

SCANNING MOBILITY PARTICLE SIZER WITH FARADAY CUP ELECTROMETER

SMPS+E 5705 5706 DMA



The GRIMM SMPS+E systems feature the Vienna-type DMA design (Winklmayr et al., 1991; Reischl et al., 1997), well known for highest size resolution and lowest particle diffusional losses – even for the smallest particles – with a Faraday Cup Electrometer (FCE) as detector.

The SMPS+E systems include the GRIMM 5706 DMA controller and the GRIMM 5705 fast and low noise FCE and can be operated at aerosol inlet flow rates of 1 - 5 L/min and sheath flow rates of 3 - 20 L/min.

GRIMM offers a flexible design of the Vienna-type DMA with three electrodes of different length to accommodate a variety of experimental needs. GRIMM's unique FCE design applies a rinsing air flow around the insulator of the Faraday Cup to minimize effects of leakage currents due to internal particle contaminations.

The instrument is optimized to reduce the effects of mechanical shocks and pressure differences, enabling the SMPS+E as a reference instrument for the calibration of nanoparticle counters.



FEATURES

- particle size distribution from 0.8 – 1094 nm
- three Vienna-type DMAs
- sample flow rate = 1 - 5 L/min
- sheath flow rate = 3 - 20 L/min
- rugged, compact, and reliable
- fully automated use with our software
- analog inputs for additional sensors
- data sampling rate up to 16 Hz
- no consumables
- operates with air and inert gases
- comprehensive self-test for highest reliability

APPLICATIONS

- fundamental aerosol research
- filter testing
- environmental & climate studies
- nanotechnology process monitoring
- printer emission studies
- inhalation & exposure studies
- studies on atmospheric nucleation
- studies on nanoparticle growth, coagulation & transport
- engine exhaust studies
- mobile aerosol studies
- workplace monitoring

SMPS+E

**3 DMAs
S, M, L**

**L - DMA
10 - 1094 nm**

**SI traceable
reference**

16 Hz

TECHNICAL DATA

SPECIFICATIONS

detector type	Faraday Cup Electrometer (FCE)
sensitivity	0.1 fA at 1 Hz
noise	0.35 fA
maximum current	± 4000 fA
maximum particle concentration	10 ⁸ p/cm ³
response time $t_{10} - t_{90}$	200 ms
resistor	1 TΩ
size range	0.8 – 1094 nm (depending on sheath flow rate: 0.8 - 53 nm (S - DMA); 5 – 350 nm (M – DMA); 10 – 1094 nm (L – DMA)
size resolution	stepping mode: 45 – 255 channels scanning mode: 64 channels per decade; logarithmic spacing

FUNCTION

DMA dimensions	$R_i = 26$ mm, $R_o = 40$ mm; L = 15 (S) or 88 mm (M) or 350 mm (L)
output HV module	5 – 10 000 V positive polarity; negative polarity on request
sample flow rate	1 – 5 L/min
sheath flow rate	3 – 20 L/min
rinsing air flow rate	0.6 L/min
port for external sensors	yes

HANDLING

ambient temperature	0 – 40°C (32 – 104°F)
ambient humidity	0 – 95% RH, non-condensing
absolute pressure range	600 – 1100 mbar
power supply	85 – 264 VAC, 47 – 440 Hz
power consumption	80 -130 W
interfaces	USB or RS-232
dimensions DMA (h x w x d)	S – DMA: 16.1 x 14 x 15.6 cm (6.3 x 5.5 x 6.1 in) M – DMA: 23.4 x 14 x 15.6 cm (9.2 x 5.5 x 6.1 in) L – DMA: 47.8 x 14 x 15.6 cm (18.8 x 5.5 x 6.1 in)
weight DMA	S – DMA: 5.6 kg (12.2 lbs); M-DMA: 5.7 kg (12.6 lbs) L – DMA: 7.9kg (17.3 lbs)
dimensions FCE (h x w x d)	19 x 9 x 9 cm (7.5 x 3.5 x 3.5 in)
weight FCE	1.36 kg (3.0 lbs)
dimensions DMA controller (h x w x d)	31 x 25.5 x 22 cm (12.2 x 10.0 x 8.7 in)
weight DMA controller	12.2 kg (26.9 lbs)

