

smart welding

intelliWELD® 30 FC

Designed for robot-assisted welding applications, this 3D-scan system is capable of swiftly positioning the laser beam along 3D contours. While a robot guides the scan system along a part's contour, the intelliWELD® 30 FC quickly and accurately moves and fine-positions the laser spot. Complex robotic motions and fast robotic repositioning are thereby avoided, thus reducing positioning times between spot welds to a few milliseconds. The result is substantially enhanced utilization of the laser source.

Despite its 30 mm aperture, the intelliWELD® 30 FC occupies a remarkably small volume, making it easily mountable on welding robots, even in difficult-to-access locations. Its optics are optimized for fiber-coupled disk or fiber lasers with powers up to 8 kW.

The intelliWELD® 30 FC incorporates SCANLAB's fully digital iDRIVE® technology, offering an integrated approach to laser and process safety. The iDRIVE® technology allows real time monitoring of all important scan head status parameters. A software-independent interlock signal indicates abnormal operational states.



Typical Fields of Application:

- Robot-assisted welding ("remote welding")
- 3D applications
- Processing-on-the-fly

intelliWELD® 30 FC

Principle of Operation

The laser beam is fiber delivered to the scan system's water-cooled collimator and then directed to the scan system's moving deflection mirrors. A scan objective at the system's beam exit focuses the beam onto the working plane.

The variable collimator's optic is dynamically driven along the optical axis via the linAXIS® linear axis, thereby altering the collimated laser beam's divergence as well as the overall system's focal length.

A dual-pane protective window serves to protect the scan objective from welding spatter.

The scan system is equipped with a sealed housing and a quick-swap protective window system.

A PC-based controller can operate the complete 3D scan system via an optical interface.

Process Monitoring

Light or radiation emanating from the work piece and returning via the deflection mirrors is decoupled from the optical path for potential analysis by additional process monitoring equipment.

Control

The intelliWELD® 30 FC incorporates SCANLAB's fully digital iDRIVE® technology, offering an integrated approach to laser and process safety. It allows real time monitoring of all important scan head and protective window status parameters. This facilitates detection of process miss-queues and enables advanced remote-diagnostics. A software-independent interlock signal, indicating abnormal operational states, can be used to switch the system to a predefined state or trigger an automatic

Specifications (all angles are in optical degrees)

Characteristics of the Collimator

Wavelength	1030 nm - 1090 nm
Focal length	110 mm
Maximum laser power (with specified cooling)	8000 W
Limiting numerical aperture	0.125
Fiber adapter	Optoskand QBH, Optoskand QS (Trumpf LLK-B), Optoskand QD (Trumpf LLK-Auto), other types on request

Step Response Time (with Step Tuning)

(settling to 1/1000 of full scale)

1% of full scale	1.2 ms
10% of full scale	3.5 ms
100% of full scale	11 ms

Typical Speeds (with Vector Tuning)

Processing speed	4 rad/s
Positioning speed	50 rad/s

Dynamic Performance

Tracking error	0.6 ms
Repeatability	< 22 µrad
Long-term drift over 8 hours (after warm-up)	< 0.6 mrad

Optical Performance

Typical scan angle	±0.35 rad
Gain error	< 5 mrad
Nonlinearity	< 3.5 mrad

Power Requirements

±(15+1.5) V DC, max. 8 A each

Input and Output Signals

XY2-100 Enhanced or optical data transfer

Weight (with objective)

approx. 27 kg

Operating Temperature

25 °C ± 10 °C

Typical Water Requirements

3 l/min at 20°C and Δp<0.1 bar, p<4 bar

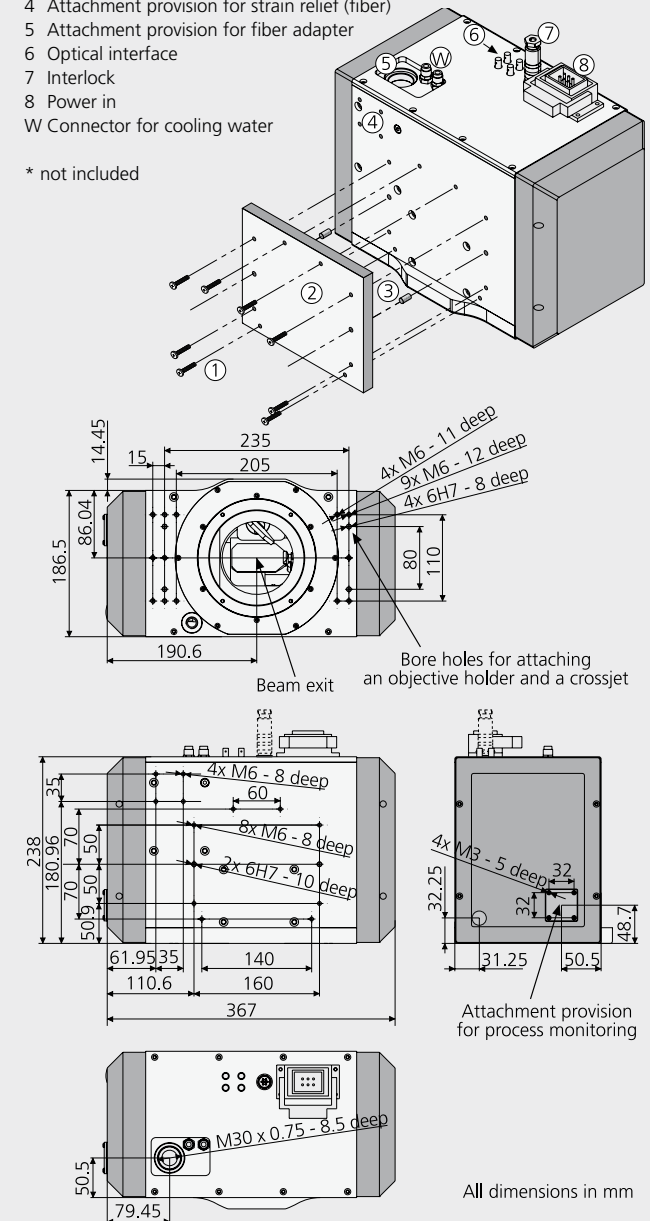
Typical optical configurations with scan objective

Focal length of objective	460 mm	330 mm
Wavelength objective	1030 nm - 1090 nm	1030 nm - 1090 nm
Image Field Size (square)	(220 x 220) mm ²	(185 x 185) mm ²
Image Field Size (elliptical)	(385 x 255) mm ²	(240 x 200) mm ²
Focus Range in Z Direction	up to ± 110 mm	up to ± 60 mm
Focus Diameter	630 µm (with 150 µm fiber)	600 µm (with 200 µm fiber)

Legend

- 1 Mounting screws (M6 threads) *
 - 2 Flange (robot adapter plate) *
 - 3 Alignment pins (6_{H6}) *
 - 4 Attachment provision for strain relief (fiber)
 - 5 Attachment provision for fiber adapter
 - 6 Optical interface
 - 7 Interlock
 - 8 Power in
- W Connector for cooling water

* not included



All dimensions in mm



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