

2-AXIS LASER BEAM DEFLECTION UNITS

# TURBOSCAN



## XY-Deflection Units for Industrial Applications

- Speed combined with accuracy and reliability
- Robust and dust proof (CE) for industrial conditions
- Easy integration and multi-head applications
- Customized solutions
- Outstanding price/performance ratio

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## ● DESIGN

The TURBOSCAN XY-deflection units set standards for speed, long-term stability, and low drift values. The compact and robust design (CE) and the reduced weight are further advantages.

RAYLASE products combine fine tolerance mechanics, optimized mirror design, high-quality electronics, and outstanding galvanometer scanners.

## ● QUALITY

Maintaining high product quality standards is a priority at RAYLASE. Deflection units are shipped to customers only after passing extensive tests.

## ● MIRRORS AND OBJECTIVES

Mirrors and objectives are available for all typical laser types and working field sizes.

## ● INTERFACES

The deflection units are electrically and mechanically compatible to the XY2-100 standard. They can be controlled via high-speed data link, with a suitable control card, or by using an analog current or voltage interface.

## ● TYPICAL APPLICATIONS

Marking; material processing such as engraving, ablation, drilling, cutting, welding; electronic production such as structuring, trimming; processing on the fly; stereolithography; rapid tooling; 3D-applications.

## ● GENERAL SPECIFICATIONS

Power Supply	Voltage	±15 to ±18 V
	Current	3 A, RMS, max. 10 A
	Ripple	≤ 200 mV
	Noise	≤ 0.5 % DC to 30 MHz
Interface Signals	Analog	±5 V, ±10 V, 0-10 V ±20 mA, 0-40 mA
	Digital	XY2-100 Protocol
Ambient Temperature		+15 to +35 °C

Storage Temperature	-10 to +60 °C
Humidity	≤ 80 % non-condensing
Typical Deflection	±0.393 rad
Resolution	12 µrad
Repeatability	20 µrad
Max. Gaindrift <sup>(1)</sup>	0.007 %/K
Max. Offsetdrift <sup>(1)</sup>	35 µrad/K
Long-term Drift over 8 hours <sup>(1,2)</sup>	< 400 µrad

(1) Drift per axis. (2) After warming-up, variations of ambient temperature < 1 K. Specifications for F-Theta objective f=160 mm / for field size 110 mm x 110 mm.

## ● APERTURE DEPENDENT SPECIFICATIONS

Deflection Unit	TURBOSCAN-10	TURBOSCAN-12	TURBOSCAN-14	TURBOSCAN-15	TURBOSCAN-30
<b>Mechanical Data:</b>					
Input Aperture (mm)	10.0	12.0	14.0	15.0	30.0
Beam Displacement (mm)	12.4	14.0	15.6	16.4	35.7
Max. Immersion Depth for Objectives (mm) <sup>(1)</sup>	20.7	19.9	18.9	17.5	17.0
Weight (kg) (without objective)	approx. 2.8	approx. 2.8	approx. 2.9	approx. 2.9	approx. 5.0
<b>Dynamic Data:</b>					
Writing Speed (cps) <sup>(2,3)</sup>	> 600	> 500	> 400	> 400	-
Positioning Speed (m/s) <sup>(2)</sup>	> 8	> 7	> 6	> 6	> 4

(1) From bearing surface of objective ring, incl. 1 mm safety clearance. (2) With F-Theta objective f=160 / field size 110 mm x 110 mm. (3) Single-stroke font with 1 mm height.

## ● MIRROR SPECIFICATIONS

Laser	Nd-YAG	Nd-YAG doubled	Nd-YAG tripled	Broadband	Diode	CO <sub>2</sub>	
Wavelength (nm)	1,064	532	355	400 - 1,064	800 - 980	10,600	10,600
Coating	dielectric	dielectric	dielectric	Silver IP	dielectric	dielectric	Gold IP
Min. Reflectivity @ Wavelength (nm)	99.5 % @ 1,064 80.0 % @ 633	99.5 % @ 532 50.0 % @ 633	99.0 % @ 355 80.0 % @ 633	97.0 % @ 400 - 1,064 97.0 % @ 633	99.0 % @ 808 - 980 50.0 % @ 633	99.9 % @ 10,600 80.0 % @ 450 - 650	99.0 % @ 10,600 80.0 % @ 450 - 650
Flatness @ 633 nm	λ/4	λ/4	λ/4	λ/4	λ/4	λ/4	λ/4
Max. Laser Power, cw (W/cm <sup>2</sup> )	500	500	100	70	500	500	80
Max. Max. Laser Power, 100 ns Pulse Width (MW/cm <sup>2</sup> )	100	100 (10 ns)	20 (10 ns)	N/A	N/A	400	400
Surface Quality (Scratch/Dig)	40/20	40/20	40/20	40/20	40/20	40/20	40/20

Mirrors for other wavelengths available on request.

## ● OBJECTIVE INFORMATION

Laser	Nd-YAG			Nd-YAG doubled	Nd-YAG tripled	CO <sub>2</sub>		
Wavelength (nm)	1,064	1,064	1,064	532	355	10,600	10,600	10,600
Objective (f in mm)	f = 100	f = 160	f = 254	f = 160	f = 160	f = 100	f = 200	f = 300
Typical Field Size (mm x mm)	60x60	110x110	180x180	110x110	110x110	70x70	140x140	210x210
Spot Diameter TEM00 (µm)								
Aperture 10 mm / 12 mm	~23 / ~20	~31 / ~27	~50 / ~44	~15 / ~13	~12 / -	~230 / ~210	~380 / ~345	~570 / ~520
Aperture 14 mm / 15 mm	~17 / ~16	~23 / ~22	~35 / ~33	~12 / ~11	- / -	~190 / ~180	~300 / ~270	~400 / ~375
Aperture 30 mm	-	-	-	-	-	-	-	-
Working Distance (mm) <sup>(1)</sup>								
Aperture 10 mm / 12 mm	126 / 127	203 / 205	356 / 356	203 / 205	222 / -	88 / 90	190 / 191	288 / 290
Aperture 14 mm / 15 mm	129 / 130	208 / 209	356 / 356	207 / 208	- / 227	91 / 91	193 / 193	291 / 292
Aperture 30 mm	-	-	-	-	-	-	-	-

(1) Distance between edge of deflection unit and working surface. This distance is dependent on the objective model and will vary with laser divergence and objective tolerance.

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