

# KyberAir Dust

A Comprehensive Air Quality Monitoring Solution by ExpandoWorks

# About **KyberAir**



KyberAir is a Continuous Ambient Air Quality Monitoring System (CAAQMS) capable of tracking a wide range of environmental parameters - air quality, noise, odour, weather, and radiation. It provides real-time measurements of particulate matter and gaseous concentrations in ambient air. With external probes, it can also extend to auxiliary monitoring.

With KyberAir, we can monitor exactly everything listed above in **one place, one sensor, one unit.**

KyberAir is an ideal choice for smart cities and urban-infrastructure applications such as roads and highways, tunnels, smart campuses, and airport environments. It integrates easily with a Smart or Intelligent Poles.

## Product **Key Features & Benefits**



### **Designed & Built in SA**

100% End-to-end South African build: design, firmware, and assembly.



### **Tamper Proof Unit**

Unit is fully lockable and mounted at height/in secure locations to deter tampering.



### **Retrofit Design**

Simple installation, plug and play, easy start-up included.



### **OTA Updates**

Remote firmware/config updates; no site visit needed.



### **Compact**

Lightweight, low-profile unit; typical install height 4-5 m (12-15 ft).



### **Multi-Network Connectivity**

4G LTE Cat-1, Wi-Fi, LoRa, Ethernet, RS-485/Modbus.



### **Real-Time Data & Dashboard View**

Continuous monitoring with data stored on our servers.



### **On-Device Calibration**

On-site calibration using built-in software tools.



### **Weather-Resistant**

IP65 enclosure for harsh outdoor environments.



### **Solar-Powered with Battery Backup**

Runs on solar with integrated backup battery.



### **KyberPortal Dashboard**

Visualise and analyse data in the cloud with live dashboards, alerts and reports. Easy integration via APIs (REST/MQTT).



### **Accurate Data**

Real-time, precise measurements for detecting ambient-air concentrations.

# KyberAir Use cases



## Smart City

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



## Smart Campus

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



## Roads and Highways

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



## Airports

Pollution and noise monitoring at taxiways and terminal surroundings facilitate airport authorities to analyse its impact on travellers and surrounding neighbourhoods.

# KyberAir Variants

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Variants	Applications	Parameters
<b>KyberAir Standard</b>	General Purpose	PMs (1.0, 2.5, 10, 100), CO2, CO, SO2, NO, NO2, O3, Wind Engine, Temp, Hum, Pres, Light, Rain, Noise
<b>KyberAir Dust</b>	Industrial & Mining	PMs (1.0, 2.5, 10, 100), Wind Engine, Temp, Hum, Pres, Light, Rain, Noise
<b>KyberAir Smell</b>	Odor Tracking	TVOC, H2S, NH3, SO2, CH4S, CH2O, NO2, Cl2, Wind Engine, Temp, Hum, Pres, Light, Rain, Noise
<b>KyberAir Waste</b>	Landfills & Waste	SO2, H2S, NH3, CH4S, TVOC, Wind Engine, Temp, Hum, Pres, Light, Rain, Noise
<b>KyberAir Max</b>	Comprehensive	PMs, CO2, CO, SO2, NO, NO2, O3, H2S, TVOC, Wind Engine, Temp, Hum, Pres, Light, Rain, Noise
<b>KyberAir Met</b>	Meteorology Only	Wind Direction & Speed, Temperature, Humidity, Pressure, Light, Rain, Noise

# Unit Sensor Parameters

ID	Parameter	Range	Resolution	Working Principle	Measurement	Rate	Sensor Life
<b>ENV-PM1</b>	PM1.0	0-1000 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Laser Scattering	Optical	1s	>2 Years
<b>ENV-PM2</b>	PM2.5	0-1000 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Laser Scattering	Optical	1s	>2 Years
<b>ENV-PM10</b>	PM10	0-1000 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Laser Scattering	Optical	1s	>2 Years
<b>ENV-PM100</b>	PM100 (TSP)	0-2000 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Laser Scattering	Optical	1s	>2 Years
<b>GAS-CO2</b>	CO2	400-5000 ppm	1 ppm	NDIR	Infrared	1s	>5 Years
<b>GAS-CO</b>	Carbon Monoxide	0-1000 ppm	0.1 ppm	Electrochemical	Amperometric	1s	>18 Months
<b>GAS-SO2</b>	Sulfur Dioxide	0-20 ppm	0.01 ppm	Electrochemical	Amperometric	1s	>18 Months
<b>GAS-NO</b>	Nitrogen Monoxide	0-50 ppm	0.1 ppm	Electrochemical	Amperometric	1s	>18 Months
<b>GAS-NO2</b>	Nitrogen Dioxide	0-10 ppm	0.01 ppm	Electrochemical	Amperometric	1s	>18 Months
<b>GAS-O3</b>	Ozone	0-10 ppm	0.01 ppm	Electrochemical	Amperometric	1s	>18 Months
<b>MET-WD</b>	Wind Direction	0-360°	1°	Ultrasonic	Time-of-flight	1s	>2 Years
<b>MET-WS</b>	Wind Speed	0-60 m/s	0.1 m/s	Ultrasonic	Time-of-flight	1s	>2 Years
<b>MET-TP</b>	Temperature	-40 to 85 °C	0.1 °C	Digital	Semiconductor	1s	>2 Years
<b>MET-HM</b>	Humidity	0-100 %RH	0.1 %	Digital	Capacitive	1s	>2 Years
<b>MET-PR</b>	Pressure	300-1100 hPa	0.1 hPa	Piezo	Piezoresistive	1s	>2 Years
<b>MET-LX</b>	Light LUX	0-200,000 lux	1 lux	Silicon Photo	Photodiode	1s	>2 Years
<b>MET-RG</b>	Rain Gauge	0-4 mm/min	0.1 mm	Tipping Bucket	Magnetic Pulse	1s	>2 Years
<b>MET-NS</b>	Noise	30-130 dB	0.1 dB	Decibel	Condenser Mic	1s	>2 Years

# Unit Specifications



## Power

<b>Avg. Power Consumption</b>	≈ 6 W (typical, all sensors connected)
<b>Power Input Options</b>	External 110-240 VAC 50-60 Hz; 40 W solar panel; onboard solar power manager & battery manager
<b>DIN-Rail SMPS</b>	24 V, 2.5 A output, 60 W; input 85-264 VAC; CE certified; protections: Short-circuit, Over-current, Over-load; display shows input/output voltage; 35 mm DIN-rail mount (52.5×90×54.5 mm)
<b>Battery Backup Time</b>	Up to 14 hours (typical load)
<b>Battery Specs</b>	LiFePO <sub>4</sub> (LFP12-7): 12.8 V nominal, 7 Ah typical (6.22 Ah rated), 89.6 Wh; >2000 cycles @ 0.2C 80% DOD; operating -20-60 °C (discharge); IP56; ~1.1 kg

## Communications

<b>Telemetry Interval</b>	Configurable: every 60 s up to 15 min
<b>Protocols</b>	HTTP / HTTPS; MQTT / MQTTS; TCP/IP
<b>Connectivity</b>	LTE Cat-1; LoRa 433 / 868 / 915 MHz; Ethernet with DHCP
<b>Industrial Interfaces</b>	RS-485 Modbus; up to 8 relay outputs
<b>OTA</b>	Over-the-air firmware updates supported
<b>Approvals</b>	ICASA approved for LTE communications

## General Specs

<b>Enclosure</b>	Mild Steel (powder-coated) – 300 × 300 × 200 mm; options: Aluminium alloy or FRP (fiberglass)
<b>Ingress Protection</b>	IP65 (per EN 60529 test report)
<b>Weight</b>	≈ 6.7 kg (assembled unit)
<b>Certifications (Enclosure/Compliance)</b>	EN 60529 (IP code). Power supply CE-certified, ICASA Type Approved Communications

## Technical Specs

<b>Processor</b>	Quad-core Atmel-based
<b>Device Interface</b>	KyberPortal dashboard
<b>Operating Temperature</b>	
<b>Operating Humidity</b>	0-95% RH
<b>Recommended Humidity</b>	5-90% RH

Type	Connectivity options	Specifications
Wireless	GSM LoRa LTE NB-IoT	Global 2G / 3G / 4G, 868, 915 MHz, CAT-M1, CAT-NB-IoT, LTE, FDD
Wired	Ethernet Modbus Relay Output	RS485 RTU / TCP 2 Channel

# Functional Specifications

Proper location selection is critical for optimized data collection. It varies as per the purpose of the project, the selection of locations should be based on monitoring purposes

<b>Preferred Mounting</b>	Pole / Wall (preferably 270° open surrounding)
<b>Installation Height</b>	12-15 feet (4-5 meters)
<b>Direction</b>	As per maximum direct sunlight exposure
<b>Power Availability</b>	Constant AC / DC supply within a 2-meter range from the unit or solar panel
<b>Network Availability</b>	Uninterrupted network connection



## Data and Calibration

### 1 Laboratory Calibration

All air quality monitoring systems are calibrated at laboratory using standard traceable calibration gas standards as per the international guidelines.

### 2 Collocation Calibration

The monitors are operated adjacent to a custom-built reference station housing designated FEM for collocation calibration to ensure optimum data quality.

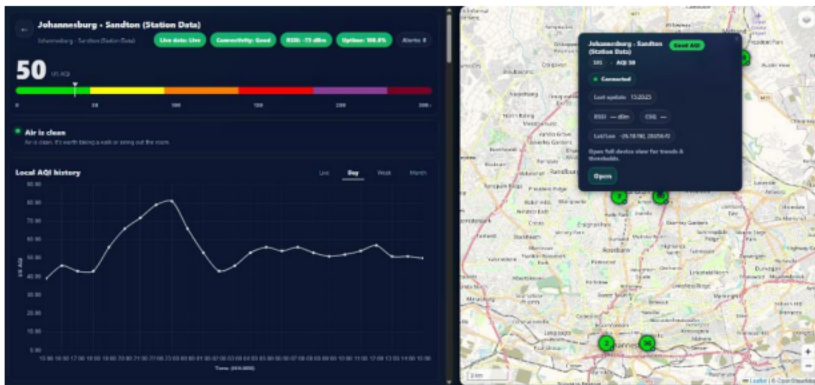
### 3 On-site Calibration

On-site calibration of KyberAir devices can be performed using standard calibration gas cylinders of known concentration or by co-locating with a reference standard.

# Solution Architecture

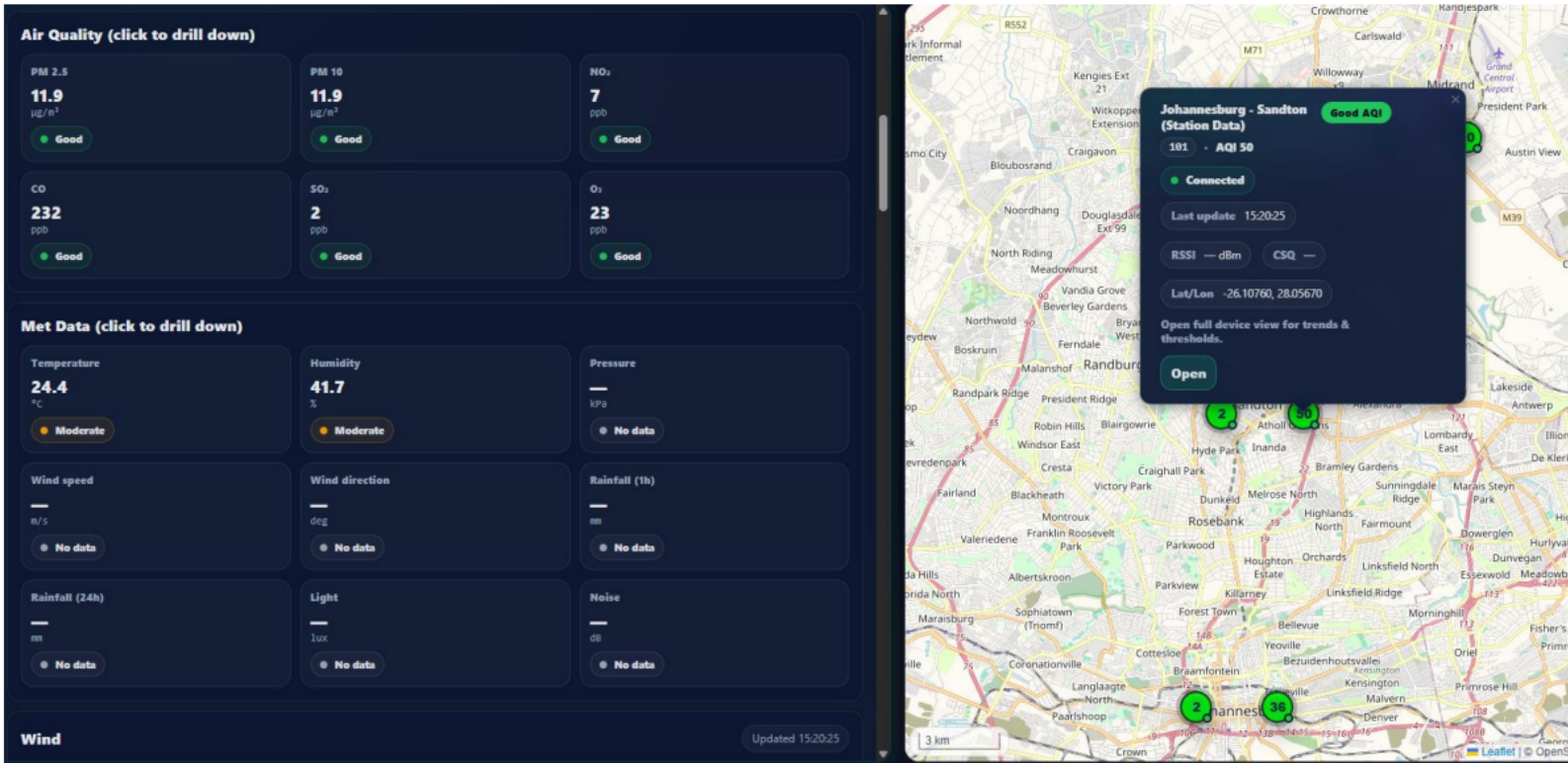


# KyberPortal RMS



An on-device and cloud-enabled KyberAir software allows users to remotely access their data, configure each sensor, adjust how the sensors operate, and manage settings such as data upload frequency and reporting. Users can also define who receives automated reports via email. In addition, KyberAir enables seamless integration with other Kyber products through the dashboarding tool, allowing users to connect and manage multiple devices. The system also supports linking external devices into KyberAir's air quality monitoring solution (KyberPortal), making it possible to collect and unify environmental data from a wide range of sources.

# KyberPortal Features



Real-time data



Easy to Set Up



Smart alerts



One click share / report



User friendly interface



Data accessibility

## Privacy First Platform

### Data Privacy

KyberPortal also uses client/server connection that adds to data safety. ONLY also uses AES encryption for connection that adds to data safety. **Data does not leave South Africa.**

### Data Ownership

**KyberPortal** creates a secure and **encrypted password** combination for the user login. KyberAir ensures **100% privacy** of the data and doesn't share without relevant permissions.

### Data Transparency

Data collected from KyberAir equipment runs through the **Environment Data Interpretation Engine**. It processes various algorithms and eliminates environmental impact interferences on the sensors.



# About **ExpandoWorks**



**Leaders in sensor based air quality monitoring**



**Plug and play monitors for hassle free setup**



**Low powered solutions for multiple applications**

ExpandoWorks is a powerful IoT company that delivers data-driven monitoring solutions to enable better, faster decision-making. We design and deploy sensor-based hardware that measures key environmental conditions - such as air quality, noise, odour, radiation, and weather - transforming real-world signals into reliable, usable data. We also connect a wide range of sensors and integrate with machines to collect operational and performance data across sites and assets.

Our analytics platform converts this information into clear, actionable insights for government authorities, communities, and industry - helping clients track trends, detect issues early, respond faster, and plan with confidence. With years of experience building innovative monitoring technologies, ExpandoWorks combines IoT engineering and data science to deliver practical solutions that support a more efficient, sustainable future.

