

SUPERSCAN IV-30



2-AXIS DEFLECTION UNITS

FOR CHALLENGING INDUSTRIAL APPLICATIONS



- Control via SL2-100 protocol 20 bit or XY2-100 protocol 16 bit
- Greatly reduced power loss and minimal heat development thanks to digital PWM output stages
- Dynamic responses and high speeds for maximum productivity, especially in MOTF applications
- Wide range of mirror substrates and coatings for diverse applications
- Input aperture: 30 mm

DIGITALLY CONTROLLED, DYNAMIC AND VERSATILE

YOUR BENEFITS

The SUPERSCAN IV's model-based, digital regulation offers extremely dynamic responses and final speeds, which really come into play when used in MOTF-applications (Marking-and-processing-On-The-Fly) in conjunction with one of our linear translator modules. The robust, water-cooled master block design, combined with optional air flushing, enables applications at up to 6 kW laser power.

CONFIGURABLE THROUGH AND THROUGH

Lenses, protective glass, and mirror substrates and coatings are available for all standard laser types, wavelengths, light densities, focal lengths and processing areas. The control electronics were designed to be flexible to enable the configuration of additional sets of control parameters (tuning options). We would be happy to provide a customized configuration of the SUPERSCAN IV for your application.

TYPICAL APPLICATIONS

With the SUPERSCAN IV, RAYLASE presents the ideal laser solution for material processing applications that demand high speeds and dynamic responses. In particular, the scribing, perforation and cutting of plastic sheets and paper webs in the packaging industry and the marking of electronic components are natural applications for the SUPERSCAN IV. Speed and dynamic responses are guaranteed, thanks to digital control and powerful PWM output stages. When combined with our high power camera adapter, the SUPERSCAN IV becomes the ideal remote welding module for mounting on robots and portal systems with optional process monitoring.

INNOVATION AND QUALITY

Innovation and maintaining high product quality standards are our priorities at RAYLASE. All our products are developed, built and tested in our own laboratories and production facilities. Through our world-wide support network we can offer best maintenance and rapid service for our customers.

SUPERSCAN IV-30

GENERAL SPECIFICATIONS

Power supply	Voltage	+30 V or +48 V	Typical deflection		± 0.393 rad
	Current	2 A RMS, max. 5 A	Resolution XYZ-100-E 16-Bit		12 µrad
	Ripple/ Noise	Max. 300 mVpp, @ 20 MHz bandwidth	Resolution SL2-100 20-Bit		0.76 µrad
Ambient temperature		+15°C to +35°C	Repeatability (RMS)		< 2.0 µrad
Storage temperature		-10°C to +60°C	Position noise (RMS)		< 3.2 µrad
Humidity		≤ 80 % non-condensing	Temperature Drift	Max. Gain drift ¹	15 ppm/K
IP Code		64		Max. Offset drift ¹	10 µrad/K
Interface signals	Digital	XYZ-100-Enhanced protocol SL2-100 protocol	Long-term drift 8 h without water tempering ¹		< 60 µrad
			Long-term drift 8 h with water tempering ^{1,2}		< 40 µrad

¹ Angles optical. Drift per axis, after 30 min warm-up, at constant ambient temperature and process stress.
² After 30 min warm-up, under varying process loads, with water temperature control set for ≥ 2 l/min and 22°C water temperature.

APERTURE DEPENDENT SPECIFICATIONS – MECHANICAL DATA

Deflection unit	SUPERSCAN IV
Input aperture [mm]	30
Beam displacement [mm]	36.0 (SC), 35.4 (QU)
Weight (without objective) [kg]	approx. 5.5
Weight type stainless steel "S" [kg]	approx. 12.0
Dimension (L x W x H) [mm]	203.0 x 159.0 x 150.0

MIRROR VARIATIONS

Wavelengths	Substrate
420 nm – 480 nm	QU
425 nm – 465 nm + AL	QU
515 nm	SC
515 nm – 532 nm + AL	QU
780 nm – 980 nm + AL	QU
900 nm – 1.100 nm + AL	QU, SC
1,064 nm	SC, QU
1,020 nm – 1,040 nm (high power coating > 3 kW)	QU
1,060 nm – 1,080 nm (high power coating > 3 kW)	QU
1.060 nm – 1.090 nm + AL	SC
10,600 nm	SC

QU = Quartz, SC = Silicon Carbide

TYPE DEPENDENT SPECIFICATIONS – TUNING

Tuning	Description
Vector tuning	Optimized tuning for a wide application spectrum and main focused on the processing speed
Fast Vector Tuning	Optimized tuning for the best combination of high dynamic performance and high speed

TYPE DEPENDENT SPECIFICATIONS – DYNAMIC DATA

Deflection unit	SUPERSCAN IV-30-QU		SUPERSCAN IV-30-SC			
Tuning	Vector		Vector		Fast Vector	
Processing speed [rad/s] ¹	30 @ 30 V	50 @ 48 V	40 @ 30 V	65 @ 48 V	30 @ 30 V	50 @ 48 V
Positioning speed [rad/s] ¹	30 @ 30 V	50 @ 48 V	40 @ 30 V	65 @ 48 V	30 @ 30 V	50 @ 48 V
Tracking error [ms] ²	0.48		0.30		0.24	
Step response time at 1 % of full scale [ms] ³	1.2		0.8		0.65	

¹ See "Calculation speed". ² Calculation acceleration time approx. 1.8 x tracking error. ³ Settling to 1/5,000 of full scale.

Calculation speed

Field speed = Focal length F-Theta lens x Positioning speed:

Example 1: SUPERSCAN IV-30-SC with F-Theta Lens f = 163 mm, Positioning speed 65 rad/s (48 V)

$$v = 163/1000 \times 65 = 10,6 \text{ m/s}$$

Example 2: SUPERSCAN IV-30-QU with F-Theta Lens f = 254 mm, Positioning speed 50 rad/s (48 V)

$$v = 254/1000 \times 50 = 12,7 \text{ m/s}$$

Mirrors and Lenses: Scan mirrors and objectives with optimized mounts are available for all typical laser types, wavelengths, power densities, focal lengths and working fields. Customer specific configurations are also possible. Please contact the RAYLASE support team for specific information and possible combinations on +49 8153 9999 699 or support@raylase.de.

Options: The SUPERSCAN IV deflection units provide two types of water-connections for the electronic components and galvanometer scanners: straight (W) connectors and 90° (W2) connectors along with air-cooling (A) of the deflection mirrors. This ensures constant working conditions and excellent long-term stability, thus guaranteeing reliable operation even in high power laser applications.

The SUPERSCAN IV deflection units can also be operated without temperature control by cooling water. In consequence the drift values may increase.

AIR COOLING

Specifications	
Compressed air ¹	Clean air free of water and oil

¹ ISO 8573-1:2010 [1:0(0.05):0(0.005)]

Flow rate	Pressure drop
50 – 100 l/min	1.0 bar – 1.5 bar

WATER TEMPERATURE CONTROL

Specifications	
Water ¹	Clean tap water with additives
Temperature	22°C – 28°C
Max. water pressure	< 3 bar

¹ **Caution:** When using cooling water including deionised water, suitable additives must be used to prevent the growth of algae and protect the aluminium parts against corrosion.

Flow rate	Pressure drop
2 l/min	0.4 bar
4 l/min	0.8 bar
6 l/min	1.2 bar

Additive recommendations (Please consult your additive supplier for dosage information):

Standard industrial applications: Products of company NALCO, e.g. CCL105 (Premix) or TRAC105A_B (Additiv)

Food & beverage, packaging applications: Polypropylene glycol of company Dow Chemical, e.g. DOWCAL N

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