**LAS 300 XD**

LASER ABSORPTION SPECTROMETRY GAS ANALYZER

4 different versions to meet your analytical requirements:

- LAS 300 XD HF for Hydrofluoric acid (HF) and water (H₂O) monitoring
- LAS 300 XD HCl for Hydrochloric acid (HCl) and water (H₂O) monitoring
- LAS 300 XD NH₃ for Ammonia (NH₃) and water (H₂O) monitoring
- LAS 300 XD O₂ for Oxygen monitoring

**Benefits:**

- High sensitivity (ppb, ppm concentrations)
- Interference free gas measurements
- Large dynamic range
- Absolute measurements: no drift, no calibration, inherently linear
- Real-time (1 s response)
- In-situ and non-invasive (optical technique)
- Suitable for harsh environment; sensor unaffected by contaminants (no corrosion)
- Absence of extractive conditioning: eliminates errors related to sample handling
- Very low maintenance, low cost of ownership

**Main applications:** Process analysis, Combustion control, Emission monitoring, Chemical industry, Fertilizer plants, Petrochemical industry, Power plants, Waste incinerators, Cement industry, Glass industry, Pulp and paper, Scrubber technology, Biomass boilers...

**Specifications**

- **Operating temperature:** -10°C to +55°C
- **Enclosure rating:** IP65
- **Transmitter / Receiver material:** Die-cast aluminium (epoxy coated)
- **Flange material:** SS 316 L or ANSI 150 lb
- **Power:** 24 v DC
- **Air purge:** Air consumption 30-40 l/min
- **Stack temperature:** ≥150°C (other temperatures upon request)
- **Outputs:** 2 x 4-20 mA, 2 x relays

**Options:**

- Purge Air unit (Blower + filters and pressure regulator)
- Optical Alignment aids
- Weather protection covers
- Evaluation unit for control
- Specific flanges (length and/or material)

**Main applications**

- Process analysis
- Combustion control
- Emission monitoring
- Chemical industry
- Fertilizer plants
- Petrochemical industry
- Power plants
- Waste incinerators
- Cement industry
- Glass industry
- Pulp and paper
- Scrubber technology
- Biomass boilers...

**DInEnSIOnS anD TEChnIcAl DaTa**

- **Operating temperature:** -10°C to +55°C
- **Enclosure rating:** IP65
- **Transmitter / Receiver material:** Die-cast aluminium (epoxy coated)
- **Flange material:** SS 316 L or ANSI 150 lb
- **Power:** 24 v DC
- **Air purge:** Air consumption 30-40 l/min
- **Stack temperature:** ≥150°C (other temperatures upon request)
- **Outputs:** 2 x 4-20 mA, 2 x relays

**Options:**

- Purge Air unit (Blower + filters and pressure regulator)
- Optical Alignment aids
- Weather protection covers
- Evaluation unit for control
- Specific flanges (length and/or material)

**BENEFITS:**

- High sensitivity (ppb, ppm concentrations)
- Interference free gas measurements
- Large dynamic range
- Absolute measurements: no drift, no calibration, inherently linear
- Real-time (1 s response)
- In-situ and non-invasive (optical technique)
- Suitable for harsh environment; sensor unaffected by contaminants (no corrosion)
- Absence of extractive conditioning: eliminates errors related to sample handling
- Very low maintenance, low cost of ownership

**Main applications:** Process analysis, Combustion control, Emission monitoring, Chemical industry, Fertilizer plants, Petrochemical industry, Power plants, Waste incinerators, Cement industry, Glass industry, Pulp and paper, Scrubber technology, Biomass boilers...

**Specifications**

- **Operating temperature:** -10°C to +55°C
- **Enclosure rating:** IP65
- **Transmitter / Receiver material:** Die-cast aluminium (epoxy coated)
- **Flange material:** SS 316 L or ANSI 150 lb
- **Power:** 24 v DC
- **Air purge:** Air consumption 30-40 l/min
- **Stack temperature:** ≥150°C (other temperatures upon request)
- **Outputs:** 2 x 4-20 mA, 2 x relays

**Options:**

- Purge Air unit (Blower + filters and pressure regulator)
- Optical Alignment aids
- Weather protection covers
- Evaluation unit for control
- Specific flanges (length and/or material)

**Main applications:** Process analysis, Combustion control, Emission monitoring, Chemical industry, Fertilizer plants, Petrochemical industry, Power plants, Waste incinerators, Cement industry, Glass industry, Pulp and paper, Scrubber technology, Biomass boilers...

**Specifications**

- **Operating temperature:** -10°C to +55°C
- **Enclosure rating:** IP65
- **Transmitter / Receiver material:** Die-cast aluminium (epoxy coated)
- **Flange material:** SS 316 L or ANSI 150 lb
- **Power:** 24 v DC
- **Air purge:** Air consumption 30-40 l/min
- **Stack temperature:** ≥150°C (other temperatures upon request)
- **Outputs:** 2 x 4-20 mA, 2 x relays

**Options:**

- Purge Air unit (Blower + filters and pressure regulator)
- Optical Alignment aids
- Weather protection covers
- Evaluation unit for control
- Specific flanges (length and/or material)

**Main applications:** Process analysis, Combustion control, Emission monitoring, Chemical industry, Fertilizer plants, Petrochemical industry, Power plants, Waste incinerators, Cement industry, Glass industry, Pulp and paper, Scrubber technology, Biomass boilers...
**TECHNOLOGY**

**SYSTEM DESCRIPTION**

The Tunable Dode Laser Spectroscopy (TDLS) is the perfect technology to use when you are looking for a selective measurement and a fast response time on some gas components as NH₃, HCl, HF or even O₂ when conditions are too rough for standard O₂ Zirconia In-Situ analysers. It uses a solid-state laser source with a wavelength that can be adjusted to the gas component unique spectrum, also called "gas component fingerprint." TDLS method is a non-contact optical technology and therefore the emitter is not exposed to any contamination or corrosion and so the maintenance operation and the cost of operation are very low compared to other technologies.

Thanks to the improved and fast A/D converters, the use of Direct Absorption Spectroscopy (DAS) is now the "must" for the TDLS analysers, compared to WPS (Wavelength Modulation Spectroscopy).

**PRINCIPLE OF OPERATION**

The TDLS Laser Gas Monitor measures gas concentration using tunable laser absorption spectroscopy. Light from a single mode laser source is directed through the gas to measure and, as the laser frequency is tuned, the intensity of light received by the photodetector varies depending on the concentration of a specific gas present in the sample.

The absorption of light follows the Beer-Lambert law shown in Equation 1.

\[
T(u) = \frac{I(u)}{I_0} = \exp[-\alpha(u)L]
\]

Equation 1: Beer-Lambert law.

Where \(I\) is the intensity of the transmitted light, \(I_0\) is the intensity of the received light, \(\alpha\) is the absorption coefficient for a given frequency, \(u\) and \(L\) is the pathlength.

Each gas absorbs light in a characteristic way. The attenuation of the light over the fixed pathlength is directly proportional to the concentration of the gas species of interest.

The concentration value can be calculated using the known intensity and other physical parameters.

By tuning a laser and recording a whole absorption peak, variations in peak width due to broadening variations such as by changes in pressure and flow regulator. The absorption of light follows the Beer-lambert law shown in Equation 1.

**TECHNICAL SPECIFICATIONS**

Based upon 1 m pathlength

<table>
<thead>
<tr>
<th>Gas</th>
<th>HF/H₂O</th>
<th>HCl/H₂O</th>
<th>NH₃/H₂O</th>
<th>O₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower detection limit</td>
<td>0.1 ppm (1 Hz) / 0.05%</td>
<td>0.15 ppm (1 Hz) / 0.05%</td>
<td>0.15 ppm (1 Hz) / 0.05%</td>
<td>0.01%</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 ppm</td>
<td>0.15 ppm</td>
<td>0.15 ppm</td>
<td>+0.01%</td>
</tr>
<tr>
<td>Measurement range</td>
<td>Minimum</td>
<td>Maximum</td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td></td>
<td>0-2 ppm / 0-5%</td>
<td>0-100 ppm / 0-50%</td>
<td>0-10 ppm / 0-5%</td>
<td>0-3000 ppm / 0-50%</td>
</tr>
<tr>
<td></td>
<td>0-15 ppm / 0-5%</td>
<td>0-500 ppm / 0-50%</td>
<td>0-10%</td>
<td>0-100%</td>
</tr>
<tr>
<td>Response time</td>
<td>1 s</td>
<td>1 s</td>
<td>1 s</td>
<td>1 s</td>
</tr>
</tbody>
</table>

**CHARACTERISTICS**

LAS 300 Cross Duct analysers are very easy to install. The two main parts of the instrument are arranged on opposite sides of the duct. On one side is the transmitter and on opposite side the receiver.

The transmitter unit on the opposite contains the laser and, typically, the signal processing and communication electronics. The receiver unit contains a photodetector, when power and signals are connected to the transmitter unit by two 2-core cables.

In case of specific installation conditions, such as high flow gas temperature or large insulation material on duct, options are available to cover it.

**INSTALLATION**

Alignment of the 2 units is also simple, thanks to the 2 specific alignment devices delivered with the whole LAS 300 XD system. For additional ease of alignment, an optical alignment aid is also available as an option.

The purge connectors are part of the window purge body and options are available to ease the installation and arrangement of the purging system: as a complete purge system that includes blower / filter and regulator (when there is no instrument air available at the installation point) or an advance Purge and Nitrogen system that includes regulator assembly and flow regulator.

**USER INTERFACE (OPTION)**

Options for the Instrument are as follows:

- Long-term log review for diagnosing location of leaking bags/or large insulation material on duct, options are available to cover it.
- 2 month @ 15 minutes
- 7 days @ 1 minute
- 2 months @ 15 minutes
- 7 days @ 1 minute
- 2 hour @ 1 second
- 500 entries

Options for advanced calculation (mass, normalisation): advanced calculation (mass, normalisation)