

# GMRV Backpack

Inspired by customer feedback, GlobalMRV is proud to introduce the GMRV Backpack, a smart solution for the small ICE industry. The GMRV Backpack was built after years of experiences and lessons learned regarding size reduction.

The result? The most flexible PEMS introduced in decades.

The Backpack goes where no other PEMS, iPEMS, or mini-PEMS has gone before. The Backpack measures mass-flow emissions of CO, CO<sub>2</sub>, NO, HC, and PM/PN in real-time. The Backpack provides accurate and timely information for decision-making.

Due to the Backpack's flexibility, minimal set-up time, and rapid deployment, large volumes of data collection can now be collected in some of the most harsh and isolating conditions. The Backpack is powered by LabVIEW®-based proprietary software, which translates into cutting-edge small ICE testing methodology.

The Backpack reports data in "grams-per-second" and provides all data for calculating "grams-per gallon and kg". Using a well-proven flow calculation method, you'll receive accurate PEMS flow data. The accurate flow of PEMS data reduces the need for extraneous equipment. On-board engine information is captured with proprietary software and an Engine Sensor Array.

**+PM/PN Module:** Particulate Matter (PM) and Particle Number (PN) are measured utilizing laser light scattering techniques. A fully integrated PM and PN module can easily fit into the existing Backpack.

**Dimensions:** 21.25"H x 9"D x 17.25"W (539 mm x 228mm x 438mm)

**Weight:** 15 lbs. (6.7 kg)

**Power:** 12 to 14 VDC

**Amperage:** 5-8 amperes

**Sample Flow (Volume):** 1 to 3.2 liters per minute (IN)

## 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

**Applicable Operational Engines:** GMRV has been successful in collecting the operational data of lawn equipment, motorcycles, ATVs, passenger vehicles, trucks, construction equipment, marine vessels, semi-trucks, and locomotives operating in real-world driving conditions.

**Position Identification:** GPS

**Emission Collection:** Condensation bowl, probes, handles, hoses

**Safety Features:** Quick operator disconnect





**Engine Information Acquisition:** Engine Sensor Array: Data Acquisition Box, Data Acquisition Box Cable, Manifold Absolute Pressure Transducer, Transducer Extension Cable, Thermistor, Piezoelectric Tachometer, Optical Tachometer, Inductive Tachometer

**Optional Modules:** VGA or USB screen projection

**PM/PN Module:** Particle Sensor Linear Laser, 100mW  
Linear laser with large power and homogeneous incident light intensity

**Ambient Sensor Module:** Temperature, humidity, and pressure

Online, phone, and email support are included in the warranty with the purchase of every Backpack PEMS.

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						
	PM and PN		PM		PM	
Operating Principle	Laser Scattering		Laser Scattering		Laser Scattering	
Measurement Range	0~30,000µg/m³ (0~30mg/m³)		0~50,000µg/m³ 0~50mg/m³ Maximum display 1000mg/m³		0 - 250,000µg/m³ (0-2,500mg/m³)	
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/m³ (0.001 mg/m³)		1 µg/m³ (0.001 mg/m³)		1 µg/m³ (0.001 mg/m³)	
Working Condition	-30°C ~ 70°C, 0-95%RH (non-condensing)		-30°C~70°C, 0-95%RH (non-condense)		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	
TPS [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	