

SMPS+C 5416

Scanning Mobility Particle Sizer with Condensation Particle Counter
for reliable nanoparticle sizing and counting

- Particle size range 3 ... 1,090 nm
- DMA-Controller and CPC in one compact instrument
- S, M, and L Vienna Reischl-Type Differential Mobility Analyzers (DMA)



FEATURES

- Compact design
- Vienna Reischl-Type DMAs
- Three particle size ranges (S, M, L-DMA)
- U-DMA option
- Integrated pumps
- Saturator shutter

TECHNICAL DATA

Measurement principle	Electrostatic classification in DMA and detection in condensation particle counter
Measuring variable	Particle size distribution, dN/dlogD (1/cm ³)
Particle size range	3 ... 109 nm (GRIMM S-DMA) 5 ... 350 nm (GRIMM M-DMA) 10 ... 1,090 nm (GRIMM L-DMA)
Particle size channels	• Stepping mode: 45 ... 255 • Scanning mode: 64 or 128 per size decade with logarithmic equidistant spacing
Particle concentration	• Up to 10 ⁷ p/cm ³ total concentration * • CPC single count mode: Up to 150,000 p/cm ³ • CPC photometric mode: Up to 10 ⁷ p/cm ³ **
Scan time	≥ 150 s
Working fluid	n-butanol (> 99.5 %)
Counting efficiency	D ₅₀ = 4 nm *** determined with tungsten-oxide particles
Response time t₁₀ ... t₉₀	< 3 s
Aerosol sample air flow	Q _s = 0.3 l/min
Sheath air flow	Q _{sh} = 3.0 l/min****
Flow control	Critical orifices with stabilized temperature
Resolution	Q _{sh} /Q _s = 10
Sizing accuracy	≤ 3% of nominal diameter
HV module	Integrated in DMA 0 ... +10,000 V (negative polarity on request)

* Depending on used aerosol neutralizer

** For short-term measurements

*** Other calibrations (e.g. D₅₀ = 10 nm) possible

**** Customized critical orifices (e.g. 2.5 l/min) possible, resulting in different DMA size range

BENEFITS

- CPC and DMA-controller in one instrument
- Low particle losses, high size resolution
- Flexible use for a wide range of applications
- Easy conversion of DMA classification length
- No external vacuum required
- Prompt transport without butanol drying

Standards and certificates	ISO 15900:2009 CEN/TS 17434:2020 ISO 27891:2015 EN 16976:2024
Internal sensors	T, p _{abs} and Δp across inlet in DMA p _{abs} and Δp across inlet in CPC
Connectivity	USB, USB flashdrive, RS-232, analog input for meteorological sensors, analog pulse output
Operation and display	Status control LEDs, GRIMM 5477 nanoSoftware for sizers on PC
Power requirements	110 ... 240 VAC; 50/60 Hz; maximum 130 W
Aerosol conditions	• Temperature: -20 ... 40 °C (-4 ... 104 °F) • Humidity: 0 ... 95 % RH, non-condensing • Absolute pressure range: 700 ... 1,100 mbar
Aerosol carrier gas	Air and inert gases
Transport and storage	0 ... +50 °C (32 ... 122 °F), RH < 95 %
System components	CPC 5416 GRIMM aerosol neutralizer (optional) 55-S, -M or -L DMA
Dimensions (h x w x d)	• CPC 5416: 28 x 24 x 40 cm (11 x 19.4 x 15.7 inch) • S-DMA: 16.1 x 14 x 15.6 cm (6.3 x 5.5 x 6.1 inch) • M-DMA: 23.4 x 14 x 15.6 cm (9.2 x 5.5 x 6.1 inch) • L-DMA: 47.8 x 14 x 15.6 cm (18.8 x 5.5 x 6.1 in)
Weight	• CPC 5416: 12.4 kg (27.3 lbs) • S-DMA: 5.6 kg (12.2 lbs) • M-DMA: 5.7 kg (12.6 lbs) • L-DMA: 7.9 kg (17.3 lbs)

OPTIONAL ACCESSORIES

5523-Ni	Ni-63 (95 MBq) aerosol neutralizer
5524-X	Soft X-ray (< 11 keV) aerosol neutralizer
5525-X	Soft X-ray (< 4.99 keV) aerosol neutralizer
5522-A	Am-241 (3.7 MBq) aerosol neutralizer
5540	Sheath air dryer and adsorber