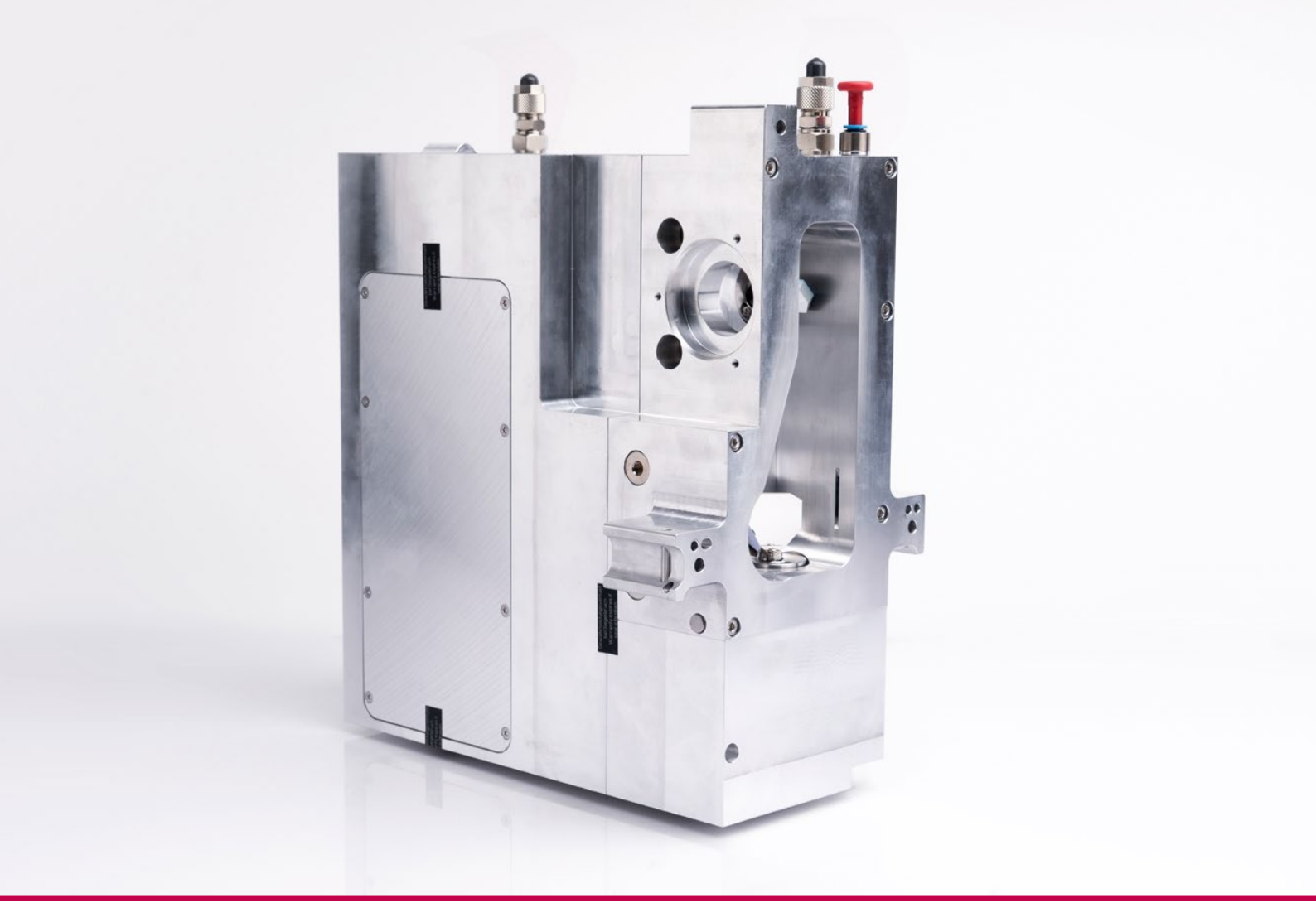


pivot*SCAN*

Scanning with Perfect Telecentricity

- Accurate Single Pivot-point
- Superior Telecentricity
- Highest Precision

SCANLAB
innovators for industry

pivot*SCAN* for Precise Laser Material Processing

Discover the new pivot*SCAN* that revolutionizes the efficiency and precision of your laser material processing. With a three-mirror design, the laser beam originates always from a single pivot-point on the final mirror. This advanced system enables superior telecentricity compared to conventional two-mirror scanners.

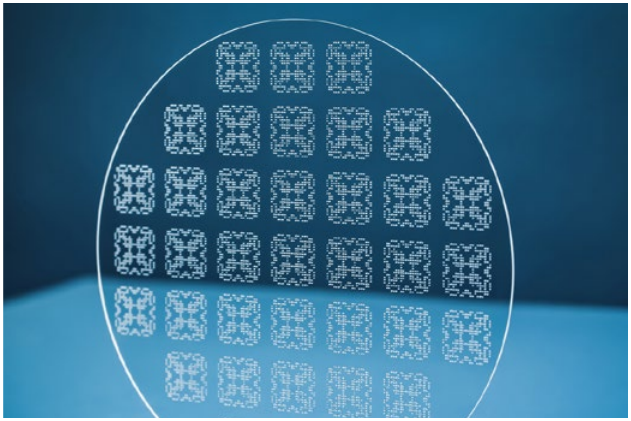
Key Features

- **Fixed Pivot-Point:** The deflected laser beam originates from a single spot, ensuring precise and consistent scanning results.
- **Superior Telecentricity:** The single pivot-point permits optimal optical configurations. This is key for realization of telecentric systems over the entire scan field.
- **High Precision:** The optical configuration allows less aberrations and improved focus quality
- **Advanced Control:** The control is based on *SCAN*motionControl and features precise control algorithms for optimal beam positioning and stability. The pivot*SCAN* can be combined with additional axes, e.g. excelli*SHIFT* and 3D XL*SCAN*.

Target Applications

- **Large Scale Display Applications:** Display foil cutting with the entire work piece in the field of view.
- **Two-Photon Polymerization:** Achieve exceptional precision in microfabrication processes, ensuring the laser beam's incidence is optimal for creating intricate structures.
- **Selective Laser Etching:** Enhance the accuracy and consistency of etching processes, particularly where the solid/air optical interface is critical.
- **Drilling:** Enhance the hole quality in high speed drilling applications and increase the throughput for instance in Through Glass Via drilling applications

Glass cutting



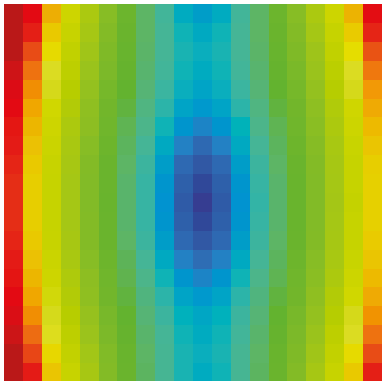
Micro drilled glass wafer

Application photos by Workshop of Photonics, Lithuania

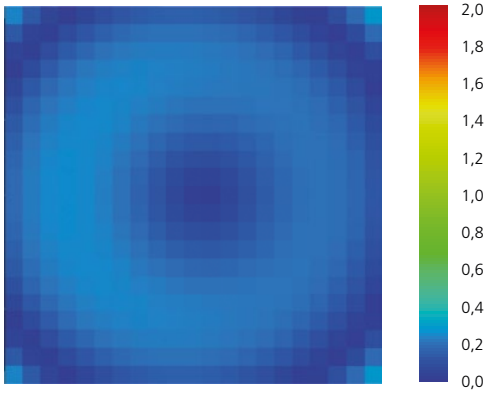
Telecentricity

pivot*SCAN* enables unparalleled telecentricity, ensuring that the laser beam remains perpendicular to the scanning surface across the entire scan field.

A) Standard 2-mirror scan system



B) pivot*SCAN*



The diagrams show the angle of incidence for a standard 2-mirror scan system and the pivot*SCAN*

As a result of non-telecentricity the incident angle varies over the field of view of a standard 2-axis scan system [A].

pivot*SCAN* greatly improves telecentricity [B].

The angle of incidence with the 2-axis scan system varies between 0° in the center and 2° at the edge of the field. With pivot*SCAN* the angle varies between 0° and 0.3°. The remaining non-telecentricity is completely caused by the nonoptimized f-theta lens (f=100 mm, fused silica). If a custom f-theta lens is used this value can be improved further.

Scan area: 45 x 45 mm²

Specifications

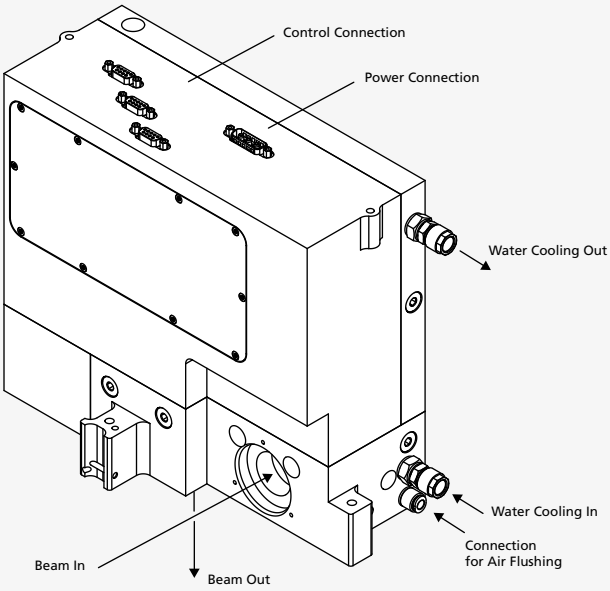
Aperture [mm]	14
Optical Configuration	
Typical scan angle [rad]	± 0.34
Wavelength [nm]	1034
Maximum average laser power [W]	200
Position accuracy of pivot point [µm]	100
Dynamics	
Tracking Error	0
Acceleration [rad/s²]	48,000
Max speed [rad/s]	30

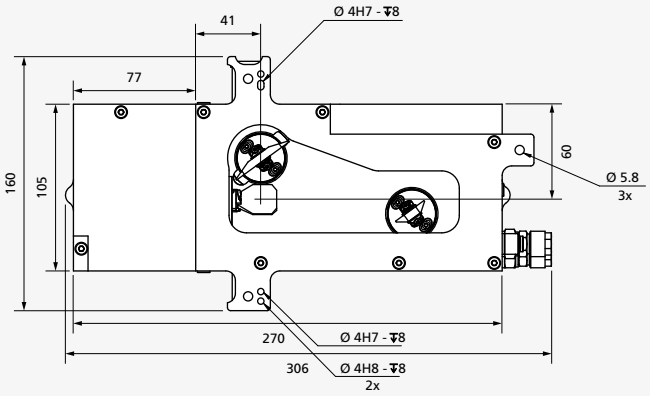
All angles are optical angles.

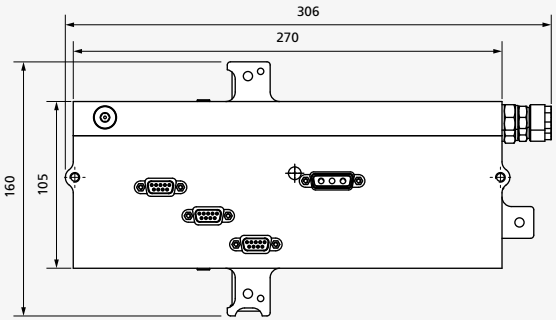
Precision [1]	
8h-drift (after 30 min warm-up)	
Gain [ppm]	40
Offset [µrad]	60
24h-drift (after 3h warm-up)	
Gain [ppm]	40
Offset [µrad]	60
Electronics & Control	
Control Interface Digital	SL2-100
Power Requirements [RMS]	48 V DC (± 2 V), 5 A
System Requirement	RTC6 or RTC6 Ethernet, *SCAN*motionControl, Water cooling
Other Specifications	
Weight [kg]	10

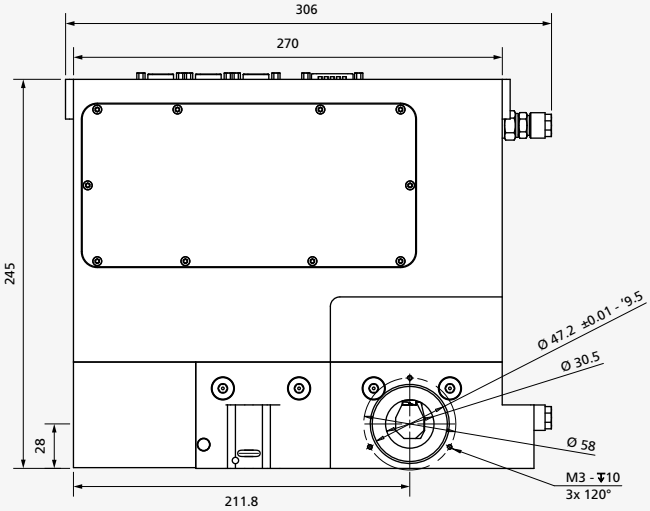
[1] Preliminary

Technical Drawings









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