



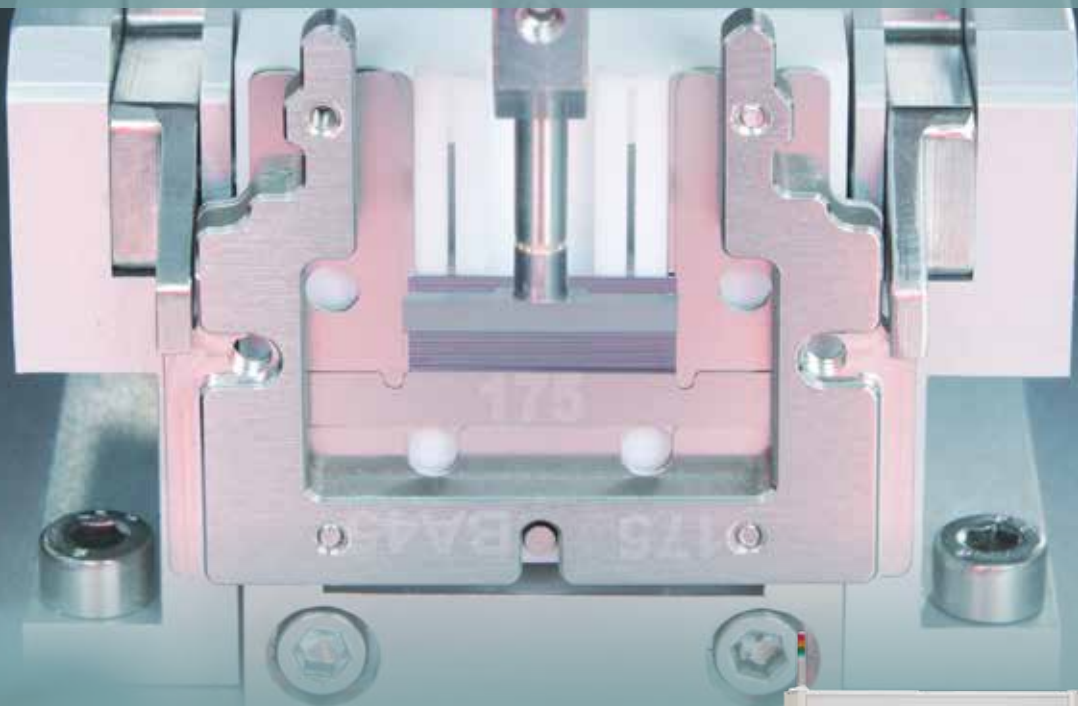
MANUFACTURING MADE LIGHT
Solutions for integrated photonics. Built to scale.



STACKLINE

High-precision device stacking & unstacking

Fully automated precision stacking/unstacking for semiconductor laser diode bars. Typically used in preparation for a coating process, and/or for post-process unstacking and optical inspection of facet and side walls (optional). Configurable as a stand-alone or as an in-line assembly cell.



Highlights

- ✓ Fully automated passive/active photonic device assembly
- ✓ Nominal $\pm 2 \mu\text{m}$, optional $\pm 0.5 \mu\text{m}$ stacking accuracy
- ✓ Integrated high-end flowbox and Class 1 laser safety
- ✓ Optional optical facet and side wall inspection



ficontec
photonics assembly & testing

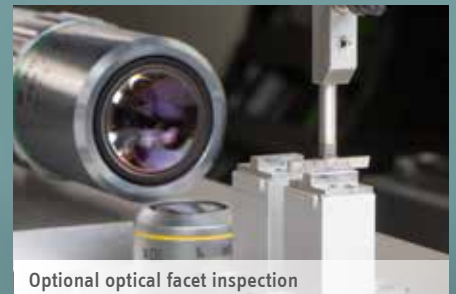
Fully automated semiconductor device stacking and unstacking

STACKLINE systems have been uniquely designed to provide fully automated device stacking and/or unstacking capabilities. This is realized by drawing together selected capabilities from the ficonTEC packaging toolbox – our ubiquitous machine vision system referencing and component recognition/handling, ASSEMBLYLINE's passive alignment routines, and TESTLINE's AI-based defect recognition facet inspection procedures. Seamlessly managed by a common process-oriented control interface, the result is an industry qualified and flexibly programmable stacking/unstacking system that continues to see wide usage.

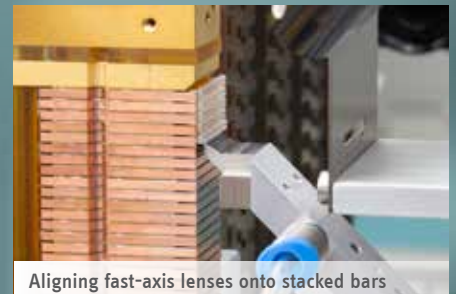
Stacking is typically required in preparation for coating (sputtering) processes, with subsequent post-process unstacking and inspection of facets and (optional) side walls. These systems are compatible with all high-precision, flush or staggered spacer diode bar stacking and unstacking needs. Although primarily available as versatile and highly capable stand-alone cells, they can also be configured as in-line process cells for volume production lines. The latest updates include optional, ML-based process monitoring hardware and software add-ons to ensure minimal downtime.



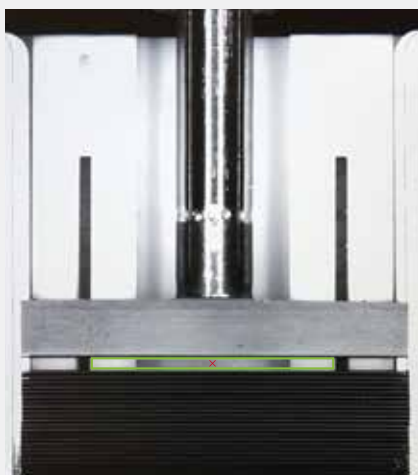
Vacuum pick-up of laser bar from blue tape



Optional optical facet inspection



Aligning fast-axis lenses onto stacked bars



Precise stack process control to $\pm 0.5 \mu\text{m}$

Software control

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 attachment/bonding process hardware.

PCM is fully enabled for laser bar alignment with flush or staggered spacers, for automated inspection, and for optical 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.



STACKLINE

High-precision device stacking & unstacking



STACKLINE in high-power diode bar preparation

High-power laser diode bars find myriad application in materials processing and as medical lasers. The so-called wall-plug efficiency can be improved, for example, by high-quality facet passivation (coating), giving higher optical intensity and brightness at superior electrical characteristics.



Tilted system set-up provides for excellent stacking results



Key features

- High-precision machine vision motion referencing and alignment
- Pick-&-place from/to standard/custom carrier formats
- Nominal +/- 2 µm, optional +/- 0.5 µm alignment accuracy
- Optional dimensional checking and full facet inspection
- Integrated flowbox, electrostatic protection and Class 1 laser safety

Modular & (re-)configurable

- Flexible device and standard/custom carrier handling options
- FAB & HVM-ready - configure as stand-alone or in-line cells
- Performance Services options for ML-based operation
- Add or swap modules to re-configure & re-purpose

General tasks & applications

- Stacking (flush/staggered) of bare singulated laserbars up to 20 mm
- Device sorting from singulated wafers
- Unstacking from, and inspection of coated LD stacks

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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	S1200	S2000
Motion system	multi-axis high-precision alignment	
Device handling	unstacking ONLY pick-&-place to Gel-Pak, Waffle Pack, custom	stacking/unstacking pick-&-place from/to Gel-Pak, Waffle Pack, blue tape, custom
Temperature control	temperature-controlled chuck, +15 to +80 (+/- 0.1) °C	
Load options	manual loading and/or single conveyor	
Feed options	suitable for Jedec or Auer boats, or for customer trays	
Machine vision	system referencing and observation camera options device and I/O port referencing	
Software features	flexible and powerful process programming extended operator-less control Windows 10 PC	
Minimum connections	120 VAC (or country specific) air/vacuum 100 Mbit/s network	
Cleanroom compliance	ISO 6**	
Physical features	rugged steel base production cell integrated flowbox for ISO 7 conditions at working area	
Dimensions (w x b x h, mm)	1200 x 1200 x 2000	1800 x 1200 x 2000
Weight (typ., kg)	1800	2500

** others available on request

STACKLINE systems are suitable for automated, high-precision stacking/unstacking of semiconductor laser diode bars, and are typically used in preparation for a coating (sputtering) process, and/or for post-process unstacking and inspection of the optical facet. Special purpose cells, robotic systems as well as some TESTLINE functionality can be flexibly incorporated to suit customer needs.