



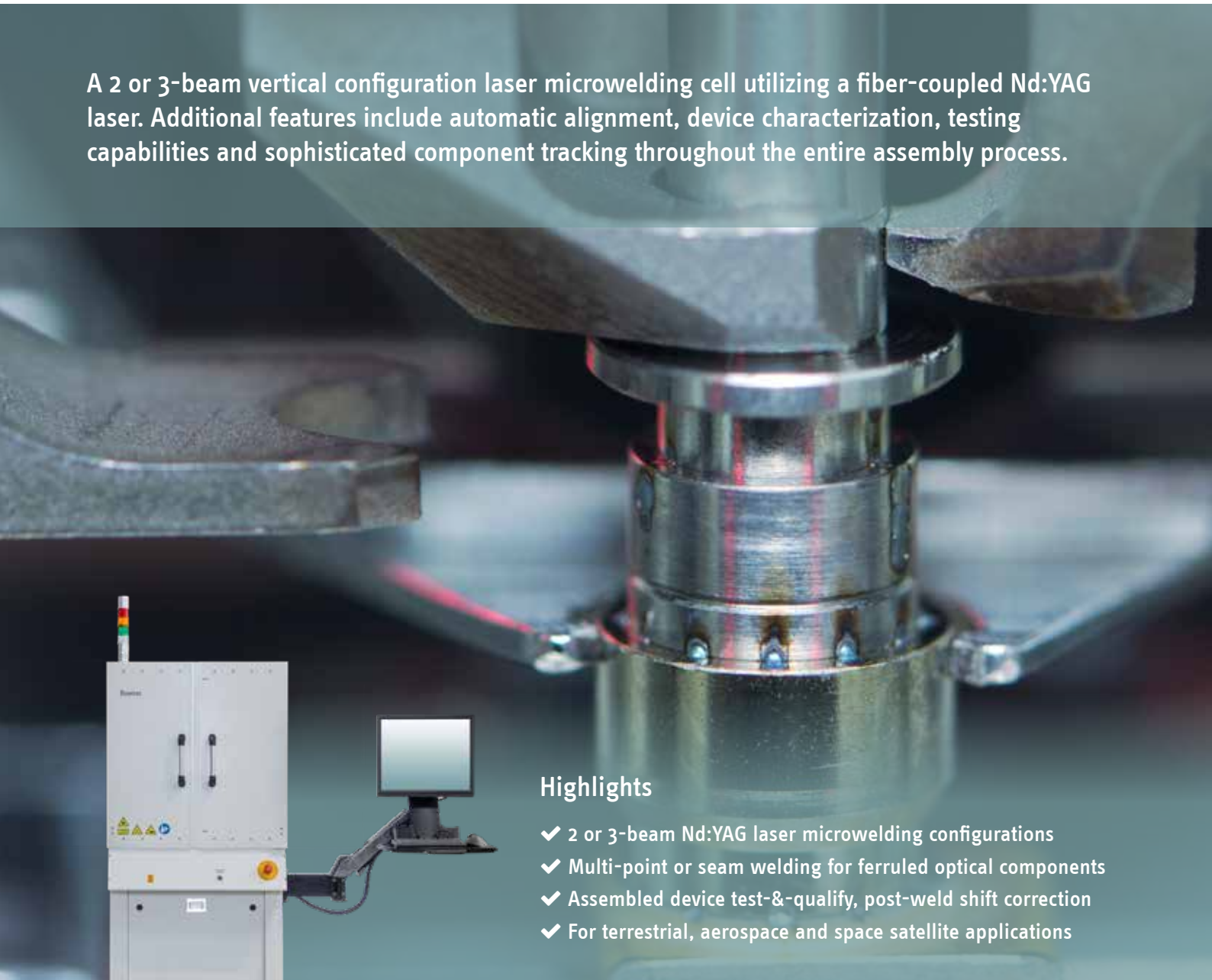
MANUFACTURING MADE LIGHT  
Solutions for integrated photonics. Built to scale.



## LASER WELD

An automated microwelding station for photonics

A 2 or 3-beam vertical configuration laser microwelding cell utilizing a fiber-coupled Nd:YAG laser. Additional features include automatic alignment, device characterization, testing capabilities and sophisticated component tracking throughout the entire assembly process.



### Highlights

- ✓ 2 or 3-beam Nd:YAG laser microwelding configurations
- ✓ Multi-point or seam welding for ferruled optical components
- ✓ Assembled device test-&-qualify, post-weld shift correction
- ✓ For terrestrial, aerospace and space satellite applications



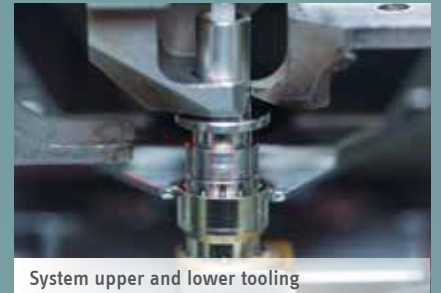
**ficontec**  
photonics assembly & testing

## Fully automated single device electro-optical test

LASER WELD systems are fully automated 'align-&-attach' microwelding production cells for photonics. These systems are typically used for optical assembly and for coupling light out of photonic device packaging (butterfly, TO, custom), using for example, either ferruled optical components or single/multi-fiber coaxial assemblies.

Comprising a vertical dual-stage layout, each stage has its own high-precision multi-axis movement. A 2-beam configuration enables direct fiber to chip coupling and confocal optical train assembly of miniature components in common package formats. A 3-beam configuration features  $45^\circ$  or  $90^\circ$  beam out-of-plane incidence for fillet or butt/lap-style welding of coaxial components, respectively.

The welding process can be performed on passive or actively driven components and can incorporate an optional inert gas feed for improved weld quality. Post-weld characterization and testing procedures enable performance and yield monitoring, with 'post-weld shift' correction capability available for 'out-of-spec' results.



System upper and lower tooling



Equally spaced weld spots



## Software control



Freely configurable operator interface

PROCESS CONTROL MASTER (PCM) is ficonTEC's unified process-oriented control interface that ships with all turn-key stand-alone systems and multiple machine configurations. PCM features an intuitive UI that includes all machine vision, high-resolution positioning and system management software routines required to reliably and repeatably drive passive/active alignment and bonding/welding process hardware.

PCM is also fully enabled for automated mixed-signal electro-optical test and characterization tasks. An up-to-date feature set includes AI-based Deep Learning defect recognition capability, ML-oriented production data monitoring for reduced downtime, and the possibility to direct call functions in Python files.



# LASER WELD

An automated microwelding station for photonics



Laser microwelding in process

## LASER WELD cell for photonics

Laser microwelding stations for micro and nano-fabrication and bonding tasks generally do not provide sufficient motion precision and tolerancing for (fiber-) optical assembly. ficonTEC's LASER WELD systems are the very latest evolution of over 20 years of development for this very application.



### Key features

- Fully automated 2 or 3-beam microwelding station
- Motion system precision and tolerancing for fiber alignment
- Precision goniometer angular control of the lower tooling stage
- Standard and custom device package tooling available
- LaserHammering™ post-weld shift correction capability

### General tasks & applications

- Suitable for all ferruled optical components and devices
- Fiber to chip, fiber to package, single or multi-fiber devices
- Coaxial laser diode modules, optical isolators, WDMs
- For terrestrial, aerospace and space satellite applications

### Operator safety

- Fiber-coupled 2 or 3-beam delivery and Laser Class 1 safety enclosure
- Fully programmable process automation, device characterization and optional ML-based process hardware monitoring reduce operator interaction



120° beam arrangement of laser weld heads

## MANUFACTURING MADE LIGHT

Solutions for integrated photonics. Built to scale.

ficonTEC is the global market leader for automated assembly and test systems for modern optoelectronics and integrated photonic devices. An unequalled breadth in process capability has been developed in serving the needs of a broad range of applications, including telecom/datacom and 5G, sensors and lidar, IoT and mobility, high-power diode laser assembly, and many more.

A unique and modular approach to production equipment design means that each system delivered is the automated and optimized embodiment of a customer-defined process

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Core system specifications	 LW800	 LW1200
Motion system	configurable high-precision multi-axis upper and lower tooling stages 3-axis beam delivery control*	
Device handling	pick-&-place from custom carriers	
Temperature control	temperature-controlled chuck on request	
Load options	manual loading	
Feed options	on request	
Machine vision	system referencing and observation camera options   device and I/O port referencing	
Software features	flexible and powerful process programming   Windows 10 PC	
Minimum connections	120 VAC (or country specific)   air/vacuum   process gas on request   100 Mbit/s network	
Cleanroom compliance	ISO 6**	
Physical features	rugged steel base production cell	
Dimensions (w x b x h, mm)	800 x 1200 x 2000	1200 x 1200 x 2000
Weight (typ., kg)	1300	1800

\* alternative multi-axis configurations optional \*\* others available on request

LASER WELD systems are suitable for single or batch volume 'align-&-attach' production tasks for all optical and fiber-optical component assembly and device integration that requires a laser microweld bonding approach. Various levels of post-weld characterization and correction can be incorporated as needed. Systems can be remotely monitored and updated.