ENVI-CPC 200

The ENVI-CPC 200 is currently the only butanol-based particle counter with high efficiency, which can directly determine the highest concentrations of 2 • 10^6particles in single counting mode in high resolution without dilution. It is part of our modular nanoparticle measurement system. It can be combined arbitrarily with different systems to measure ultrafine particles. Likewise, it is particularly suitable for long-term measurement of combustion or other aerosols with high concentrations of nanoscaled particles. The patented evaporator and condensation module is maintenance-free.

The system meets the requirements of the current standard EN 16976:2024 (Harmonized measurement of number concentrations using CPC) in all areas. It can be operated directly with a NAFION® based sampling system if desired. The pumps required for this are already integrated.

Operation principle

Nanoparticle counter for ambient air monitoring with integrable NAFION® aerosol dryer

The aerosol pre-dried by the NAFION® dryer is fed directly to the evaporator unit by the internally adjustable and controlled diaphragm pump, which is saturated with the working liquid n-butanol. From there, it flows to the base of the evaporator in a spiral trough placed inside the cylinder. The non-evaporated residue is pumped back into the reservoir by a second pump. This actively ensures permanent saturation of the evaporator and simultaneously prevents deposits from forming on the inner walls. In contrast to a control with a critical nozzle, contamination of the system cannot lead to a drop in the volume flow. This is especially important for long-term measurements in the ambient air. The user can calibrate the volume flow.

The detection of the condensed particles is done by an optical sensor, which determines the concentrations and size distribution of the condensed particles and thus allows a simple and efficient quality control.

In addition to the usual factory calibration and adjustment of the cut-off according to EN 16976:2024, Palas offers certification of the instrument at the WCCAP (World Calibration Center for Aerosol Physics at the Leibniz Institute for Tropospheric Research).

The ENVI-CPC system has a 7″ touch display for visualization and control. The system supports a standardized interface with different remote control and network application protocols, e.g., Modbus and Bayern-Hessen protocol.

All necessary calculations and evaluations are performed directly on the device. A laptop for monitoring, changing settings, or visualization is not needed.

Comparison measurements

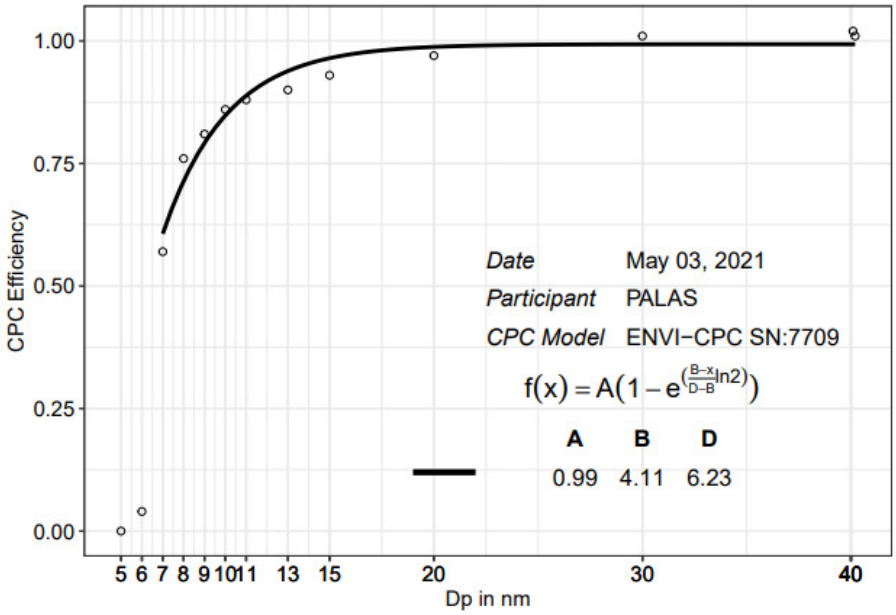

Fig. 1: Counting efficiency curve of the ENVI-CPC system measured at the Leibniz Institute for Tropospheric Research

Extensions/Accessories

The ENVI-CPC system can be equipped with a meteorological sensor that monitors temperature, pressure, humidity, wind speed, wind direction, and precipitation type and intensity of the outdoor air. A climate-controlled weather protection enclosure is available.

BENEFITS

- The unique, patented way of providing the working fluid for unattended operation for months
- Ambient air monitoring without a dilution system
- Intuitive user interface with sophisticated software for data evaluation
- Limitless, integrated network connectivity that supports remote operation and data storage on the internet
- Powerful software package
- Low maintenance

NORMS AND CERTIFICATES

EN 16976:2024-09, ISO 27891:2015

DATASHEET

Measuring principle	Condensation of ultrafine particles, optical sensor for determining the number concentration and size distribution of the condensed particles
Measurement range (number C_N)	$2 \cdot 10^6$ particles/cm^3 (single count mode)
Measurement range (size)	> 3 μm
Volume flow	0.9 l/min +/- 2% (optional 0.5 l/min additional) (pressure loss isotherme capillary)
Time resolution	1s - 60s
Interfaces	USB, Ethernet (LAN), weather station/butanol level sensor, RS-232, T/rH sensor
User interface	Touchscreen, 800 • 480 pixel, 7″ (17.78 cm)
Protocols	UDP, UIDEP, B/H, MODBUS TCP/RTU, ASCII TCP/Seriell
Data logger storage	Approx. 6 GB data storage (2 years)
Detection efficiency (at low particle size)	D50 = 10 ± 1 nm (others on request); D90 < 20 nm, D95 @ 40 nm ± 10 nm, D90 @ 1000 nm ± 100 nm
Data acquisition	Digital, 20 MHz processor, 256 raw data channels
Light source	Long term stable LED
Housing	Tabletop device
Power supply	90 – 264 V, 50/60 Hz
Power consumption	Average power consumption: 40 W
Installation conditions	Operating temperature: +10 – +30 °C, operating humidity: < 95% (non-condensing)
Accuracy	+/- 2% (according to calibration certificate)
Response time	t_{90} < 3 s
Working fluid	n-Butanol (>99.5%)
Dimensions	330 • 380 • 240 mm (H • W • D)
Weight	Approx. 10 kg
Resolution	Min. 1s
Data Management	Prepared for connection to the Palas Cloud MyAtmosphere (“MyAtmosphere-ready”)

Applications

- Aerosol Research
- Environmental measurements
- Environmental monitoring measurement networks
- Workplace safety and occupational exposure studies
- Traffic emission monitoring
- Health studies
- Mobile aerosol studies

Mehr Informationen:
https://www.palas.de/en/product/envicpc200