

Laser Solutions

EV



India's First Registered **Laser** Machine Manufacturer



Battery Laser Welding Machine



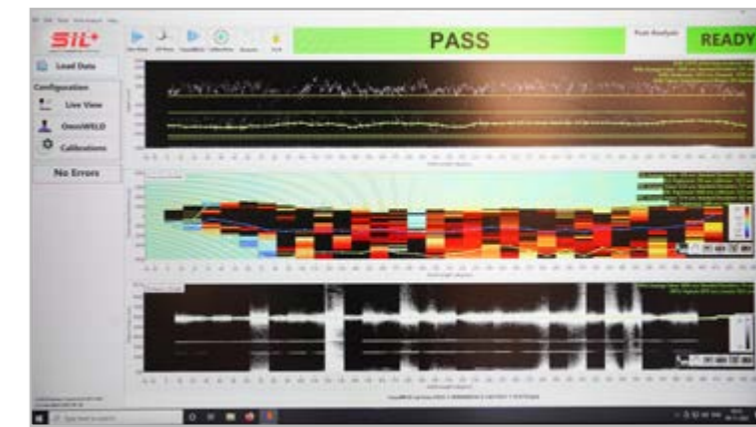
Features:

- Modular construction makes the machine adoptable to weld all types of batteries like Prismatic, Cylindrical, Capacitor Casings simply by changing the fixturing setup.
- Indigenous Vision System for accurate weld positioning by compensating all the stack-up tolerances.
- Intelligent clamping system to ensure air tight contact between the bus-bar and the cell terminal by precise control of clamping pressure.
- In situ (real time) weld depth monitoring and controlling to ensure puncture proof welding throughout the cycle.
- Automated part positioning system to ensure the precise positioning of battery packs on the fixture.
- Vision Inspection System for post weld inspection and quality controlling.
- Seam Tracking System for path compensation.
- Laser power available up to 10 kW
- Welding similar or dissimilar materials.
- Rotary Indexer with QR code scanning system.
- Available Working Area - 300 x 300 mm to 1000 x 1000 mm (customized as per customer requirement).

Advantages

- Consistent Weld Depth
- Crack & Porosity Free Welding
- High Throughput
- Excellent Surface Quality
- Low Heat Input
- Controlled Depth of Penetration
- High Degree of Control in process parameters

Real Time Monitoring



- Transverse Profile - The finished weld bead transverse profile is measured.
- Finished Weld Surface - The height of the finished weld bead is measured just behind the melt pool.
- Keyhole Depth - Measured inside the keyhole during the weld to determine real-time weld penetration depth.
- Seam Profile - A sweep performed before the process looks for joint position on the workpiece.
- Workpiece Height - The distance between the material surface and the welding optics is measured.

Samples:



FlexiWELD 2000

Handheld Laser Welding Machine



Overview:

FlexiWELD handheld Laser welding systems from SIL are fast, simple to learn and use, produce high-quality, consistent results across a wide range of materials and thicknesses. The Handheld Laser Welding System provides fabricators ease of use with a comprehensive range of highly productive welding solutions to choose from.

Laser welding for thick, thin, reflective, and dissimilar-thickness materials is made much easier by high speed, low heat input, and a small HAZ (heat affected zone). As the system is IOT enabled, it can be integrated with any automation and multiple kinds of fixtures to perform critical welding where human hands can't reach.

Advantages:

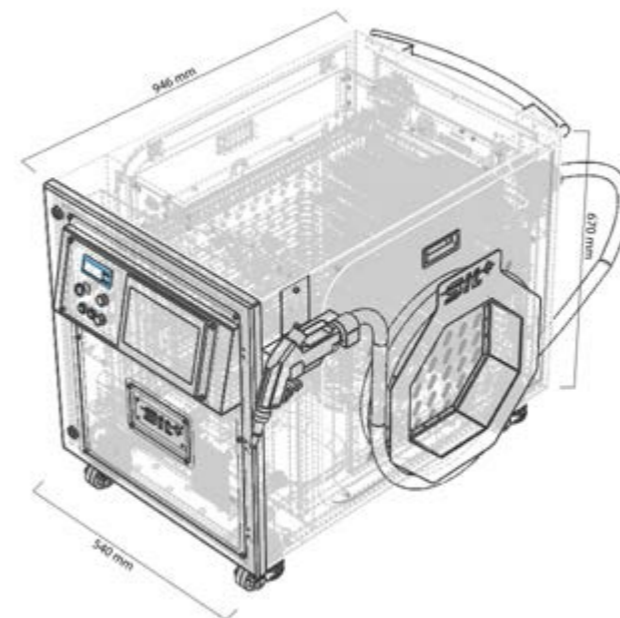
- FAST: 4X Faster Welding
- VERSATILE: Wide range of materials – up to 1/4 in. (6.35 mm).
- EASY: Optimized presets reduce learning curve.
- CONSISTENT: High-quality, repeatable results.
- FLEXIBLE: Simple production implementation & applications.
- COST: Low Operating Costs.

Features:

- Laser powers of 1, 1.5, & 2 kW are available with a 10-meter fiber cable.
- High Laser energy density, small thermal effect area, & minimal deformation.
- Factory Pre-set Optimization & Laser Power Control.
- Proven parameters for dissimilar material welding.
- Wobble Welding Built-in for Increased Productivity.
- Handheld Welding Gun that is lightweight and handy.
- Intelligent Wire Feeding System.
- Suitable for spot and continuous welding on battery modules & station welding.
- Feather contact processing, stress-free and noise-free operation.
- Excellent welding quality & high strength.
- Weld strength & toughness are equal to or greater than that of the base metal.
- Fast welding speed, 2-10 times that of traditional welding.
- Smooth welding seam - does not require polishing and saves time.
- Water cooling system.

Specifications:

Laser Power	1 / 1.5 / 2 kW
Wavelength	1064 nm
Operational Power	1 Phase (230V-50Hz)
Wobble Weld Width	Up to 5 mm
Wobble Frequency	Up to 300 Hz
Fiber Cable Length	10 Meters
Parameter Presets	100 +
Weight	< 100 kgs
Dimensions	540 x 946 x 670 mm



Samples:



Laser Micro Welding Cell



Features:

- Laser power up to 1 kW.
- Precision micro joining of parts having a weld bead size < 1mm and a weld penetration depth of < 1mm.
- The dimensions of welding station range from 150 x 150 mm to 600 x 600 mm.
- Compact, portable model & can be mounted on a table.
- Can be used to weld high-value miniature components in industries such as precision electronics, automotive, PCBs, micro gears in watches, hermetic seals, starter motors, bellows, metal tubing, fuel rails, compressor parts, and so on.
- Welding SS, MS, AL, and OFHC copper with similar or dissimilar materials is possible.
- Operated with a high-speed galvo head with traceable function and CC vision for testing.

Samples:



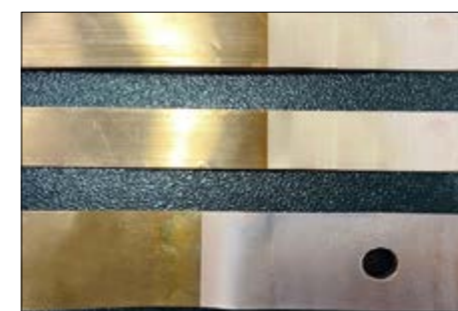
Laser Cleaning Machine - Galvo



Features:

- High Power Galvo Head
- Portable cleaning head
- Air-cooled chilling system
- Mode of operation - CW or Pulsed Q-Switched.
- IOT Enabled – Easy Automation
- Maintenance free machine & no consumables required for operation.

Samples:



Fiber Laser Marking Machine



Overview:

Fiber Laser marking system is software integrated industrial marking tool used in various industries like EV, Automotive, Aerospace, Engineering, etc., to mark on metallic components. The integrated software allows users to control the galvanometer scanners that produce relative motion between the Laser spot and the work-piece.

Fiber Laser marking is suitable for various products and applications with variety of combinations, characters, graphics, logos, serial no., barcode & QR code, which are used on all kinds of products for part identification, traceability, anti-counterfeiting, material, batch or manufacturer identification.

Advantages:

- Permanent Marking: Damage-proof marking that can not be erased
- No Consumables: No need to replace dyes, inks or stylus tips.
- Versatile: Can be used on wide range of materials
- Consistent: High-quality, repeatable results.

Features:

- Can process a wide variety of Metals
- Non – Contact Process
- IOT Enabled – Easy Automation
- Permanent & Damage Proof Marking
- Low Operating Costs
- Zero Maintenance
- High speed on-the-fly marking for mass production
- Customizable material handling solutions.
- No Material Damage
- High-speed process

Additional Attachments:

- Rotary
- On-Fly
- Auto Trace

Fiber Laser Marking Machine Specifications:

SPECS/MODEL	ACCUWRITE F - 20/30/50/60/100
Power	20 W to 100 W
Wavelength	1064 ±3 nm
Pulse Repetition Rate	20 - 400 KHz
Power Stability	<± 1%
Focus Spot Diameter	<0.05 mm
Working Area	100x100 - 600x600 mm
Max marking Depth	up to 1.2 mm
Max marking speed	1500 standard characters / second
Minimum Line Width	0.05 mm
Minimum Character	0.05 mm
Repetition Accuracy	±0.003 mm
Cooling Mode	Air cooling
Ambient Temperature	15°- 35° C
Power Requirement	220V/single phase/50Hz/<600W
Life of Laser Module	>100000Hrs
Guide Laser/Red Aiming Beam	Yes 660nm

Samples:



Compact UV Laser Marking Machine



Overview:

UV Lasers have a wavelength that is roughly one-third (355 nm) that of standard wavelength Lasers (1064 nm).

The ability of these Lasers to mark with minimal heat damage due to their incredibly high absorption rate on a variety of materials is referred to as "Cold Marking." UV Laser marking is ideal for applications requiring high contrast and minimal product damage, and the power does not need to be increased in order to create highly visible marks.

The size of electronic parts has steadily decreased over the years, component manufacturers are facing the challenge of marking on miniscule components due to limited marking area. SIL's UV Laser marking machine is highly compatible to perform marking on these miniscule components with high accuracy & precision.

UV Laser's high material absorption rate reduces the possibility of energy transmission to internal components.

Advantages:

- Permanent Marking: Damage-proof marking that can not be erased
- Cold Marking: No heat zones, hence no material damage
- No Consumables: No need to replace dyes, inks or stylus tips.
- Versatile: Can be used on wide range of materials
- Consistent: High-quality, repeatable results.

Features:

- Cold Marking
- Small beam diameter for fine marking
- High Quality Laser Beam
- Simple operation
- IOT Enabled – Easy Automation
- Narrow pulse width
- Water Cooling System
- Less heat affected zone
- Specially designed for Micro Marking Applications

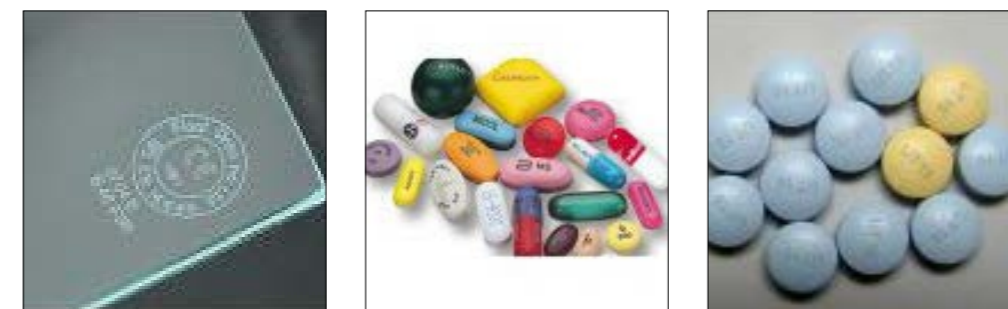
Additional Attachments: (As per requirement)

- Rotary
- On-Fly
- Auto Trace

UV Laser Marking Machine Specifications:

SPECS/MODEL	UV - 3/5
Max Laser Power	3W/ 5W
Laser Wavelength	355 nm
Repetitive Rate	20 KHz - 150 KHz
Marking Range	100 x 100 mm ~ 300 x 300 mm
Linear Speed	≤ 7000 mm/s
Min. Character	0.20 mm
Minimum Linear Width	0.05 mm
Repeatability	±0.01 mm
Power Consumption	500 W
Electricity Requirements	220V / 50Hz

Samples:



Laser Micro Machining System



Overview:

Laser Micro Machining is typically applied to cases where material thickness is less than one millimeter and size is commonly measured in microns. To achieve these dimensions with a Laser machine, the actual focused Laser spot size needs to be significantly smaller than a few microns.

SIL offers a Laser micro machining system that performs a generic machining process which involves the removal of material to a defined depth while providing relief features such as grooves, slots, and profiles without actually cutting through the material. This method is commonly utilized in the medical and electronics sectors.

The short pulse duration is crucial in this application to obtain a shallow depth of marking. Because of the short pulse duration, a shallow melt pool is formed, which is then retrieved, removing very tiny layers of material.

Advantages:

- Forceless and contactless Laser machining.
- Minor heat-affected zone.
- Marginal modifications to the micro-structure.
- Machining free of burrs and bulges.
- High flexibility regarding the design of tiny structures.
- High machining speed.
- High precision.
- Constant machining quality.
- No additional tooling costs by wear.
- Easily capable of being automated.

Features:

- Configuration with CW Fiber Laser or QCW Fiber Laser sources. (As per requirement)
- Suitable for most of the materials, including titanium.
- Intelligent CNC controller with Industry 4.0 feature
- Minor heat-affected zone.
- Zero backlash.
- High precision.
- Linear acceleration up to 3G.
- Resolution up to $\leq \pm 0.0001$ mm.
- For 1000 mm of travel, accuracy is up to 5 microns.
- IOT Enabled – Easy Automation
- Working area - 300 x 300 x 300 mm to 1500 x 1500 x 600 mm.

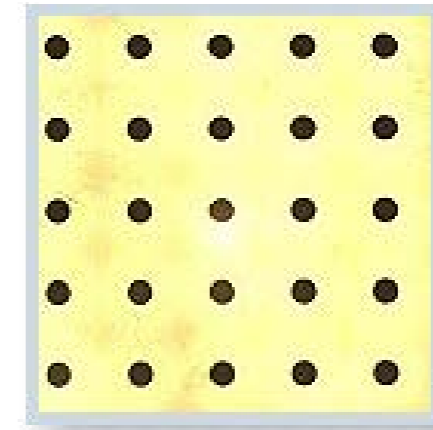
Additional Attachments:

- Rotary axis for micro tube machining.
- Trepanning for micro hole drilling from 0.25 mm to lower and up to 1 mm.
- Granite table is installed to handle 3G acceleration & 50 m / min cutting speed.
- Intelligent CNC controller with Industry 4.0 feature

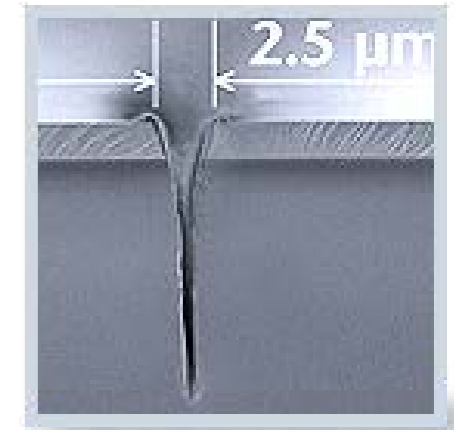
Applications:



Micro Cutting

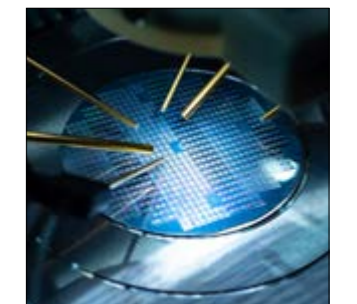
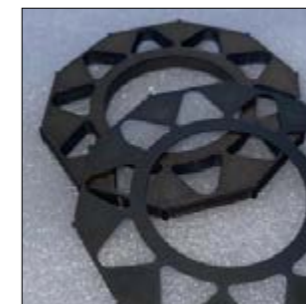
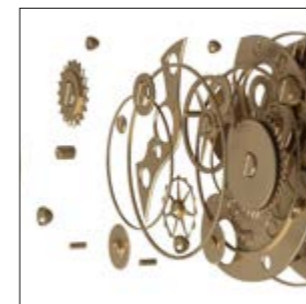


Micro Drilling



Scribing

Samples:



Robotic Laser Cutting - Welding Machine Pro Fx Series



Robotic Laser Welding Machine - Pro



Advantages of Inverted Mount Robots:

Accessibility: Invert-Mount Robots provide better accessibility to large and hard to reach parts. They are ideal for machine tending applications in particular. Drastically increase your reach by allowing the Robot to work in (+/-) X and Y.

Footprint: Robots hung from above save floors pace. Condense the overall footprint of your work cell with an Invert-Mount Robot.

Maintenance: Maintaining machines, positioners, and conveyors is less of a hassle with the Robot up and out of the way.

Advantages of Inverted Mount Robotic Laser Cutting - Welding Machine Pro Fx Series:

- It opens up a world of possibilities for 3D part welding and cutting.
- The anti-collision head protects the head and optics.
- The seam tracker allows error-free welding.
- Pyrometer, to do real-time analysis of the welding heat zone.
- Simultaneously automated and flexible, allowing 3D as well as 2D welding & cutting.
- Machined one-frame assembly ensures that 3D CAD simulation is error-free.
- The addition of a wire feeder attachment enhances the welding quality.
- Auto tool changer, preventing time loss due to changeover.
- Tube Welding and Tube Cutting with an additional rotary axis is designed to process multiple applications in one stand.
- The Positioner adds two more axis to the existing 6-axis system, giving an endless possibility of welding & cutting.
- For the first time in the industry, Dual Pallet is installed with Inverted Robotic Laser Solutions to increase production.

Advantages of Inverted Mount Robotic Laser Welding Machine - Pro:

- It gives the endless possibility of 3D welding parts.
- The Seam Tracker allows error-free welding.
- Pyrometer, to do real-time analysis of the welding heat zone.
- Simultaneously automated and flexible, allowing 3D as well as 2D welding.
- It ensures that 3D CAD simulation is error-free.
- The addition of a wire feeder attachment enhances the welding quality.

Samples:



