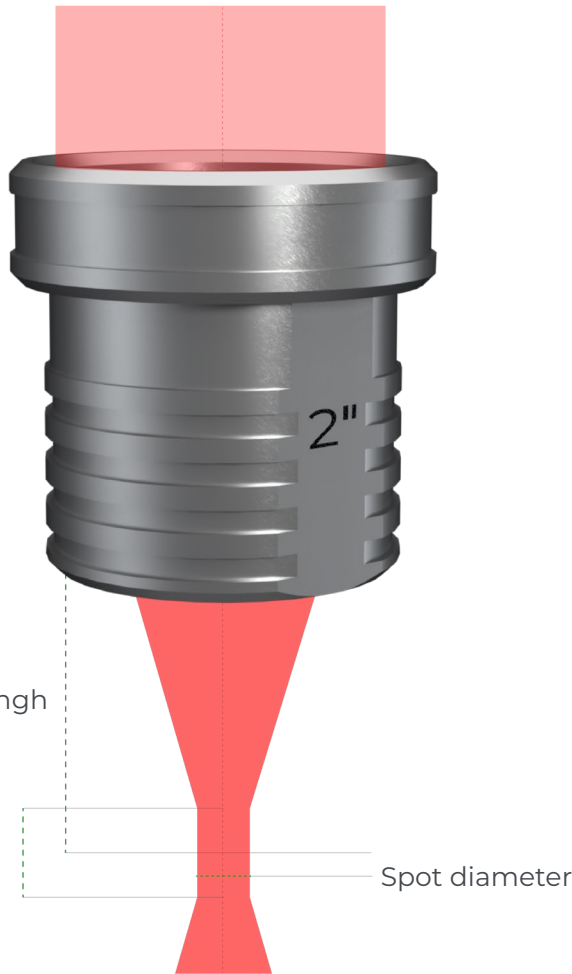




# HOW TO

## choose your laser lens?

Changing laser lenses enables you to shape your engraver's laser beam according to certain properties. This makes it easy to improve engraving or cutting quality, or even productivity. With this guide, discover the effects of your lens on your laser beam, and determine which lens is the best answer to your application.



### What is a laser lens?

The laser lens is the optical element of your machine that focuses the laser beam. The laser beam is between 8 and 10 mm in diameter before the lens. The lens concentrates the beam at a thin point for greater precision and more concentrated power. This point is called the focal point.

Choosing a focal length defines the diameter of the laser spot and therefore the width of the engraving line.

The focal length also defines the focus depth, the distance over which the beam is considered to be focused. The depth of field is used to define the acceptable difference in flatness on a part for uniform engraving.

### FIND THE FOCAL LENGTHS AVAILABLE FOR YOUR MACHINE

	Machine model	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
<b>CO2 laser</b>	LS100	Ref. 47082	<b>Ref. 47200</b>	Ref. 62916	-	Ref. 27381	Ref. 27382
	LS100EX						
	LS900	Ref. 29257	<b>Ref. 27377</b>	Ref. 27379	-	Ref. 27381	Ref. 27382
	LS1000XP	-	<b>Ref. 76030</b>	-	-	Ref. 75228	<b>Ref. 75227</b>
<b>Fiber laser</b>	LS100EX	-	Ref. 69850	-	<b>Ref. 71684</b>	-	-
	LS900	-	Ref. 78609	-	<b>Ref. 83451</b>	-	Ref. 78733
<b>Edge laser</b>	LS900	-	-	-	<b>Ref. 81059</b>	-	-

(Green references indicate the lenses supplied with the machine)



## OUR MAIN LASER LENS



Lens 1.5"  
**Precision and sharpness**

**Perfect for:** precision engraving, detailed ink stamps, precision cutting on thin materials, high-resolution photos and logotypes (> 800DPI)

**Not suitable for:** cutting thick materials (> 3 mm) and large engraving areas



Lens 2.0"  
**Multi-purpose**

**Perfect for:** engraving and cutting of 2-ply plastics, engraving of letters (>1 mm high) and medium-resolution photos and logotypes (< 500DPI)

**Not suitable for:** precision engraving or cutting of thick materials (> 8 mm)



Lens 4.0"  
**Thick cutting and fast engraving**

**Perfect for:** cutting of thick materials (> 8 mm), engraving of large characters or large areas, engraving of objects with hollow or irregular surfaces, or low-detail designs (< 200DPI)

**Disadvantages:** Low resolution engraving and wide cutting lines

### Laser beam properties

<b>Spot diameter</b>	0.06 mm
<b>Focus depth</b>	0.5 mm
<b>Focal length</b>	37.5 mm

<b>Spot diameter</b>	0.08 mm
<b>Focus depth</b>	0.8 mm
<b>Focal length</b>	50.0 mm

<b>Spot diameter</b>	0.16 mm
<b>Focus depth</b>	3.3 mm
<b>Focal length</b>	100 mm

## ENGRAVING & CUTTING COMPARISON

See below for comparative examples of our 3 main focal lenses. Ultra-detailed wood engraving and 10 mm acrylic cutting.



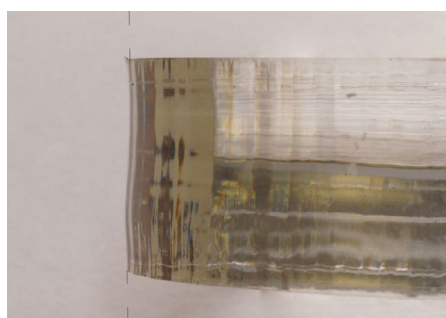
1.5" lens engraving  
The most detailed and accurate engraving



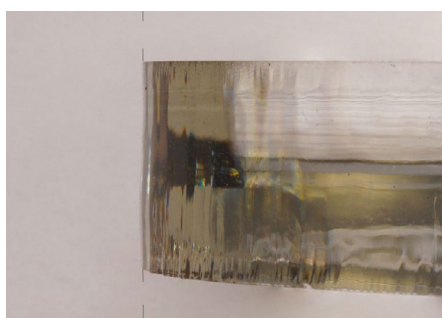
2.0" engraving  
A fine result but some small details are missing



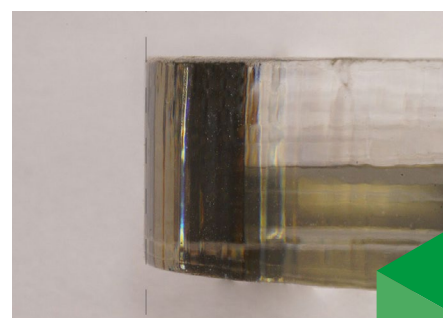
4.0" engraving  
A rough engraving that looks blurred



1.5" cutting  
A wave-shaped cut



2.0" cutting  
A slightly angled cutting edge



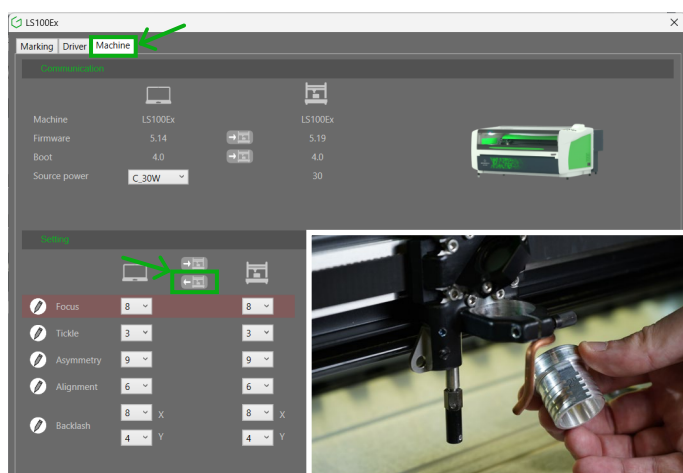
4.0" cutting  
A totally straight cut





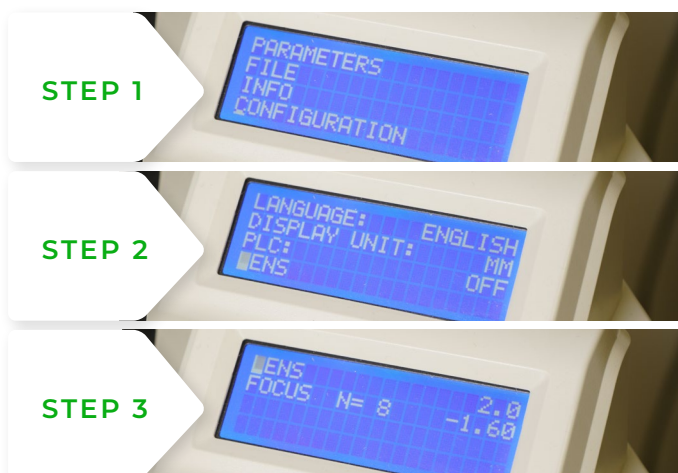
## HOW TO CALIBRATE YOUR MACHINE TO YOUR NEW LENS?

Follow these simple steps to change your laser lens and recalibrate your machine's automatic focal length.



### Save your actual configuration

Start by opening our driver's interface by opening your machine's printing preferences on your computer. In the «machine» tab, back up your current settings by clicking on the «Send to computer» button. Then, unscrew the fleece screw to remove your current lens and attach your new lens in its place.



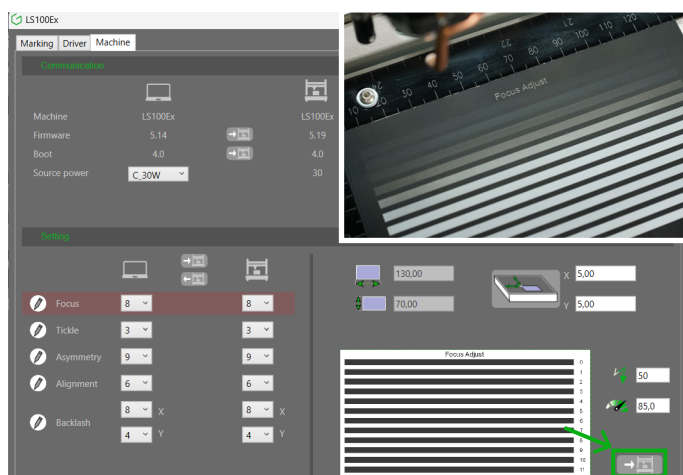
STEP 1

STEP 2

STEP 3

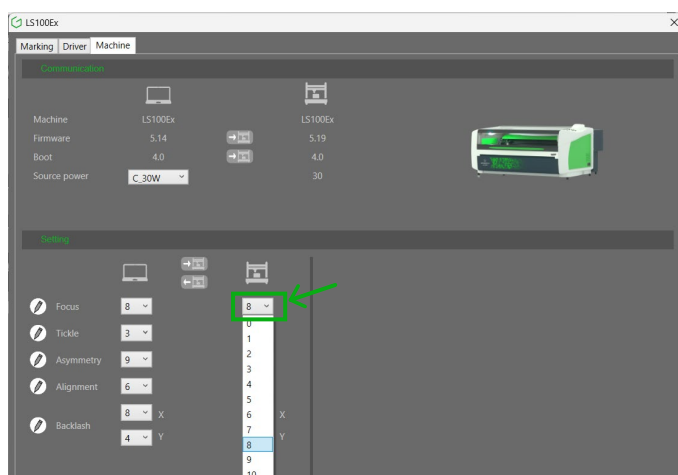
### Changing your machine settings

In your machine's menus (X button), select «Configuration» then «Lens» and indicate the focal length of your new lens.



### Run the calibration test in the driver

Calibrate your machine perfectly to its new focal length by launching the calibration job via the driver interface. Prepare a sheet of anodized aluminum and run the job! The machine will engrave 13 lines.



### Select the best calibration

Finally, select the number of the engraved line you feel is best engraved in the «Focus» field of the driver interface. Your machine is now perfectly calibrated to its new focal lens!

Do you need additional information?

Contact a Gravotech expert

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