

## **Promo® 2000/3000** Light-scattering aerosol spectrometer system for process monitoring and process measurement



 $Promo^{\circledast}$  is a light-scattering aerosol spectrometer system for particle size analysis and concentration determination that can be equipped with all welas  $\si{s}$  sensors .

Using fibre-optic cables, welas<sup>®</sup> sensors – equipped with measurement volumes of different sizes – can be easily attached to the Promo<sup>®</sup> 2000 and Promo<sup>®</sup> 3000 and exchanged at will. These sensors make possible a reliable measurement in the concentration range from <1 P/cm<sup>3</sup> to 10<sup>6</sup> P/cm<sup>3</sup>. The sensors are available for measurements in gases as well as in liquids. Please refer to the datasheet "welas<sup>®</sup> sensors".

A touch display ensures user-friendly operation. Measurements can be started easily, and all data, such as the current number distribution and the number concentration, as well as 24 further statistical values, can be evaluated and displayed in real time.

Promo<sup>®</sup> can be operated as a stand-alone measurement device (i.e. without external pc) for continuous measurement. All incoming data can be stored with a max. temporal resolution of 1 second. Promo<sup>®</sup> can thus autonomously measure for weeks and store the generated data. For data transfer, Promo<sup>®</sup> can also be integrated into a company network. Optionally, a printer can be connected as data recorder.

Promo<sup>®</sup> has a standard interface and can be controlled by a process control system or by a simple Labview program. Promo<sup>®</sup> is therefore **particularly suitable for control and monitoring applications.** 

For this device, Palas<sup>®</sup> offers remote maintenance and data access via www.palas.de/user.

### Contact

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### Advantages:

- Largest measurement range from 0.2  $\mu m$  to 105  $\mu m$  (up to 4 measurement ranges available in one device)
- Calibration curves for various refraction indices
- Greatest concentration range from <1  $\rm P/cm^3$  to  $10^6 \rm \ P/cm^3$
- Extremely high and repeatable counting efficiency starting at 0.2  $\mu m$  (see Diagram 2)
- Pressure-resistant up to 10 bar (optional)
- Can be heated to 250 °C (optional)
- Fibre-optic technology
- User-friendly operation with large touch display and integrated webserver
- Calibration, cleaning and lamp replacement can all be performed independently by the customer
- Low maintenance
- Reliable function
- · Reduces your operating expenses

### **Example applications:**

- Plant emission monitoring
- Control of grinding and screening processes
- Monitoring of production processes in the food, pharmaceutical and chemical industries
- Test of complete filters, inertial separators and wet scrubbers
- Electrostatic precipitators

### Technical parameters:

• Measurement range: 0.2 μm-105 μm  $C_n \leq 10^6 \text{ P/cm}^3$ -90 °C ≤ T ≤ 70 °C **Optional:** T ≤ 250 °C p ≤ 10 bar • Exhaust flow rate: 5 l/min • Digital individual signal acquisition: 20 MHz processor, 256 raw data channels • Light source: 35 W Xenarc lamp • Operating terminal: Touch display 800 x 480 pixels, 1.6 GHz Intel Atom<sup>™</sup> processor 2 GB CompactFlash • Interfaces: USB, Ethernet, RS232/485 • Electric connection: 115 V/230 V, 50/60 Hz · Case: Desktop case (19" compatible, 4 RU, 84 HP, D=360 mm); optional with mounting brackets for rack installation

### Accessories:

- Printer as data recorder
- Integrated temperature, humidity and pressure sensor
- Fibre-optic cables of various lengths
- Transportation case

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### Promo<sup>®</sup> 2000/3000 Quality in detail

### The latest Promo<sup>®</sup> measurement technology:

Promo<sup>®</sup> has a new, fast 20 MHz signal processing processor, which analyses the progression of each particle signal. This makes it possible to recognise coincidental events in light-scattering measurement technology at the individual signal and correct them (according to Dr. Umhauer/Prof. Dr. Sachweh). Coincidental events are when more than one particle is in the measurement volume simultaneously.

This makes it possible to increase the maximum concentration limit up to  $10^6$  P/cm<sup>3</sup> (welas<sup>\*</sup> sensor 2070).

In low concentrations <1  $P/cm^3$  with the welas<sup>\*</sup> sensor 2500, this also leads to increased measurement accuracy.

# The best classification accuracy and the best size resolution regarding the particle size are guaranteed by the following characteristics (see Diagram 1):

- White light and 90° light-scattering detection  $\rightarrow$  Clear calibration curve
- Patented T-aperture
- ightarrow No border zone error
- New digital individual signal processing
- $\rightarrow$  Coincidence detection and correction at the individual signal making it possible to measure up to a factor of 5 above the max. concentration limit of each sensor.



Diagram 1: Example with sensor 2200

Promo® is characterised by an extremely high counting efficiency, event starting from 0.2  $\mu m!$ 



The technical specifications in this sheet are for information only. Technical modifications reserved. V0030213

### The Promo<sup>®</sup> 2000:

The Promo<sup>®</sup> 2000 is characterised by fibre-optic technology. The welas<sup>®</sup> aerosol sensor is connected – using fibre-optic cables up to 50 metres long – to the Promo control unit.

This minimises the particle losses in long sampling lines due to the easy installation of the sensor directly at the sampling location.

### The Promo® 3000:

On the Promo<sup>®</sup> 3000, two welas<sup>®</sup> sensors are supplied with one light source and the light-scattering pulses are detected by a photomultiplier. This enables a quasi-simultaneous particle measurement at two sampling locations up to 100 metres apart.

With the Promo<sup>®</sup> 3000, it's as if the user has two light-scattering spectrometers in one device, with the same characteristics:

- Particle size resolution capability
- Particle size classification accuracy
- Counting efficiency
- Zero counting rate

The various welas<sup>\*</sup> sensors are characterised by a particularly good agreement of counting efficiency and particle size resolution (see datasheet "welas<sup>\*</sup> sensors").

With the Promo<sup>®</sup> System, all welas<sup>®</sup> sensors of the 2000 series can be used. The quasi-simultaneous particle size and particle number determination offers particular advantages for characterising separators with fluctuating raw gas concentrations.

### **Opto-mechanical switching:**

Using opto-mechanical switching, the two sensors that are connected can be easily controlled. The sensors are controlled automatically with the software.

The particular advantage over a manual measurement selector switch:

- · Faster switching of the measurement location
- No deposits in sample lines
- · Long service life; no wear in the seals due to dust particles



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