



## Exhaust Gas Analyser

Cost-Effective Emission Control

# L-O-A-S NOX/O2 Analysing System

NanoNord A/S is a technology company based in Aalborg in northern Denmark. NanoNord's mission is applying modern technology to optimize the economic and environmental operation of shipping. The company's present focus is the monitoring and management of fuel oil, lubricants and exhaust emissions. NanoNord's majority shareholder is the J Lauritzen group.

The LOAS Exhaust Gas Analyser is a practical on-funnel instrument system for monitoring NOx concentration in exhaust gas. The system uses a zirconia sensor technology providing a cost effective solution to demonstrate compliance with emissions regulation. It also enables combustion in engines and boilers.

- **Regulatory compliance:** The LOAS Exhaust Gas Analyser enables the management of emissions and demonstrates compliance with environmental regulations.
- **Combustion optimisation:** Monitoring NOx emissions as well as excess oxygen in flue gases can be utilized to adjust fuel supply and airflow to engines optimizing combustion. It can also be utilized to detect faulty engine and boiler operation.
- **Good corporate governance:** International corporate governance standards require that corporations report the environmental impact of their operations. The LOAS Exhaust Gas Analyser enables accurate quantification of emissions for this purpose.

## KEY FEATURES

- Management and validation of compliance with emissions regulations
- Engine combustion optimization
- Simple cost-effective installation on-funnel
- Highly reliable true wet measurement of NOx
- Automatic back-flushing and purging of probe
- Analog outputs and data transmission on CAN-Bus / Ethernet
- Low total cost of ownership

## SOx and CO2 Emissions

When used in combination with the LOAS Oil Analyser, SOx and CO2 emissions can be accurately measured and reported. The LOAS Oil Analyser measures the sulphur content in the fuel as well as the mass of fuel consumed. CO2 emissions can also be calculated based on fuel mass consumption

Analyzer Board of the LOAS NO<sub>x</sub>/O<sub>2</sub> Analysing system



Stack probe of the LOAS NO<sub>x</sub>/O<sub>2</sub> Analysing system





Pearl of Scandinavia

## Easy Technology with ZrO2

The LOAS NOx/O2 Analyzing System was recently developed based on our long experience working with zirconia oxygen sensors and NOx monitoring solutions. We know that marine instruments have to be very robust and simple in order to be operated by a crew that is met by many and diverse challenges each day.

The LOAS NOx/O2 Analyzing System makes use of a new zirconium oxide (ZrO2) sensor with multiple diffusion cells specifically for NOx measurement. This sensor is small and robust and can be installed directly on the stack without special protection. This technology allows real-time measurement of NOx/O2 on wet basis at high temperatures. It avoids sampling lines and sampling systems, coolers and converters with all their disadvantages.

The simple plug'n'play design makes it easy and cost-effective to install, operate, and maintain the analyzing system. A complete system includes an automatic back-flushing ejector probe connected to an analyzing board with analyzer and air supply and calibration gas reduction station.

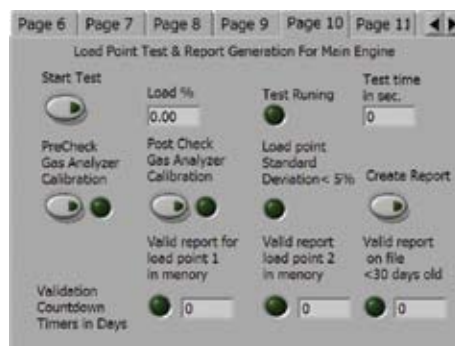
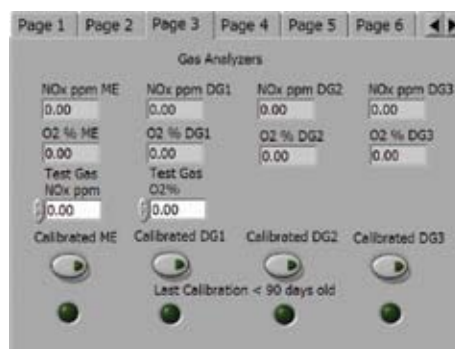
## Easy Reporting

As optional extension to the NOx/O2 Analyzing System, Green Instruments provides you with the Visualization & Reporting Family with the modular system for tailor made solutions. The requirements for emissions reporting and data system integration are different from vessel to vessel. The following main modules are available:

**Recording & Visualization System:** MARPOL Annex VI compliant calculation of NOx emissions in g/kWh

**MARPOL Reporting System:** relevant for approval by flag state and/or class

Screen shots of the LOAS NOx/O2 system



# L-O-A-S NOX/O2 Analysing System

## Specifications

ANALYZER:	
Measurement range	NOx: 0 to 1500 ppm (F.S.) – O2: 0 to 21% (F.S.)
Repeatability	Better than 1.0% of F.S. for both NOx and O2
Accuracy	oBetter than 2.0% of F.S. for both NOx and O2
Response time	90% of F.S. in less than 30 sec.
Power supply	90-230 V AC, 50-60 Hz (47-63 Hz) or 24 V DC – 40 VA max.
Ambient temperature	-15 °C to 55 °C
Display	LCD touch screen
Analog output signal	2 x 4...20 mA range selectable (for NOx and O2) – Load output (max.): 20mA/ 600 Ω/ 24 VDC
System interface	Analog 4...20 mA (optional: CAN Bus, Ethernet)
Relays	4 relays – volt free – max. 260 V AC/ 5A
Analyzer casing	Aluminium casing – IP55
Analyzer board with connections:	
Dimensions / Weight	HxWxD: 600x500x150 (wall mounted) / ca. 10kg (without umbilical cord)
Test gas inlet	max. 2 bar – 1/8" BSP connection
Span NOx Gas	Known concentration of NOx in N2 in the range of 50...1500ppm with 0.0% O2
Air supply reduction regulator	incl. 25µm filter – max. 8 bar – 1/8" BSP connection
Zero NOx Gas – Air supply	Instrument air with 0 ppm NOx and 20.9% O2 – quality according to ISO 8573-1.4.4.4 – consumption up
to 5 l/min	
Ejector Probe:	
Sensor technology	Heated Zirconia type sensor
Sample temperature	0 °C to 500 °C
Probe length / socket	Insert length: app. 250 – 300 mm – for duct diameters 290 – 2800 mm
Calibration air flow	App. 2 l/min
Ejector air flow at 1 bar	App. 2 l/min = Vacuum 80 mm H2O – adjustable if more suction is needed
Dimensions / Weight	HxWxD: 285x180x600 mm / ca. 5kg (without umbilical cord)
Umbilical cord	3.0 m length in 28 mm nylon conduit
Optional Equipment:	
Recording & Visualization System	Test gas bottle case with span NOx gas bottle and regulator
MARPOL Reporting System	Ambient air sensor module
Extended Visualization & Reporting System	GPS module

Specifications subject to changes without notice

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