OIZOM
REDEFINING RESOURCES

Polludrone®

Ambient Air Quality Monitoring System

Polludrone is a Continuous Ambient Air Quality Monitoring System (CAAQMS). It is capable of monitoring various environmental parameters related to air quality, noise, odour, 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.
Polludrone 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.

Product Variants

Variant Name	Application	Parameter
Polludrone Lite	General Purpose	$PM_{2.5}$, PM_{10}, CO_2, CO, Noise, Light, UV-Radiation, Temperature, Humidity
Polludrone Smart	Extensive	$PM_{2.5}$, PM_{10}, CO_2, CO, SO_2, NO, NO_2, O_3, Noise, Light, UV-Radiation, Temperature, Humidity
Polludrone Pro	Critical	PM_1, $PM_{2.5}$, PM_{10}, PM_{100} (TSP), CO_2, CO, SO_2, NO, NO_2, O_3, H_2S, Noise, Light, UV-Radiation, Temperature, Humidity
External Modules	Optional	Wind Speed & Direction, Rainfall, Flood (integrable with all the 3 variants)

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

Powered by
e-Breathing™ Technology

Product Features

Patented Technology: Works on innovative e-breathing technology for higher data accuracy

Weather Resistant: IP66 Grade (certified) enclosure for endurance against harsh weather conditions

Solar Powered with Battery Backup: Compatible to charge internal battery using solar power

Tamper Proof: Comes with a security system to avoid tampering / malfunction / sabotage

Retrofit Design: Plug and play design for ease of implementation

Over-The-Air Update: Automatically upgradeable from a central server without any onsite visit

Compact: Light-weight and compact system that can be installed at 12-15 feet (4-5 m) height

Real-Time Data: Continuous monitoring and real-time data transfer at configurable intervals

Ultimate Durability: Made of high-grade engineering-metal and composite polymers for long life

Network Agnostic: Supports a wide range of connectivity options like GSM / GPRS / WiFi / LoRa / NBIoT/ Ethernet / Modbus

Identity & Configuration: Each equipment carries its unique identity with geo-tagging through wireless configuration

On-device Calibration: On-site device calibration capability using on-device calibration software

3 Levels of Calibration

Factory Calibration

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

Lab Calibration

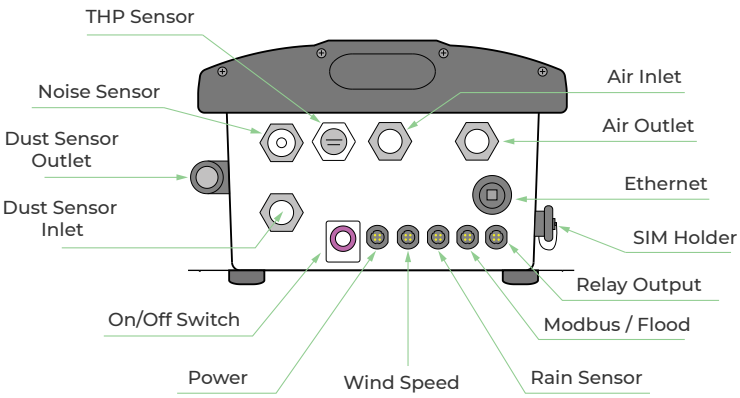
Laboratory calibration is performed for Baseline Correction & Span-Calibration for all the parameters to compensate for cross-sensitivity and ensure higher data accuracy.

Collocation Calibration

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

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



Communication

Data Interval	2-30 minutes (configurable)
Data-push Protocol	HTTP post request to host-server
Data-pull	HTTP request on device IP
Firmware Updates	Over-The-Air Firmware Update
Standby Connectivity	GSM (2G/3G/4G) for remote diagnosis, FOTA updates, and cloud calibration

Power

Avg. Power Consumption	5 Watt (Actual consumption depends upon the number of parameters)
Power Input Options	External 110-230V AC 50-60Hz, 40Watt Monocrystal Solar Panel
SMPS Specs	24V, 2Amps output UL-62368 & CAN/CSA C22.2 Certified
Battery Backup Time	12 Hours
Battery Specs	Lithium iron phosphate (LiFePO4) battery cell with rated voltage 12.8V Capacity 6Ah

Technical Specification

Processor	Quad Core ARM Cortex
Memory	2GB RAM / 8GB eMMC ROM
Device Interface	On-device Software / API
Operating Temperature	-20 °C to 60 °C
Operating Humidity	0-95% RH

	Connectivity Options	Specification
Wireless	GSM	Global 2G / 3G / 4G
	LORA	868 MHz / 915 MHz
	LTE	CAT-M1
	NB-Iot	CAT-NB1
	Sigfox	868 to 869 MHz, 902 to 928 MHz
	Wifi	AP Mode and Station Mode
Wired	Ethernet	Static / DHCP Configuration
	Modbus	RS485 RTU / TCP
	Relay Output	2 Channel

Parameters

ID	Parameter	Range	Resolution	Min. Detection	Drift	Working Principle	Measurement Principle	Sample Rate	Expected Sensor Life
OZPM_1	Suspended Particulate Matters with size less than 2.5µ ($PM_{2.5}$)	Upto 5000 µg/m³	0.1 µg/m³	1 µg/m³	N.A.	Optical Particle Counter	Active Sampling	1 L /min	5000 hours
OZPM_2	Suspended Particulate Matters with size less than 10µ (PM_{10})								
OZPM_3	Ultra Fine Particulate Matters with size less than 1µ (PM_1)								
OZPM_4	Total Suspended Particulates (PM_{100})	Upto 30 mg/m³							
OZCO2_1	Carbon Dioxide (CO_2)	0-5000 ppm	1 ppm	400 ppm	±5 ppm / Year	NDIR		325 mL per sample	2 years
OZCO_2	Carbon Monoxide (CO)	0-100 ppm	0.1 ppm	0.1 ppm	< 2% / Month	Electrochemical			
OZSO2_1	Sulfur Dioxide (SO_2)	0-20 ppm	0.001 ppm	0.01 ppm	±20 ppb / Year				
OZNO_1	Nitric Oxide (NO)	0-20 ppm	0.001 ppm	0.01 ppm	±50 ppb / Year				
OZNO2_1	Nitrogen Dioxide (NO_2)	0-20 ppm	0.001 ppm	0.01 ppm	±20 ppb / Year				
OZO3_1	Ozone (O_3)	0-20 ppm	0.001 ppm	0.01 ppm	±20 ppb / Year				
OZH2S_1	Hydrogen Sulfide (H_2S)	0-10 ppm	0.001 ppm	0.01 ppm	±100 ppb / Year				
OZN_1	Ambient Noise	Upto 140 dB	1 dB	0.5 dB	N.A.	Capacitive	Passive Monitoring	N.A.	
OZLI_1	Light Intensity	Up to 1,00,000 Lux	1 Lux	1 Lux	N.A.	Photo-conductivity			3 years
OZUV_1	UV Radiation (0-12 UVI)	0.1-100,000 uW/cm2	0.1 uW/cm²	0.1 uW/cm²	N.A.				
OZVLI_1	Visible Light Intensity	Up to 5000 Lux	0.1 Lux	0.1 Lux	N.A.				
OZTEMP_1	Temperature	-40 to 125°C	0.01°C	-40 °C	N.A.	Solid state semi conductor sensing			2 years
OZHUM_1	Humidity	100% Rh	0.1%	0.1%	N.A.				
OZPRES_1	Barometric Pressure	300-1100 hPa	0.18 Pa	300 hPa	N.A.				

External Modules (optional)

1

Rain Sensor
- Tipping Bucket
- In mm / inch

2

Wind Sensor
- Ultrasonic sensor
- 360°, 0-40 m/s

3

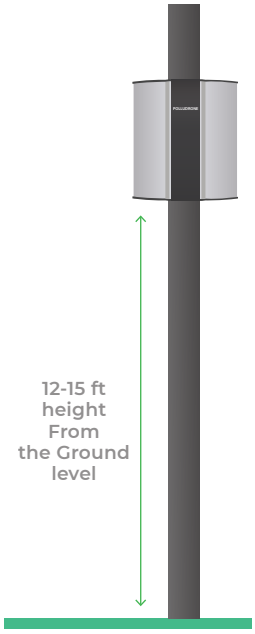
Flood Sensor
- Ultrasonic sensor
- Upto 765 cm

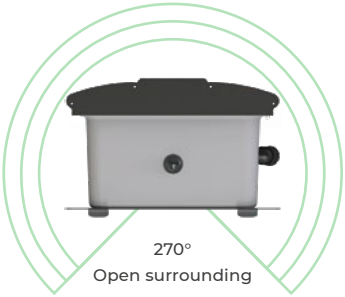
Functional Specification

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	12-15 feet (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

Operation:

When the device is powered on, the device intakes air samples at a predefined frequency through the air sampling system. Once the air sample is stabilized, the sensory system takes multiple readings during the sampling time and performs relevant data-processing. During this cycle time, the device flushes out old air sample and pulls in a fresh one. After each sampling, the data processing system sends the processed data to the central server using a built-in communication module

Maintenance:

Cleaning: Periodic cleaning is important to ensure optimum device performance. Monthly or quarterly regular maintenance activity has to be carried out depending upon the surrounding. The activity includes cleaning the dome for the light sensor, air inlet, and outlet mesh & general cleaning of the exterior.

Sensor Replacement: Every sensor has a limited life span. The sensor life depends on the average pollutant concentration in the area. The sensors need to be replaced once their performance starts to deteriorate and the system starts giving unstable data.

Spot-Calibration: The frequency of calibration is decided based on atmospheric conditions and individual sensor drift to ensure data accuracy. Spot calibration can be performed using reference equipment which can also be a recently calibrated Oizom device.

Diagnosis/Debugging: Power and network availability are the prime check in case of equipment failure. If the issue is still unresolved after remote diagnosis, on-site troubleshooting can be planned by an engineer.

Accurate Air Quality Monitoring And Advanced Data Analytics

Visit us at:
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OIZOM
REDEFINING RESOURCES

306, Indraprasth Corporate,
Prahladnagar, Ahmedabad - India
contact@oizom.com / connect@oizom.com
+91 88666 60025 / 39

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