Automotive Industry Products AIP ®

MAHA

Portable Emissions Measurement System

PEMS-GAS for gaseous emissions from diesel- and gasoline engines

PEMS-PN for particle numbers

PEMS-GAS/PN for combined measurement

Portable Emissions Measurement System
PEMS-GAS for gaseous emissions from diesel- and gasoline engines

The MAHA-AIP developed compact measurement system allows mobile exhaust gas measurement during an actual road trip. The ultra-lightweight device (<20 kg!), fitted at the test vehicle, includes compact fuel gas analyzers, a weather station, a GPS system and the connection to the vehicle network [OBD/CAN interface / INCA-interface (ASAP3)] for continuous test evaluation.

A probe delivers the vehicle exhaust gases from the test box in real-time mode. Depending on the test vehicle, it is possible to use up to two probes.

The component emissions (CO, CO_2, NO_X [or NO + NO_2], [optional THC / NMHC, particle number PN]) together with the associated engine-, vehicle- and environmental-parameters are recorded for further analysis.

Advantages

- Weatherproof protective, robust case (IP67)
  630 x 400 x 200 mm (W x H x D)
- Compact, lightweight design: < 20 kg (incl. battery)
- Clever, quick positioning and fixation at the vehicle trailer hook
- Self-sufficient power supply by rechargeable Lithium-Ion battery
- Easy change of battery without system switch-off
- Safety approved by DEKRA
  – measuring time up to 5h
- Online reporting with operation indicator for the driver of moving avaraging window method
- Verification and trip evaluation by moving avaraging window method (EMROAD) or power binning method (CLEAR Tool)

Application Examples

- Measurement and analysis of the exhaust emissions directly from the vehicle, while on an actual road trip
- Fuel consumption measurement
- Analysis for engine development and exhaust after-treatment
- Component testing

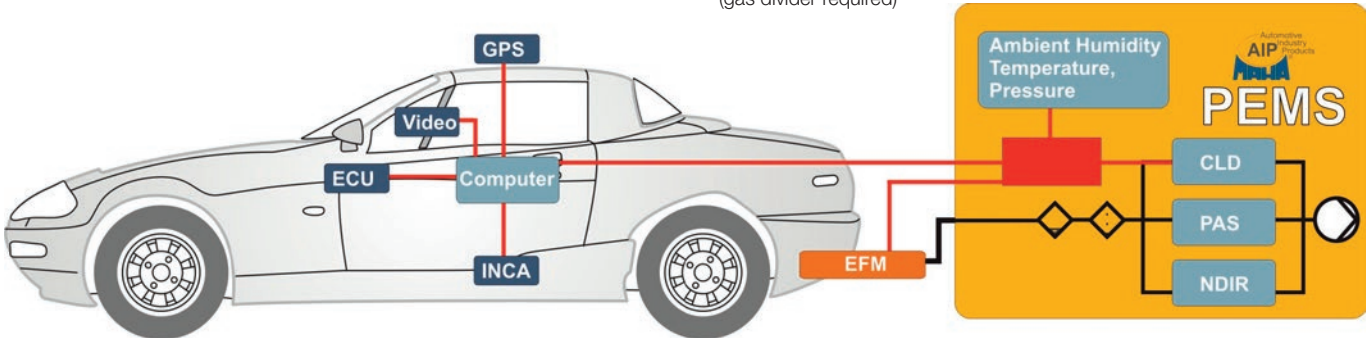
Portable **E**missions **M**easurement **S**ystem
PEMS-GAS for **gas**eous emissions from diesel- and gasoline engines

Technical Data

Measuring Principles:	NDIR (CO/CO_2), CLD (NO), PAS (NO_2)
Operating power:	DC 22 … 29V
Power demand:	< 50W@+20°C ambient temperature after warm-up without heated lines
Battery[2]:	10,4 Ah rechargeable Lithium-Ion battery. Easy change of rechargeable battery without system switch off
Operating Time:	3 … 5 h, depends on lengths of heated lines and operating temperature
Operating Temperature:	–10°C … +40°C
Protection class:	weatherproof, robust case (IP67)
Dimension:	630 x 400 x 200 mm (W x H x D)
Weight:	< 20 kg

Gas	Analyzer Method	Measuring Range
CO	Non-Dispersive Infrared Detection (NDIR)	0 … 5 vol %
CO_2	Non-Dispersive Infrared Detection (NDIR)	0 … 20 vol %
NO	Chemiluminescence Detector (CLD)	0 … 2,500 ppm
NO_2	Photoacustic Spectroscopy (PAS)	0 … 5,000 ppm

- Analyzers fulfill Euro 6c RDE requirements (accuracy, drift, noise, response time, linearity)
- Especially designed for portable emission measurement (robust, compact & lightweight)
- No NO_X converter necessary
- Photacustic analyzer testifyed by DEKRA (low noise, low drift, no interference with other gaseoues components)
- Hardware and software development of analyzers in house
- Time saving automated span calibration with external calibration unit (up to 6 gas inlets)
- Automated linearity checks with external calibration unit (gas divider required)



Additional Features

- Weather station (ambient temperature, humidity, pressure)
- INCA-Interface (ASAP3)
- CAN-Interface
- OBD-Interface
- AK-Interface
- Video-Recording (incl. Overlays of Measurement Data)
- CSV-Logging
- GPS-Interface (compatible with NMEA-0183 GPS-devices)
- Export of Geodata to Google Maps / Google Earth
- Export of Test data to MDF4-Files (AVL Concerto)
- Online reporting with operation indicator for the driver

Portable Emissions Measurement System
PEMS-PN for Particle Numbers

The MAHA AIP developed compact particle number measurement system allows mobile exhaust emission measurement during an actual road trip in real time. The ultra-lightweight device, fitted to the test vehicle, includes a compact Condensation Particle Counter (CPC), a weather station, a GPS system and the connection to the vehicle network [OBD/CAN interface/ INCA-interface (ASAP3)] for continuous test evaluation.

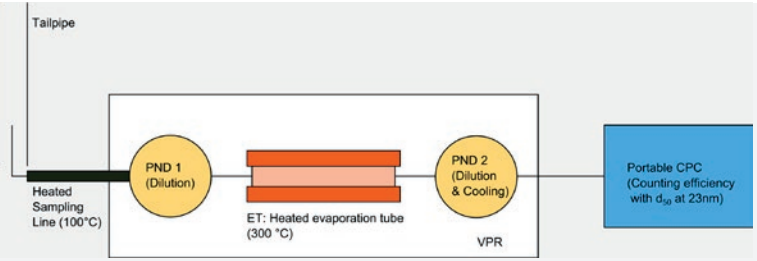
It is possible to use the system in combination with an Exhaust Flowmeter (EFM) also designed by MAHA AIP. The emitted particle number and the associated engine-, vehicle- and environmental-parameters are recorded for analysis.

Advantages

- CPC technology for better comparability to particle number measurement on chassis dynamometers
- Weatherproof protective, robust case (IP67) (W 510 x H 390 x D 220 mm)
- Compact, ultra-lightweight design < 20 kg
- Clever, quick positioning and fixation at the vehicle trailer hook, also in combination with an MAHA-AIP EFM (Exhaust Flow Meter)
- Self-sufficient power supply by rechargeable Lithium Ion Battery
- Easy change of rechargeable battery without system switch off
- Online reporting with operation indicator for the driver

Application Examples

- Measurement and analysis of the exhaust particle number emissions directly from the vehicle, while on an actual road trip
- Analysis for engine development and exhaust after-treatment
- Component testing



Technical Data

Measurement principle:	Condensation Particle Counter
Measurement range:	Electrical mobility diameter Dp: 23 nm = Dp = 2,5 µm Particle concentration cP diluted: 1 cm^{-3} = cP = 1 x v105 cm^{-3}
Linearity CPC:	< 5 % of reading
Response time T10 … 90:	< 5 s
Operating power:	DC 22 … 29 V
Power demand:	< 70 W @ + 20 °C ambient temperature after warm-up without heated lines
Battery[2]:	10,4 Ah rechargeable Lithium-Ion battery. Easy change of rechargeable battery without system switch off
Operating Time:	> 3 h, depends on lengths of heated lines and operating temperature
Operating Temperature:	– 10 °C … + 40 °C
Protection class:	weatherproof, robust case (IP 67)
Dimension in mm:	570 x 400 x 250 mm (W x H x D)
Weight:	< 20 kg

Portable Emissions Measurement System
PEMS-PN for Particle Numbers

Additional Features

- Weather station (ambient temperature, humidity, pressure)
- INCA-Interface (ASAP3)
- CAN-Interface
- OBD-Interface
- AK-Interface
- Video-Recording (incl. Overlays of Measurement Data)
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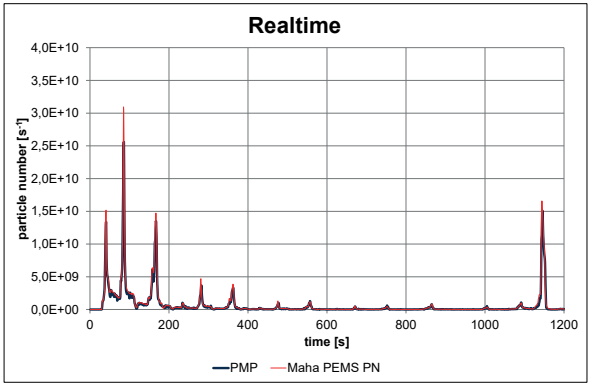
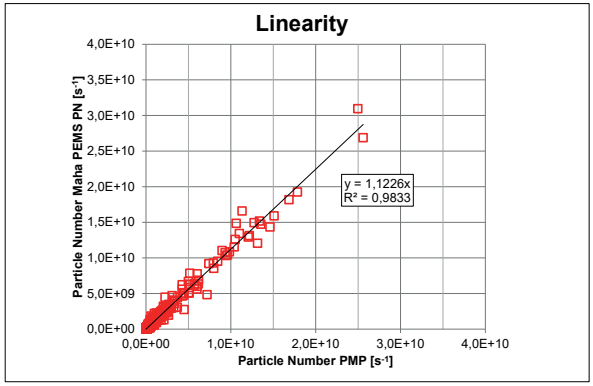
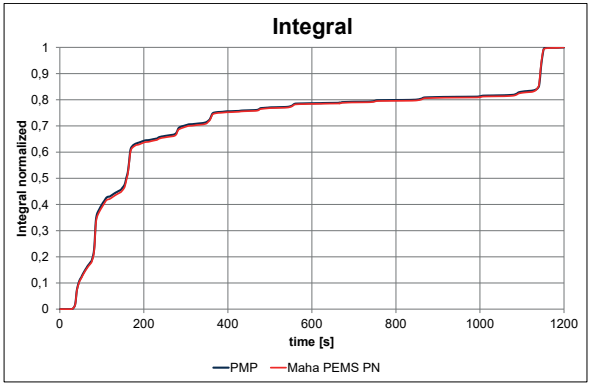






Portable **E**missions **M**easurement **S**ystem

PEMS-GAS/PN for **gas**eous emissions from diesel- and gasoline engines as well as particle numbers

The PN-System can be combined with the MAHA-AIP PEMS-GAS in a weather proof protective and robust case (IP67) as a combined stand-alone unit. It is possible, to combine the system with a MAHA-AIP Exhaust Flow Meter.

PEMS-EFM (Exhaust Flow Meter)

Specification

Measurement principle:	Differential Flow Measurement Principle
Power supply:	MAHA-AIP PEMS
Communication:	LAN, CAN via MAHA-AIP PEMS
Accuracy:	< 2 % of reading or 0.5 % of full scale, whichever is larger
Linearity:	< 1% of full scale
Exhaust temperature range:	0 °C … + 700 °C
Weight:	8 kg (2,5“ Tube)

Features

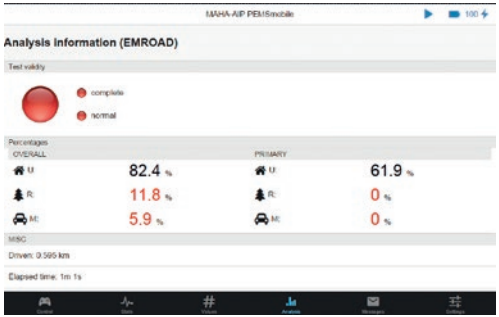
- Compact design, clever, quick installation, e.g. at the test vehicle trailer hook
- For the operation at the left side, right side or dual use (both sides)
- Different flow tube diameters available, for mass flows up to 650 g/s.

PEMS Mobile-App

Remote control of the desktop applications via web service for visualization of instantaneous emissions and pollutant concentration during a road test drive.

- Key data presentation of the online evaluation
- Controlling the operating modes, e.g. stand by, pause, measuring mode, status display (e.g. battery status)
- Ready to measure – yes / no
- error messages (watchdog function)

Online Evaluation



Automotive Industry Products

Test Systems for a Clean and Safe Environment


Testing Technology for Research & Development


Emission Measurement Systems


Chassis Dynos (Twin Roll)


Chassis Dynos (Single Roll)


Flat Track Systems


Hydraulic 'Shaker' Test Stands


Powertrain Test Benches


Test Bench Automation


Driving Robot


Vehicle Cooling Fan

... the Road in Your Lab

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