

MID-IR QCL LASER BASED GAS DETECTION

Key Features

- ▣ Configurable spectral coverage using one or two laser modules within the 5.4–12.8 μm (1850–780 cm^{-1}) range
 - ▶ Currently 7 modules available (each > 250 cm^{-1})
- ▣ Configurable dynamic range and LOD options with customizable gas cell lengths based on requirements
- ▣ No consumables – Internal referencing design
- ▣ Fast measurement speed (10 Hz)
- ▣ Single-box fully-integrated solution or OEM module
- ▣ Flexible interface and SDK for remote access of data
- ▣ Small footprint – ideally suited for OEM applications

Compact QCL Gas Detector



Applications Areas

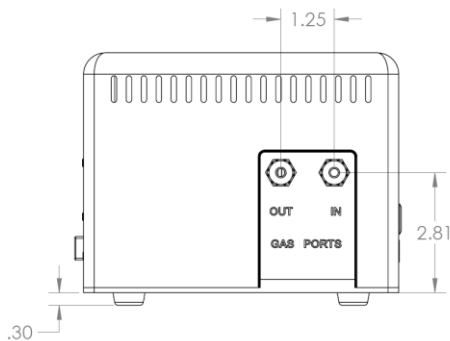
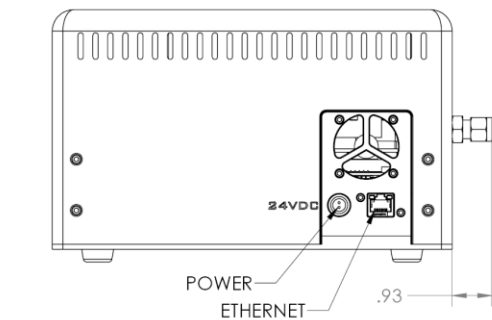
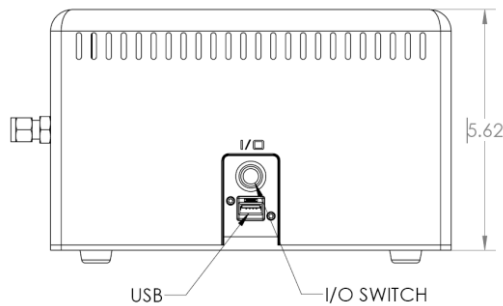
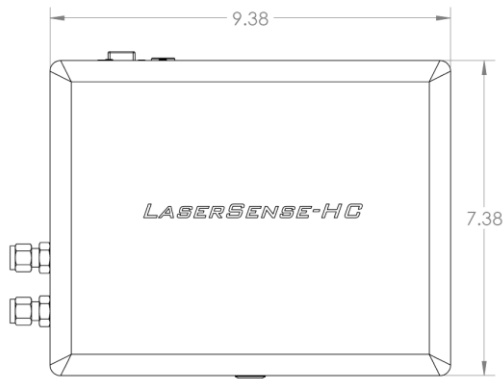
- ▣ Hydrocarbon Detection
 - ▶ Mudlogging (C1 – C5)
 - ▶ Upstream/Downstream
- ▣ Semiconductor Industry
 - ▶ Endpoint Detection
 - ▶ Process Monitoring
- ▣ Environmental Monitoring
 - ▶ Laboratory Analysis
 - ▶ Industrial Monitoring

Examples of Gases and Limits of Detection

Gas	LOD (ppm)	Gas	LOD (ppm)	Gas	LOD (ppm)
CH ₄ , Methane	4.3	SiF ₄ , Silicon Tetrafluoride	0.08	NO, Nitric Oxide	7
C ₂ H ₆ , Ethane	14	C ₇ H ₈ , Toluene	3.5	NO ₂ , Nitrogen Dioxide	1.2
C ₃ H ₈ , Propane	14	C ₈ H ₁₀ , Xylenes	4.6	HNO ₃ , Nitric Acid	0.5
C ₄ H ₁₀ , n-Butane	12	C ₂ H ₂ , Acetylene	7	SO ₂ , Sulfur Dioxide	3.5
C ₅ H ₁₂ , n-Pentane	7.7	C ₂ H ₄ , Ethane	1.7	C ₆ H ₆ , Benzene	12
H ₂ S, Hydrogen Sulfide	497	C ₃ H ₆ , Cyclopropane	3.5	Ethylbenzene	7

Limits of Detection for Standard 144-inch Gas Cell – Longer Cell With Lower Limits of Detection available Upon Request

Mechanical Interface & Dimensions



All dimensions in inches

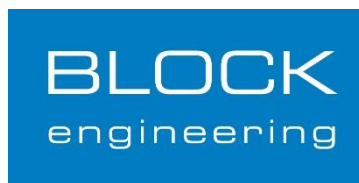
LASERSENSE™ Specifications

Gap-Free Tuning Range	$\lambda \approx 5.4 - 12.8 \mu\text{m}$ (1850 - 780 cm^{-1}) (typical) System can be configured with up to 2 tunable laser modules which cover approximately 250 cm^{-1} each
Spectral Linewidth	2 cm^{-1} (typical)
Spectral Accuracy / Repeatability	< 2 cm^{-1} / < 0.5 cm^{-1} (typical)
Gases Detected	Most gases with absorption features in range Best suited for gases with broader features
Sensitivity	Varies with gas and gas cell (see table)
Response Time	1-5 seconds (typical) Can be configured for 0.1 second (10Hz)
Detection Method	Infrared Absorption Spectroscopy
Sensitivity	Varies with gas and gas cell (see table)
Dynamic Range and Limits of Detection	Configurable with 4, 24, or 144 inch gas cells Other lengths available upon request
Communication Options	Ethernet, other options upon request
Communication Interface	Readily available interface to OEM systems or networks
Gas Fittings	1/4-inch outside diameter tubing (Swagelok fittings)
Dimensions	Approx. 24 x 19 x 15 cm (9.5 x 7.5 x 6 inches) OEM approx. 275 cubic inches (225 without pump)
Weight	13 lbs (11 without pump)
Electrical Power	100 - 240 Volts (50/60 Hz), 20 Watts (typical)
Temperature Range (Operating / Storage)	10 to 30 °C / -10 to 70 °C

Flexible User Friendly Interface for Real-Time Monitoring



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