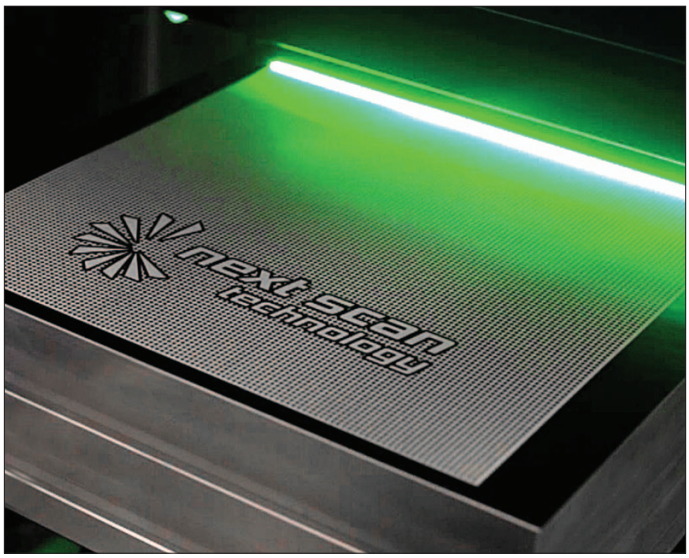
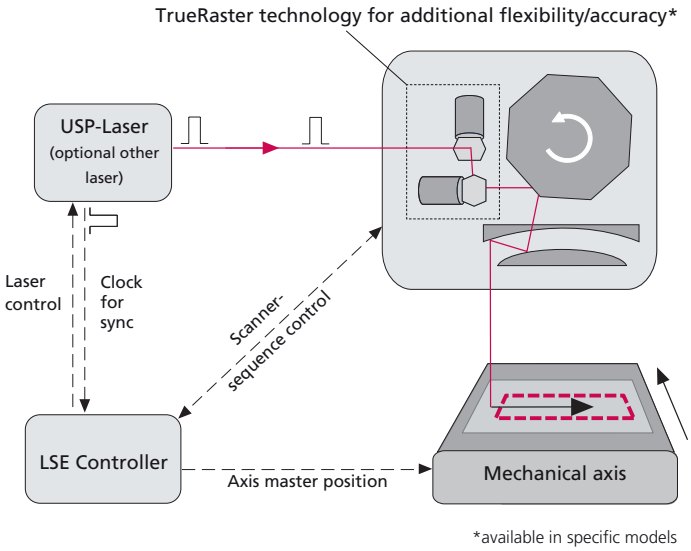
Polygon Scanner Systems





*available in specific models

High-speed Scanner for Line-by-line Processing

For ultra-precise micromachining of diverse materials ultra-short pulse (USP) lasers are the best choice, because cold ablation allows particularly fine, targeted material removal. To achieve industrial-scale productivity, USP lasers must be combined with ultra-fast scanners like a polygon scanner system.

Polygon scanners are particularly advantageous for line-oriented full-surface processing of workpieces and surfaces. Through the high speed, these systems can drastically reduce material processing times. USP laser processing applications range from patterning touchscreen surfaces or scribing solar cells, to micro-drilling and processing of electronic components, glass and plastics, as well as sensor manufacturing.

Next Scan Technology offers a wide range of polygon scanner systems allowing customization for optimum efficiency.

High Throughput Raster Processing

Polygon scanner systems from Next Scan Technology are optimized for highest scan speed stability and accuracy. The scan system employs a rotating polygon mirror for fast line scanning. With the aid of an external feed axis or web moving perpendicular to the polygon wheel's scan direction, a long area can be processed.

The scanner is typically used for full-surface processing in a regular raster. Individual exposure patterns can be produced via a function that allows outputting a user defined bitmap for pixel-accurate control of the processing laser.

Through the integration of high precision actuators and advanced control features such as SuperSync and TrueRaster additional flexibility in scanning strategies and highest accuracy becomes available.

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Full Telecentric Optics

The Line Scan Engine (LSE) provides integrated full telecentric mirrors for a compact all-in-one scan head, to address large areas at the highest performance. The mirror based concept allows for application specific customization when using high power legacy lasers and stitching of scan heads, enabled through a staggered or in-line configuration and complementary controls.

Polygon & Distortion Correction

When required, two high precision actuators are used to permit compensation of polygon mirror inaccuracies as well as image field distortion. This TrueRaster technology delivers calibrated accuracy and ensures a precise, high quality processing raster even under high-throughput conditions.

Synchronization Functionality

Ultra short pulsed lasers normally used with this system are typically equipped with an internal clock source that regulates the time points of possible laser emission. SuperSync provides for proprietary synchronization to trigger the laser to guarantee spot repeatability – vital for high quality micro-machining.

Intelligent Controls

Smart scanning strategies such as interleaving and job-dithering enhance processing quality where proprietary SuperSync and TrueRaster fulfill requirements regarding repeatability and accuracy. These features are particularly vital for requiring spatial separation of single pulses, high line straightness or identical repetitive processing.

Optical specifications	**Wavelength**	**LSE170 STD**	**LSE170 HNA**	**LSE300 STD**
Minimum spot (1/e2) [1]	341-357 nm	15 µm	9 µm	15 µm
	515-535 nm	22 µm	14 µm	22 µm
	1030-1070 nm	45 µm	27 µm	45 µm
Input beam aperture (1/e2)		6 mm	8 mm	11 mm
Input clear aperture		10 mm	13 mm	18 mm
Scan width		170 mm	170 mm	300 mm
Position accuracy		± 10 µm	± 1 µm [2]	± 1 µm [2]
Line straightness		10 µm	2 µm [2]	2 µm [2]
Spot repeatability		< 3 µm [3]	< 3 µm [3]	< 3 µm [3]
Input beam		parallel beam	parallel beam	parallel beam
System specifications				
Scan speed [lines per second]		100-400	100-400	56-224
Moving spot speed		25-100 m/s	25-100 m/s	25-100 m/s
Duty cycle		71%	71%	71%
Optical efficiency		>85% GR/IR / >70% UV		
Average laser power		140 W (>7 ps) 50 W (200 fs)		
Minimum pulse width		> 200 fs		
Scanner to substrate clearance		18 mm	13.7 mm	26.5 mm
Weight		6.8 kg	12.5 kg	21 kg

[1] M2 = 1.0, D(1/e2) = 1.7 x FWHM, larger spot sizes are possible using smaller diameter input beam

[2] Requires TrueRaster technology and calibration - accuracy is determined as average of 20 dot location measurements, calibration accuracy depends on measurement tool performance.

[3] Standard deviation of 20 dot location measurements, requires SuperSync control, see website for supported lasers.

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