

SUPERSCAN IV-20



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 speed for maximum productivity, in particular with structuring applications
- Wide range of mirror substrates and coatings for diverse applications
- Input aperture: 20 mm

DIGITALLY CONTROLLED, DYNAMIC AND VERSATILE

YOUR BENEFITS

The SUPERSCAN IV-20's model-based, digital control offers extremely dynamic responses and final speeds, which really come into play when used in marking processes and in extremely fast but precise structuring processes. The robust, water-cooled master block design enables applications at up to 3 kW laser power when quartz mirrors are used.

CONFIGURABLE THROUGH AND THROUGH

Lenses, protective glass, and mirror substrates and coatings are available for all standard laser types, wavelengths, power densities, focal lengths and processing areas. This allows to handle a wide range of tasks with best quality and optimized throughput. We would be happy to provide a customized configuration of the SUPERSCAN IV for your application.

TYPICAL APPLICATIONS

Natural applications include, in particular, micro welding and wobble welding, but also the marking of electronic components. Speed and dynamic responses are guaranteed, thanks to digital control and powerful PWM output stages. When combined with our camera adapter and MVC components, the SUPERSCAN IV-20 is the perfect precision tool with process monitoring. The SUPERSCAN IV-20 is emerged for the hatching in the additive manufacturing.

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.

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GENERAL SPECIFICATIONS

Power supply	Voltage	+30 V or +48 V	Typical deflection		± 0.393 rad
	Current	2 A RMS, max. 5 A	Resolution XY2-100-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)		< 4.5 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	XY2-100-Enhanced protocol SL2-100 protocol	Long-term drift 8 h without water temperature control ¹		< 60 µrad
			Long-term drift 8 h with water temperature control ^{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-20 QU / SI / SC
Input aperture (mm)	20
Beam displacement (mm)	26.0
Weight (without objective) (kg)	approx. 5.5
Dimension (L x W x H) (mm)	203.0 x 159.0 x 150.0 / 160.5 ¹

¹ AXIALSCAN model, output plate for protection window

MIRROR VARIATIONS

Wavelengths	Substrate
355 nm	QU
532 nm	QU, SC
1,064 nm	QU, SC
10,600 nm	SI, SC

QU = quartz, SI = silicon, SC = silicon carbide

TYPE DEPENDENT SPECIFICATIONS – TUNING

Tuning	Description
Vector tuning (VC)	Optimized tuning for a wide range of applications mainly focused on processing speed, other tunings on request

TYPE DEPENDENT SPECIFICATIONS – DYNAMIC DATA

Deflection unit	SUPERSCAN IV-20 QU	SUPERSCAN IV-20 SC	SUPERSCAN IV-20 SI
Tuning	VC	VC	VC
Processing speed (rad/s) ¹	45 @ 30 V	50 @ 30 V	45 @ 30 V
	50 @ 48 V	75 @ 48 V	60 @ 48 V
Positioning speed (rad/s) ¹	45 @ 30 V	50 @ 30 V	45 @ 30 V
	50 @ 48 V	75 @ 48 V	60 @ 48 V
Tracking error (ms)	0,28 ²	0,20 ²	0,25 ³
Step response time at 1% of full scale (ms) ⁴	0,70	0,50	0,62

¹ See "Calculation of speed". ² Calculation acceleration time approx. 1.7 x tracking error. ³ Calculation acceleration time approx. 2.0 x tracking error

⁴ Settling to 1/5,000 of full scale.

Calculation of speed

Speed in working field = Focal length F-Theta lens x Positioning speed:

Example: SUPERSCAN IV-20 SC with F-Theta Lens f = 163 mm, Positioning speed 75 rad/s (48 V)

$$v = 163/1000 \times 75 = 12.2 \text{ m/s}$$

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 88 98-0 or support@raylase.de.

Options: The SUPERSCAN IV-20 deflection units provide water temperature control (W) for the electronic components and galvanometer scanners. This ensures constant working conditions and excellent long-term stability, thus guaranteeing reliable operation even in high power laser applications.

The SUPERSCAN IV-20 deflection units can also be operated without temperature control. In consequence the drift values may increase.

WATER TEMPERATURE CONTROL

Specifications	Flow rate	Pressure drop
Water ¹	2 l/min	0.4 bar
Temperature	4 l/min	0.8 bar
Max. water pressure	6 l/min	1.2 bar

¹ **Caution:** When using cooling water, even if it is deionized water, suitable additives must be used to prevent the growth of algae and protect the aluminium parts against corrosion.

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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