

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 μ J per pulse in UV and 70 W or 1000 μ 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 TEM₀₀ 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.

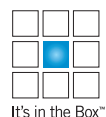
The Talon Advantage

- 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

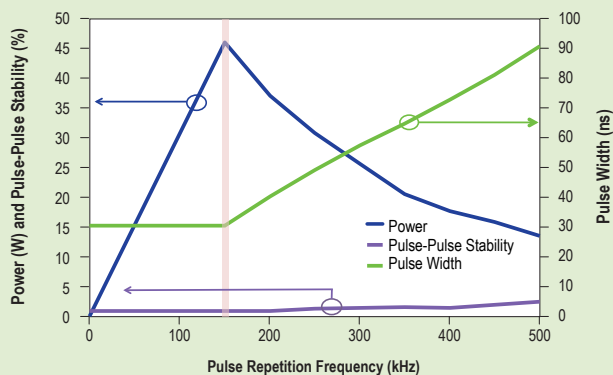
- PCB dpaneling, cutting, and drilling
- Solar cell processing
- Silicon scribing
- Ceramic scribing, cutting, and drilling
- ITO patterning
- Glass cutting and drilling
- Metal foil cutting



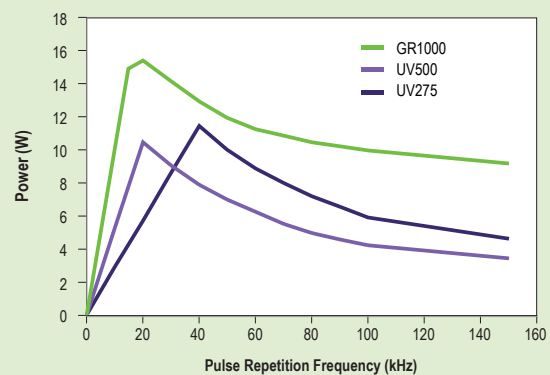
Each of the Talon models feature the same interfaces, similar footprints, and remarkable ease of use, making scaling existing processes or bringing up a new one straightforward and convenient. All Talon's are bore-sighted, making replacement, if ever needed, simple and convenient. The laser can be remotely 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 Stability¹

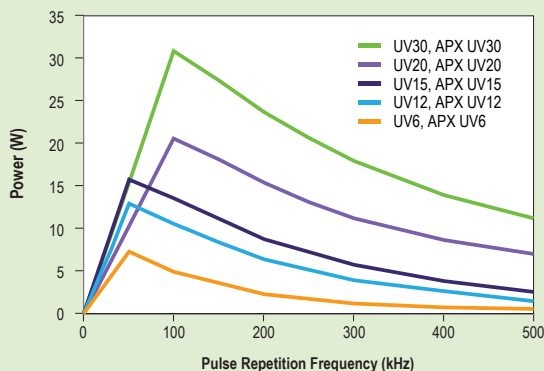


Talon HE Models: Typical Power¹

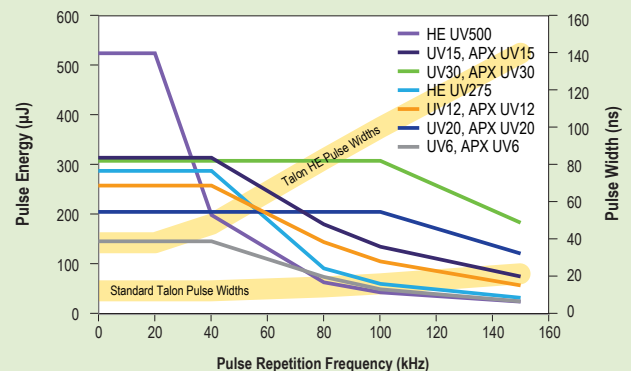


1. Typically measured performance; not a guaranteed or warranted specification.

Talon UV and APX 6-30 W Models: Typical Power¹

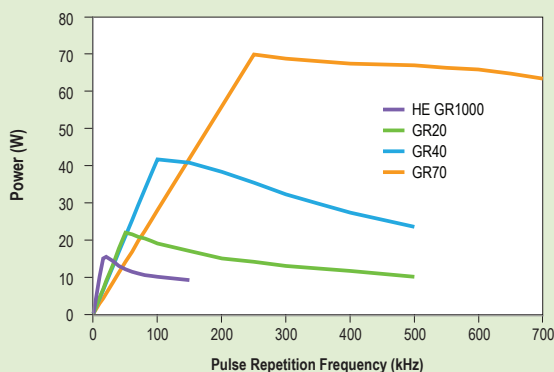


Talon UV and APX Models: Typical Pulse Energy and Pulse Width¹

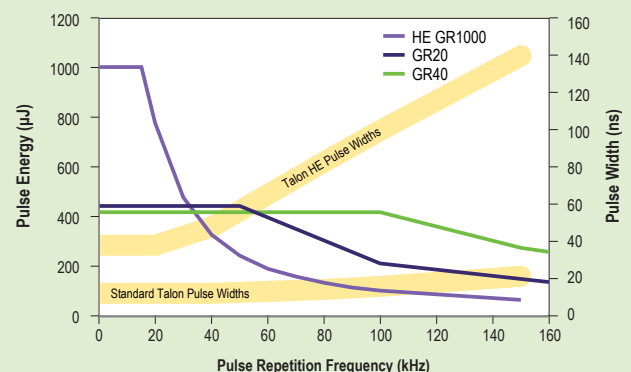


1. Typically measured performance; not a guaranteed or warranted specification.

Talon Green Models: Typical Power¹



Talon Green Models: Typical Pulse Energy and Pulse Width¹



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

Talon Specifications^{1, 2, 7}

	Talon UV45	Talon UV30 & APX UV30	Talon UV20 & APX UV20	Talon UV15 & APX UV15	Talon UV12 & APX UV12	Talon UV6 & APX UV6
Output Characteristics						
Wavelength	355 nm	355 nm	355 nm	355 nm	355 nm	355 nm
Power ²	>30 W @ 100 kHz	>15 W @ 50 kHz	>10 @ 50 kHz	>15 W @ 50 kHz	>12 W @ 50 kHz	>6 W @ 50 kHz
	>45 W @ 150 kHz >35 W @ 200 kHz	>30 W @ 100 kHz >23 W @ 200 kHz	>20 W @ 100 kHz	>13 W @ 100 kHz	>10 W @ 100 kHz	>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
Beam Characteristics ³						
Spatial Mode	TEM ₀₀					
M ²	<1.2					
Polarization Ratio	100:1 vertical					
Beam Diameter, at waist	3.5 mm ±10% ⁵				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 ⁴	< ±25 µrad/°C		< ±10 µrad/°C			
Operating Conditions / Environmental Range						
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 ⁶	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		
Physical Characteristics						
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)					
Features						
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^{1, 2, 6}

	Talon GR20	Talon GR40	Talon GR70
Output Characteristics			
Wavelength	532 nm	532 nm	532 nm
Power ²	>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		
Beam Characteristics ³			
Spatial Mode	TEM ₀₀		
M ²	<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 ⁴	< ±10 μrad/°C	< ±25 μrad/°C	
Operating Conditions / Environmental Range			
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 ⁵	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
Physical Characteristics			
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
Features			
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^{1, 2, 6}

		Talon HE UV500	Talon HE UV275	Talon HE GR1000
Output Characteristics				
Wavelength		355 nm	355 nm	532 nm
Pulse Energy ^{2, 3}	15 kHz	500 µJ typical	275 µJ typical	1000 µJ typical
	20 kHz	>500 µJ	275 µJ typical	>750 µJ
	40 kHz	192 µJ typical	>275 µJ	325 µJ typical
	100 kHz	42 µJ typical	59 µJ typical	100 µJ typical
Power ^{2, 3}	15 kHz	—	—	15 W typical
	20 kHz	>10 W	5.7 W typical	>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 ^{2, 3}		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		
Beam Characteristics				
Spatial Mode		TEM ₀₀		
M ²		<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 ⁴		< ±10 µrad/°C		
Operating Conditions / Environmental Range				
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 ⁵		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		
Physical Characteristics				
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)		
Features				
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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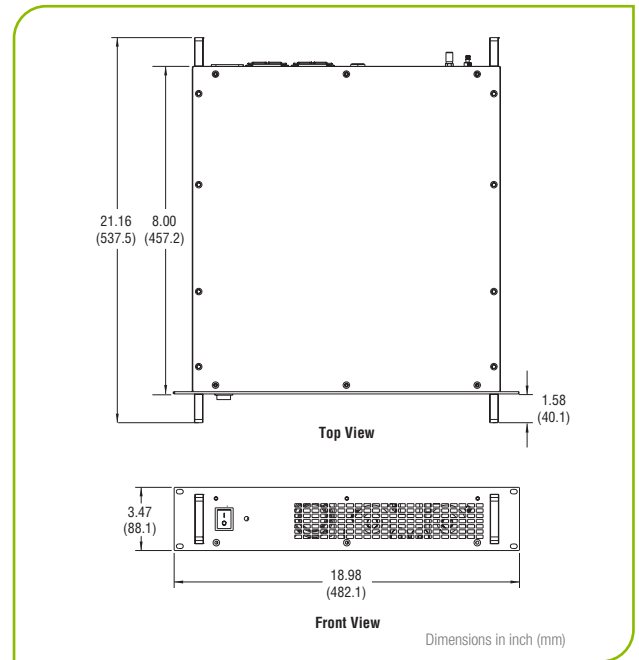
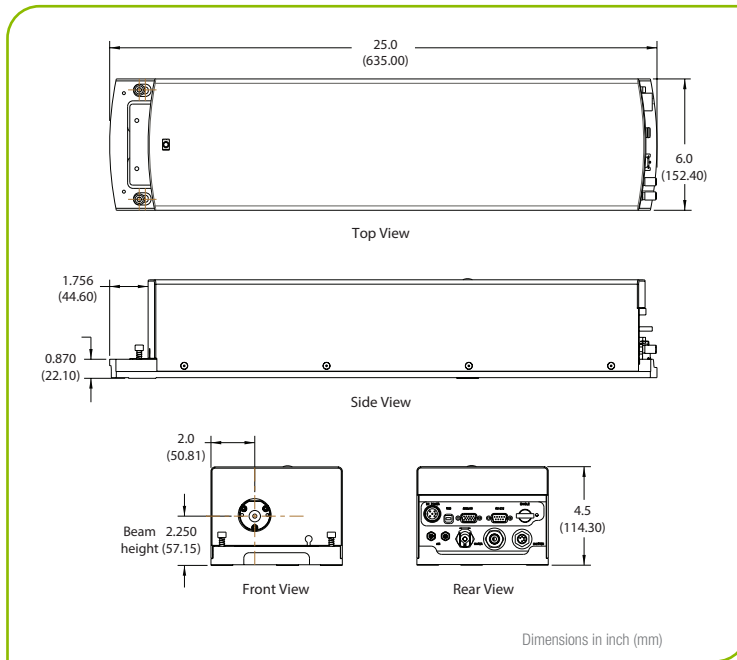
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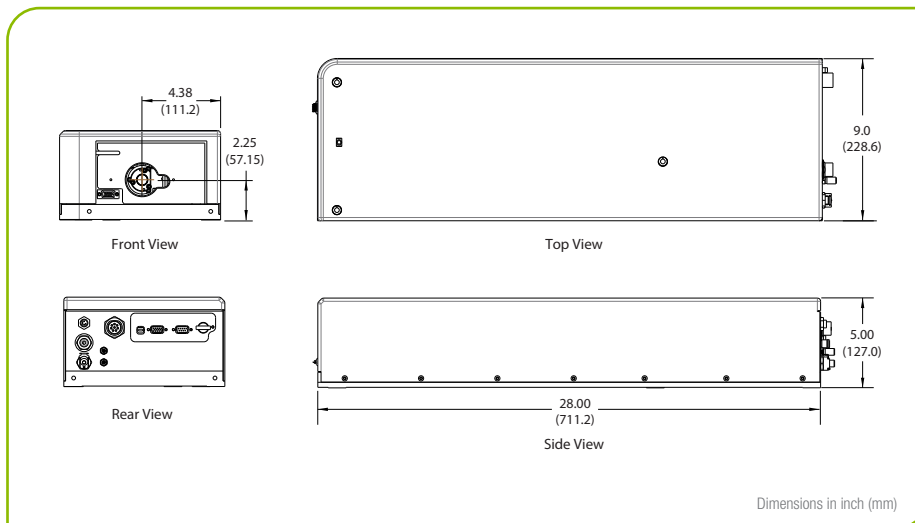
Talon Dimensional Drawings



Talon and Talon APX Laser Dimensions¹

1. Except Talon UV45 and GR70

Utility Module Dimensions



Talon UV45 and GR70 Laser Dimensions