



TYPE APPROVAL CERTIFICATE
No. MAC100123XP

This is to certify that the product below is found to be in compliance with the applicable requirement of the RINA type approval system.

<i>Description</i>	Multigas Monitoring System
<i>Type</i>	G7200
<i>Applicant</i>	Green Instruments A/S Erhvervsparken 29 DK- 9700 Brønderslev DENMARK
<i>Manufacturer</i>	Green Instruments A/S
<i>Place of manufacture</i>	Erhvervsparken 29 DK- 9700 Brønderslev DENMARK
<i>Reference standards</i>	IACS UR E10 Rev 8 corr.1; MEPC.340(77); NTC2008 Appendix 3; Rules for the Classification of Ships - Part C - Machinery, Systems and fire protection - Ch.3, Sect.6, Tab.1.

Issued in **RINA Poland Plan Approval Centre** on **August 7, 2023**. This Certificate is valid until **August 6, 2028**

RINA Services S.p.A.
Jaroslaw Kondracki

This certificate consists of this page and 1 enclosure



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Product Description:

This system is a continuous gas monitoring system. The modular design of the system makes it possible to monitor different gases according to customer specification. It can monitor the SO₂ and CO₂ concentrations in exhaust gases. It provides an accurate measurement of SO₂ in ppm, CO₂ in percent as well as presents the SO₂/CO₂ ratio. The gas analyzer is based on both non-dispersive infrared (NDIR) principle and non-dispersive Ultraviolet (NDUV) principle. These principles makes it possible to detect a wide range of gasses among others SO₂, CO₂, NO₂, NO, CH₄, CO, HC, N₂O and H₂O. The system includes heated probe(s) and heated hose(s) to maintain the extractive exhaust gas sample at a sufficient temperature to avoid condensed water and loss of SO₂.

Technical Data:

G7200 Multigas Monitoring System	
Type	G7200
Function	Monitoring of CO ₂ , SO ₂ , NO ₂ , NO, CH ₄ , CO, N ₂ O, HC, H ₂ O and other relevant gasses.
Equipment including	Analyzer modules, gas cooler, gas pump (s), condensate pump(s), gas filtration system, flow transmitter, solenoid valves, air filter regulator and oil/particle separator, air dryer, HMI, PLC.
Number of Gas Analyzer Modules	1-3 depending on configuration
Power Supply	230 VAC – 50/60 Hz
Power Consumption	16 A - 40 A dependent on system configuration – refer to the electrical drawings of each system
External Communication	Modbus TCP/IP (RJ45). Optional Modbus RTU
Air supply quality	ISO 8573-1 Class 3 Free from traces of measured gasses.
Sample flow	0.33 – 1.67 l/min. Default 0,5L/min.
Max ambient temperature	Class A From 5°C to 45 °C
Humidity	RH up to 96% at all relevant temperatures
Vibration	Class A
EMC	Class A
Material/Enclosure Class	Painted mild steel RAL 7035 IP54
Dimensions/Weight	1200 x 800 x 300 mm (H x W x D) Approx. 118 kg depending on configuration

Optional Modules	
IoT module	Establish a remote connection link between system and user
Communication Converter Module	Converts bus communication to other standard bus communication protocols
Ethernet Switch	Used to connect optional modules

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Analyzer Modules:

Type G7010	
Gas Analyzer Measuring principle	NDIR
Measuring Gasses and typical Ranges	CO2: 0 – 10 % SO2: 0 – 200 ppm Other ranges upon request
Accuracy/Linearity	≤ ±2 % of reading or ≤ 0.3 % of full scale whichever is larger (except zero)
Precision/Repeatability	≤ ±1 % of full scale above 100 ppm or ≤ ±2 % of full scale below 100 ppm
Noise	≤ ±2 % of full scale
Zero drift	< ±2 % of full scale
Span drift	< ±2 % of full scale
Calibration	Zero Calibration: Automatic using compressed air Span Calibration: Automatic using inbuilt cuvette which hold span gas and also possibility to connect mixed test gases for verification

Type G7210			
Gas Analyzer Measuring Principle	NDIR		
Measuring Gasses and typical Ranges	Gas Component	Full range	Default range
	NO	0 – 5000 ppm	0 – 1000 ppm
	CH4	0 – 100 %	0 – 5000 ppm
	H2O	0 – 5%	0 – 20000 ppm
	CO2	0 – 100 %	0 – 20 %
	CO	0 – 100 %	0 – 5000 ppm
	N2O	0 – 100 %	0 – 2000 ppm
	HC	0 – 100 %	0 – 5000 ppm
	Note: Combination of gasses and ranges are hardware dependent. Each module can be configured for maximum 4 individual gasses. Kindly contact us for specific requirements.		
Accuracy/Linearity	≤ ±2 % of reading or ≤ 0.3 % of full scale whichever is larger (except zero)		
Precision/Repeatability	≤ ±1 % of full scale above 100 ppm or ≤ ±2 % of full scale below 100 ppm		
Noise	≤ ±2 % of full scale		
Zero drift	< ±2 % of full scale		
Span drift	< ±2 % of full scale		
Calibration	Zero Calibration: Automatic using compressed air Span Calibration: Manually by connecting mixed test gases for verification		
Compensations	Fully temperature and pressure compensated		



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Type G7230			
Gas Analyzer Measuring Principle		NDUV + NDIR	
Measuring Gasses and typical Ranges	Gas Component	Full range	Default range
	NO CH4	0 – 5000 ppm	0 – 1000 ppm
	H2O CO2 CO N2O	0 – 100 %	0 – 5000 ppm
	HC SO2 NO2	0 – 5%	0 – 20000 ppm
		0 – 100 %	0 – 20 %
		0 – 100 %	0 – 5000 ppm
		0 – 100 %	0 – 2000 ppm
		0 – 100 %	0 – 5000 ppm
		0 – 10 %	0 – 300 ppm
		0 – 5000 ppm	0 – 100 ppm
Accuracy/Linearity	≤ ±2 % of reading or ≤ 0.3 % of full scale whichever is larger (except zero)		
Precision/Repeatability	≤ ±1 % of full scale above 100 ppm or ≤ ±2 % of full scale below 100 ppm		
Noise	≤ ±2 % of full scale		
Zero drift	< ±2 % of full scale		
Span drift	< ±2 % of full scale		
Calibration	Zero Calibration: Automatic using compressed air Span Calibration: Manually by connecting mixed test gases for verification		
Compensations	Fully temperature and pressure compensated		

Reference Documents:

P&I & Arrangement & Installation Drawings filed under RINA dwg no. PLMC-9312
 Components + Electrical Drawings + IP Rating Assessment + SQAP filed under RINA dwg no. PLMC-9311
 Test Reports + Control Plan + User Manual + ISO 9001 Certificate filed under RINA dwg no. PLMC-9313

Application Fields:

The G7200 Multigas Monitoring System may be used on board ships and other units classed by the RINA for exhaust monitoring as well as other applications where continuous monitoring of gasses is relevant. It can be installed as CEMS on SO2 scrubbers according to MEPC.340(77). The system can also be applied as a generic gas monitor for various gasses. For these applications the mentioned relevant sections of NTC 2008, appendix 3 have been demonstrated.

Acceptance condition:

Correct configuration and set up for each delivery to be tested during commissioning after installation.
 The G7200 Multi Gas Monitoring System shall be installed, maintained and operated in compliance with the User Manual.

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