

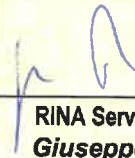


TYPE APPROVAL CERTIFICATE
No. **MAC277419XG**

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>	G7000
<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>	NOx Technical Code 2008 Appendix 3; IMO Resolution MEPC.259(68); RINA Rules for the Classification of Ships Part C, Chapter 1, Section 10.

Issued in **HAMBURG** on **October 24, 2019**. This Certificate is valid until **October 23, 2024**



RINA Services S.p.A.
Giuseppe Russo

This certificate consists of this page and 1 enclosure.



TYPE APPROVAL CERTIFICATE

No. **MAC277419XG**

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G7000

Product Description:

This system is a continuous emission 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.

Technical Data:

The system consists of the following components:

Heated sample probe(s) with heated sample hose(s):

- Up to 5 sample probes each with heated hoses leading to the monitoring cabinet.
- Sample flow: 0.33-1.67 l/min
- Exhaust gas temperature 0-500°C
- Ambient temperature: 5°C to 55°C

Monitoring Cabinet with HMI control panel:

- Enclosure: IP55
- Power Supply: 230V AC 50/60 Hz
- Communication: Modbus TCP/IP

Gas Analyzer:

- Type: ABB Uras 26
- Measurement Principle: NDIR
- Gasses: Measures CO₂ and SO₂. Other gasses available upon request.
- Measuring range: CO₂: 0-10%; freely configurable from 0-20%
SO₂: 0-200 ppm; freely configurable from 0-1000ppm
- Accuracy/Linearity: $\leq \pm 2\%$ of reading, or $\leq \pm 0,3\%$ of full scale whichever is larger
- Precision/Repeatability: $\leq \pm 1\%$ of full scale above 100ppm or $\leq \pm 2\%$ of full scale below 100 ppm
- Noise: $\leq \pm 2\%$ of full scale
- Zero & Span Drift: $\leq \pm 2\%$ of full scale
- Calibration: Zero Calibration: Automatic using compressed air
Span Calibration: Automatic using built in optical reference filters. Possibility for verification with test gasses.

Reference Documents:

P&I + Installation Layout + Component + Electrical Drawings filed under RINA dwg no. HMMC-14803
Test Reports + Installation & Operation Manual filed under RINA dwg no. HMMC-14804

Application Fields:

The G7000 Multigas Monitoring System may be used on board ships and other units classed by the RINA for the continuous monitoring of different gases in exhaust gas ducts according to the requirements of the NO_x Technical Code 2008 Appendix 3 and IMO Res. MEPC. 259(68).

Acceptance condition:

Correct configuration and set up for each delivery to be tested during commissioning after installation. The monitoring cabinet shall be mounted on vibration dampers according to the manufacturer instructions.

HAMBURG October 24, 2019

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