Model GEO-AQAN-4000
Air Quality & Ambient Noise Monitoring System

As part of **GEOcityQUAL solutions**, **GEO-AQAN-4000** is a Continuous Ambient Air Quality Monitoring System (CAAQMS). It is capable of monitoring various environmental parameters related to air quality, noise, weather, radiation etc. It measures the particulate matter and gaseous concentrations in the ambient air in real-time. Using external probes, it can also monitor other auxiliary parameters like traffic, disaster etc. **GEO-AQAN-4000** is an ideal choice for smart cities as well as urban infrastructure applications like roadside, campus, and airport monitoring. It is easily integrable with a Smart Pole/Intelligent Pole.

Applications

Smart City

Pollution monitoring at strategic locations in a smart-city empowers city authorities to obtain actionable insights for pollution control.

Road-side & Tunnels

Pollution monitoring at roads and tunnels can help create pollution mitigation action plan to control vehicular emissions.

Campus Monitoring

Pollution monitoring at key locations on campus allows stakeholders to spread awareness about environmental conditions of the premises.

Airports

Pollution and noise monitoring at taxiways and terminal surroundings facilitates airport authorities to analyze its impact on travellers and surrounding neighbourhoods.
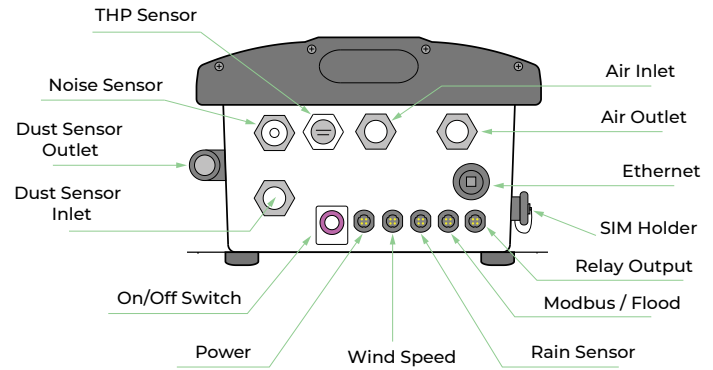
Product Variants

Model	Applications	Parameter
GEO-AQAN-4000L	General Purpose	PM2.5, PM10, CO2, CO, Noise, Light, UV-Radiation, Temperature, Humidity, Pressure
GEO-AQAN-4000S	Extensive	PM2.5, PM10, CO2, CO, SO2, NO, NO2, O3, Noise, Light, UV-Radiation, Temperature, Humidity, Pressure
GEO-AQAN-4000P	Critical	PM1, PM2.5, PM10, TSP, CO2, CO, SO2, NO, NO2, O3, H2S, Noise, Light, UV-Radiation, Temperature, Humidity, Pressure
GEO-AQAN-4000C	Critical	PM1, PM2.5, PM10, CO2, CO, SO2, NO, NO2, O3, H2S, TVOC
Other Sensors	Optional	TVOC, NMVOC, Benzene, NH3, Wind Speed & Direction, Rainfall, Flood, and more (consult GEONICA)

General Specifications

Size	360mm (H) x 328mm (W) x 200mm (D)
Weight	7.2 Kg (instrument weight)
Material	Aluminum Magnesium Alloy, Mild-steel (With Powder Coating), FRP
Certifications	CE & FCC Certified, PTCRB Certified Communication Module

Power

|	
Avg. Power Consumption	2.5 W (Actual consumption depends upon the number of parameters)
Power Input Options	External 110-230V AC 50-60Hz, 40Watt Monocrystal Solar Panel
SMPS Specs	24V, 2A output from either of the power inputs UL-62368 & CAN / CSA C22.2 Certified
Battery Backup Time	Up to 48 Hours
Battery Specs	Lithium iron phosphate (LiFePO4) battery cell with rated voltage 12.8V Capacity 6Ah

THP Sensor, Noise Sensor, Dust Sensor Outlet, Dust Sensor Inlet, On/Off Switch, Power, Wind Speed, Air Inlet, Air Outlet, Ethernet, SIM Holder, Relay Output, Modbus / Flood, Rain Sensor

Environmental Performance

|	
Operating Temperature	-20 °C to 60 °C
Operating Humidity	0-95%
Weather Protection	IP63

Parameters

ID	Parameter	Range	Resolution	Min. Detection	Error / Drift	Working Principle	Measurement Principle	Sample Rate	Expected Sensor Life
$PM_{2.5}$	Suspended Particulate Matters with size less than 2.5μ	Up to 5000 μg/m³	0.1 μg/m³	1 μg/m³	Upto ±10%	Optical Particle Counter	Active Sampling	1 L /min	2 years
PM_{10}	Suspended Particulate Matters with size less than 10μ								
PM_1	Ultra Fine Particulate Matters with size less than 1μ								
PM_{100}	Total Suspended Particulates (TSP)	Up to 30000 μg/m³							
CO_2	Carbon Dioxide	Up to 5000 ppm	1 ppm	20 ppm	< ±5 ppm/year	NDIR		325 mL per sample	5 years
CO	Carbon Monoxide	0-1000 ppm	10 ppb	100 ppb	< ±100 ppb/year	Electrochemical			2 years
SO_2	Sulfur Dioxide	0-20 ppm	1 ppb	10 ppb	< ±20 ppb/year				
NO	Nitric Oxide	0-20 ppm	1 ppb	10 ppb	< ±50 ppb/year				
NO_2	Nitrogen Dioxide	0-20 ppm	1 ppb	10 ppb	< ±20 ppb/year				
O_3	Ozone	0-20 ppm	1 ppb	10 ppb	< ±20 ppb/year				
H_2S	Hydrogen Sulfide	0-100 ppm	1 ppb	10 ppb	< ±100 ppb/year				
NH_3	Ammonia	0-100 ppm	10 ppb	100 ppb	< ±24 ppb/year				
TVOC	Total Volatile Organic Compounds	0-100 ppm	1 ppb	5 ppb	N.A.	PID			16 months
NMVOC	Non Methane VOC	0-100 ppm	1 ppm	5 ppb					16 months
C6H6	Benzene	0-100 ppm	10 ppb	10 ppb	±3%	Electrochemical			1.5 year
Noise	Ambient Noise	Up to 140 dB	0.1 dB	30 dB	2%/year	Capacitance	Passive Monitoring	N.A.	3 years
Li	Light Intensity	Up to 100,000 Lux	1 Lux	1 Lux	N.A.	Photo-conductivity			
UV	UV Radiation (0-12 UVI)	0.1-100,000 μW/cm²	0.1 μW/cm²	0.1 μW/cm²	N.A.				
Lv	Visible Light Intensity	Up to 5000 Lux	0.1 Lux	0.1 Lux	N.A.				
Temp	Temperature	-40 to +120 °C	0.01°C	-40 °C	N.A.	Solid state semi conductor sensing			
RH	Humidity	Up to 100% RH	0.1%	0.1%	N.A.				
BP	Barometric Pressure	300-1100 hPa	0.1 hPa	300 hPa	±1.0 hPa/year				

Communication & Datalogging
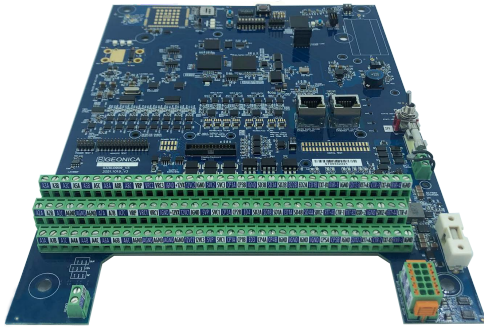
WEBTRANS Internet Platform
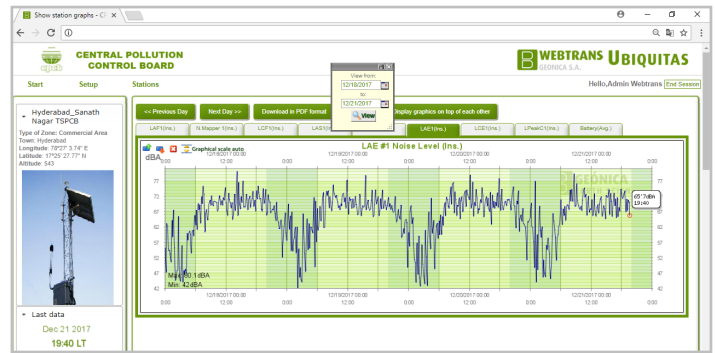
METEODATA Datalogger with Integrated Communications (5G / 4G / 3G / GPRS, LPWAN BB, NB IoT, Ethernet, Satellite).

Installation

Strategic Location Selection:

Proper location selection is critical for optimized data collection. It varies as per the purpose of the project. According to USEPA QA handbook (Vol II, Section 6.0 Rev.1), the selection of locations should be based on monitoring purposes such as:

- Real-time air quality public reporting
- Research monitoring
- Trends monitoring
- Compliance monitoring
- Emergency episode monitoring

Installation

Preferred Mounting	Pole / Wall (preferably 270° open surrounding)
Installation Height	4-5 meters
Direction	As per maximum direct sunlight exposure (if ambient-light monitoring is a preference)
Power Availability	Constant AC supply within a 2-meter range from the unit or solar panel
Network Availability	Uninterrupted network connection

4-5 m height from the ground level

270º Open surrounding
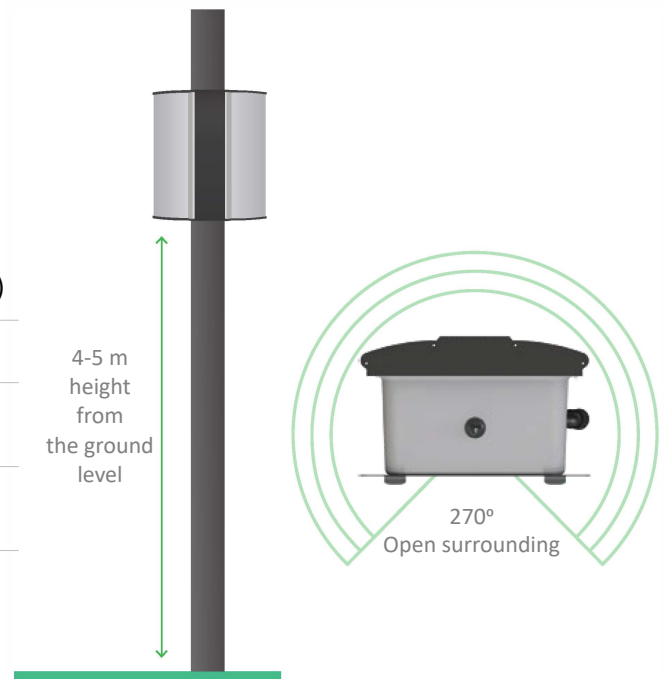
Levels of Calibration

Factory Calibration

The sensors are bump tested at factory to check their proper operation for each parameter.

Lab Calibration

Laboratory calibration is performed for Baseline Correction & Span-Calibration for all the parameters to compensate for cross-sensitivity and ensure higher data accuracy.

Collocation Calibration

The sensors are calibrated against a reference station before installation and their performance is tested in the ambient condition before final deployment.