



U-SMPS SYSTEM

# ULTRAFINE PARTICLES IN AEROSOLS

Universal Scanning Mobility Particle Sizer

*Made in Germany*



# U-SMPS SYSTEM: Sizing and Counting of Nano Scaled Particles

Particles smaller than  $0.1 \mu\text{m}$  have a significant impact not only on health, but also on a wide range of environmental processes such as particulate matter and cloud formation.

Their formation and their effects have long been the focus of scientific attention. For this purpose, systems of different technologies are used for direct or indirect measurement of particle size and concentration.

The **U-SMPS SYSTEM** manufactured by Palas® in Germany meet the diverse normative and technological requirements and have been used successfully for many years in aerosol research and by official measurement networks or private companies.



# Application examples



**AEROSOL RESEARCH**



**CLIMATIC RESEARCH**



**EMISSION SOURCE ALLOCATION**



**WORKPLACE MEASUREMENTS**



**FILTER TESTING**



**COMBUSTION**

# Principle of operation

The classification of particles by means of the so-called „electric mobility“ and subsequent concentration measurement is a common method for determining the size resolution and distribution of nanoscaled particles in many application areas such as the analysis of synthetically produced nanoparticles or measurement of ultrafine particles of the ambient air.

The determination of size distribution and number concentration is performed by a multi-step procedure:

- Generation of an electrically neutral aerosol (neutralizer):  
For example, XRC 049 (X-ray source), KR-85-370 (radioactive source)
- Continuous, logarithmically ascending size selection (classifier):  
DEMC SYSTEM, classifier column
- Parallel measurement of raw concentrations (counter):  
UF-CPC SYSTEM, ENVI-CPC SYSTEM, CHARME® SYSTEM
- Raw data inversion (back calculation to original concentrations)
- Diffusion correction (compensation of particle losses due to diffusion processes)

# U-SMPS System

All systems provided by Palas® for this purpose can be combined and interchanged with each other, thus enabling exact adaptation to the respective application and customer requirements. The open architecture and the interfaces allow third-party systems to be connected in parallel or exclusively to measure the number concentration for comparison.

For example



*DEMC 2000*



*XRC 049*



*UF-CPC 100*

**U-SMPS 2100** Measurement range: 8 - 1,200 nm,  $C_N = 0 - 10^8$  particles/cm<sup>3</sup>

# Special advantages and benefits

## FLEXIBILITY

- Control unit accepts DMAs and counters from different well known manufacturers
- Supports multiple interfaces and remote access

## LATEST TECHNOLOGY

- Continuous and fast-scanning principle of measurement
- User-friendly 7" touchscreen with GUI
- Direct graphical visualization of measured data
- Integrated data logger with high storage volume

## BEST PRICE-PERFORMANCE RATIO

- Low maintenance
- Reliable functions
- Low operating costs

# Technical Data

Measuring principle	Universal scanning mobility particle sizer
Size channels	Max. 256 (128 / decade)
Measurement range (number $C_N$ )	0 – 10 <sup>8</sup> particles/cm <sup>3</sup>
Measurement range (size)	from 4 nm up to 40 µm
User interface	Touchscreen, 800 • 480 pixel, 7 " (17.78 cm)
Data logger storage	4 GB
Software	PDAalyze
Adjustment range (voltage)	1 – 10,000 V
Volume flow (sheath air)	2.5 – 14 l/min
Volume flow (aerosol)	0.5 – 3 l/min
Installation conditions	+10 – +30 °C (others on demand)
Power supply	115 – 230 V, 50/60 Hz

Palas<sup>®</sup> is a leading developer and manufacturer of high precision instruments for the generation, measurement and characterization of particles in air.

With more than 30 active patents, Palas<sup>®</sup> develops technologically leading and certified fine dust and nanoparticle analyzers, aerosol spectrometers, generators and sensors as well as related systems and software solutions. Palas<sup>®</sup> was founded in 1983 and employs more than 100 people.

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