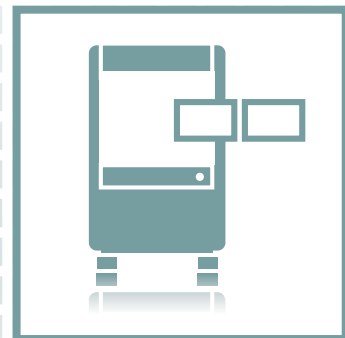


MACHINES

Laser Welder



Laser Welder

The ficonTEC Laser Welder consists of a 3-beam vertical configuration laser welding based on a FOBD (Fiber Optics Beam Delivery) system with an automatic alignment, laser welding, device characterization and testing capabilities that are fully controlled and managed by ficonTEC's proprietary PCS-Plus process/sequence software.

The 3-beam configuration consists of a fixed 120° BAS (Beam Angle of Separation) and a 25° to 90° BAI (Beam Angle of Incidence) from the vertical axis. As a standard the system includes ficonTEC's exclusive AccuView target viewing laser processing heads.

The system's architecture is based on a pneumatically vibration controlled table with a super rigid aluminum gantry structure for securing the 3 FOBDs and an upper tooling on a long travel, counter balanced precision vertical stage.

Key Features

- + PCS Controller with GPIB and DIO boards
- + Sub-micron precision motion system controller
- + Micron precision motion controller
- + IO controller with pneumatic and illumination control
- + Laser diode driver
- + Power meter for alignment functionality
- + 3-beam Nd:YAG welding laser
- + External and internal E-Stop

Housing & Control

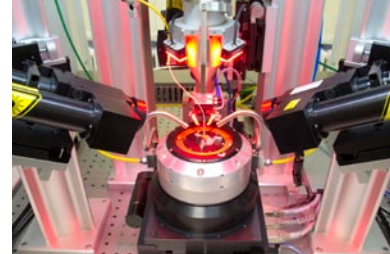
- + Steel base
- + Control system with PC
- + 2x 17" TFT-displays, keyboard & trackball
- + Motion control system for linear and rotary motion system
- + Pneumatic switchboard panel



As a unique feature all ficonTEC machines offer a sophisticated component tracking throughout the entire machine process. All machines run the same machine software for easy operation and portability.

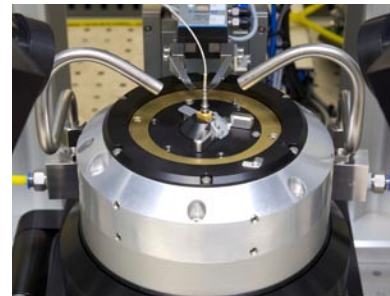
Lower Tooling and Packages

The simple yet very precise lower dock design can accommodate tooling for both active and passive package designs of any geometry. It incorporates electronic contacts and a pneumatic pass through, tooling changes can be achieved in about a minute. Butterfly package tooling as well as TO package tooling offering one handed clamping, reproducible gripping and integral electronic contacts are readily available. Tooling for other package types can be created.



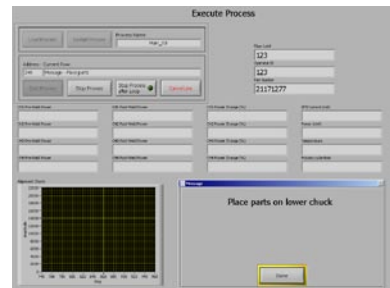
2-Beam Applications

Direct fiber to chip coupling designs as well as confocal optical trains can be assembled with the 2-beam configured Laser Welder. Pneumatically actuated tweezers in the upper tooling assembly of the Laser Welder provide precise gripping pressure control for handling small components. Interchangeable blades with wire-cut features handle cylindrical fibers and lenses as well as rectangular shapes of nearly any size. The narrow profile design reaches into tight spaces inside of rectangular packages and incorporates an inert gas delivery nozzle for superior weld quality.



3-Beam Applications

Coaxial laser diode module and coaxial isolator or WDM module can be processed with a Beam Angle of Incidence of 45° for fillet-type welds or 90° for butt- and lap-style welds. Both single-fiber (active) and multi-fiber (passive) coaxial devices can be assembled with the Laser Welder. An upper collet can be mounted into the upper tooling assemblies to assure firm reproducible gripping of fiber ferrules in vertical welding applications.



Software

ficonteC's Laser Welders are equipped with state of the art R&D and manufacturing process development and control software for:

- + Fully automated routines for 3D and 4D simultaneous alignment and optimization algorithms for the three-piece optical alignment
- + Open-architecture automated and programmable metrology functionalities (electrical and optical), including 2D and 3D power-spatial distribution profiles, LIV device characterization, among many, and other customer specific signal and data processing capabilities
- + Built-in and programmable complete system control, management, and monitoring functionalities including, but not limited to, alignment engine, FOBD system positioning and laser firing, power meter control, current/voltage source control, and TEC interface/control
- + Statistical analysis and process control data acquisition and archiving
- + LaserWeld PCS-PLUS™ - Process Control System software has built-in multi-level password security access for differentiating and managing the manufacturing (i.e. for operators) and engineering activities
- + LaserHammering™ - This patented and automated PWS (Post Weld Shift) correction capability (depending on device package design and welding process) enables correction of 'out-of-spec PWS laser welding results' by detecting the magnitude and direction of the PWS and correcting it using the same laser weldig process

Motion Systems & Specifications

	Lower Stages	Upper Stages	Beam Delivery
Travel	80 x 80 mm x $\pm 180^\circ$	100 mm	25 mm
Speed	80 mm/s	100 mm/s	10 mm/s
Resolution	50 nm/[20 arc-sec]	50 nm	0.5 μm incremental motion
Repeatability	50 nm/[20 arc-sec]	50 nm	0.5 μm per axis
Details	Automated X, Y, Θ_z stages (Z is the vertical/optical axis) with $\sim\varnothing 75$ mm center aperture for lower-tooling, cross roller bearing, and glass scale encoders	Automated Z-stage cross roller bearings, and glass scale encoder	Automated X, Y, Z linear stages, cross-roller bearings, linear encoder

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