AQ Guard Smart 2000



AQ Guard Smart 2000 is a measuring device for monitoring particle concentrations in the ultrafine range. They typically cannot be detected by optical aerosol photometers or spectrometers due to their small size. Mass limit values such as $PM_{2.5}$ and PM_{10} can be measured well with gravimetric methods; at the latest, for smaller PM_1, ultrafine fractions are difficult to estimate and can be meaningfully assessed only by determining the particle concentration.Expensive and more maintenance-intensive condensation particle counters are usually used to measure ultrafine particles. A size-classifying system (Scanning Mobility Particle Sizer) can make statements about particle size distribution and concentration.

Operation principle

Air quality analyzer for monitoring nanoparticles

AQ Guard Smart 2000 for ultrafine particles closes the gap between classical condensation particle counters and optical systems. Long-term measurements for the evaluation of number concentrations indoors and outdoors, e.g., at highly polluted locations such as airports, main roads, forwarding agencies, or also, e.g., toll stations, are quickly and reliably possible. They can already be used to define avoidance and reduction measures in a meaningful and targeted way.

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

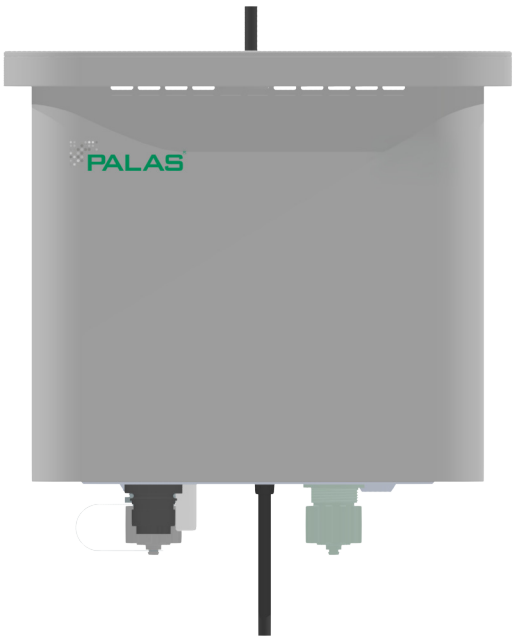
AQ Guard Smart System has a pole or tripod mount and can be extended with a sunshade and LoRa modem if required.



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 NO2, O3, or optionally CO, NO, and SO2 can be measured. Data analysis is performed via the main unit.

MyAtmosphere

AQ Guard Smart 2000 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).

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

Sunshade

Optionally, the AQ Guard Smart 2000 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.

Literature

- P. Bächler, F. Weis, S. Kohler, A. Dittler: Exploratory measurements of ambient air quality in a residential area applying a diffusion charge based UFP monitor, Gefahrstoffe, 2024, 84, 01-02, 15-22 (elibrary.vdi-verlag.de/10.37544/0949-8036-2024-01-02/gefahrstoffe-jahrgang-84-2024-heft-01-02).

Benefits

- Simple and precise monitoring of UFP concentrations from 10 nm
- Suitable for high concentrations up to 10,000,000 particles/cm^3
- Quick and easy installation
- Long-term stability (24/7) and low maintenance, no working fluids required
- Reliable measurements
- Flexibility in communication and data transmission
- Versatile application options, even in demanding environments
- Access to data in real time and with high temporal resolution

DATASHEET

Measuring principle	Diffusion charging
Reported data	CN,average diameter X50, LDSA (Lung Deposited Surface Area), ambient pressure, ambient temperature, rel. ambient humidity
Measurement range (number C_N)	1,000 – 10^8particles/cm^3
Measurement range (size)	From 0.01 μm
Interfaces	USB, Ethernet (LAN), Wi-Fi, 3G/4G via Modem, optional: LoRaWAN
Protocols	UDP, ASCII, Modbus
Installation conditions	-20 – +40 °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

- UFP concentrations in and around airports and seaports
- Formation and dispersion studies
- Immission monitoring of industrial plants
- Urban air quality monitoring
- Supplementary measurement of UFP concentrations at traffic-rich sites

Mehr Informationen:
https://www.palas.de/en/product/aq-guard-smart2000