Axetris Laser Gas Detection

A solution to many gas detection challenges

How OEM gas detection solutions for low-cost, high-volume applications based on Tunable Diode Laser Spectroscopy (TDLS) are helping to popularise the technology.

Laser Gas Detection (LGD) products from Axetris – based on Tunable Diode Laser Spectroscopy (TDLS) – provide a solution to many gas detection challenges in emission monitoring, process control and medical applications. The technology offers unique advantages like high precision, contactless measurements, excellent target gas selectivity and sub ppm-level detectivity.

Axetris’ LGD solutions achieve high detection performance at relatively short absorption lengths, helping us design compact solutions for OEM customers. The modular design of the LGD solutions, combined with Axetris’ intellectual property of reference channel-free devices, enables significant cost synergies and drives down unit cost.

Proprietary TDLS gas detection technology

Axetris uses proprietary technology-enhanced TDLS for gas detection, where a 0.1nm narrow bandwidth diode laser beam is scanned across an absorption band of the target gas, performing a high-resolution near-infrared absorption measurement. Electronic lock-in technology allows separating the gas absorption information from electro-optical system information, leading to a detection method that eliminates the need for a physical reference channel. The design of the LGD modules offers continuous sensor status monitoring, which helps customers use built-in diagnostic features to design maintenance-free gas analysers. Axetris’ LGD products thus present a clear alternative to current sub-optimal detection solutions and combine precision with high target gas selectivity, calibration-free operation, low-cost-of-ownership and easy OEM integration.

Helping popularise TDLS

The LGD technology from Axetris can deliver key advantages compared to existing gas detection technologies such as Electrochemical (EC) or Non-Dispersive Infrared (NDIR):

- Extremely high selectivity to the target gas
- Detection limits down to ppm
- Long lifetime (10+ years)
- Quick response time
- Compact size due to short absorption length
- Modular product design enabling custom designs
- Very low cost-of-ownership (no regular replacement and/or calibration)
- Low gas sensor unit cost through scaling effects

The LGD F200 line of standard OEM products is available for gases such as NH₃, HCl, CH₄, H₂O and CO₂.

The value proposition of Axetris LGD products benefits OEMs in a variety of environmental and safety applications:

- Continuous emission monitoring
- Biogas detection
- Fugitive emissions
- Natural gas leak detection
- Industrial process control, e.g. De-NOx

Case Study

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Axetris supports OEMs right from prototyping to mass production by providing commercially-viable TDLS gas detection solutions (pictured here: Prototype of diffusive-type gas detection module)
Axetris – A true OEM partner

Besides its LGD F200 line of standard OEM products, Axetris also offers customised solutions for specific gas detection applications. For this, the highly-skilled team of Axetris engineers and development experts support OEMs with in-depth knowledge of technology and applications, right from prototyping up to mass production.

About Axetris AG, Switzerland

Axetris AG is a company of the privately-owned Leister Group which has over 60 years’ experience in the development, production and worldwide distribution of premium technical products. Besides its line of laser gas detection products, the company is an OEM partner for MEMS-based gas flow control and sensing products.

Mass Flow Devices from Axetris are available in various configurations, such as meters (MFM), controllers (MFC) and manifolds for gases. The proprietary platinum-based MEMS chip technology from Axetris guarantees excellent accuracy and repeatability in combination with high speed and an extended dynamic range. The Axetris mass flow technology is used by many leading companies in the field of gas chromatography, leak testing, thermal analysis, mass spectroscopy, thin film deposition, plasma engineering and more.

Infrared sources from Axetris are micro-machined, electrically modulated thermal infrared emitters featuring true blackbody radiation characteristics, low power consumption, high emissivity and a long lifetime. Infrared sources from Axetris are used by optical gas detection OEMs in a variety of medical and environmental applications.

Axetris AG
Schwarzenbergstrasse 10,
CH-6056 Kaegiswil, Switzerland
+41 (0) 41 662 76 76
axetris@axetris.com

Conformity to EN14181 / QAL1

The Axetris LGD F200 module can be integrated into gas analysis systems for a hot-wet measurement, which can be certified for use in continuous emission monitoring (CEM) by complying with the European testing norms for emissions from stationary sources.

“the LGD F200-H NH3 module can be used for a certification range of 0–10mg/m³ NH3 and 0 - 40% volume absolute humidity”

The Axetris LGD technology displays practically no cross-interference with gas matrix components such as humidity.

The LGD F200-H NH3 achieves quick T90 reaction times to support gas analyser integrators to fulfill EN14181 requirements.