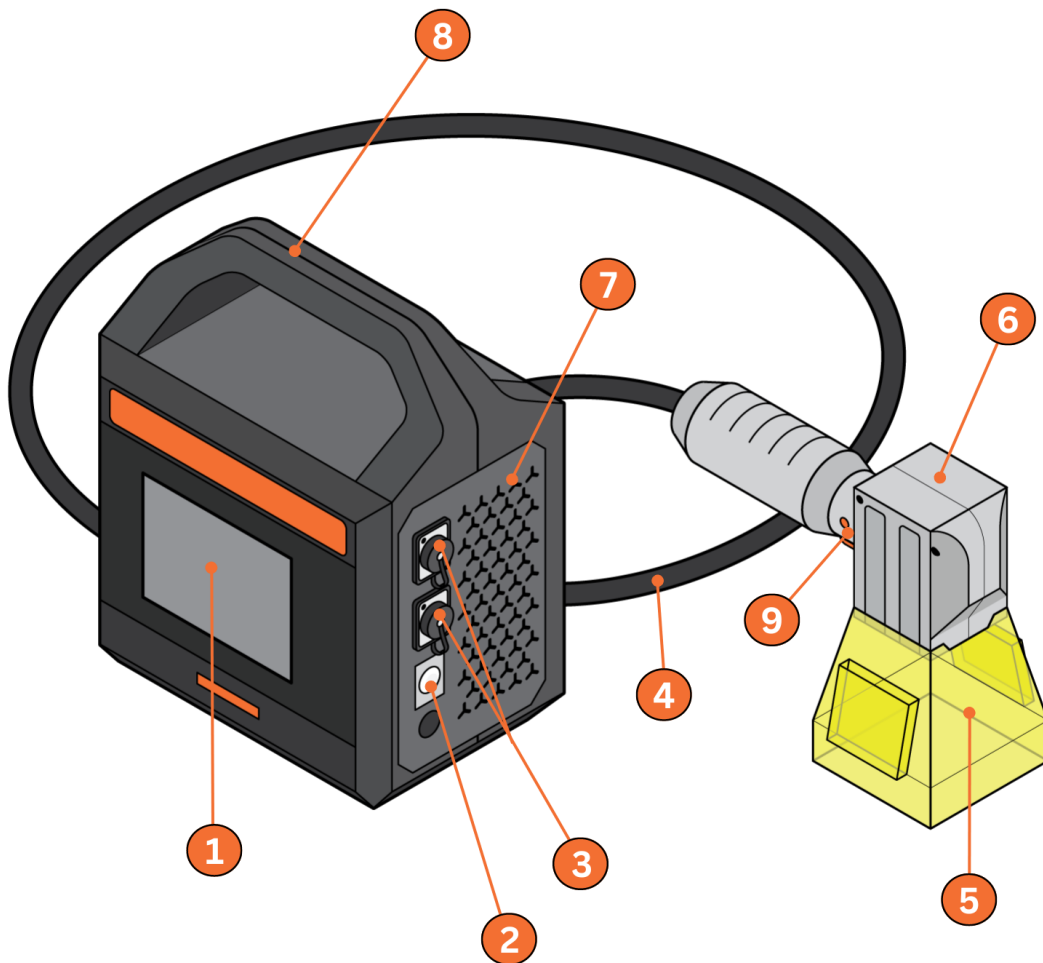


Figure 1 - MK300 main parts

- | | |
|---|----------------------|
| 1 | Touch screen |
| 2 | Power switch |
| 3 | USB port |
| 4 | Cable |
| 5 | Bracket |
| 6 | Laser marking head |
| 7 | Air vent |
| 8 | Handle |
| 9 | Start marking button |

2.3 Dimensions

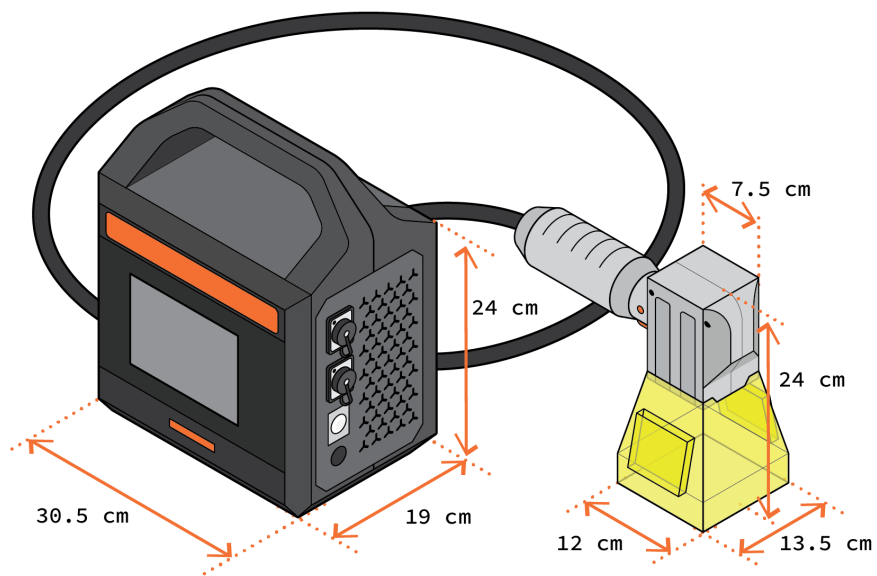


Figure 2 - Main device dimensions

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3 Getting started

This section describes the initial steps required to start using the device.

3.1 Unpacking the device

It is important to keep the following information in mind while unpacking the device:

1. Unpack the device.
Dispose of the packaging correctly.
2. The following items are the minimum required to operate the device:
 - Machine unit
 - Laser marking head
 - Main lead with handle
 - Operating user manual

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4 Software and operating instructions

This section describes the software application and the instructions to use the application.

4.1 Home screen

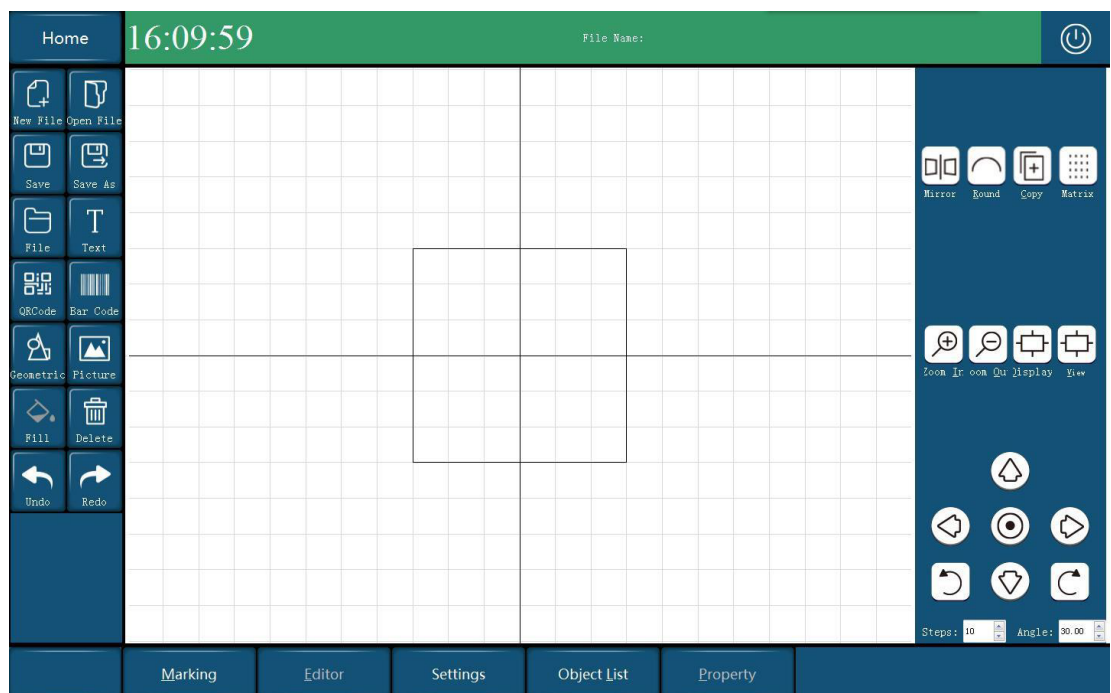






































Table 3 - Home screen menus

Menu	Description	Menu	Description
	Turn off		Add New Picture
	Add New File		Barcode
	Add Text		Save
	2D Code/QR Code		Geometric
	Filling		Mirror
	Text Arc Layout		Display Object
	Zoom Out		Zoom In
	Array Setting		View
	Rotate 30° to the left		Rotate 30° to the right
	Delete		Copy
	Object Centered		Object Up
	Object Undo		Object Left
	Object Redo		Object Right

Menu	Description	Menu	Description
	Open File		Object Down
	Save As File		Return to Home Screen
	Marking		Object List
	Settings		Edit Object
	Property		Real Time

4.2 Keys and functions

4.2.1 Creating new text

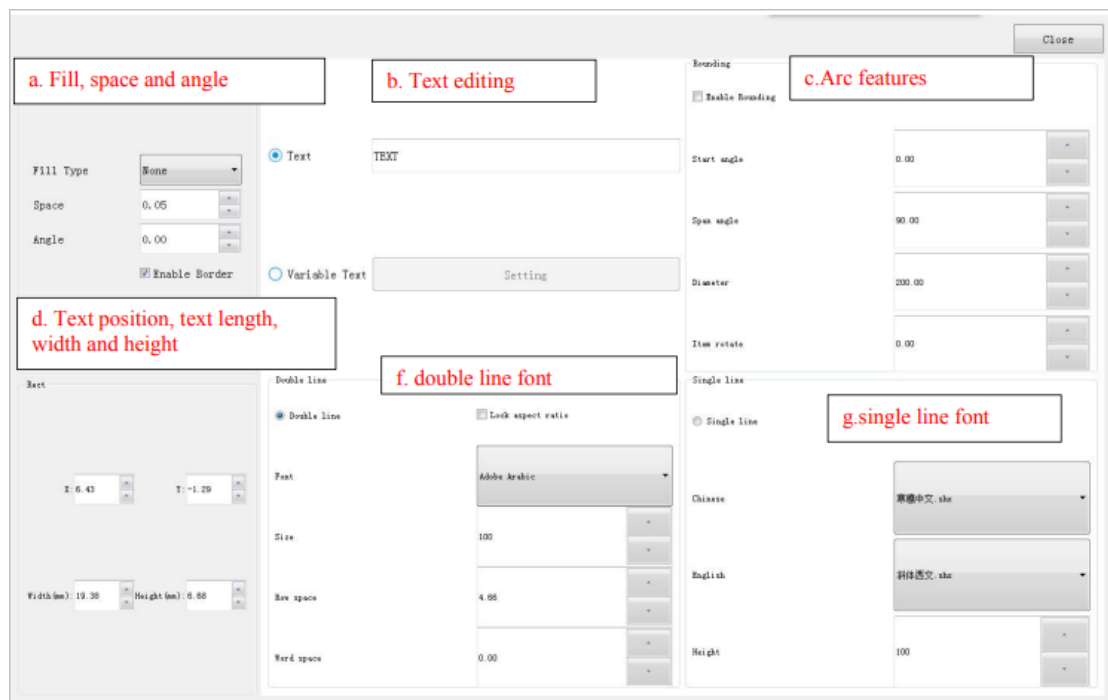
Select **Add New File > Text**, select the specific screen area, and then, select **Editor** at the bottom of screen to edit the text, as shown below:



4.2.2 Editing a message

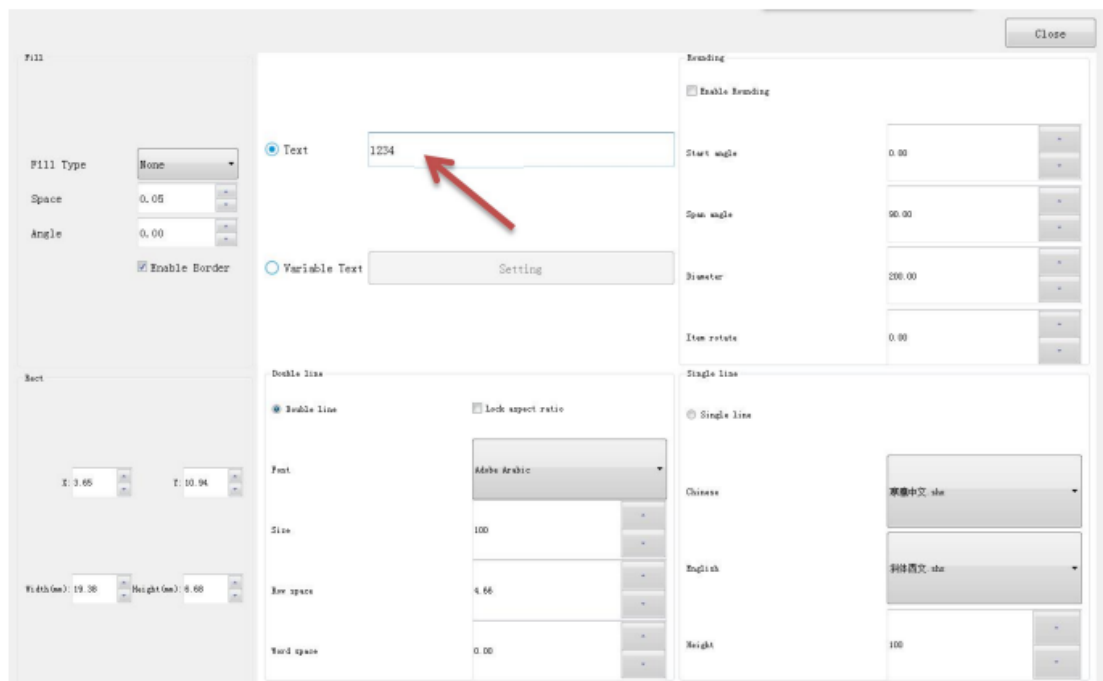
Select **Editor** to enter the interface show as below, edit the text and select the features for the text:

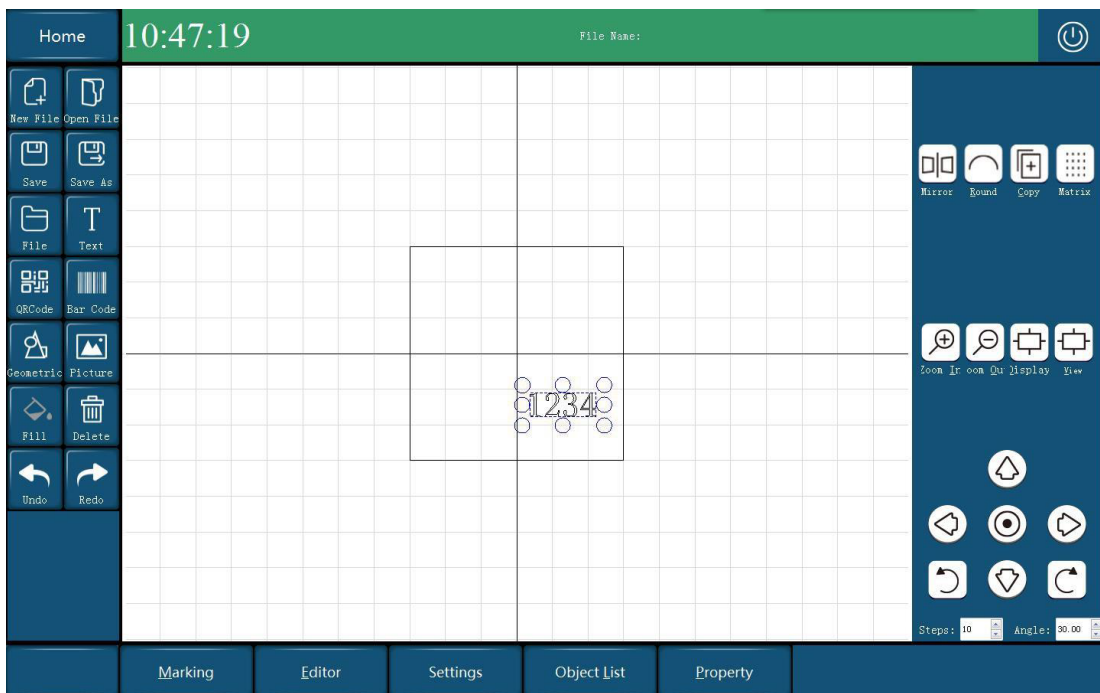
- a. Fill, space and angle
- b. Text editing
- c. Arc features
- d. Text position, text length, width and height
- f. Double line font
- g. Single line font



4.2.3 Add a new fixed message

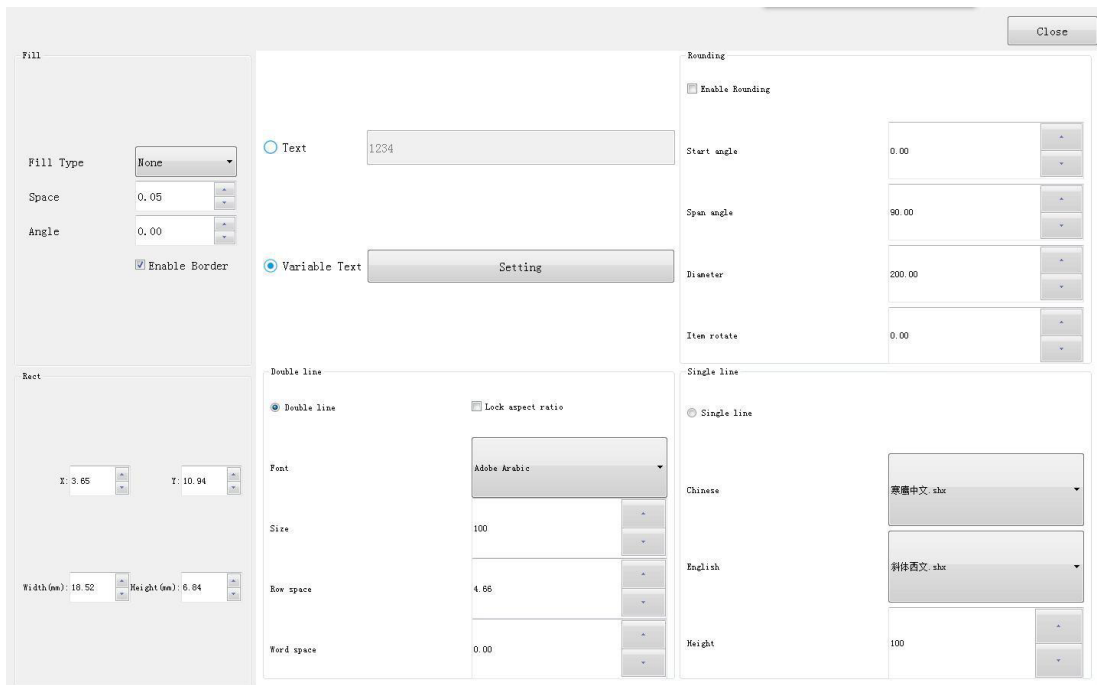
Select **Text >Editor**, edit your text, shown as following:

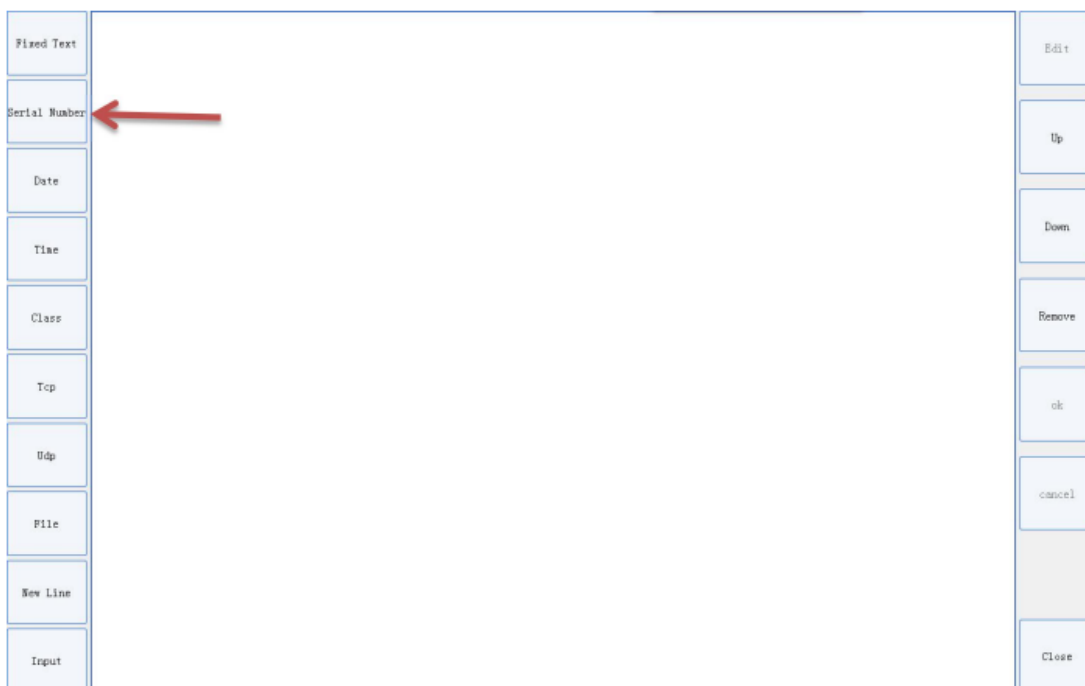
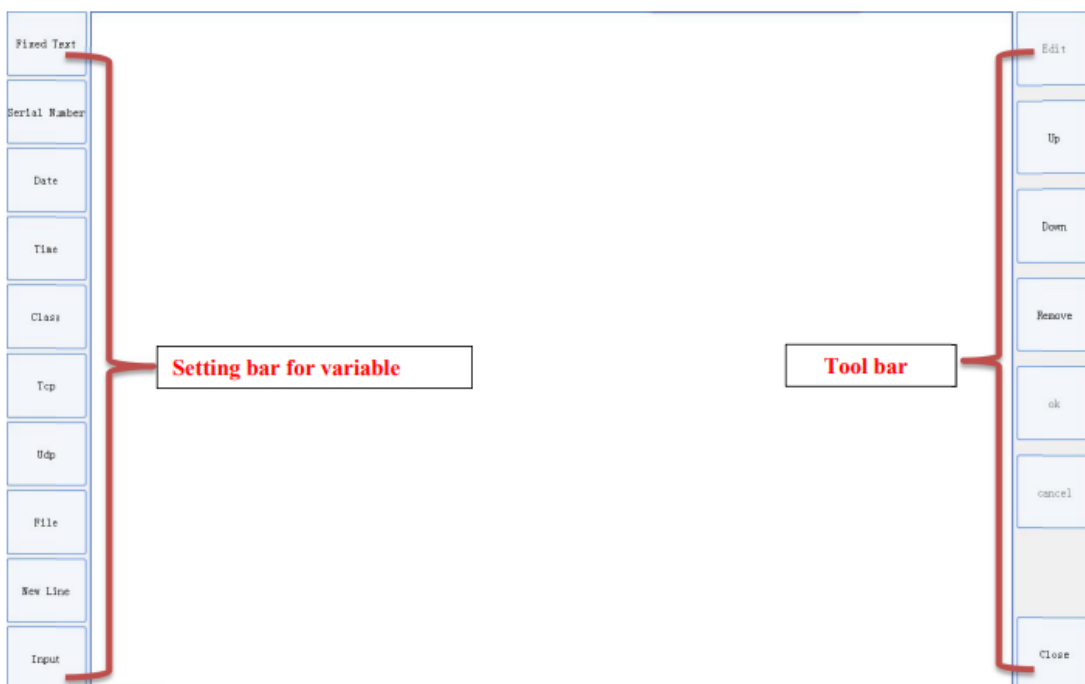




4.2.4 Add a new variable

Select **Text >Editor**, enable Variable Text and select Setting, shown as below:





4.2.4.1 Set Serial Number

- Begin Num: set the starting value of the serial number.
- End Num: Set the maximum value of the serial number (if the end value is 0, there is no limit).
- Increment: the increased value.

- Repeat: Choose whether to restart marking using the original starting values after all serial numbers have been marked.

Default value: Yes.

Base: Set the number base for serial number. Decimal, octal, and hex values can be set.

Begin Num:	1
Current Num:	1
End Num:	100
Increment:	1
Repeat:	1
Number Base:	Dec
<input type="checkbox"/> Leading zero	<input type="checkbox"/> Loop

4.2.4.2 Set Date & Time

There are several default formats to choose from when setting date and time. If your preferred option is not available, you can modify the format after the selection by adding elements such as horizontal lines, text, spaces, and other.

For example, "2020/05/23" can be updated to "15:24:23".

Serial Number
Date
Time
Class
Tcp

Fixed Text	2021/1/9	Edit
Year	/	year/month/day
Month	/	year-month-day
Day		year-month-day
Custom		week
Time		year/month/day
Class		year-month-day/year/month/day
Tcp		year-month-day/year/month/day
Ddp		month-day-year
File		
New Line		
Input		

Custom template

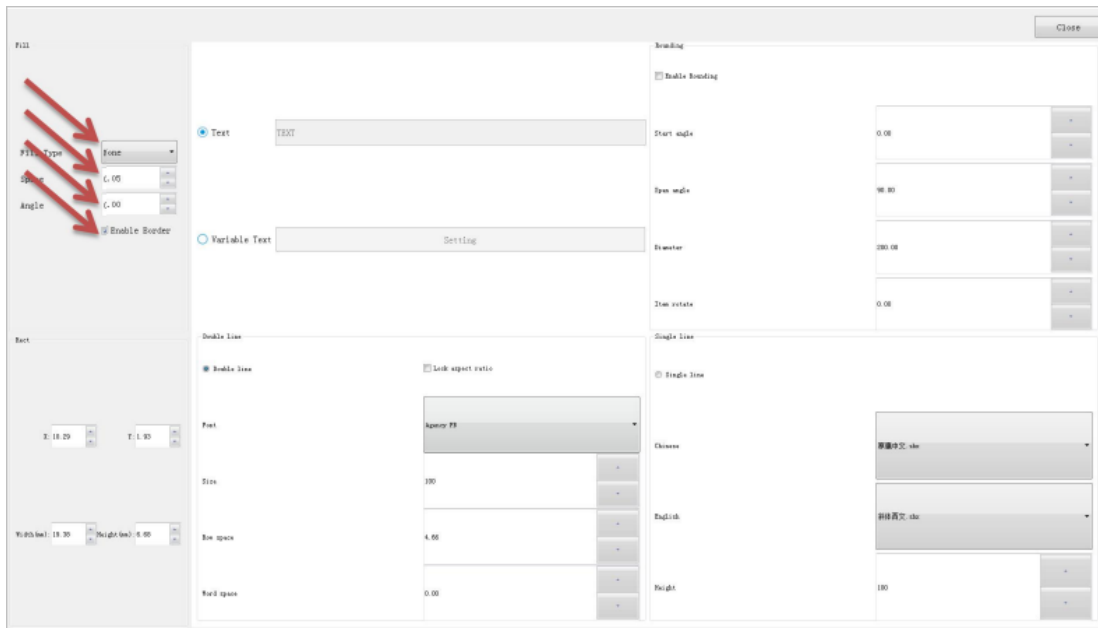
Template

Month	January	February	March	April	May	June	July	August	September	October	November	December
-------	---------	----------	-------	-------	-----	------	------	--------	-----------	---------	----------	----------

Serial Number	
Date	
Time	
Class	
Tcp	
Udp	

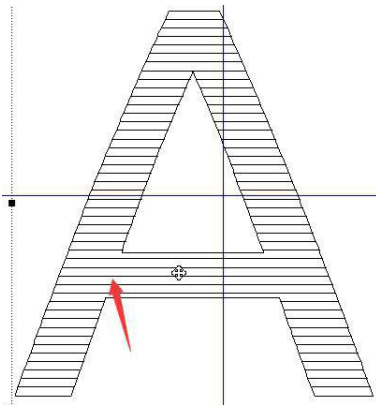
Fixed Text	20/10/07			Edit
Serial Number				Up
Date	24Hours /	24minutes/second		Down
	Minutes /	12minute		Remove
	Second	12minute		ok
Time	Custom	12minutesecord		cancel
	Custom	12minutesecordAMPM		Close
	Custom	24minutesecord		
Class	Deviation hour 0 minute 0 second 0			
Tcp	Field	AM Field	PM Field	
Udp	AM Field	PM Field		
File	<input type="checkbox"/> Leading zero			
New Line				
Input				

4.3 Filling

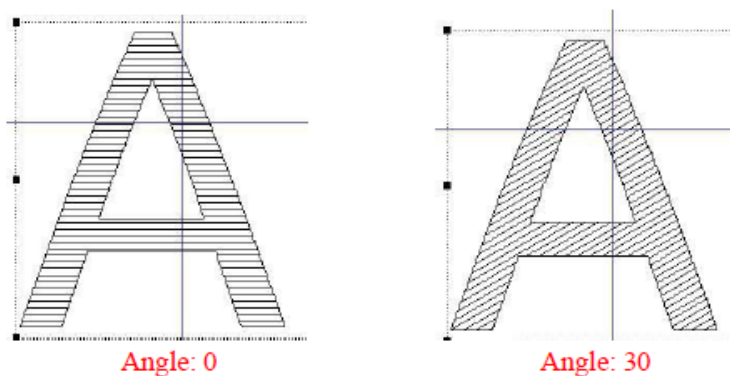


4.3.1 Types of filling

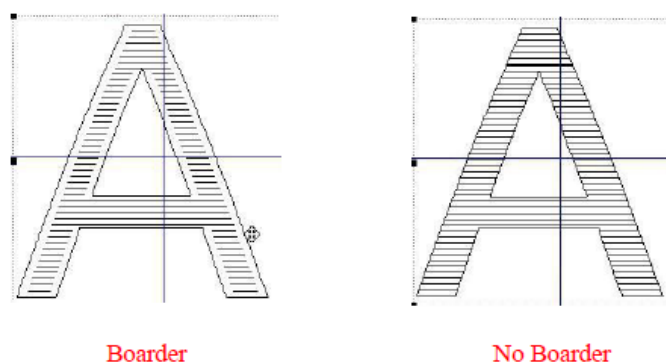
Space: the spacing between filling lines



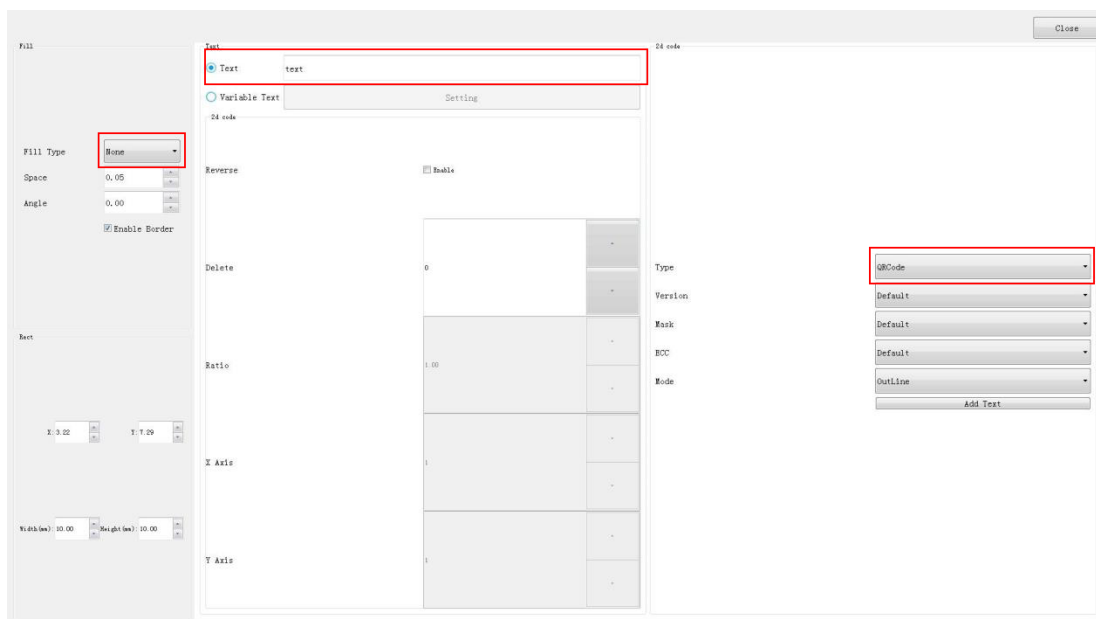
Angle: the angle of the filling lines



Border: spacing between the fill line and the outline



4.4 Creating QR codes



The MK300 laser marking machine supports marking of all types of bar codes and QR codes. The instructions are provided using a sample QR code.

Select the QR Code on the home screen, then click on the **Editor**:

Fixed message: If the content of the QR code is a fixed message, you can add it directly;

Variable: If the content of the QR code is a variable message, select “Variable Text” to update the settings. For specific variable settings, please refer to "Text Variable Settings".

4.4.1 QR code direction settings

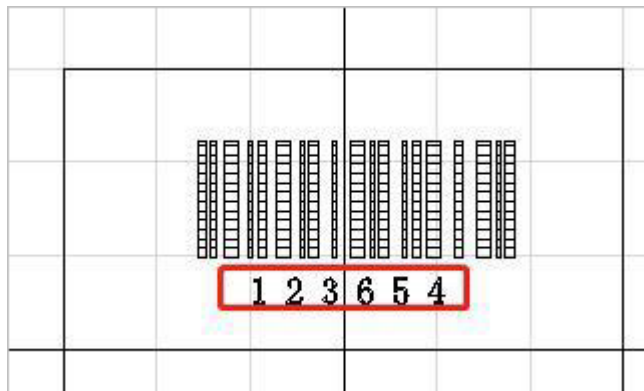
If the direction of the QR code requires reverse positioning, please select the “Enable” option.

The screenshot shows a settings window for a QR code. At the top, there is a 'Text' section with two radio buttons: 'Text' (selected) and 'Variable Text'. The 'Text' input field contains '12354568AAAA'. Below this is a '2d code' section. In the '2d code' section, there are two options: 'Reverse' and 'Enable'. Both 'Reverse' and 'Enable' are highlighted with red rectangular boxes.

4.4.2 Displaying bar code text (this function is not available for QR codes)

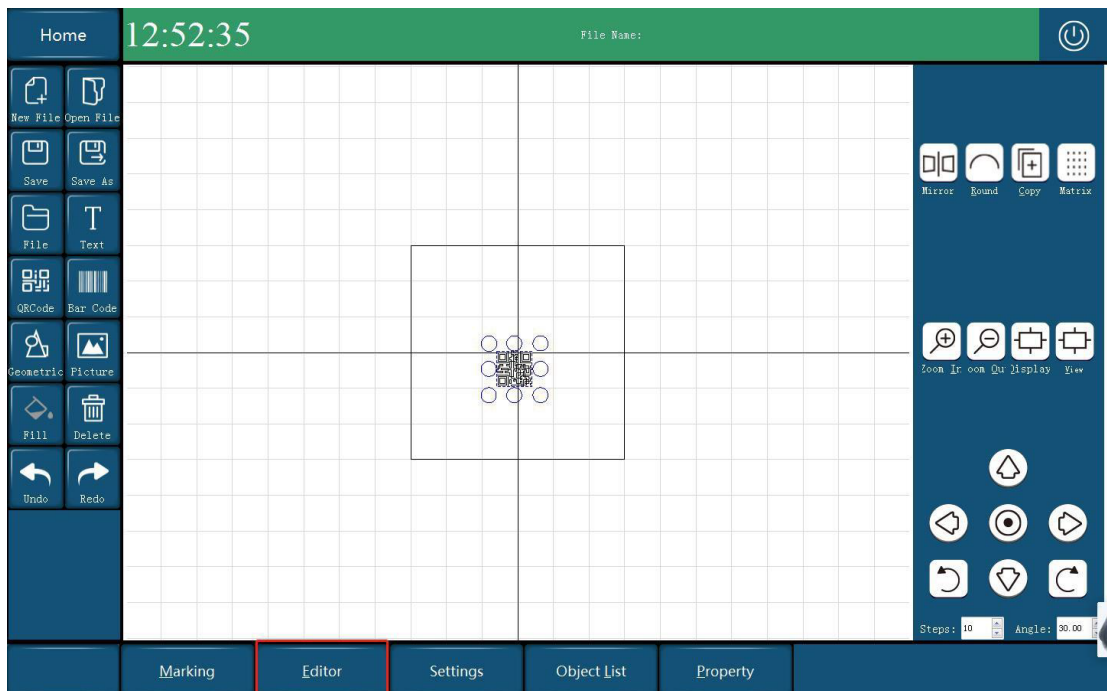
To display the text of the bar code, enable “Display Text”.

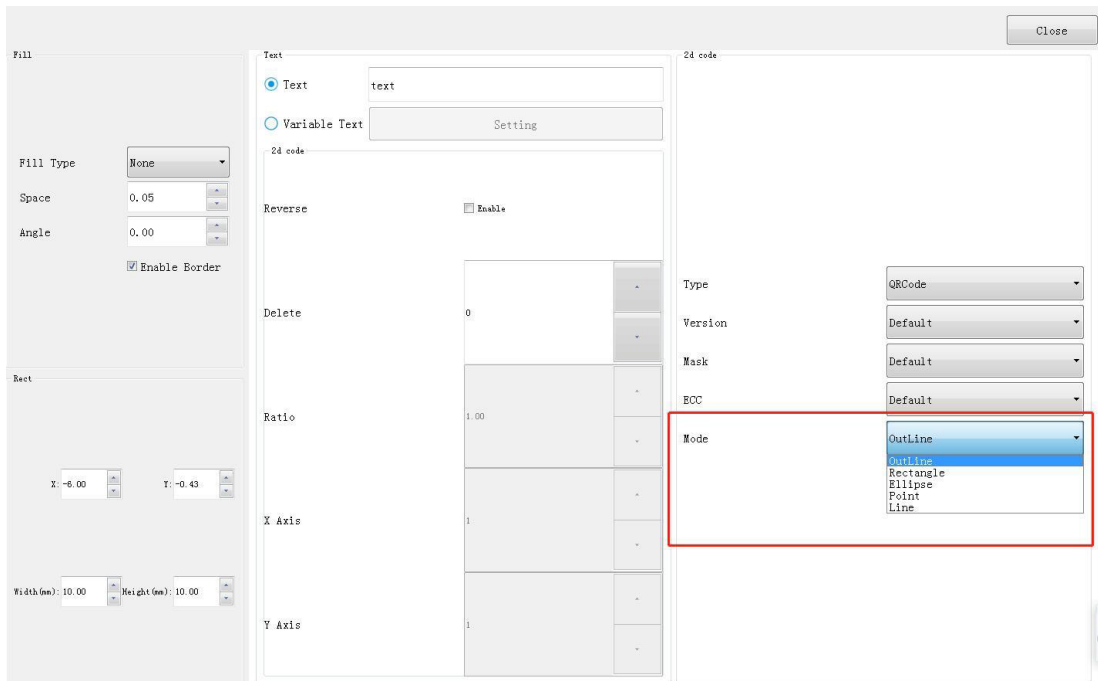
The screenshot shows a settings window for a bar code. It has a 'Font Size' field set to '3'. At the bottom, there are two checkboxes: 'Bar Space Reverse' (unchecked) and 'Display Text' (checked). The 'Display Text' checkbox is highlighted with a red rectangular box.



4.4.3 QR code filling

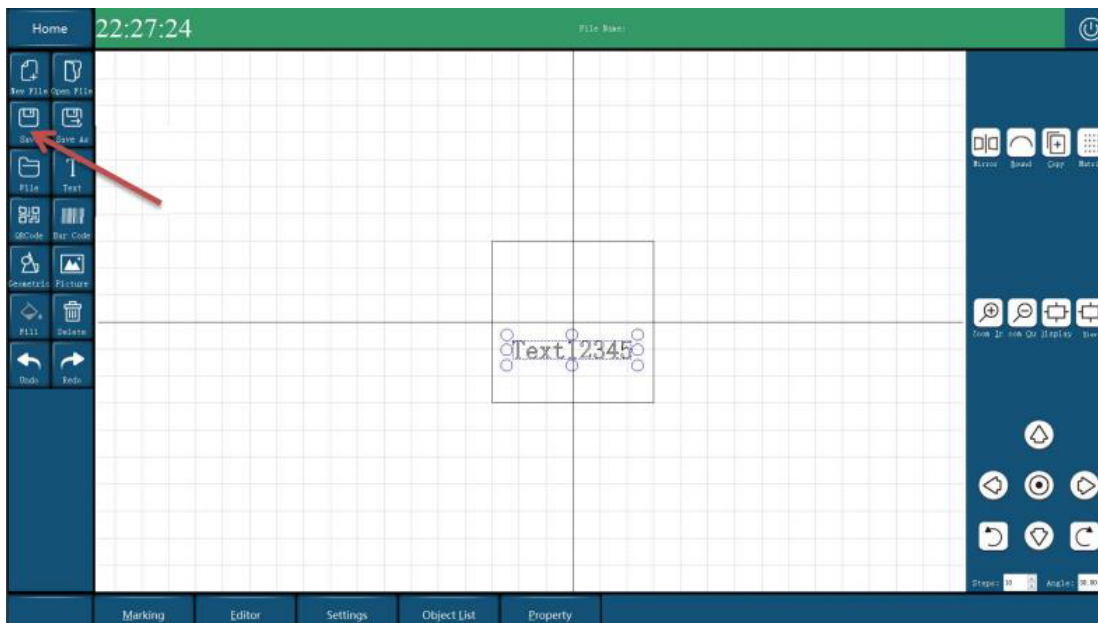
There are several types of QR code filling: Outline, Rectangle, Ellipse, Point, and Line. Select “Editor” on the home screen, find the “Mode”, then select the pattern to fill the QR code.

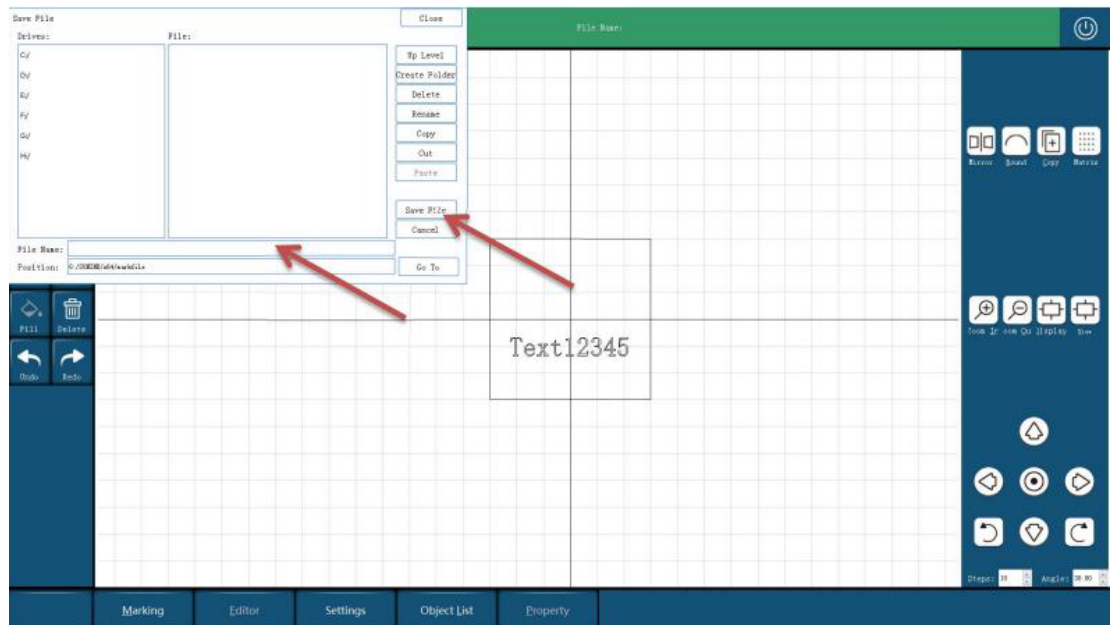




4.5 Saving file

Select **Save** to enter the save settings area, add the desired file name and then click **“Save File”**, as shown below.

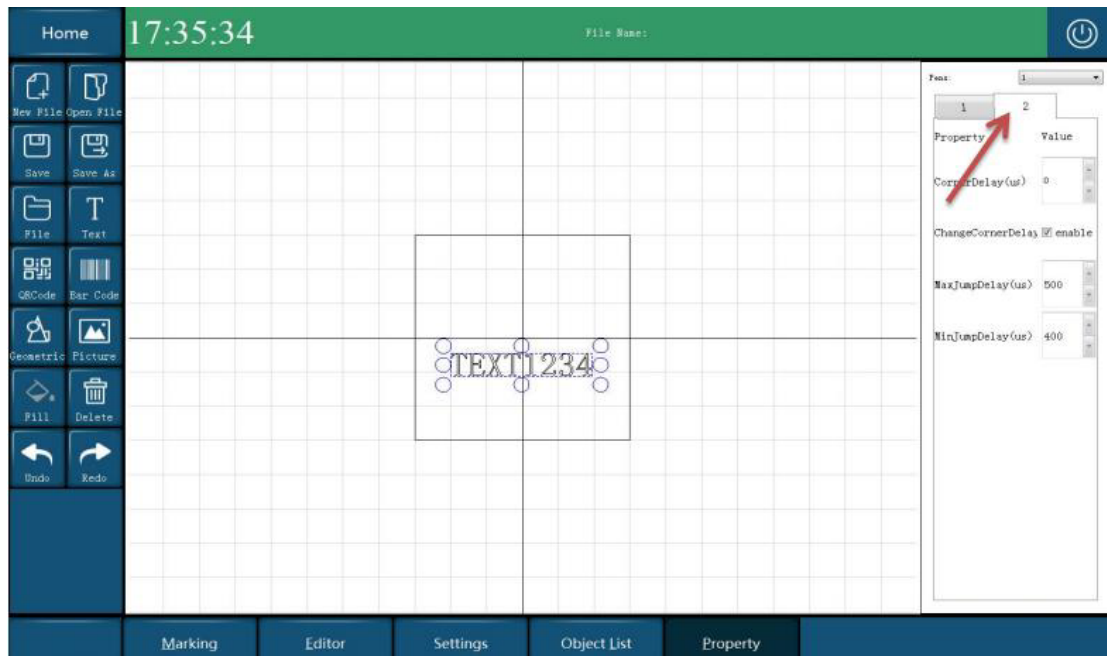
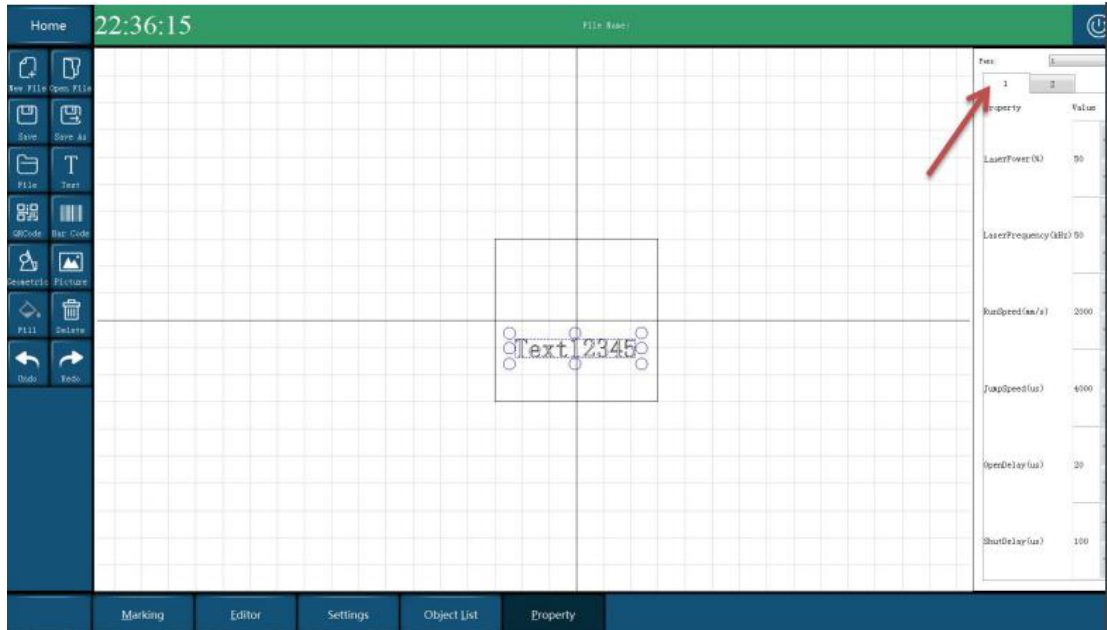




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5 Operating properties and parameters

Select **Property** on the home screen.



Laser Power - Unit: %. Set the percentage for the optical output of the fiber laser.

The power range is 0% -100%. However, it is advisable to avoid the 100% output as it will shorten the lifetime of the laser source. Set the maximum value to 95% instead. The initial value is set to 30%. The greater the value, the deeper the marking.

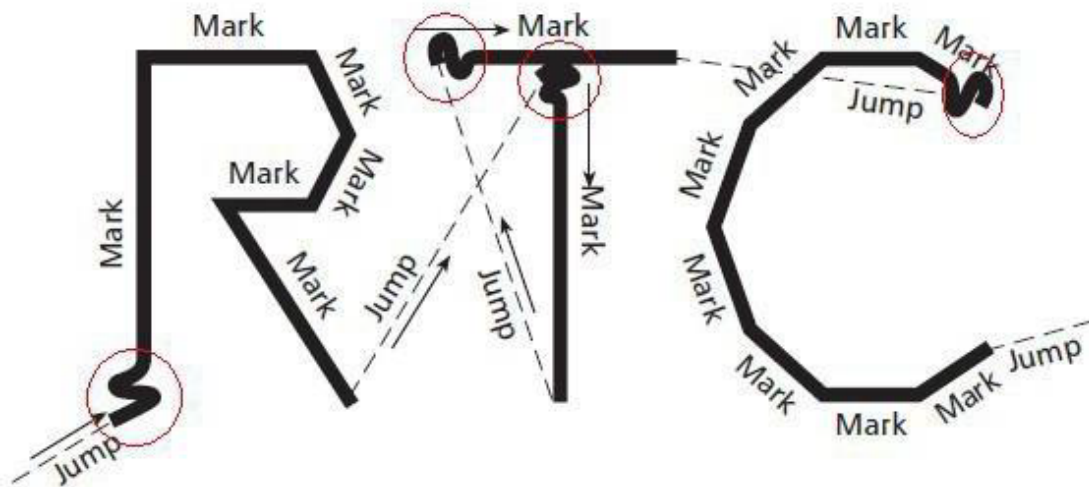
Laser Frequency - Unit: KHz. Denotes pulse frequency, the value range is 1KHz - 100KHz. The initial value is set to 20 KHz.

Run Speed - Unit: mm/s. Sets the marking speed; the speed range is 1-5000mm/s. If the mark appears to be faint, reduce the value (note that this will increase the marking time).

Jump Speed - Unit: mm/s. Set the speed to be used between marked vectors (speed at which laser jumps from one vector to the next). If an object consists of many short polygon strokes, then a large value will make the mark appear distorted. The value range is 1-5000mm/s, the initial value is set to 2000mm/s.

Jump Delay - Unit: ms. Jump delay is the time for the laser to jump from one character to the next. The value range is 1-1000. The initial minimum value is set to 400ms, maximum value is set to 500ms.

Jump-Delay too short: the vector following a jump command is already marked at the end position of the jump-vector during the necessary setting time of the mirrors. Result: an indent or overshoot becomes visible.



Jump-Delay too long: has no negative effect on the visible scanning results. The time required consequently increases.

Laser-On Delay: The delay before switching the laser on until the galvanometer scanning system finishes its command.

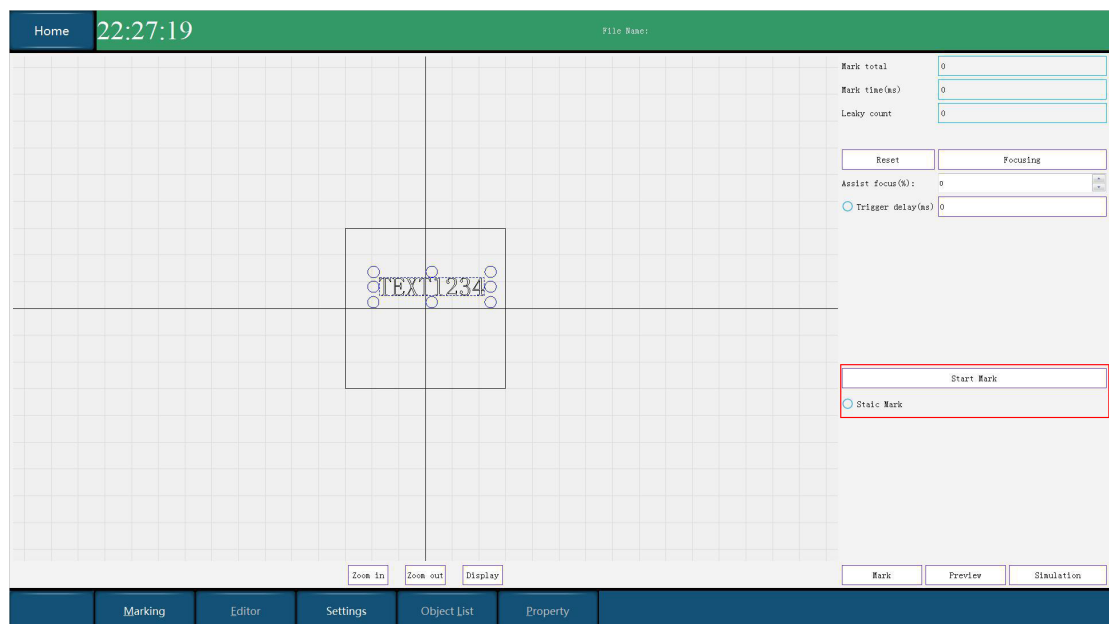
- **Laser-On Delay too short:** Can cause burn-in effects at the starting point.
- **Laser-On Delay too long:** The vector may not be marked from the starting point.

Laser-Off Delay: The delay before switching the laser off.

- **Laser-Off Delay too short:** The vector may not be marked completely.
- **Laser-Off Delay too long:** The vector may not be marked from the start.

6 Initiate marking

Select **Marking** on the home screen to proceed to the marking area. Select the parameters needed, choose the “Start Marking” option, and press the corresponding button on the handle to start the process.



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7 Lens correction

Select the **Settings** from the home screen. Choose the “Lens” area and add ‘50’ to the “Working Scope” and “Lens Wide” fields (50mm is the size of galvanometer scanner). Click on “Enable” when done.

Home 13:00:52 File Name:

Mark

Lens Setting

Working Scope(mm) 50

Lens Wide(mm) 50

X Swap X Y

Laser

Lens

IO

System

Lens Correction

	X Axis	Y Axis
Bucket	0.000	0.000
Slant	0.000	0.000
Trapezoid	0.000	0.000
Ratio(%)	0.000	0.000

X Calculate Y Calculate

Enable

Correction Red Test Laser Test Import File Export File

Marking Editor Settings Object List Property

This completes the correction of the lens.

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8 Machine specifications

This section details the specifications of the machine.

Table 4 - MK300 machine specifications

Technical data	MK300
Laser type	Marking laser
Power output	30W
Standard marking area	100mm x 100mm
Laser handle part weight	1.2 kg
Marking speed	≤700mm/s
Repeated precision	0.01mm
Wavelength	1064±10nm
Frequency of pluse	20-100KHZ
Marking depth	≤0.25mm (depends on material)
Mini line width	0.03mm
Mini line characters	0.2mm
Power supply	AC220V±10% 50Hz or AC110V± 10%60Hz
Cooling	Air cooling
Operation temperature	10-45°C
Laser generator life	50000~100000 hours
Software	Integrated Touch Screen Software
Machine weight	15 kg

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Index

A

add

message 23

text 22

variable 24

add new message 23

add new variable 24

applications 19

C

creating new text 22

Creating QR Codes 29

D

dimensions 15

displaying barcode text 30

E

editing messages 22

F

filling 28

filling types 28

fire risk 10

H

hardware overview 14

home screen 19

I

initiate marking 37

K

keys and functions 22

L

laser

frequency 35

Off Delay 35

On Delay 35

laser safety requirements 7

lens correction 39

M

machine specification 41

main parts 14

marking 37

menus 19

O

operating instruction 19

operating parameter 35

other requirements 9

overview 19

owner responsibilities 11

P

property 35

Q

QR code

create 29

filling 31

settings 30

QR code direction 30

R

residual risk

fire 10

uv radiation 10

S

safety labels 6

safety labels and warnings 7

safety notices 5

saving file 32

set

 date 26

 serial number 25

 time 26

shipping 17

software 19

specification 41

T

technical data 41

U

unpacking the device 17

using the device 19

uv radiation 10

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