

KyberAir

A Comprehensive Air Quality Monitoring Solution by ExpandoWorks



KyberAir at SAWS

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

Variants	Applications	Parameters
KyberAir Standard	General air quality	PM1, PM2.5, PM10, PM100 / TSP, CO2, CO, SO2, NO and NO2; weather and noise options.
KyberAir Max	Broad environmental monitoring	PM1, PM2.5, PM10, PM100 / TSP, CO2, CO, SO2, NO, NO2 and O3; weather and noise options.
KyberAir Dust	Dust and particulate monitoring	PM1, PM2.5, PM10 and PM100 / TSP.
KyberAir Smell	Odour and nuisance monitoring	TVOC, H2S, NH3, SO2, CH3SH, CH2O, NO2 and Cl2; weather and noise options.
KyberAir Waste	Waste and landfill monitoring	SO2, H2S, NH3, CH3SH and TVOC.
KyberAir Met	Weather monitoring	Weather module.
External Modules	Optional expansion	Wind speed and direction, rainfall and pressure; selected to suit the deployment.

Unit Sensor Parameters

ID	Parameter	Range	Resolution	Working Principle	Measurement Principle	Sample Rate	Expected Sensor Life
EXWKYA-AQM	PM Air Quality (PM1.0/PM2.5 /PM10)	Particle sizes: 0.3-1.0; 1.0-2.5; 2.5-10 µm; PM2.5 effective 0-500 µg/m³ (max ≥1000 µg/m³)	≈1 µg/m³ (PM2.5 accuracy up to 1 µg/m³)	Optical particle counter (laser scattering)	Active Sampling (fan)	≈1 s typical	MTTF ≥5 years
EXWKYA-ENV	Temperature	-40 to 85 °C	±0.5-1.0 °C (typ 0.8 °C)	MEMS environmental (BME688)	Passive Monitoring	N.A.	N.A.
EXWKYA-ENV	Humidity	0-100 %RH	±3%RH typical (up to ±6%RH)	MEMS environmental (BME688)	Passive Monitoring	N.A.	N.A.
EXWKYA-ENV	Barometric Pressure	300-1100 hPa	≈±0.6 hPa	MEMS barometer (BME688)	Passive Monitoring	N.A.	N.A.
EXWKYA-ENV	VOC / Gas (IAQ index)	Gas resistance-based (no fixed ppm range)	N.A.	MEMS gas (heated MOx in BME688)	Passive Monitoring	N.A.	N.A.
EXWKYA-UVRS	Ultraviolet (UVA) Intensity	0-15 mW/cm² (UVA 240-370 nm)	0.01 mW/cm²	Photodiode + conditioning	Passive Monitoring	<1 s response	N.A.
EXWKYA-LUV	Visible Light Intensity	1-65,535 lux	≈1.2 lux	Digital photodiode ALS	Passive Monitoring	N.A.	N.A.
EXWKYA-SLM	Ambient Noise (A-weighted)	30-130 dBA	N.A. (±1.5 dB error)	Electret/MEMS mic + A-weighting	Active Sampling	Time constant 125 ms	N.A.
EXWKYA-O3	Ozone (O ₃)	0-1 ppm	1 µg/m³	Electrochemical	Diffusion	Not specified	2 years
EXWKYA-H2S	Hydrogen Sulfide (H ₂ S)	0-100 ppm	1 ppm	Electrochemical	Active Sampling	Active upload every 1 s	>2 years (air)
EXWKYA-NO2	Nitrogen Dioxide (NO ₂)	0-1 ppm	1 µg/m³	Electrochemical	Diffusion	Not specified	2 years
EXWKYA-CO	Carbon Monoxide (CO)	0-10 ppm	1 µg/m³	Electrochemical	Diffusion	Not specified	2 years
EXWKYA-SO2	Sulfur Dioxide (SO ₂)	0-1 ppm	1 µg/m³	Electrochemical	Diffusion	Not specified	2 years
EXWKYA-CO2	Carbon Dioxide (CO ₂)	400-5000 ppm	±(40 ppm + 5% MV) accuracy	Photoacoustic NDIR (SCD41)	Active Sampling	Response time ~60 s	>10 years
EXWKYA-WX	Wind Speed	–	–	Cup anemometer (pulse)	Passive Monitoring	1 Hz data output	N.A.
EXWKYA-WX	Wind Direction	0-360° (compass points)	–	Vane (resistive ladder)	Passive Monitoring	1 Hz data output	N.A.
EXWKYA-WX	Rainfall	–	0.254 mm per tip (0.01 in)	Tipping bucket	Passive Monitoring	1 Hz data output	N.A.
EXWKYA-WX	Temperature	-40 to 125 °C	–	Digital temp sensor on station	Passive Monitoring	1 Hz data output	N.A.
EXWKYA-WX	Humidity	0-100 %RH	–	Digital humidity sensor on station	Passive Monitoring	1 Hz data output	N.A.
EXWKYA-WX	Barometric Pressure	–	–	Digital barometer on station	Passive Monitoring	1 Hz data output	N.A.

CO, SO₂, O₃ and NO₂: response and recovery ≤120 s; operating conditions –20 to 50 °C, 15-90% RH (non-condensing). Resolution is not measurement accuracy; sampling cadence is not specified in the current sensor data sheet.

Gas accuracy (N = concentration in µg/m³): CO ±150 for N ≤3750, otherwise ±10% of N; SO₂ ±30 for N ≤428, otherwise ±10% of N; NO₂ ±30 for N ≤308, otherwise ±10% of N; O₃ ±30 for N ≤321, otherwise ±(30 + 10% of N). These figures apply within the stated measurement ranges.

Unit Specifications



Power

Avg. Power Consumption	≈ 6 W (typical, all sensors connected)
Power Input Options	External 110-240 VAC 50-60 Hz; 40 W solar panel; onboard solar power manager & battery manager
DIN-Rail SMPS	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)
Battery Backup Time	Up to 14 hours (typical load)
Battery Specs	LiFePO ₄ (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

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

General Specs

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

Technical Specs

Processor	Quad-core Atmel-based controller
Device Interface	Web dashboard & REST API
Operating Temperature	-20 °C to 80 °C
Operating Humidity	0-95% RH
Recommended Humidity	5-90% RH

Functional Specifications

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

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

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

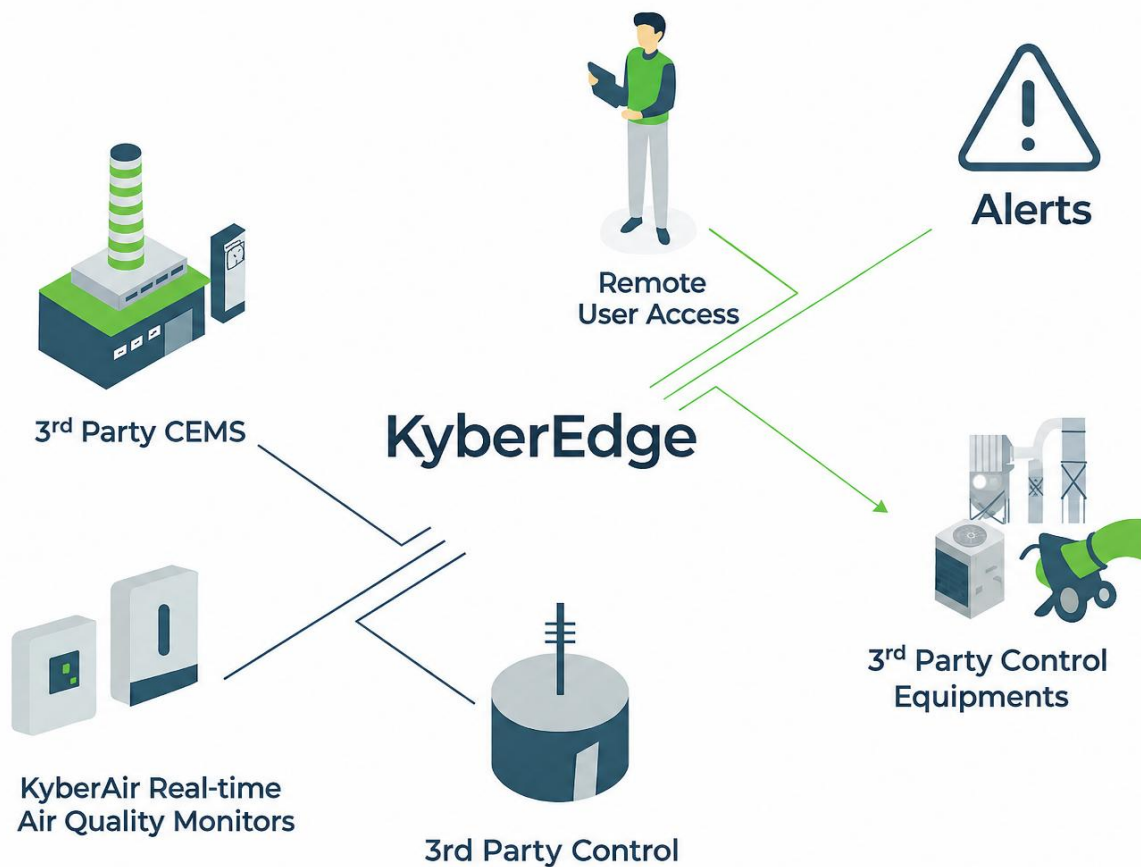
2 Collocation Calibration

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

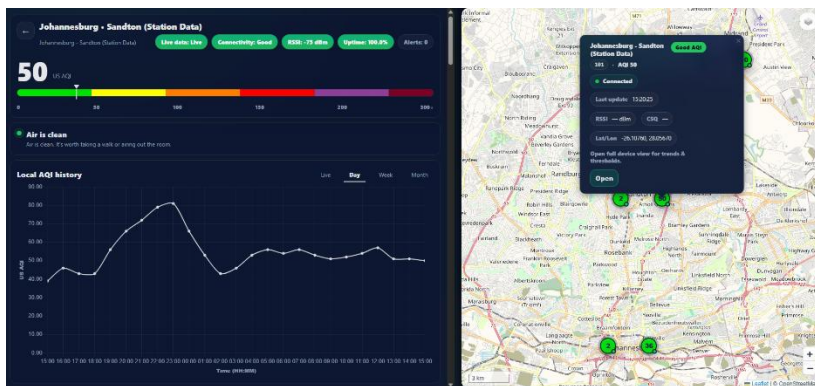
3 On-site Calibration

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

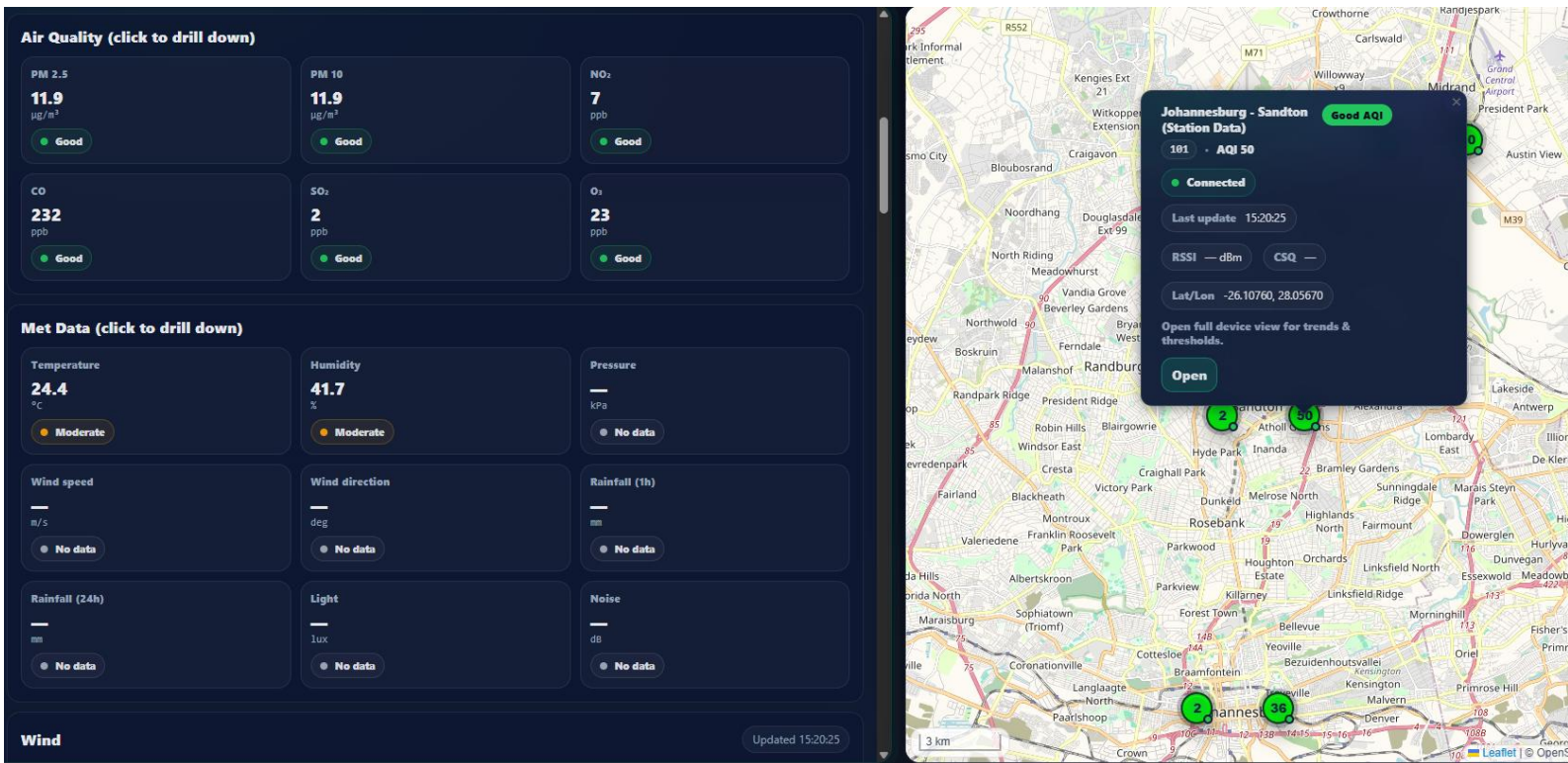


KyberPortal RMS



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



Smart alerts



User friendly interface



Easy to Set Up



One click share / report



Data accessibility

Privacy First Platform

Data Privacy

The data shared with the client uses an encryption server through HTTPS Secure Socket layers. The solution 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.

