

# LaserGas™ II Single Path Monitor

- *Data sheet*



The LaserGas II Single Path (SP) monitor from NEO Monitors AS is a compact, high performance gas monitor for true continuous in-situ monitoring. Based on the well-proven tuneable diode laser (TDLAS) technology the instrument has a number of unique features:

- **Response time down to one second**
- **No cross interference from other gases**
- **No gas sampling - in-situ measurement**
- **Very low detection limits (ppb and low ppm)**
- **Wide range of process conditions possible**
- **Suitable for high dust environments**
- **Low cost of ownership**
- **Ethernet connection (optional)**
- **ATEX approved EEx P solution available**

The monitors' very compact design comprises a transmitter and receiver unit, only (no additional control unit required). Both are protection classified to IP66 for outdoor use. Measurement readings are provided through standard 4-20mA current loops, a fibre-optic output or the optional Ethernet interface. The latter enables communication via a local area network or the Internet.

## Measuring principle

Unlike conventional UV or IR spectrographic instruments, LaserGas II monitors employ the measurement principle known as 'single line spectroscopy', which eliminates cross interference from other gases. A single gas absorption line with no interference is chosen in the near IR spectral range and scanned by a single-mode diode laser. A detector located opposite the laser detects the light absorp-

tion caused by the target gas molecules, after which the gas concentration is calculated. Automatic correction for temperature, pressure, and dust load variations is included.

## Installation and Operation

The LaserGas II SP monitor is easy to install and designed to operate in very rough industrial environments. The transmitter and receiver unit are mounted directly onto the duct or stack flanges. For installation in hazardous areas an ATEX approved EEx P solution is available. By-pass and extractive configurations are also possible. The instrument contains no moving parts, thereby limiting preventive maintenance to visual inspection and cleaning of optical windows. Purging with instrument air or nitrogen prevents dust from fouling the optical windows. Calibration checks are recommended every 6 - 12 months, only.

## Main applications

The LaserGas monitors play an important role in continuous emission monitoring and in-situ process control across a wide range of industrial applications. The following are typical applications with many units installed worldwide:

- **Combustion control**
- **deNOx control**
- **Emission monitoring in Aluminium smelters or waste incinerators**
- **Explosion surveillance (safety systems)**
- **Scrubber and filter optimisation**

# Technical Data LaserGas™ II Single Path Monitor

## Table of Gases

Gas	Detection limit		Max temp.	Max pressure
NH <sub>3</sub>	0.15 ppm	0.11 mg/m <sup>3</sup>	500 °C	2 bar abs.
HCl	0.05 ppm	0.08 mg/m <sup>3</sup>	400 °C	2 bar abs.
HF	0.015 ppm	0.013 mg/m <sup>3</sup>	400 °C	2 bar abs.
H <sub>2</sub> S	3 ppm	4.5 mg/m <sup>3</sup>	300 °C	2 bar abs.
O <sub>2</sub>	0.01 %		1500 °C	20 bar abs.
H <sub>2</sub> O	0.03 ppm	0.024 mg/m <sup>3</sup>	1500 °C	2 bar abs.
CO	30 ppm	38 mg/m <sup>3</sup>	1500 °C	2 bar abs.
CO <sub>2</sub>	30ppm	59 mg/m <sup>3</sup>	1500 °C	2 bar abs.
CO (low conc)	0.3 ppm	0.4 mg/m <sup>3</sup>	300 °C	2 bar abs.
CO <sub>2</sub> (low conc)	0.2 ppm	0.4 mg/m <sup>3</sup>	300 °C	2 bar abs.
NO	15 ppm	20 mg/m <sup>3</sup>	300 °C	2 bar abs.
N <sub>2</sub> O	5 ppm	10 mg/m <sup>3</sup>	200 °C	2 bar abs.
HCN	0.3 ppm	0.36 mg/m <sup>3</sup>	300 °C	2 bar abs.
CH <sub>4</sub>	0.2 ppm	0.14 mg/m <sup>3</sup>	300 °C	3 bar abs.
C <sub>2</sub> H <sub>2</sub>	0.1 ppm	0.12 mg/m <sup>3</sup>	200 °C	2 bar abs.
C <sub>3</sub> H <sub>6</sub>	0.01 %		200 °C	3 bar abs.
CH <sub>3</sub> I	3 ppm	9 mg/m <sup>3</sup>	200 °C	2 bar abs.
CH <sub>3</sub> OH	0.05 %		200 °C	2 bar abs.
NH <sub>3</sub> + H <sub>2</sub> O	0.2 ppm	0.15 mg/m <sup>3</sup> / 0.05 % *	500 °C	1.5 bar abs.
HCl + H <sub>2</sub> O	0.1 ppm	0.16 mg/m <sup>3</sup> / 0.05 % *	400 °C	1.5 bar abs.
HF + H <sub>2</sub> O	0.02 ppm	0.018 mg/m <sup>3</sup> / 0.01 % *	400 °C	1.5 bar abs.
CO + CO <sub>2</sub>	0.01 % (both)		300 °C	1.5 bar abs.

Detection limits are specified as two standard deviations for 1 m optical path length and gas temperature / pressure = 25 °C / 1 bar abs. (\* H<sub>2</sub>O specified for 180 °C). The recommended minimum measurement range is the detection limit multiplied by 100. Other gases such as NO<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, HBr, and HI are available on request.

## Instrument data

### Specifications

Optical path length	typically 0.5 – 15 m
Response time	1 – 2 sec
Averaging time	Rolling average from 2 seconds to 24 hours (exp. decay)
Span drift	< 4% of measuring range between maintenance intervals
Zero drift	Negligible (< 2% of measuring range between maintenance intervals)

### Environmental conditions

Operating temperature	-20 °C to +55 °C
Storage temperature	-20 °C to +55 °C
Protection classification	IP66

### Inputs / Outputs

Analogue output (3)	4 – 20 mA current loop
Digital output	RS - 232 format, Optional 10 or 10/100 Base T Ethernet, Optional fibre optic (ASCII - format)
Relay output (3)	High gas-, Warning - and Fault relays (normally closed-circuit relays)
Analogue input	Optional 4 – 20 mA process temperature and pressure reading

### Ratings

Input power supply unit	100 – 240 VAC, 50/60 Hz, 0.36 – 0.26 A
Output power supply unit	24 VDC, 900 – 1000 mA
Input transmitter unit	18 – 36 VDC, max. 20 W
4 – 20 mA output	500 Ohm max. isolated
Relay output	1 A at 30 V DC/AC

### Installation and Operation

Flange dimension	DN50/PN10 (optional DN80 or ANSI)
Alignment tolerances	Flanges parallel within 1,5°
Purging of windows	Dry and oil-free pressurised air or gas, or by fan
Purge flow	20 – 50 l/min (application dependent)

### Maintenance

Interval	Recommended every 6 – 12 months (no consumables needed) Remote instrument check by Ethernet connection or external modem possible
Calibration	Check recommended every 6 – 12 months In-situ with flow through cell or ex-situ with separate calibration cell

### Security

Laser class	Class 1 according to IEC 60825-1
CE	Certified
EMC	Conformant with EMC standards EN 61000-6-2(3) and LVD 73/23/EEC

### Explosion protection (optional)

Area classification	Zone 1
Type of protection	EEx P – purged/pressurized
Explosion group	GD – all gases, vapours, and dusts
Temperature class	T5 – max. 100 °C

### Dimension and weight

Transmitter unit	365 (plus 70 for purge unit) x 270 x 170 mm, 6.2 kg
Transmitter unit (EEx P version)	365 (plus 70 for purge unit) x 270 x 310 mm, 7.9 kg
Receiver unit	355 (plus 70 for purge unit) x 120 x 120 mm, 3.9 kg
Power supply unit	180 x 85 x 70 mm, 1.6 kg