U-SMPS 2050/2100/2200



U-SMPS (Universal Scanning Mobility Particle Sizers) have been successfully used worldwide for many years for the precise selection of particle size with simultaneous measurement of the particle concentration of airborne particles in the sub-micron range. Depending on the combination of classifying column (DMA), control unit (DEMC), and particle counter, they cover ranges from a few nanometers to several micrometers. Different combinations are possible depending on the application and customer requirements.

Palas U-SMPS System can be operated directly with max. two different counters and also accepts third-party products of well-known manufacturers for direct comparison.

Model Variations



U-SMPS 2050 X/2100 X/2200 X

Version for various applications of 4 – 1,200 nm with integrated X-ray ionization

Operation principle

Universal Scanning Mobility Particle Sizer for a measuring range from 4 to 1200 nm

Palas U-SMPS systems work according to the principle of ″electric mobility″ of particles in the electric field and in ambient air, as described in ISO 15900:2000. Here, the particles in the aerosol are first brought into a neutral known charge equilibrium with known charge distribution (Bolzmann charge distribution) by different bipolar neutralizer systems (X-ray emitters, radioactive emitters) and then selected by size via the classifier column (Differential Mobility Analysis - DMA). The selected particles are detected and recorded using a counter (e.g., condensation particle counter or electrometer).

Particle-free enveloping air in the column carries the aerosol flowing in at the annular gap of the column to the opposite side of the column. At the same time, an electric field from the inner column outer wall to the inner center electrode displaces the particles horizontally to the electrode (capacitor). They drift after short acceleration with constant velocity and either reach the upper inner annular gap (exit to the counter) or are deposited at the electrode or carried out of the column via the enveloping volume flow and filtered off.

The change of the applied voltage at the electrode of the column (typically in the range of a few volts up to max. 10 kV) leads to different horizontal drift velocities in the column depending on the particle size and the number of charges on the particle. An ″inversion algorithm″ can be used to infer the particle size and concentration, as described in ISO 15900:2000. Instead of selecting individual particle sizes, the systems can display the size distribution and concentration in the set range in scan mode.

All settings can be accessed directly via the 7″ touch screens, also used for the initial graphical processing and enabling the first comparisons. Measured values and sensor data are immediately and continuously recorded.

Extensions/Accessories

The U-SMPS system is usually operated as a stand-alone device. Still, it can be coupled with other systems via various interfaces (USB, LAN, WLAN, RS-232/485) and can also be expanded to a U-Range system together with a Fidas® fine dust measurement system.

BENEFITS

- Particle size distributions from 4 nm to 1.2 μm
- Continuous and fast-scanning principle of measurement
- High resolution in up to 128 size classes/decade
- Suitable for concentrations of up to10^8 particles/cm^3
- Universally connects to DMAs and nanoparticle counters from other manufacturers
- Graphic display of measurement values
- Intuitive operation using 7″ touchscreen and GUI
- Integrated data logger
- Supports multiple interfaces and remote access
- Low maintenance

* Please contact Palas® for further details.

NORMS AND CERTIFICATES

ISO 15900:2010, ISO 27891:2015, CEN/TS 17434:2020

DATASHEET

Measurement range (number C_N)	0 – 10^8 particles/cm^3
Measurement range (size)	4 – 1,200 nm
Volume flow	0.5 – 3 l/min
Volume flow (sheath air)	2.5 – 14 l/min (others on request)
Size channels	Max. 256 (128/decade)
Interfaces	USB, Ethernet (LAN), AUX, RS-232 (CPC only)
User interface	Touchscreen, 800 • 480 pixel, 7″ (17.78 cm)
Data logger storage	4 GB
Software	PDAnalyze
Power supply	90 – 264 V, 50/60 Hz
Installation conditions	+10 – +30 °C (others on request)
Adjustment range (voltage)	1 – 10,000 V(UP and DOWN scan possible)
Data Management	Prepared for connection to the Palas Cloud MyAtmosphere (“MyAtmosphere-ready”); Internet access and separate registration required. The MyAtmosphere terms of use apply.

APPLICATIONS

- Filter test
- Aerosol research
- Environmental and climatic studies
- Inhalation experiments
- Interior and workplace measurements

Mehr Informationen:
https://www.palas.de/en/product/usmps2050$_2$100$_2$200