

PRODUCT CODE

EIS-EN-01-PAB 04-SCR-00-GAS ABCDF-PM-02-IP 56-HSL 10-HATA-01

# OF ENCLOSURES 1 ENCLOSURE 01 2 ENCLOSURES 02 3 ENCLOSURES 03 4 ENCLOSURES 04 5 HLCU OPTION		MEASURED GASES NO A NO2 B SO2 C CO2 D CO E CH4 F	SAMPLE LINE LENGTH XX METRES	ENCLOSURE RATING ENGINE ROOM IP55 WEATHER DECK IP56	
# OF STACKS 1 STACK 01 2 STACKS 02 3 STACKS 03 4 STACKS 04 16 STACKS 16		SMOKE PARTICULATES NOT REQUIRED 00 OPACITY 01 PM 02			# OF HATA 01 02 03
SCRUBBER VERSION NO SCRUBBER 00 SCRUBBER 01					



Emsys Maritime offers 24/7/365 support to its customers

Our service team specialises in through-life support ensuring your Emsys systems are operational at all times. We offer distance support packages to allow remote diagnosis of issues that often allow the crew to re-instate system operation without the deployment of a technician. We also offer comprehensive extended warranty packages and service level agreements to keep your Emsys in top condition



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Marine Approved Emissions and
Particulate Matter Monitoring Systems



Proven technology for all maritime emissions applications

Designed specifically for the maritime industry, Emsys Maritime used expertise gained from extensive deployment across multiple vessel types and monitoring applications to create the worlds most advanced maritime emissions monitoring system, the Emsys-iS EMS technology has been supplied to the worlds premier shipbuilders, shipowners and scrubber manufacturers. Installations on-board cruise ships, container ships, LNG carriers, tankships, drillships and semi-submersibles are amongst a long list of industry references

Emsys is offered in 2 basic configurations, a low-cost SO₂/CO₂ unit for Exhaust Gas Cleaning System (EGCS-Scrubber) applications and a more advanced unit with a modular capability to add additional gases such as NO_x, CO and CH₄ for various applications such as MARPOL Annex VI (Direct Measurement & Monitoring– DMM) and Mass Emissions and methane slip reporting

Type Approved by ABS / DNV-GL / Korean Register

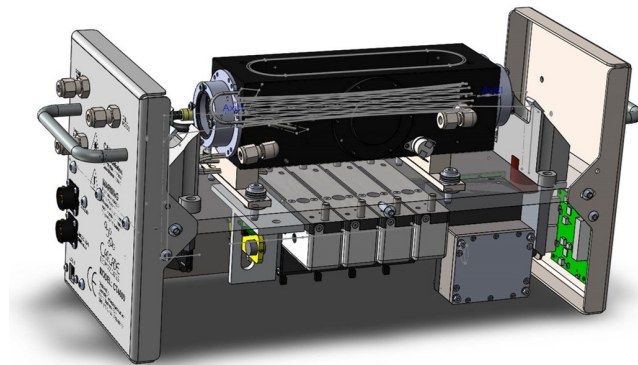
MEPC.259 (68) EGCS applications

MARPOL Annex VI, Regulation 13 Direct Measurement and Monitoring Methane Slip

Mass Emissions Recording (Suitable for EU MRV)

Approved for monitoring all engine types engines (2-Stroke/4-Stroke marine diesels), Boilers, Incinerators and Gas Combustion Units (GCU's)

Emsys has additionally been approved by the US EPA for offshore drilling applications in the US Gulf of Mexico on Drillships and semi-submersibles



Unique QCL sensor can be configured to measure 8 gases

Key Features

IP56 Stainless Steel Enclosure (316L), certified for installations on the weather deck. This is particularly beneficial for scrubber applications where the monitoring point may be close to the top of the stack

The QCL sensor has a rapid measurement response time, allowing a single Emsys enclosure to monitor up to 4 scrubbers within the allowable cycle time in MEPC.259 (68)

High ambient operational temperature (55°C), no need for Emsys to be installed in an Air Conditioned (A/C) space or require an integral A/C unit

Up to 4 measurement points per Emsys-iS Enclosure, and up to 4 enclosures per system (16 points maximum per system). Additionally an expansion module (HLCU) can increase the base version from 4 to 8 measurement points

Typical Applications

EGCS Scrubber Compliance Monitoring

SCR (DeNO_x) applications for IMO Tier III NO_x (NECA)

MARPOL Regulation 13 NO_x Monitoring

Reporting of GHG total Emissions CO₂, CH₄, N₂O

Methane Slip monitoring & reporting

Air Permits for FPSO, FSRU & MODU's

Vessel performance monitoring including maintenance indicators

Multiple Exhaust Gas Mass Flow Measurement Options

Carbon Balance (standard configuration)

Direct Measurement using a Type Approved mass flow sensor

Air/Fuel Method



Emsys-iS HLCU variant installed on an LNG Carrier for methane slip and mass emissions reporting

Configurable sensor - The Quantum Cascade Laser (QCL) sensor can measure just SO₂/CO₂ for scrubber applications (low cost version) or be specified to measure up to 8 gases simultaneously. Gases include NO, NO₂, SO₂, CO₂, CO, CH₄, NH₃ & N₂O

Accurate measurements in scrubbing applications

Emsys can measure accurate down to very low concentrations. For scrubber applications our standard SO₂ range measures down to 3ppm lower detectable limit (LDL). We also offer an enhanced range version that measures down to 1ppm SO₂ LDL for applications where enhanced accuracy is required.

The sensor is drift and cross-interference free, very important in scrubbing applications where the low temperature and high moisture in the gas stream can affect CO₂ readings

Calibration Free Operation

The QCL sensor is calibration-free. Only an annual calibration check and mandatory Class/Flag zero/span checks are required. This means you don't have to purchase large volumes of calibration gas which is expensive and difficult to transport to your vessel

Compact Size

800mm x 600mm x 300mm the standard enclosure weighs less than 60kg.

This is advantageous for retrofit installations where space and access requirements are a critical consideration

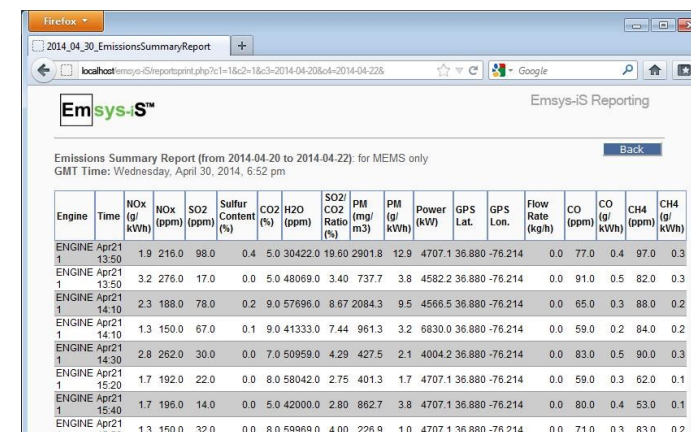
Emsys can measure Particulate Matter (PM) Measurement

Measurement of Opacity, Specific PM and volumetric PM data are available as an option.

Measurements from each stack in mg/m³ and g/kWh available for PM

Low power requirements

Only a single power supply to the enclosure is required and typically total system power is >3kW. Each stack probe and sample line are heated along a



Engine	Time	NOx (g/kWh)	NOx (ppm)	SO ₂ (ppm)	Sulfur Content (%)	CO ₂ (%)	H ₂ O (ppm)	SO ₂ /CO ₂ Ratio (%)	PM (mg/m ³)	PM (g/kWh)	Power (kW)	GPS Lat.	GPS Lon.	Flow Rate (kg/h)	CO (ppm)	CO (g/kWh)	CH ₄ (ppm)	CH ₄ (g/kWh)
ENGINE Apr21 13:50	1	1.9	216.0	98.0	0.4	5.0	30422.0	19.60	2901.8	12.9	4707.1	36.880	-76.214	0.0	77.0	0.4	97.0	0.3
ENGINE Apr21 13:50	1	3.2	276.0	17.0	0.0	5.0	48069.0	3.40	737.7	3.8	4582.2	36.880	-76.214	0.0	91.0	0.5	82.0	0.3
ENGINE Apr21 14:10	1	2.3	188.0	78.0	0.2	9.0	57696.0	8.67	2084.3	9.5	4566.5	36.880	-76.214	0.0	65.0	0.3	88.0	0.2
ENGINE Apr21 14:10	1	1.3	150.0	67.0	0.1	9.0	41333.0	7.44	961.3	3.2	6830.0	36.880	-76.214	0.0	59.0	0.2	84.0	0.2
ENGINE Apr21 14:30	1	2.8	262.0	30.0	0.0	7.0	50959.0	4.29	427.5	2.1	4004.2	36.880	-76.214	0.0	83.0	0.5	90.0	0.3
ENGINE Apr21 15:20	1	1.7	192.0	22.0	0.0	8.0	58042.0	2.75	401.3	1.7	4707.1	36.880	-76.214	0.0	59.0	0.3	62.0	0.1
ENGINE Apr21 15:40	1	1.7	196.0	14.0	0.0	5.0	42000.0	2.80	862.7	3.8	4707.1	36.880	-76.214	0.0	80.0	0.4	53.0	0.1
ENGINE Apr21 15:50	1	1.3	150.0	32.0	0.0	8.0	59969.0	4.00	226.9	1.0	4707.1	36.880	-76.214	0.0	71.0	0.3	83.0	0.2

EmChart Software provides detailed reporting and trending



Our probes are powered from the main enclosure meaning only a single power supply is required

Emsys fully integrates into the vessels automation system or scrubber panel–

Emsys was designed to fully integrate into other shipboard systems using MODBUS. Emsys provides data to the vessels automation and alarm systems and can provide valuable data to vessel performance management software.

Comprehensive data reporting software provides

instantaneous, specific and mass emissions – Emsys features the most comprehensive data suite of all marine CEM's systems. Specific (MARPOL) emissions, instantaneous measurements, mass emissions and PM along with a host of other engine performance data provides the owner with a huge amount of data to ensure compliance whilst providing valuable metric to enable optimisation of vessel performance

Methane Slip—Emsys can monitor methane slip in real-time in ppm, g/kWh and additionally report the total mass output of methane in kg/tons