



AxionR/S+PM

Data is the lifeblood of vehicle improvement and emissions reduction.

GlobalMRV is proud to introduce the Axion™R/S+PM Generation 4 complete with PM capabilities in the same compact package.

Global MRV continually improves Micro “Portable Emissions Measurement System” (PEMS) for real-world driving emissions, providing real-time, real-world fixed and mobile emissions testing — including marine emissions, engine testing, and performance analysis.

The Axion™R/S+PM measures mass-flow emissions of CO, CO₂, NO, HC, and PM in real-time. The Axion™R/S+PM provides accurate and timely information for decision-making. Large fleet data set collection is now possible due to the Axion™R/S+PM flexibility, minimal set-up time, and rapid deployment.

The Axion™ series is powered by LabVIEW®-based proprietary software and easily syncs with CAN broadcast software, such as INCA from ETAS, to provide municipalities, researchers, and OEMs a fully comprehensive data package for measurement verification and predictive analysis.

Redesigned to include:

- Electromagnetic Interference (EMI) Protection from external devices that may cause erroneous readings
- Multiple USB connections for integration with external devices and additional vehicle data collection products
- Remote data collection, analysis, and storage in real-time for increased security from data loss
- PM and PN Capabilities
- Multi-point calibrations for more accurate range testing

The Axion™ Micro PEMS passed a rigorous evaluation by the United States Environmental Protection Agency (USEPA) Environmental Technology Verification (ETV) Program, demonstrating that GlobalMRV continues to set the standard for continuous PEMS field-testing.

The Axion™ reports data in “grams-per-second” and provides all data for calculating “grams-per-mile, gallon, and kg”. Using a proprietary (and patented) flow calculation method, accurate PEMS flow data is provided. This reduces extraneous equipment. On-board engine information is captured with either vehicle/vessel OBD hardware and software or an Engine Sensor Array.

+PM Module: Particulate Matter (PM) is measured utilizing the process of a laser light scattering technique. The fully integrated PM module easily fits into the existing Axion™R/S footprint.

+NH₃ Module: (Additional Option) The fully integrated Ammonia (NH₃) module easily fits into the existing Axion™R/S+PM footprint. See the Axion™R/S+PM+NH₃ datasheet for more specifications.

Online, phone, and email support are included in the warranty with the purchase of every Axion™R/S+PM.



Gas	Range	Accuracy	Repeatability	Noise	Resolution	Measurement and T90
HC Propane	0 - 4000 ppm 4k to 10kppm 10k to 30kppm	±8 ppm abs or ±3% rel ±5% rel ±10% rel	±6ppm abs or ± 2% rel ±3% rel ±5% rel	4ppm abs or 0.8% rel	1 ppm	NDIR < 3.5 sec
CO	0.00 - 10.00% 10.01 to 15.0%	±0.02% abs or ±3% rel ±5% rel	±0.02% abs or ± 2% rel ±3% rel	0.01% abs or 0.8% rel	0.001 vol. %	NDIR < 3.5 sec
CO 2	0.00 - 16.00% 16.01% to 20%	±0.3% abs or ±3% rel ±5% rel	±0.1% abs or ± 2% rel ±3% rel	0.1% abs or 0.8% rel 2% rel	0.01 vol. %	NDIR < 3.5sec
NO	0 - 5000 ppm	±15 ppm abs or ±3% rel	±2% rel	5 ppm abs or 1% rel	1 ppm	Electrochemical < 5s
O2	0.00 - 25.00%	±0.02% abs or ±1% rel	±0.02% abs or ±1% rel	0.02% abs or 1% rel	0.01 vol. %	Electrochemical < 6s
Optional Add-Ons to Select Devices						
NO	0 – 3000 ppm	±2ppm abs or ±2% rel	±2ppm abs or ±2% rel	<2ppm abs or 2% rel	0.1 ppm	UVRAS < 3 sec
NH ₃	0 – 500 ppm	±2ppm abs or ±2% rel	±2ppm abs or ±2% rel	<2ppm abs or 2% rel	0.1 ppm	TDLS < 2s
PM and PN						
	PM and PN		PM		PM	
Operating Principle	Laser Scattering		Laser Scattering		Laser Scattering	
Measurement Range	0~30,000µg/m ³ (0~30mg/m ³)		0~50,000µg/m ³ 0~50mg/m ³ Maximum display 1000mg/m ³		0 - 250,000µg/m ³ (0-2,500mg/m ³)	
Output Channels	PM1.0, PM2.5, PM4.25(optional), PM10 and TSP		PM2.5, PM10 and TSP		PM2.5, PM10 and TSP	
Resolution	1 µg/m ³ (0.001 mg/m ³)		1 µg/m ³ (0.001 mg/m ³)		1 µg/m ³ (0.001 mg/m ³)	
Working Condition	-30°C ~ 70°C,0-95%RH (non-condensing)		-30°C ~ 70°C,0-95%RH (non-condensing)		0-55°C (32°-131°F)	
Particle Measurement Results						
PM1.0 [ug/m3]	Yes		No		Optional	
PM2.5 [ug/m3]	Yes		Yes		Optional	
PM10.0 [ug/m3]	Yes		Yes		Yes	
TSP [ug/m3]	Yes		Yes		Optional	
0.3um [ct/L]	Yes		No		No	
0.5um [ct/L]	Yes		No		No	
1.0um [ct/L]	Yes		No		No	
2.5um [ct/L]	Yes		No		No	
5.0um [ct/L]	Yes		No		No	
10.0um [ct/L]	Yes		No		No	
Global MRV Compatibility Matrix						
Axion R/S	Yes		Yes		No	
Axion R/S+	Yes		Yes		Yes	
Axion R/S+ NH3	Yes		Yes		Yes	
Axion GO	Yes		Yes		No	
Backpack	Yes		Yes		No	
Firefly	Yes		Yes		No	
Rack or Cabinet	Yes		Yes		Yes	
SCS	Yes		Yes		No	
Rack or Cabinet	Yes		Yes		Yes	
SCS	Yes		Yes		No	

Dimensions: 21.7"L x 16.9"W x 8.5"H (550mm x 430mm x 215mm)

Weight: 39lbs. (17.7kg)

Accessory Case: 30lbs. (13.6kg)

Power: 12-14 VDC

Amperage: 5-8 Amperes

Data Reporting Rate: 1 Hertz

Sample Flow: 15 liters/min

System Computer: Windows 10 Embedded

User Interface: Push Button Power, keyboard, and mouse

Data Output:

Data Reported: Real-time DAQ, aligned results, test configuration (vehicle, engine, fuel, DAQs), aggregate test results (bags)

Reporting Formats: Software UI, .txt Files, CAN Broadcasts, PEMSNet

Measured Parameters: Geolocation (GPS), Vehicle Performance/Operation (OBD/ECU, Sensor Array), engine exhaust gaseous constituents, ambient conditions

Additional Parameters: Grams of pollutant per second (g/s), Intake air flow, Exhaust air flow, Fuel consumption (not all inclusive)

Optimal Instrument Conditions:

5°C to 35°C (40°F to 95°F)

0-90% relative humidity (RH), non-condensing

Emission Collection: Condensation bowls, probes, handles, and hoses

Applicable Operational Engines: Axion has been successfully utilized in the operation of lawn equipment, motorcycles, ATVs, passenger vehicles, trucks, construction equipment, marine vessels, semi-trucks, and locomotives operating in real-world driving conditions.

Engine Information Acquisition:

Vehicle Communication Protocols (J1979 OBDII, J1587, J1939, and as requested)

Engine Sensor Array: Manifold Absolute Pressure Transducer, Thermistor, Piezoelectric Tachometer, Optical Tachometer, Inductive Tachometer

Driver's Aid

Optional Modules:

- CAN output
- PM Module:
 - PM10
 - PM2.5
- Particle Number Module
- TDLS NH3 (Ammonia) Module
- Weather Station Module:
 - Temperature
 - Humidity
 - Pressure