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.

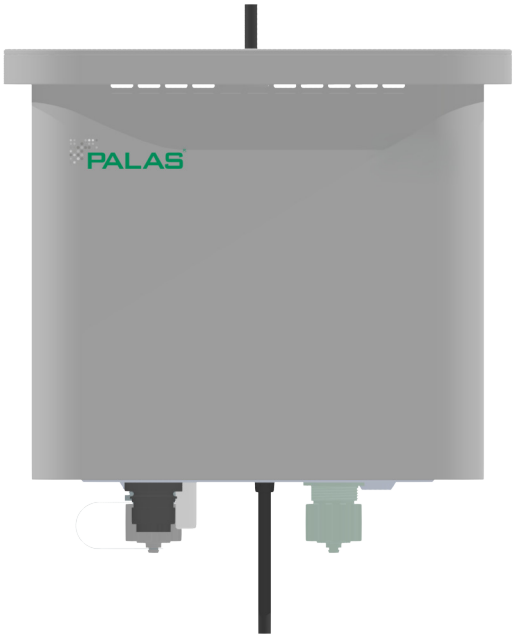
AQ Guard Smart System has a pole or tripod mount and can be extended with a sunshade and LoRa modem if required.

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_2, O_3, or optionally CO, NO, and SO_2 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. MyAtmopshere 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) from our partner NTI Audio[1] . 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

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 overruns.

[1] 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

BENEFITS

- Simultaneous measurement of PM_1, $PM_{2.5}$, PM_4, PM_{10}, TSP, C_N, CO_2
- Comprehensive factory calibration for optimal consistency, accuracy, and precise data
- Near-Reference Standard for particles, MCERTS Indicative certified, TÜV QAL1 in progress, EN TS 17660-2 Class 1-ready
- Quick and easy installation
- Long-term stability (24/7) and low maintenance
- On-site verification/calibration with test dust (NIST-traceable)
- Real-time access to data with high temporal resolution;
- Flexibility in communication and data transmission
- Integration via MyAtmosphere possible

NORMS AND CERTIFICATES

ISO 21501-1, MCERTS (Sira MC 220412/01)

DATASHEET

Measuring principle	Optical light scattering at single particles
Reported data	PM_1, $PM_{2.5}$, PM_4, PM_{10}, TSP, CN, CO_2; particle size distribution, ambient pressure, ambient temperature, rel. ambient humidity
Measurement range (number C_N)	0 – 20,000 particles/cm³
Measurement range (size)	0.178 – 17.8 μm
Measurement range (mass)	0 – 100 mg/m^3 (depending on the composition of the aerosol)
Volume flow	1 l/min ± 1,5% (-20 - +50°C), time-of-flight volume flow control, usable up to altitudes of 5,000 m a.s.l.
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

- Indicative air quality monitoring and support for the development of air quality plans in accordance with Directive (EU) 2024/2881
- Smart City projects
- Monitoring of construction sites and redevelopment areas, as well as, for example, open-pit mines and bulk material handling facilities
- Fenceline/emission monitoring of industrial facilities
- Measurement of traffic-induced emissions
- Data collection for source and dispersion studies
- Monitoring of risk areas (natural and anthropogenic)

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