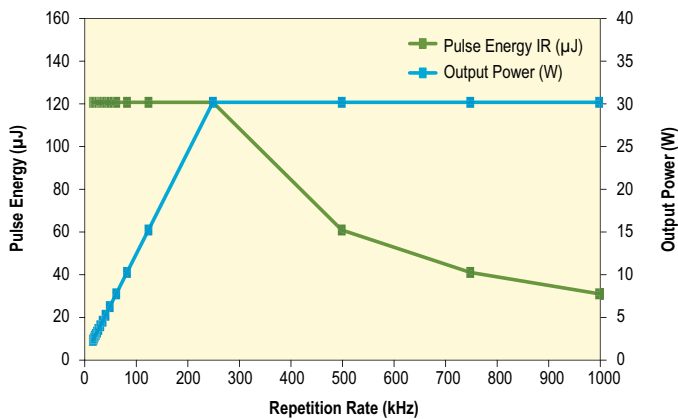




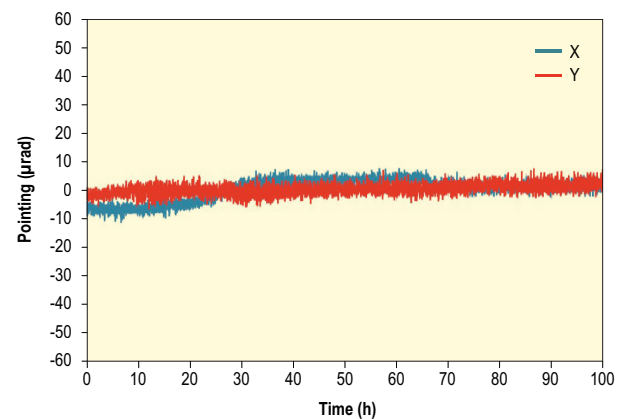
# Spirit HE

Fully automated and computer controlled, Spirit is manufactured with high reliability and quality in mind. Spirit's design is optimized for easy integration and for superb power and beam pointing stability (typically <math>20 \mu\text{rad}</math> for 100 hours) during 24/7 operation, ensuring high precision and reproducibility in every application.

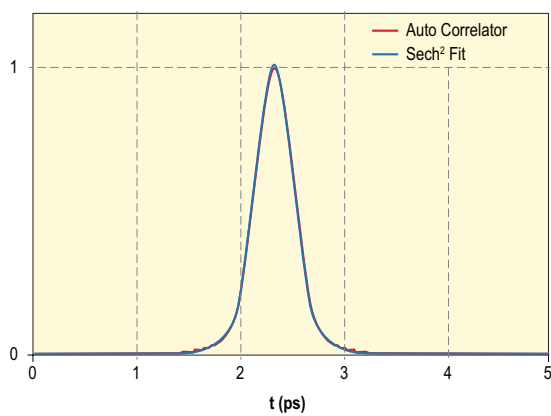
Pulse Energy and Output Power vs. Repetition Rate<sup>1</sup>



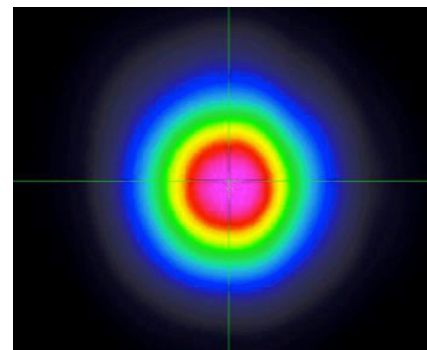
Beam Pointing Stability over 100 hours<sup>1</sup>



Pulse Duration and Pulse Shape fitted with the Sech<sup>2</sup> Function<sup>1</sup>



Spirit HE 1040-30: Beam Profile<sup>1</sup>



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

# Spirit HE Specifications<sup>1, 2</sup>

	Spirit HE 1040-16	Spirit HE 1040-16-SHG	Spirit HE 1040-30	Spirit HE 1040-30-SHG
<b>Output Characteristics</b>				
Wavelength	1040 nm ±8 nm			
Output Power	>16 W		>30 W	
Pulse Energy	>120 µJ at 100 kHz		>120 µJ at 250 kHz	
Wavelength (SHG)	NA	520 ±3 nm	NA	520 ±3 nm
Output Power (SHG)	NA	>6 W at 100 kHz >8 W at 200 kHz	NA	>15 W at 250 kHz
Max Pulse Energy (SHG)	NA	>60 µJ at 100 kHz >40 µJ at 200 kHz	NA	>60 µJ at 250 kHz
Repetition Rate <sup>13</sup>	100 kHz, 200 kHz or 1 MHz		250 kHz or 1 MHz	
Pulse Selection	Integrated pulse picker (AOM)			
Pulse Width	<400 fs			
Pulse Width Tunability <sup>4,5</sup>	<400 fs to 10 ps at 1040 nm			
Burst Mode <sup>6,7,8</sup>	>120 µJ/burst at 1040 nm, up to 14 sub-pulses			
Power Stability	<1% rms over 100 hours			
Pulse-to-Pulse Stability	<2% rms			
Spatial Mode	TEM <sub>00</sub> (M <sup>2</sup> <1.2)			
Beam Diameter at exit	2.5 mm ±0.5 mm			
Beam Divergence, full angle	<1 mrad (1040 nm); <0.5 mrad (520 nm)			
Pre-Pulse Contrast Ratio	>250:1			
Polarization	Horizontal			
Cold Start Time	<30 min			
Warm Start Time	<15 min			
<b>Environmental Specifications</b>				
Operating Temperature	18–30°C (64–86°F)			
Relative Humidity	<65%, non-condensing			
<b>Cooling Requirements</b>				
Laser Head	Water cooled			
Power Supply	Air cooled			
<b>Utility Requirements</b>				
Voltage	Laser controller (including chiller): 100-240 V, 50 Hz / 60 Hz			
Current	<15 A			
<b>Laser Head Physical Characteristics</b>				
Dimensions (L x W x H)	32.5 x 14 x 6.5 in (875 x 340 x 160 mm)			
Weight	155 lb (70 kg)			
<b>Rack with Power Supply and Chiller Physical Characteristics</b>				
Dimensions (L x W x H)	23.6 x 22.0 x 29.4 in (600 x 560 x 746 mm)			
Weight	176 lb (80 kg)			

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

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

3. Additional, pre-calibrated repetition rates upon request; please contact Spectra- Physics. For Spirit HE 16 and Spirit HE 30, the maximum pre-calibrated repetition rate is 1 MHz.

4. Pulse duration tunability is optional; if implemented, pulse duration is software tunable.

5. Conversion efficiency for SHG module will be lower for longer pulse width. Conversion efficiency for SHG is not specified for longer pulse width.

6. Burst mode operation is optional; if implemented the number of pulses per burst (<14 pulses) can be selected in GUI.

7. Pre-calibrated repetition rates are limited to ≤ 500 kHz for Spirit HE lasers with the burst mode option.

8. Conversion efficiency for SHG module will be lower in the burst mode operation. Conversion efficiency for SHG is not specified for the burst mode operation.

