

# CONDENSATION PARTICLE COUNTERS FOR NANOPARTICLES

CPC

5410

5412

5416

5420

5421

With the CPC lineup of models 5410 to 5421, GRIMM establishes a new standard for Condensation Particle Counters. The detection head enables single particle counting for concentrations up to 150 000 particles/cm<sup>3</sup>; moreover, it features improved detection efficiency and response time. These models are optimized for stationary use in any indoor or outdoor application.

All models feature the well-established condensate removal pump and the anti-spill saturator design. In addition, a novel saturator shutter enables the transport of the CPC without the need of removing or drying the saturator.

We offer models with or without rugged internal pumps (the pumps fully meet the requirements of continuous long-term measurements), and with or without built-in DMA controller. The photometric mode for high concentrations (up to 10<sup>7</sup> p/cm<sup>3</sup>) is integrated in all models.

The CPCs can be combined with a GRIMM DMA for measurements of particle size distributions (see datasheet for the Scanning Mobility Particle Sizer, SMPS+C). Furthermore, a GRIMM Optical Particle Counter expands the SMPS+C system to a Wide Range Aerosol Spectrometer (WRAS) that measures particle size distributions up to the particle size of 32 µm.



The CPC line includes also 19" rack versions. GRIMM offers also mini-containers with additional meteorological sensors and online data transfer via mobile networks for unattended long-term measurements at remote sites.

## FEATURES

- five models optimized for laboratory and long-term use
- improved detection limit with  $D_{50} = 4.0$  nm for tungsten oxide particles
- single particle counting up to 150 000 p/cm<sup>3</sup>
- tolerant to high ambient temperatures (40°C)
- improved response time with  $t_{90} < 3$  seconds
- preconfigured software on a netbook
- analog inputs for additional sensors
- comprehensive self-tests for high reliability

## APPLICATIONS

- fundamental aerosol research
- filter testing
- environmental & climatic studies
- nanotechnology process monitoring
- printer emission studies
- inhalation & exposure studies
- workplace monitoring

CPC

SMPS+C

WRAS

n - butanol

real - time

## TECHNICAL DATA

### SPECIFICATIONS

	5410	5412	5416	5420	5421
	compact, rugged standard CPC	advanced CPC with sample pump	high-end CPC all inclusive	high-end CPC 19" rack version	standard CPC 19" rack version
max. conc. (p/cm <sup>3</sup> ) single count mode (p/cm <sup>3</sup> ) photometric mode	100 000 10 <sup>7</sup>	100 000 10 <sup>7</sup>	150 000 10 <sup>7</sup>	150 000 10 <sup>7</sup>	150 000 10 <sup>7</sup>
sample flow rate [L/min]	0.6	0.6	0.3	0.3	0.3
SMPS option	-	-	yes	yes	-
internal pump	-	yes	yes	yes	yes
port for external sensors	-	-	yes	yes	yes
size (h x w x d) (cm)	23 x 25 x 29	23 x 25 x 29	40 x 25 x 29	19", 22 x 48 x 41	19", 22 x 48 x 41
weight (kg)	8.9	8.9	12.4	16.2	16.2

#### particle detection system

particle size range

4.0 nm ( $D_{50}$  measured with tungsten oxide particles) to greater than 3  $\mu$ m; adjustable to 7.0 nm for compliance with the standard CEN 16967 for determination of the particle number concentration of atmospheric aerosols

concentration accuracy

>95% for single particle counting  
(up to 100 000 p/cm<sup>3</sup> at 0.6 L/min, up to 150 000 p/cm<sup>3</sup> at 0.3 L/min)  
10% for optional photometric mode (up to 10<sup>7</sup> p/cm<sup>3</sup> at specified conditions)

rise time  $t_{10}$  -  $t_{90}$

< 3 s

#### air flow system

flow rate sample air

0.6 L/min for counter models 5410 and 5412  
0.3 L/min for counter models 5416, 5420, and 5421 as CPC or SMPS

flow rate sheath air

3.0 L/min

flow control

critical orifice with stabilized temperature; constant volume flow independent from ambient conditions

aerosol carrier gas

air and inert gases

working fluid

n-butanol (n-butyl alcohol)

condensate removal

continuous drain with micropump

### FUNCTION

CPC control

USB or RS-232

data recording

directly on PC (GRIMM universal software 5477), optionally on USB stick

status indication

display and 4 LEDs with 3 colors

analog input

port for 3 optional analog climatic or gas sensors, plug and play

### HANDLING

ambient temperature

10 to 40°C (50 to 104°F)

ambient humidity

0 to 95% RH, non-condensing

absolute pressure range

500 - 1100 mbar

power supply

85 - 264 VAC, 47 - 440 Hz

power consumption

80 - 130 W

