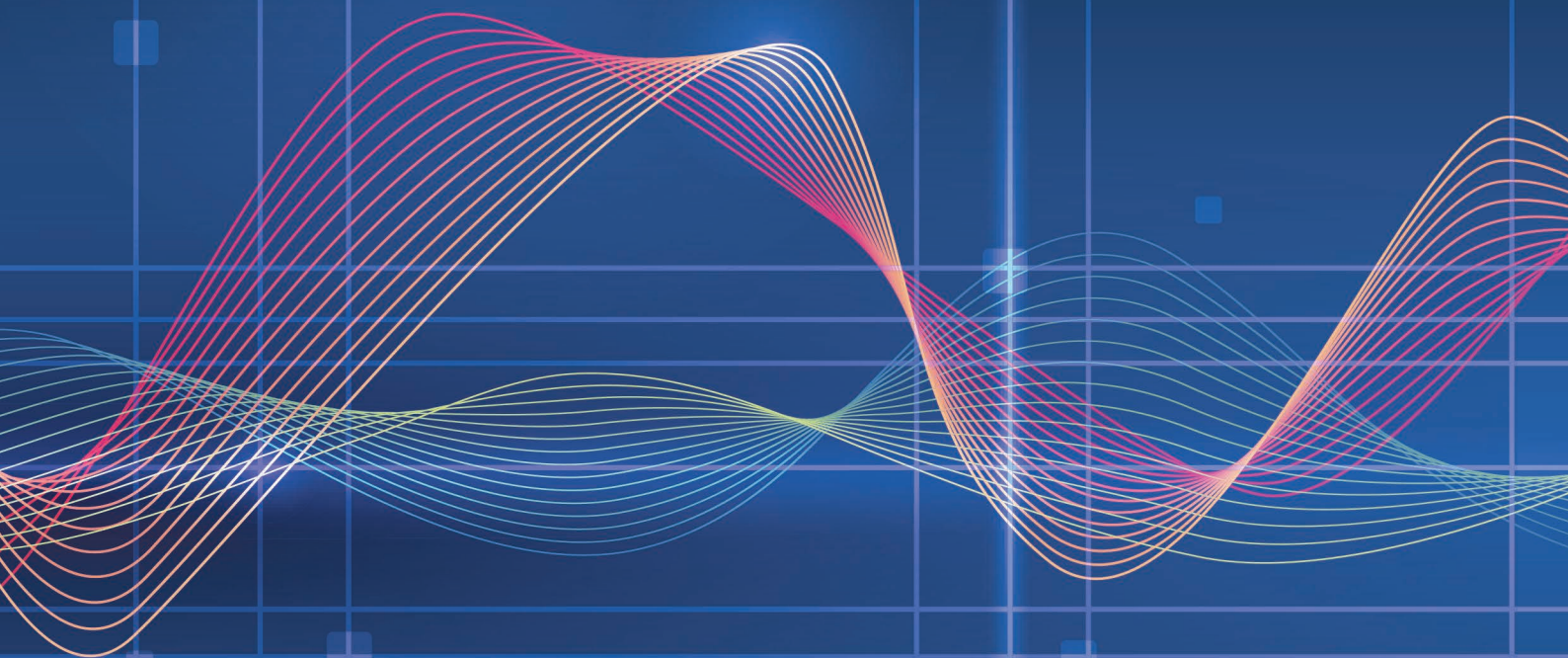


Comex

Comex



Particle size distribution measurement

CMA-9 Comex Multi-Channel Analyzer
for on-line measurement

Comex Multi-Channel Analyzer CMA-9

Operating principle

General information

Comex CMA analysers can measure particle size distributions from 0.1 to 1000µm, wet or dry, in-line or on-line, in industrial applications. Using advanced laser diffraction technology developed by Malvern, CMA analysers were successfully tested and applied in the industrial scale including production of: minerals, powder

coatings, cement, pigments and tonners, metal powders and pharmaceuticals. The robust construction and optimal mechanical configuration guarantees the long-life applications in heavy industrial conditions. Flexible software makes it possible to present measured data in the required pattern and to use the chosen parameters for controlling other production systems.

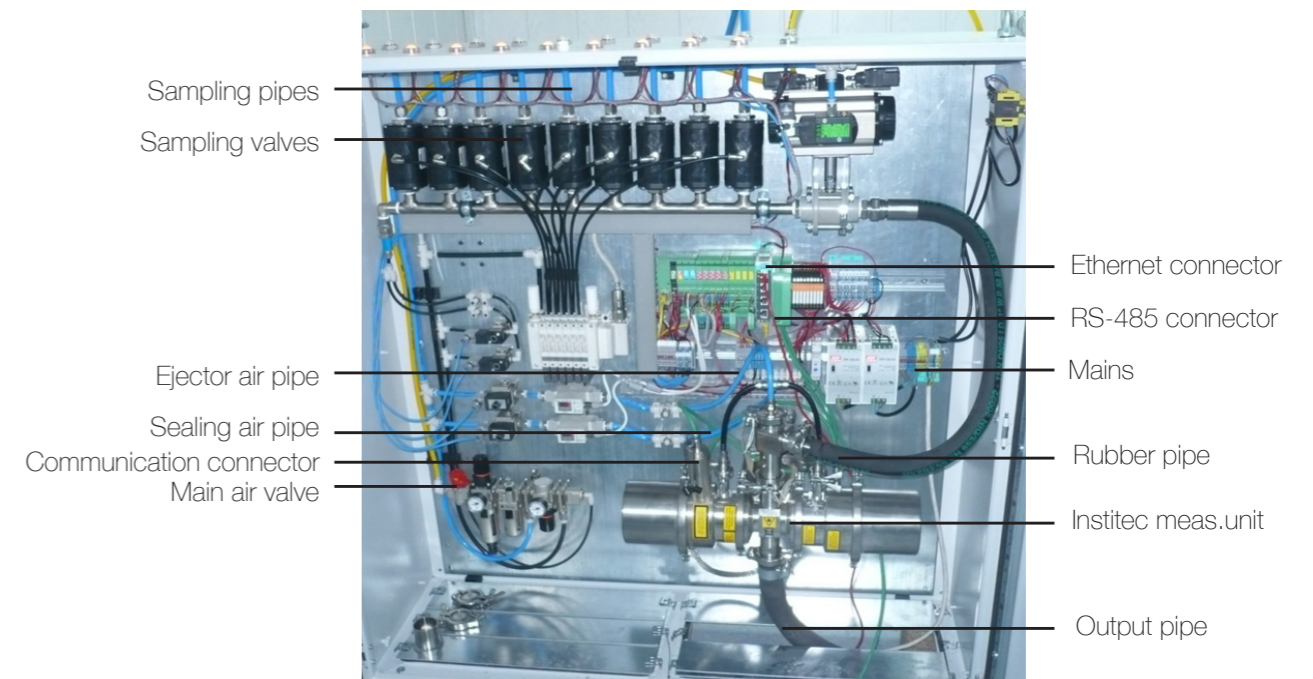
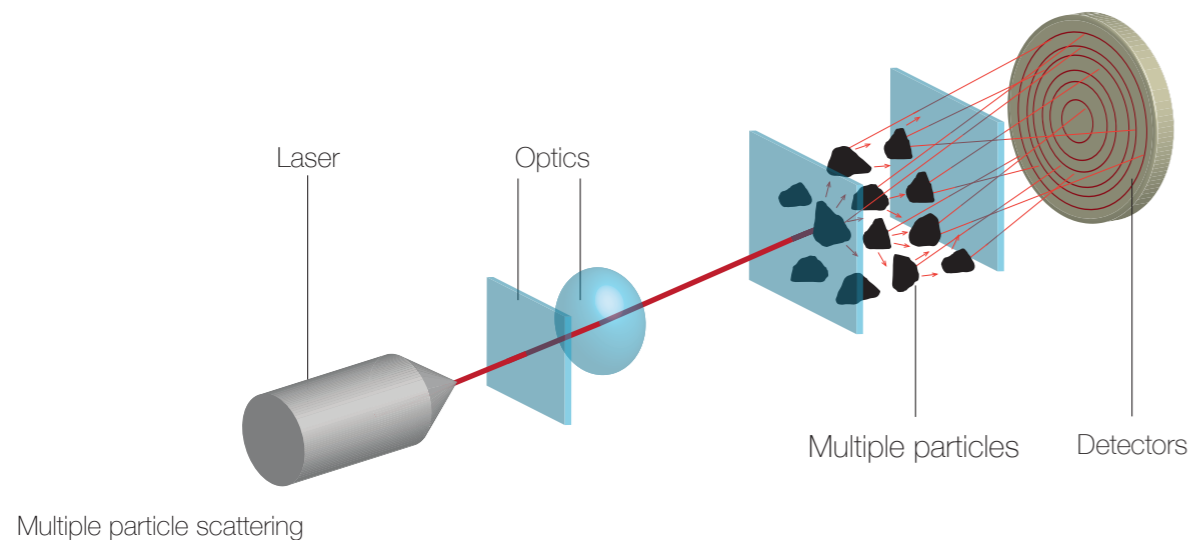
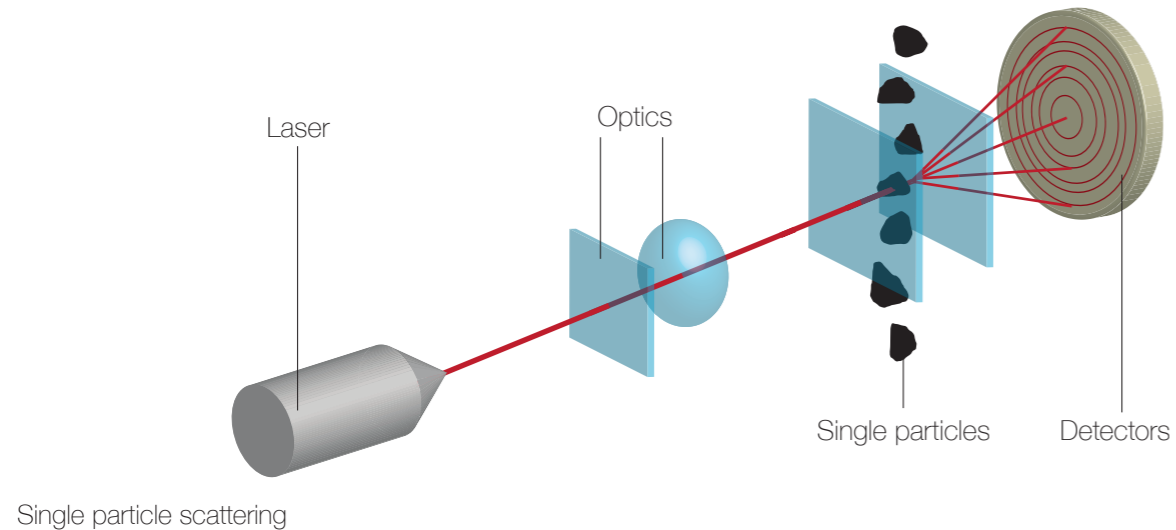
Operating Principle

The particle size measurement system is based on the laser diffraction principle. This technology utilizes diffraction patterns of a laser beam passing through the measured object ranging from nanometres to millimetres in size, to quickly measure geometrical dimensions of a particle. Laser diffraction analysis is based on the Fraunhofer diffraction theory, stating that the intensity of light scattered by a particle is directly proportional to the particle size. The angle of the laser beam and particle size have an inversely proportional relationship, where the laser beam angle increases as particle size decreases and vice versa. The unique feature of the Comex CMA analyser is related to the measuring possibility with very high particle concentrations. Normally, in other analysers, too high particle concentrations limit the measurement flexibility and

they require high dilution degree of the measured sample. This makes the measurements more complicated and less accurate. In the CMA system, special multi-particle scattering model is used to provide reliable measurements with very high concentrations of particles.

Multichannel solutions

The CMA systems are delivered for dry and wet applications, providing multichannel measurements. This allows sampling and measuring many channels in the production circuit, using the same instrument system in sequential operation. Such systems allow optimal use of the measuring instrument and significantly reduce the total cost of industrial applications.



CMA-9 Multichannel analyzer for dry measurements

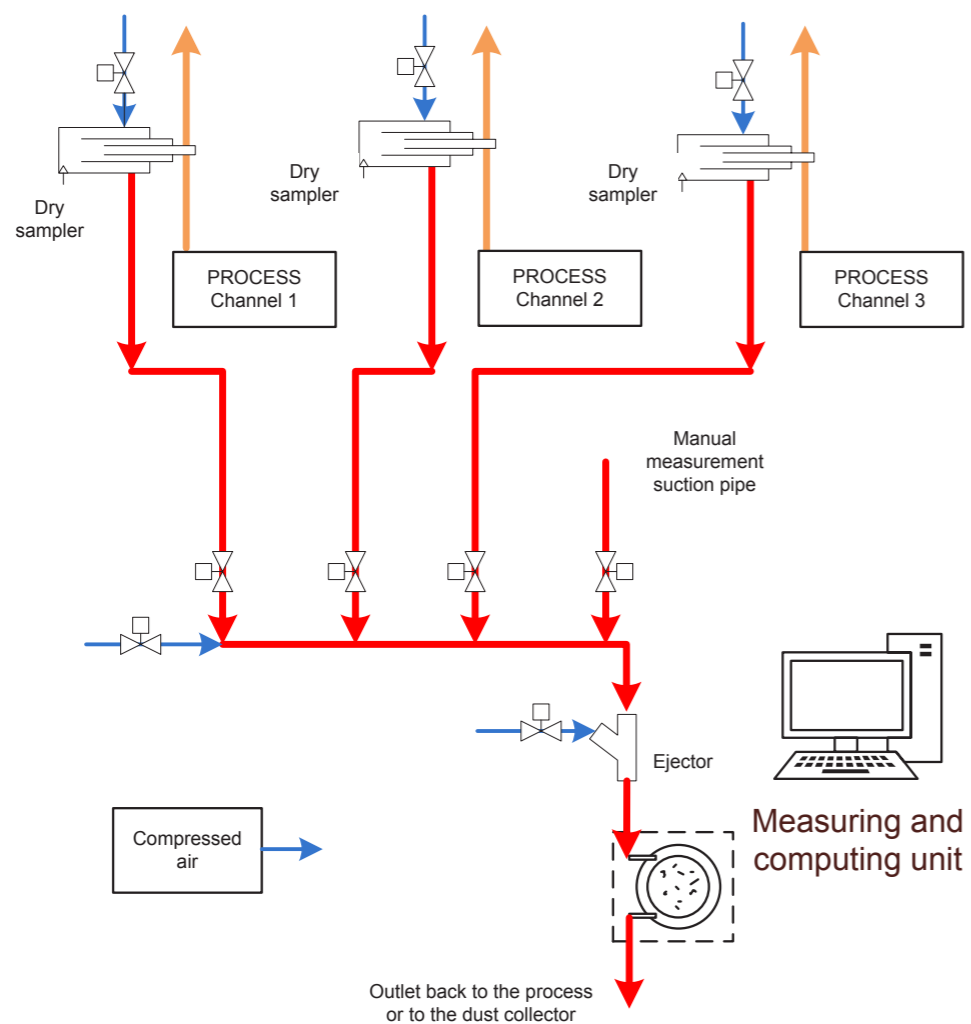
Comex Multi-Channel Analyzer CMA-9

Dry operating mode

Dry operating mode

Dry measurements are carried out by specially constructed sampling devices, which can be installed in the pressurised piping or in the stream of a free falling material. The measurements are automatically carried out in required timing, the measurement period and the sequence. The sampled material batches are normally analysed at the same time as the sample is taken from the process. However, if necessary the sampling devices can be configured to allow storage of the samples from different channels in the inter-

mediate vessels at the sampling points. Then, the sampled batches can be analysed in an independent sequence and time. The sampled material is transported to the analyser by pneumatic transportation. Depending on the transportation distance and material flow properties, the transportation system can be configured in the suction mode (up to 5-10 meters distance) or in the pressurised mode allowing problem free sampling from distances of even few hundred meters.



Dry measurement system example for three channels

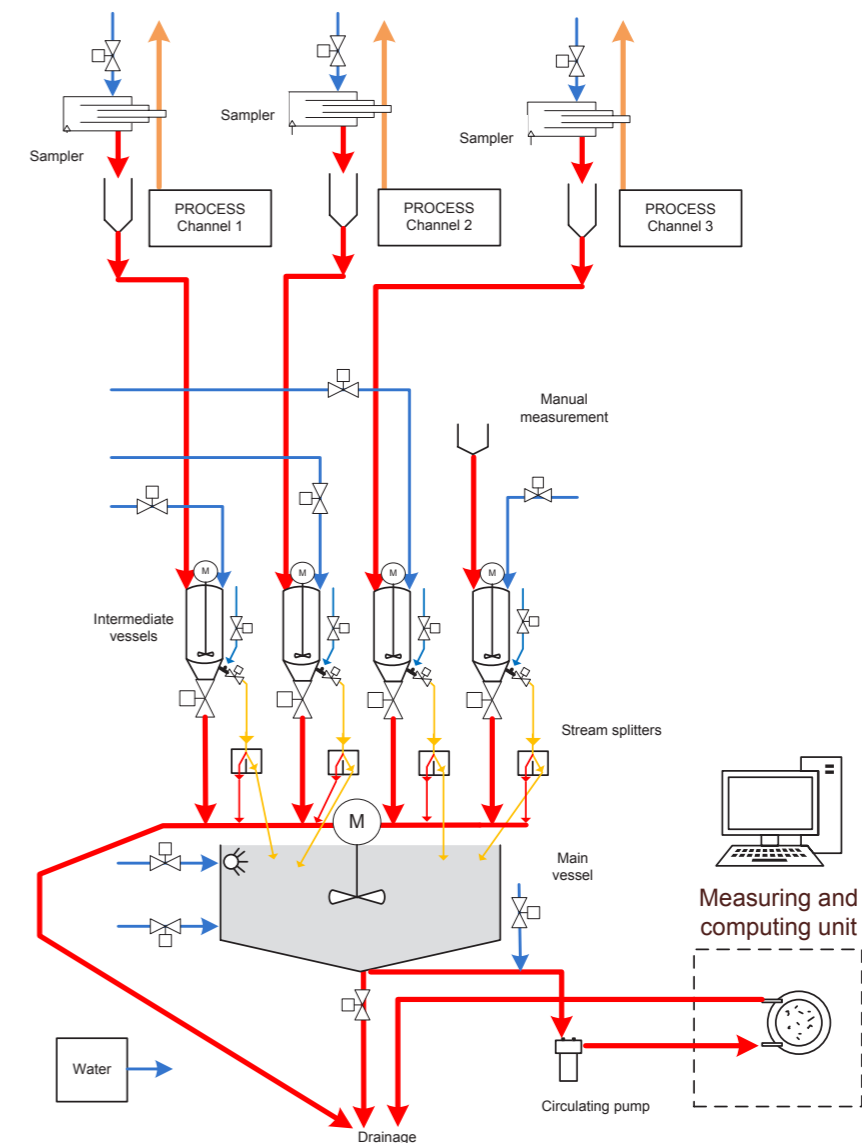
Comex Multi-Channel Analyzer CMA-9

Wet operating mode

Wet operating mode

Wet measurements are very demanding in terms of sampling, handling of the sampled slurry, correct dilution of the solids and the proper measurement. The CMA system allows controlling the samples slurry volume by the advanced sampler devices. Such sampling devices have special construction and they are dedicated for high or low pressure applications, high or low slurry concentrations and flow conditions in pipes or as free flowing. In

addition, all samplers are resistant against most of the aggressive suspensions and abrasive materials. The measurement is fully automated and allows sampling and measuring independently. It means different slurries can be sampled at the same time, and then stored in the CMA system by intermediate vessels. Then, they can be analysed in required sequence, time and applying optimal measurement periods, depending on general process requirements.



Wet measurement system example for three channels

Comex Multi-Channel Analyzer CMA-9

Specifications



The measured data from each analysed sampling point is classified by the software and displayed separately for each channel. The user interface allows entering required settings for each measurement to provide the optimal measuring patterns. In addition, the CMA software generates the data tables for external control like PLC, allowing the PID control of the specific devices in the process, affecting the particle size of the measured samples like slurry pumps, centrifuges, air classifiers, fans, etc.

CMA-system specifications

Measuring range	0.1-2500 microns
Measuring accuracy	+/- 2% on Dv50
Measurement frequency	4 measurements per second with averaging possibilities
Measurement principle	Laser diffraction with multi-scattering mathematical model
Calculation theory	Mie solution which requires no calibration
Lenses and optics	Replaceable lenses for specific measuring ranges
Communication interface	Ethernet allowing connection to any external PC via Internet
Software	Comex CMA package for PLC automation
Data presentation	Specific process parameters (d50, d90, d97 etc.), PSD curves, calculated Blaine. Classified data for each channel presented in tables or as the data matrix for PLC control
Sampling distance (max)	In wet mode: 100 m In dry mode: Standard: 5-10 m Enhanced: 200 m
Maximal material concentration	Dry: up to 5 kg/m ³ in the air Wet: up to 2000 kg/m ³ in water (must flow)
Temperature	10-70 °C
Humidity RH	0-90% (non-condensing)
Maximal pressure protection	10 bar
Enclosure protection	IP65
Industrial approval	Compliant with industrial-grade electromagnetic compatibility (EMC) requirements
Power supply	110/230 V 50/60 Hz
Conformity	CE badged

The user interface include the following setting and data presentation possibilities:

- Defining storage of the measured data on the local HD or external PC with the defined Internet address
- Defining measurement frequency and data averaging
- Defining measurement sequence
- Defining importance level to provide more frequent measurements for more important channels
- Defining measurement period
- Defining cleaning time period between the measurements
- Illustrating the channel overview showing the active channels
- Illustrating sequence of measurements by the clock indicator
- Presenting the particle size measurements for measured channels
- Presenting the trend curves for chosen parameters (like d50, d97 etc.) for measured channels

Measurement sequence, time, importance level etc.

Sequence clock indicator

Main function buttons

Function illustration

Particle size distribution curves

Trend curves d50, d97 etc.

The Comex logo is rendered in a bold, red, sans-serif font. The background of the entire page is a dark blue grid with various geometric shapes and glowing lines, including a prominent wavy pattern of red and orange lines that spans across the middle of the image.

Comex

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