

## SCANNING MOBILITY PARTICLE SIZER WITH FARADAY CUP ELECTROMETER (SMPS+E)

**GRIMM has developed the SMPS+E system** as a counter and sizer for nanoparticles in the size range of 0.8 nm to 1094 nm in a wide range of concentrations (100 to  $10^8$  particles/cm<sup>3</sup>).

The SMPS+E system includes:

- The fast and low noise Faraday Cup Electrometer (FCE - GRIMM model 5705)
- The high performance Differential Mobility Analyser (DMA)
- The DMA controller (model 5706) to control DMA voltages, electrical settings of the FCE, and air flows.



**GRIMM's unique design of the FCE** avoids internal contamination virtually completely by using rinsing air around the isolation of the Faraday Cup. Other electrometers often degrade in their performance because particles that settle on the isolation cause eventually small leak currents. As a consequence, other electrometers require periodic cleaning and verification. Furthermore, the instrument was designed to minimize the effects of mechanical shocks and pressure variation for the use as a reliable reference for the calibration of nano particle counters.

### YOUR BENEFITS

- Counts & sizes particles from 0.8 to 1094 nm
- Sampling with up to 16 Hz
- Very low noise level
- Rinse air flow for fastest response time
- Three different DMAs available for maximum flexibility
- Compact and rugged
- Operates without any consumables
- Fully automated use with our software
- Three analog inputs
- Self-test upon start-up assures highest reliability

### APPLICATIONS

- Fundamental aerosol research
- Studies on atmospheric nucleation
- Size distributions of airborne ion clusters
- Macromolecule studies
- Nanotechnology process monitoring
- Combustion studies
- Official reference for calibration of CPCs



**SMPS+E**

**3 DMAs  
S, M, L**

**0.8 - 1094 nm**

**SI traceable  
reference**

**16 Hz**

# TECHNICAL DATA

## SPECIFICATIONS

Particle Size Range	0.8 to 1094 nm	Signal Filter	Optional, low pass (250, 500, or 1500 ms)
Particle Concentration Range	up to $10^8$ particles/cm <sup>3</sup>	Pressure Range	400 – 1100 mbar
Response Time	T <sub>90</sub> = 200 ms	Aerosol Carrier Gas	Air and inert gases
Resistor	1 TΩ	Power Supply	12 VDC ± 10%
Sensitivity	0.1 fA at 1 Hz	Dimensions	Ø 88 mm, height: 190 mm
Maximum Current	± 4000 fA	Weight	1.36 kg (3.0 lbs)
Noise	0.35 fA (τ = 0.25 s, 90%), i.e. 65 charges/cm <sup>3</sup> at 2 l/min	Operating Conditions	
Zero Point Adjustment	Automatic and performed electronically	Ambient Temperature	0 to 40°C (32 to 104°F)
		Ambient Humidity	0 to 95% RH, noncondensing

## CLASSIFIERS / DMAs

Inner Diameter of Outer Electrode	40 mm
Outer Diameter of Inner Electrode	26 mm
Output of High Voltage Module	5 – 10 000 V, positive inner electrode (negative available on request)
Input of High Voltage Module	0 – 10 V, from CPC or DMA controller
Safety Shutdown of HV Sensors (internal)	Automatic when opening the DMA Temperature, absolute pressure, and pressure difference across impactor nozzle

## DMA CONTROLLER

Sampling Frequency	0.25 – 16 Hz
Size Channels	Up to 255
Flow Rates of Sample Air	1 – 5 l/min in 8 steps
Flow Rates of Sheath Air	3 – 20 l/min in 9 steps
Flow Rate of Rinse Air	0.3 – 0.6 l/min
Flow Control	Volumetric flow controller
Status Indication	4 LEDs with 3 colors and messages on the digital display RS-232 9-pin D connector, ASCII based command set
Internal Memory	80 kB
Memory Card	PCMCIA SRAM 4MB
Analog Inputs	Port for 3 optional analog climatic or gas sensors, plug and play
Power Requirements	230 VAC, 50 – 60 Hz (optional 120 V, 50 – 60 Hz)
Dimensions	31 x 25.5 x 22 cm / 12.2 x 10.0 x 8.7 inches (H x W x D)
Weight	12.2 kg (26.9 lbs)

For applications that require measurements of particle size distributions in **hot gases**, such as emission measurements in engine exhaust, domestic heating, burners, stacks, etc. GRIMM offers the Emission Sampling System (ESS).

**Please refer to our ESS datasheet for more in formation.**

This technical data may be subject to change without notice.  
Datasheet\_5705-5706\_SMPS-E\_ENG\_V2p0.pdf

**laftech**

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