

# MINISCAN III-14



2-AXIS DEFLECTION UNITS

FOR COMPACT INDUSTRIAL DESIGNS

**DIGITAL  
CONTROL**



- Control via SL2-100 protocol 20 bit or XY2-100 protocol 16 bit
- Digitally controlled, low noise and drift
- Robust and dust-proof for industrial applications
- Various tuning options, mirror substrates and coatings for marking, hatching (AM LPBF / SLS) and cleaning
- Input aperture: 14 mm

## DIGITALLY CONTROLLED, COMPACT AND ROBUST

### YOUR BENEFITS

The new MINISCAN III offers very stable digital control, which further improves noise and drift values, thereby making the system even more reliable and robust. Both the XY2-100 16 bit and the SL2-100 20 bit protocols can be used with the digital interface. A corresponding cable defines the use of the protocol.

### CONFIGURABLE THROUGH AND THROUGH

Lenses, protective glass, and mirror substrates and coatings are available for many 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

Natural applications include, in particular, hatching of surfaces in additive manufacturing with high dynamic performances, ablation and cleaning of surfaces at high speed and challenging marking tasks. Speed and dynamic responses are guaranteed, thanks to digital control and powerful PWM output stages. You also have the option of combining the MINISCAN III with our CAMERA ADAPTER and MACHINE VISION CONTROL components for 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.

# MINISCAN III-14



2-AXIS DEFLECTION UNITS

FOR COMPACT INDUSTRIAL DESIGNS

## GENERAL SPECIFICATIONS

Power supply	Voltage	+30 or +48 V
	Current	2 A, RMS, max. 5 A
	Ripple/ Noise	Max. 300 mVpp, @ 20 MHz bandwidth
Ambient temperature		+15°C to +35°C
Storage temperature		-10°C to +60°C
Humidity		≤ 80 % non-condensing
IP-Code		IP 64
Interface signals	Digital	XY2-100 Enhanced protocol SL2-100 protocol

Typical deflection (optical)		± 0.393 rad
Resolution XY2-100 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 <sup>1</sup>	15 ppm/K
	Max. Offsetdrift <sup>1</sup>	10 µrad/K
Long-term drift 8 h <sup>1</sup>		< 80 µrad

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

## APERTURE DEPENDENT SPECIFICATIONS – MECHANICAL DATA

Deflection unit	MINISCAN III-14 SI	MINISCAN III-14 QU
Input aperture [mm]	14	14
Beam displacement [mm]	17.0	17.0
Weight (without objective) [kg]	2.0	2.0
Dimension (L x W x H) [mm]	134.0 x 98.0 x 100.3	134.0 x 98.0 x 100.3

## MIRROR VARIATIONS

Wavelengths	Substrate
355 nm	SI
532 nm	SI
1,064 nm	SI
10,600 nm	SI
1,070 nm	QU
980 + 1,940 nm	QU

QU = quartz; SI = silicon

## TYPE DEPENDENT SPECIFICATIONS – TUNING

Tuning	Description
Vector-Tuning (VC)	Optimized tuning for a wide range of applications with emphasis on processing speed
Marking-Tuning (MA)	Optimized tuning for marking applications
Cleaning-Tuning (C)	Optimized tuning for long vectors at highest speeds

## TYPE DEPENDENT SPECIFICATIONS – DYNAMIC DATA

Deflection unit	MINISCAN III-14-SI		MINISCAN III-14-QU	
	VC	MA	C	MA
Tuning				
Writing speed [cps] with high/good writing quality <sup>1,2</sup>	-	650/800	-	600/750
Processing speed [rad/s] <sup>3</sup>	30 @ 30 V 50 @ 48 V	30 @ 30 V 30 @ 48 V	70 @ 30 V 100 @ 48 V	30 @ 30 V 30 @ 48 V
Positioning speed [rad/s] <sup>3</sup>	30 @ 30 V 50 @ 48 V	60 @ 30 V 90 @ 48 V	70 @ 30 V 100 @ 48 V	60 @ 30 V 90 @ 48 V
Tracking error [ms]	0.20 <sup>4</sup>	0.16 <sup>5</sup>	0.30 <sup>6</sup>	0.17 <sup>5</sup>
Step response time at 1% of full scale [ms]	0.68 <sup>7</sup>	0.36 <sup>8</sup>	0.69 <sup>7</sup>	0.39 <sup>8</sup>

<sup>1</sup> With F-Theta Lens f = 163 mm / field size 120 mm x 120 mm. <sup>2</sup> Single-stroke font with 1 mm height. <sup>3</sup> See "Calculation of speed"

<sup>4</sup> Calculation acceleration time approx. 2.3 x tracking error. <sup>5</sup> Calculation of acceleration time approx. 1.9 x tracking error.

<sup>6</sup> Calculation of acceleration time approx. 2.0 x tracking error. <sup>7</sup> Settling to 1/5,000 of full scale. <sup>8</sup> Settling to 1/1000 of full scale.

### Calculation of speed

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

Example: MINISCAN III-14 SI with F-Theta Lens f = 163 mm, Positioning speed 30 rad/s

$$v = 163/1,000 \times 30 = 4.8 \text{ m/s}$$

**Mirrors and Lenses:** Scan mirrors and objectives with optimized mounts are available many 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.

All trademarks are registered trademarks of their owner.

**Headquarters:**  
RAYLASE GmbH  
Wessling, Germany  
☎ +49 8153 9999 699  
✉ info@raylase.de

**Subsidiary China:**  
RAYLASE Laser Technology (Shenzhen) Co.  
Shenzhen, China  
☎ +86 755 28 24 8533  
✉ info@raylase.cn

**Subsidiary USA:**  
RAYLASE Laser Technology Inc.  
Newburyport, MA, USA  
☎ +1 978 255 1672  
✉ info@raylase.com

