

CAMBUSTION CSA

Catalytic Stripper Accessory for DMS500



- Optimised for low solid particle losses
- Controlled outlet temperature for stability
- Automatic size dependent loss correction
- 'Plug & play' for existing DMS500s

NEW!

- Removes volatile particles
- Software selectable d_{50} 10 & 23 nm roll-offs
- Automatic size dependent loss correction
- Maintains DMS500's fast time response (< 300 ms)



Introduction

Current and proposed European legislation mandates that volatile particles are removed before homologation measurements of particle number (PN) from engines and vehicles.

The use of a Catalytic Stripper with particle counters and sizers offers an alternative to achieve volatile particle removal without a thermodiluter, especially in situations where the greater dilution of the latter would lead to sensitivity limits being reached. The Cambustion CSA provides a simple means of removing volatile particles and is fully integrated with the DMS500 in hardware and software.

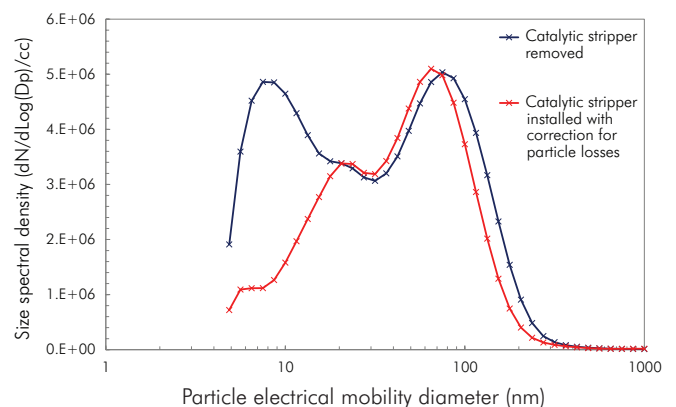
Works with Existing DMS Sampling & Dilution

The DMS500's existing fully integrated two-stage dilution system, proven in the field for over 15 years, supports plug & play addition of the CSA with no adjustments to existing hardware. The DMS500's existing heated 1st dilution system (used for sampling raw exhaust gas), ensures oxygen availability to allow the Catalytic Stripper to function, even when the exhaust conditions are rich.

The 2nd dilution stage of the DMS500 is not required for CSA operation, and can be switched off in software if

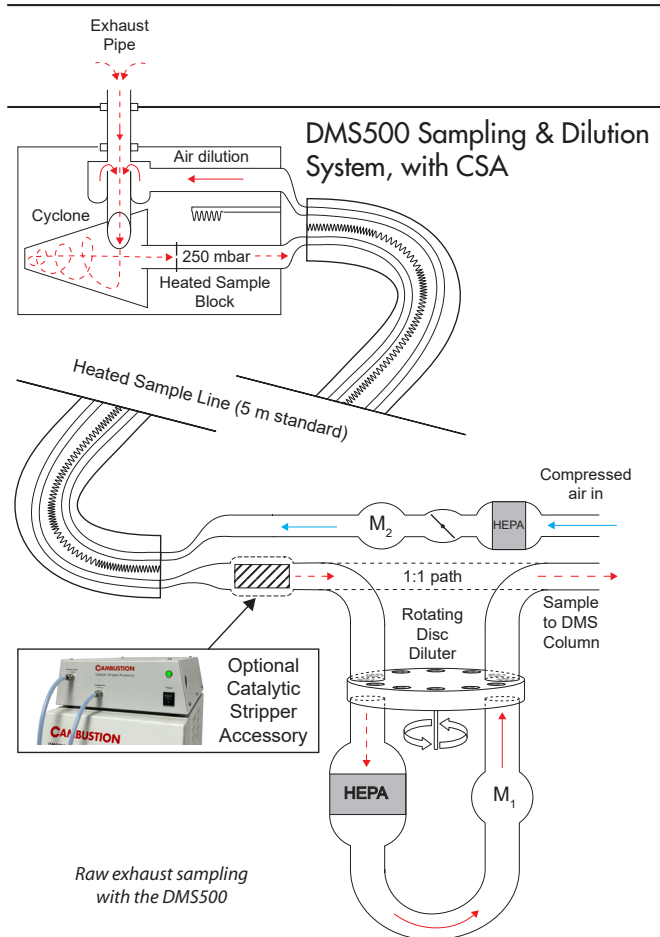
desired. This ensures that the DMS500's sensitivity is not compromised by fitting the CSA, and maintains the DMS500's flexibility in sampling anywhere from engine out to CVS tunnel.

DMS500 measurements of GDI particles sampled upstream of turbocharger during WLTC



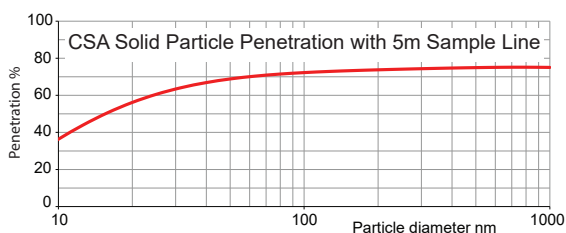
Uncompromised Time Response

Careful design of the CSA ensures that the market-leading fast time response of the DMS500 and heated line (<300ms $T_{10-90\%}$) is not at all compromised by the installation of the Catalytic Stripper. This is increasingly important with the adoption of highly transient real-world driving cycles, where short-lived transient events must be properly resolved.



Optimised for Low Loss

An actively controlled cooling system ensures that the gas is cooled to the correct conditions for the DMS500 while minimising particle losses, and also without the use of further otherwise unnecessary dilution.



Low pressure operation ensures that the residence time in even a 7 metre sample line is just 75 ms, minimising particle transport losses. The DMS500 itself has multiple sheath flows for low particle losses, while our established but pioneering end-to-end traceable calibrations for compact and soot aerosols ensure accurate measurements.

Loss Correction

Particle losses in the sample line and Catalytic Stripper can be automatically corrected for by the DMS500's software, with real time correction for line temperature and sample flow rates.

PMP "roll-off"

The DMS500 software allows easy selection of 23nm or 10nm "roll-offs" to match current and proposed "PMP" legislation. (Un-rolled off raw data also available).

Installation

Designed specifically for integration with the DMS500, the CSA offers a lightweight integrated package, easily added to existing DMS500s by customers. The CSA can easily be bypassed by the user.

Software Control

Supplied software integrates with the DMS500 and the test bench via AK protocol over Ethernet. Full AK control and monitoring of the CSA by the test bench is possible for total integration.

The CSA software monitors and controls the temperatures of catalyst and outlet cooler, guaranteeing repeatable performance and accurate measurements. Full error detection and logging of performance parameters is included.

Specifications

Dilution (As for existing DMS500)	1 st dilution: ÷ 5 @ 191°C 2 nd dilution, post-CSA: ÷ 1 (bypass) ÷ 12–500 (if required)
System Time Response ($T_{90-10\%}$)	< 300 ms (with up to 7 m sample line, inc. DMS). Data rate 10 Hz.
Volatile Particle Removal	> 99% of 30 nm tetracontane aerosol
Physical d_{50} for Solid Particles	~ 23 nm (with 7 m sample line) (corrected for in software)
Loss correction	Automatic if selected
Software Output	Selectable
"Roll-Off" function	d_{50} 10 nm, d_{50} 23 nm or no "roll-off"
Sample Line Length	(DMS500 line) 2, 5 or 7 m
Sampling Locations	As DMS500, standard pre- & post DPF/GPF, CVS tunnel & ambient
Catalyst (gas) temp.	350°C typical (software selectable)
Sample Line Temp.	(DMS500 line) 191°C
Environmental Conditions	+5 – +40°C 0–95% RH non-condensing
Control Interface	Ethernet
Warm-up Time	30 minutes
Remote Control	AK Protocol
Weight/Dimensions	6.2 kg / 44 x 35.5 x 13 cm
Electrical supply	100–240V AC 800 W

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All specifications subject to change without notice