

WHAT ARE THE FACTORS THAT AFFECT LASER ENGRAVING?

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Lasers can perform many types of processing. Such as surface heat treatment, welding, cutting, drilling, engraving and micro-processing of materials. The processing objects of the CNC [laser engraving machine](#): organic board, cloth, paper, leather, rubber, cardboard, dense version, foam cotton, melamine, glass, plastic, and other non-metallic. CNC laser engraving machine processing technology has been widely used in many fields such as machinery industry, electronics industry, national defense and people's life. What factors affect laser engraving machine processing? The factors affecting laser engraving machine processing mainly include the following six aspects:

The influence of output power and irradiation time

If the laser output power is high and the irradiation time is long, the laser energy obtained by the workpiece will be large. When the focus is fixed on the surface of the workpiece, the greater the output laser energy, the larger and deeper the engraved pit will be, and the taper will be smaller.

The influence of focal length and divergence angle

The laser beam with small divergence angle can obtain smaller spot and higher power density on the focal plane after passing through the short focal length focusing objective lens. The smaller the spot diameter on the focal plane, the finer the product can be engraved.

The influence of focus position

The focus position has a great influence on the shape and depth of the pit formed by the workpiece being engraved. When the focus position is very low, the area of the light spot passing through the surface of the workpiece is very large, which will not only produce a large bell mouth, but also affect the processing depth due to the preference of energy density. As the focus is increased, the groove depth increases. If the focus is too high, the spot on the surface of the workpiece will be large and the erosion area will be large, and the single depth will be shallow. Therefore, the position of the focus should be adjusted according to the technological requirements of the workpiece.

The influence of energy distribution in the spot

After the laser beam is focused, the light intensity of each place in the spot is different. The energy is distributed symmetrically about the micro-axis of the focal point, and the grooves processed by the beam are symmetrical, otherwise, the pits after engraving are asymmetrical.

The influence of the number of exposures

With laser irradiation once, the processing depth is about five times the groove width, and the taper is relatively large. If the laser is used many times, not only the depth can be greatly increased, the taper can be reduced, and the width is almost unchanged.

The influence of workpiece material

Due to the different energy absorption spectra of various workpiece materials, the laser energy gathered by the lens on the workpiece cannot be completely absorbed, and a considerable part of the energy is reflected or projected and lost. The absorption rate is the same as the absorption spectrum of the workpiece material and dependent on the laser wavelength.