

Ultraviolet Laser Marking Machine (10W) Product Overview

The ultraviolet laser marking machine is a precision processing equipment that utilizes a 355nm ultraviolet laser. Due to its unique cold processing mechanism and extremely small spot size, it excels in ultra-fine marking and special material processing, offering advantages unmatched by other laser devices.

Working Principle

This machine is developed using a 355nm ultraviolet laser. It employs third-order intracavity frequency doubling technology. Compared to infrared lasers, the 355nm UV light focuses into a much smaller spot, significantly reducing mechanical deformation of materials (classified as cold light). The machine generates the UV laser beam through high-power multi-mode laser diode pumping and subsequent frequency doubling. A computer-controlled high-speed scanning galvanometer then deflects this beam to achieve automatic marking.

Model Characteristics:

- **High Precision:** Excellent beam quality with a very small spot enables ultra-fine marking and near-perfect marking quality.
- **Minimal Thermal Impact:** The short pulse width results in a short interaction time with materials, creating very small heat-affected zones. This prevents thermal effects, avoiding material deformation, scorching, or burning.
- **Permanent & Non-Contact:** The marking process is non-contact, and the marks are permanent.
- **Wide Applicability:** Suitable for processing most metals and non-metals, especially materials sensitive to heat.
- **High-Performance Laser:** Features a high-performance UV laser utilizing intracavity frequency doubling and TEC cooling technology.
- **Superior Beam Properties:** Fundamental transverse mode, short pulse width, high peak power, and high repetition frequency.
- **Efficiency & Reliability:** High electro-optical conversion efficiency, long service life, high reliability, stability, and safety.
- **High Speed & Repeatability:** High-precision marking with high speed and excellent repeatability.
- **Automation Compatibility:** Can be integrated into production lines for automatic loading and unloading.

Main Advantages:

- **Ultra-Fine Processing:** The extremely small focused spot and minimal heat-affected zone allow for ultra-fine marking and processing of special materials, making it the preferred choice for customers with high-quality requirements.

- **Broad Material Compatibility:** Suitable for processing almost all materials except copper.
- **User-Friendly Software:** Flexible and intuitive operating system with stable performance. The dedicated control software is compatible with outputs from AutoCAD, CorelDRAW, Photoshop, and others.
- **Versatile Marking Capabilities:** Capable of automatic editing and modification of text, symbols, graphics, images, barcodes, QR codes, serial numbers, etc. Supports multiple file formats including PLT, PCX, DXF, BMP, JPG, and can directly use TTF fonts.
- **CCD Vision System:** Features automatic recognition, tracking, and positioning.

Application Industries:

The UV laser marking machine is used for fine marking, precision cutting, and micro-processing of special materials. Key applications include:

- Marking and surface treatment of various glasses, LCD screens, textiles, thin ceramic sheets, semiconductor wafers, IC chips, sapphire, and polymer films.
- High-end ultra-fine processing markets, such as marking on pharmaceutical, cosmetic, and food packaging bottles. Offers high precision, clean and durable marks, superior to inkjet coding without pollution.
- Marking and scribing on flexible PCB boards.
- Micro-hole and blind hole processing on silicon wafers.
- QR code marking on LCD glass, surface drilling of glassware, marking on metal surface coatings, plastic keys, electronic components, gifts, communication devices, building materials, and more.

Technical Parameters

Category	Specification
Device Model	BY-UV-10W
Laser Output Power	10W
Laser Wavelength	355nm
Beam Quality (M^2)	< 1.2
Pulse Width	0 – 150 ns
Q-Switch Frequency	0 – 200 kHz

Category	Specification
Marking Speed	≤ 10000 mm/s
Min. Character	0.05 mm
Min. Line Width	≤ 0.005 mm
Working Area	Optional: 110x110mm to 300x300mm
Marking Depth	$\leq 0.01 - 3$ mm (Adjustable based on material)
Repeatability Accuracy	± 0.001 mm
Total Power	800 W
Power Requirement	220V, 50Hz/60Hz
Cooling Method	Water Cooling
Operating System	Windows 10

Standard Configuration Details

- **Camera:** Gigabit Ethernet, 6.3 Megapixel
- **Lens:** Focal Length 16mm
- **Light Source & Bracket:** Strip light source bracket with power supply / Backlit ring light bracket with power supply
- **Marking Control Card:** V1 (Single-axis) or V2 (Dual-axis vision marking card, compatible with XY stages)
- **Marking Software Features:** Conveyor line marking, equidistant marking, sensor triggering, XY stage marking, dual conveyor line marking, flying marking
- **Conveyor Line:** 250x1500
- **Laser Source:** Ultraviolet Laser
- **Input Devices:** Keyboard, Mouse, Ethernet port, USB, WiFi receiver
- **Character Size:** 1 - 110 mm height (adjustable)
- **Supported Fonts:** All fonts available under Windows system, with built-in multiple laser-specific fonts.
- **Marking Content:** Any text, patterns, automatic serial numbers, combined alphanumeric encoding, production dates, expiration dates, batch numbers, logistics numbers, communication data, etc.
- **Software Language:** Supports Chinese/English switch. The computer supports internet connection and is equipped with a

wireless WiFi receiver

Image



