
ABB MEASUREMENT & ANALYTICS

Diode laser analyser LS4000

Highest precision under harshest conditions



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The LS4000 is an in situ cross-conduct analyzer for measuring gas component concentrations. It applies the highly selective, optical measuring principle of tunable diode laser (TDL) absorption spectroscopy. The LS4000 is a stand-alone system and is approved for use in hazardous areas according to international standards.

The device consists of a transmitter unit with a laser light source and a receiver unit with a photodetector. The two units are mounted opposite each other on the process pipe or stack and are connected by a junction box.

Measurement made easy.

The advantages to you:

High precision

Due to the narrow spectral width of the laser beam and the narrow scan window, only the absorption by the target gas component is measured. Consequently, high selectivity and accuracy are achieved and the measurement is virtually cross-interference free.

Suitable for harsh process conditions

LS4000 applies a non-contact, optical technique, which allows the measurement of corrosive, toxic and hazardous gas streams directly in the process. The laser analyzer is suitable for measurements at elevated temperatures up to 1500 °C (2732 °F) and pressures up to 20 bar (290 psi). The influence of temperature and pressure variations is eliminated by automatic dynamic correction.

Fast and direct

A sampling and conditioning system is unnecessary since the instrument is directly installed on the process (in situ). This results in a typical response time of 2 seconds, providing better loop control and faster detection of critical conditions. The in situ laser analyzer is ideally suited for process optimization and safety measurements.

Safe, compact and easy

- No purging for installations in hazardous areas – the analyzer includes flameproof housing (Ex-d) with international certifications
- No nitrogen purging of the analyzer housing for O₂ measurement
- Insensitive to vibrations through compact and lightweight design
- Ease of maintenance

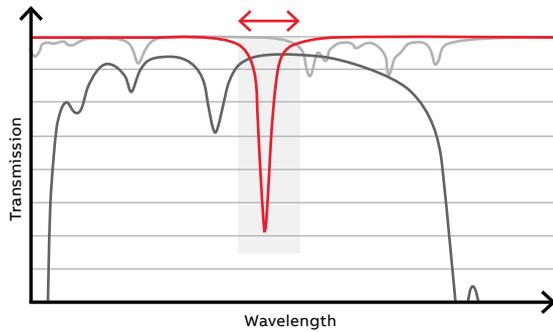


How it works – measuring principle

The LS4000 employs the optical measuring technique of absorption spectroscopy, which utilizes the fact that a specific gas absorbs specific light wavelengths. The light beam is emitted from a tunable laser diode located in the transmitter unit. The laser light passes through the process gas and strikes the photo-detector in the receiver unit.

The measured gas component present in the optical path absorbs the laser light, attenuating the light received. A sophisticated signal algorithm processes the amount of light attenuation and calculates the gas concentration on the basis of the Beer-Lambert law. The influence of temperature and pressure variations is eliminated by dynamic automatic correction.

01 Tunable laser scanning the absorption line of the target gas



Sample components and measurement ranges

The LS4000 laser analyzer has one physical measurement range per sample component.

O ₂	from 0 ... 1 bis 0 ... 100 Vol%
NH ₃ +H ₂ O (optional)	from 0 ... 10 to 0 ... 1000 ppm from 0 ... 10 to 0 ... 50 Vol%
H ₂ O	from 0 ... 10 to 0 ... 50 Vol%

Typical applications

- Process and safety monitoring
- Combustion control
- Control of flue gas abatement equipment (e.g. ammonia slip measurements)
- Emission monitoring

Typical industries served

- Chemical and petrochemical industry
- Power industry
- Iron and steel industry

International certifications

- ATEX Zone 2
- ATEX Zone 1
- IECEx Zone 1
- CSA Class I, Division 1
- KCs Zone 1





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