
ABB MEASUREMENT & ANALYTICS

Continuous Emission Monitoring (CEM)

Easy. Cost-effective. Compliant.



Measurement made easy

Knowing what to expect from your CEMS vendor is critical to making the right choice, thereby avoiding unexpected costs and unplanned downtime after installation. With decades of experience and tens of thousands of installations worldwide, ABB is committed to exceeding your expectations.

ABB is your full-scope solution provider continuously striving for and delivering lowest measurement uncertainty, maximum equipment availability, lowest cost of ownership and most dependable service.

ABB knows what you need to remain compliant and delivers much more.

ABB's gas analyzer solutions

Experts in emission monitoring

In selecting ABB you are choosing a partner who offers the best measurement solution for your needs, enabling maximum return on your investment. When investing in ABB's measurement products and solutions you are receiving the best technology, reliability and service in the business.

Contact ABB for all your measurement needs – flow, pressure, temperature, level, flatness, tension, thickness, as well as a full-line of gas and liquid analyzers and valve automation solutions. All supported by first-class service worldwide.

**Learn more at
www.abb.com/analytical**

Global warming, acid rain, air, water and soil contamination are all environmental issues that must be managed. Governmental and environmental pressure to monitor and reduce pollutants introduced into the environment will continue to increase.

ABB's emissions monitoring solutions have helped a wide variety of industries for over 85 years. Our Continuous Emission Monitoring Systems (CEMS) are designed to help customers maximize profit while operating in a sustainable way through technology and expertise.

ABB Continuous Emission Monitoring (CEM) solutions provide compliance with international, national and local environmental directives for measuring and reporting.

Did you know?

ABB's analyzers are used in space to monitor greenhouse gas emissions from satellites.



The right solution

For every industry and application

—
01 AO2000 – LS25
in-situ laser analyzer

—
02 ACF5000
hot/wet system
for emission and
process monitoring

ABB is dedicated to helping our customers provide cleaner and more efficient fuels, cleaner and safer drinking water, cleaner and less harmful emissions and cleaner and less costly combustion processes. As a supplier of analyzers to various space programs, we are proven and trusted in the most demanding applications.

Our full-line of in-situ and extractive gas analyzers are systems are trusted by every industry with CEM applications

- Power generation
- Waste incineration
- Oil and gas
- Chemicals and petrochemicals
- Pulp and paper
- Metals and minerals
- Landfills and biogas
- Marine
- Cement production

Why are they used?

Compliance to environmental regulations

- Avoid regulatory penalties
- Support process control
- Optimize combustion to reduce fuel and lower emissions
- Increase plant efficiency for extended lifetime of equipment
- Decrease operating and maintenance costs of the plant
- Improve productivity

Safety measurement

- Filter monitoring
- Leakage monitoring
- Explosion protection

Where are they used?

- Stack emission monitoring
- Flue gas desulfurization (FGD)
- HCl scrubber control
- DeNOx (SCR and SNCR)
- Dust filter monitoring, electrostatic precipitator (ESP) or fabric filter
- Boiler control
- Turbo generator
- Coal mill and coal bin

Our offering

- Continuous gas analyzers and sample handling system
- Pre-engineered continuous gas analyzer cabinets
- Turn-key systems tailored to your needs, including third party products
- Solutions to reduce total cost of ownership
- Upgrade packages to improve your equipments' performance during the lifecycle
- Commissioning support
- Maintenance contracts
- A worldwide and reliable partner providing comprehensive support
- Filter monitoring solutions for each installation
- Dust measuring devices
- Turn-key flue gas flow measurement solutions

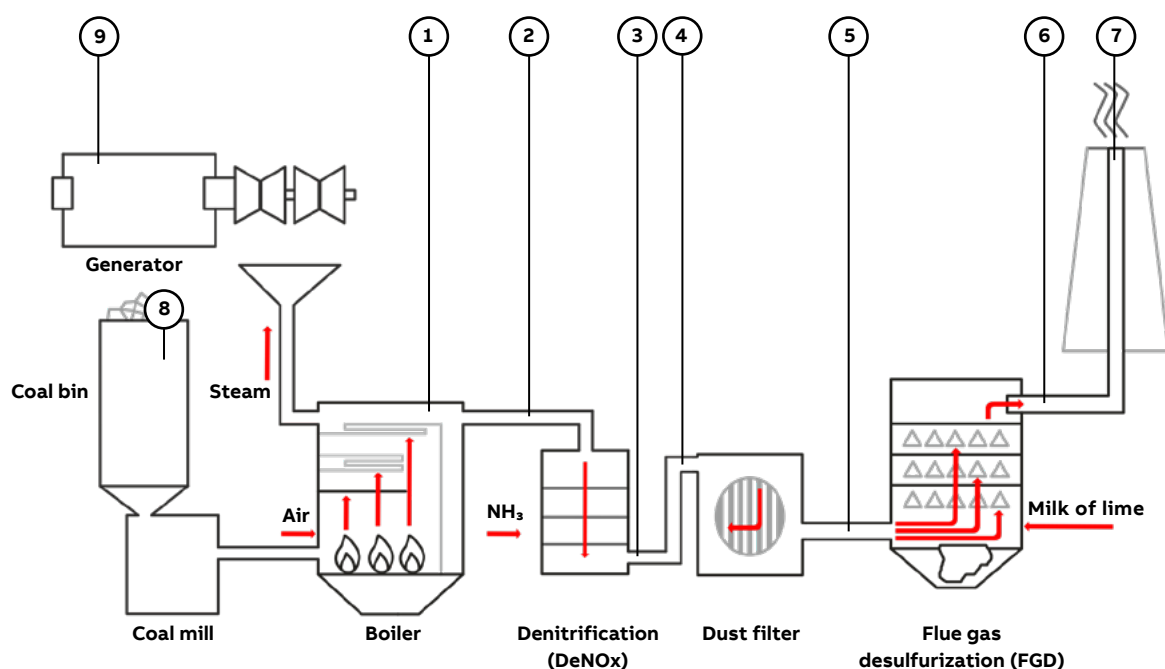
Did you know?

ABB is the market leader for emission monitoring with close to 100,000 analyzers installed worldwide.



Example 1 – thermal power plant

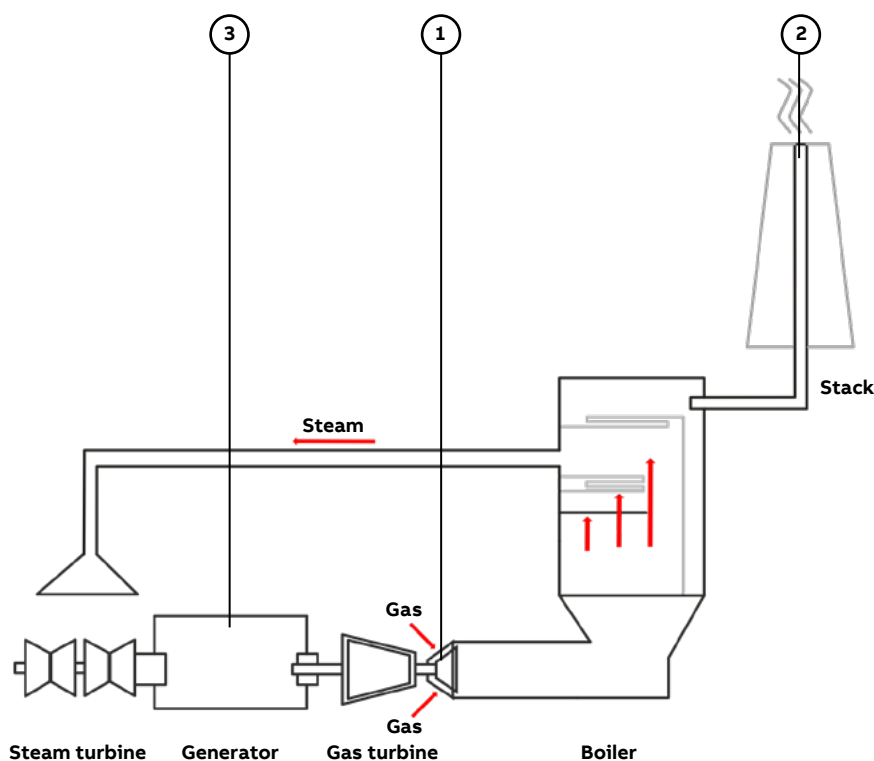
Measuring points and solutions



Measuring point	Application	Measuring task	Measuring components	Solution	Analyzers
1	Combustion control	- Optimization of combustion - Lower fuel consumption	CO, O ₂	AO2000 System AZ20	Uras Magnos LS25
2	DeNOx upstream	Monitor NOx to control treatment process	NO, NO ₂ , NOx, O ₂	AO2000 System	Uras Limas Magnos LS25
3	DeNOx downstream	- Effectiveness of DeNOx - NH₃ slip control	NO, NO ₂ , NOx, NH ₃ , O ₂	AO2000 System MCA 10 Process	Limas Uras Magnos LS25
4	Dust filter monitoring	- Safety measurement - Explosion protection	CO, CO ₂ , O ₂	AO2000 System LS25	Uras Magnos
5	FGD upstream	- Control of FGD process - For example, milk of lime dosing - Filter control	SO ₂ Dust	AO2000 System PFM 13	Uras
6	FGD downstream	Effectiveness of FGD	SO ₂ , O ₂	AO2000 System	Uras Limas Magnos
7	Stack	Emission monitoring	CO, NOx, SO ₂ , O ₂ , HCl, NH ₃ , HF Dust Flow	AO2000 System ACF5000 MCA 10 CEMS PFM 20 FMD 09	Uras Limas Magnos LS25
8	Coal bin monitoring Coal mill monitoring	- Safety measurement - Detection of smoldering fire	CO	AO2000 System	Uras LS25
9	Turbo generator monitoring	- Safety measurement - Leakage monitoring - Inertization and filling	H ₂ in air, CO ₂ in air, H ₂ in CO ₂	EL3000	Caldos (Ex or GP)

Example 2 – combined cycle gas turbine power plant

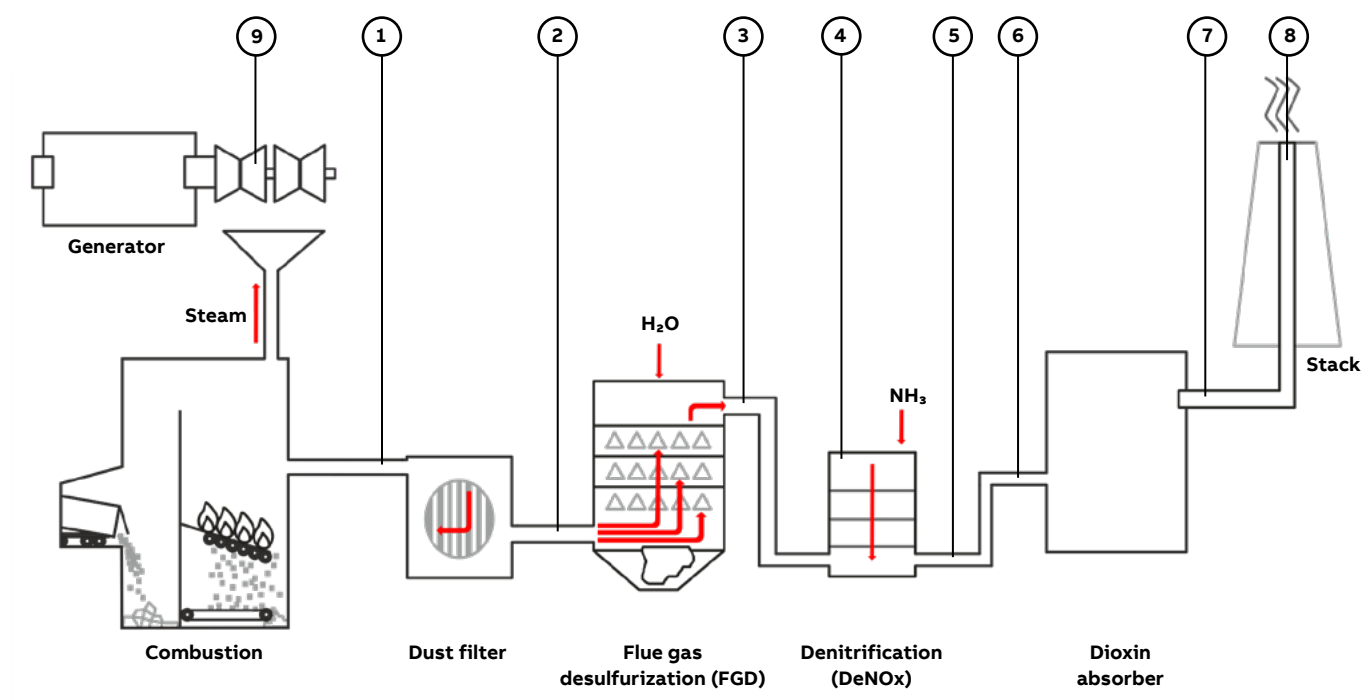
Measuring points and solutions



Measuring point	Application	Measuring task	Measuring components	Solution	Analyzers
1	Gas turbine	- Fuel mix monitoring - Process control	CH ₄ , C ₂ H ₆ , C ₃ H ₈ , CO ₂ , H ₂ , O ₂	AO2000 EL3000	Uras Magnos Caldos
	Boiler control	- Optimization of combustion - Lower fuel consumption	CO, O ₂	AO2000 System AZ20	Uras Magnos LS25
2	Stack	Emission monitoring	CO, NO _x , SO ₂ , O ₂ , NH ₃ Dust Flow	AO2000 System MCA 10 CEMS PFM 20 FMD 09	Uras Limas Magnos LS25
3	Turbo generator monitoring	- Safety measurement - Leakage monitoring - Inertization and filling	H ₂ in air, CO ₂ in air, H ₂ in CO ₂	EL3000	Caldos (Ex or GP)

Example 3 – incinerator

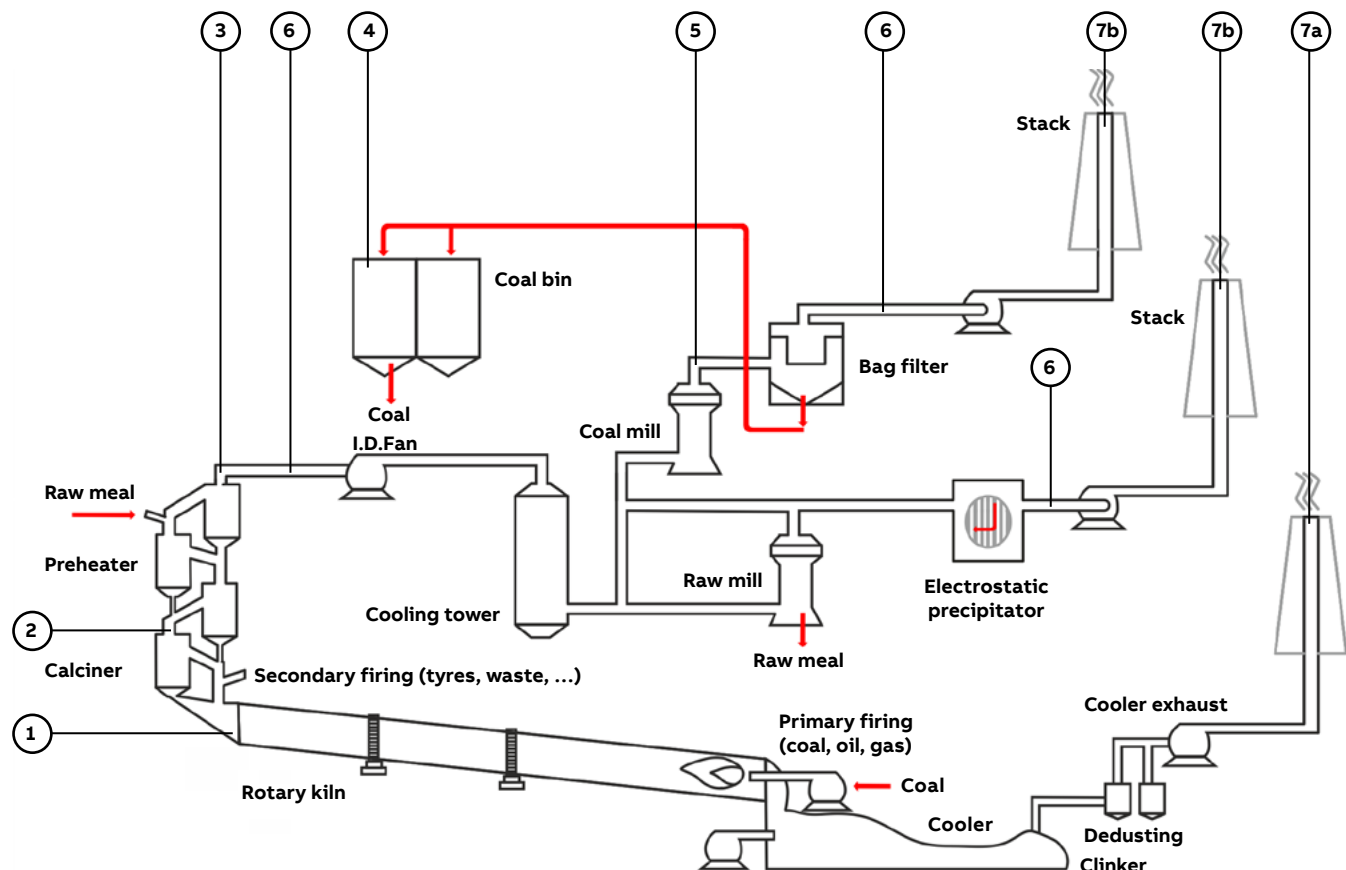
Measuring points and solutions



Measuring point	Application	Measuring task	Measuring components	Solution	Analyzers
1	Combustion and dust filter control	• Optimization of combustion • Dust filter explosion protection • Catalyzer protection	CO, O ₂	AO2000 System AZ20	Uras Magnos LS25
2	Flue gas scrubber upstream	• Process control • For example, milk of lime dosing	SO ₂ , HCl, H ₂ O, Dust	AO2000 System MCA10 Process PFM 13	Limas LS25
3	Flue gas scrubber downstream	• Efficiency of flue gas scrubber	SO ₂ , HCl, H ₂ O	AO2000 System MCA10 Process	Uras Limas LS25
4	DeNOx upstream	• Monitor NOx to control treatment process	NO, NO ₂ , NOx, O ₂	AO2000 System MCA10 Process	Uras Magnos Limas
5	DeNOx downstream	• Efficiency of SCR/SNCR	NO, NO ₂ , NH ₃ , O ₂ , H ₂ O	AO2000 System MCA10 Process	Uras Magnos LS25
6	Dioxin absorber upstream	• CO for absorber efficiency	CO	AO2000 System	Uras
7	Dioxin absorber downstream	• Delta CO for absorber efficiency	CO	AO2000 System	Uras
8	Stack	• Emission monitoring	CO, NOx, N ₂ O, SO ₂ , O ₂ , NH ₃ , HCl, HF, VOC Dust Flow	ACF5000 MCA 10 CEMS PFM 20 FMD 09	Uras Magnos Fidas
9	Turbo generator monitoring	• Safety measurement • Leakage monitoring • Inertization and filling	H ₂ in air, CO ₂ in air, H ₂ in CO ₂	EL3000	Caldos (Ex or GP)

Example 4 – cement production

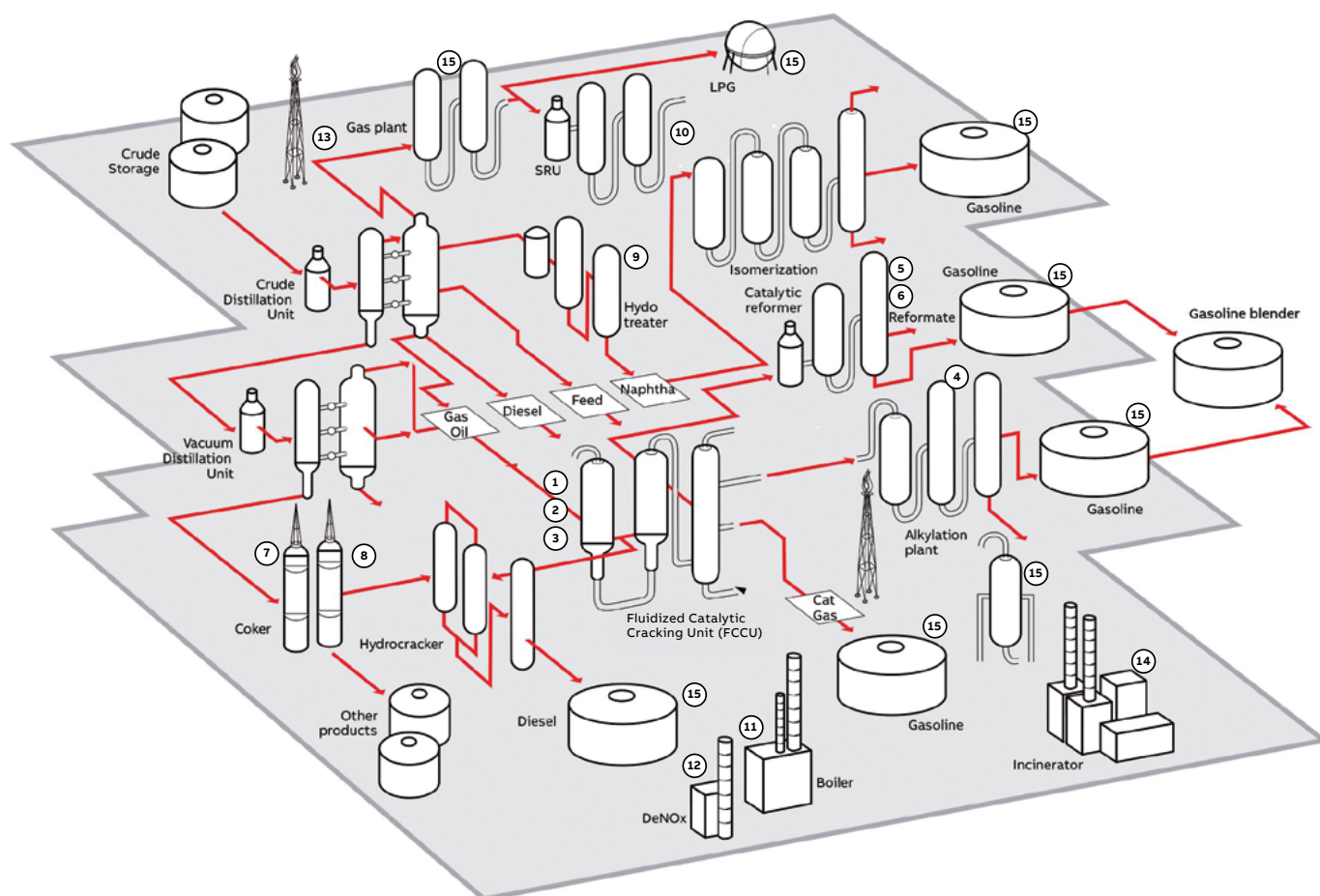
Measuring points and solutions



Measuring point	Application	Measuring task	Measuring components	Solution	Analyzers
1	Kiln gas outlet	• Optimization of primary firing • Lower fuel consumption • Maintain clinker quality	CO, O ₂ , NO, CO ₂ , CH ₄ , SO ₂	AO2000 System + ProKiln	Uras Limas Magnos
2	Calcliner	• Optimization of secondary firing • Lower fuel consumption	CO, O ₂	AO2000 System AO2000 System + ProKiln	Uras Magnos
3	Preheater	• Safety measurement • Prevention of explosion in ESP • Control of false air in preheater	CO, O ₂	AO2000 System	Uras Magnos LS25
4	Coal bin	• Safety measurement • Prevention of smoldering (monitor of air entrance)	CO, (O ₂)	AO2000 System	Uras (Magnos) LS25
5	Coal mill	• Safety measurement • Prevention of smoldering • Monitor of air entrance	CO, O ₂	AO2000 System	Uras Magnos
6	DeNOx	• NH₃ measurement	NH ₃ Dust	MCA 10 Process PFM 13	LS25
7a	Stack	• Emission monitoring	CO, O ₂ Dust Flow	AO2000 System PFM 20 FMD 09	Uras Magnos
7b	Stack	• Emission monitoring	CO, NO, NO ₂ , NO _x , SO ₂ , O ₂ , CO ₂ , HCl, VOC, HF Dust Flow	ACF5000 AO2000 System MCA 10 CEMS PFM 20 FMD 09	Uras Limas Magnos LS25

Example 5 – refinery

Measuring points



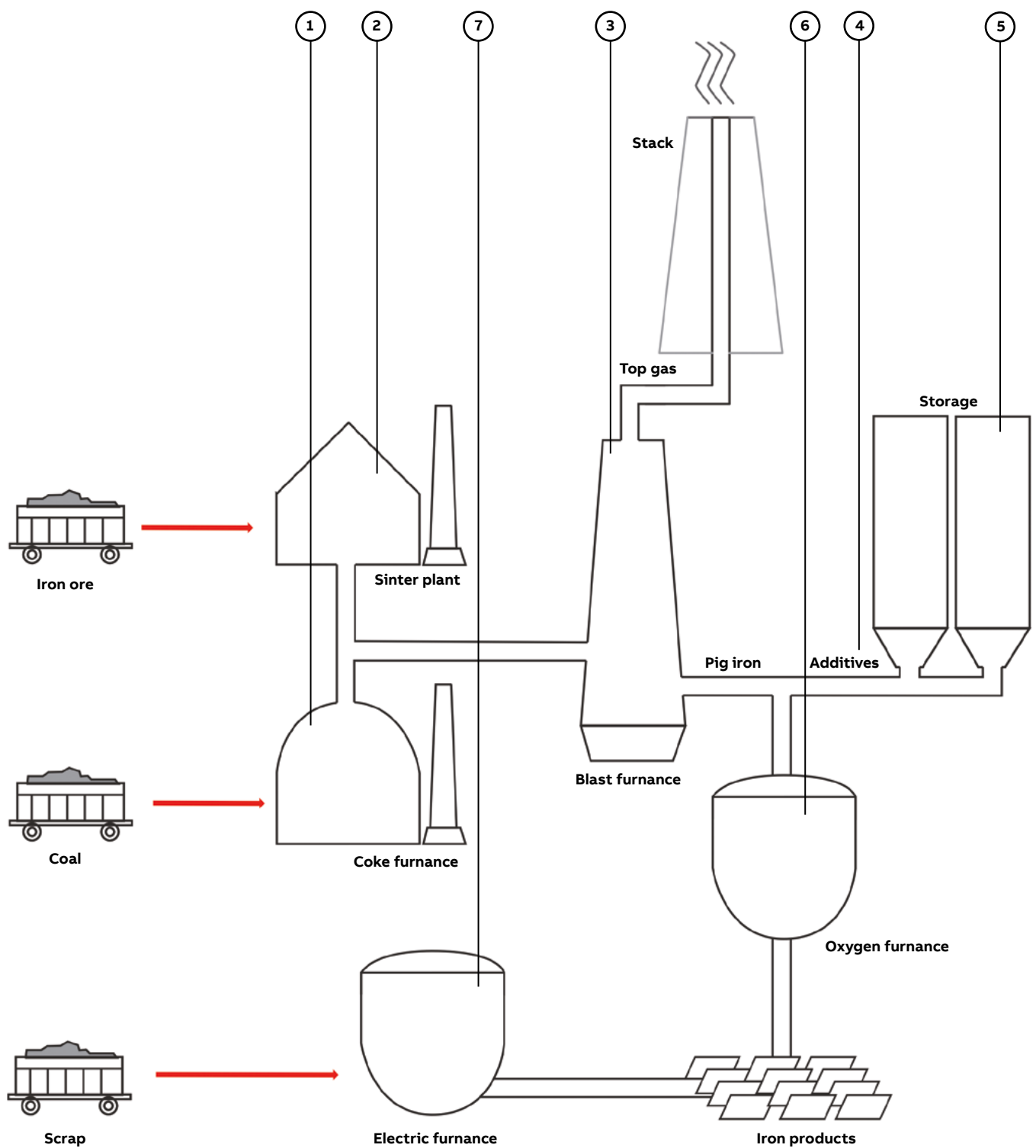
Example 5 – refinery

Measuring points and solutions

Measuring point	Unit – application	Measuring task	Measuring components	Solution	Analyzers
1	Catalytic cracker • Gas abatement after regenerator	• Emission monitoring • Flue gas effectiveness	NO, NO ₂ , SO ₂ , CO, CO ₂ Dust Flow	AO2000 System MCA 10 CEMS PFM 20 FMD 09	Uras Limas
2	Catalytic cracker • Regenerator flue gas	• Combustion optimization	CO, CO ₂	AO2000 System	Uras
3	Catalytic cracker • Off-gas	• Catalyst efficiency to minimize waste and improve fuels yield	CO, CO ₂ , O ₂	AO2000 System AZ20	Uras Magnos
4	Alkylation unit • Stack	• Emission monitoring	NO, NO ₂ , SO ₂ , CO, CO ₂ , HF Dust Flow	AO2000 System ACF5000 MCA 10 CEMS PFM 20 FMD 09	Uras Limas LS25
5	Catalytic reformer • Wet scrubber	• Scrubber effectiveness	CO ₂	AO2000 System	Uras
6	Catalytic reformer • Furnace	• Combustion optimization	CO ₂ , O ₂	AO2000 System AZ20	Uras Magnos LS25
7	Coking unit • Coke calciner	• Green coke calcinations	NO, NO ₂ , N ₂ O, SO ₂ , CO	AO2000 System	Uras Limas
8	Coking unit • Flue gas coker	• Combustion optimization	CO, O ₂	AO2000 System AZ20	Uras Limas Magnos LS25
9	Hydrotreater • Flue gas	• Combustion optimization	CO, O ₂	AO2000 System AZ20	Uras Magnos LS25
10	Sulfur recovery unit • Stack	• Emission monitoring	SO ₂ , O ₂ Dust Flow	AO2000 System PFM 20 FMD 09	Limas Magnos
11	Boilers • Process furnaces • Gas turbines	• Combustion optimization	NO, NO ₂ , SO ₂ , CO, CO ₂	AO2000 System AZ20	Uras Limas
12	DeNOx • with SCR/SNCR	• Denitrification optimization	NO, NO ₂ , NH ₃ , N ₂ O	AO2000 System MCA 10 Process	Limas Uras LS25
13	Flares	• Safety monitoring	O ₂	AO2000 System AZ20	LS25
14	Incinerators	• Emission monitoring	NO, NO ₂ , SO ₂ , CO, CO ₂ , N ₂ O Dust Flow	AO2000 System MCA 10 CEMS PFM 20 FMD 09	Uras Limas
15	• Gas separators • Storage facilities • Oil/water separators • Fugitive emissions points • Vents	• Safety • Explosions prevention	O ₂ , VOCs	AO2000 System AZ20	Magnos Fidas

Example 6 – iron and steel

Measuring points



Example 6 – iron and steel

Measuring points and solutions

Measuring point	Unit – application	Measuring task	Measuring components	Solution	Analyzers
1	Coke furnace	Process optimization	CO, CO ₂ , O ₂	AO2000 System	Uras Magnos
		Safety monitoring	O ₂		LS25
2	Sinter plant	Kiln optimization	CO, CO ₂ , O ₂		Uras Magnos LS25
		Oxygen leakage	O ₂		LS25
3	Blast furnace	Transverse probe (above burden/under burden) blast furnace optimization	CO, CO ₂ , H ₂ , (O ₂)		Uras Caldos (Magnos)
		Riser tube measurement Oven symmetry	CO, CO ₂ , H ₂		Uras Caldos
		Top gas measurement • Gas very dirty	CO, CO ₂ , H ₂		Uras Caldos
		Top gas measurement • Gas semi clean	CO, CO ₂ , H ₂ , H ₂ O		Uras Caldos LS25
		Cowper waste gas Burner optimization	CO, O ₂		Uras Magnos LS25
		Cold blast • Process optimization	O ₂		LS25
4	Additives	AOD converter off-gas Process control	CO		Uras
5	Storage Hot Metal Desulphurization (HMDS)	Calcium carbide silo • Safety monitoring	C ₂ H ₂ , O ₂		Uras Magnos
		Magnesium silo • Safety monitoring	O ₂		Magnos
6	(Basic) oxygen furnace	Converter off-gas Process control & safety monitoring	CO, CO ₂ , H ₂ , O ₂		Uras Caldos Magnos
		Process control & safety monitoring, short T ₉₀ lower temperature	CO, CO ₂ , H ₂ , O ₂		Uras Caldos Magnos
		ESP ¹ , flare or consumer – safety monitoring	CO, O ₂	AO2000 System fast	Uras Magnos LS25
		Leakage detection	H ₂ O		LS25
7	Electric (arc) furnace	EAF off-gas monitoring Process & safety monitoring	CO, CO ₂ , O ₂		Uras Magnos LS25
Others 1–7	Stack/off-gas	Emission monitoring	CO, NO, NO ₂ , NO _x , SO ₂ , O ₂ , NH ₃ , HF, HCl	AO2000 System, ACF5000, MCA 10 CEMS, PFM 20, FMD 09	Uras Magnos Limas LS25
	Hot strip mill – slab reheating Steel rolling – pickling line	Monitoring	SO ₂ , NO, NO ₂ , NO _x , O ₂ , NH ₃ , HCl	AO2000 System, ACF5000, MCA 10 Process	Uras Magnos Limas LS25

¹ Electrostatic precipitator

AO2000 System cold/dry extractive system

Complete. Configurable. Consistent.

—
01 AO2000 System
cold/dry system
for emission and
process monitoring

AO2000 System is a pre-engineered system solution for continuous gas analysis, including everything from probe, sample lines and sample conditioning to reliable and certified analyzers of the Advance Optima series.

The system can be operated from a keypad and display in the front door without opening the cabinet. The system is available with various options to be tailored to your measuring tasks. It is especially designed for easy service and maintenance.

AO2000 System is suitable for non water-soluble components – typically NO, NO₂, NO_x, CO, CO₂, SO₂, CH₄, O₂, VOC.

AO2000 System offers

- Certified analyzers with proven measuring technology: IR and UV photometers, paramagnetic oxygen analyzer, electrochemical oxygen sensor, FID analyzer
- Up to six gas components, measured by up to four analyzers with corresponding sample conditioning
- Convenient and easy operation from front door panel
- Communication interfaces: Modbus, PROFIBUS, and Ethernet to connect to a PC or process control system
- Integrated self-monitoring functions and easy remote service & maintenance
- License-free AnalyzeIT Explorer software for asset management and worldwide access for remote maintenance via Ethernet

AO2000 System benefits

Complete. From sampling to measurement.

- World leading AO2000 series analyzers
- Physically and digitally integrated sample handling
- Three installation variations to choose from: steel cabinet, mounting plate, fibre glass cabinet

Configurable. Tailored to your needs.

- Pre-engineered for known applications
- Adaptable to even the most challenging applications

Consistent. The quality you expect.

- Produced in Germany
- Easy operation via front door
- Familiar and service-friendly internal layout

Did you know?

The AO2000 System can also integrate ancillary device signals for example, dust, p, T, V and mercury to transmit to DCS.



MCA 10 Process hot/wet extractive system

Flexible Gas Filter Correlation based process analyzer solution

01 MCA 10 Multi
Component Analyzer

The MCA 10 Process Measurement is a turn-key solution tailored to make the measurement in raw gas applications based on gas filter correlation and bi-frequency photometer technology.

- delivered as fully pre-engineered system for easy field installation
- low maintenance interval



01

MCA 10 Process offers

- Modularly structured hot/wet gas analyzer system (without gas cooler), compact 19" format
- Up to twelve infrared components and oxygen through ZrO₂
- Field-proven components, modern photometer technology
- Heated system to enable raw gas streams with high corrosive components in large concentrations
- Pre-calibrated → immediately deployable
- Integrated control, integrated zero gas provision
- Self-control (additional control of inlet temperature)
- Zero point drift control
- Remote diagnosis and system setting via Ethernet
- Connection of multiple sample streams
- Data storage on hard disk

MCA 10 Process measures typically NO, NO₂, NH₃, SO₂, HCl, CO, CO₂, CH₄, H₂O and O₂.

MCA 10 Process benefits

Flexibility

- Every configuration is tailored to customer needs to accommodate the high measuring ranges in raw gas applications
- Broad reach to control each status in the field with two measuring ranges for each component with a high ratio of 1:10
- The heated gas distribution block is equipped with 3 inlets which enables switch-over between up to 3 measuring points for process measurements – no need for an additional analyzer
- Measurement before and after the flue gas treatment plant can also be performed with the same analyzer by switching between sample points
- Due to the modular design (compact 19" analyzer rack), a pre-calibrated analyzer module can easily replace the existing analyzer and secure uptime
- Ready for operation – electrical power and instrument air are needed

Robust

- Long maintenance interval
- Maintenance-free sample transportation through ejector pump
- No gas conditioning unit required
- Fully heated system to avoid losses and condensation

ACF5000 hot/wet extractive system

The benchmark in FTIR based CEMS

—
01 ACF5000
hot/wet system
for emission and
process monitoring

ACF5000 is a fully certified analyzer system to accurately monitor the composition of exhaust gases.

- A completely pre-engineered CEM system for easy operation
- With longest maintenance interval in the market
- Worldwide certified support



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ACF5000 offers

- Measurement of 15 gas components
- Hot/wet extractive measurement
- Powerful FTIR technology
- Proven FID and ZrO₂ sensors to measure the unburned hydrocarbons and the oxygen content
- Completely pre-engineered system with a compact and modular design
- Communication, control and maintenance via Modbus and Ethernet/TCP or modem
- Technical drawings digitally available by emailing on the day of quoting

International certifications

- TÜV certification according to the German and European requirements, EU Directive 2010/75/EU and EN 14181
- MCERTS certified in United Kingdom
- Compliant to US and Canadian EPA requirements

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ACF5000 measures typically NO, NO₂, N₂O, NH₃, SO₂, HCl, CO, CO₂, CH₄, H₂O, HF, O₂, VOC, including water soluble components.

ACF5000 benefits

Reliable

- More than 25 years' experience with FTIR spectrometers in gas analysis and experience with thousands of installations worldwide
- Fully compliant to European and international legislations
- Worldwide support through certified service engineers

Flexible

- Ready for operation – electrical power, instrument air and hydrogen supply are needed
- Easy adding of further measuring components – no additional hardware needed
- Extra gas port to connect other analyzers – no need for a separate probe

Profitable

- Saving time and money with automatic validation through built-in validation cell without need for test gas cylinders
- Longest maintenance interval in the market
- Maintenance-free sample transportation through aspirator pump
- Cost reduction for routine maintenance through remote control and diagnosis

MCA 10 CEMS hot/wet extractive system

Leading Gas Filter Correlation based CEMS solution

01 MCA 10 CEMS
Analyzer system

The MCA 10 CEMS is a fully certified analyzer system to precisely monitor the composition of exhaust gases based on gas filter correlation and bi-frequency photometer technology.



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MCA 10 CEMS offers

- Modularly structured hot/wet gas analyzer system (without gas cooler), compact 19" format
- Up to twelve infrared components
- FID and ZrO₂ sensors to measure the unburned hydrocarbons and the oxygen content
- Field-proven components, modern photometer technology
- Long operation times, high reliability (6-month maintenance interval)
- Pre-calibrated → immediately deployable
- Data storage on hard disk

International certifications

- TÜV certification according to the German and European requirements, EU Directive 2010/75/ EU and EN 14181
- MCERTS certified in United Kingdom
- CCEP certified in compliance with RJGF051-2024, HJ 76-2017, and T/CAEPI 47-2022 for People's Republic of China
- National Institute of Environmental Research certified in Republic of Korea
- Certified in Republic of Kazakhstan
- Compliant to US and Canadian EPA requirements

MCA 10 CEMS measures typically NO, NO₂, N₂O, NH₃, SO₂, HCl, CO, CO₂, CH₄, H₂O, O₂, VOC.

MCA 10 CEMS benefits

Proven track record

- Almost 20 years experience in photometer gas analysis and nearly 1,000 MCA 10 CEMS installations

Versatile

- Tailored configuration for flexibility and efficiency: The analyzer system can be individually configured depending on the measuring task
- The heated gas distribution block is equipped with 3 inlets which enables integration of other analyzers (Hg, FID) – no need for a separate probe
- Due to the modular design (compact 19" analyzer rack), a pre-calibrated analyzer module can easily replace the existing analyzer in case of emergency

Cost Effective

- No gas conditioning unit required
- Optional Filtercal technology for reference point adjustment
- Signal processing of external devices, avoiding additional hardware (flow, dust, TOC, Hg)

Advance Optima

Innovative modular analyzer technology

—
01 Advance Optima
series gas analyzers

Advance Optima gas analyzers combine advanced technologies with 85 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.



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The advantages to you –
Advance Optima offers advanced and reliable technology

Unrivalled economy

- Cost-effective operation, service and maintenance over the entire life cycle
- High quality design with a long life cycle
- Lower training and documentation expenses
- Simple user friendly operation
- Packaging that fits right in
- Reliable and powerful

Integrated system solutions – for added flexibility

- Basic version consists of a central processing unit and one analyzer module
- Standardized modules can be adapted to your measuring tasks and combined to systems tailored to your individual requirements
- Designed to integrate flexibly with each other – from analyzer modules, housings, from displays to control units and from power supplies to sample conditioning
- Integrated control and monitoring
- Unlimited access to analytical data

Multi-analyzer systems

- Up to four analyzer modules can measure six different components
- The sample gas feeding units and coolers can also be integrated
- The modules are operated by the central processing unit – and can even be installed up to 350m away

EasyLine

Continuous gas analyzers

—
01 EasyLine series
gas analyzers

EasyLine is both a powerful and affordable line of instruments for the monitoring of gas concentrations in numerous applications. EasyLine is based on the proven and reliable analyzer technology of ABB for extractive continuous gas analysis. EasyLine is available in two versions, which are optimized for the various installation requirements of the respective location.



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The advantages to you

Proven and reliable measurement technology

- Infrared photometer
- Ultraviolet photometer
- Magnetomechanical oxygen analyzer
- Thermomagnetical oxygen analyzer
- Electrochemical oxygen sensor
- Thermal conductivity analyzer
- Trace oxygen analyzer
- Flame ionization detector analyzer

The efficient alternative

- EasyLine offers an excellent price-performance ratio
- Extensive self-diagnosis functions with output of error messages
- Optionally with integrated gas feed
- Automatic calibration without test gas cylinders for most applications
- Measurement of flammable and non-flammable gases without purging
- Available in a 19 in. slide-in housing or in a wall-mount housing

Convenient operation and configuration

- Simple intuitive operation, menu-driven via five buttons
- Information presentation in several languages
- Individual configuration of the inputs/outputs

Interface to external controllers

- Ethernet interface with Modbus TCP/IP. Also used for configuration, software update and QAL3 data transfer
- Modbus or PROFIBUS protocol for networking with a PC, PLC, or process control system
- Modbus DDE driver for integration into a Windows environment for simple reading, archiving, and visualization of data

Internal quality control and reporting (QAL3 function)

- Integrated QAL3 reporting according to EN 14181
- Data storage for one year minimum
- Standard web browser access and Ethernet interface

Unique qualities

Calibration cells and Dynamic QR Codes

— 01 Application in cement industry

— 02 EasyLine display with Dynamic QR Code

Calibration cells

Calibration is necessary for all gas analyzers but the frequency varies significantly between different devices. The time and costs can increase substantially depending on the approach taken. Regulatory aspects can also have a big impact (e.g. daily validation required according to US EPA emission regulations), especially when you consider the real cost of gas cylinders.



Manufacturing

- Gas-filled calibration cell
- Tightness guaranteed by proprietary manufacturing technique
- Nearly 40 years' manufacturing experience

Suitability

- Alternative to flowing test gas
- Available in both Uras and Limas photometers
- Compliant with EN 14181 and US EPA 40 CFR 60

Proven technology

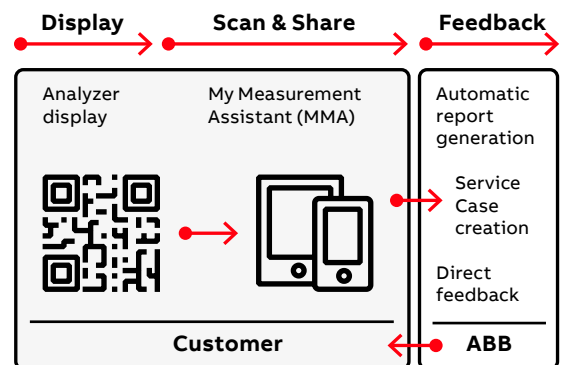
- Tested by TÜV for over 10 years
- Stability superior to many test gas cylinders
- Drift <0.5% per year
- Certified according EN 15267

Up to 95% lower calibration costs!

Ask your local contact for more info.

Dynamic QR Codes

ABB's Dynamic QR Code is a unique feature to display dynamically generated QR codes on the analyzer display for easy communication. In addition to static information for system identification, it contains also dynamic information on system configuration and analyzer health status. In combination with mobile devices, the Dynamic QR Code represents an innovative way of customer communication which allows, for instance, improved case-specific support by ABB resulting in an increased availability of analyzer assets. It is compatible with ABB's website My Measurement Assistant (<https://my-measurement-assistant.abb.com/>).



Generally applicable for all installations across all industries, especially interesting for

- Measurements with high availability requirements (for example CEMS)
- Remote installations
- Installations with constraint remote access due to information security guidelines

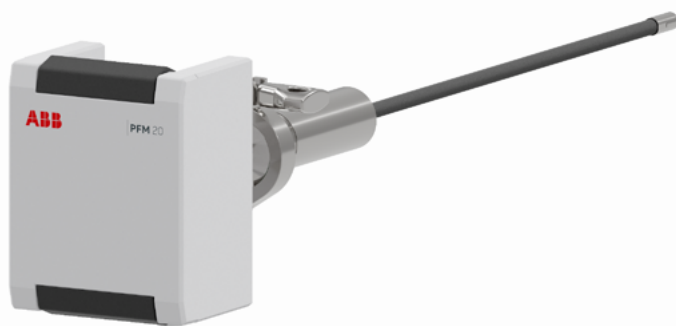


PFM 20

Dust measuring device

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01 PFM 20 Dust
measuring device

The PFM 20 is an in-situ quantitative dust concentration measuring device designed to continuously measure total suspended dust from a duct or stack. The analysis is based on the triboelectric measuring principle. The PFM 20 consists of an in-situ probe with probe head and probe rod. The probe rod has a high-temperature coating for insulation. It is surrounded by a sleeve and an insulating body and is thus electrically isolated from the housing. The signal module with the evaluation electronics is located in the probe head.



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Advantages and features

- Simple design, no sensitive or mechanically moved parts
- One-side installation, no mechanical alignments or adjustment, no special tools needed for installation
- Compact probe head and coated probe rod with customizable length and power supply options
- Plug-and-measure device simple to maintain: clamp connection allows a quick inserting as well as taking out of the probe which simplifies any kind of service activities like checks or cleaning
- IP 65 protected, therefore no weather protection needed (-20 to 50°C)
- Remote setup possibilities via included PC software
- Low operational costs, no time-consuming cleaning operations
- Lowest certified range 0–7.5 mg/m³ dust, max. measuring range 0...250 mg/m³ dust
- Automatic zero and reference point check
- Flow velocity compensation
- Modbus RS 485, analogue and digital signal output
- Robust design ensures analog stability and long lifespan (>10–15 years)
- Linearity test module available as an option
- Connectivity for external display and operation unit optionally available

International Certifications

- TÜV certification according to the German and European requirements, EU Directive 2010/75/EU and 2015/2193/EC, EN 14181 and EN15267-1.2.3
- MCERTS certified in United Kingdom

Further versions are available as derivatives from PFM 20 design and are used for filter monitoring:

- Qualitative dust monitoring certified acc. to DIN EN 15859
- Dust monitoring with or without display
- Dust monitoring suitable for high temperature range from 280 up to 900°C

FMD 09

Flow measuring device

01 FMD 09 Flow measuring device

The flow measuring device FMD 09 is an ideal complement to CEM packages, meeting regulatory requirements and offering a total CEM solution from ABB. The challenge of quantifying the pollutants is subject to legislation on the metering of the concentration and quantity of pollutants introduced to the environment.



01

Working principle and design

The flow measuring device FMD 09 is based on the determination of the differential pressure in flowing flue gas with help of a back pressure probe and a pressure sensor. The measured values from the pressure transmitter are transferred as 4–20 mA measuring signal to the evaluation electronics which are located in the measuring device.

The control and display unit is integrated into a weather protected housing.

Due to the possibility to add temperature and pressure measurement, the FMD 09 therefore offers up to three measurements mounted to one flange, significantly reducing integration, installation and commissioning costs.

Always an operational probe

A choice of materials is available to handle both the corrosive properties of the gas and its temperature. Where particulates in the gas could cause blockages, an optional manual or automatic air purging system is available. The system purges the probe automatically and periodically at regular intervals to avoid blockages even with large dust or particle loads and to guarantee maintenance-free continuous operation.

Advantages and features

- Certified for official emission monitoring according to EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007), EN 16911 (2013) and EN 14181 (2015) and MCERTS for stack emissions monitoring equipment at industrial installations.
- Velocity certified range 2–30 m/s and supplementary 2–60 m/s
- Precise measurement of gas velocity and volume flow
- Compact device consisting of probe and operating unit → no separate operating device necessary
- Robust design, no purge air required
- Easy mounting, assembly flange included within scope of supply
- One-sided installation
- Local diagnosis of system state by integrated graphic display
- Real-time display with line diagram
- Readout of volume flow at standard reference conditions possible
- Low maintenance requirement
- Temperature measurement included
- Absolute pressure measurement (optional)
- Versatile device suitable for different requirements: options for high temperature probes, manual and auto back-purging and anti-freeze heating, therefore suitable for measurement in humid and aggressive gases
- Minimum gas velocity of 2 m/s required

CEM-DAS

Reporting made easy

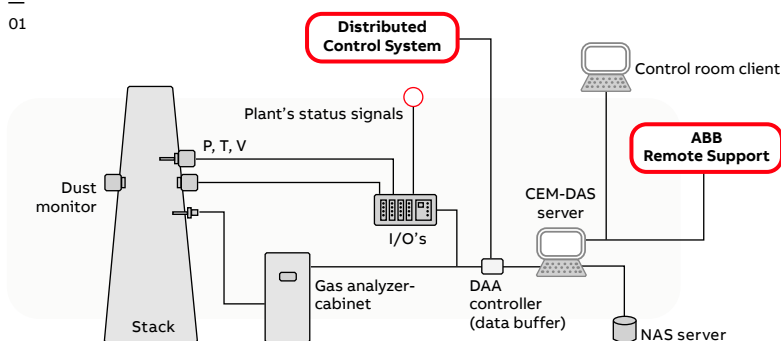
—
01 CEM-DAS
Process flow diagram

—
02 CEM-DAS in
a control room

CEM-DAS is a PC-based data acquisition and handling system for continuous emission monitoring. It is a complete, networkable system for continuous recording and evaluation of emission data in all industries.

CEM-DAS is scalable to support smallest stack installations up to multi-block plants with numerous measuring points.

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01



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02



Compliance

- Compliant to the DAHS standard EN 17255
- QAL1 certified according
 - EN 14181
 - EN 15267-1 and EN 15267-2
 - MCERTS Performance Standards and Test Procedures for Environmental Data Management Software
 - German Uniform Practice in monitoring emissions
 - German teletransmission interface (EFÜ)
 - VDI 4201-3

Handling

- Seamless server access through a web browser from any PC, no additional software installation required
- Multi-user password management with customizable access rights for different user groups.
- Emission predictions enable plant managers to optimize operations in order to meet emission limits and improve plant efficiency
- Reports available in pdf, csv and txt format
- Seamless documentation for authorities

Maximum Availability

- Over 99% availability tested by German TÜV in a field test
- Redundancy available for data storage, CEMS and CEM-DAS servers and DAA controllers (data buffers)
- Remote access allows for immediate support from CEM-DAS expert
- System backups ensure rapid recovery in the event of a server failure
- Secure internet connection via CEM-DAS Connect to allow access for local authorities

LS25, tunable diode laser analyzer

Highest precision for harshest conditions



01 LS25 in-situ laser analyzer

Solution suitable for measurement directly in the process. Typically O₂, NH₃ (+ H₂O), HCl (+ H₂O), H₂O or CO, CO₂

The laser is selected for a single wave length in the sample gas absorption spectrum, where no cross sensitivity from other gases occurs. The absorption line is scanned and the receiver detects the absorption caused by the measuring component and calculates the gas concentration.

LS25

As an integrated part of the Advance Optima series, the LS25 can be combined with further analyzer modules and completely operated remotely in Ethernet networks. The LS25 holds ATEX and IECEx Zone 1 & 2 as well as CSA Class 1 Division 2 certificates for hazardous locations. Depending on the application, LS25 is suitable for measurements at temperatures of over 1,500°C and pressures of up to 10 bar.

Typical applications

- Process control and safety monitoring
- Combustion control
- Control of flue gas abatement equipment for example, ammonia slip measurements
- Emission monitoring

Typical industries served

- Chemical and petrochemical industry
- Power industry
- Iron and steel industry
- Waste to Energy



01

LS25 is an in-situ cross-duct analyzer for measuring gas components concentrations. It applies the highly selective, optical measuring principle of tunable diode laser (TDL) absorption spectroscopy.

PFM 13

Filter Monitoring device

01 PFM 13 Filter Monitoring device

The PFM 13 filter monitor is a very sensitive in-situ device for continuous dust measurement. The qualitative dust measurement is based on the triboelectric measuring principle. Applied as a filter monitoring device it is an effective instrument to detect and localize damages to filtering precipitators at an early stage.



Advantages and features:

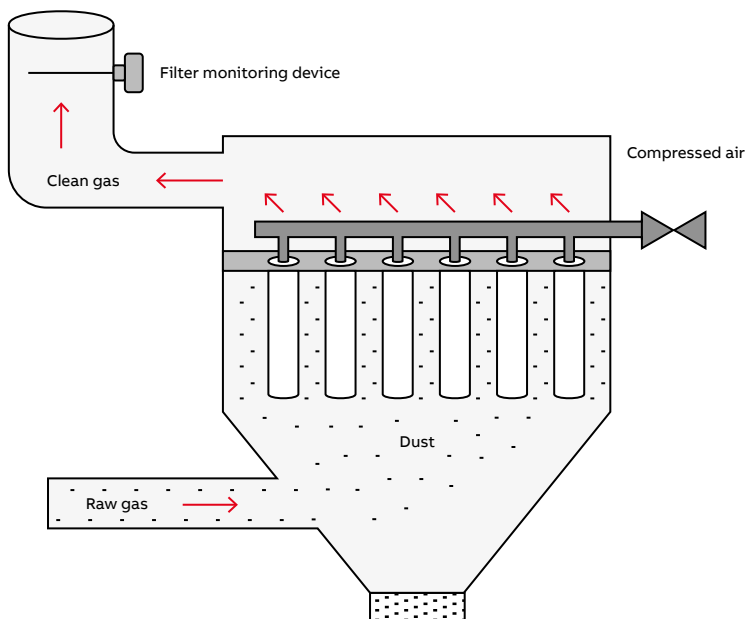
- Immediate filter check without previous gravimetric calibration
- Low investment costs
- Simple design, no sensitive or mechanically moved parts
- Plug-and-play device: easy to install and maintain; the clamp connection enables quick installation, as well easy disassembly for maintenance
- One-side installation, no mechanical alignments or adjustment, no special tools needed for installation
- IP 65 protected, therefore no weather protection needed (-20 to 50°C)
- Local diagnosis of system status by integrated graphic representation
- No separate power supply required (2-wire transmitter)
- No purge air blower required
- Low operating costs, no time-consuming cleaning operations
- High sensitivity with respect to the measuring range
- Robust design ensures a long lifespan >10–15 years

Uses:

- Accurate, routine, observation of filters, i.e. preventive maintenance
- Localization of defective filter bags allows selective replacement
- Saves costs for replacement bags
- Maximizes filter life
- Avoidance of visible exhaust gas plumes and therefore keeping a more positive corporate image
- Avoidance of product losses

Special PFM 13 versions available :

- Compact versions without display
- EX approved for Ex II 3D Ex ic tc IIIC T80°C Dc for ATEX installations in hazardous areas of zone 22



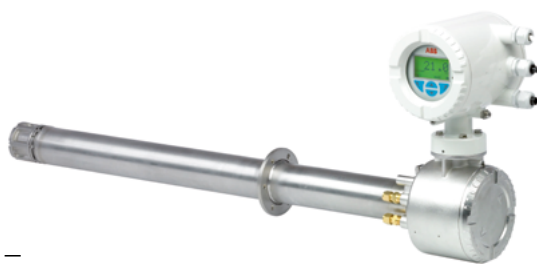
AZ series zirconia oxygen analyzers

Optimizing combustion efficiency



01 AZ20 combustion gas oxygen analyzer

Efficient fuel combustion in any industrial process is essential in cutting operating costs while reducing pollution to enable compliance with environmental legislation.



01

The challenge of finding the right air/fuel mix

The ratio of air to fuel is a critical factor in efficient combustion. Where there is just sufficient oxygen to ensure complete combustion, this ratio is known as the stoichiometric mixture, and lambda equals one. This is a theoretical value which cannot normally be achieved in industrial combustion processes. Lambda values about 1.1 and above are usual.

Controlling the air supplied to the combustion process is a fine balancing act. Insufficient air will mean incomplete combustion of fuel, resulting in fouling of heat transfer surfaces and emissions of soot, smoke and carbon monoxide. If air levels are too high, heat efficiency is reduced as the extra air carries more heat away in the flue gas, reducing overall boiler efficiency.

The solution is to measure flue gas oxygen

The level of oxygen present in the combustion waste gas is a key indicator of the amount of excess air supplied to the process. Oxygen measurement is therefore critical when optimizing combustion control for maximum efficiency.

ABB offers a range of combustion gas analyzers to accurately measure the oxygen concentration in a wide range of combustion processes. The analyzers can be used in conjunction with ABB's Sensyflow thermal mass flowmeters to regulate the amount of air supplied to the burner.

The added value

What you can expect from the market leader

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

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 nearly 40 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.



ABB Measurement & Analytics

For your local ABB contact, visit:

www.abb.com/contacts

For more product information, visit:

solutions.abb/analytical

