



Advance Optima Modular continuous gas analyzers

Advance Optima

Innovative modular analyzer technology

Advance Optima gas analyzers combine advanced technologies with more than 75 years of experience in processing and environmental analysis.

They are the innovative solution for the demands of today and the challenges of tomorrow.

Being tailored to satisfy the requirements of various industries, the Advance Optima series can be used in almost every form of production and has proven itself in the toughest processing environments – worldwide.

Typical applications

- Refineries, petrochemicals and chemical plants
- Air separators and pure gas production
- Pharmaceuticals, food and beverages
- Metals, minerals, pulp and paper
- Power generation
- Environmental technology
- Waste incinerators

Advanced and reliable technology

- Unrivalled economy
- Integrated system solutions – for added flexibility
- Multi-analyzer systems – up to four analyzer modules
- Integrated control and monitoring
- Simple, user-friendly operation
- „Packaging“ that fits right in
- Reliable and powerful
- Always the right analyzer for the job. Whatever the measuring task!
- Unlimited access to analytical data

Unrivalled economy

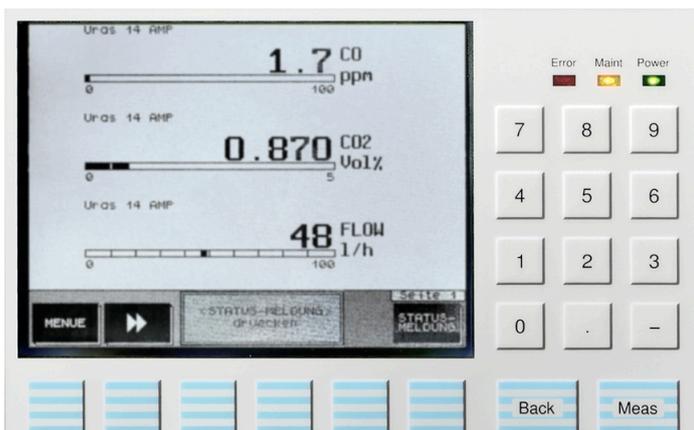
- Cost-effective operation, service and maintenance over the entire life cycle
- High quality design with a long lifetime
- Lower training and documentation expenses

Integrated system solutions – for added flexibility

Standardized modules can be adapted to your measuring tasks and combined to systems tailored to your individual requirements. And all of these assemblies are designed to integrate flexibly with each other – from analyzer modules to housings, from displays to control units and from power supplies to sample conditioning. In its basic version, Advance Optima consists of a central processing unit and an analyzer module.

Multi-analyzer systems

In its most extensive version, an Advance Optima multi-analyzer system consists of four analyzer modules and it can measure six different components. Other locally installed system components for the conditioning of sample gas, such as sample gas feeding units and coolers, can also be integrated. All the modules are operated by the central processing unit – and the analyzer module can even be installed up to 350 m away.



Multi component analyzer

Tailored to your needs

Integrated control and monitoring

High performance processor technology for rapid signal processing is used for sophisticated calculations, such as cross-sensitivity corrections and auto-calibration. Internal PLC functions with programmable function blocks eliminate the need for additional external logic controllers.

Simple, user-friendly operation

- Simultaneous display of up to six sample components
 - Clear status and maintenance messages
 - Operation menus with online help
 - 10 menu languages are available
- Operator controls can be customized

“Packaging” that fits right in

Three system housings are available: a 19” slide-in version for cabinet installation, a wall mounted housing and an explosion-protected design. And all these housings can be purged for the measurement of toxic or corrosive gases.

Reliable and powerful

- Measurements of even low level, trace values
- Calibration without test gas cylinders
- Easy-to-service construction
- Standardized electrical and pneumatic connections
- Proven measuring technology with minimized maintenance
- Corrosion-proof housings made from coated stainless steel
- High quality construction with a long service life

Always the right analyzer for the job.

Whatever the measuring task!

Advance Optima offers analyzer modules using various measurement principles which are suitable for practically any processing task, including:

- Infrared analyzer modules
- UV analyzer modules
- Thermal conductivity analyzer modules
- Oxygen analyzer modules
- Flame ionization detectors
- Laser analyzer modules

Unlimited access to analytical data

- Ethernet with TCP/IP protocol for direct integration into existing PC networks or control systems
- OPC interface for direct integration into centralized process control equipment
- First analyzer in the market with PROFIBUS-DP/PA interface certified for emission monitoring systems according VDI 4201-2
- Modbus protocol via Ethernet and serial port, also for Windows applications

Asset management facility wide

The asset management software “Analyze IT Explorer” permits centralized maintenance of all analyzers and systems via the Ethernet – as well as worldwide via an Intranet connection.

- Increased system availability through rapid trouble-shooting and diagnosis
- Reduced costs through planned predictive maintenance
- Surveillance, interpretation and reporting according to EN 14181 with QAL3 package in Analyze IT Explorer



Improving safety for people, facilities and the environment

Advance Optima with all its associated safety engineering assemblies is certified for operation in hazardous Zone 1, Zone 2 and Class I Division 2 designated areas.

Explosion protection

The analyzers for a Zone 1 installation are available in an explosion-proof version. The central processing unit can be installed either in a Zone 2 area or in a non-hazardous area via an extended system bus.

Safety concept

A sophisticated safety concept which is built into Advance Optima ensures the impermeability of its measuring system. Minimized purging volumes and superior Ex nAC (nonincendive) protection even permits the installation of these modules in hazardous Zone 2 areas for measurement of flammable gases.

Hazardous area Zone 2

The designs for operation in Zone 2 for measurement of non flammable gases and the Class I, Division 2 version for the USA and Canada do not require additional case purging. All the assemblies have been tested to ensure that they are nonincendive.

Alarm System

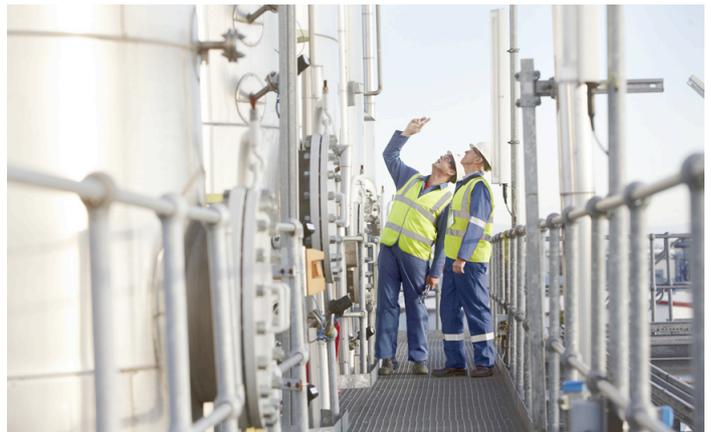
In addition, an innovative 24-7 alarm system has also been integrated, which can send messages to maintenance personnel via the standard network, as well as by e-mail or SMS.

Quality assurance

ABB fulfills all ISO 9001 quality guidelines. All development and production processes are monitored.

Typical applications

- Chemical industry
- Technical process plants
- Pharmaceutical industry
- Waste incinerators
- Bio gas plants
- Production, storage and transport of flammable gases in hazardous areas



Thermal conductivity analyzer modules

Caldos25

The Caldos25 is designed for highly corrosive applications. The measuring cell with its glass-coated resistor is especially resistant to corrosive gases. With Caldos25 pressure correction is not required. The measurement signal is completely independent of the sample gas pressure – whether negative or positive.

Measurement principle

The analyzer modules' measuring principle is based on the differences in thermal conductivity between gases. Individual gas components are quantitatively analyzed in a binary or quasi-binary mixture based on their thermal conductivity.

Typical applications

- Chlorine production
- Analysis of SO₂ in metal roasting plant off-gas
- Ammonia dissociation

Sample components – smallest measuring ranges (examples)

- H₂ in N₂ or air 0... 0.5 Vol.-%
- SO₂ in N₂ or air 0...1.5 Vol.-%
- H₂ in Cl₂ 0...0.5 Vol.-%

Calibration

- Zero-point calibration with sample component-free process gas or substitute gas
- End-point calibration with process gas having a known sample gas concentration or with substitute gas

Caldos27

Smallest measuring ranges and fast measurements are characteristic of Caldos27 thanks to its silicon sensor. In addition, the micro-structure of the sensor gives the Caldos27 a particularly short T₉₀ response time. Measuring ranges can be selected freely. An exceptionally long-term stability of the end point permits Caldos27 the single-point calibration with only one gas.

Typical applications

- Hydrogen purity measurement
- Turbo generator monitoring
- Inert gas monitoring
- LEL monitoring

Sample components – smallest measuring ranges (examples)

- | | |
|--|-------------------|
| – Ar in O ₂ | 0...2 Vol.-% |
| – H ₂ in Ar | 0...0.25 Vol.-% |
| – H ₂ in N ₂ or air | 0...0.3 Vol.-% |
| – CH ₄ in N ₂ or air | 0...2 Vol.-% |
| – Ar in N ₂ | 97.5...100 Vol.-% |
| – He in N ₂ | 97...100 Vol.-% |

Calibration

- Zero-point calibration with sample component-free process gas or substitute gas
- End-point calibration with process gas having a known sample gas concentration or with substitute gas
- Simplified calibration with standard gas avoids the need for separate zero- and end-point calibration with test gases
- Automatic calibration by means of internal control

Dynamic response

- T₉₀ ≤ 2 s



Photometers for industrial...

Uras26

The Uras26 is an NDIR photometer suitable for continuous measurement of gases in emission monitoring and many other industrial process applications. The Uras26 can measure up to 4 infrared active gases in one analyzer module. The analyzer detectors are filled with gas that corresponds to the desired measuring component. This enables the detectors to provide optimum sensitivity and high selectivity over other gases present in the sample gas mixture, thereby achieving low detection limits.

A special safety cell is available for corrosive, toxic or flammable sample gas mixtures, whose windows can be purged whereby the purging is monitored internally by the system controller.

The Uras26 can be used in combination with the paramagnetic O₂ analyzer Magnos206 or an electro-chemical O₂ sensor within one analyzer housing. The optional gas filled calibration cells are an ideal substitute for expensive test gas bottles used for the automatic calibration.

Measurement principle

Non-dispersive infrared (NDIR) absorption in the $\lambda = 2.5...8 \mu\text{m}$ wavelength range, employing gas filled opto-pneumatic detectors.

Calibration

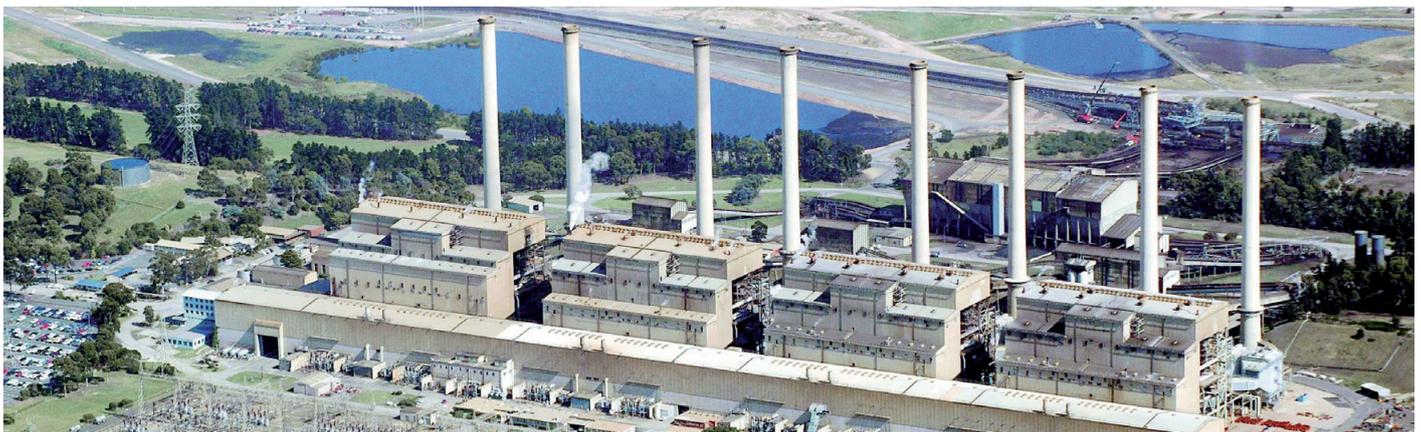
- Zero- and end-point calibration with gas-filled calibration cells or test gas mixture
- Automatic calibration by means of internal control

Typical applications

- Emission monitoring
- Landfill gas monitoring
- Gas production/purity monitoring
- Burner optimization
- Process monitoring, e.g. in the chemical industry, steel and glass industry, power generation
- Fermentation process monitoring
- Blast furnace gas analysis

Sample components – smallest measuring ranges (examples)

CO	0...10 ppm
CO ₂	0...5 ppm
NO	0...150 ppm
SO ₂	0...25 ppm
N ₂ O	0...20 ppm
CH ₄	0...50 ppm
C ₃ H ₈	0...50 ppm
C ₂ H ₄	0...300 ppm
R 134	0...50 ppm



...processes

Limas11

The Limas11 is an industrial photometer that can be either configured to meet process measurement requirements or deployed for emission monitoring applications. The measuring principle is particularly reliable because of its high stability which is based on the four-beam signal processing principle. A high degree of selectivity is provided by using interference and gas filters correction technique as well as optimum selection of measured wavelength and reference wavelength. The Limas11 is also a reliable and simple solution for measurement of flammable, corrosive and toxic gases, in hazardous area beside general purpose installation.

Measurement principle

- The principle is based on non dispersive spectroscopy, by making use of gas filter correlation and/or wavelength comparison techniques. The photometer can be configured either in the UV-Vis or in the IR ranges:
- Ultraviolet and visible spectrum range $\lambda = 200...600$ nm (Limas11UV, Limas11HW)
- Infrared spectrum range $\lambda = 2.5...10$ μm (Limas11IR)

Calibration

- Zero- and end-point calibration
- Automatic calibration by means of internal control
- Gas filled calibration cells

Typical applications (Limas11IR)

- Olefins production and processing
- Oil Refining
- Cl_2 production and processing
- Quality control in chemical productions
- Marine exhausts gases monitoring
- Biogas analysis

Typical applications (Limas11 UV/ HW)

- Burner optimization
- Control of DeNOx process
- Nitric acid production
- Cement production
- Purity measurement in the chemical industry
- Production and processing of cellulose and viscose
- Natural gas and biogas analysis
- Cl_2 production and processing
- Automotive and marine exhaust gas monitoring
- Power plants emission monitoring

Sample components – smallest measuring ranges (examples)

Limas11UV

NO	0...10 ppm
SO ₂	0...25 ppm
NO ₂	0...50 ppm
H ₂ S	0...25 ppm
Cl ₂	0...125 ppm
CS ₂	0...50 ppm
COS	0...250 ppm
C ₃ H ₆	0...500 ppm

Limas11IR

CO	0...500 ppm
CO ₂	0...150 ppm
HCl	0...2,500 ppm
CH ₄	0...1,000 ppm
C ₂ H ₂	0...1,250 ppm
C ₂ H ₄	0...1,500 ppm
C ₂ H ₆	0...250 ppm

Limas11HW

C ₃ H ₈	0...150 ppm	C ₄ H ₁₀	0...250 ppm
NO	0...25 ppm	NO ₂	0...40 ppm
NH ₃	0...25 ppm		

Measuring ranges

- 1 to 5 sample components
- Measurement ranges freely adjustable within a range ratio of 1:20 relative to the factory-set reference measuring range



Oxygen analyzer modules and...

Magnos206

The Magnos206 is based on the magneto-mechanical measuring principle. Thanks to the short T_{90} time, the Magnos206 is also suitable for measuring rapid changes in the concentration of the sample gas. The ability to freely select measuring ranges and set suppressed ranges means that the analyzer can be easily adapted to specific measurement tasks. Even measurements for safety are no problem – monitoring the sample flow rate through the measuring chamber always ensures that the current oxygen concentration is being measured. Calibration of the zero-point is only required once a month using air or nitrogen.

Typical applications

- Oxygen purity measurement
- Air separation plants
- Biogas monitoring
- Process gas monitoring
- Emission monitoring

Sample components

- O_2

Measuring ranges

- Smallest measuring range: 0...0.5 Vol.-% O_2
- Largest measuring range: 0...100 Vol.-% O_2
- Measuring range suppression max. 1:100, e.g. 99...100 Vol.-% O_2

Calibration

- Zero- and end-point calibration with nitrogen and air or test gas mixtures
- Single-point calibration with ambient air
- Automatic calibration via built-in pneumatic module or external valves

Magnos27

The Magnos27 is based on the thermomagnetical measuring principle. The robust measuring cell means that the Magnos27 is especially resistant to vibrations and shocks.

Typical applications

- Flue gas analysis
- Metal roasting plant off-gas analysis
- Cement flue gas analysis

Sample components

- O_2 in flue gas or nitrogen

Measuring ranges

- Smallest measuring range: 0...3 Vol.-% O_2
- Largest measuring range: 0...100 Vol.-% O_2

Calibration

- Zero-point calibration with oxygen-free process gas or substitute gas
- End-point calibration with process gas having a known oxygen concentration or with substitute gas
- Automatic calibration via built-in pneumatic module or external valves



...in situ laser analyzer

ZO23

The oxygen trace analyzer ZO23 measures the gas concentration with a zirconium dioxide measuring cell. The measuring element consists of ceramics with a platinized surface, conducting oxygen ions at temperatures typically above 600 °C. The measuring cell is catalytically inactive. The measuring method is especially advantageous to small measuring ranges of down to 1 ppm. This makes the analyzer particularly suitable for measuring oxygen in pure gases.

Measurement principle

- Measurement of oxygen with catalytically inactive ZrO₂ cell

Typical applications

- Measurement of oxygen purity, even with small amounts of flammable components
- Air separation plants
- Quality control in gas depots

Sample components

- O₂ in nitrogen or argon

Measuring ranges

- Minimal measuring range: 0...1 ppm
- Measuring ranges can be adjusted up to 250,000 ppm
- Factory setting: 0...1/10 ppm

Dynamic response

- T₉₀ < 60 s when switching from sample to test gas

Calibration

- Manual or automatic calibration

LS25

LS25 is an in-situ laser analyzer which selectively measures the concentration of up to two IR active sample components directly in the process. The analyzer operates according to the principle of tunable diode laser (TDL) single-line spectroscopy. For measurement purposes a single absorption line is selected from the gas to be measured in the near infrared spectral range, at which no cross-sensitivity from other gases occurs. The absorption line is scanned and the receiver located opposite detects the absorption caused by the measuring component and calculates the gas concentration from this. The transmission rate is displayed as a signal for predictive maintenance. As an integrated part of the Advance Optima series it can be combined with further analyzer modules and completely operated remotely in Ethernet networks. The LS25 holds ATEX and CSA certificates for hazardous locations as well as emission certificates for NH₃ and H₂O according to EN14181/EN15267. Depending on the application, LS25 is suitable for measurements at elevated 1500 °C and pressures up to 20 bar.

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 and glass industry

Sample components

O₂, NH₃ (+H₂O), HCl (+H₂O), HF+(H₂O), H₂O, CO

Calibration

- Calibration takes place either via a built-in flow cell or a separate calibration cell



Flame ionization detectors

Flame ionization detector MultiFID14 & MultiFID14 NMHC

The MultiFID14 is a flame ionization detector which measures the total content of organic carbon in the sample gas. The organic components present in the sample gas are ionized in a hydrogen flame and the ion current measured is proportional to the concentration. The MultiFID14 NMHC measures the total content of organic carbon with and without methane (NMHC = non-methane hydrocarbon) in the sample gas. An internal solenoid valve alternatively passes the sample gas through a catalyst in which all non-methane hydrocarbons are burned to CO_2 and H_2O or passes the sample gas directly to the detector. From the difference between these alternately measured values the non-methane hydrocarbon concentration can be calculated. Both analyzer modules are heated to 200 °C and can be connected directly to a heated sample gas line so that at no point cold spots can occur in the sample path. Furthermore it comes with a self-monitoring, error detection, logging and reporting function, as well as an automatic restart after fault detection.

Sample components

- Hydrocarbons
 additionally for MultiFID14 NMHC: Total C, CH_4 & NMHC

Measuring ranges

- Smallest measuring range: 0...10 mgC/m³
- Largest measuring range: 0...100 gC/m³
(0...5,000 mgC/m³ for MultiFID14 NMHC)
- Measuring range switchover is either manual, external or automatic

Flame ionization detector Fidas24

The Fidas24 is a single component flame ionization detector (FID) optimized for the continuous monitoring of volatile organic carbons (VOC's) or alternatively called hydrocarbons (HC) in industrial gases. It can be employed in a vast number of applications, measuring hydrocarbons from low ppm levels as

in emission applications through to 10 Vol% measurements, which is typical for process applications. The analyzer is heated to 200 °C and can be directly connected to a heated sample line. This results in no cold spots occurring at any point in the sample gas path. The Fidas24 is the successor of the MultiFID14.

Sample components

- Hydrocarbons: Total C, CH_4 , C_3H_8 , etc.

Measuring ranges

- Smallest measuring range: 0...5 mgC/m³ (Total C) or 10 ppm CH_4
- Largest measuring range: 10 Vol% (CH_4)

Calibration

Manual or automatic calibration

- Zero point with air or nitrogen
- Endpoint calibration with propane or other Hydrocarbon in air or nitrogen
- Effectivity of the MultiFID14 NMHC catalyst is tested via test gas C_3H_8 and CH_4 in N_2

Typical Applications

- CEM (utilities, HPI processing industry, automotive)
- Process (THCs in steam, solvent recovery)
- Quality (HPI processing industry, industrial gases)
- Safety (HPI processing industry)
- Power plants, waste incinerators monitoring
- Chemical process plant monitoring
- Solvent recovery systems monitoring
- Waste water monitoring
- Purity of gases such as O_2 , N_2 und Ar ¹
- Development of combustion engines for the automotive, marine and stationary operation
- Emissions monitoring according to EU guidelines, QAL3
- Warning device¹

¹ only for MultiFID



The Added Value

What you can expect from a market leader

As one of the world's leading suppliers of analyzer technology, we offer our customers additional benefits and services other manufacturers can not provide. With the added values ABB Analytical helps to improve performance and reliability at work.

Best choice of analyzers tailored to your needs

We offer the broadest selection of measuring principles under one roof. All types of analyzers share a common operation to reduce the need for training and spare parts.

Certified sales and service partners wherever you are

Our "Manufacturer Certified Service" program involves more than 300 service specialists with many years of experience and comprehensive know-how working for our clients on-site worldwide. Our engineers are your professional partners dedicated to finding the best solutions for your measuring tasks. They regularly undergo manufacturer training and certification.

Long-term security in your investment

Our comprehensive and transparent life cycle plan for each of our products covers the service of spare parts and service support for their entire lifetime. Our products are extendable with upgrade programs keeping them technologically up-to-date at all times.

Most powerful software solutions

Full remote control and maintenance access to the system inside a protected network and quality monitoring (QAL3) are available for ABB analyzers. Integrated controllers with PLC functionality provide monitoring while controlling the measurement from sample taking right up to analysis.

Unique time and cost saving calibration concepts

ABB has 30 years of unrivalled experience in producing gas-filled calibration cells, allowing internal calibration without test gas cylinders for photometers. Single-point calibration with ambient air as the standard gas is also possible.

Unrivalled options for connectivity

ABB gas analyzers and systems excel in Ethernet network abilities and Modbus or PROFIBUS interfaces. This enables the analyzer data to be easily read, archived and visualized on a PC, PLC or process control system.

Assured quality through independent certification

ABB provides all major international certificates for CEMS, hazardous area installations, metrological approvals, electrical safety and quality and environmental management.



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