# AQ Guard Smart 1100



AQ Guard Smart 1100 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.

The simultaneous measurement of pollutant gases makes the device perfect for measuring in environmentally sensitive areas, especially where they are already common or required by law.

## Operation principle

### Air quality analyzer for monitoring fine particulate matter and pollutant gases

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 1100 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 1100 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. Other gas sensors for measuring the pollutant gases $NO_2$, $SO_2$, $O_3$, and CO are integrated, which can provide additional information about the particle origin.

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




Fig. 1: AQ Guard Smart on a tripod

## Extensions/Accessories

MyAtmosphere

AQ Guard Smart 1100 can be connected to the cloud platform MyAtmosphere[1] . 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).

Sunshade

Optionally, the AQ Guard Smart 1100 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.

[1] https://my-atmosphere.net/: https://my-atmosphere.net/

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.

## Benefits

- Technology based on the certified Fidas® 200 series (EN 16450 and MCERTS)
- Simultaneous measurement of $PM_1$, $PM_{2.5}$, $PM_4$, $PM_{10}$, $C_N$ with high temporal resolution
- Additional $SO_2$, CO, $NO_2$, $O_3$ measurement
- Easy and fast installation
- Data visualization via cloud MyAtmosphere
- Communication via GPRS / 3G / 4G / Ethernet / Wi-Fi, optional: LoRaWAN
- Extendable with weather station / solar protection

## DATASHEET

| | |
|---|---|
| Measurement range (number $C_N$) | 0 – 20,000 particles/cm³ |
| Size channels | 64 (32/decade) |
| Measurement range (size) | 0.175 – 20 $\mu$m |
| Measuring principle | Optical light scattering at single particles |
| Reported data | $PM_1$, $PM_{2.5}$, $PM_4$, $PM_{10}$, TSP, $C_N$, particle size distribution, ambient pressure, ambient temperature, rel. ambient humidity, $SO_2$, CO, $NO_2$, $O_3$ |
| Measurement range (mass) | 0 – 100 mg/m$^3$ (depending on the composition of the aerosol) |
| Measurement uncertainty | < 15 % for $PM_{2.5}$, < 20 % for $PM_{10}$ (expanded measurement uncertainty according to EN 16450, corrected – MCERTS) |
| Time resolution | 1 min, moving average 1 min |
| Light source | Long term stable LED |
| Power consumption | Standard operation: 1.2 A (1.7 A with additional heating) |
| Weight | Approx. 6 kg |
| Response time | < 3 s (gas sensor) |
| Installation conditions | -20 – +50 °C |
| Interfaces | USB, Ethernet (LAN), Wi-Fi, 3G/4G via Modem, optional: LoRaWAN |
| Protocols | ASCII, MODBUS, UDP |
| Power supply | Supplied power supply: 12 V |
| Special features | Heated inlet, mast / tripod mount |
| Dimensions | 530 • 270 • 208 mm (H • W • D) |
| Resolution | 0.01 ppm (gas sensor) |
| Data Management | Prepared for connection to the Palas®Cloud MyAtmosphere (”MyAtmosphere-ready”); internet access and separate registration required.MyAtmosphere terms and conditions of use apply. |
| Repeatability | < 2% (gas sensor) |
| Long-term drift | < 1% / month (gas sensor) |

## CASE STUDIES

- 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/product/aq-guard-smart1100

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