

Emsys™

Continuous Emissions Monitoring System

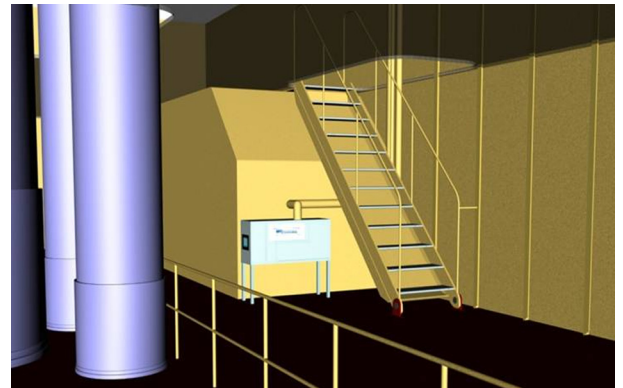


A unique 2nd generation technology combining Particulate Matter (PM) and gas emissions measurement to meet MARPOL Annex VI Maritime Emissions Regulations and proposed Marine EPA PM Regulations.

Description: The Emsys™ Continuous Emissions Monitoring System is a laser-optic, sensor-driven single enclosure device that continuously monitors emissions and provides automated analysis and data recordings from multiple smokestacks and boilers in marine applications. W R Systems, Ltd. (WRSystems), developed the new technology to help the maritime industry comply with MARPOL Annex VI Maritime Emissions Regulations. Emsys™ allows operators of marine-fueled engines to continuously monitor, analyze, and record emissions from all engine exhaust stacks simultaneously. It analyzes and records nitrogen oxide (NO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), and carbon dioxide (CO₂), particulate matter (PM), and other gases such as CO as specified. In addition, Global Positioning System (GPS) interface data and electronic charting tracks actual vessel position to aid in voyage compliance management within Emission Control Area (ECA) zones.

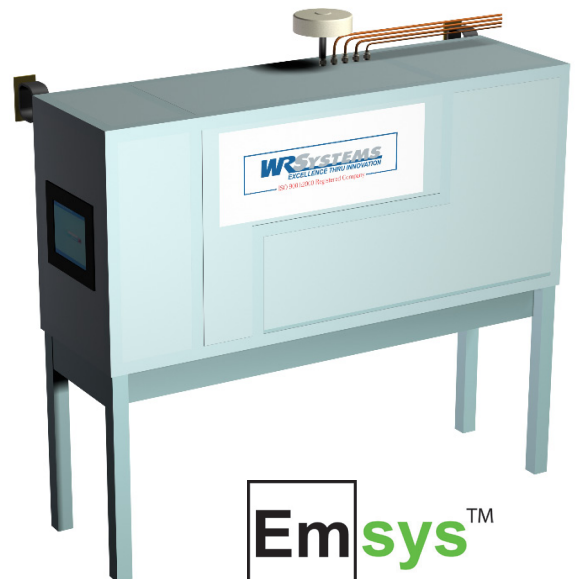
Specifications:

- Self-contained unit in a single rack with Ethernet connectivity to Emsys Server and Status Reporting Units (SRU)
- Approximate Dimensions: Length: 1562mm, Height: 876mm, Depth: 482mm
- Weight: Approx. 181kg
- Provides emissions data for NO, NO₂, SO₂, CO₂, PM, and other gases such as CO available as required
- SRU application can be installed in various locations via Ethernet
- GPS data input for Voyage Compliance Management.
- Custom and standard reporting format capability easily transmitted and/or recorded
- Designed specifically for Maritime Applications



Advantages:

- Single rack unit connects to multiple stacks providing cost-effective solution to demonstrate compliance with MARPOL Annex VI emission requirements
- Highly accurate, laser-optic, sensor-driven system
- Small footprint and collocation in stack area for ease of retrofit
- Provides emissions and geographic position data for voyage compliance management
- Provides both real-time and historical data
- Low life cycle maintenance cost



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Emsys™

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System Measurement Characteristics

Gas Analyzer	Mid IR Source	Quantum Laser
	Measurement Technique	MidIR Absorption Spectroscopy
	Number of Gases	Configurable
	Response Time	Sub 10 seconds
	Zero Drift	< 2.0%
	Span Drift	< 2.0%
	Linearity Error	< 2.0 %
PM Analyzer	Measurement Technique	Double Pass Extinction
	Optical Source	Light Emitting Diode
	Opacity Range	0-100%
	PM Range	0-1000 mg/m3
	Response Time	Less than 10 seconds
	Zero Drift	< 0.5%
	Span Drift	< 0.5%
Linearity Error	< 2.0%	

Standard Gases Measured

	Measurement Range	Lower Detectable Limit	Resolution
Carbon Dioxide (CO ₂)	0-10%	0.10%	0.10%
Nitric Oxide (NO)	0-2000 ppm	20 ppm	0.5 ppm
Nitrogen Dioxide (NO ₂)	0-300 ppm	3 ppm	0.2 ppm
Sulphur Dioxide (SO ₂)	0-1750 ppm	17.5 ppm	0.2 ppm

Power Requirements

Voltage Input	220 VAC/60 Hz
Maximum Power Consumption	2500 W (Base System)

Ambient Operating Conditions

Temperature Range	0° - 55° C (32° - 131° F)
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