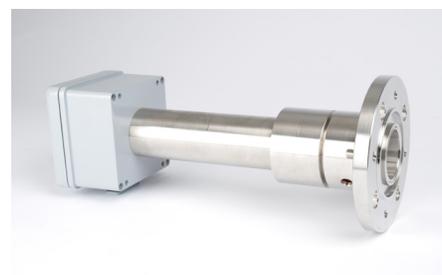
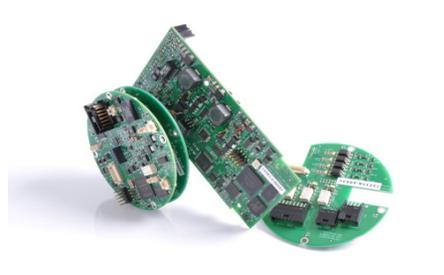
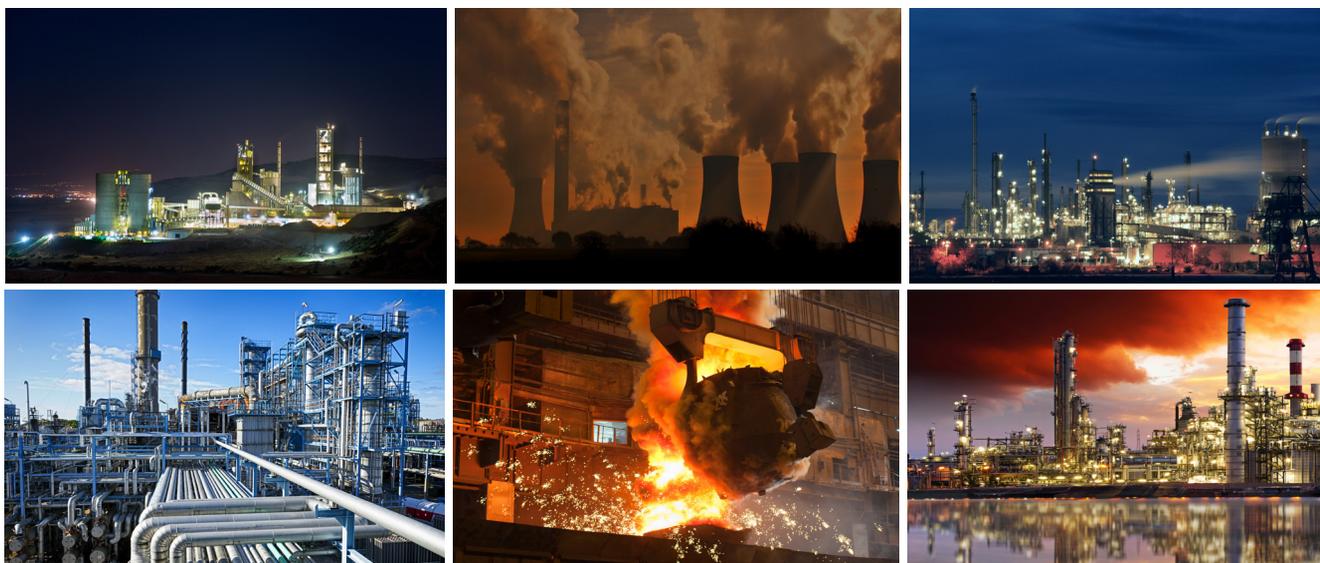


# Data sheets

## LaserGas™ & LaserDust™





NEO Monitors AS was founded in 2003 as a commercial part of Norsk Elektro Optikk AS (NEO).

Today, NEO Monitors is a leading manufacturer and supplier of TLAS gas and dust analyzers, based on over 30 years of high-risk research and development in electro optics and laser technology.

NEO Monitors develops and supplies tailored solutions (LaserGas™ and LaserDust™) for measuring gas and dust in all types of industry worldwide.

The solutions have three main missions:

1. Optimize production processes
2. Control and improve safety
3. Measure emissions

The analyzers can measure over 40 gases and combinations, and are used in numerous types of applications in all types of industries, such as cement, chemical/petro-chemical, oil and gas, power, pulp and paper, environmental, fertilizer and many more, worldwide.

NEO Monitors has more than 40 distributors in all continents. It is the fastest growing European company in this niche, with over 11000 analyzers installed worldwide (2016).

The analyzers accommodate different needs in the industry, from monitoring gas in stacks, pipes, ducts and process chambers to controlling the safety of workers and environmental functions.





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**NEO Monitors LaserGas™ iQ<sup>2</sup>** analyzer is the first to measure up to four gases (O<sub>2</sub>, CO, CH<sub>4</sub>, H<sub>2</sub>O)\*\* and temperature depending on configuration, which eliminates the need for multiple units for combustion analysis. The cutting-edge design and ground-breaking functionality, ensures that the instrument delivers unmatched reliability and durability. By providing an optional single flange solution, installation cost can be significantly reduced. Customers may replace existing analyzers where explosion risks or high maintenance issues are a huge concern.

Features	Applications	Customer benefits
<ul style="list-style-type: none"> <li>• No interference from background gases</li> <li>• Factory calibrated</li> <li>• No zero drift</li> <li>• Transceiver configuration</li> <li>• Multiple configurations</li> <li>• Designed for 3 configurations – cross stack, one-flange with probe and open path</li> <li>• Automatic gain</li> <li>• In-situ measurement</li> <li>• Integrated span check option (Application dependent)</li> </ul>	<ul style="list-style-type: none"> <li>• Combustion analysis</li> <li>• FCC units</li> <li>• Package boilers</li> <li>• Process heaters</li> <li>• Electrostatic precipitators</li> <li>• VCM waste gas recovery</li> <li>• Reformer gas</li> <li>• Incineration</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 5 measuring components O<sub>2</sub>, CO, CH<sub>4</sub>, H<sub>2</sub>O and temperature</li> <li>• Can handle a typical combustion process up to 2372 °F/1300°C</li> <li>• Reduced installation cost</li> <li>• Low maintenance cost</li> <li>• Easy to install transceiver, one unit ensures easy alignment</li> <li>• Double path length increases absorption signal for low concentration</li> <li>• Transceiver can be mounted on coldest side of stack in extreme hot environments</li> <li>• Well proven technology</li> <li>• The design has flexibility to measure new/ other gases and combinations of them</li> </ul>

# LaserGas™ iQ<sup>2</sup>

## Technical Data

<p><b>Specifications</b></p> <p>Max. process gas temperature: 1300 °C</p> <p>Max. process gas pressure: 1.5 bar</p> <p>Optical path length: max 20m</p> <p>Response time: 5 seconds</p> <p><b>Environmental conditions</b></p> <p>Operating temperatures: -40 °C - +55 °C</p> <p>Storage temperature: -40 °C to +70 °C</p> <p>Protection classification: IP66 NEMA 4X <b>(PENDING)</b></p> <p><b>Input/output</b></p> <p>Analog output: 4 - 20 mA current loop</p> <p>Digital output: Ethernet (TCP/IP)</p> <p>Relay output (4): High gas, warning and fault (normally closed)</p> <p>Analog input (2): 4 - 20 mA Process temperature and pressure reading</p>	<p><b>Ratings</b></p> <p>Power supply: 24 VDC (18 - 30 VDC)</p> <p>Power consumptions: max 30W</p> <p>4 - 20 mA: 500 Ohm max isolated</p> <p>Relay output: 1 A at 30 V DC/AC</p> <p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1, eye safe</p> <p>CE: Certified</p> <p>EMC: Conformant with directive 2014/30/EU</p> <p><b>Approvals</b></p> <p>IECEX/ATEX zone 1: II 2 G Ex pxb [op is] IIC T6 Gb II 2 D Ex pxb [op is] IIIC T85 °C Db</p> <p>CSA: Class I Div. 2, <b>(PENDING)</b></p> <p>ATEX rating connection box: II 2 GD Ex e IIC T5 Gb -40°C ≤Ta≤65°C</p>	<p><b>Installation and operation</b></p> <p>Flange dimension: DN 80/PN 10-40 (Center Ø 3") or ANSI 3" #150 (#300) (Center Ø 3") ANSI 4" #300</p> <p>Instrument purge: Application dependent N<sub>2</sub> or air</p> <p>Probe purge (Optional): Nitrogen</p> <p>Calibration: Every 12 months</p> <p><b>Dimensions / weight</b></p> <p>Transceiver: 461 x 399 x 174 15 kg</p>
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LaserGas™iQ<sup>2</sup> X-stack O<sub>2</sub> + CO ppm Standard (below 500 °C)

	Min	Max	LDL/precision
CO	0-100ppm	0-10000ppm*m	1 ppm
O <sub>2</sub> (N <sub>2</sub> purge)	0-2%	0-25%	0.02%
O <sub>2</sub> (Air purge)	-	0-25%	0.2%
Process path length	0.5m	20m	
Process temperature	-40 °C	500 °C	
Process pressure	0.7 BarA	1.5 BarA	
CH <sub>4</sub> add-on	0-1%*meter	0-5%*meter	0.01%
Temperature add-on (N <sub>2</sub> purge)	-40 °C	500 °C	15 °C

\*NEO Monitors reserve the right to change specifications without prior notice

\*\* Some configurations may not be available in certain countries.

Contact NEO Monitors AS for more information.

LaserGas™iQ<sup>2</sup> X-stack O<sub>2</sub> + CO ppm High temperature (above 500 °C)

	Min	Max	LDL/precision
CO Range	0-200ppm	0-20000ppm*m	3 ppm
O <sub>2</sub> (N <sub>2</sub> purge)	0-5%	0-25%	0.05%
O <sub>2</sub> (Air purge)	-	0-25%	0.2%
Process path length	0.5m	20m	
Process temperature	500 °C	1300 °C	
Process pressure	0.7 BarA	1.5 BarA	
CH <sub>4</sub> add-on	0-5%*meter	0-10%*meter	0.05%
H <sub>2</sub> O add-on	-	0-40%	2%
Temperature add-on	500 °C	1300 °C	30 °C
Temperature add-on (N <sub>2</sub> purge)	-40 °C	1300 °C	20 °C

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**NEO Monitors LaserGas™ Q NO** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e a non-contact optical measurement method employing solid-state laser sources. The sensor remains unaffected by contaminants corrosives and does not require regular maintenance. The absence of extractive conditioning systems further improves availability of the measurements and eliminates errors related to sample handling. The monitor is mounted directly onto flanges, which include purge gas connections and a tilting mechanism for easy alignment. Continuous purge flow prevents dust and other contamination from settling on the optical windows. Once power and data lines are connected, measurements are performed in real-time.

## Features

- Fast response time
- No gas sampling: In-situ measurement
- No interference from background gases
- Line measurement, integral concentration over the full stack diameter
- Suitable for harsh environment
- No zero drift
- Stable calibration

## Applications

LaserGas™ Q NO is designed for reliable and fast measurement of nitric oxide in continuous emission monitoring and process control.

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement technique

# LaserGas™ QNO

## Technical Data

<p><b>Specifications</b></p> <p>Optical path length: Typically 0.5 - 6 m Response time: Typically 10 - 20 sec (faster response time on request)</p> <p>Accuracy: Application dependent Repeatability: 1% of range (gas &amp; application specific)</p> <p>Range NO: 0 - 1000 ppm*m Detection limit: 1 ppm Temperature: Ambient to 450 °C Pressure: Max 1.5 bar abs Windows material: CaF<sub>2</sub></p>	<p><b>Ratings</b></p> <p>Input power supply unit: 100 – 240 VAC, 50/60 Hz Output power supply unit: 24 VDC, 900 – 1000 mA</p> <p>Input transmitter unit: 18 – 36 VDC, max. 20W 4 – 20 mA output: 500 Ohm max. isolated Relay output: 1 A at 30 V DC/AC</p> <p><b>Installation and Operation</b></p> <p>Flange dimension alignment: DN50/PN10 or ANSI 2"/150lbs (other dimensions on request)</p> <p>Alignment tolerances: Flanges parallel within 1.5°</p> <p>Purge flow: Dry and oil-free pressurised air or nitrogen 10 - 50 l/min (application dependent)</p> <p>Purging of laser: Clean dry air, ≈ 15 l/min <b>(Mandatory)</b></p> <p>Purging of windows: Dry and oil-free pressurized air or gas, or by fan</p> <p><b>Maintenance</b></p> <p>Visual inspection: Recommended every 6 – 12 months Calibration: Check recommended every 12 months Validation: In-situ span check with optional internal cell (application dependent)</p>	<p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1 CE: Certified EMC: Conformant with directive 2014/30/EU</p> <p>ATEX: PENDING CSA: PENDING</p> <p><b>Dimension and weight</b></p> <p>Transmitter unit: 340 x 270 x 170 mm, 6.9 kg Receiver unit: 260 x 270 x 170 mm, 5.5 kg Power supply unit: 180 x 85 x 70 mm, 1.6 kg</p>
<p><b>Environmental conditions</b></p> <p>Operating temperature: -20 °C to +55 °C Storage temperature: -20 °C to +55 °C Protection classification: IP66</p>		
<p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 - 20 mA current loop (concentration, transmission)</p> <p>Digital output: RS - 232 format, Optional 10 or 10/100 Base T Ethernet, Optional fiber optic (ASCII - format)</p> <p>Relay output (3): High gas-, Maintenance-, Warning - and Fault relays (normally closed-circuit relays)</p> <p>Analog input (2): 4 - 20 mA process temperature and pressure reading</p>		

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# LaserGas™ Q NO<sub>2</sub>



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**NEO Monitors LaserGas™ Q NO<sub>2</sub>** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e a non-contact optical measurement method employing solid-state laser sources. The sensor remains unaffected by contaminants corrosives and does not require regular maintenance. The absence of extractive conditioning systems further improves availability of the measurements and eliminates errors related to sample handling. The monitor is mounted directly onto flanges, which include purge gas connections and a tilting mechanism for easy alignment. Continuous purge flow prevents dust and other contamination from settling on the optical windows. Once power and data lines are connected, measurements are performed in real-time.

## Features

- Response time down to 1 second
- No gas sampling: In-situ measurement
- No interference from background gases
- Line measurement, integral concentration over the full stack diameter
- Integrated span check option available
- Suitable for harsh environment
- No zero drift
- Stable calibration

## Applications

LaserGas™ Q NO<sub>2</sub> is designed for reliable and fast measurement of nitrogen dioxide, combustion process control, DeNO<sub>x</sub> and safety and emission monitoring applications.

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement technique

# LaserGas™ QNO<sub>2</sub>

## Technical Data

<p><b>Specifications</b></p> <p>Optical path length: Typically 0.5-6 m Response time: 1 – 2 sec Accuracy: Application dependent Repeatability: 1% of range (gas &amp; application specific)</p> <p>Min range NO<sub>2</sub>: 0 - 50 ppm Max range NO<sub>2</sub>: 0 - 1000 ppm*m Detection limit: &lt; 1ppm Temperature: Ambient to 450 °C Pressure: 0.7 - 1.5 bar abs Windows material: CaF<sub>2</sub></p> <p><b>Environmental conditions</b></p> <p>Operating temperature: -20 °C to +55 °C</p> <p>Storage temperature: -20 °C to +55 °C Protection classification: IP66</p> <p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 - 20 mA current loop (concentration, transmission) Digital output: TCP/IP, MODBUS Relay output (3): High gas, Maintenance Warning and Fault Analog input (2): 4 – 20 mA process temperature and pressure reading</p>	<p><b>Ratings</b></p> <p>Input power supply unit: 100 – 240 VAC, 50/60 Hz Output power supply unit: 24 VDC, 900 – 1000 mA</p> <p>Input transmitter unit: 18 – 36 VDC, max. 20W 4 – 20 mA output: 500 Ohm max. isolated Relay output: 1 A at 30 V DC/AC</p> <p><b>Installation and Operation</b></p> <p>Flange dimension alignment: DN50/PN10 or ANSI 2"/150lbs (other dimensions on request) Alignment tolerances: Flanges parallel within 1.5° Purge flow: Dry and oil-free pressurised air or nitrogen 10 - 50 l/min (application dependent)</p> <p><b>Maintenance</b></p> <p>Visual inspection: Recommended every 6 – 12 months Calibration: Check recommended every 12 months Validation: In-situ span check with optional internal cell (application dependent)</p>	<p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1 CE: Certified EMC: Conformant with directive 2014/30/EU</p> <p>ATEX: PENDING CSA: PENDING</p> <p><b>Dimension and weight</b></p> <p>Transmitter unit: 420 x 270 x 170 mm, 6.6 kg Receiver unit: 265 x 270 x 170 mm, 5.7 kg Power supply unit: 180 x 85 x 70 mm, 1.6 kg</p>
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# LaserGas™ Q SO<sub>2</sub>



**NEO Monitors LaserGas™ Q SO<sub>2</sub>** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e a non-contact optical measurement method employing solid-state laser sources. The sensor remains unaffected by contaminants corrosives and does not require regular maintenance. The absence of extractive conditioning systems further improves availability of the measurements and eliminates errors related to sample handling. The monitor is mounted directly onto flanges, which include purge gas connections and a tilting mechanism for easy alignment. Continuous purge flow prevents dust and other contamination from settling on the optical windows. Once power and data lines are connected, measurements are performed in real-time.

## Features

- Response time down to 1 second
- No gas sampling: In-situ measurement
- No interference from background gases
- Line measurement, integral concentration over the full stack diameter
- Integrated span check option available
- Suitable for harsh environment
- No zero drift
- Stable calibration

## Applications

LaserGas™ Q SO<sub>2</sub> is designed for reliable and fast measurement of sulfur dioxide in all kinds of emission control applications

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement technique

# LaserGas™ QSO<sub>2</sub>

## Technical Data

<p><b>Specifications</b></p> <p>Optical path length: Typically 0.5-6 m Response time: 1 – 2 sec Accuracy: Application dependent Repeatability: 1% of range (gas &amp; application specific)</p> <p>Range SO<sub>2</sub>: 0 - 10000 ppm*m Detection limit: 3 ppm Temperature: Ambient to 400 °C Pressure: 0.7 - 1.3 bar abs Windows material: CaF<sub>2</sub></p> <p><b>Environmental conditions</b></p> <p>Operating temperature: -20 °C to +55 °C</p> <p>Storage temperature: -20 °C to +55 °C Protection classification: IP66</p> <p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 - 20 mA current loop (concentration, transmission) TCP/IP, MODBUS Relay output (3): High gas, Maintenance Warning and Fault Analog input (2): 4 – 20 mA process temperature and pressure reading</p>	<p><b>Ratings</b></p> <p>Input power supply unit: 100 – 240 VAC, 50/60 Hz Output power supply unit: 24 VDC, 900 – 1000 mA</p> <p>Input transmitter unit: 18 – 36 VDC, max. 20W 4 – 20 mA output: 500 Ohm max. isolated Relay output: 1 A at 30 V DC/AC</p> <p><b>Installation and Operation</b></p> <p>Flange dimension alignment: DN50/PN10 or ANSI 2"/150lbs (other dimensions on request)</p> <p>Alignment tolerances: Flanges parallel within 1.5°</p> <p>Purge flow: Dry and oil-free pressurised air or nitrogen 10 - 50 l/min (application dependent)</p> <p><b>Maintenance</b></p> <p>Visual inspection: Recommended every 6 – 12 months Calibration: Check recommended every 12 months Validation: In-situ span check with optional internal cell (application dependent)</p>	<p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1 CE: Certified EMC: Conformant with directive 2014/30/EU</p> <p>ATEX: PENDING CSA: PENDING</p> <p><b>Dimension and weight</b></p> <p>Transmitter unit: 420 x 270 x 170 mm, 6.6 kg Receiver unit: 265 x 270 x 170 mm, 5.7 kg Power supply unit: 180 x 85 x 70 mm, 1.6 kg</p>
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# LaserGas™ Q SO<sub>2</sub> (QCL edition)



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**NEO Monitors LaserGas™ Q SO<sub>2</sub> (QCL edition)** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e a non-contact optical measurement method employing solid-state laser sources. The sensor remains unaffected by contaminants corrosives and does not require regular maintenance. The absence of extractive conditioning systems further improves availability of the measurements and eliminates errors related to sample handling. The monitor is mounted directly onto flanges, which include purge gas connections and a tilting mechanism for easy alignment. Continuous purge flow prevents dust and other contamination from settling on the optical windows. Once power and data lines are connected, measurements are performed in real-time.

## Features

- Fast response time
- No gas sampling: In-situ measurement
- Limited interference from background gases
- Line measurement, integral concentration over the full stack diameter
- Suitable for harsh environment
- No zero drift
- Stable calibration

## Applications

LaserGas™ Q SO<sub>2</sub> (QCL edition) is designed for reliable and fast measurement of sulphur dioxide in continuous emission monitoring and process control.

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement technique

# LaserGas™ Q SO2 (QCL edition)

## Technical Data

<b>Specifications</b> Optical path length: Typically 0.5 - 6 m Response time: Typically 10 - 20 sec (other response time request) on Accuracy: Application dependent Repeatability: 1% of range (gas & application specific)  Range SO <sub>2</sub> : 0 - 2000 ppm (other ranges on request)  Detection limit: 1 ppm Temperature: 200 °C - 400 °C (other temperatures on request)  Pressure: 0.7 - 1.5 bar abs Windows material: CaF <sub>2</sub>  <b>Environmental conditions</b> Operating temperature: -20 °C to +55 °C  Storage temperature: -20 °C to +55 °C Protection classification: IP66  <b>Inputs / Outputs</b> Analog output (3): 4 - 20 mA current loop (concentration, transmission)  Digital output: RS - 232 format, Optional 10 or 10/100 Base T Ethernet, Optional fiber optic (ASCII - format)  Relay output (3): High gas-, Maintenance-, Warning - and Fault relays (normally closed-circuit relays)  Analog input (2): 4 - 20 mA process temperature and pressure reading	<b>Ratings</b> Input power supply unit: 100 - 240 VAC, 50/60 Hz  Output power supply unit: 24 VDC, 900 - 1000 mA  Input transmitter unit: 18 - 36 VDC, max. 20W 4 - 20 mA output: 500 Ohm max. isolated Relay output: 1 A at 30 V DC/AC  <b>Installation and Operation</b> Flange dimension alignment: DN50/PN10 or ANSI 2"/150lbs (other dimensions on request)  Alignment tolerances: Flanges parallel within 1.5°  Purge flow: Dry and oil-free pressurized air or nitrogen 10 - 50 l/min (application dependent)  Purging of laser: Clean dry air, ≈ 15 l/min <b>(Mandatory)</b>  Purging of windows: Dry and oil-free pressurized air or gas, or by fan  <b>Maintenance</b> Visual inspection: Recommended every 6 - 12 months  Calibration: Check recommended every 12 months	<b>Safety</b> Laser class: Class 1 according to IEC 60825-1  CE: Certified EMC: Conformant with directive 2014/30/EU  ATEX: PENDING  CSA: PENDING  <b>Dimension and weight</b> Transmitter unit: 340 x 270 x 170 mm, 6.9 kg Receiver unit: 260 x 270 x 170 mm, 5.5 kg Power supply unit: 180 x 85 x 70 mm, 1.6 kg
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# LaserGas™ Q CF<sub>4</sub>



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**NEO Monitors LaserGas™ Q CF<sub>4</sub>** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e a non-contact optical measurement method employing solid-state laser sources. The sensor remains unaffected by contaminants corrosives and does not require regular maintenance. The absence of extractive conditioning systems further improves availability of the measurements and eliminates errors related to sample handling. The monitor is mounted directly onto flanges, which include purge gas connections and a tilting mechanism for easy alignment. Continuous purge flow prevents dust and other contamination from settling on the optical windows. Once power and data lines are connected, measurements are performed in real-time.

## Features

- Fast response time
- No gas sampling: In-situ measurement
- Line measurement, integral concentration over the full stack diameter
- Suitable for harsh environment
- No zero drift
- Stable calibration

## Applications

LaserGas™ Q CF<sub>4</sub> is designed for reliable and fast measurement of tetrafluoromethane in continuous emission monitoring especially in the aluminum industry.

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement technique

# LaserGas™ QCF<sub>4</sub>

## Technical Data

<p><b>Specifications</b></p> <p>Optical path length: Typically 0.5 -6 m            Response time: Typically 10 - 20 sec            Accuracy: Application dependent            Repeatability: 1% of range (gas &amp; application specific)</p> <p>Range CF<sub>4</sub> (preliminary): 0 - 4000 ppb*m            Detection limit: &lt; 20 ppb            Temperature: Ambient to 200 °C            Pressure: Max 1.5 bar abs            Windows material: CaF<sub>2</sub></p>	<p><b>Ratings</b></p> <p>Input power supply unit: 100 – 240 VAC, 50/60 Hz            Output power supply unit: 24 VDC, 900 – 1000 mA</p> <p>Input transmitter unit: 18 – 36 VDC, max. 20W            4 – 20 mA output: 500 Ohm max. isolated            Relay output: 1 A at 30 V DC/AC</p>	<p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1            CE: Certified, conformant with LVD 73/23/EEC, including 93/68/EEC            EMC: Conformant with directive 2014/30/EU            ATEX: PENDING            CSA: PENDING</p>
<p><b>Environmental conditions</b></p> <p>Operating temperature: -20 °C to +55 °C</p> <p>Storage temperature: -20 °C to +55 °C            Protection classification: IP66</p>	<p><b>Installation and Operation</b></p> <p>Flange dimension alignment: DN50/PN10 or ANSI 2"/150lbs (other dimensions on request)</p> <p>Alignment tolerances: Flanges parallel within 1.5°</p> <p>Purge flow: Dry and oil-free pressurized air or nitrogen 10 - 50 l/min (application dependent)</p> <p>Purging of laser: Clean dry air, ≈ 15 l/min <b>(Mandatory)</b></p> <p>Purging of windows: Dry and oil-free pressurized air or gas, or by fan</p>	<p><b>Dimension and weight</b></p> <p>Transmitter unit: 340 x 270 x 170 mm, 6.9 kg            Receiver unit: 260 x 270 x 170 mm, 5.5 kg            Power supply unit: 180 x 85 x 70 mm, 1.6 kg</p>
<p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 - 20 mA current loop (concentration, transmission)</p> <p>Digital output: RS - 232 format, Optional 10 or 10/100 Base T Ethernet, Optional fiber optic (ASCII - format)</p> <p>Relay output (3): High gas-, Maintenance-, Warning - and Fault relays (normally closed-circuit relays)</p> <p>Analog input (2): 4 - 20 mA process temperature and pressure reading</p>	<p><b>Maintenance</b></p> <p>Visual inspection: Recommended every 6 - 12 months            Calibration: Check recommended every 12 months</p>	

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# LaserGas™ III SP Oxygen Analyzer



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**NEO Monitors LaserGas™ III SP** oxygen analyzer (3<sup>rd</sup> generation) is specifically designed for service in hazardous areas. The analyzer consists of transmitter and receiver unit that are mounted diametrically opposite each other on stack, ducts or reactors. The laser will cross the process gas and concentration changes are detected in-situ and in real time. LaserGas™ III sets a new standard for fast and reliable Tunable Laser Absorption Spectroscopy analysis (TLAS). The laser scans the absorption line in milliseconds.

## Features

- 3. Gen compact LaserGas™ electronics
- For ATEX Ex-d and Class I Division 1 areas
- Fast response time
- Low power < 10 Watt
- Suitable for SIL2 applications
- No interference from other gases
- Stable calibration, no zero drift
- No gas sampling: In-situ measurement
- Safety application
- Zero gas application
- No consumables

## Applications

- Safety application
- Chemical industry (inertisation control of reactors, Vinyl Chloride or PVC, Acryl Acid, Solvent acid, carbon black etc
- Petrochemical industry: FCC units, tail gas treatment, flare gas monitoring, vent headers of incinerators, process heaters etc.
- Steel industry: Coke oven gas, converter coal gas, reheating furnaces
- and more

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement technique
- Less fuel consumptions
- Reduced downtime
- Suitable for SIL2

# LaserGas™ III SP Oxygen Analyzer

## Technical Data

<p><b>Specifications</b></p> <p>Detection limit (O<sub>2</sub>): 100 ppm **</p> <p>Max. process gas temperature: 1500 °C</p> <p>Max. process gas pressure: 8 bar abs</p> <p>Optical path length: Typically 0,5 - 20 m</p> <p>Repeatability: Application dependent 1% of range (gas &amp; application specific)</p>	<p>Flange dimension: DN50/PN10 or ANSI 2"/150 lbs (other dimensions on request)</p> <p>Alignment tolerances: Flanges parallel within 1.5°</p> <p>Purging of windows: Dry and oil-free pressurised air or gas, or by fan</p> <p>Purge flow: 10-50 l/min (application dependent)</p> <p>Calibration: Check recommended every 12 months</p>	<p><b>Dimension and weight</b></p> <p>Transmitter and receiver unit (TU/RU): 215 mm (length, add 50 mm for purge unit) x 125 mm (diameter), 3,5 kg each</p> <p>Window unit (optional): Wu 60 (length) Wu 100 (length)</p> <p>TU/RU connection box: 260 x 160 x 90 mm, 2,5kg</p>
<p><b>Environmental conditions</b></p> <p>Operating temperature: -40 °C to +65 °C</p> <p>Storage temperature: -40 °C to +70 °C</p> <p>Protection classification: IP65</p>	<p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1, eye safe</p> <p>CE: Certified</p> <p>EMC: Conformant with directive 2014/30/EU</p>	<p>**NOTE: Detection limits are specified as the 95% confidence interval for 1 m optical path and gas temperature / pressure = 25°C / 1 bar abs. Measured in N<sub>2</sub>.</p>
<p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 - 20 mA current loop (concentration and transmission)</p> <p>Digital output: 10/100 Base T Ethernet (Modbus TCP)</p> <p>Relay output (2): High gas, warning and fault (normally closed)</p> <p>Analog input: 4 - 20 mA process temperature and pressure reading</p>	<p><b>Approvals</b></p> <p>ATEX zone 1: II 2 G Ex d [op is] IIC T4 Gb (TU/RU) II 2 D Ex tb IIIC T78°C Db II 2 D Ex tb IIIC T88°C Db (Lasergas III Ext)</p> <p>CSA: Class I Div. 1, Groups B, C and D</p>	
<p><b>Ratings</b></p> <p>Power supply: 24VDC range 18-32 VDC</p> <p>Power consumption: Max. 10 W</p> <p>4 - 20 mA output: 500 Ohm max. load impedance, not isolated</p> <p>Relay output: 1 A at 30 V DC/AC</p>	<p>ATEX rating connection box: II 2 GD Ex e IIC T5 Gb -40°C ≤ TA ≤ 65°C</p> <p>Functional safety: Designed according to SIL 2; IEC 61508</p>	
<p><b>Installation and Operation</b></p>		

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# LaserGas™ III SP CO Combustion



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**NEO Monitors LaserGas™ III SP CO analyzer** (3<sup>rd</sup> generation) is specially designed for operation in hazardous areas and it provides real time in-situ CO measurements for virtually any type of combustion control. The configuration is transmitter/receiver units for cross-stack installation. An external junction box simplifies installation and maintenance. The operation principal is based on the well proven Tunable Laser Absorption Spectroscopy (TLAS) implemented using a fast scanning absorption technique with fully digital signal processing. Years of experience allowed us to carefully design this highly compact CO analyzer which offers exceptional performance in harsh environments, is truly robust and provides immediate benefits in terms of operational ease and low cost of ownership.

## Features

- In-situ real time measurements
- Fast response time
- Compact design
- Low power consumption (< 10W)
- Suitable for SIL2 applications
- TLAS technology
- Low detection limit
- No interference from other gases
- Not affected by high dust load
- Lifetime calibration, no zero drift
- Integrated span check
- Optional components: CH4, H2O, Temperature
- Ethernet connectivity

## Applications

- Combustion control
- Boilers
- To:
- Refineries
- Powerplants
- Chemical industries
- Petrochemical industries
- Steel industries
- and more

## Customer benefits

- Reliable in-situ CO measurements in real time
- Process optimization
- Reduce fuel consumption
- Minimize emission
- Simple installation, ease of use
- Low maintenance cost
- No consumables
- No sampling systems
- Compressed air purge (no need for Nitrogen)
- No regular calibrations needed
- Automatic span check available

# LaserGas™ III SP CO Combustion

## Technical Data

<p><b>Specifications</b></p> <p>Detection limit (CO): 0.5 ppm**</p> <p>Max process gas temperature: 1300 °C</p> <p>Max process gas pressure: 1.5 bar abs</p> <p>Optical path length: Typically 0.5 - 20m</p> <p>Repeatability: +/- 0.5 ppm or +/-1% relative, whichever is greater (application dependent)</p> <p>Linearity: &lt; 1% of range</p> <p>Response time: ≤ 5 sec</p> <p><b>Environmental conditions</b></p> <p>Operating temperature: -40 °C to +65 °C</p> <p>Storage temperature: -40 °C to +70 °C</p> <p>Protection classification: IP65</p> <p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 - 20 mA current loop (concentration CO, transmission, concentration CH4)</p> <p>Digital output: 10/100 Base T Ethernet (Modbus TCP)</p> <p>Relay output (2): High gas, warning and fault (normally closed)</p> <p>Analog input: 4 - 20 mA process temperature and pressure reading</p>	<p><b>Ratings</b></p> <p>Power supply: 24VDC range 18-32 VDC</p> <p>Power consumption: Max. 10 W</p> <p>4 - 20 mA output: 500 Ohm max. load impedance, not isolated</p> <p>Relay output: 1 A at 30 V DC/AC</p> <p><b>Installation and Operation</b></p> <p>Flange dimension: DN50/PN10 or ANSI 2"/150 lbs (other dimensions on request)</p> <p>Alignment tolerances: Flanges parallel within 1.5°</p> <p>Purging of windows: Dry and oil-free pressurised air or gas, or by fan</p> <p>Purge flow: 10-50 l/min (application dependent)</p> <p>Calibration: Check recommended every 12 months</p> <p><b>Safety</b></p> <p>Laser class: Class 1 M according to IEC 60825-1, eye safe Certified</p> <p>CE:</p> <p>EMC: Conformant with directive 2004/108/EC</p>	<p><b>Approvals</b></p> <p>ATEX zone 1: II 2 G Ex d [op is] IIC T4 Gb (TU/RU) II 2 D Ex tb IIIC T78°C Db II 2 D Ex tb IIIC T88°C Db (Lasergas III Ext)</p> <p>CSA: Pending</p> <p>ATEX rating connection box: II 2 GD Ex e IIC T5 Gb -40°C ≤TA≤65°C</p> <p>Functional safety: Designed according to SIL 2; IEC 61508</p> <p><b>Dimension and weight</b></p> <p>Transmitter and receiver unit (TU/RU): 215 mm (length, add 50 mm for purge unit) x 125 mm (diameter), 3,5 kg each</p> <p>TU/RU connection box: 260 x 160 x 90 mm, 2,5kg</p> <p>**NOTE: Detection limits are specified as the 95% confidence interval for 1 m optical path and gas temperature / pressure = 25°C / 1 bar abs. Measured in N<sub>2</sub>.</p> <p><b>Special process conditions on request</b></p>
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### Process temperature below 500°C

	Min	Max	LDL/precision
CO	0-50 ppm	0-10000ppm*m	0.5 ppm**
CH4 add-on	0-1% * m	0-10% * m	0.01%
Process path length	0.5	30m	
Process temperature	-40 °C	500 °C	
Process pressure	0.7 BarA	1.5 BarA	

### Process temperature above 500°C

	Min	Max	LDL/precision
CO	0-200ppm	0-20000ppm*m	3 ppm
CH4 add-on	0-5% * m	0-10% * m	0.05%
H2O add-on	-	0-40%	2%
Temperature add-on	500 °C	1300 °C	30 °C
Process path length	0.5m	30m	
Process temperature	500 °C	1300 °C	
Process pressure	0.7 BarA	1.5 BarA	



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# LaserGas™ III SP NH<sub>3</sub> DeNO<sub>x</sub>



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**NEO Monitors LaserGas™ III** ammonia analyzer (3<sup>rd</sup> generation) is specially designed for operation in hazardous areas and it provides real time in-situ NH<sub>3</sub> measurements for virtually any type of DeNO<sub>x</sub> systems. The configuration is transmitter/receiver units for cross-duct/stack installation. An external junction (cable connection) box simplifies installation and maintenance. The operation principal is based on well proven Tunable Laser Absorption Spectroscopy (TLAS) implemented using fast scanning absorption technique with fully digital signal processing. Years of experience allowed us to carefully design this highly compact NH<sub>3</sub> analyzer which offers exceptional performance in harsh environments, is truly robust and provides immediate benefits in terms of operation ease and low cost ownership.

## Features

- In-situ real time measurements
- Fast response time
- Compact design
- Low power consumption (< 10W)
- TDLAS technology
- Low detection limit
- No interference from other gases
- Not affected by high dust load
- Lifetime calibration, no zero drift
- Integrated span check
- Additional H<sub>2</sub>O measurements available
- Ethernet connectivity
- Suitable for SIL2

## Applications

- Selective catalytic reduction (SCR)
  - Selective non-catalytic reduction (SNCR)
  - Typical DeNO<sub>x</sub> outlet
  - Emission monitoring
- To;
- Refineries
  - Powerplants
  - Chemical industries
  - Petrochemical industries
  - Steel industries
  - and more

## Customer benefits

- Reliable in-situ NH<sub>3</sub> measurements in real time
- Process optimization
- Reduction of NH<sub>3</sub>/Urea consumption
- Monitoring of catalyst activity
- Increase DeNO<sub>x</sub> efficiency and minimize emission
- Simple installation, ease of use
- Low maintenance cost
- No consumables
- No sampling systems
- Compressed air purge (no need for Nitrogen)
- No regular calibrations needed
- Automatic span check available

# LaserGas™ III SP NH<sub>3</sub> DeNO<sub>x</sub>

## Technical Data

<b>Specifications</b> Detection limit (NH <sub>3</sub> ): 0.2 ppm ** Default range: 0 - 50 ppm Other ranges on request Range H <sub>2</sub> O: 0 - 40% vol Max. process gas temperature: 450 °C Max. process gas pressure: 1.5 bar abs Optical path length: Typically 0.5 - 5 m *** Repeatability: +- 0.2 ppm or +- 1 % relative, whichever is greater (application dependent) Linearity: < 1 % of range Response time: 1 second or longer (configurable)  <b>Environmental conditions</b> Operating temperature: -40 °C to +65 °C (extended rating -40 °C to +65 °C on request) Storage temperature: -40 °C to +70 °C Protection classification: IP65  <b>Inputs / Outputs</b> Analog output (3): 4-20 mA current loop (concentration NH <sub>3</sub> , transmission, concentration H <sub>2</sub> O) Digital output: 10/100 Base T Ethernet (Modbus TCP) Relay output (2): High gas, warning and fault (normally closed) Analog input: 4 - 20 mA process temperature and pressure reading	<b>Ratings</b> Power supply: 24VDC range 18-32 VDC Power consumption: Max. 10 W 4 - 20 mA output: 500 Ohm max. load impedance, not isolated Relay output: 1 A at 30 V DC/AC  <b>Installation and Operation</b> Flange dimension: DN50/PN10 or ANSI 2"/150 lbs (other dimensions on request) Alignment tolerances: Flanges parallel within 1.5° Purging of windows: Compressed dry and oil free air (recommended) or air blower Purge flow: 5 -100 l/min (application dependent) Calibration: Lifetime, no routine calibration needed  <b>Safety</b> Laser class: Class 1 according to IEC 60825-1, eye safe CE: Certified EMC: Conformant with directive 2014/30/EU  <b>Approvals</b> IECEX/ATEX zone 1: II 2 G Ex d [op is] IIC T4 Gb (TU/RU) II 2 D Ex tb IIIC T78°C Db II 2 D Ex tb IIIC T88°C Db (Lasergas III Ext) CSA: Class I Div. 1, Groups B, C and D	ATEX rating connection box: II 2 GD Ex e IIC T5 Gb -40°C ≤TA≤65°C  Functional safety: Designed according to SIL 2; IEC 61508  <b>Dimension and weight</b> Transmitter and receiver unit (TU/RU): 215 mm (length, add 50 mm for purge unit) x 125 mm (diameter), 3.5 kg each  TU/RU connection box: 260 x 160 x 90 mm, 2.5kg  **NOTE: Detection limits are specified as the 95% confidence interval for 1 m optical path and gas temperature / pressure = 25°C / 1 bar abs. Measured in N <sub>2</sub> .  *** Insertion tubes may be needed to shorten path length for very high dust loads.  Special process conditions on request.
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# LaserGas™ III OP NH<sub>3</sub> Gas Detector



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**NEO Monitors new LaserGas™ III NH<sub>3</sub> Open Path Gas Detector** is specifically designed for service in hazardous areas. Based on our third generation LaserGas™ Technology, the entire instrument is built into compact flameproof enclosures making it fit for zone 1 applications. The LaserGas™ III OP NH<sub>3</sub> consists of a transmitter and receiver unit that is mounted diametrically opposite each other at distances up to 100 meters. The laser light is sent from the transmitter to the receiver and any NH<sub>3</sub> concentration changes along the optical path from the transmitter to the receiver are detected in real-time.

Features	Applications	Customer benefits
<ul style="list-style-type: none"> <li>• Gen. 3 compact LaserGas™ Technology</li> <li>• For operation in zone 1 (Explosion proof, Ex-d)</li> <li>• Automatic health check</li> <li>• Low power &lt; 15 Watt</li> <li>• No need for regular replacement of parts</li> <li>• No interference from other gases</li> <li>• Factory calibrated, no zero drift</li> </ul>	<p>Open Path monitors are critical in emission monitoring across a wide range of industrial applications:</p> <ul style="list-style-type: none"> <li>• Oil and gas industry</li> <li>• Petrochemical refineries</li> <li>• Chemical plants</li> <li>• Metal industry</li> <li>• Fenceline monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Compact high performance gas monitor for ambient long distance monitoring</li> <li>• No cross interference from other gases</li> <li>• Easy to install</li> <li>• Limited need for maintenance</li> <li>• Low cost of ownership</li> <li>• Proven and reliable</li> </ul>

# LaserGas™ III OP NH<sub>3</sub> Gas Detector

## Technical Data

<b>General</b>		<b>Output signals</b>		<b>Dimensions / weight</b>	
Type:	Near IR Diode Laser Spectroscopy	Standard:	4-20 mA source or sink, max load impedance 500 Ohm	Footprint/weight:	Ø 125mm x 250 mm/ 5.5 Kg (12 lbs.) per TU or RU
IR-source:	Diode laser Class1 M, eye safe	Options:	Ethernet	<b>Maintenance</b>	
Detected gas:	NH <sub>3</sub>	Fault signals:	Fault 1mA Beam Block 2 mA Warning 3 mA	Visual inspection:	Recommended every 6 – 12 months (no consumables needed)
Range:	0-5000 ppm*m	<b>Electrical</b>		Calibration:	Check recommended every 12 months
Path length:	5-100 m	Power Supply:	24V DC range 18-32V DC	<b>Safety</b>	
Self-test:	Continuous	Power consumption:	< 15W	Laser class:	Class 1 according to IEC 60825-1, eye safe
Calibration:	Factory set, no field calibration necessary	<b>Temperature range</b>		CE:	Certified
LDL:	5ppm*m	Storage temperature:	-55 °C to 75 °C	EMC:	Conformant with directive 2014/30/EU
<b>Performance</b>		Operating:	-40 °C to 65 °C	<b>Approvals</b>	
Zero:	<+/- 1% of full scale	Humidity (operational):	100% RH	IECEX/ATEX zone 1: (TU/RU)	II 2 G Ex d [op is] IIC T6 II 2 D Ex tb IIC T88 °C
Repeatability:	<+/- 1% of full scale	<b>Material</b>		Ingress:	IP66/IP67 IEC 60529
Response time:	5 sec (adjustable)	TU and RU:	Stainless steel (ASTM 316)	<b>Optional junction box (technical data)</b>	
<b>Optics</b>				Junction box:	GRP / aluminum
Alignment:	+/- 0.15 deg			Footprint Junction box:	250 mm x 250 mm/ 2.0 Kg (4.4 lbs. per Junction Box)
Obscuration:	> 90%			ATEX rating:	II 2 G Ex e IIC T4/T5/T6

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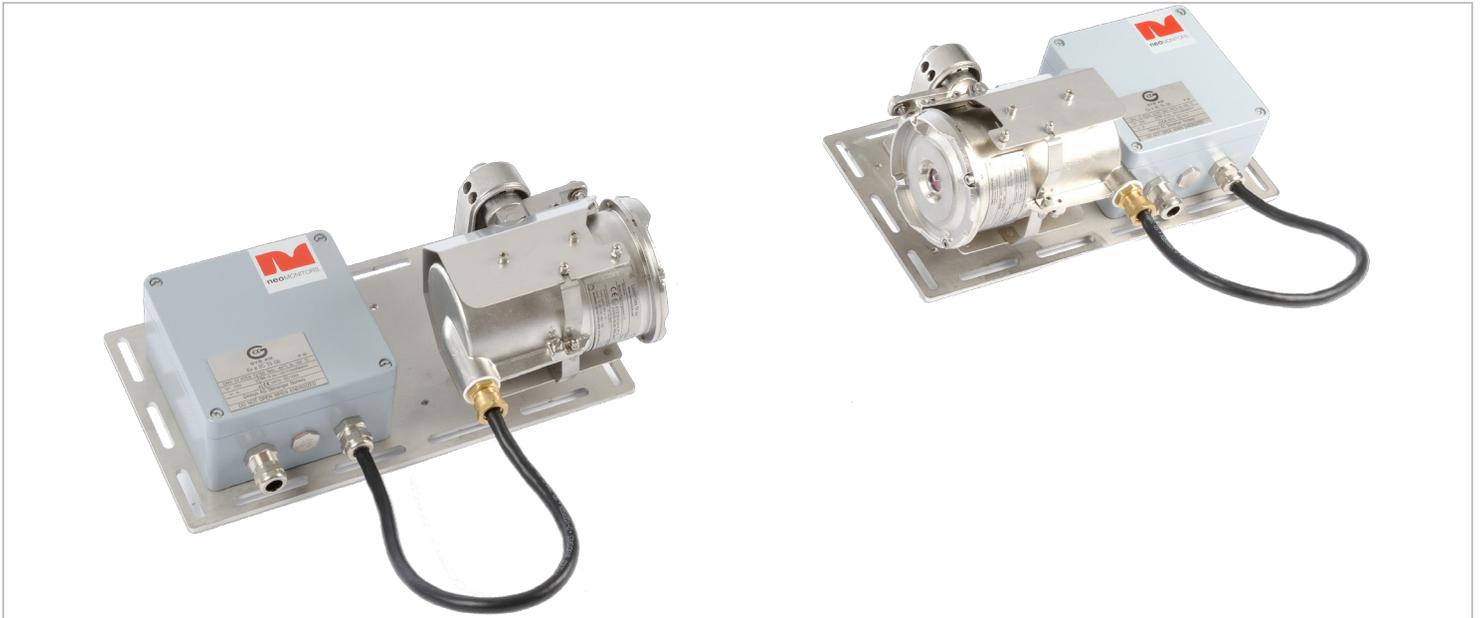
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# LaserGas™ III OP HF Gas Detector



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**NEO Monitors LaserGas™ III** new HF Open Path Gas Detector is specifically designed for service in hazardous areas. Based on our third generation LaserGas™ Technology, the entire instrument is built into compact flameproof enclosures making it fit for zone 1 applications. The LaserGas™ III OP HF consists of a transmitter and receiver unit that is mounted diametrically opposite each other at distances up to 100 meters. The laser light is sent from the transmitter to the receiver and any HF concentration changes along the optical path from the transmitter to the receiver are detected in real-time.

## Features

- Gen. 3 compact LaserGas™ Technology
- For operation in zone 1 (Explosion proof, Ex-d)
- Automatic health check
- Low power < 15 Watt
- No need for regular replacement of parts
- No interference from other gases
- Factory calibrated, no zero drift
- Suitable for SIL2

## Applications

Open Path monitors are critical in emission monitoring across a wide range of industrial applications:

- Oil and gas industry
- Petrochemical refineries
- Chemical plants
- Metal industry
- Fenceline monitoring

## Customer benefits

- Compact high performance gas monitor for ambient long distance monitoring
- No cross interference from other gases
- Easy to install
- Limited need for maintenance
- Low cost of ownership
- Proven and reliable

# LaserGas™ III OP HF Gas Detector

## Technical Data

<b>General</b>		<b>Output signals</b>		<b>Dimensions / weight</b>	
Type:	Near IR Diode Laser Spectroscopy	Standard:	4-20 mA source or sink, max load impedance 500 Ohm	Footprint/weight:	Ø 125mm x 250 mm/ 5.5 Kg (12 lbs.) per TU or RU
IR-source:	Diode laser Class1 M, eye safe	Options:	Ethernet	<b>Maintenance</b>	
Detected gas:	HF	Fault signals:	Fault 1mA Beam Block 2 mA Warning 3 mA	Visual inspection:	Recommended every 6 – 12 months (no consumables needed)
Range:	Minimum 0-5 ppm*m	<b>Electrical</b>		Calibration:	Check recommended every 12 months
Path length:	5-100 m	Power Supply:	24V DC range 18-32V DC	<b>Safety</b>	
Self-test:	Continuous	Power consumption:	< 15W	Laser class:	Class 1 according to IEC 60825-1, eye safe
Calibration:	Factory set, no field calibration necessary	<b>Temperature range</b>		CE:	Certified
<b>Performance</b>		Storage temperature:	-55 °C to 75 °C	EMC:	Conformant with directive 2014/30/EU
Zero:	<+/- 1% of full scale	Operating:	-40 °C to 65 °C	<b>Approvals</b>	
Repeatability:	<+/- 1% of full scale	Humidity (operational):	100% RH	IECEX/ATEX zone 1: (TU/RU)	II 2 G Ex d [op is] IIC T6 II 2 D Ex tb IIIC T88 °C
Response time:	5 sec (adjustable)	<b>Material</b>		Ingress:	IP66/IP67 IEC 60529
<b>Optics</b>		TU and RU:	Stainless steel (ASTM 316)	SIL:	Suitable for use in SIL2 systems
Alignment:	+/- 0.15 deg			<b>Optional junction box (technical data)</b>	
Obscuration:	> 90%			Junction box:	GRP / aluminum
				Footprint Junction box:	250 mm x 250 mm/ 2.0 Kg (4.4 lbs. per Junction Box)
				ATEX rating:	II 2 G Ex e IIC T4/T5/T6

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# LaserGas™ III Portable HF Analyzer



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**NEO Monitors LaserGas™** is using Tunable Laser Absorption Spectroscopy (TLAS) i.e. a non-contact optical measurement method employing solid-state laser sources.

The portable analyzer is compact, lightweight, and battery powered for HF measurement on the spot. With onboard pump and connections for Teflon tubing the target gas is continuously transferred into the internal measurement cell. The instrument's low power design gives long operating time on each battery cycle.

## Features

- Most advanced LaserGas™ technology available (3<sup>rd</sup> generation)
- Portable (low weight)
- Low power usage <10 Watt
- Sub ppm HF detection
- No interference from other gases
- Stable calibration
- No zero drift

## Applications

The LaserGas™ III Portable HF Analyzer is the solution for reliable detection of short-term HF concentrations, wherever diffuse emissions occur representing a risk to the work force.  
Focused applications are:

- Aluminium smelters: Worker protection during active work
- Aluminium smelters: Mapping plant emissions
- Refinery alkylation plants: Worker safety

## Customer benefits

- Flexible unit designed for measurement on the spot
- Allows fast and reliable operation to measure sub ppm and several hundred ppm HF concentrations
- Regular maintenance not required
- No cross interference from other gases
- Short-term HF peaks are uncovered with the LaserGas™ III portable
- Easy to carry
- Battery operated for several hours
- Internal storage of data

# LaserGas™ III Portable HF Analyzer

## Technical Data

<b>Specifications</b> Detection limit (HF)*: 50 ppb ** Repeatability: 1% of range (gas & application specific)	<b>Installation and Operation</b> Gas inlet / outlet: 6 mm SMC one touch fittings (series KQG) Sample gas flow: 3 l/min Sample inlet pressure: +/- 50 mbar G / 0.8 PSIG (higher pressures possible with different pump) Sample inlet temperature: Max 85 °C	<b>Physical</b> Dimensions: 110 x 120 x 250 mm (4.3" x 4.7" x 9.8") Weight (incl. battery): 2.3 kg (5 lbs) Display: 2.7" colour LCD panel Sample Cell: Teflon coated Aluminium
<b>Storage</b> 3MB		
<b>Environmental conditions</b> Operating temperature: -20 °C to +55 °C Storage temperature: -20 °C to +55 °C Protection classification: IP65		
<b>Outputs</b> Analog output (3): 4 – 20 mA current loop (concentration and transmission) Digital output: 10/100 Base T Ethernet (Modus TCP), RS-485	Calibration: Check recommended every 12 months	
<b>Ratings</b> Power consumption: Max. 10 W 4 – 20 mA output: 500 Ohm max. load impedance, not isolated	<b>Maintenance</b> Instrument check by Ethernet	
Battery: Lithium Ion Battery (14.4 V, 5 A, approx. 10 hours usage time per charge)	<b>Filter change</b> Recommended every 3 months	
	<b>Safety</b> Laser class: Class 1 according to IEC 60825-1, eye safe	** NOTE: Detection limits are specified as the 95% confidence interval for 1 m optical path and gas temperature / pressure = 25 °C / 1 bar abs, measured in N <sub>2</sub> .

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**NEO Monitors LaserGas™** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e a non-contact optical measurement method employing solid-state laser sources. The sensor remains unaffected by contaminants corrosives and does not require regular maintenance. The absence of extractive conditioning systems further improves availability of the measurements and eliminates errors related to sample handling. The monitor is mounted directly onto flanges, which include purge gas connections and a tilting mechanism for easy alignment. Continuous purge flow prevents dust and other contamination from settling on the optical windows. Once power and data lines are connected, measurements are performed in real-time.

## Features

- Response time down to 1 second
- No gas sampling: In-situ measurement
- No interference from background gases
- Applicable for many process conditions:
  - high/low temperature
  - high dust
  - corrosive gases
- Line measurement, integral concentration over the full stack diameter
- ATEX and CSA certified
- TÜV, MCERTS, GOST approved technology
- Integrated span check option available
- Suitable for harsh environment
- No zero drift
- Stable calibration
- Long OPLs

## Applications

LaserGas™ II SP is designed for reliable and fast measurement of all kinds of gases in any environment, most typically:

- Chemical industry
- Petrochemical industry
- Metal industry
- Power plants
- Waste incinerators
- Cement industry
- Automotive industry
- Scrubber technology
- Glass industry
- PVC production
- Pulp and paper
- and more

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement technique

# LaserGas™ II SP

## Technical Data

<p><b>Specifications</b></p> <p>Optical path length: Typically 0.5-20m          Response time: 1 – 2 sec          Accuracy: Application dependent          Repeatability: 1% of range (gas &amp; application specific)</p> <p><b>Environmental conditions</b></p> <p>Operating temperature: -20 °C to +55 °C (special version up to +65 °C on request)          Storage temperature: -20 °C to +55 °C          Protection classification: IP66</p> <p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 - 20 mA current loop (concentration, transmission)          Digital output: TCP/IP, MODBUS, Optional fibre optic          Relay output (3): High gas, Maintenance Warning and Fault          Analog input (2): 4 – 20 mA process temperature and pressure reading</p> <p><b>Ratings</b></p> <p>Input power supply unit: 100 – 240 VAC, 50/60 Hz, 0.36 – 0.26 A          Output power supply unit: 24 VDC, 900 – 1000 mA</p>	<p>Input transmitter unit: 18 – 36 VDC, max. 20W          4 – 20 mA output: 500 Ohm max. isolated          Relay output: 1 A at 30 V DC/AC</p> <p><b>Installation and Operation</b></p> <p>Flange dimension alignment: DN50/PN10 or ANSI 2"/150lbs (other dimensions on request)</p> <p>Alignment tolerances: Flanges parallel within 1.5°</p> <p>Purge flow: Dry and oil-free pressurised air or nitrogen 10 - 50 l/min (application dependent)</p> <p><b>Maintenance</b></p> <p>Visual inspection: Recommended every 6 – 12 months          Calibration: Check recommended every 12 months          Validation: In-situ span check with optional internal cell (application dependent)</p> <p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1 Certified.          Conformant with directive 2014/30/EU</p> <p>CE:          EMC:</p>	<p><b>Explosion protection (optional)</b></p> <p>IECEX/ATEX zone 1: II 2 G Ex px IIC T5 Gb          II 2 D Ex p IIC T64°C Db</p> <p>Laser zone 1: II 2 G [Ex op is T4 Gb] IIC</p> <p>IECEX/ATEX zone 2: II 3 G Ex nA nC op is IIC T4 Gb          II 3 D Ex td A22 T100°C</p> <p>Laser zone 0: II 1 G [Ex op is T6 Ga]</p> <p>CSA: Class I, Div. 2, Groups A, B, C and D; Temp. Code T4; non-incendive</p> <p><b>Dimension and weight</b></p> <p>Transmitter unit: 405 (plus 65 for purge unit) x 270 x 170 mm, 6.2 kg          Transmitter unit: 405 (plus 65 for purge unit) x 270 x 310 mm, 7.9 kg (Ex version)          Receiver unit: 355 (plus 65 for purge unit) x 125 x 125 mm, 3.9 kg          Power supply unit: 180 x 85 x 70 mm, 1.6 kg</p>
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Gas	Detection limit (ppm)	Max temp (°C)	Max pressure (bar abs)
NH <sub>3</sub>	0,15	600	2
HCl	0,05	600	2
HF	0,015	400	2
H <sub>2</sub> S	3	300	2
O <sub>2</sub>	100	1500	20
% H <sub>2</sub> O	50	1500	2*
ppm H <sub>2</sub> O	0,1	400	2
% CO	30	1500	2*
% CO <sub>2</sub>	30	1200	2*
ppm CO	0,3	1500	2
ppm CO <sub>2</sub>	0,2	300	2
NO	10	300	2
N <sub>2</sub> O	1	200	2
CH <sub>4</sub>	0,2	1000	3
NO <sub>2</sub>	2	200	1,5
HCN	0,3	300	2

\*NEO Monitors reserve the right to change specifications without prior notice

**NOTE:** Detection limits are specified as the 95% confidence interval for 1m optical path and gas temperature / pressure = 25 °C / 1 bar abs. Measured in N<sub>2</sub>.

Other gases available on request.

Dual Gas: NH<sub>3</sub>+H<sub>2</sub>O, HCl+H<sub>2</sub>O, CO+CO<sub>2</sub>, CO+H<sub>2</sub>O, CO+CH<sub>4</sub>, O<sub>2</sub>+temp, CO+temp.

\*Higher pressure available on request for certain gases.

Please contact us for details.

TÜV and MCERTS, GOST approval available for some gases.

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# LaserGas™ II Compact



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**NEO Monitors LaserGas™** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e a non-contact optical measurement method employing solid-state laser sources. The sensor remains unaffected by contaminants and corrosives and does not require regular maintenance. The absence of extractive conditioning systems further improves availability of the measurements and eliminates errors related to sample handling. The monitor is mounted directly onto flanges, which include purge gas connections and a tilting mechanism for easy alignment. Continuous purge flow prevents dust and other contamination from settling on the optical windows. Once power and data lines are connected, measurements are performed in real-time.

Features	Applications	Customer benefits
<ul style="list-style-type: none"> <li>• Response time down to 1 second</li> <li>• No gas sampling: In-situ measurement</li> <li>• No interference from background gases</li> <li>• No moving parts, no consumables</li> <li>• ATEX and CSA certified</li> <li>• Can measure through very thin nozzles &lt;10 mm diameter</li> <li>• Optimised for very short distance measurements across pipes and along short cells</li> <li>• Compact design</li> <li>• No zero drift</li> <li>• Stable calibration</li> </ul>	<p>LaserGas™ II SP is designed for reliable and fast measurement of all kinds of gases in any environment, most typically:</p> <ul style="list-style-type: none"> <li>• Chemical industry</li> <li>• Petrochemical industry</li> <li>• Metal industry</li> <li>• Power plants</li> <li>• Waste incinerators</li> <li>• Cement industry</li> <li>• Automotive industry</li> <li>• Scrubber technology</li> <li>• Glass industry</li> <li>• PVC production</li> <li>• Pulp and paper</li> <li>• and more</li> </ul>	<ul style="list-style-type: none"> <li>• In-situ monitoring</li> <li>• Highly reliable real time analyzer</li> <li>• Limited need for maintenance</li> <li>• Low maintenance cost</li> <li>• Reduce emission to the environment</li> <li>• Easy to install and operate</li> <li>• Reduce daily operation costs</li> <li>• Optimize process</li> <li>• Well proven measurement technique</li> <li>• Requires low purge flow</li> </ul>

# LaserGas™ II Compact

## Technical Data

<p><b>Specifications</b></p> <p>Optical path length: Typically 0.1-1m          Response time: 1 – 2 sec          Accuracy: Application dependent          Repeatability: 1% of range (gas and application specific)</p> <p><b>Environmental conditions</b></p> <p>Operating temperature: -20 °C to +55 °C          Storage temperature: -20 °C to +55 °C          Protection classification: IP66</p> <p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 – 20 mA current loop (concentration, transmission)          Digital output: TCP/IP, MODBUS, Optional fibre optic          Relay output (3): High gas-, Maintenance, Warning- and Fault relays (normally closed-circuit relays)          Input: 4 – 20 mA process temperature and pressure reading</p> <p><b>Ratings</b></p> <p>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</p>	<p><b>Installation and Operation</b></p> <p>Flange dimension alignment: DN50/PN10 or ANSI 2"/150lbs (other dimensions on request)</p> <p>Alignment tolerances: Flanges parallel within 1.5°</p> <p>Purge flow: Dry and oil-free pressurised air or gas or by fan          10-50 l/min per flange (application dependent)          2-4 l/min per flange when set up with thin nozzles (optinal)</p> <p><b>Maintenance</b></p> <p>Visual inspection: Recommended every 6 – 12 months (no consumables needed)</p> <p>Calibration: Recommended every 12 months          Validation: With optional flow through cell</p> <p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1          CE: Certified          EMC: Conformant with directive 2014/30/EU</p>	<p><b>Explosion protection (optional)</b></p> <p>IECEx/ATEX zone 2: II 3 G Ex nA nC op is IIC T4 Gb          II 3 D Ex tD A22 T100°C</p> <p>CSA: Class I, Div. 2, Groups A, B, C and D; Temp. Code T4; non-incendive</p> <p><b>Dimension and weight</b></p> <p>Transmitter unit: 195 (plus 65 for purge unit) x 270x170 mm, 4.8 kg          Transmitter unit: (EX ver.) 195 (plus 65 for purge unit) x 270x310 mm, 6.5 kg          Receiver unit: 208 (plus 65 for purge unit) x 125 x 125 mm, 2.6 kg          Power supply unit: 180 x 85 x 70 mm, 1.6 kg</p>
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Gas	Detection limit (ppm)	Max temp (°C)	Max pressure (bar abs)
NH <sub>3</sub>	0,15	600	2
HCl	0,05	600	2
HF	0,015	400	2
H <sub>2</sub> S	3	300	2
O <sub>2</sub>	100	600	2
% H <sub>2</sub> O	50	600	2
ppm H <sub>2</sub> O	0,1	400	2
% CO	30	600	2
% CO <sub>2</sub>	30	600	2
ppm CO	0,3	600	2
ppm CO <sub>2</sub>	0,2	300	2
NO	10	300	2
N <sub>2</sub> O	1	200	2
CH <sub>4</sub>	0,2	300	2

**NOTE:** Detection limits are specified as the 95% confidence interval for 1m optical path and gas temperature / pressure = 25 °C / 1 bar abs. Measured in N<sub>2</sub>.

Other gases might be available on request.

Dual Gas: NH<sub>3</sub>+H<sub>2</sub>O, HCl+H<sub>2</sub>O, CO+CO<sub>2</sub>, CO+H<sub>2</sub>O, CO+CH<sub>4</sub>, O<sub>2</sub>+temp, CO+temp and others.

Higher pressure may be available on request for certain gases.

Please contact us for details.

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**NEO Monitors LaserGas™** is using Tuneable Laser Absorption Spectroscopy (TLAS) i.e. a non-contact optical measurement method employing solid-state laser sources. Therefore, the sensor remains unaffected by contaminants and corrosives and does not require regular maintenance. The laser beam is coupled into a Herriott cell, where it is reflected multiple times between two spherical mirrors in order to enhance the analyser sensitivity. The MP monitor is a turn-key instrument. No other operations than connecting power, sample gas tubes and optional purge are required during installation. To avoid fouling of optical parts in the Multipass cell the cleanliness of the sample gas must be ensured. Filtering the sample gas in an appropriate extractive system may be required for some applications.

Features	Applications	Customer benefits
<ul style="list-style-type: none"> <li>• Short response time (flow depended)</li> <li>• Very low detection limits (ppb for most gases)</li> <li>• No interference from background gases</li> <li>• Stable calibration</li> <li>• No zero drift</li> <li>• Offline gas analysis in controlled environment</li> <li>• No moving parts, no consumables, turn-key instrument</li> <li>• ATEX and CSA certified</li> </ul>	<ul style="list-style-type: none"> <li>• Chemical industry</li> <li>• Petrochemical industry (contaminants like H<sub>2</sub>S in NG)</li> <li>• Industrial gas (impurities in pure gases)</li> <li>• Semiconductor industry</li> <li>• Power plants (stack testing of corrosive emission gases)</li> <li>• H<sub>2</sub>S emission monitoring (pulp &amp; paper, refineries, biogas production)</li> <li>• and more</li> </ul>	<ul style="list-style-type: none"> <li>• The multipass cell concept combines a long measurement path length with a compact analyzer design</li> <li>• Measures trace levels of gases, offline in a controlled environment</li> <li>• Limited need for maintenance</li> <li>• Highly reliable real time analyzer</li> <li>• Low maintenance cost</li> <li>• Reduce emission to the environment</li> <li>• Easy to install and operate</li> <li>• Reduce daily operation costs</li> <li>• Optimize process</li> <li>• Well proven measurement technique</li> </ul>

# LaserGas™ II MP

## Technical Data

<p><b>Specifications</b>          Optical path length: 2.7 and 11.4 m          Response time: Typically 2 – 10 sec (depending on cell and sample gas flow)          Accuracy: Application depended          Repeatability: 1% of range (gas &amp; application specific)</p> <p><b>Environmental conditions</b>          Operating temperature: -20 °C to +55 °C          Storage temperature: -20 °C to +55 °C          Protection classification: IP65</p> <p><b>Inputs / Outputs</b>          Analog output (3): 4 – 20 mA current loop (concentration, transmission)          Digital output: TCP/IP, MODBUS, Optional fibre optic          Relay output (3): High gas-, Maintenance, Warning - and Fault relays          Analog input: 4 – 20 mA process temperature and pressure reading</p>	<p><b>Ratings</b>          Input power: 100 – 240 VAC, 50/60 Hz, 0.36 – 0.26 A or 18 - 36 VDC, max 20 W          4 – 20 mA output: 500 Ohm max. isolated          Relay output: 1 A at 30 V DC/AC</p> <p><b>Installation and Operation</b>          Gas inlet / outlet: 6 mm or 1/4" / 8 mm (5/16") Swagelok (other dimensions on request)          Sample gas flow: Recommended 1 – 5 l/min          Sample inlet pressure: 1 – 1.5 Bar abs (14.5 – 21.7 psia)          Sampling gas temperature: 0-180 °C          Purging of laser chamber (optional): Dry and oil free pressurised air and gas, Nitrogen for O<sub>2</sub> and CO<sub>2</sub>          Purge flow: Maximum 0.5 l/min</p> <p><b>Maintenance</b>          Visual inspection: Recommended every 6 – 12 months (no consumables needed)          Calibration: Check recommended every 12 months</p>	<p><b>Safety</b>          Laser class: Class 1 according to IEC 60825-1          CE: Certified          EMC: Conformant with directive 2014/30/EU</p> <p><b>Explosion protection (optional)</b>          IECEx/ATEX zone 2: II 3 G Ex nA nC op is IIC T4 Gb II 3 D Ex td A22 T100°C          CSA: Class I, Div 2 Groups A, B, C and D; Temp. Code T4; non-incendive</p> <p><b>Dimension and weight</b>          Cabinet: 500 x 510 x 215mm, 18.4 kg</p>
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Gas	Detection limit (ppm)
O <sub>2</sub>	7 ppm
H <sub>2</sub> S	0.5 ppm
CH <sub>4</sub>	20 ppb
CO	20 ppb
CO <sub>2</sub>	50 ppb
HCN	50 ppb
NH <sub>3</sub>	30 ppb
HCl	10 ppb

NOTE: Detection limits are specified as the 95% confidence interval for the standard 11 m cell and gas temperature / pressure = 25 °C / 1 bar abs measured in N<sub>2</sub>.

Also available are NO<sub>2</sub>, CH<sub>2</sub>CHCl (VCM), C<sub>2</sub>H<sub>4</sub>O (EtO), CH<sub>2</sub>Cl<sub>2</sub> (DCM).

Other gases are available, please contact us with your request.

Dual Gas: CO+CO<sub>2</sub>, CO+CH<sub>4</sub>

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# LaserGas™ II OP



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**NEO Monitors LaserGas™ II OP** is a compact, high performance gas monitor for ambient long distance monitoring. The LaserGas™ II OP consists of a transceiver and retro-reflector unit. The retro-reflector unit consists of one or several cube corners in a weather proof enclosure. LaserGas™ II OP is known as “single line spectroscopy”. 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 retro-reflector located opposite to the laser reflects the light back to the transceiver. A detector collects the returned light for further analysis and calculation of the gas concentration.

## Features

- Easy to install, limited need for maintenance
- Response time down to 1 second
- No cross interference from other gases
- Very low detection limits (ppb and low ppm)
- Unaffected by fog or rain down to <1% transmission
- Optional Ethernet connection and auto-alignment unit
- Wide range of detectable gases
- Mounted on our proprietary x/y alignment platform (goniometer). Adapters for fixed installation on platforms or for tripod use are available.
- Equipped also for hazardous areas

## Applications

Open Path monitors are critical in emission monitoring across a wide range of industrial applications:

- Oil and gas industry
- Petrochemical refineries
- Landfill sites
- Chemical plants
- Metal industry
- Fireprotection
- Traffic exhaust
- and more

## Customer benefits

- Compact high performance gas monitor for ambient long distance monitoring
- No cross interference from other gases
- Easy to install
- Limited need for maintenance
- Low cost of ownership
- Proven and reliable

# LaserGas™ II OP

## Technical Data

<p><b>Specifications</b>                  Path length: Typically 10 - 500 m                  Response time: 1-2 sec</p> <p><b>Environmental conditions</b>                  Operating temperature: -20 °C to +55 °C                  Storage temperature: -20 °C to +55 °C                  Protection classification: Transceiver unit IP66 (retro-reflector and battery unit IP65)</p> <p><b>Inputs / Outputs</b>                  Analog output (3): 4 - 20 mA current loop (concentration, transmission)                  Digital output: TCP/IP, MODBUS, Optional fibre optic                  Relay output (3): High gas-, Maintenance-Warning - and Fault (normally closed)</p> <p><b>Ratings</b>                  Input power supply: 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</p>	<p>4 - 20 mA output: 500 Ohm max. isolated                  Relay output: 1 A at 30 V DC/AC                  Battery supply unit (optional):                  Input: 90-264 VAC, 50/60 Hz, Output: 24 VDC, fused 1A</p> <p><b>Installation and Operation</b>                  Installation: Special X/Y alignment platform, tripod or auto alignment unit.                  Purging of windows: By fan or blower (only recommended for certain applications)</p> <p><b>Maintenance</b>                  Interval: Recommended every 6 - 12 months                  Calibration: Check recommended every 12 months</p> <p><b>Safety</b>                  Laser class: Class 1 according to IEC 60825-1                  CE: Certified                  EMC: Conformant with directive 2014/30/ EU</p>	<p><b>Explosion protection (optional)</b>                  ATEX zone 1: II 2 G Ex px II T5                  II 2 D Ex pD 21 IP66                  T64 °C                  IECEx/ATEX zone 2: II 3 G Ex nA nC [op is]                  IIC T4 Gb                  II 3 D Ex tD A22                  T100 °C                  CSA: Class I, Div. 2, Groups A, B, C and D; Temp. Code T4; non-incendive</p> <p><b>Dimension and weight</b>                  Transceiver unit: 500x70x180 mm, 6.5 kg                  Transceiver unit (Eex P): 500x270x320 mm, 8.2kg                  Retro reflector unit: Size depends on number of reflectors (1 - 25 reflectors)                  Power supply unit: 180x85x70 mm, 1.6 kg                  Battery supply (optional): Size depends on version (10 h / 24 h) max. 280 x 190 x 180 mm, 13.8 kg</p>
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Gas	Range	LDL/resolution
NH <sub>3</sub>	0-50 ppm	0.01 ppm
HF	0-1 ppm / 0-10 ppm	0.001 ppm
CO	0-50 ppm / 0-2%	0.015 ppm / 0.005%
CH <sub>4</sub>	0-50 ppm / 0-5%	0.01 ppm / 0.01%
CO <sub>2</sub>	0-2%	0.005%
H <sub>2</sub> S	0-2000 ppm	0.5 ppm

Detection limits are specified as the 95% confidence interval for 100 m path (Optical path length 200m) and gas temperature/pressure = 25 °C/1 bar abs.

NOTE: HF measurement with continuous verification on atmospheric oxygen or water is an option.

Other gases available on request. Please contact us for details.

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# LaserGas™ R2P Monitor



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The R2P Monitor employs a measurement cell concept to combine extractive measurement with a compact analyzer design. The measurement path length will enhance the detection limit. Heated and nonheated cells are available. To avoid fouling of optical parts in the measurement cell the cleanliness of the sample gas must be ensured. Filtering the sample gas in an appropriate extractive system may be required for some applications.

Features	Applications	Customer benefits
<ul style="list-style-type: none"> <li>• Short response time</li> <li>• Low detection limits (ppm for most gases)</li> <li>• No interference from background gases</li> <li>• Stable calibration</li> <li>• No zero drift</li> <li>• Offline gas analysis in controlled environment</li> <li>• Rack mounted</li> </ul>	<p>LaserGas™ R2P monitor is designed for reliable and fast measurement of all kinds of gases in any environment, most typically:</p> <ul style="list-style-type: none"> <li>• Laboratory and university</li> <li>• Chemical industry</li> <li>• Petrochemical industry</li> <li>• Industrial gases</li> <li>• Power plants</li> <li>• H2S emission monitoring</li> <li>• and more</li> </ul>	<ul style="list-style-type: none"> <li>• Compact analyzer design</li> <li>• Rack mounted</li> <li>• Measures trace levels of gases, offline in a controlled environment</li> <li>• Limited need for maintenance</li> <li>• Highly reliable real time analyzer</li> <li>• Low maintenance cost</li> <li>• Reduce emission to the environment</li> <li>• Easy to install and operate</li> <li>• Reduce daily operation costs</li> <li>• Optimize process</li> <li>• Well proven measurement technique</li> <li>• Heated samples are optimal</li> </ul>

# LaserGas™ R2P Monitor

## Technical Data

<p><b>Specifications</b></p> <p>Optical path length: 0.7 m (Can be delivered with Heated cell) Max 180°C</p> <p>Response time: Typically 2 – 10 sec (depending on gas flow)</p> <p>Repeatability: 1% of range (gas and application specific)</p> <p><b>Environmental conditions</b></p> <p>Operating temperature: -20 °C to +55 °C</p> <p>Storage temperature: -20 °C to +55 °C</p> <p>Protection classification: 19" Rack</p> <p><b>Inputs / Outputs</b></p> <p>Analog output (3): 4 – 20 mA current loop (concentration, transmission)</p> <p>Digital output: TCP/IP, MODBUS, Optional fibre optic</p> <p>Relay output (3): High gas, Maintenance Warning and Fault (normally closed-circuit relays)</p>	<p><b>Ratings</b></p> <p>Input power supply: 100/240 VAC, 50/60 Hz</p> <p>4 – 20 mA output: 500 Ohm max. isolated</p> <p>Relay output: 1 A at 30 V DC/AC</p> <p><b>Installation and Operation</b></p> <p>Gas inlet/ outlet: 6 mm or 1/4" Swagelok (other dimensions on request)</p> <p>Sample gas flow: Recommended 1 – 5 l/min</p> <p>Sample inlet pressure: 0.2 - 2.0 Bar abs (2.9- 29 psia)</p> <p>Sample input temprature: Max 180 °C</p> <p>Purging of laser / mirror chamber (optinal): Dry and oil-free pressurised air or gas, Nitrogen for O<sub>2</sub> and H<sub>2</sub>O applications</p> <p>Purge flow: Maximum 0.5 l/min</p>	<p><b>Maintenance</b></p> <p>Visual inspection: Recommended every 6 – 12 months (no consumables needed) Remote instrument check by Ethernet connection or external modem possible check</p> <p>Calibration: Recommended every 12 months</p> <p><b>Safety</b></p> <p>Laser class: Class 1 according to IEC 60825-1</p> <p><b>Dimension and weight</b></p> <p>19" Rack version: 483 x 506 x 266 mm, 10 – 14 kg</p>
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Gas	Detection limit (ppm)
O <sub>2</sub>	140ppm
HCL	0.07 ppm
H <sub>2</sub> S	4.5 ppm
CH <sub>4</sub>	0.3 ppm
CO	0.4 ppm
CO <sub>2</sub>	43 ppm
NO	25 ppm
N <sub>2</sub> O	7 ppm
NH <sub>3</sub>	0.2 ppm

NOTE: Detection limits are specified as the 95% confidence interval for the standard 0.7 m measurement cell and gas temperature / pressure = 25 °C / 1 bar abs measured in N<sub>2</sub>.

Other gases on request.

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# LaserDust™ MP, LP and XLP Monitors



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**NEO Monitors LaserDust™** Medium Path (MP), Long Path (LP), and Extra Long Path (XLP) Monitors are compact, optical dust monitors for true continuous in-situ measurement of dust concentration or opacity. The monitors are designed for measurement across pipes, stacks, and ducts with typical path lengths of 0.5 – 10 m LaserDust™ Monitors use a transmitter/receiver configuration to measure the dust concentration along the optical line of sight. Our true non-contact approach is superior to point type dust meters.

## Features

- Response time down to one second
- Suitable for high temperatures
- Cross stack measurement up to 10 m
- High dynamic range (mg or g with one instrument)
- Scattered light detection for high sensitivity
- Non-contact measurement
- No moving parts

## Applications

LaserDust™ the ideal choice for obtaining the best measurement data. Monitors are most typically used in:

- Aluminum smelters and steel works
- Waste incinerators, power plants or cement kilns
- Scrubber and filter optimization
- Bag house filter surveillance
- Dust explosion prevention

## Customer benefits

- In-situ monitoring
- Highly reliable real time analyzer
- Low maintenance cost
- Reduce emission to the environment
- Easy to install and operate
- Reduce daily operation costs
- Optimize process
- Well proven measurement techniques

# LaserDust™ MP, LP and XLP Monitors

## Technical Data

<b>Specifications</b> Process temperature: Above dew point up to 700 °C Process pressure: 0.1 – 1.5 bar abs (optional windows for up to 5 bar) Detection limit: < 0.5 mg/Nm <sup>3</sup> (in scattered mode) Measurement range: min. 0 – 15 mg/Nm <sup>3</sup> (scattered mode), particle size >1micron max. 0 – 10.000 mg/Nm <sup>3</sup> (transmission mode), particle size >1micron Resolution: 0.05 mg/Nm <sup>3</sup> Optical path length**: MP: 0.5 – 3 m LP: 3 – 6 m XLP: 6 – 10 m Response time: 1 – 2 sec Pulse mode: 50 ms <b>Environmental conditions</b> Operating temperature: -20 °C to +55 °C Storage temperature: -20 °C to +55 °C Protection classification: IP66 <b>Inputs / Outputs</b> Analog output: 4 – 20 mA current loop (concentration, transmission) Digital output: TCP/IP, MODBUS, Optional fibre optic Relay output: High dust-, Warning - and Fault relays (normally closed-circuit relays) Analog input: 4 – 20 mA process temperature and pressure reading	<b>Ratings</b> 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 <b>Installation and Operation</b> Flange dimension: MP: DN50/PN10 LP: DN80/PN10 XLP: DN150/PN10 Optional ANSI or other sizes on request Alignment tolerances: Flanges parallel within 1.5° Purging of windows: Dry and oil-free pressurised air or gas, or by fan Purge flow: 50 – 100 l/min (application dependent) <b>Maintenance</b> Visual inspection: Recommended every 6 – 12 months (no consumables needed) Remote instrument check by Ethernet connection or external modem possible Calibration: Recommended every 12 months (against gravimetric analysis) Validation: Integrated zero and span check	<b>Safety</b> Laser class: Class IIIb according to IEC 60825-1 CE: Certified EMC: Conformant with directive 2014/30/EU <b>Explosion protection (optional)</b> IECEX/ATEX zone 2: II 3 GD T100 °C Ex nA nC II T5 <b>Dimension and weight</b> Transmitter unit: (MP, LP, XLP) 200 (plus 100 for purge unit) x 270 x 170 mm, 6.2 kg Transmitter unit: (Ex version) 200 (plus 100 for purge unit) x 270 x 310 mm, 7.9 kg Receiver unit (MP): 300 (plus 100 for purge unit) x 120 x 120 mm, 3.9 kg Receiver unit (LP): 380 (plus 100 for purge unit) x 120 x 120 mm, 5 kg Receiver unit (XLP): 410 (plus 100 for purge unit) x 270 x 170 mm, 8 kg Power supply unit: 180 x 85 x 70 mm, 1.6 kg  ** Other OPLs on request
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\*NEO Monitors reserve the right to change specifications without prior notice

**Your local distributor:**



**neomonitors**

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# Guide gas measurement

	LaserGas™ iQ2**	LaserGas™ Q	LaserGas™ III SP	LaserGas™ III OP	LaserGas™ III Portable	LaserGas™ II SP	LaserGas™ II Compact	LaserGas™ II MP	LaserGas™ II OP	LaserGas™ II R2P	LaserDust™
CH4						•	•	•	•	•	
CO%						•	•				
CO2%						•	•				
CO% + CO2%						•	•			•	
CO ppm	•		•	•		•	•	•	•	•	
CO ppm +CH4	•		•	•		•	•	•		•	
CO ppm +H2O%	•		•			•	•				
CO2 ppm						•	•	•		•	
H2O%						•	•				
H2O ppm							•				
H2S						•	•	•	•	•	
H2S +CO2						•	•	•	•		
HCl						•	•	•	•	•	
HCl + H2O%*						•	•			•	
HCl+CH4						•	•	•	•		
HCl in VCM						•	•	•			
HCN						•	•	•		•	
HCN + NH3						•	•	•		•	
HF*				•	•	•	•		•		
HF + H2O					•	•	•				
N2O%						•	•				
N2O ppm						•	•	•			
NH3			•	•		•	•	•	•	•	
NH3 + H2O%*			•			•	•			•	
NO		•				•	•	•			
NO2		•				•	•	•			
O2	•		•	•		•	•	•		•	
O2 + Temperature	•		•			•	•				
Particles											•
SO2		•									
C2H2 (Acetylene)						•	•	•			
C2H4 (Ethylene)						•	•				
C2H3Cl (VCM)						•					
C2H4O (Ethyleneoxide)						•					
C3H6 (Propylene)						•					
CF4		•									
CH2O (Formaldehyde)						•	***	***			
CH3I (Methyl Iodid)						•	***	***			
COs (Carbonyl sulfide)						•	***	***			
C3H3N (Acrylonitrile)						•	***	***			
C2H4Cl2 (1,1-Dichloroethane)						•	***	***			

Above is a list of gases and gas combination NEO Monitors can perform with our products LaserGas™ and LaserDust™. We are constantly seeking for new gases to measured. This list is dynamic and will be developed further.

\* LaserGas™ II SP with TÜV/MCERTS certification • \*\* LaserGas™ iQ2: H2O in combination with CO (>500 °) • \*\*\* Contact NEO Monitors • • Upcoming gases



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