



Advance Optima Modular continuous gas analyzers

Innovative modular analyzer technology – Advance Optima

The measurement of a large number of different gas components, at low concentrations, places exacting demands on your continuous gas analysis systems.

At ABB, we offer you solutions that meet and exceed those demands, with flexible systems designed to provide optimum results at very competitive prices.

With Advance Optima, ABB is the right partner for you.



Advanced and reliable technology

Advance Optima 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:

- Refineries, petrochemicals, chemicals and synthetics
- Air separators and pure gas production
- Pharmaceuticals, food and beverages
- Metals, minerals, pulp and paper
- Power generation
- Environmental technology

Advance Optima is based on an integrated system concept and it excels the performance standards of conventional analyzers. Thanks to the advanced features built into all Advance Optima analyzers, comprehensive multi-component analytical systems can now be expanded to meet new requirements cost-effectively and efficiently.

Unrivalled economy

With Advance Optima, you can also reduce the overall costs of your analyzer technology, while at the same time increasing the availability of your systems.

- Cost-effective operation, service and maintenance over the entire life cycle
- Lower training and documentation expenses

Integrated system solutions – for added flexibility

Standardized modules can now 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.

"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.



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. Communication takes place via its internal system bus. 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.

Integrated control and monitoring

State-of-the-art processor technology with high performance and rapid signal processing is used for sophisticated calculations, such as cross-sensitivity correction and auto-calibration. This innovation therefore eliminates the need for additional external logic controllers.

Simple, user-friendly operation

The control unit is ergonomically designed, with an illuminated, easy to read display.

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

Reliable and powerful

All our analyzers have been designed with user requirements in mind and are built for the toughest industrial conditions. Their convincing features include:

- 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

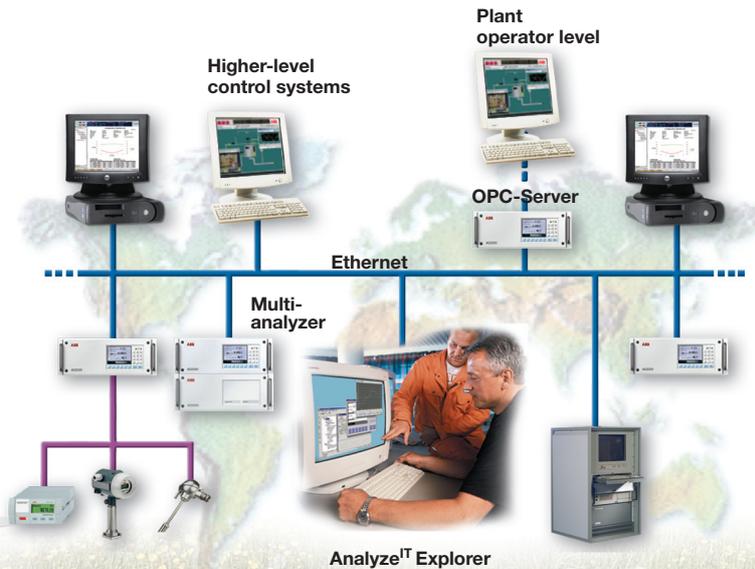
Always the right analyzer for the job. Whatever the measuring task!

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

- Infrared analyzer modules
- Process photometers
- Thermal conductivity analyzer modules
- Oxygen analyzer modules
- Flame ionization detectors
- Laser analyzer modules

Unlimited communications – information anywhere

Thanks to Advance Optima's unique communication network, which includes a wide range of standard interfaces, vital information can be made available virtually anywhere. Its analyzers are seamlessly incorporated in existing PC networks or higher-level control systems by means of an integrated ethernet, profibus or modbus port.



Improved operating functions such as remote control of the analyzer, effective asset management as well as the installation of new software versions from a central maintenance computer, are now also possible. And advanced software tools are available too. Naturally, today's commonly used fieldbus systems are supported by the system as well as the traditional 4...20 mA analog outputs.

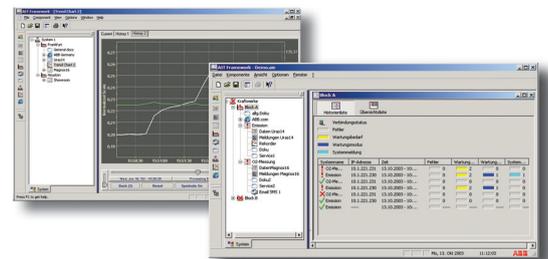
- **Ethernet port** with TCP/IP protocol for direct integration into existing PC networks or control systems
- **OPC interface** for direct integration into centralized process control equipment
- **Profibus-DP/PA interface** for the direct coupling of a fieldbus
- **Modbus connection**, serial port, also for Windows applications

- Complete remote control of the analyzer
- Asset management for centralized maintenance
- Facility wide – as well as worldwide access

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

Safety concept for flammable and toxic sampling components

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

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.



Explosion protection

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.

The AO2060 category's 2G analyzers are available in an explosion-proof version. And the AO2040 central processing unit with overpressure purging can be installed either directly in a Zone 1 area or in a non-hazardous area via an extended system bus.

The designs for operation in Zone 2 (known as Class I and Division 2 in the USA and Canada respectively) do not require additional case purging. All the assemblies have been tested to ensure that they are nonincendive.

Quality assurance

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

International certifications

- For emission monitoring tested according to European Regulations EN 2001/80/EG and EN 2000/76/EG, 13. and 17. BImSchV and TA-Luft in Germany
- EN 14181/EN 14956 (QAL1), prEN 15267-3
- In Great Britain, certified to MCERT
- ATEX-certified for Category II 2G, II 3G
- Certified safety concept for measurement of flammable gases in Zone 2
- In the USA, meets EPA requirements
- CSA-certified for use in Class I, Division 2 areas
- In Germany, certified for quality assurance systems in production sites
- Additional certificates are available on request



Infrared analyzer module

Uras26

The continuous NDIR industrial photometer can selectively measure concentrations of up to four sample components.

The analyzer features gas-filled opto-pneumatic detectors. Detector filling corresponds to the gas being measured. This means that the detector provides optimum sensitivity and high selectivity compared with the other gas components in the sample. Smallest measuring ranges are possible with the thermostat version.

Gas-filled calibration cells substitute expensive test gas bottles. With an optional electro-chemical sensor cell, oxygen can be measured in the same device.

For corrosive and toxic processes or use with flammable gases, a special safety cell is available whose windows can be purged. Purging is monitored internally.



Measurement principle

Non-dispersive infrared absorption in the $\lambda = 2.5 \dots 8 \mu\text{m}$ wavelength range.

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
- CO₂ 0...5 ppm
- NO 0...150 ppm
- SO₂ 0...25 ppm
- N₂O 0...20 ppm
- CH₄ 0...50 ppm
- C₃H₈ 0...50 ppm
- C₂H₄ 0...300 ppm
- R 134 0...50 ppm

Calibration

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

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.



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 T_{90} 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.



H₂

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

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

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

Sample components – smallest measuring ranges (examples)

- Ar in O₂ 0...2 Vol.-%
- H₂ in Ar 0...0.25 Vol.-%
- H₂ in N₂ or air 0...0.3 Vol.-%
- CH₄ in N₂ or air 0...2 Vol.-%
- Ar in N₂ 97.5...100 Vol.-%
- He in N₂ 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

- $T_{90} \leq 2$ s

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 – moni-

Measurement principle

The measuring method of this analyzer module is based on the specific paramagnetic behavior of oxygen.



ring 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...1 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

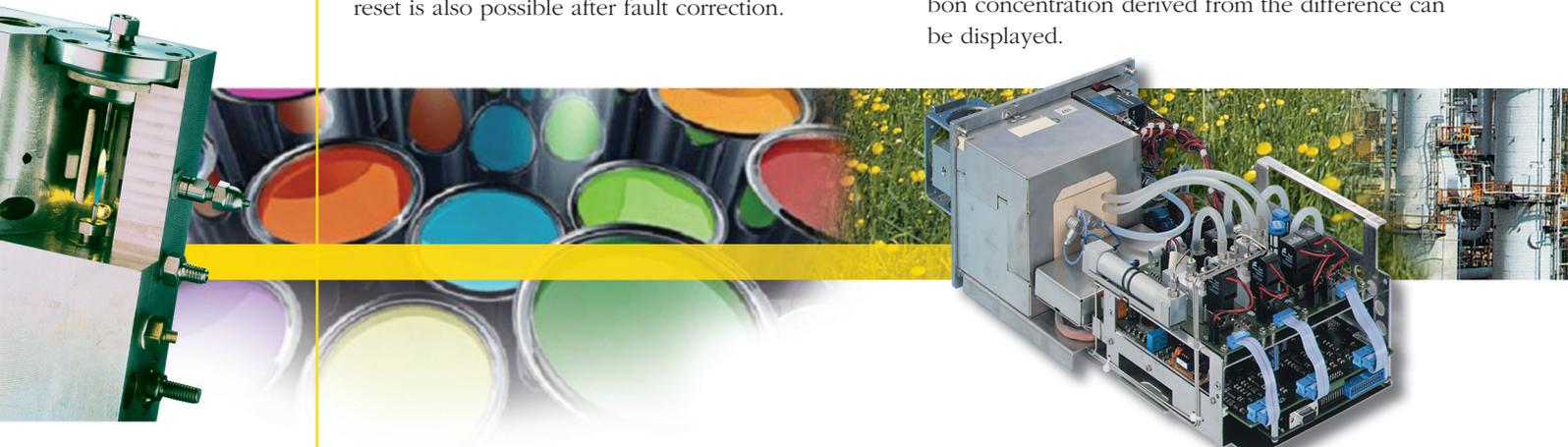
Flame ionization detectors

MultiFID14

The Multi-FID14 is a flame ionization detector which measures the total content of organic carbon in the sample gas. For this purpose organic substances are ionized in a hydrogen flame. The current of these ions is proportional to the organic carbon content. The analyzer is heated up to 200 °C and can be directly connected to a heated sample gas line. Thus no cold spots occur at any point. The Multi-FID14 features self-monitoring, fault detection, logging and messaging functions. An automatic reset is also possible after fault correction.

MultiFID14 NMHC

The Multi-FID14 NMHC is a flame ionization detector which measures the total contents of organic carbon with and without methane in the sample gas (NMHC = non-methane hydrocarbon). Via an internal solenoid valve, the sample gas is conducted through a catalyst in which all hydrocarbons are combusted into CO₂ and H₂O without methane. Thus only the methane content is measured. Then the sample gas is supplied directly to the detector leaving out the catalyst. The methane-free hydrocarbon concentration derived from the difference can be displayed.



Typical applications

- Emission monitoring
- Process monitoring
- Measurement of volatile hydrocarbons (VOC) in water
- Purity measurements of O₂, N₂ and argon

Sample components

- Hydrocarbons

Measuring ranges

- Smallest measuring range: 0...10 mg org. C/m³
- Largest measuring range: 0...100,000 mg org. C/m³
- Measuring range switching: manual; optionally external or automatic control

Calibration

- Zero-point calibration with air or nitrogen
- Sensitivity calibration with propane or another hydrocarbon in air or nitrogen
- Automatic calibration via built-in zero gas and test gas valves

Typical applications

- Emission monitoring
- Process monitoring
- Also for applications in which there is no O₂ or H₂O

Sample components

- Hydrocarbons
- Methane
- Hydrocarbons without methane

Measuring ranges

- Smallest measuring range: 0...10 mg org. C/m³
- Largest measuring range: 0...5,000 mg org. C/m³

Calibration

- Zero-point calibration with air or nitrogen
- Sensitivity calibration with propane or another hydrocarbon in air or nitrogen
- Automatic calibration via built-in zero gas and test gas valves
- Efficiency testing of catalyst with test gas C₃H₈ and CH₄ in N₂

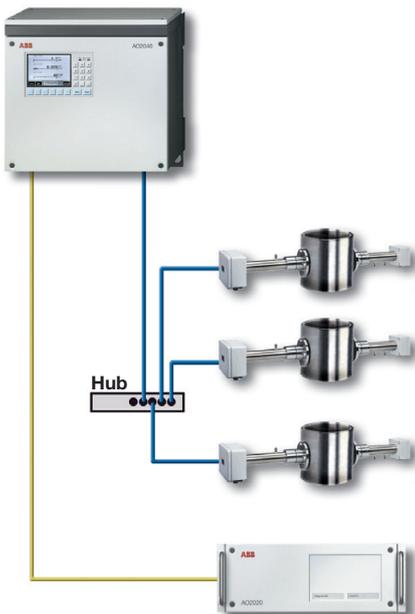
LS25

The LS25 laser analyzer selectively measures the concentration of up to two sample components. The laser operates according to the principle of 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 sample gas and calculates the gas concentration from this.

The laser analyzer module consists of a transmission and receiver unit which can be used on ducts with a diameter of 0.5...6 m. Depending on the application, process pressures of 10 bar and temperatures up to 1500 °C can be achieved.



Multianalyzer systems allow the combination of up to four analyzer modules from the product range.



Typical applications

- Emission monitoring
- Combustion control
- Process monitoring and analysis in the chemical industry, steel and iron manufacture, power industry and glass manufacture.
- Control of DeNOx installations

Sample components – smallest measuring ranges (examples)

- O₂ 0...1 Vol.-%, 10 bar, 1,500 °C
- CO 0...3,000 mg/m³, 3 bar, 1,500 °C
- CO₂ 0...3,000 mg/m³
- HCl 0...7 mg/m³
- H₂S 0...300 mg/m³
- NH₃ 0...10 mg/m³
- H₂O 0...3 mg/m³ low levels
- H₂O 0...1 Vol.-% high levels

Calibration

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

Analyzer technology is our strength

ABB is one of the leading international companies in the field of analyzer technology. Thanks to decades of experience, we can develop innovative instruments and systems to meet your company's individual requirements.

And with a distribution network covering over 40 countries, ABB's know-how is available to you – worldwide.

Naturally, after any purchase after-sales services are just as important to you, as they are to us. That's why we offer you a broad spectrum of specialized services, such as: continuous maintenance, analyzer system modifications and troubleshooting etc. We'll be pleased to put together an individual service package for you.

ABB is your partner: From consulting to project planning, from system installation to after-sales service.

Tradition and innovation

More than 75 years of experience in the development and production of analyzers as well as regular contacts with our customers are the basis for our innovative solutions, which have always been the market leader. Under the brand name "Hartmann & Braun", our products for the continuous measurement of processing gases have gained an outstanding

international reputation and represent the leading edge of technology. Since then, analyzers with the names Uras, Limas and Magnos have enjoyed worldwide acclaim and stand for the highest efficiency. Today, more than 35,000 of these analyzers have been installed throughout the world – in almost every industry.



2007	ACX , complete systems
2005	EasyLine EL3000
2003	AO2000 series, the integrated analyzer system
2002	ACF-NT , with FTIR technology EL6010 analyzers for hazardous areas
2001	EasyLine analyzers, high-quality measuring technology for simple applications
1999	Limas11 , unique UV/IR photometer
1998	ABB acquires Hartmann & Braun
1996	Advance Optima , the first modular analyzer system
1988	Uras10 , with calibration cells which replaced test gas cylinders
1986	Magnos 6/7, Caldos 5/7 , digital microprocessors replace analog electronics
1980	Radas* UV analyzer, new measurement methods for gas analyzers
1970	Fidas** flame ionization detector
1950	Uras, Magnos and Limas capture the market
1938	CO-, CO ₂ analyzer
1929	First CO₂-analyzer for combustion , basis for the subsequent Caldos
1901	Foundation of Hartmann & Braun AG

* today Limas11UV ** today MultiFID14

ABB continuously optimizes its products, therefore the technical data in this document is subject to change.

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