

# Talon®

Disruptive Cost-Performance  
UV and Green Nanosecond Lasers

**mks** | Spectra-Physics

Talon is a high-performance family of ns UV and green Q-switched DPSS lasers designed for demanding industrial applications requiring maximum reliability, lifetime, and beam quality. Delivering up to 45 W or 500  $\mu$ J per pulse in UV and 70 W or 1000  $\mu$ J per pulse in green, Talon lasers offer superior power and precision across a wide repetition rate range – 0 – 500 kHz (UV) and 0 – 700 kHz (green) – with excellent pulse-to-pulse stability and TEM<sub>00</sub> beam quality.

Built on Spectra-Physics' proven *It's in the Box*™ architecture, Talon integrates laser and controller into a single, compact package to streamline installation and reduce complexity. A common optical, electrical, and command interface across the product family simplifies system integration and interchangeability further.

Engineered for continuous manufacturing environments, Talon lasers deliver long-term performance with low cost of ownership.

Talon APX models extend lifetime expectations to 40,000 hours of operation, enabling 5-year+ lifecycles in 24/7 production settings.

Talon lasers are trusted in a wide range of precision micromachining and demanding marking applications where uptime and consistent beam quality are critical. Proprietary E-Pulse™ technology maintains constant pulse energy and width over varying repetition rates, ensuring stable processing conditions and precise control across operating modes.

Available in a broad range of output powers – 6 W to 45 W UV, 20 W to 70 W green – Talon offers unmatched versatility. For applications needing short pulse widths and high peak power, standard Talon models excel. For those applications requiring higher pulse energies and extended pulse width, Talon HE models 3x – 6x longer pulses while preserving high energy per pulse.

## The Talon Advantage

- Superior combination of performance, reliability, and cost
- 12 interchangeable models with common optical, electrical, and command interfaces for wide breadth of process coverage
- Rugged industrial platform
- Outstanding beam parameters, performance, and stability
- ALPS (Active Laser Purification System) for sustained performance to ensure long laser lifetime
- Long-life diodes and minimal interventions over the life of the laser
- Easy-to-integrate compact laser head includes the diodes and control electronics, with simple utility hookups



## Applications

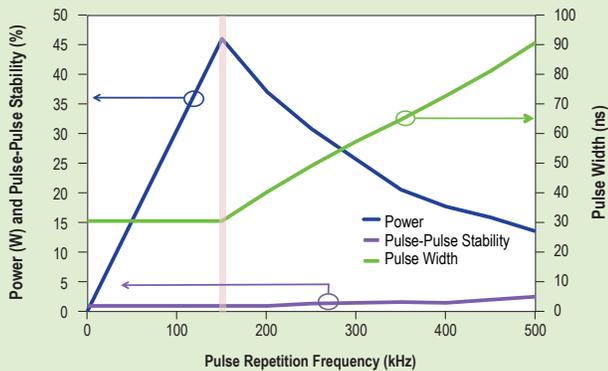
- PCB depaneling, cutting, and drilling
- Solar cell processing
- Silicon scribing
- Ceramic scribing, cutting, and drilling
- ITO patterning
- Glass cutting and drilling
- Metal foil cutting



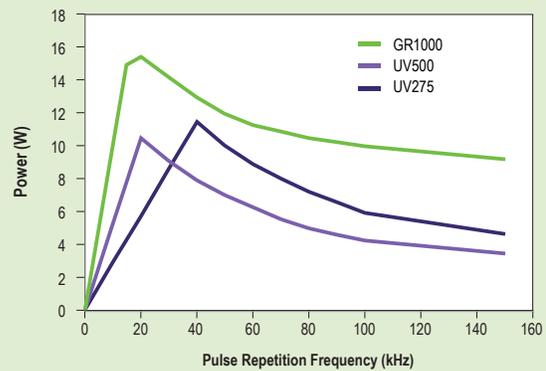
Each of the Talon models feature the same interfaces, similar footprints, and remarkable ease of use, making scaling existing processes or bringing up a new one straightforward and convenient. All Talon's are bore-sighted, making replacement, if ever needed, simple and convenient. The laser can be remotely controlled via RS 232 or USB interface, and incorporates extensive

on-board data logging of key parameters. Mode quality remains stable over the operating range, up to 500 kHz for UV and up to 700 kHz for green. The long-life diodes, innovative optical and electronics design, and Spectra- Physics' extensive experience in producing UV lasers for 24/7 applications make Talon a highly reliable laser for demanding applications.

Talon UV45: Typical Power, Pulse Width and Pulse Stability<sup>1</sup>

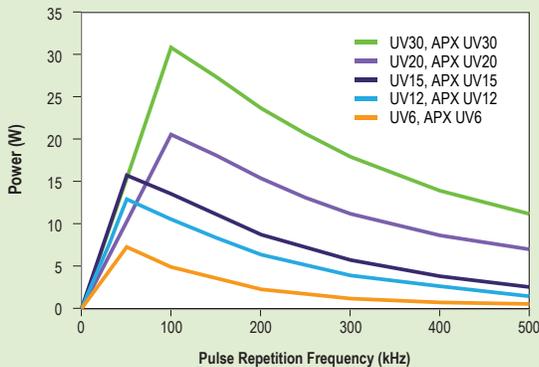


Talon HE Models: Typical Power<sup>1</sup>

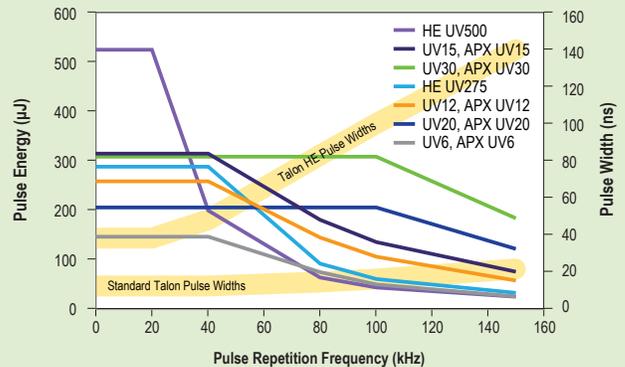


1. Typically measured performance; not a guaranteed or warranted specification.

Talon UV and APX 6-30 W Models: Typical Power<sup>1</sup>

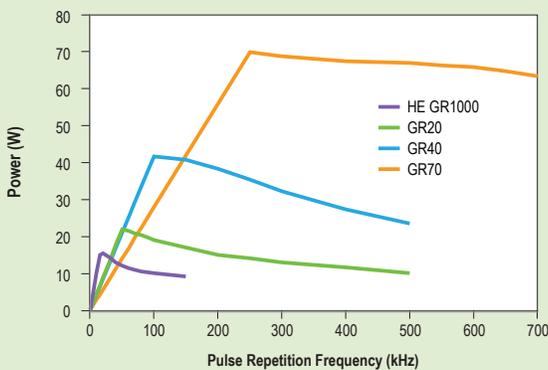


Talon UV and APX Models: Typical Pulse Energy and Pulse Width<sup>1</sup>

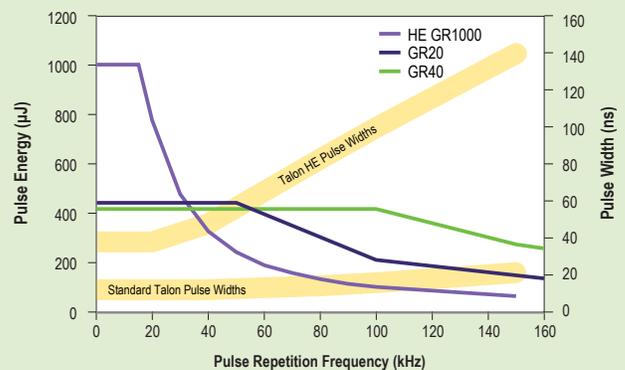


1. Typically measured performance; not a guaranteed or warranted specification.

Talon Green Models: Typical Power<sup>1</sup>



Talon Green Models: Typical Pulse Energy and Pulse Width<sup>1</sup>



1. Typically measured performance; not a guaranteed or warranted specification.

## Talon Specifications<sup>1, 2, 7</sup>

	Talon UV45	Talon UV30 & APX UV30	Talon UV20 & APX UV20	Talon UV15 & APX UV15	Talon UV12 & APX UV12	Talon UV6 & APX UV6
<b>Output Characteristics</b>						
Wavelength	355 nm	355 nm	355 nm	355 nm	355 nm	355 nm
Power <sup>2</sup>	>30 W @ 100 kHz	>15 W @ 50 kHz	<b>&gt;10 @ 50 kHz</b>	<b>&gt;15 W @ 50 kHz</b>	<b>&gt;12 W @ 50 kHz</b>	<b>&gt;6 W @ 50 kHz</b>
	<b>&gt;45 W @ 150 kHz</b> <b>&gt;35 W @ 200 kHz</b>	<b>&gt;30 W @ 100 kHz</b> <b>&gt;23 W @ 200 kHz</b>	<b>&gt;20 W @ 100 kHz</b>	<b>&gt;13 W @ 100 kHz</b>	<b>&gt;10 W @ 100 kHz</b>	>4 W @ 100 kHz
	>23 W @ 300 kHz	>17 W @ 300 kHz	>11 W @ 300 kHz	>3 W @ 300 kHz	>3 W @ 300 kHz	>1 W @ 300 kHz
Repetition Rate	0 to 500 kHz					
Pulse Width	<35 nsec @ 150 kHz	< 25 nsec @ 100 kHz				
Pulse-to-Pulse Energy Stability	<2% rms @ 150 kHz	<2% rms @ 100 kHz, typical				<2% rms @ 50 kHz, typical
		<3% rms up to 300 kHz				<3% rms up to 150 kHz
		<5% rms above 300 kHz				<5% rms up to 300 kHz, typical
<b>Beam Characteristics<sup>3</sup></b>						
Spatial Mode	TEM <sub>00</sub>					
M <sup>2</sup>	<1.2					
Polarization Ratio	100:1 vertical					
Beam Diameter, at waist	3.5 mm ±10% <sup>5</sup>				1.0 mm ±10%	
Beam Divergence (full angle)	<0.3 mrad			<0.6 mrad		
Beam Asymmetry (circularity)	<1.1 (>90%)					
Boresighting Tolerance	<1 mm, <1 mrad					
Beam Pointing Stability <sup>4</sup>	< ±25 μrad/°C			< ±10 μrad/°C		
<b>Operating Conditions / Environmental Range</b>						
AC Input	110/220 ±10% VAC, 50-60 Hz					
Warm-up Time	<20 min from standby; <40 min from cold start					
Temperature Range	18 to 35°C operating; -20 to 50°C non-operating					
Altitude	0-3,000 m operating; 0-12,000 m non-operating					
Humidity <sup>6</sup>	8-95%, non-condensing					
Cooling Water Temperature	20°C ±1°C, stable to ±0.2°C					
Cooling Water Flow	3.5-6.0 liter/minute, 40 psi typical	1.5 liter/minute minimum, 20 psi typical				
Thermal Load (to water)	<800 Watts	<350 Watts				<300 Watts
Total Power Consumption	<900 Watts	<400 Watts				<300 Watts
<b>Physical Characteristics</b>						
Dimensions (Laser) (L x W x H)	28 x 9 x 5 in (711x 229 x 127 mm)	25 x 6 x 4.5 in (635 x 153 x 115 mm)				
Weight (Laser)	45 lbs. (20.5 kg)	28 lbs (12.7 kg)				
Dimensions (Utility Module) (L x W x H)	19.6 x 19 x 3.5 in (498 x 482 x 88 mm)					
Weight (Utility Module)	22 lbs (10 kg)					
<b>Features</b>						
Optional Safety Shutter	Externally mounted for easy field service and customer replaceable					
Internal Power Monitor	May be calibrated against an external power meter					
E-Pulse Pulse Energy Control	Keeps pulse energy, pulse width and beam parameters held constant over a wide range of repetition rates					
Data Log	Long-term and short-term recording for diagnostics and equipment maintenance					
CW Alignment Beam Mode	Lower power CW UV beam for installation and alignment in a tool					
Sacrificial Window	Customer replaceable to maintain power in harsh environments					
ALPS (Active Laser Purification System)	Maintains internal optics cleanliness for long term, reliable operation					
Precision Position Registration	Hardened steel receptacles for indexing pins for repeatable, precision alignment from unit to unit					

1. Due to our continuous product improvement, all specifications are subject to change without notice.

2. Power specification and warranty applies to **Boldface power** specs only. Other values are typical.

3. All beam parameter specifications are at 100 kHz, except for 150 kHz for UV45 and 500 kHz for GR70.

4. Pointing stability applies after 2 hour warm-up.

5. Talon UV15 is available with a 1.0 mm beam diameter upon request.

6. Non-condensing at laser coolant temperature.

7. The Talon is a Class IV - High Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to the direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

## Talon Specifications<sup>1, 2, 6</sup>

	Talon GR20	Talon GR40	Talon GR70
<b>Output Characteristics</b>			
Wavelength	532 nm	532 nm	532 nm
Power <sup>2</sup>	>20 W @ 50 kHz	>20 W @ 50 kHz	> 70 W @ 275 kHz
	>18 W @ 100 kHz	>40 W @ 100 kHz >36 W @ 200 kHz	
	>13 W @ 300 kHz	>30 W @ 300 kHz	
Repetition Rate	0 to 500 kHz		0 to 700 kHz
Pulse Width	<25 nsec @ 100 kHz		<43 nsec @ 550 kHz
Pulse-to-Pulse Energy Stability	<2% rms @ 100 kHz, typical		<3% rms up to 550 kHz
	<3% rms up to 300 kHz		
	<5% rms above 300 kHz		
<b>Beam Characteristics<sup>3</sup></b>			
Spatial Mode	TEM <sub>00</sub>		
M <sup>2</sup>	<1.2		
Polarization Ratio	100:1 vertical		
Beam Diameter, at waist	1.0 mm ±10%		2.0 mm ±10%
Beam Divergence (full angle)	<0.9 mrad		<0.6 mrad
Beam Asymmetry (circularity)	<1.1 (>90%)		
Boresighting Tolerance	< 1 mm, < 1 mrad		
Beam Pointing Stability <sup>4</sup>	< ±10 μrad/°C	< ±25 μrad/°C	
<b>Operating Conditions / Environmental Range</b>			
AC Input	110/220 ±10% VAC, 50-60 Hz		
Warm-up Time	<20 minutes from standby; <40 minutes from cold start		
Temperature Range	18-35°C operating -20 to 50°C non-operating		
Altitude	0-3,000 m operating 0-12,000m non-operating		
Humidity <sup>5</sup>	8-95%, non-condensing		
Cooling Water Temperature	20°C ±1°C, stable to ±0.2°C		
Cooling Water Flow	1.5 liter/minute minimum, 20 psi typical		3.5-6.0 liter/minute, 40 psi typical
Thermal Load (to water)	<300 Watts	<350 Watts	<800 Watts
Total Power Consumption	<300 Watts	<400 Watts	<900 Watts
<b>Physical Characteristics</b>			
Dimensions (Laser) (L x W x H)	25 x 6 x 4.5 in. (635 x 153 x 115 mm)		28 x 9 x 5 in. (711 x 229 x 127 mm)
Weight (Laser)	28 lbs. (12.7 kg)		45 lbs. (20.5 kg)
Dimensions (Utility Module) (L x W x H)	19.6 x 19 x 3.5 in. (498 x 482 x 88 mm)		NA
Weight (Utility Module)	22 lbs. (10 kg)		NA
<b>Features</b>			
Optional Safety Shutter	Externally mounted for easy field service and customer replaceable		
Internal Power Monitor	May be calibrated against an external power meter		
E-Pulse Pulse Energy Control	N/A		
Data Log	Long-term and short-term recording for diagnostics and equipment maintenance		
CW Alignment Beam Mode	N/A		
Sacrificial Window	Customer replaceable to maintain power in harsh environments		
ALPS (Active Laser Purification System)	Maintains internal optics cleanliness for long term, reliable operation		N/A
Precision Position Registration	Hardened steel receptacles for indexing pins for repeatable, precision alignment from unit to unit. All models have same position relative to beam location		

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3. All beam parameter specifications are at 100 kHz, except for 150 kHz for UV45 and 500 kHz for GR70.

4. Pointing stability applies after 2 hour warm-up.

5. Non-condensing at laser coolant temperature.

6. The Talon is a Class IV – High Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to the direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

## Talon HE Specifications<sup>1, 2, 6</sup>

	Talon HE UV500	Talon HE UV275	Talon HE GR1000	
<b>Output Characteristics</b>				
Wavelength	355 nm	355 nm	532 nm	
Pulse Energy <sup>2, 3</sup>	15 kHz	500 μJ typical	1000 μJ typical	
	20 kHz	>500 μJ	>750 μJ	
	40 kHz	192 μJ typical	>275 μJ	325 μJ typical
	100 kHz	42 μJ typical	59 μJ typical	100 μJ typical
Power <sup>2, 3</sup>	15 kHz	—	15 W typical	
	20 kHz	>10 W	>15 W	
	40 kHz	7.7 W typical	>11 W	13 W typical
	100 kHz	4.2 W typical	5.9 W typical	10 W typical
Frequency <sup>2, 3</sup>	20 kHz	40 kHz	20 kHz	
Repetition Rate	0 to 150 kHz			
Pulse Width	25–40 nsec @ 20 kHz	40–60 nsec @ 40 kHz	25–40 nsec @ 20 kHz	
Pulse-to-Pulse Energy Stability	<3% rms			
<b>Beam Characteristics</b>				
Spatial Mode	TEM <sub>00</sub>			
M <sup>2</sup>	<1.2			
Polarization Ratio	100:1 vertical			
Beam Diameter, at waist	3.5 mm ±10%		1.0 mm ±10%	
Beam Divergence (full angle)	<0.3 mrad		<0.9 mrad	
Beam Asymmetry (circularity)	<1.1 (>90%)			
Boresighting Tolerance	<1 mm, <1 mrad			
Beam Pointing Stability <sup>4</sup>	< ±10 μrad/°C			
<b>Operating Conditions / Environmental Range</b>				
AC Input	110/220 ±10% VAC, 50-60 Hz			
Warm-up Time	<20 min from standby; <40 min from cold start			
Temperature Range	18 to 35°C operating; -20 to 50°C non-operating			
Altitude	0–2,000 m operating; 0–12,000 m non-operating			
Humidity <sup>5</sup>	8–95%, non-condensing			
Water Cooling Requirements	20°C ±1°C, stable to ±0.2°C, 1.5 liter/minute minimum, 20 psi			
Thermal Load (to water)	<350 W			
Total Power Consumption	<400 W			
<b>Physical Characteristics</b>				
Dimensions (Laser) (L x W x H)	25 x 6 x 4.5 in (635 x 153 x 115 mm)			
Weight (Laser)	28 lbs (12.7 kg)			
Dimensions (Utility Module) (x W x H)	19.6 x 19 x 3.5 in (498 x 482 x 88 mm)			
Weight (Utility Module)	22 lbs (10 kg)			
<b>Features</b>				
Optional Safety Shutter	Externally mounted for easy field service and customer replaceable			
Internal Power Monitor	May be calibrated against an external power meter			
E-Pulse Pulse Energy Control	Keeps pulse energy, pulse width and beam parameters held constant over a wide range of repetition rates			
Data Log	Long-term and short-term recording for diagnostics and equipment maintenance			
CW Alignment Beam Mode	Lower power CW UV beam for installation and alignment in a tool			
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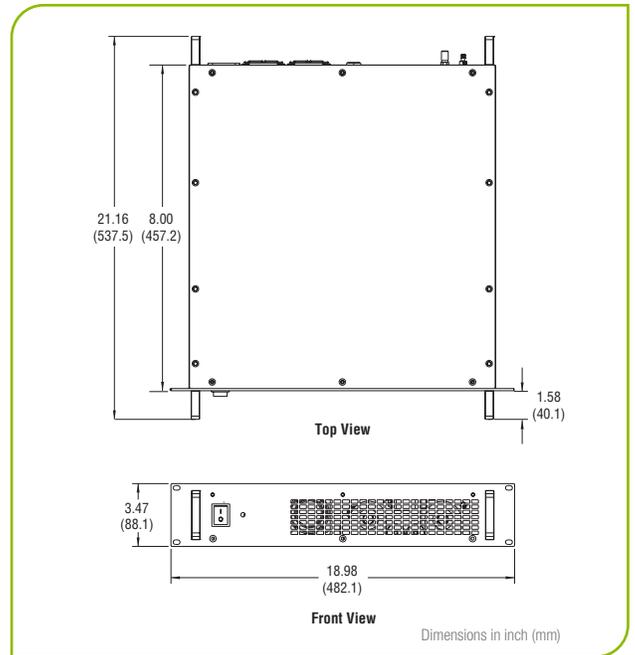
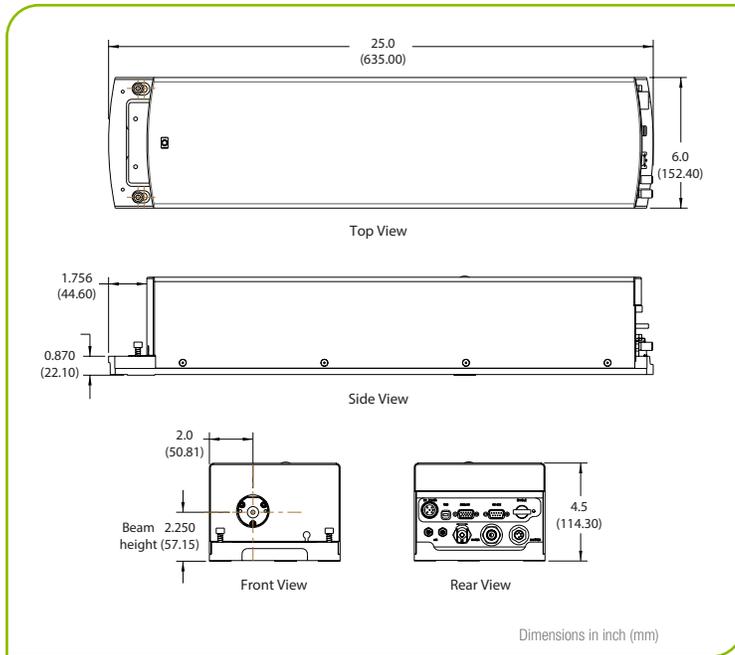
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4. Pointing stability applies after 2 hour warm-up.

5. Non-condensing at laser coolant temperature.

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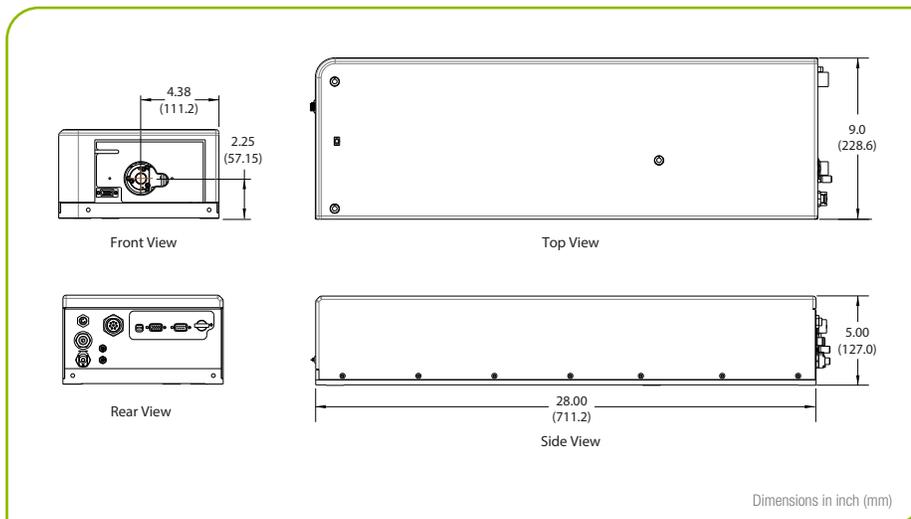
## Talon Dimensional Drawings



### Talon and Talon APX Laser Dimensions<sup>1</sup>

1. Except Talon UV45 and GR70

### Utility Module Dimensions



### Talon UV45 and GR70 Laser Dimensions