

## 2-AXIS LASER BEAM DEFLECTION UNITS

RL  
BF



## Smart Outside, Stunning Inside

- Same dimension for all apertures (7, 10, 12, 14 mm)
- Available also as open frame kit
- Very compact design for easy and cost-effective integration
- Outstanding price/performance ratio

**ONE SIZE  
FITS ALL**



# 2-AXIS LASER BEAM DEFLECTION UNITS



## DESIGN

RL XY deflection units offer high performance at the lowest price. The compact and smart lightweight design makes them the perfect choice for all industrial applications. RAYLASE products combine precision tolerance mechanics, optimised mirror design, high quality electronics and state of the art galvanometer scanners. Also available as open-frame kits.

## 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 with the XY2-100 standard. They can be controlled via high-speed data link, with a suitable control card, or by using an analogue current or voltage interface.

## TYPICAL APPLICATIONS

Marking; material processing such as drilling, cutting, hardening, texturing.

## 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	40 µrad
Max. Gaindrift <sup>(1)</sup>	0.05 %/K
Max. Offsetdrift <sup>(1)</sup>	0.02°/K
Long-term Drift over 8 hours <sup>(1,2)</sup>	< 600 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	RL-7	RL-10	RL-12	RL-14
<b>Mechanical Data:</b>				
Input Aperture (mm)	7.0	9.0	12.0	14.0
Beam Displacement (mm)	9.0	12.4	14.0	17.0
Weight (kg) (without objective)	approx. 1.3	approx. 1.3	approx. 1.3	approx. 1.3
<b>Dynamic Data:</b>				
Writing Speed High Quality (cps) <sup>(1,2)</sup>	> 600	> 400	> 350	> 280
Positioning Speed (m/s) <sup>(1)</sup>	> 12	> 7	> 6	> 5

(1) With F-Theta objective f=160 / field size 110 mm x 110 mm. (2) Single-stroke font with 1 mm height. The above specifications are preliminary.

## MIRROR SPECIFICATIONS

Laser	Nd:YAG	Nd:YAG doubled	Nd:YAG tripled	Broadband	CO <sub>2</sub>	
Wavelength (nm)	1,064	532	355	400 - 1,064	10,600	10,600
Coating	dielectric	dielectric	dielectric	Silver IP	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	99.9 % @ 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
Max. Laser Power, cw (W/cm <sup>2</sup> )	500	500	100	70	500	80
Max. Max. Laser Power, 100 ns Pulse Width (MW/cm <sup>2</sup> )	100	100 (10 ns)	20 (10 ns)	N/A	400	400
Surface Quality (Scratch/Dig)	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 = 450
Typical Field Size (mm x mm)	60x60	110x110	180x180	110x110	110x110	70x70	140x140	300x300
Spot Diameter TEM <sub>00</sub> (µm)								
Aperture 7 mm / 9 mm	~33 / ~25	~45 / ~34	~70 / ~55	~22 / ~17	~15 / ~13	~330 / ~255	~540 / ~420	~810 / ~630
Aperture 12 mm / 14 mm	~20 / ~17	~27 / ~23	~44 / ~35	~13 / ~12	- / -	~210 / ~190	~345 / ~300	~520 / ~400
Working Distance (mm) <sup>(1)</sup>								
Aperture 7 mm / 9 mm / 12 mm / 14 mm	141.0	216.9	355.8	216.7	221.7	101.08	200.51	445.62

(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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