

# SUPERSCAN V-15



2-AXIS DEFLECTION UNITS

FOR CHALLENGING INDUSTRIAL APPLICATIONS



- Positioning of the laser with 20 bit resolution with the SL2-100 protocol
- Minimal drift and extremely low noise thanks to digital encoder technology
- Extreme acceleration and precise laser guidance for sharp corners and edges
- Recording and diagnosis of all properties
- Input aperture: 15 mm

## FULLY DIGITAL FEEDBACK CONTROL, FAST AND PRECISE

### YOUR BENEFITS

A fully digital feedback control electronics inside the SUPERSCAN V provides excellent dynamics and continuous monitoring of e.g. the position of the mirrors and their speed. Depending on the applied protocol (SL2-100 or XY2-100), the mirrors can be positioned with a resolution of up to 20 bits. Thanks to the enormous acceleration and maximum speed of the digital galvanometers, the SUPERSCAN V performs also laser jobs with sharp edges extremely fast and precise.

### CONFIGURABLE IN AND OUT

The lenses and lightweight SC and QU mirrors are suited for all common laser types, wavelengths, power levels, focal distances and working fields. The control electronics can also support additional sets of control parameters (tuning options). We would also be happy to help you put together the perfect configuration for your application.

### TYPICAL APPLICATIONS

SUPERSCAN V is the right choice for various high-end applications in laser processing, where highest accuracy is required. This is continuously ensured by the digital feedback control of the mirror positions. Especially applications like marking, welding, drilling or structuring of semiconductor wafers, medical products and security features of documents and chip cards benefit from the precision and speed of the SUPERSCAN V scan head.

### 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.

## GENERAL SPECIFICATIONS

Power supply	Voltage	30 V or 48 V
	Current	3 A RMS, Max. 10 A
	Ripple/ Noise	Max. 200 mVpp, @ 20 MHz bandwidth
Ambient temperature		+15 °C to +35 °C
Humidity		≤ 80 % non-condensing
IP-Code		65
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)		< 0.4 µrad
Position noise (RMS)		< 2.0 µrad
Temperature drift	Max. Gaindrift <sup>1</sup>	8 ppm/K
	Max. Offsetdrift <sup>1</sup>	15 µrad/K
Long-term drift 8 h without water tempering <sup>1</sup>		< 50 µrad
Long-term drift 8 h with water tempering <sup>1,2</sup>		< 30 µrad

<sup>1</sup> Angles optical. Drift per axis, after 30 min warm-up, at constant ambient temperature under varying process stress.

<sup>2</sup> After 30 min warm-up, even under varying process stress with water tempering at 4.5 l/min and 22 °C water.

## APERTURE DEPENDENT SPECIFICATIONS – MECHANICAL DATA

Deflection unit	SUPERSCAN V
Input aperture (mm)	15
Beam displacement (mm)	18.27 (SC), 18.33 (QU)
Weight (without objective) (kg)	approx. 3.2
Dimension (mm) (L x W x H)	170.0 x 125.0 x 117.5

## MIRROR VARIATIONS

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

## TYPE DEPENDENT SPECIFICATIONS – TUNING

Tuning	Description
Microstructuring tuning	Optimized for high precision beam deflection with sharp corners and minimized tracking error

## TYPE DEPENDENT SPECIFICATIONS – DYNAMIC DATA

Deflection unit	SUPERSCAN V-15-QU	SUPERSCAN V-15-SC
Mirror type	QU	SC
Tuning	Microstructuring	Microstructuring
Writing speed (cps) <sup>1</sup>	600	800
Positioning speed (rad/s) <sup>2</sup>	33	33
Tracking error (ms)	0.18	0.14
Step response time 1 % of full scale (ms) <sup>3</sup>	0.55	0.45

<sup>1</sup> With F-Theta lens f=163mm / field size 120 mm x 120 mm, Single-stroke font with 1 mm height. <sup>2</sup> See "Calculation speed in field". <sup>3</sup> Setting to 1/5,000 of full scale.

## Calculation speed in field

1 rad/s @ ± 0.393 rad deflection (45°) ≈ 0.127 m/s for 100 mm working field size

Example: SUPERSCAN V-15-SC with f-theta lens f = 163 mm, field size 120 mm x 120 mm (≈ field factor = 1.2), Positioning speed 33.0 rad/s:

=> 33.0 x 0.127 m/s x 1.2 = 5 m/s

## Mirrors & 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 email support@raylase.de.

## Options

The SUPERSCAN V deflection unit provides two types of water-tempering connections for the electronic components and galvanometer scanners, straight (W) connectors and 90° (W2). This ensures constant working conditions and excellent long-term stability.

## WATER TEMPERING

Specifications	Flow rate	Pressure loss
Water <sup>1</sup>	2 l/min	0.3 bar
Temperature	4 l/min	0.4 bar
Pressure	6 l/min	0.7 bar

<sup>1</sup> **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.

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

**Standard industrial applications:** Products of company NALCO, e.g. CCL105

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

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