SUPERSCAN IV-15

2-AXIS DEFLECTION UNITS

FOR CHALLENGING INDUSTRIAL APPLICATIONS

DIGITAL CONTROL

- Control via SL2-100 protocol 20 bit or XY2-100 protocol 16 bit
- Digital driver board (PWM) with significantly reduced power loss and minimal heat development
- Dynamic responses and high speeds for maximum productivity
- Wide range of tunings, mirror substrates and coatings for diverse applications
- Input aperture: 15 mm

DYNAMIC, FAST AND VERSATILE

YOUR BENEFITS

The SUPERSCAN IV-15's model-based, digital control offers extremely dynamic responses and speeds up to 75 rad/s, which really come into play in marking – and extreme fast, but precise-applications. The robust, water-cooled master block design enables applications at up to 2 kW laser power when using quartz scan mirrors.

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 also be happy to help you put together the perfect configuration for your application.

TYPICAL APPLICATIONS

In particular, the hatching in Additive Manufacturing or wobble welding and the marking of electronic components as well as the cleaning are natural applications for the SUPERSCAN IV-15. 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-15 becomes the ideal precision tool with 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-15

2-AXIS DEFLECTION UNITS

FOR CHALLENGING INDUSTRIAL APPLICATIONS

GENERAL SPECIFICATIONS

Power supply	**Voltage**	30 V or 48 V
	Current	2 A RMS, max. 5 A
	Ripple/ Noise	Max. 200 mVpp, @ 20 MHz bandwidth
Ambient temperature		+15°C to +35°C
Storage temperature		-10°C to +60°C
Humidity		≤ 80 % non-condensing
IP Code		64
Interface signals	**Digital**	XY2-100-Enhanced protocol SL2-100 protocol

Typical deflection		± 0.393 rad
Resolution XY2-100-E 16-Bit		12 µrad
Resolution SL2-100 20-Bit		0.76 µrad
Repeatability (RMS)		< 2.0 µrad
Position noise (RMS)		< 4.5 µrad
Temperature Drift	**Max. Gaindrift [1]**	15 ppm/K
	Max. Offsetdrift [1]	10 µrad/K
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**
Input aperture [mm]	15
Beam displacement [mm]	18.1 (QU, SI), 18.0 (SC)
Weight (without objective) [kg]	approx. 3.2
Dimension (L x W x H) [mm]	170.0 x 125.0 x 117.5

MIRROR VARIATIONS

Wavelengths	**Substrate**
355 nm	QU
532 nm	QU, SI
1,030 nm	SC
1,064 nm	QU, SI, SC
1,060 nm – 1,080 nm (high power coating)	QU
10,600 nm	SI, SC

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

TYPE DEPENDENT SPECIFICATIONS – TUNING

Tuning	**Description**
Vector tuning (VC)	Optimized tuning for a wide range of applications with emphasis on processing speed
C-Tuning (C)	Optimized tuning for long vectors at highest speeds
Hatching Tuning (H)	Optimized tuning for high precision beam deflection and fastest beam direction change during hatching

TYPE DEPENDENT SPECIFICATIONS – DYNAMIC DATA

Deflection unit	**SUPERSCAN IV-15-QU**		**SUPERSCAN IV-15-SI**	**SUPERSCAN IV-15-SC**	
Tuning	VC	C	VC	VC	H
Processing speed [rad/s] [1]	45 @ 30 V 50 @ 48 V	- 200 @ 48 V	50 @ 30 V 65 @ 48 V	55 @ 30 V 75 @ 48 V	30 @ 30 V 30 @ 48 V
Positioning speed [rad/s] [1]	45 @ 30 V 50 @ 48 V	- 200 @ 48 V	50 @ 30 V 65 @ 48 V	55 @ 30 V 75 @ 48 V	30 @ 30 V 30 @ 48 V
Tracking error [ms]	0.19 [3]	0.30 [4]	0.16 [3]	0.14 [3]	0.12 [3]
Step response time at 1% of full scale [ms] [2]	0.49	0.65	0.43	0.37	0.47

[1] See "Calculation of speed". [2] Settling to 1/5,000 of full scale. [3] Calculation acceleration time approx. 1.9 x tracking error.
[4] Calculation of acceleration time approx. 2.3 x tracking error

Calculation of speed
Speed in working field = Focal length F-Theta lens x Positioning speed:
Example 1: SUPERSCAN IV-15-SC with F-Theta Lens f = 163 mm, Positioning speed 75 rad/s (48 V), v = 163/1000 x 75 = 12.2 m/s
Example 2: SUPERSCAN IV-15-QU with F-Theta Lens f = 254 mm, Positioning speed 50 rad/s (48 V), v = 254/1000 x 50 = 12.7 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-15 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-15 deflection units can also be operated without temperature control (N). In consequence the drift values may increase.

WATER TEMPERATURE CONTROL

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

Flow rate	**Pressure drop**
2 l/min	0.4 bar
4 l/min	0.8 bar
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 (Additive)
Food & beverage, packaging applications: Polypropylene glycol of company Dow Chemical, e.g. DOWCAL N

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