



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