fiberSYS

Compact Design. Modular Usage. Straightforward Integration.

The fiberSYS is a 3D scan system for lasers with power levels of up to 2 kW. It is based on a low-drift xy scan module and a fast and precise z-axis. The fiberSYS offers a compact sealed housing with a direct fiber connection. This speeds up and facilitates the installation in laser processing machines.

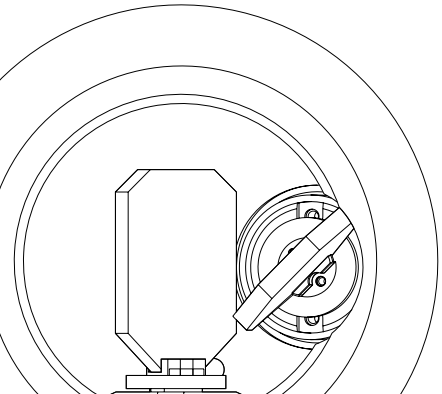
For multi-head systems, the narrow footprint of the fiberSYS allows for maximum overlap of the image fields, which benefits the user through increased productivity of the laser machine.

Key features:

- Modular, compact 3D scan system with integrated z-axis
- *SCAN*ahead control (optional vector tuning)
- Maximum image field overlap in multi-head systems
- Low-drift galvanometer scanner thanks to digital encoders
- Optimized for up to 2 kW single-mode laser
- Interface for process monitoring

Typical applications:

- Additive manufacturing
- Laser welding
- Electromobility
- 3D applications



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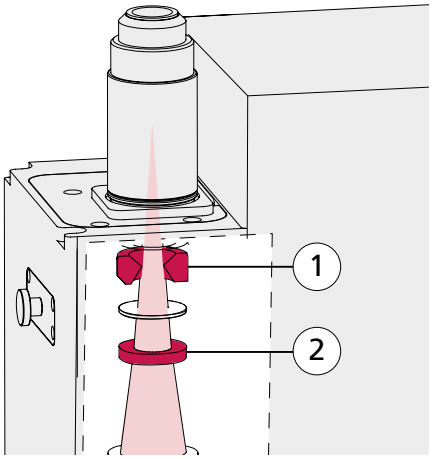
Optimum Integratability

- Fully integrated beam guidance from the fiber adapter, including z-axis
- Efficient water cooling for galvanometer scanners, electronics and beam entrance aperture
- Flexible installation options: top, bottom, front face
- Sealed optics path in a dust- and splash-proof housing (IP 64 rating)
- Torsion-resistant main body ensures a high positional stability of the sub-modules relative to one another
- Replaceable protective window on the beam entrance side prevents contamination when changing the fiber
- Possibility to adapt for a range of lasers by replacing the aperture (1) and diverging lens (2). Thereby, the external dimensions and interfaces remain identical.



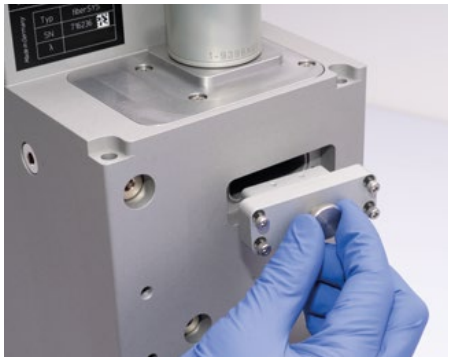
Status and Process Monitoring

- Optomechanical interface for coaxial process monitoring
- High transmission over a wide range of wavelengths
- Can be individually adapted to sensor concept
- Record all key status variables in real time (i*DRIVE* technology)
- Scan mirror monitoring via contactless temperature sensors

Optional additions:

- Open Interface Extension (OIE): Synchronization of sensor and position data for spatially resolved measurements
- Beam splitter cube for simultaneous connection of different sensors, e.g. pyrometer, camera and/or OCT sensor

Direct fiber connection



Replaceable protective window

Process monitoring port with beam splitter cube

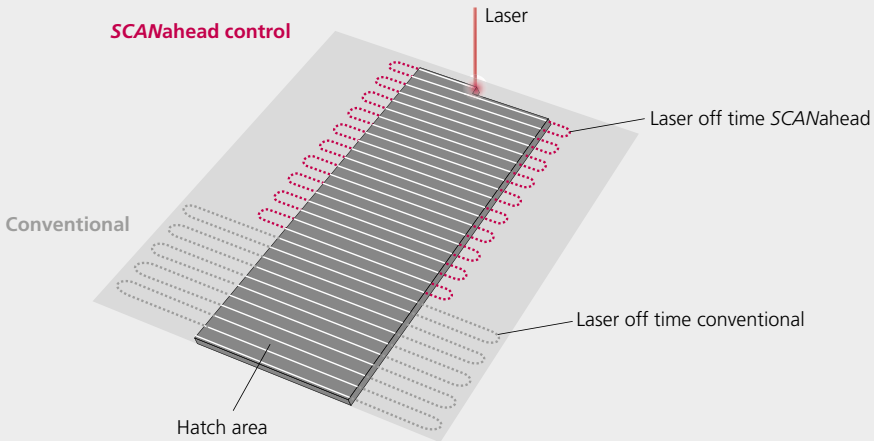
*SCAN*ahead Control

With *SCAN*ahead control, the fiberSYS always reaches the set scan speed using the maximum acceleration. The dynamic potential of the galvos is fully utilized.

In additive manufacturing, two dimensional structures are typically realized by bidirectional hatching. A large part of the process time when using scan systems with conventional control is required for the turnaround times for acceleration and deceleration processes.

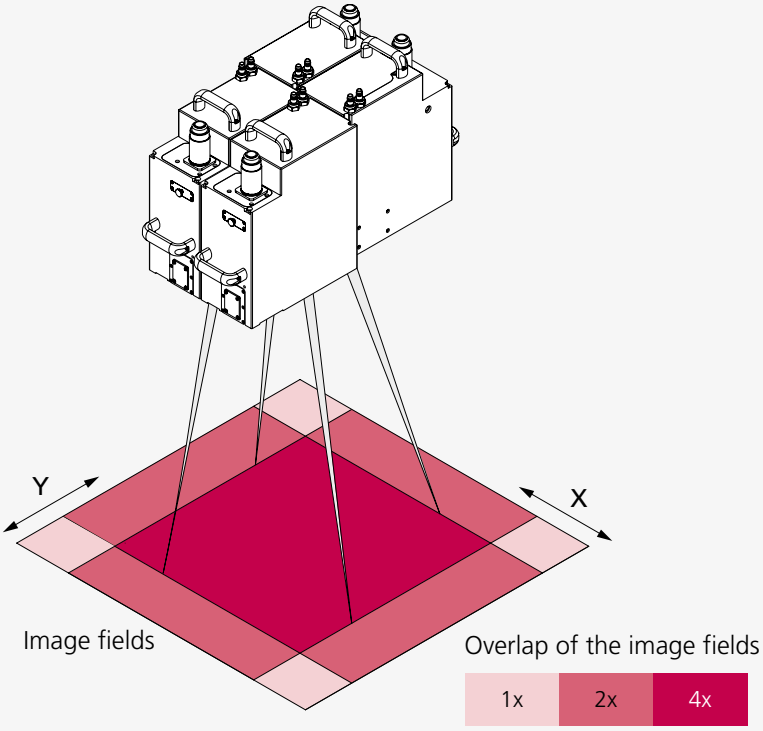
The fiberSYS with *SCAN*ahead control significantly reduce these turnaround times and therefore contribute to a significant increase in productivity.

Example: Additive manufacturing



More information in the *SCAN*ahead video:

Expansion to a multi-head system: high productivity thanks to maximum image field overlap



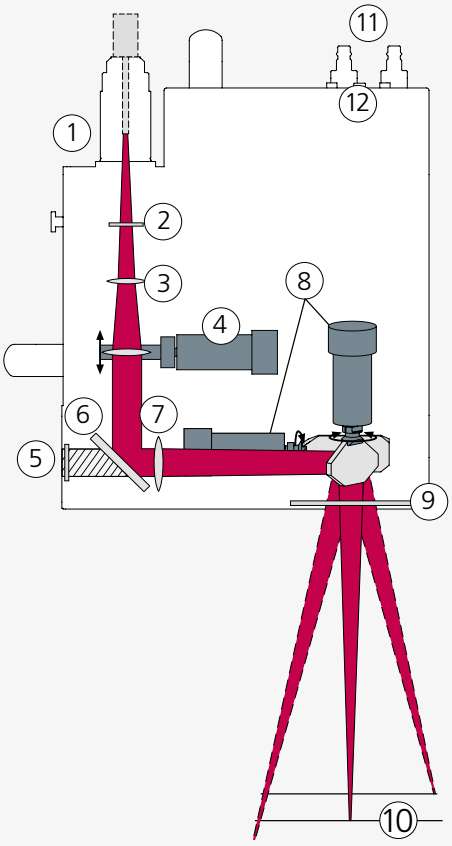
Advantages

- Galvo-based z-axis allows for a slim design, which means 3D scan systems can be arranged in rows (in the x direction) close to one another
- Denser packing than standard systems (in the y direction) thanks to optimized arrangement of the galvanometers in the xy sub-module
- CalibrationLibrary software package (optional) provides support during scan field calibration

Benefits for the user

- Shorter process times due to simultaneous processing of a component using multiple lasers
- Improved productivity thanks to parallel processes in a given process chamber
- Optimized duty cycle of the laser and 3D scan system due to flexible use of the available lasers throughout the entire construction area

Operating principle

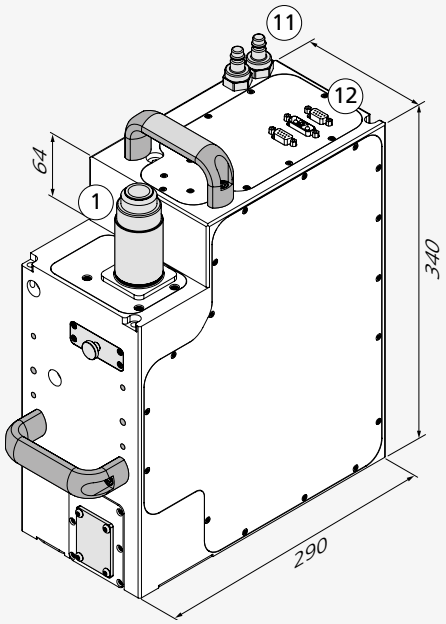


Legend

1 Fiber adapter
2 Replaceable protective window
3 Diverging lens
4 Galvanometer scanner collimation optics and z-axis
5 Connection for process monitoring with protective window
6 Tilted mirror
7 Pre-focus optics
8 Galvanometer scanner with digital encoders
9 Protective window
10 Focal plane
11 Cooling water connections
12 Electrical connections

Dimensions

(in mm)



fiberSYS – Preliminary specifications

(all angle specifications optical)

Typical optical configurations [1]

Image field size [mm²]	450 x 450	550 x 550	650 x 650
100% overlap per image field [mm²] 2x2 scanner	308 x 323	408 x 423	508 x 523
Free working distance from lower edge of scan system [mm]	495	615	730
Rayleigh length [mm]	1.8	2.6	3.5
Average focus diameter in the image field [µm] [2]	55	65	75
Defocus diameter [µm]	approx. 200 – 250	approx. 200 – 250	approx. 200 – 250

Collimation

	Config. 1	Config. 2
Limiting NA (full angle)	160 mrad	224 mrad
Colimation focal length	190 mm	135 mm
Typ. beam divergence (full angle, 1/e²)	100 mrad	140 mrad
Fiber diameter	14 µm	10 µm

The laser in use determines the appropriate configuration. Further configurations on request.

General specifications

Aperture	30 mm
Wavelength	1060 – 1085 nm
Max. laser power [3]	2 kW
Wavelength range for process monitoring [4]	800 – 870 nm and 1450 – 2000 nm
Supply voltage (Requirements)	48 V DC max. 6 A
Dimensions LxWxH in mm [5]	290x140x340
Interface	SL2-100
Water cooling	3 l/min Δp < 4,5 bar Cooling water wetted material: Aluminium
IP code	IP 64
Weight	approx. 20 kg

Precision & stability

Repeatability (RMS)	<0.4 µrad
Position resolution	20 Bit
Nonlinearity [6]	<0.5 mrad
Dither	<1.6 µrad
Temperature drift	
Offset	< 10 µrad/K
Gain	< 5 ppm/K
Long-term drift	
8-hr drift (after 30 min) [7]	
Offset	< 15 µrad
Gain	< 25 ppm
24-hr drift (after 3 hrs) [7]	
Offset	< 15 µrad
Gain	< 25 ppm

Dynamics

Process speed [8]	17 m/s
Acceleration	130.000 rad/s²
Step response [9]	
1% full scale	0.47 ms
10% full scale	1.54 ms
Tracking error XY sub-module (standard tuning)	0 ms
Tracking error Z-axis	<0.84 ms

[1] Other configurations on request
[2] At z=0, M^2=1.05, typ. beam divergence
[3] Depending on the customer-specific optical configuration
[4] Other wavelengths on request
[5] Dimensions without fiber adapter, handles and plug connections
[6] Related to 0.77 rad
[7] Measured in the thermal equilibrium of the system under constant conditions
[8] For an image field of 550 × 550 mm²
[8] Adjusted to 1/1000 full scale

Options

Expansions for process monitoring

- Synchronization of sensor data with RTC data possible using Open Interface Extension (OIE)
- Additional monitoring port via beam splitter cube

Tilted mirror (variants)

- HR mirror for the laser
- Dichroitic beam splitter for process monitoring

Fiber adapters

- QBH/HLC-8
- QD/LLK-D

More information in the fiberSYS video:

01/2026 Information is subject to change without notice.
Product photos are non-binding and may show customized features.

SCANLAB GmbH · Siemensstr. 2a · 82178 Puchheim · Germany
Tel. +49 89 800 746-0 · info@scanlab.de · www.scanlab.de

SCANLAB America, Inc. · 100 Illinois St · St. Charles, IL 60174 · USA
Tel. +1 630 797-2044 · info@scanlab-america.com · www.scanlab-america.com