

# Advantages of the **CAMBUSTION**

## Centrifugal Particle Mass Analyser

High transmission efficiency at high resolution

Direct entry of required mass;  
automatic calculation of speed/voltage

Constant resolution scanning

Excellent mass accuracy;  
even below 100 nm

Standalone bench-top instrument;  
built-in full digital control and I/O

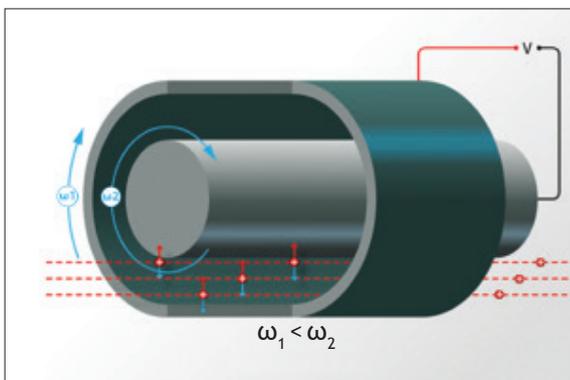


### High Transmission Efficiency

Uniquely, the CPMA rotates the two cylindrical electrodes at slightly different speeds, allowing a stable classification field (Olfert and Collings, 2005).

See animation at:

[www.cambustion.com/products/cpma/animation](http://www.cambustion.com/products/cpma/animation)



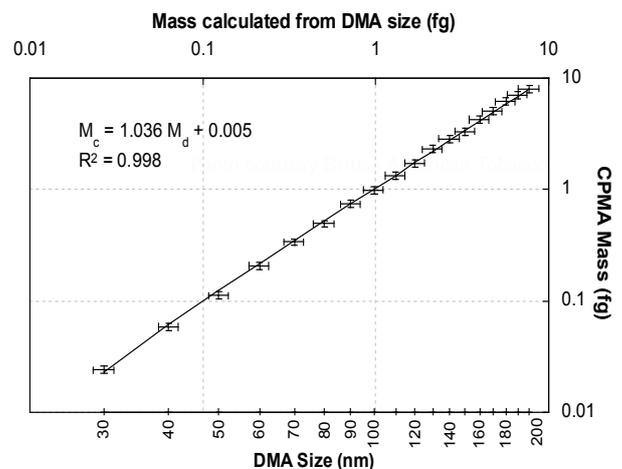
This offers improved transmission efficiency even at high resolution. A constant force balance across the classification zone ensures particles are evenly classified, even if they do not enter exactly in the centre of that zone.

As transit time and hence sample flow rate / classifier length affects resolution, it is important to compare performance at the same sample flow. The CPMA classifier offers higher resolution at high sample flows than can be achieved with smaller classifiers. Careful instrument design and packaging keeps the total weight down and allows for benchtop operation in a single box.

The CPMA classifier size is optimised for flows in the range 0.3–1.5 lpm (many modern CPCs do not allow flow rates less than 0.6 lpm), but can be successfully used at flows as high as 10 lpm over a reduced mass range. The optional aerosol flowmeter accessory allows real-time measurement of the sample flow, and automatic adjustment to maintain the same resolution.

### High Accuracy

The CPMA offers errors below 5%, even at particle diameters below 100 nm, where publications report some other analysers exhibit a significant drop in mass accuracy.

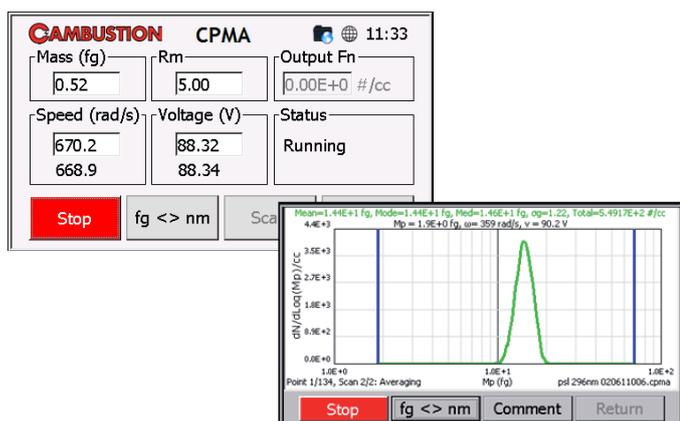


Suitable for measurement even from high concentration sources, the CPMA classifier may be cleaned by the user when required. The cleaning process takes 30 minutes; the cylinders are separated and their surfaces simply wiped. There are no fine classification channels to clean out.

## Standalone Instrument with Touchscreen

The CPMA is supplied ready to run, with no external computers or controllers required. All CPMAs are capable of 100/110/220 VAC operation, for ease of international experiments.

It incorporates a touchscreen user interface, allowing the experimenter to enter desired parameters directly. The style of interface will be familiar to aerosol researchers used to other modern classifiers such as DMAs.



Users may set a single mass setpoint (voltage / rotation speed are then calculated automatically) or set up an automatic mass scan between specified extremes.

The CPMA is able to vary both voltage and rotational speed during a scan, allowing scans at constant resolution. The sophisticated motor controller allows for both fast acceleration and deceleration for bidirectional scanning.

Alternatively, the resolution may be allowed to vary, in favour of a reduced scan time at fixed rotational speed.

## Input / Output Interfaces



The CPMA has an RS232 port and three analog input channels for easy experimental setup. The CPMA can connect to many standard detectors such as CPCs using in-built communications settings, or the user can program custom settings. This allows the set up of experiments and results plotting in real time. The CPMA serial interface is currently out-of-the-box compatible with: Airmodus A20 CPCs,

Grimm CPCs, Palas UF CPCs, TSI 30xx and 37xx series CPCs (inc. water based CPCs), Keithley 651x electrometers and TSI 3068B aerosol electrometers.

Data may be logged to a USB flash drive, or across a network to remote location. The CPMA has three analog output channels, which may be configured in software to output measured parameters.

When interfaced with an electrometer as part of a Mass Concentration Standard (Symonds *et. al.*, 2013), the output mass concentration in  $\text{mg}/\text{m}^3$  is automatically calculated and displayed on the screen:

Output Fn  
3.71E-1  $\text{mg}/\text{m}^3$

## Remote Control

The CPMA can be controlled directly from the touchscreen. It is also capable of being remotely controlled, either via the RS232 port (or USB), or across a network via its Ethernet port.

Remote control is either via the supplied PC application, via ASCII text commands, or via the in-built web interface, which allows control from any device with a web browser and Java. The supplied software includes an API for use in users' own programs, and full integration with MS Excel including experiment scheduling and live data import.

## Long Service Life

The sealed, pressure equilibrated lid significantly reduces the pressure drop across the rotating seals, eliminating leaks and improving seal life.

## In Service Worldwide

Prototype CPMAs have been used for publications since 2005, with commercial instruments available from 2012. Production CPMAs are in use in China, Europe, Japan and the USA for aerosol measurement in automotive, ambient, aerospace, biological, metrology and other applications.

## Publications

For a full list of CPMA publications, visit:  
[www.cambustion.com/publications/pubinst/CPMA](http://www.cambustion.com/publications/pubinst/CPMA)

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