



DATASHEET

# kunak air

The most advanced and reliable  
solution for air quality monitoring



Meets EPA performance  
targets for air sensors



CSA MC230418/00





# Kunak AIR Pro

Air quality monitor



## Measure air pollution with accurate and reliable data.

### SENSOR BASED | NEAR REFERENCE DATA

Simultaneously monitor particles and up to 5 gas pollutants from our wide portfolio of sensors, and obtain continuous, real-time data on ambient air. Kunak AIR Pro delivers near-reference measurements in multiple environments, providing reliable insights for air quality monitoring.

All collected data can be visualised and analysed anytime, anywhere through the Kunak AIR Cloud web platform.

**Get the most versatile solution.** Our plug & play gas cartridge technology lets you easily combine and switch sensors at any time to fit your project needs.

**Data quality is guaranteed.** All of our sensors are factory calibrated and tested according to the European CEN/TS 17660 and EPA/600/R protocols, metrics and target values for air sensors.

**Data traceability** to reference standards: European Directive 2024/2881 and USEPA 40 CFR Part 53.



Patented plug&play cartridge system



Up to 16 pollutants  
Combine 5



Proven accuracy  
(EPA, Mcerts, Airlab, CEN/TS 17660)



Traceable back to reference standards



Easy & remote maintenance



Autonomous operation

## Simplify your daily operations. Make better decisions.



Kunak AIR Pro air quality station was awarded **The Most Accurate Multi Pollutant Sensor** in 2021 and 2023 AIRLAB Microsensors Challenge editions organised by Airparif.

Our solution has been tested by the world's leading air quality experts:





Kunak AIR stations offer performance levels close to reference instruments, providing reliable, accurate data according to [Class 1 of the European CEN/TS 17660](#); protocols, metrics and target values of [EPA/600/R-20/279](#) for  $O_3$ , [EPA/600/R-23/14](#) for  $NO_2$ ,  $CO$  and  $SO_2$ , [EPA/600/R-20/280](#) for  $PM_{2.5}$  and [EPA/600/R-23/145](#) for  $PM_{10}$ .

Also, data is traceable to international recognised standards ([European Directive 2024/2881](#) and [USEPA 40 CFR Part 53](#)).

## Specifications

|                   |                                                                                                    |
|-------------------|----------------------------------------------------------------------------------------------------|
| Dimensions        | 257 x 270 x 225 mm                                                                                 |
| Weight            | < 3.5 kg                                                                                           |
| Enclosure         | PMMA & Polycarbonate & Stainless steel                                                             |
| Operating temp.   | -40 °C to 60°C                                                                                     |
| Operating RH      | 0 to 99 %RH                                                                                        |
| IP rating         | IP65                                                                                               |
| Battery           | Lithium 26 Ah                                                                                      |
| External supply   | 7 - 12 Vdc. charger or solar panel                                                                 |
| Autonomy          | 24/7 with charger or solar panel<br>9-30 days operation on battery<br>(depending on configuration) |
| Power consumption | 0.08 - 1.2W (depending on configuration)                                                           |
| Communications    | Multi-Band 2G/3G/4G, Ethernet and Modbus RTU Slave                                                 |
| GNSS              | GPS and GLONASS                                                                                    |

|                      |                                                                                                                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gas sensors          | $CO$ , $NO$ , $NO_2$ , $NO_x$ , $O_3$ , $H_2S$ , $CO_2$ , $SO_2$ , $NH_3$ , VOC, NMHC, $CH_4$ , HCl, HCN, HF, $Cl_2/ClO_2$ and $O_2$                                                                |
| PM sensor            | $PM_{10}$ , $PM_{2.5}$ , $PM_{4}$ , $PM_{10}$ , TSP and TPC                                                                                                                                         |
| Internal status      | Temperature, battery, charging voltage and current, and signal                                                                                                                                      |
| Built-in sensors     | Temperature, humidity, atmospheric pressure and dew point                                                                                                                                           |
| Connectors           | #1: Power 7V to 12V or Ethernet<br>#2: Modbus RTU slave<br>#3: Sound meter, UV<br>#4: WBGT, Pyranometer, Modbus RTU master<br>#5: Anemometer & Rain gauge<br>#Wifi: Ultrafine particle sensor (UFP) |
| Sampling frequencies | 3Hz gases, 0.25Hz particles                                                                                                                                                                         |
| Sampling periods     | From 10 seconds to a maximum of 24 hours                                                                                                                                                            |
| Sending periods      | From 5 minutes to a maximum of 24 hours                                                                                                                                                             |
| Remote management    | Bidirectional communications<br>Remote configuration and calibration                                                                                                                                |
| SIM                  | Embedded eSIM and SIM extra holder                                                                                                                                                                  |



# Kunak AIR Lite

Air quality station



Take quick and effective actions based on accurate and reliable data.

## INDUSTRY GRADE DESIGN | NEAR REFERENCE DATA

Monitor pollution levels and make timely, effective decisions to protect human health and the environment. With the Kunak AIR Lite monitoring station, you get accurate air quality data on multiple pollutants, easily, reliably and cost effectively.

Designed for industrial applications and large-scale urban deployments, Kunak AIR Lite measures particulate matter (PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>) along with up to 2 gases from our wide portfolio of sensors, simultaneously and in real time.

Our patented plug & play gas cartridge technology lets you replace cartridges easily, without returning the device to the factory. Perfect for projects where up to 2 gases and particles need to be monitored.

**Data quality is guaranteed.** All of our sensors are factory calibrated and tested according to the European CEN/TS 17660 and EPA/600/R protocols, metrics and target values for air sensors.

**Data traceability** to reference standards: European Directive 2024/2881 and USEPA 40 CFR Part 53.



Patented plug&play cartridge system



Up to 16 pollutants  
Combine 2



Proven accuracy  
(EPA, Airlab, CEN/TS 17660)



Traceable back  
to reference  
standards



Easy & remote  
maintenance



Autonomous  
operation



Kunak AIR Lite air quality station was awarded **The Most Accurate Multi Pollutant Sensor** in the latest AIRLAB Microsensors Challenge edition organised by Airparif.

Our solution has been tested by the world's leading air quality experts:





Kunak AIR stations offer performance levels close to reference instruments, providing reliable, accurate data according to [Class 1 of the European CEN/TS 17660](#); protocols, metrics and target values of [EPA/600/R-20/279](#) for  $O_3$ , [EPA/600/R-23/14](#) for  $NO_2$ , CO and  $SO_2$ , [EPA/600/R-20/280](#) for  $PM_{2.5}$  and [EPA/600/R-23/145](#) for  $PM_{10}$ .

Also, data is traceable to international recognised standards ([European Directive 2024/2881](#) and [USEPA 40 CFR Part 53](#)).

## Specifications

|                   |                                                                                                    |
|-------------------|----------------------------------------------------------------------------------------------------|
| Dimensions        | 200 x 153 x 185 mm                                                                                 |
| Weight            | < 2.3 kg                                                                                           |
| Enclosure         | PMMA & Polycarbonate & Stainless steel                                                             |
| Operating temp.   | -40 °C to 60°C                                                                                     |
| Operating RH      | 0 to 99 %RH                                                                                        |
| IP rating         | IP65                                                                                               |
| Battery           | Lithium 20 Ah                                                                                      |
| External supply   | 7 - 12 Vdc. charger or solar panel                                                                 |
| Autonomy          | 24/7 with charger or solar panel<br>9-30 days operation on battery<br>(depending on configuration) |
| Power consumption | 0.08 - 0.55W (depending on configuration)                                                          |
| Communications    | Multi-Band 2G/3G/4G, Ethernet and Modbus RTU Slave                                                 |
| GNSS              | GPS and GLONASS                                                                                    |

|                      |                                                                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gas sensors          | CO, NO, $NO_2$ , $NO_x$ , $O_3$ , $H_2S$ , $CO_2$ , $SO_2$ , $NH_3$ , VOC, NMHC, $CH_4$ , HCl, HCN, HF, $Cl_2/ClO_2$ and $O_2$                                                         |
| PM sensor            | $PM_{1\mu}$ , $PM_{2.5}$ , and $PM_{10}$                                                                                                                                               |
| Internal status      | Temperature, battery, charging voltage and current, and signal                                                                                                                         |
| Built-in sensors     | Temperature, humidity, atmospheric pressure and dew point                                                                                                                              |
| Connectors           | Option 1: Anemometer & Rain gauge<br>Option 2: Modbus RTU master<br>Option 3: Sound meter<br>Option 4: Ethernet<br>Option 5: Modbus RTU slave<br>Wifi: Ultrafine particle sensor (UFP) |
| Sampling frequencies | 3Hz gases, 1Hz particles                                                                                                                                                               |
| Sampling periods     | From 10 seconds to a maximum of 24 hours                                                                                                                                               |
| Sending periods      | From 5 minutes to a maximum of 24 hours                                                                                                                                                |
| Remote management    | Bidirectional communications<br>Remote configuration and calibration                                                                                                                   |
| SIM                  | Embedded eSIM and SIM extra holder                                                                                                                                                     |



# Smart gas cartridges

## Description

Kunak AIR stations are sensor-based devices featuring slots to insert the smart gas cartridges. These cartridges solve many of the known issues of sensor technology as sensor variability, factory and field calibration, automatic data invalidation, sensor replacement, network operation and maintenance work.

The smart gas cartridges ensure measurement control throughout the life cycle of each sensor.

Kunak AIR stations are the most sustainable solution on the market with most of the electronic and mechanical parts designed to be reused and recycled.



### Near reference data

Accurate real-time pollutant value without the need for external instruments or reference data



### Traceable QC & QA

Each cartridge is calibrated and validated individually in lab against traceable reference standards.



### Low intra-variability

Consistent readings across all equipment and locations, correcting implicit sensor variability.



### Endless combinations

Combine your cartridges according to your needs in just 2 minutes.

## Patented GasPlug™ technology

All cartridges share the same form factor and can be inserted into any available slot. Each cartridge integrates a sensor mounted on a PCB that stores all relevant data, including type, age, and factory calibration.

Once connected, the base station automatically reads this information, configures itself accordingly, and operates within seconds.

**20+** cartridges  
tailored for every project need



Say hello to a revolutionary gas sensor that fits in the palm of your hand.



|                                                    | CO                                                                               | NO                      | NO <sub>2</sub>         | O <sub>3</sub>          | SO <sub>2</sub>         | H <sub>2</sub> S                                                                 | CO <sub>2</sub>                | CH <sub>4</sub>                                                                        |
|----------------------------------------------------|----------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------|
| Type                                               | Electrochemical                                                                  | Electrochemical         | Electrochemical         | Electrochemical         | Electrochemical         | Electrochemical                                                                  | Non-dispersive infrared (NDIR) | N. A. <sup>(C)</sup><br>TDLAS <sup>(D)</sup>                                           |
| Unit of measurement                                | µg/m <sup>3</sup> , ppb <sup>(A)</sup><br>mg/m <sup>3</sup> , ppm <sup>(B)</sup> | µg/m <sup>3</sup> , ppb | µg/m <sup>3</sup> , ppb | µg/m <sup>3</sup> , ppb | µg/m <sup>3</sup> , ppb | µg/m <sup>3</sup> , ppb <sup>(A)</sup><br>mg/m <sup>3</sup> , ppm <sup>(B)</sup> | mg/m <sup>3</sup> , ppm        | mg/m <sup>3</sup> , ppm                                                                |
| Measurement range <sup>(1)</sup>                   | 0 - 12,000 ppb <sup>(A)</sup><br>0 - 500 ppm <sup>(B)</sup>                      | 0-5,000 ppb             | 0-5,000 ppb             | 0-2,000 ppb             | 0-10,000 ppb            | 0 - 2,000 ppb <sup>(A)</sup><br>0 - 20 ppm <sup>(B)</sup>                        | 0-5,000 ppm                    | 2-300 ppm <sup>(C)</sup><br>0-1,000 ppm <sup>(D)</sup>                                 |
| Resolution <sup>(2)</sup>                          | 1 ppb <sup>(A)</sup><br>0.01 ppm <sup>(B)</sup>                                  | 1 ppb                   | 1 ppb                   | 1 ppb                   | 1 ppb                   | 1 ppb <sup>(A)</sup><br>0.01 ppm <sup>(B)</sup>                                  | 0.01 ppm                       | 0.01 ppm <sup>(C)</sup><br>0.1 ppm <sup>(D)</sup>                                      |
| Operating temp. range <sup>(3)</sup>               | -30 to 50 °C                                                                     | -30 to 45 °C            | -30 to 45 °C            | -30 to 45 °C            | -30 to 40 °C            | -30 to 50 °C                                                                     | -20 to 50 °C                   | -30 to 60 °C                                                                           |
| Operating RH range <sup>(4)</sup>                  | 0 to 99 %RH                                                                      | 0 to 99 %RH             | 0 to 99 %RH             | 0 to 99 %RH             | 0 to 99 %RH             | 0 to 99 %RH                                                                      | 0 to 99 %RH                    | 10 to 99 %RH <sup>(C)</sup><br>0 to 98 %RH <sup>(D)</sup>                              |
| Recommended RH range <sup>(5)</sup>                | 15 to 90 %RH                                                                     | 15 to 85 %RH            | 15 to 85 %RH            | 15 to 85 %RH            | 15 to 90 %RH            | 15 to 90 %RH                                                                     | 15 to 95 %RH                   | 15 to 90 %RH <sup>(C)</sup>                                                            |
| Operating life <sup>(6)</sup>                      | > 24 months                                                                      | > 24 months             | > 24 months             | > 24 months             | > 24 months             | > 24 months                                                                      | > 4 years                      | > 24 months <sup>(C)</sup><br>> 5 years <sup>(D)</sup><br>(10 years manufacturer)      |
| Guarantee range <sup>(7)</sup>                     | 1,000 ppm                                                                        | 20 ppm                  | 20 ppm                  | 20 ppm                  | 100 ppm                 | 100 ppm                                                                          | —                              | 10,000 ppm                                                                             |
| LOD - Limit of detection <sup>(8)</sup>            | 10 ppb <sup>(A)</sup><br>0.02 ppm <sup>(B)</sup>                                 | 2 ppb                   | 2 ppb                   | 3 ppb                   | 3 ppb                   | 2 ppb <sup>(A)</sup><br>0.01 ppm <sup>(B)</sup>                                  | —                              | < 0.05 ppm                                                                             |
| Repeatability <sup>(9)</sup>                       | 20 ppb <sup>(A)</sup><br>0.05 ppm <sup>(B)</sup>                                 | 4 ppb                   | 4 ppb                   | 4 ppb                   | 5 ppb                   | 4 ppb <sup>(A)</sup><br>0.01 ppm <sup>(B)</sup>                                  | —                              | < 0.35 ppm <sup>(C)</sup><br>< 0.30 ppm <sup>(D)</sup>                                 |
| Response time <sup>(10)</sup>                      | < 30 sec <sup>(A)</sup><br>< 180 sec <sup>(B)</sup>                              | < 30 sec                | < 60 sec                | < 70 sec                | < 60 sec                | < 60 sec                                                                         | < 30 sec                       | < 120 sec <sup>(C)</sup><br>< 30 sec <sup>(D)</sup>                                    |
| Typical accuracy <sup>(12)</sup>                   | ± 80 ppb <sup>(A)</sup><br>± 0.1 ppm <sup>(B)</sup>                              | ±4 ppb                  | ±5 ppb                  | ±8 ppb                  | ±15 ppb                 | ± 10 ppb <sup>(A)</sup><br>± 0.05 ppm <sup>(B)</sup>                             | ±20 ppm                        | ±1 ppm+ 10%<br>of reading <sup>(C)</sup><br>±0.5 ppm + 1%<br>of reading <sup>(D)</sup> |
| Typical precision - R <sup>2</sup> <sup>(11)</sup> | > 0.85                                                                           | > 0.9                   | > 0.85                  | > 0.9                   | > 0.7                   | > 0.75                                                                           | > 0.8                          | > 0.85 <sup>(C)</sup><br>> 0.90 <sup>(D)</sup>                                         |
| Typical slope <sup>(11)</sup>                      | 0.78 - 1.29                                                                      | 0.9 - 1.12              | 0.78 - 1.29             | 0.85 - 1.18             | 0.78 - 1.29             | 0.78 - 1.29                                                                      | 0.6 - 1.66                     | —                                                                                      |
| Typical intercept (a) <sup>(11)</sup>              | -50 ppb ≤ a ≤ +50 ppb <sup>(A)</sup><br>-0.1 ppm ≤ a ≤ +0.1 ppm <sup>(B)</sup>   | -2 ppb ≤ a ≤ +2 ppb     | -4 ppb ≤ a ≤ +4 ppb     | -3 ppb ≤ a ≤ +3 ppb     | -5 ppb ≤ a ≤ +5 ppb     | -5 ppb ≤ a ≤ +5 ppb <sup>(A)</sup><br>-0.05 ppm ≤ a ≤ +0.05 ppm <sup>(B)</sup>   | -170 ppm ≤ a<br>≤ 170 ppm      | —                                                                                      |
| DQO - Typical U(exp) <sup>(13)</sup>               | < 20%                                                                            | < 20%                   | < 25%                   | < 20%                   | < 25%                   | -                                                                                | —                              | —                                                                                      |
| Typical intra-model variability <sup>(14)</sup>    | < 3 ppb <sup>(A)</sup><br>< 0.05 ppm <sup>(B)</sup>                              | < 1 ppb                 | < 1 ppb                 | < 1 ppb                 | < 3 ppb                 | < 2 ppb <sup>(A)</sup><br>< 0.02 ppm <sup>(B)</sup>                              | < 0.5 ppm                      | < 0.3 ppm <sup>(C)</sup>                                                               |

|                                                 | VOC                                                                              | NMHC                    | NH <sub>3</sub>                                                               | HCl                     | HCN                     | HF                      | Cl <sub>2</sub> / ClO <sub>2</sub> | O <sub>2</sub>              |
|-------------------------------------------------|----------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|------------------------------------|-----------------------------|
| Type                                            | Photoionization detector                                                         | N. A.                   | Electrochemical                                                               | Electrochemical         | Electrochemical         | Electrochemical         | Electrochemical                    | Electrochemical             |
| Unit of measurement                             | µg/m <sup>3</sup> , ppb <sup>(A)</sup><br>mg/m <sup>3</sup> , ppm <sup>(B)</sup> | µg/m <sup>3</sup> , ppb | mg/m <sup>3</sup> , ppm                                                       | mg/m <sup>3</sup> , ppm | mg/m <sup>3</sup> , ppm | mg/m <sup>3</sup> , ppm | µg/m <sup>3</sup> , ppb            | %                           |
| Measurement range <sup>(1)</sup>                | 0 - 3,000 ppb <sup>(A)</sup><br>0 - 40 ppm <sup>(B)</sup>                        | 0-5,000 ppb             | 0-50 ppm <sup>(A-C)</sup><br>0 - 1,500 ppm <sup>(B)</sup>                     | 0-20 ppm                | 0-50 ppm                | 0-10 ppm                | 0-20 ppm                           | 0-30 %                      |
| Resolution <sup>(2)</sup>                       | 1 ppb <sup>(A)</sup><br>0.01 ppm <sup>(B)</sup>                                  | 1 ppb                   | 0.01 ppm                                                                      | 0.01 ppm                | 0.01 ppm                | 0.01 ppm                | 1 ppb                              | 0.01 %                      |
| Operating temp. range <sup>(3)</sup>            | -40 to 60 °C                                                                     | -30 to 60 °C            | -10 to 50 °C <sup>(A)</sup><br>-30 to 45 °C <sup>(B-C)</sup>                  | -20 to 50 °C            | -20 to 45 °C            | -20 to 50 °C            | -20 to 50 °C                       | -30 to 50 °C                |
| Operating RH range <sup>(4)</sup>               | 0 to 99% RH                                                                      | 10 to 99 %RH            | 0 to 99 %RH                                                                   | 0 to 99 %RH             | 0 to 99 %RH             | 0 to 99 %RH             | 0 to 99 %RH                        | 0 to 99 %RH (short periods) |
| Recommended RH range <sup>(5)</sup>             | 0 to 99% RH                                                                      | 15 to 90 %RH            | 15 to 90 %RH                                                                  | 15 to 90 %RH            | 15 to 90 %RH            | 15 to 90 %RH            | 15 to 90 %RH                       | 5 to 95 %RH                 |
| Operating life <sup>(6)</sup>                   | 10,000 hours                                                                     | > 4 years               | > 24 months                                                                   | > 24 months             | > 24 months             | > 24 months             | > 12 months                        | > 4 years                   |
| Guarantee range <sup>(7)</sup>                  | 50 ppm <sup>(A)</sup><br>60 ppm <sup>(B)</sup>                                   | 30 ppm                  | 100 ppm <sup>(A)</sup><br>5,000 ppm <sup>(B)</sup><br>200 ppm <sup>(C)</sup>  | 200 ppm                 | 200 ppm                 | 50 ppm                  | 250 ppm                            | 50 %                        |
| LOD - Limit of detection <sup>(8)</sup>         | 1 ppb <sup>(A)</sup><br>0.01 ppm <sup>(B)</sup>                                  | 5 ppb                   | 0.02 ppm <sup>(A-C)</sup><br>0.15 ppm <sup>(B)</sup>                          | 0.01 ppm                | 0.02 ppm                | 0.02 ppm                | 2 ppb                              | —                           |
| Repeatability <sup>(9)</sup>                    | 5 ppb <sup>(A)</sup><br>0.02 ppm <sup>(B)</sup>                                  | 6 ppb                   | 0.03 ppm <sup>(A)</sup><br>0.5 ppm <sup>(B)</sup><br>0.1 ppm <sup>(C)</sup>   | 0.02 ppm                | 0.03 ppm                | —                       | —                                  | —                           |
| Response time <sup>(10)</sup>                   | < 12 sec <sup>(A)</sup><br>< 10 sec <sup>(B)</sup>                               | < 120 sec               | < 45 sec <sup>(A)</sup><br>< 90 sec <sup>(B-C)</sup>                          | < 45 sec                | < 160 sec               | < 120 sec               | < 60 sec                           | < 10 sec                    |
| Typical accuracy <sup>(12)</sup>                | —                                                                                | —                       | ±0.5 ppm <sup>(A)</sup><br>±1.5 ppm <sup>(B)</sup><br>±0.3 ppm <sup>(C)</sup> | ±0.1 ppm                | ±0.1 ppm                | ±0.1 ppm                | ±20 ppb                            | ±0.3 %                      |
| Typical intra-model variability <sup>(14)</sup> | < 3 ppb <sup>(A)</sup><br>< 0.1 ppm <sup>(B)</sup>                               | < 3 ppb                 | < 0.1 ppm <sup>(A-C)</sup><br>< 0.2 ppm <sup>(B)</sup>                        | < 0.1 ppm               | < 0.1 ppm               | < 0.1 ppm               | < 3 ppb                            | 0.1 %                       |

|                                                    | PM <sub>1</sub>                                                                                                | PM <sub>2.5</sub>                                                                                          | PM <sub>4</sub>                                     | PM <sub>10</sub>                                                                                             | TSP                                                 | TPC                                  |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------|
| Type                                               | Optical particle counter                                                                                       | Optical particle counter                                                                                   | Optical particle counter                            | Optical particle counter                                                                                     | Optical particle counter                            | Optical particle counter             |
| Unit of measurement                                | µg/m <sup>3</sup>                                                                                              | µg/m <sup>3</sup>                                                                                          | µg/m <sup>3</sup> (A)                               | µg/m <sup>3</sup> (A)                                                                                        | µg/m <sup>3</sup> (A)                               | counts/cm <sup>3</sup> (A)           |
| Measurement range <sup>(1)</sup>                   | 0 - 1,000 µg/m <sup>3</sup>                                                                                    | 0 - 2,000 µg/m <sup>3</sup> (A)<br>0 - 1,000 µg/m <sup>3</sup> (B)                                         | 0 - 2,000 µg/m <sup>3</sup> (A)                     | 0 - 10,000 µg/m <sup>3</sup> (A)<br>0 - 1,000 µg/m <sup>3</sup> (B)                                          | 0 - 15,000 µg/m <sup>3</sup> (A)                    | 0 - 8,000 counts/cm <sup>3</sup> (A) |
| Resolution <sup>(2)</sup>                          | 1 µg/m <sup>3</sup>                                                                                            | 1 µg/m <sup>3</sup>                                                                                        | 1 µg/m <sup>3</sup> (A)                             | 1 µg/m <sup>3</sup>                                                                                          | 1 µg/m <sup>3</sup> (A)                             | 1 counts /cm <sup>3</sup> (A)        |
| Operating temp. range <sup>(3)</sup>               | -20 to 50 °C (A) **<br>-10 to 60 °C (B)                                                                        | -20 to 50 °C (A) **<br>-10 to 60 °C (B)                                                                    | -20 to 50 °C (A) **                                 | -20 to 50 °C (A) **<br>-10 to 60 °C (B)                                                                      | -20 to 50 °C (A) **                                 | -20 to 50 °C (A) **                  |
| Operating RH range <sup>(4)</sup>                  | 0 to 99 %RH                                                                                                    | 0 to 99 %RH                                                                                                | 0 to 99 %RH (A)                                     | 0 to 99 %RH                                                                                                  | 0 to 99 %RH (A)                                     | 0 to 99 %RH (A)                      |
| Recommended RH range <sup>(5)</sup>                | 0 to 95 %RH                                                                                                    | 0 to 95 %RH                                                                                                | 0 to 95 %RH (A)                                     | 0 to 95 %RH                                                                                                  | 0 to 95 %RH (A)                                     | 0 to 95 %RH (A)                      |
| Operating life <sup>(6)</sup>                      | > 24 months                                                                                                    | > 24 months                                                                                                | > 24 months (A)                                     | > 24 months                                                                                                  | > 24 months (A)                                     | > 24 months (A)                      |
| LOD - Limit of Detection <sup>(8)</sup>            | 0.5 µg/m <sup>3</sup>                                                                                          | 0.5 µg/m <sup>3</sup>                                                                                      | 0.5 µg/m <sup>3</sup> (A)                           | 0.5 µg/m <sup>3</sup>                                                                                        | 1 µg/m <sup>3</sup> (A)                             | —                                    |
| Repeatability <sup>(9)</sup>                       | 2 µg/m <sup>3</sup> (A)<br>3 µg/m <sup>3</sup> (B)                                                             | 3 µg/m <sup>3</sup>                                                                                        | 3 µg/m <sup>3</sup> (A)                             | 5 µg/m <sup>3</sup> (A)<br>6 µg/m <sup>3</sup> (B)                                                           | 6 µg/m <sup>3</sup> (A)                             | —                                    |
| Response Time <sup>(10)</sup>                      | < 10 sec                                                                                                       | < 10 sec                                                                                                   | < 10 sec (A)                                        | < 10 sec                                                                                                     | < 10 sec (A)                                        | < 10 sec (A)                         |
| Typical accuracy <sup>(12)</sup>                   | ±2 µg/m <sup>3</sup> (A)<br>±3 µg/m <sup>3</sup> (B)                                                           | ±3 µg/m <sup>3</sup>                                                                                       | ±3 µg/m <sup>3</sup> (A)                            | ±4 µg/m <sup>3</sup> (A)<br>±6 µg/m <sup>3</sup> (B) *                                                       | ±6 µg/m <sup>3</sup> (A)                            | —                                    |
| Typical precision - R <sup>2</sup> <sup>(11)</sup> | > 0.9 (A)<br>> 0.85 (B)                                                                                        | > 0.8 (A)<br>> 0.8 (B)                                                                                     | > 0.8 (A)                                           | > 0.7 (A)<br>> 0.5 (B) *                                                                                     | > 0.7 (A)                                           | > 0.8 (A)                            |
| Typical slope <sup>(11)</sup>                      | 0.85 - 1.18 (A)<br>0.80 - 1.25 (B)                                                                             | 0.85 - 1.18 (A)<br>0.83 - 1.20 (B)                                                                         | 0.85 - 1.18 (A)                                     | 0.85 - 1.18 (A)<br>0.75 - 1.35 (B) *                                                                         | 0.85 - 1.18 (A)                                     | —                                    |
| Typical intercept (a) <sup>(11)</sup>              | -1.8 µg/m <sup>3</sup> ≤ a ≤ +1.8 µg/m <sup>3</sup> (A)<br>-2 µg/m <sup>3</sup> ≤ a ≤ +2 µg/m <sup>3</sup> (B) | -2 µg/m <sup>3</sup> ≤ a ≤ +2 µg/m <sup>3</sup> (A)<br>-3 µg/m <sup>3</sup> ≤ a ≤ +3 µg/m <sup>3</sup> (B) | -2 µg/m <sup>3</sup> ≤ a ≤ +2 µg/m <sup>3</sup> (A) | -3 µg/m <sup>3</sup> ≤ a ≤ +3 µg/m <sup>3</sup> (A)<br>-9 µg/m <sup>3</sup> ≤ a ≤ +9 µg/m <sup>3</sup> (B) * | -4 µg/m <sup>3</sup> ≤ a ≤ +4 µg/m <sup>3</sup> (A) | —                                    |
| DQO - Typical U(exp) <sup>(13)</sup>               | < 50%                                                                                                          | < 35%                                                                                                      | < 50% (A)                                           | < 50% (A)<br>< 75% (B) *                                                                                     | < 50% (A)                                           | —                                    |
| Typical intra-model variability <sup>(14)</sup>    | < 2 µg/m <sup>3</sup> (A)                                                                                      | < 2 µg/m <sup>3</sup> (A)                                                                                  | < 2 µg/m <sup>3</sup> (A)                           | < 2 µg/m <sup>3</sup> (A)                                                                                    | < 2 µg/m <sup>3</sup> (A)                           | —                                    |

**Table notes for gases and particulate matter:**

- Measurement range:** concentration range measured by the sensor.
- Resolution:** smallest unit of measurement that can be indicated by the sensor.
- Operating temperature range:** temperature interval at which the sensor is rated to operate safely and provide measurements. (\*\*) In PM sensor Type A: -40 to 50°C with heater (more information on this version on request).
- Operating RH range:** humidity interval at which the sensor is rated to operate safely and provide measurements.
- Recommended RH range:** Recommended relative humidity range for optimal sensor performance. Continuous exposure outside the recommended range may damage the cartridge.
- Operating life:** time period during which the sensor can operate effectively and accurately under normal conditions.
- Guarantee range:** concentration range covered by Kunak's guarantee.
- LOD (Limit Of Detection):** measured at laboratory conditions at 20°C and 50% RH. The limit of detection is the minimum concentration that can be detected as significantly different at zero gas concentration, calculated according to the Technical Specification CEN/TS 17660.
- Repeatability:** measured at laboratory conditions at 20°C and 50% RH. Closeness of the agreement between the results of successive measurements of the same measure carried out under the same conditions of measurement, calculated according to the Technical Specification CEN/TS 17660.
- Response time:** time needed by the sensor to reach 90% of the final stable value.
- Typical precision - R<sup>2</sup>:** statistics obtained between the device hourly measurements and reference instruments in field test between -10 to +30°C at different locations. (\*) For the type B PM sensor, the expected error for PM<sub>10</sub> is higher in presence of coarse particles.
- Typical accuracy:** for criteria pollutants is the average Mean Absolute Error (MAE) obtained between the device hourly measurements and reference instruments for 1 to 8 months field test between -10 to +30°C in different countries. For other pollutants is the expected error of the measurement at the reading.
- DQO-Typical U(exp):** Data Quality Objective expressed as the Expanded Uncertainty in the Limit Value obtained between the device hourly measurements and reference instruments for 1 to 8 months field test between -10 to +30°C in different countries, calculated according to the European Air Quality Directive 2024/2881 and from the Technical Specification CEN/TS 17660. (\*) For the type B PM sensor, the expected error for PM<sub>10</sub> is higher in presence of coarse particles.
- Typical intra-model variability:** calculated as the standard deviation of the three sensor means in 1 to 8 months field test between -10 to +30°C in different countries.

**A, B, C, D superindex:** the super indexes refer to different types of cartridges related to the same target pollutant but with different technical specifications.



# Kunak AIR Cloud

Air quality software

Simplify data analysis and get actionable insights for decision-making

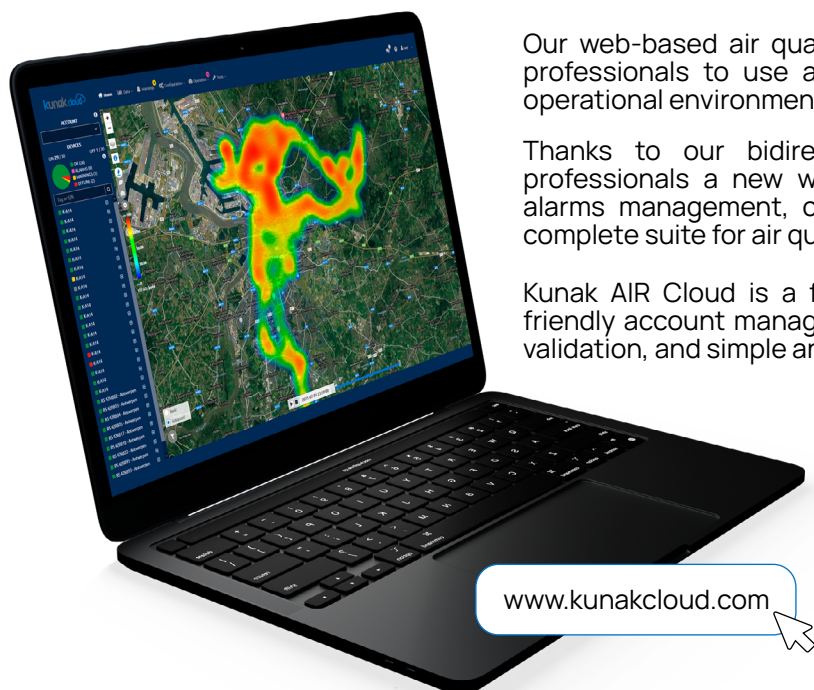
REAL-TIME DATA | ALWAYS UPDATED

Our web-based air quality monitoring software helps environmental professionals to use and understand air quality data and delivers operational environmental intelligence to make better decisions.

Thanks to our bidirectional software, Kunak AIR Cloud offers professionals a new way to handle remote settings configuration, alarms management, calibration and field operations, as well as a complete suite for air quality data analysis.

Kunak AIR Cloud is a flexible modular software designed for user-friendly account management, easy network operation, intuitive data validation, and simple analysis and reporting.

The Kunak Cloud web platform is the powerful air quality software that completes the comprehensive Kunak AIR solution.



[www.kunakcloud.com](http://www.kunakcloud.com)



## Secure & Confidential

HTTPS/SSL protocols. Confidentiality and ownership of data guaranteed by EULA.



## Free continuous updates

Be always updated. Enjoy any new tool or functionality immediately without additional cost.



## Air Quality reports

Customized AQ reporting for clients and agencies in any required format.



## Automatic supervision

Continuous station and sensor health monitoring, with operation alarms and guided troubleshooting for anomalies.



## Reliable data guaranteed

The advanced algorithms for automatic data flagging and the data validation tool ensure high quality data.



## Pollution sources & Hot spots

Powerful air quality tools with advanced map-based visualization.



## Remote troubleshooting

Service, diagnose and repair your stations remotely. Get remote support from our team.



## Data sharing & Integration

Integrate and share data via API, export in multiple formats, and publish air quality data through web portals and widgets.



## Advanced forecasting

Advanced forecasting tools to anticipate weather, pollen and air quality trends.



# Complete suite of tools

Our air quality monitoring software is the perfect complement to unleash the full potential of Kunak AIR stations and air pollution monitoring networks.



## Control panel & dashboard

Monitor your devices in real time, check their status and latest measurements displayed on an interactive map.



## Advanced analytics

Advanced analytics in OpenAir: basic stats, pollutant time trends, temporal variation, wind plots, and more.



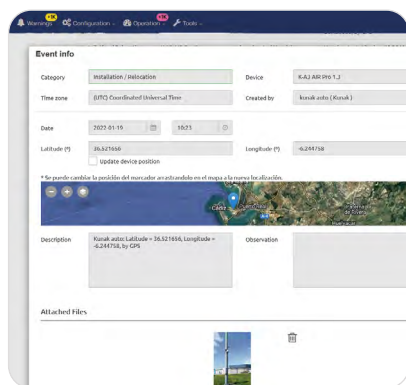
## Contamination sources

Identification of hotspots and pollution sources using heatmaps, pollution roses, and polar plots displayed directly on the map.



## Particle size distribution

Particle size analysis tool including size distribution graphs by mass and by counts.



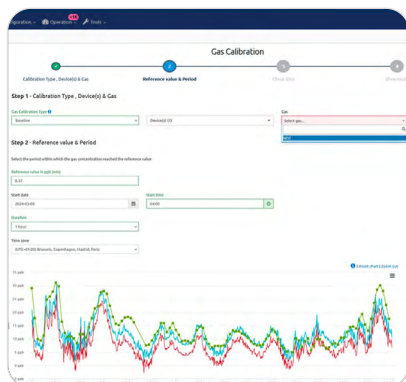
## Maintenance tracking

CMMS (Computerized maintenance management system) to record, track and consult every action performed on a device over time.



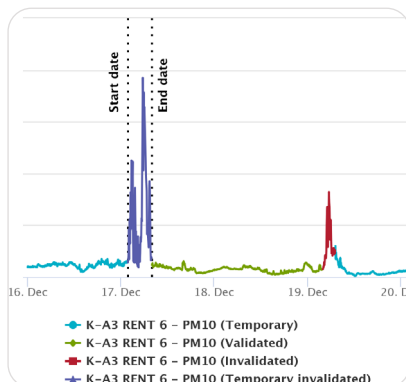
## Customized reports

Create tailored reports with air quality data in the required format clients or external agencies.



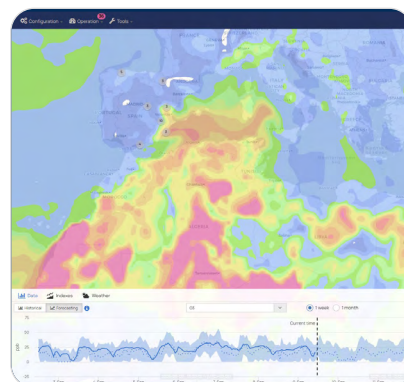
## Remote calibration

Optimize sensor performance and reduce operational costs with remote calibration and signal correction.



## Data validation

Validation tool for tagging, validating, or invalidating measurements to ensure reliable and traceable air quality data.



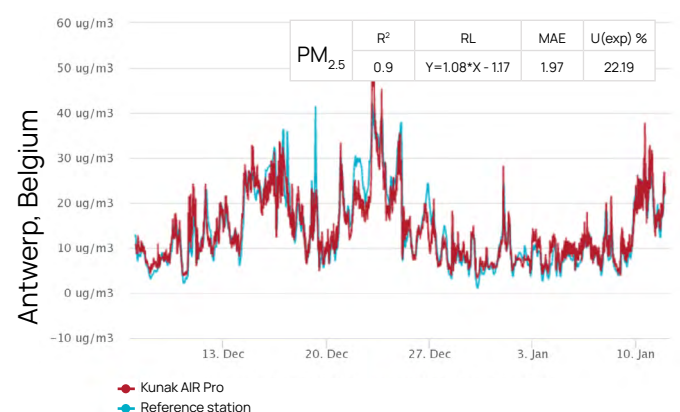
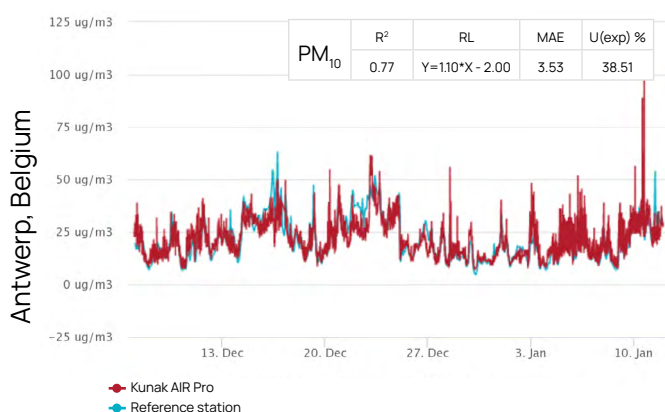
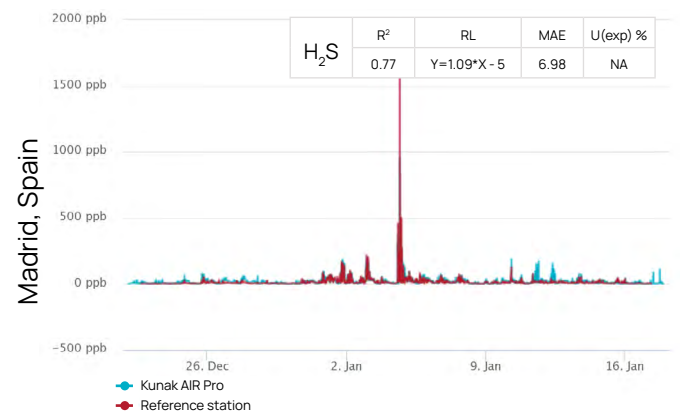
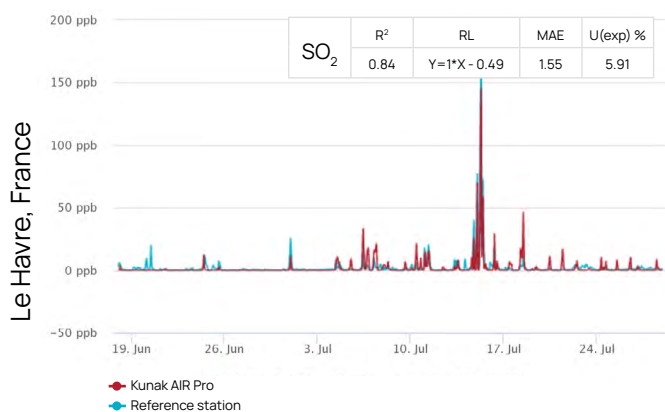
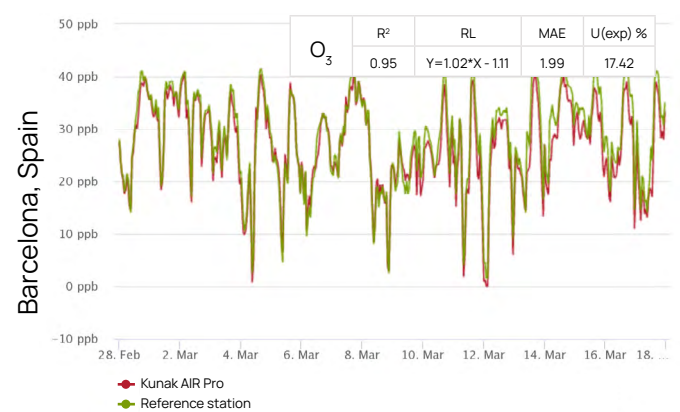
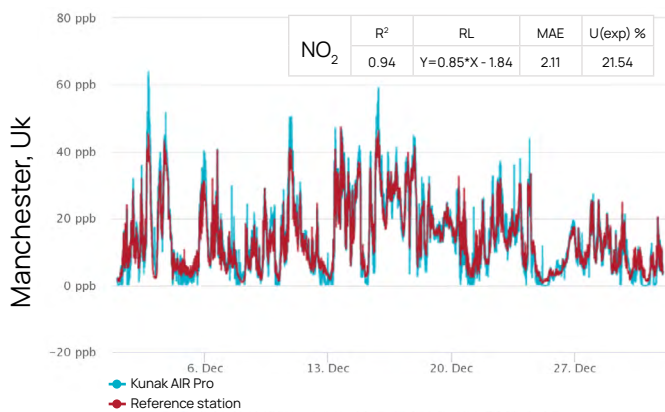
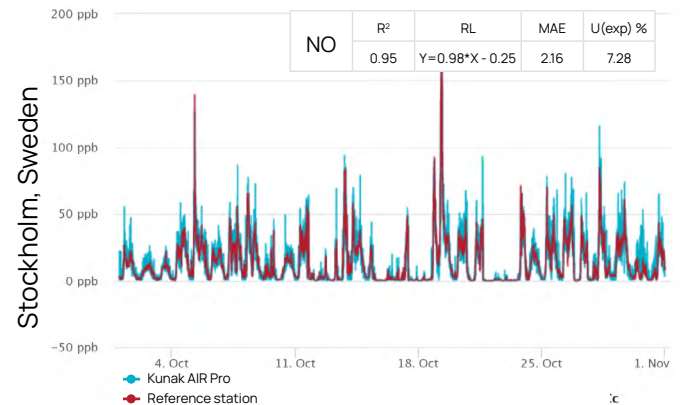
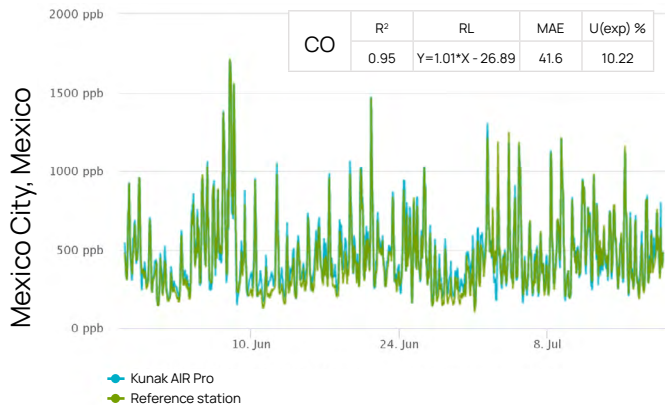
## Forecasting tools

Advanced air quality forecasting, weather and pollen (only EU) to complement local measurements.



# Evidence of accuracy

We continuously conduct intercomparative studies with reference stations in different locations and laboratories to guarantee the highest quality results.



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