



HEDGEHOG™

COMPACT, RAPID-SCAN, TUNABLE MID-IR LASER

Molecular spectroscopy applications benefit from rapid, high Signal-to-Noise Ratio data acquisition. This demands fast-scan mid-IR lasers delivering high-quality light. Until now, high tuning speed has come with compromises. The new Hedgehog from DRS Daylight Solutions changes this. For the first time, fast tuning and high-fidelity output is available from a compact, robust mid-IR laser. Hedgehog is built on Daylight's field-proven Quantum Cascade Laser (QCL) technology. Available center wavelengths span the mid-IR spectrum from $< 4\ \mu\text{m}$ to $>13\ \mu\text{m}$, and Hedgehog can provide pulsed or CW output. Users can select from three model types (HHG, HHG-UT, or HHG-LT) depending on their application power and tuning range requirements. All models include a GUI option for ultra-quiet CW operation, high wavelength repeatability, and multiple tuning modes.

Hedgehog's small size and rugged design make it ideally suited to either laboratory use or OEM integration. Each Hedgehog is shipped with a compact, easy-to-use SideKick™ multi-function QCL controller. All control functionality is via USB/Ethernet connectivity and an included GUI and SDK command set. Daylight's proprietary HFQD™ (High-Fidelity QCL Drive) circuitry also protects your QCL chip.

With Hedgehog, high-speed, high-quality mid-IR spectroscopic data acquisition is now a reality. Hedgehog brings new capabilities to a wide range of molecular sensing applications including process control, detection of pollutants, chemical and biological agents, time-resolved spectroscopy, and cellular imaging. Please contact us today to learn how Hedgehog, and our highly experienced team, can help your application

HIGHLIGHTS

- Tuning slew rates to $> 30,000\ \text{cm}^{-1}/\text{s}$
- Ultra-low noise mode (CW RIN as low as $-140\ \text{dBc}/\text{Hz}$)
- High wavelength accuracy, precision and repeatability
- Available center wavelengths: $< 4\ \mu\text{m}$ to $>13\ \mu\text{m}$
- Compact head ideal for OEM integration or lab use
- New Hedgehog-LT: greater utility than DFBs

FOR SPECTROSCOPY AT SPEED, WITHOUT COMPROMISE

HEDGEHOG SPECIFICATIONS

PERFORMANCE SPECIFICATIONS			
MODEL	HHG	HHG-UT	HHG-LT
Tuning Range	Up to 200 cm ⁻¹	Up to 400 cm ⁻¹	30 cm ⁻¹
Average Power	Up to 500 mW	Up to 500 mW	Up to 150 mW
Peak Power	Up to 1 W	Up to 1 W	Up to 200 mW

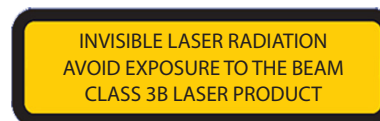
PERFORMANCE	
Center Wavelength Availability	< 4 μm to > 13 μm
Modes of Operation	Pulsed or CW
Tuning Modes	Set λ, Step & Measure, Continuous Scans
Max. Tuning Speed (Step)	250 ms step-and-settle time to arbitrary λ
Max. Tuning Speed (Scan)	Slew rates to >5000 cm ⁻¹ /s
Wavelength Accuracy	≤ 1 cm ⁻¹
Wavelength Repeatability	To ≤ 0.1 cm ⁻¹
Average Power Stability	< 2% (1 hr)
Spatial Mode	TEM ₀₀ (nominal)
Beam Divergence	< 4 mrad (full angle, 1/e ² intensity width)
Beam Pointing Stability	< 1 mrad (beam centroid change)
Spot Size	< 2.5 mm (1/e ² intensity radius)
Polarization	Linear, vertical, >100:1

CW PERFORMANCE	
Linewidth	≤ 100 MHz (FWHM, over 1s)

PULSED PERFORMANCE	
Energy Stability	< 3%, standard deviation
Linewidth	≤ 1 cm ⁻¹ (FWHM)
Pulse Width	40 to 500 ns, 20-ns increments
Repetition Rate	0.1 kHz to 1 MHz, 0.1-kHz increments
Maximum Duty Cycle	10% (custom up to 30%)

OTHER SPECIFICATIONS	
Triggering (Pulsed Operation)	Internal/External, External Pulse Input
Triggering (Scans)	External Wavelength Step, Scan Start
External Control Interfaces	USB 2.0, Ethernet 10/100
Temperature Range (°C)	15 to 35 °C (operating)
Humidity	0–80% RH, non-condensing
Cooling	Passive Air (pulsed, up to 5% duty cycle) Water (CW, or >5% duty cycle pulsed)
Power Requirements	≤ 2A, 90 to 264 VAC, 47 to 63 Hz, single phase (or ≤ 3A, 24 VDC, OEM models)
Dimensions (L x W x H)	Head: 4.2 x 2.6 x 2.1 in. (11 x 6.5 x 5.2 cm) Controller: 7.3 x 5.2 x 1.4 in. (19 x 13 x 4 cm)

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