

Ultra-broadly tunable mid-IR external-cavity CW/Pulsed MIRcat™ laser system



Ultra-broad tuning range from a single-box quantum cascade laser source in the important mid-IR “fingerprint” region.

Uniquely configurable for either pulsed or continuous wave (CW) operation¹, MIRcat provides a mid-IR tuning range of up to $\sim 800 \text{ cm}^{-1}$ ($\sim 6000 \text{ nm}$)² from a single box – one of the broadest tuning ranges of any quantum cascade laser (QCL) source commercially available. Incorporating up to four tunable laser modules in a single, sealed laser head, MIRcat is based on field-proven Daylight Solutions' technologies such as our widely tunable ÜberTuner™ lasers. A fully automated system, MIRcat switches effortlessly between its tuning modules, and produces a single high quality, highly collimated output beam. This attention to beam quality avoids the need for user beam re-alignment as MIRcat tunes.

MIRcat's modularity allows users to preselect one, two, three or four pulsed and/or CW tunable laser modules from an extensive library covering from <4 to $>12 \mu\text{m}$. Depending on modules selected, MIRcat can be factory configured to: provide ultra-broad and/or gapless tuning; focus on one spectral region; or address multiple regions spread across a wide wavelength range. This flexibility allows users to optimize their mid-IR wavelength coverage based on their application requirements and budget. Users can also upgrade, adding or changing tuning modules as their requirements evolve.⁴

A true one-box system with an integrated controller and hands-free, maintenance-free operation, MIRcat delivers uncompromised performance in application-critical parameters such as: high output power; superb beam pointing stability and mode quality; and narrow linewidths. Taking mid-IR QCL systems to new price: performance levels, MIRcat has—as standard—all the features it needs to be the heart of your measurement system. Supplied with a PC software user interface, users have flexible control over: set-point wavelengths; wavelength scans; output power (and, in pulsed operation, pulse width, duty cycle, repetition rate and triggering modes).

MIRcat brings new capabilities and agility to a broad range of applications, including: spectroscopic imaging; standoff explosive detection; hyperspectral imaging for medical diagnosis; microscopy; spectroscopy; and food safety and contamination detection. Solid, liquid, and gas phase spectroscopy and imaging measurements are now easier, faster and more cost-effective than ever before.

PERFORMANCE SPECIFICATIONS³

Wavelength Availability:	Pulsed or CW tuning modules available with center wavelengths from <4 to $>12 \mu\text{m}$
MIRcat Configurations:	Select 1, 2, 3 or 4 standard or custom tuning modules – please inquire
Standard Configurations:	MIRcat-1400-PX-A (pulsed, 6.5–12.4 μm) ² MIRcat-1400-PX-B (pulsed, 5.5–11 μm) ² MIRcat-1400-PCX-B (CW/pulsed, 5.5–11 μm) ^{2,3}

PULSED OPERATION¹

Output Peak Power:	Depends on module (e.g. $>500 \text{ mW}^2$, module M1080-PX)
Linewidth:	$\leq 1 \text{ cm}^{-1}$ (FWHM)
Pulse Width:	40 to 500 ns (20 ns increments)
Pulse Repetition Rate:	0.1–100 kHz (0.1 kHz increments)
Duty Cycle:	Up to 5%
Triggering:	Internal & External Pulse, External Trigger
Pulse-Pulse Stability	$<5\%$ (pk-pk)

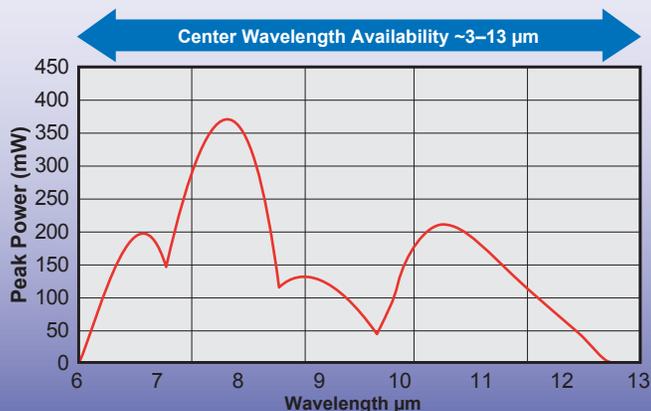
CW OPERATIONS¹

Output Average Power:	Depends on module (e.g. $>100 \text{ mW}^2$, module M1095-PCX)
Linewidth:	$\leq 100 \text{ MHz}$ (FWHM) ²

OTHER PARAMETERS

Wavelength Scan Types:	Uni- and Bi-directional sweeps; survey scans; program Start, Stop, Step, Pause
Beam Divergence:	$<5 \text{ mrad}$ (full angle, 1/e intensity)
Beam Pointing Stability:	$<2 \text{ mrad}$ up to 100 cm^{-1} tuning
Beam Quality:	TEM ₀₀
Polarization:	Linear, Vertical, $>100:1^2$
External Control Interface:	USB 2.0 ⁴
Operating Temperature:	15–30 °C
Cooling (pulsed):	Passive air
Cooling (CW):	Water
Dimensions (L × W × H):	17.9" × 9.8" × 6.3"/45.5 × 24.9 × 16.0 cm

¹ Requires selection of appropriate pulsed- or CW/pulsed-capable QCL tuning modules.
² Typical value. To request a specified value, please inquire.
³ All specifications are subject to change without notice. Unless stated otherwise, all specifications are defined at the peak of each tuning module gain curve.
⁴ Requires return to factory.
⁵ Ethernet control available – please inquire.



Typical tuning curve. Example shown: MIRcat-1400-PX-A.

Daylight Solutions: The Source for All Applications in the Mid-IR

Call today for pricing and availability of specific wavelengths.

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