

# AQ GUARD SMART 1000



AQ Guard Smart 1000 is a compact and cloud-enabled air quality measurement device. The system is designed for the requirements of outdoor air measurement in the smart city environment to improve granularity while maintaining high comparability to official measurements for environmental monitoring and health protection.

## OPERATION PRINCIPLE

### AIR QUALITY ANALYZER FOR MONITORING FINE PARTICULATE MATTER

The system works on the principle of 90-degree scattered light measurement on the single particle, based on the EN 16450 certified Fidas® 200 technology. Signal duration and shape are taken into account.

The Fidas® technology used here also has decisive advantages over competitive products concerning long-term stability and function monitoring. In particular, the high size resolution of more than 200 channels enables a continuous check of the size deviation according to a patented procedure. It provides additional information on the aerosol composition and origin, like no other device on the market.

AQ Guard Smart 1000 is suitable for outdoor use under extreme conditions. It has proven its performance under a wide range of meteorological conditions.

For better utilization of its heat, the heated inlet is located inside the housing and is dynamically switched on depending on the humidity and temperature.

The AQ Guard Smart System has Ethernet, WLAN, and cellular connectivity and supports ASCII and MODBUS protocols for communication. All data is continuously recorded and can be retrieved retrospectively and in real-time.

The AQ Guard Smart 1000 supports model calculations of the current fine dust pollution and forecasts. These will be based on stricter limit values in the future, requiring lower uncertainties for local measurements.

The device offers manufacturers and users of low-resolution sensors a comparison option and, thus, a plausibility check before the measured values are made available for further processing in formation and dispersion studies.

Sensors that measure temperature, humidity, and pressure are integrated as standard.

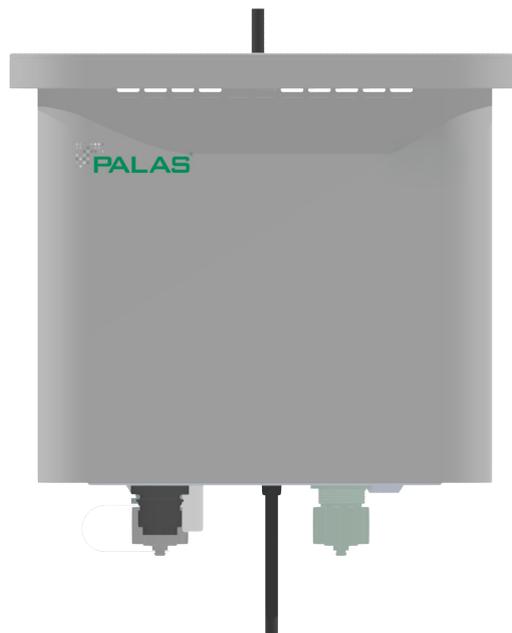
AQ Guard Smart System has a pole or tripod mount and can be extended with a sunshade and LoRa modem if required.



AQ Guard Smart auf einem Tripod  
Fig. 1: AQ Guard Smart on a tripod

#### Extensions/Accessories

Multi-Gas Extension



The AQ Guard Smart System can be used as a hub. With the AQ Guard Smart Multi-Gas Extension, gases such as NO<sub>2</sub>, O<sub>3</sub>, or optionally CO, NO, and SO<sub>2</sub> can be measured. Data analysis is performed via the main unit.

#### MyAtmosphere

AQ Guard Smart 1000 can be connected to the cloud platform MyAtmosphere. Private and government operators can retrieve current readings directly without delay. Furthermore, the data can be compared with the measured values of other devices. MyAtmosphere can be integrated into its systems/environments via an optional programming interface (API).

#### Noise Monitoring



#### AQ Guard Smart Noise

In addition to measuring particulate matter, gases and other air quality parameters, the AQ Guard Smart 1000 can optionally be equipped with the [XL3 sound level meter \(Class 1 according to the IEC61672 standard\)](https://www.nti-audio.com/en/products/sound-level-meters/xl3-acoustic-analyzer) from our partner [NTI Audio](https://www.nti-audio.com/en/products/sound-level-meters/xl3-acoustic-analyzer)<sup>1</sup>. This enables detailed noise level recording for a more comprehensive environmental assessment. The noise data collected is displayed in MyAtmosphere and can be combined with other environmental parameters – ideal for cities, industrial areas and infrastructure projects.

#### Sunshade

Optionally, the AQ Guard Smart 1000 can be equipped with a sunshade made of white powdered aluminum to reduce direct sunlight and overheating of the device. We recommend this in areas with high continuous sunlight and simultaneously high ambient temperatures. The sunshield can also be used as protection for the device itself, e.g., on construction sites or other areas (wind/snowfall/rain).

#### Weather station

To better understand the fine dust input and its cause, the device is optionally available with a corresponding weather station, which provides supplementary meteorological information.

#### Touch panel

<sup>1</sup><https://www.nti-audio.com/en/products/sound-level-meters/xl3-acoustic-analyzer>: <https://www.nti-audio.com/en/products/sound-level-meters/xl3-acoustic-analyzer>

The touch panel allows direct display as well as configuration of the system via a USB port provided below or inside.

#### Signal lamp

A switchable signal light (green/yellow/red), connected via the system's WiFi hotspot, visualizes limit value over-runs.

## BENEFITS

- Quick and easy installation
- Long-term stability (24/7) and low maintenance
- Flexibility in communication and data transmission
- Reliable measurements (near-reference standard for particles)
- Simultaneous measurement of PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>4</sub>, PM<sub>10</sub>, TSP, C<sub>N</sub>, CO<sub>2</sub>
- Versatile application possibilities even in demanding environments
- Suitable for high dust concentrations
- Access to data in real time and with high temporal resolution

## NORMS AND CERTIFICATES

ISO 21501-1, MCERTS (Sira MC 22041/00)

## DATASHEET

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|--|--|
| Measuring principle                        | Optical light scattering at single particles   |
| Reported data                              | PM <sub>1</sub> , PM <sub>2.5</sub> , PM <sub>4</sub> , PM <sub>10</sub> , TSP, CN, CO <sub>2</sub> ; particle size distribution, ambient pressure, ambient temperature, rel. ambient humidity |
| Measurement range (number C <sub>N</sub> ) | 0 – 20,000 particles/cm <sup>3</sup>   |
| Measurement range (size)                   | 0.178 – 20 μm  |
| Measurement range (mass)                   | 0 – 100 mg/m <sup>3</sup> (depending on the composition of the aerosol)  |
| Volume flow                                | 1 l/min  |
| Size channels                              | 64 (32/decade)   |
| Time resolution                            | 1 min, moving average 1 min (MyAtmosphere), every second via internal protocols  |
| Interfaces                                 | USB, Ethernet (LAN), Wi-Fi, 3G/4G via Modem, optional: LoRaWAN   |
| Protocols                                  | ASCII, MODBUS, UDP   |
| Light source                               | Long term stable LED   |
| Power supply                               | Supplied power supply: 12 V  |
| Power consumption                          | Standard operation: 1.2 A (1.7 A with additional heating)  |
| Installation conditions                    | -20 – +50 °C   |
| Dimensions                                 | 530 • 270 • 208 mm (H • W • D)   |
| Weight                                     | Approx. 6 kg   |
| Special features                           | Heated inlet, mast / tripod mount  |
| Data Management                            | Prepared for connection to the Palas Cloud MyAtmosphere (“MyAtmosphere-ready”)   |

## APPLICATIONS

- Urban air quality monitoring
- Smart city projects
- Open pit mining and landfills
- Formation and dispersion studies
- Construction sites
- Immission monitoring of industrial plants
- Measurement of dust emissions from road and rail traffic as well as ports
- Risk areas (natural and anthropogenic)



Mehr Informationen:  
<https://www.palas.de/en/product/aq-guard-smart1000>