clarity
WWW.CLARITY.IO

Multi–Gas Module:
Criteria pollutant and traffic emissions monitoring made simple

The Clarity Multi-Gas Module expands the capabilities of the Node-S, enabling real-time measurement of CO, O_3, NO_2, NO, and NO_x — five key pollutants that impact air quality and public health. Whether monitoring urban pollution, industrial emissions, or transportation corridors, this compact, all-in-one sensor provides high-quality data without the complexity of multiple instruments.

Designed for effortless deployment, the Multi-Gas Module features a weatherproof, UV-resistant enclosure and modular mounting for quick installation on both vertical and horizontal poles. With Clarity's plug-and-play Add-On Module design, the Multi-Gas Module leverages the solar-powered operation and built-in cellular connectivity of the Node-S — even when paired with the Wind Module as pictured here.

Measure more criteria pollutants

The Multi-Gas Module streamlines data collection and expands your monitoring capabilities with Carbon Monoxide (CO), Ozone (O_3), Nitrogen Dioxide (NO_2), Nitric Oxide (NO), and Nitrogen Oxide (NO_x) measurements all in one device — all measurements can be retrieved via Clarity Dashboard and API.

Identify wildfire, traffic, and smog trends

Designed for diverse applications, the Multi-Gas Module enhances monitoring of wildfire smoke, traffic emissions, and smog formation. Distinguish wildfire smoke from urban pollution using the CO-to-$PM_{2.5}$ ratio, identify traffic pollution hotspots through NO and NO_2 levels, and track O_3 non-attainment and smog formation with joint NO_2 and O_3 measurements.

Solar-powered and always connected

The Multi-Gas Module runs directly off the Node-S power system, meaning it can leverage the native solar power and cellular connectivity of the Node-S. Measurements are automatically transmitted to the Clarity Cloud, eliminating the need for complex infrastructure or manual data retrieval.

Multi-Gas Module | Technical Specifications

Air Quality Measurements

PARAMETER	TECHNOLOGY	RANGE	RESOLUTION	ACCURACY
CO	Electrochemical cell sensor	0 - 10 ppm	0.01 ppm	$R^2 > 0.8$ RMSE < 0.1 ppm
O_3	Electrochemical cell sensor	0 - 3000 ppb	1 ppb	$R^2 > 0.5$ RMSE < 8 ppb
NO_2	Electrochemical cell sensor	0 - 3000 ppb	1 ppb	$R^2 > 0.5$ RMSE < 8 ppb
NO	Electrochemical cell sensor	0 - 3000 ppb	1 ppb	$R^2 > 0.6$ RMSE < 7 ppb
NO_x	Electrochemical cell sensor	0 - 3000 ppb	1 ppb	$R^2 > 0.6$ RMSE < 8 ppb

Data Flow

Measurement Frequency (Adjustable)	Default: Once every 15 minutes (adjustable)
Data Retrieval from Cloud	• Clarity Dashboard (Web App) • RESTful APIs (Programmatic Access)
Communication Protocol	RS-485, Clarity Add-On Module protocol
Device to Cloud Communication	Global cellular 2G/ 3G/ 4G SIM card and service included via companion Node-S

Power

Power Consumption	20 mWh energy consumption at default measurement frequency 50 mW maximum power dissipation
Power Source	Powered by Add-On Module port of companion Clarity Node-S • 40 minutes of sunlight per day is required for continuous operation. • Can operate for 14 days without sun when the battery is fully charged

Operating Conditions

Operating Temperature	-10°C to 40°C
Operating Humidity	15% to 85%
UV Exposure	UV-resistant, weatherproof housing with aluminum solar radiation shield

Dimensions

Dimensions	232 mm (W) x 114 mm (H) x 68 mm (W)
Weight	0.138 kg