



TECHNICAL DATA	
Measuring Range Measured value concentration of soot (mg/m <sup>3</sup> , µg/m <sup>3</sup> )	0.001–150 mg/m <sup>3</sup>
Display Resolution	0.01 µg/m <sup>3</sup>
Soot Detection Limit	1 µg/m <sup>3</sup>
Data Logging Frequency	2 Hz standard/10 Hz for selected values
System Rise Time (t <sub>1</sub> –t <sub>90</sub> ) at DR < 5	< 1 s
Operating Temperature	–10 °C to + 40 °C
Operation Sea Level	Up to 3,000 m (up to 5,000 m with optional pump module)
Sample Flow	~ 7 l/min
Interfaces	1 TCP/IP, analog I/O (2 In/4 Out), 2 CAN, 1 USB
Power Supply	21 ... 50 VDC at max. 25 A
Power Consumption	~ 250 W (at 20 °C with 4 m heated sampling line), max. < 450 W during heat up
Average Operation Time at 20 °C with 4 m Heated Sample Line	~ 4,5 hours with 60 Ah M.O.V.E battery pack
Laser Class	Class 1 laser product
Dilution Ratio (DR) The actual DR will be displayed with the accuracy noted below	Adjustable from 2–20
Accuracy of DR	Max. ± 2 + (DR*0,5) %
Max. Exhaust Gas Temperature	Up to 800 °C (max. 1,000 °C for short time < 30 s) with pressure reduction unit
Exhaust Gas Back Pressure	Up to 1,000 mbar
Tolerance Range for Exhaust Inlet Pressure	–110 mbar ... + 80 mbar (relative)
Dimensions	~ 446 (19") x 349 x 373 mm (W x H x D)
Weight	~ 26 kg

FOR FURTHER INFORMATION PLEASE CONTACT:

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**AVL MICRO SOOT SENSOR 2™**

Standard beyond limits

## THE ADDED VALUE

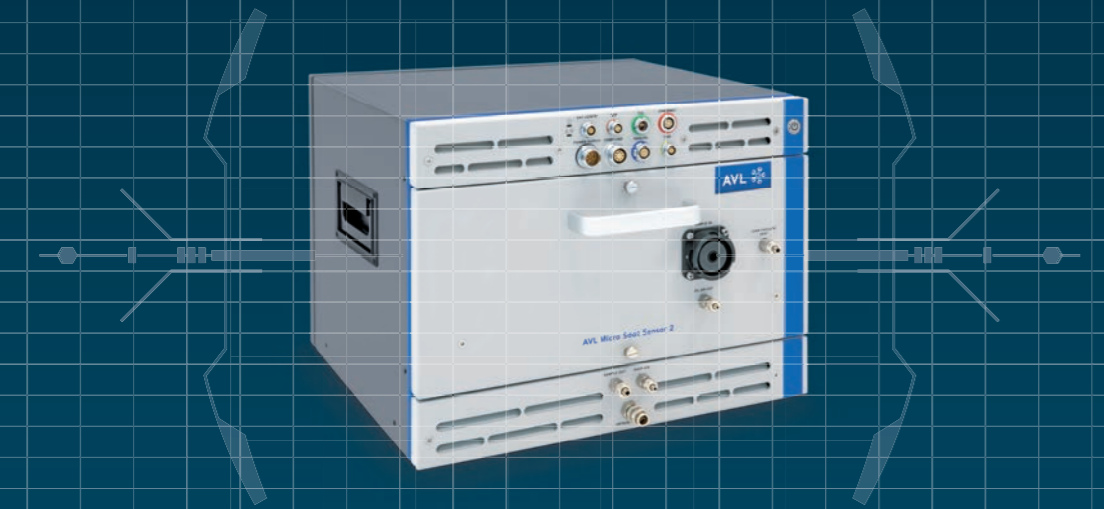
The AVL Micro Soot Sensor 2™ is the next generation of the industrial standard device for transient soot measurement optimized specifically for on-board usage in vehicles.

The new device features:

- Transient soot mass measurement w/o cross sensitivities to other exhaust gas components
- One metric throughout the whole engine development process across the different test environments e.g. engine testbed, chassis dyno and on the road
- Optimized for on-road testing beyond RDE boundary conditions: 24 V power supply, IP34 protection class, small dimensions, low weight, low power consumption, small sampling system, ISOFIX mounting plate, enlarged measurement, operating temperature and pressure range
- Simple to operate: Harmonized AVL Device Center™ user interface, low maintenance effort due to exchangeable sensor unit drawer system and on-site calibration check with calibration window
- Full compatibility for a seamless system integration: Fully compatible to the M.O.V.E iS and iX platform, CAN connection for easy INCA integration

## THE CHALLENGE

The continuous lowering of emission limits and the global focus on Real Driving Emission (RDE) limits lead to highly complex exhaust aftertreatment system layouts and increased development efforts. Important development tasks such as the combustion optimization and exhaust aftertreatment system development require maximum precision in order to achieve reliable results. The metric at these development tasks is the soot content within the exhaust gas or on the particle filter, as soot is an important indicator for the combustion quality and generally a main contributor to particulate emissions. Therefore, soot is also the key parameter when evaluating the efficiency of a Diesel (DPF) or Gasoline Particle Filter (GPF) system as well as the measure for the creation and validation of the soot loading model. The growing number of tasks and the current use of different devices for various applications to measure different exhaust gas components calls for an easy solution. A user-friendly, versatile and reliable measurement device delivering accurate results under harshest testing conditions.



## THE AVL SOLUTION

### EASY

The very compact dimensions of the AVL Micro Soot Sensor 2™ allow for low weight and easy installation. The comprehensive mounting concept offers high flexibility in the positioning of the device and its sampling system which has been drastically reduced in size as well. Thanks to the rugged design fulfilling IP34 classification, the sensor can be used under harshest testing conditions outside the vehicle without additional protection – even beyond current RDE boundary conditions at temperatures from -10 °C to 40 °C and at altitudes up 5,000 m. The AVL Micro Soot Sensor 2™ is fully compatibility with the M.O.V.E iS and iX platform including its versatile mounting and power supply options.

### SMART

The revolutionary exchangeable sensor unit design enables simple access to all maintenance-relevant parts through a drawer module without the need for tools. The drawer module includes not only the complete sensor unit but also the related calibration data. The big advantage: If a second drawer module is available for exchange, cleaning and maintenance will not interrupt the measurement. This leads to highest availability resulting in a significant operating cost reduction compared to its predecessor.

Furthermore, the device offers multiple smart connection possibilities, e.g. for seamless INCA connection and fast data transfer, the AVL Micro Soot Sensor 2™ is equipped with a CAN interface. And thanks to the integrated USB connection the device is certainly prepared for future applications.

### FOCUS ON APPLICATION

The development of the DPF / GPF soot loading model is a complex and costly task with current instrumentation and methodologies, including difficult and time-consuming reference weighing of the particle filter. The usage of the AVL Micro Soot Sensor 2™ increases the efficiency by providing an improved correlation between integrated soot measurement and reference weight of the filter. This improvement is based on an optimization of the dilution air control, an increased sample flow through the system, the reduction of death volumes within the sample path and the possibility to measure high soot concentrations with a lower dilution rate. These measures lead to a reduction of the dilution error and increase the system dynamics enabling highest data accuracy even for high dynamic maneuver testing as it is also required for the smoke map development. For Applications with very high soot emissions (e.g. GDI cold start testing) the measurement range has been tremendously enlarged without comprising the ultra low detection limit of 1 µg/m³, allowing measurements of soot concentrations up to 3000 mg/m³.

The sum of all these benefits enables the usage of the AVL Micro Soot Sensor 2™ as one consistent metric throughout the development process for unlimited applications, even if testing “beyond RDE boundaries” is required.



AVL Micro Soot Sensor 2™ with optional trailer tow carrier system

### DESIGNED FOR ON-BOARD MEASUREMENTS

- The revolutionary exchangeable sensor unit design enables simple access to all maintenance relevant parts through a drawer module without the need for tools
- 24 V power supply
- Low power consumption for extended on-board measurements
- Low weight and small dimensions for easy installation
- Small and flexible sampling system optimized for Light Duty requirements
- Protection class: IP34 for usage under harshest conditions outside the vehicle

### APPLICATION DEDICATED

- Enlarged measurement range for GDI Cold Start applications: 1 µg/m³–3000 mg/m³
- Improved pneumatics for altitude measurements up to 3000 m (5000 m with optional pump unit)
- Increased operating temperature range: -10 °C to 40° C for measurements beyond current RDE boundary conditions
- Improved system dynamics for highly dynamic testing manoeuvres leading to an invcreased accuracy for filter loading model and smoke map development

### FULL COMPATIBILITY FOR SEAMLESS SYSTEM INTEGRATION

- Full compatibility to the versatile M.O.V.E iS and iX platform with its various components (M.O.V.E E-Box iS, M.O.V.E E-Box HD, M.O.V.E EFM, M.O.V.E System Control, M.O.V.E Battery Box)
- Isofix mounting plate and full compatibility to existing M.O.V.E mounting options and M.O.V.E Gas PEMS iS Design Hood
- Seamless INCA connection through CAN bus
- AVL CONCERTO 5™ – M.O.V.E Data Toolbox for mg/mile or g/km result calculation (requires mass flow signal)



Smart Service: A drawer enables access to all maintenance relevant parts without tools



Easy installation with various mounting possibilities (e.g. ISOFIX mounting plate)



Intuitive system set-up, thanks to color-coded and IP34 compliant connections