SUPPORTING YOUR COMBUSTION AND EMISSIONS APPLICATIONS

PROCESS STUDY
Waste to energy using thermal conversion processes

EXPERT FOCUS
A solution for SO₂ impact on CO₂ sensors

APPLICATION STUDY
Safety considerations in boiler conversions
Servomex provides comprehensive support for customers in the power generation market.

At the US Business Center (USBC) in Houston, the core of this support is provided by our applications, customer support and service team experts.

Our featured expert is Field Applications Engineer Joshua Christian, who has been with Servomex for three years, bringing more than 14 years of extensive experience in the petrochemical industry to Servomex.

His role is to ensure that in-field installations support the technology and solutions that Servomex provides. He also inspects installations to ensure conformity to current regulations.

“The current standards that determine what is required in the field are constantly updated,” Joshua explained. “I work with the new standards and bring them to the customers with considerations of how to best implement them with current and newer technologies.”

A recognized industry expert, he sits on both the API-556 and API-560 standards committees for the American Petroleum Institute (API) trade association, focusing on instrumentation and control for fired heaters.

As part of our effort to provide great customer service, Servomex announces the addition of Robert Rankin, taking on the role of Customer Support Manager for the Americas. Robert brings his ability to build strong customer relationships with him after 19 years at Emerson Automation Solutions. He will oversee and continuously improve the expert in-house support group for our customers, assembling a world-class inside sales team.

Rounding out our Americas team is Christopher Galley, who joined Servomex as Service Manager for the Americas last year. Chris brings over 23 years of industry service and operational experience to the role, having worked for several industrial electronics and technology companies. With his ability to work quickly he is striving to make Servomex the leading expert when it comes to both Field and Depot service support.

To find out more about the support offered to power market customers by the USBC, contact: americas_service@servomex.com or americas_sales@servomex.com

The same high standard of support is provided by our business centers around the world. Find your nearest office at: www.servomex.com/locations

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NATURAL GAS IS FUEL OF CHOICE

Even though the current United States administration is in the process of replacing and defunding the EPA Clean Power Plan to encourage new coal-fired plant builds, none of the new capacity brought on-line in 2017 was for coal. Natural gas combined cycle and renewable sources from wind and solar represented 39% and 53% of all the new plant build in the US respectively1 and this continues to be the trend in 2018. According to the US Energy Information Administration (EIA), natural gas displaced coal as the number one fuel of choice for electric power generation in 2016 and increased to 32% natural gas and 30% coal in 2017, with the remainder as 20% nuclear and 17% renewables2. Even though natural gas is on average the main fuel powering the US electrical grid, there has been a surge in the use of renewable sources as well. This increase has not been driven by fuel cost but by states looking to lower their overall emissions footprint. In fact, California has set a goal that by 2030, 50% of the state’s electricity must come from a renewable source3 and groups from several other states are pushing utilities to build cleaner renewable power plants in place of those running on fossil fuels.

CLOSURES AND CONVERSIONS

There is 11.4 GW of coal-fired power capacity scheduled to be taken off-line in 2018 as natural gas prices continue to remain low and higher efficiency appliances and processes continue to lower the demand for electricity4. Many power utility companies continue to either close or convert older plants from coal to gas as the economics of maintaining older coal plants and meet regulatory emissions requirements are no longer economically feasible. As with any change, switching an electrical utility source away from coal to a cleaner source also brings new challenges.

Renewable energy sources like wind and solar are being used for baseload electricity generation. While providing a cleaner source of energy, they remain unpredictable and must be fortified with on-demand power from gas-fired turbines, coal-fired boilers, batteries and other sources to provide grid stability. Keeping the production stable can be quite challenging at times.

SAFETY MEASURES

Converting a power plant from coal to natural gas presents many new safety hazards regarding the handling and operation of the fuel. Even if personnel are properly trained in the use of natural gas, extreme care is still needed, as seen with the recent explosions that blew up several homes in the Merrimack Valley in Massachusetts while the pipelines were being worked on.

Challenges with the safe operation of plants begin with the operators as they migrate from a solid to gaseous fuel source – new safety measures and training are required. The utmost care must be taken during start-up/shutdown, operation and control, and having gas analyzers co-located on the plant equipment providing real-time feedback can save lives.

SAFETY CONSIDERATIONS FOR PLANTS CONVERTING TO GAS

Increased operational costs, combined with lowered emission limits, have led many power plant operators to convert from coal to natural gas fuel. Servomex field applications engineer Joshua Christian and Dr. Marshik explore the driving forces behind this switch and the new safety issues that now confront plant operators and technicians.

Natural gas conversion produces other unintended consequences for operational and maintenance personnel, including staff reductions (up to two-thirds due to lower fuel handling needs) and training on new hazards and safety management skills. This is especially critical if the plant is used for peaking power, which relies on strict capacity agreements, with stiff penalties if the plant is not producing when the demand is required. At this point, safety is of the utmost concern.

Continued on page 06.
SAFETY ASSESSMENTS

Most explosions arise during either start-up or shutdown of a boiler or turbine due to unburned fuel arising from fuel-rich or flameout conditions. The lack of air in the combustion chamber—such as insufficient air flow or too much fuel channeled to the burners—results in a sub-stoichiometric, fuel-rich situation leading to unexpected explosions. Excess fuel can also accumulate in the combustion chamber, causing a burner flameout condition. Having analyzers able to monitor CH4 (fuel) signals can lead to incorrect improper diagnosis and explosions. Servomex Laser 3 Plus analyzers provide the perfect tools for power plant operators looking for ways to reduce operational costs and risks, especially when switching from coal-fired to natural gas-fired fuel in boilers. The Laser 3 Plus analyzers are SIL 2 rated and are the perfect solution for combustion optimization or safety monitoring.

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Monitoring the fuel feed rate and the combustion process are the keys to increasing the efficiency while reducing costs and emissions in a boiler. Operating at or near the optimal combustion parameters requires fast and reliable monitoring of the change in oxygen ($O_2$) and unburnt fuel.

The SERVOTOUGH FluegasExact 2700 uses Zirconia sensor technology to monitor $O_2$ levels in conjunction with a patented Thick Film Calorimetry (Tfx) sensor to detect unburnt fuel in the form of combustible (COe) gas components.

A Flowcube flow sensor can be placed before the $O_2$ cell, giving a highly reliable measurement of flow, enabling preventative maintenance. The signal response time ranges from 17 seconds up to 30 seconds depending upon the configuration using a unique low flow extractive sampling technique.

The FluegasExact 2700 is designed as a close-coupled extractive analyzer, with a probe inserted into the hot boiler or economizer section, and the actual sensors located just outside of the hot process wall in a temperature-controlled analyzer head.

Asian and Indian power plants commonly use lower grades of coal that can contain up to 8% sulfur. Sulfur released into the atmosphere creates acid rain, haze and many health-related issues and while reducing the use of sulfur-containing coal is desirable, the economic cost is the biggest driver. Unfortunately, sulfur deactivates or poisons the catalytic material used in emission-reduction processes, including those used for NOx reduction like Selective Catalytic Reduction (SCR) catalysts.

This same process that deactivates the SCR catalyst also deactivates catalyst-based sensors. The sulfur preferentially reacts with the metal catalyst, leading to a layer of sulfur that prohibits CO from reaching the surface of the COe sensor. Without a means to remove the sulfur, the catalyst eventually becomes deactivated or poisoned.

A special sulfur-resistant Tfx sensor can be installed for exhaust gas streams that contain lower amounts of sulfur (<2%). The sensor is operated at a higher temperature, 400°C (752°F), promoting burn-off which keeps the sulfur from depositing permanently on the COe sensor. Additional combustion air is also supplied internally to dilute the amount of exhaust gas and therefore sulfur, that is seen by the sensor at any one time.

However, when lower grades of coal are used, neither of these options have had success long term, requiring the Tfx sensor to be replaced after only a few months on stream. Continued on page 10.

**THE IMPACT OF SULFUR ON Tfx SENSORS**

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DEVELOPING THE SO₂ SCRUBBER

A South East Asian operator at a power plant site generating >3000 MW was looking for a combustion control solution for several steam generation boilers at the plant.

A SERVOTOUGH FluegasExact 2700 gas analyzer was equipped with an oxygen (O₂) and combustion (COe) sensor and optimized for high sulfur emissions. Because the plant also did not want to mount the sensor head directly on the boiler, a remote extractive system was designed and installed. This system was able to achieve a response time of under 40 seconds, even though the sensor head was 10 meters away.

The high-sulfur version of the COe sensor was installed but it failed within two weeks due to the high-sulfur environment of the coal-fired boiler; the O₂ sensor continued to work.

Servomex created a new sulfur dioxide (SO₂) scrubber and installed it on the inlet to the FluegasExact 2700 sensor head. Because this installation was on a remote extractive system and the configuration of the scrubber system was completed, the exhaust gas had to be kept approximately 1 meter away to avoid condensation. The COe sensor has been in continuous operation for over one year and because of the location of the scrubber at grade, it is easily maintained.

CREATE A MORE COMPACT SCRUBBER

While the remote extractive system works well, there are many installations that require the FluegasExact 2700 sensor head to be mounted directly to the boiler or economizer wall avoiding a remote sampling system completely. A new compact version of the COe sensor SO₂ scrubber was created that fits between the port flange on the boiler/economizer wall and the close-coupled head flange of the FluegasExact 2700. The addition of the scrubber in this configuration adds less than three seconds to the total sample time of the analyzer (20-30 seconds total) without compromising the scrubber performance. The compact SO₂ scrubber system has a screw-in membrane filter that removes condensed moisture prior to gas entering the sulfur absorber. The sulfur absorber must be replaced on a regular basis (three to 12 months depending on the sulfur load). However, this is a simple replacement and does not require the probe to be removed from the boiler.

The compact scrubber systems were installed at another South East Asian power plant earlier this year and the COe sensors continue to work well, even in these high-sulfur environments.

Existing systems can be retrofitted with this new compact scrubber design. For more information on the compact or remote extractive design please contact your local Servomex representative:

- americas_sales@servomex.com
- europe_sales@servomex.com
- asia_sales@servomex.com
- MEI_sales@servomex.com

WASTE TO ENERGY USING THERMAL CONVERSION PROCESSES

WITH EFFECTIVE GAS ANALYSIS, GASIFICATION AND PYROLYSIS CAN PROVIDE EFFICIENT PROCESSES FOR CREATING POWER FROM WASTE SOURCES. SERVOMEX’S GLOBAL BUSINESS DEVELOPMENT MANAGER, DR. STEPHEN FIRTH, EXPLAINS THE KEY MEASUREMENTS INVOLVED IN THIS APPLICATION.

Gasification and pyrolysis are two different processes used to turn residual waste into an energy resource or chemical product.

In gasification, waste is heated to produce synthesis gas (syngas), a fuel gas mixture mostly made up of hydrogen, carbon monoxide and some carbon dioxide. Syngas is a useful intermediate in the production of synthetic natural gas, and for the creation of ammonia or methanol.

Pyrolysis works by heating the waste in the absence of oxygen (O₂), creating a char and a gas and/or liquid that can be used for electricity production or the manufacture of other fuels.

Gasification and pyrolysis can be combined into an advanced process that uses organic feedstocks to create a fuel-type syngas which is, in turn, combusted to provide renewable energy generation.

Gas analysis plays an important role in both processes, monitoring for O₂ in the gasifier to ensure an efficient reaction. A combustion control solution is also required to optimize the fuel-air ratio at several points in the process, including combined cycle power generation. In addition, emissions monitoring remains a key requirement.

SERVOTOUGH ANALYZER SOLUTIONS FOR GASIFICATION AND PYROLYSIS

SERVOTOUGH Laser 3 Plus Process

High-sensitivity cross-stack TDL analyzer optimized for fast-response, accurate measurements of O₂ in hazardous conditions.

SERVOTOUGH FluegasExact 2700

Advanced flue gas analyzer for combustion process analysis of O₂ and combustibles in challenging locations.

SERVOTOUGH Oxy 1900

Safety-enhanced O₂ analyzer designed to deliver accurate Paramagnetic measurements in hazardous or demanding applications.

SERVOPRO 4900 Multigas

High-performance CEMS analyzer certified for multi-gas measurements of flue gases, O₂ and pollutants in regulatory environments.

See our analyzers across the process OVERLEAF
For this application, Servomex offers a comprehensive range of process safety, combustion control and continuous emissions monitoring system (CEMS) measurements.

The application commences with the gasification/pyrolysis process, where waste material is heated to produce a rich mixture of gases, including carbon monoxide (CO), hydrogen (H₂) and hydrocarbons. Any presence of oxygen (O₂) is a potentially dangerous flammability risk, so the in-situ O₂ safety measurement provided by the SERVOTOUGH Laser 3 Plus Process (1) is critical. The waveform-specific scanning of Tunable Diode Laser (TDL) technology means the signal is unaffected by cross-interference of other gases, especially important as the composition of the gas mixture is constantly changing. As the process is full of particulates with a high dust load, these are removed from the optics through use of a nitrogen purge gas.

The higher hydrocarbons present in the mixture generated are converted to lower hydrocarbons in the high-temperature combustion processes in the reformer. Combustion efficiency across the burner is provided by SERVOTOUGH FluegasExact 2700 analyzers (2), which enable the precise control of O₂ and combustibles (COe) at high temperatures.

The heat created in the reformer is removed by a heat recovery boiler, and the gas mixture cleaned, with the resulting output designated for storage or for burning in a combined cycle boiler. The methane present is liquified through cooling (-150°C) and passed into storage. Once again, the presence of O₂ presents a flammability risk, so a SIL-compliant measurement of O₂ in the 1-2% range is made by the SERVOTOUGH Oxy 1900 (3). The remainder of the mix is then fed into the combustion process of a combined cycle boiler, where again the FluegasExact 2700 (4) provides precise measurements of O₂ and CO for effective combustion control. Finally, the residual gases are vented into the atmosphere, where the SERVOPRO 4900 Multigas (5) is able to provide simultaneous 0-100 parts per million CEMS measurements for O₂, CO, nitrogen oxides (NOx) and sulfur dioxide (SO₂).

Find out more at servomex.com or contact your nearest business center.
Servomex offers the most compact high-performance multi-gas monitoring solution for flue gas emissions monitoring, measuring criterion pollutants, greenhouse gases and reference oxygen for both continuous monitoring or mobile laboratory / stack testing applications.

Compact and robust, the 4900 Multigas requires minimal rack space and is easily integrated into any data acquisition system, reducing installation time and cost. It is the best space-saver on the market with up to three gas transducers housed in a standard 19” (48.26cm) rack mountable chassis only 3U (5.25” or 13.335cm) high!

The 4900 Multigas is highly configurable with a combination of reliable, highly linear, ultra-stable digital sensing transducer technologies – including Paramagnetic and Infrared based non-dispersive and Gas Filter Correlation. Capable of measuring any combination of nitric oxide (NO), sulfur dioxide (SO2), carbon monoxide (CO), oxygen (O2), carbon dioxide (CO2), nitrogen oxide (NOx) and methane (CH4) with outstanding accuracy.

There is also a configurable version of the analyzer for those applications that require MCERTS/QAL1 certification. The highly successful SERVOPRO 4900 analyzer has been fully updated to conform to the new European Union standards and provided with a fresh interface for easier navigation and control of the analyzer. It is fully backwards-compatible with existing 4900 installations, delivering the same key measurements alongside significant improvements in communications and control.

These enhancements include an intuitive, icon-driven touchscreen interface which enables easy user interaction and device configuration. There are up to four analog and eight digital inputs, four analog outputs individually selectable as mA or voltage, 32 alarms and 32 relays available. Updated digital protocols include RS232/RS485 Modbus and PROFIBUS, with Modbus TCP/IP to be released in Q4 2018. Optimized for applications where accurate emissions analysis is a regulatory requirement, such as CEMS or mobile laboratories / trailers, the 4900 Multigas is ideal for industrial processes including power generation, refining, incineration and manufacturing.

Servomex Service Network offers a full range of service products developed to ensure optimum process performance. Contact your local Servomex Business Center today to find out more and protect your investment.

Correct installation and configuration of your analyzer is essential to ensure it provides optimum performance and that it meets your compliance and operational needs from the outset. Servomex’s highly trained commissioning engineers provide a fast, seamless and comprehensive service that supports your process. They will assess installation suitability and commission your analytical equipment to perform safely, accurately and reliably.

This delivers optimum performance from your analyzer or system, and qualifies the analyzer for an additional warranty period.

**THE 4900 Multigas**

**MEASURES:**
- **CRITERION POLLUTANTS:** NO, SO2, CO
- **GREENHOUSE GASES:** CO2, N2O, CH4
- **DILUTION/REFERENCE GASES:** O2 or CO2

### Key Applications

- **Utility Boilers**
- **Waste Incinerators**
- **Chemical Incinerators**
- **Crematoria**
- **Mobile Labs/Trailers**
- **Emissions Destruction or Removal Efficiency**

### THE SERVOPRO 4900 MULTIGAS DELIVERS ADVANCED CONTINUOUS EMISSIONS MONITORING (CEMS) IN A NEXT-GENERATION DIGITAL PLATFORM.

**Delivering Peace of Mind to Your Analyzer Set-UPS**

MARK CALVERT, SERVOMEX’S SERVICE MANAGER FOR THE EMEAI REGION, EXPLAINS THE BENEFITS OF COMMISSIONING FOR YOUR ANALYZER OR SYSTEM.

**A customized solution**
An engineer will provide a fully customized commissioning program that meets your compliance and operational needs. They will then hand over control to your in-house technicians with a face-to-face training session.

**Return on your investment**
Commissioning ensures you get the best return from your analyzer; it helps avoid costly process inefficiencies and ongoing maintenance costs caused by incorrectly installed equipment.

**Optimize your performance**
An analyzer commissioned by Servomex eliminates the operational errors caused by incorrect installation. This avoids the dangers of compromised plant safety and ensures analyzer operation is tailored to suit your process requirements.

**Health Check protection**
You can protect your analyzer for two years by purchasing a Servomex Health Check with your Commissioning package. We will validate your analyzer’s performance after the first year of installation, and provide you with a further 12-month warranty.

Servomex Service Network offers a full range of service products developed to ensure optimum process performance. Contact your local Servomex Business Center today to find out more and protect your investment.

**Get peace of mind for your process today:** servomex.com/service
POWER PRODUCT GUIDE

Power generation is a demanding and competitive industry – producing energy for a global market is a complicated balancing act between process efficiency, emissions control, safety requirements and cost control.

Servomex offers a comprehensive gas analysis that enables the world’s power producers to optimize their processes, meet legally binding emissions targets and raise profitability.

For the full range of Servomex analyzers, visit servomex.com/gas-analyzers
ADVANCED FLUE GAS ANALYZER FOR HIGH-TEMPERATURE MEASUREMENT OF O₂ AND COMBUSTIBLES

- Designed to measure O₂ and CO in flue gases for improved combustion efficiency and reduced emissions.
- The FluegasExact 2700 gas analyzer is designed to suit the most demanding needs of combustion efficiency applications in the power generation and process industries.

FEATURES AND BENEFITS
- ATEX Cat. 3, ECEx Zone 2 & North America Class I, Div 2
- Unique FlexiCell flow sensor technology enables positive flow conditions to be validated
- Corrosion-resistant combustibles sensor enables sensor to operate at elevated sulfur levels

APPLICATIONS
- Process heaters
- Utility boilers
- Thermal crackers
- Cement & incinerators

SERVOTOUGH FluegasExact 2700

Hazardous Area

EXTRACTIVE TDL TRACE MULTI-GAS ANALYZER, DESIGNED FOR MEASURING TRACE GAS EMISSIONS OFFLINE

- Specifically designed for extractive trace analysis applications, the LaserExact 2950’s TDL technology offers unsurpassed low ppb detection limits for most gases, making it ideal for the measurement of trace gases offline.

FEATURES AND BENEFITS
- Zone 2/Div 2 hazard-rated locations and use without purge
- Advanced multipass cell delivers ppb or low ppm detection limits
- Innovative PeakLock pattern recognition line tracking eliminates drift over extended operational periods

APPLICATIONS
- Refinery monitoring: H₂, H₂S, CO₂ (during natural gas refinement)
- HF and HCl impurity monitoring in process gas
- Monitoring H₂ during biogas production
- H₂O and H₂S in natural gas

SERVOTOUGH LaserExact 2950

Hazardous Area

SERVOTOUGH LaserSP 2930

HIGH-SENSITIVITY CROSS-STACK TDL ANALYZER

- A high-performance gas analyzer designed for continuous in-situ monitoring, the LaserSP 2930 delivers a fast response time and highly stable performance. Suitable for measuring a range of gases including HCl, HF, H₂S, HCN, and other hydrocarbons, the LaserSP is ideal for a wide range of process, combustion control and emissions applications.

FEATURES AND BENEFITS
- Designed for Zone 1 and Zone 2 hazard rated (gas/particle) locations
- Involved with no sample conditioning delivers reliable operation
- Wavelength Modulated Spectroscopy provides wide dynamic range and lowest cross-interference

APPLICATIONS
- Emission control systems for CEMS
- Combustion control systems for process heaters and crackers
- Ammonia slip control in DNOx plants

SERVOTOUGH LaserSP 2930

Hazardous Area

RELIABLE RESULTS IN A TESTING RANGE OF ENVIRONMENTS

- The DF-140E allows for reliable oxygen measurement in a wide variety of environments, including outdoors and in explosive environments with a NEMA 7 remote sensor enclosure. Using the revolutionary non-depleting E-Sensor, the DF-140E delivers reliable readings without frequent recalibration and periodic sensor replacement.

FEATURES AND BENEFITS
- Long-term reliability and stability with minimal maintenance
- Durability – can be used in Class I, Div 1 or 2 areas
- STAB-EL option allows for accurate measurement in the presence of acid gases

APPLICATIONS
- Reactor process control
- Pressure swing adsorber nitrogen skids
- Blanking and inserting

SERVOTOUGH DF-140E

Hazardous Area

SHORT PATH LENGTH TDL ANALYZER

- Optimized for measurement across pipes and along short measurement cells and able to measure through very thin nozzles, reducing or even eliminating consumption of purge gas, the LaserCompact 2940 delivers the fast response time, highly stable performance and minimum sample conditioning advantages of TDL technology.

FEATURES AND BENEFITS
- ATEX, IECEx and North American hazardous area approvals: ATEX Cat 3 (Gas) and Cat 2 (Dust) IECEx Zone 2 and Zone 21. CSA Divisions and Zones (Gas and Dust)
- Optical line-width correction delivers accurate measurement with variations in matrix
- Involved with low purge gas consumption

APPLICATIONS
- Chemical reactors – inert gas control
- Moisture in VCM
- Natural gas contaminants – H₂O, CO₂, H₂S

SERVOTOUGH LaserCompact 2940

Hazardous Area

HIGH-RELIABILITY TRACE AND PERCENT O₂ MEASUREMENTS IN HAZARDOUS AREA LOCATIONS

- Designed for use in harsh and hazardous areas, the DF-320E uses Servomex’s unique, non-depleting Coulometric sensor technology to give highly stable O₂ measurements, making it ideal for applications including hydrogen, propene and polyethylene production, oil refining and petrochemical process monitoring.

FEATURES AND BENEFITS
- Ideal analytical solution for applications including H₂, C₂H₄, and PE production, oil refining, and petrochemical process monitoring
- Microprocessor-driven for easy configuration and maintenance
- Coulometric sensor delivers accurate results with no sensor drifting, false low readings, or frequent calibration requirements

APPLICATIONS
- Hydrogen production
- Polypropylene production
- Polyethylene production
- Oil refining
- Petrochemical applications

SERVOTOUGH DF-320E

Hazardous Area
SERVOTOUGH DF-340E

Hazardous area

**Features and Benefits**
- High-sensitivity trace/per cent CO2, CO, O2, O, or CO + CH4 measurements
- Containing all the benefits of Servomex's TDL technology in a safe area, with unmatched installation flexibility plus cost and performance benefits, this analyzer is designed for fast, accurate and responsive measurements in combustion and process control, making it a must for safety applications.

**Applications**
- Process headers
- Incinerators
- Power stations
- Furnaces

THE REVOLUTIONARY COMPACT COMBUSTION ANALYZER OPTIMIZED FOR CO2, O2, OR CO + CH4 MEASUREMENTS

SERVOTOUGH Laser 3 Plus Process

**Features and Benefits**
- High safety integrity utilizing Servomex's own line lock cuvette technology
- ATEX, IECEx and North American hazardous area approvals
- Optimized for combustion processes

**Applications**
- Process headers
- Incinerators
- Power stations
- Furnaces

GAS DETECTION OxyDetect

**Features and Benefits**
- The most reliable O2 detector on the market
- No-false readings or false alarms caused by depleting cell technologies

**Applications**
- Chemical incinerators
- Crematoria
- Mobile labs

OXYGEN MEASUREMENTS...

SERVOFLEX 4900 Multigas

**Features and Benefits**
- An advanced digital multi-gas CEMS analyzer
- A comprehensive solution for CEMS analysis of multiple flue gas components
- Low maintenance and cost of ownership
- Advanced digital communications including Ethernet, Modbus TCP/IP and PROFIBUS

**Applications**
- Utility boilers
- Chemical incinerators
- Crematoria
- Mobile labs
### CHEMILUMINESCENCE DETECTOR (CLD) ANALYZER FOR KEY EMISSIONS APPLICATIONS INVOLVING ULTRA-LOW NO, NO₂, AND NOₓ

- **Uses proven pulsed UV fluorescence technology to deliver a precise and reliable measurement of ultra-low sulfur dioxide in emissions and ambient air**

**Features and Benefits**
- Ultra-long-lasting UV light source
- Removable flash memory stores up to 10 years of data
- Operation over wide temperature range reduces cost of ownership

**Applications**
- Continuous emissions monitoring (CEMS)
- Ambient air monitoring

### HIGH-PERFORMANCE FAST ANALYSIS OF TOTAL HYDROCARBONS, METHANE AND NON-METHANE HYDROCARBONS

- Using a highly sensitive Flame Ionization Detector (FID) for measuring variable hydrocarbon concentrations in industrial or vehicle emission applications, the HDF utilizes an internally heated oven set to 190°C to maintain the sample gas above its dew point, for optimum performance in total hydrocarbon analysis (THC). Can be equipped with a non-methane cutter for additional CH₄ and non-methane hydrocarbon (NMHC) reporting.

**Features and Benefits**
- Four user-definable measurement ranges, reconfigurable in the field
- High-accuracy, gas-selective Raman technology for maximized uptime
- Heated oven for maximum stability and “hot/wet” sampling
- EPA Method 25A compliant
- EPA 1065/1066 and LD Euro 6, HD Euro V1 compliant

**Applications**
- Continuous emissions monitoring (CEMS)
- VOC abatement
- Scrubber efficiency
- Compliance monitoring and testing

### PORTABLE GAS ANALYZER FOR MEASUREMENT OF COMMON GAS MIXTURES

- Designed for use in field locations or light industrial applications, the MiniHD 5200 portable gas analyzer is a rugged, heavy duty analyzer designed to accurately measure the levels of O₂, CO and CO₂ within common gas mixtures. The MiniHD 5200 utilizes Servomex’s non-depleting Paramagnetic and Infrared sensing technologies.

**Features and Benefits**
- Robust IP65 construction meets the demanding needs of field location analysis
- Long-life Li-ion rechargeable batteries and range of sampling options ensure ease of use
- Accurate measurement of O₂, CO and CO₂ levels with no background interference

**Applications**
- Physiology studies
- Universities
- Combustion optimization
- Medical gas verification
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