

# INDUSTRIAL PROCESS & EMISSIONS



## GAS ANALYSIS MAGAZINE

ISSUE  
ONE

SUPPORTING YOUR COMBUSTION,  
HYDROCARBON PROCESSING AND  
EMISSIONS APPLICATIONS

### PROCESS STUDY

Oxygen monitoring solutions  
for inerting

### EXPERT FOCUS

Laser combustion analysis for sulfur  
removal facilities

### APPLICATION STUDY

Monitoring gas pipeline  
compositional changes



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# WE DELIVER SOLUTIONS FOR YOUR PROCESSES

Welcome to the first issue of our new Industrial Process and Emissions (IP&E) magazine, which focuses on Servomex's solutions for the power generation and hydrocarbon processing industries.

Our IP&E team delivers a range of expert knowledge and innovative products for these key industrial markets, and is optimized to provide easy access to sales and support for customers around the world.

In this edition, we look at the trends affecting developments in Europe and outline how Servomex has prepared for the UK's departure from the EU.

We also focus on our product offers for important applications, including oxygen monitoring for inerting processes, which are used by a wide range of industries.

Our application-based expertise delivers effective solutions to global industries, and we showcase a recent example, revealing how we supplied a reliable, economic solution to sulfur removal facilities in the Middle East.

For operators looking to upgrade their gas analysis, we also highlight the benefits of switching to our latest digital analyzer platforms.

The IP&E team is supported worldwide by Servomex's service network, recently enhanced by the appointment of Mark Calvert as Global Head of Service. Read about his plans to improve our overall service processes on page 14.

If you'd like to find out more about what our IP&E team can do for your power generation, hydrocarbon processing or emissions monitoring applications, get in touch with us at [servomex.expert/contact-us](mailto:servomex.expert/contact-us).

## NEW ADDITIONS TO THE IP&E TEAM

Keith Warren has been appointed Product Manager for process oxygen Paramagnetic and Zirconia products. Based at the UK Technical Centre in Crowborough, Sussex, Keith will oversee the strategic development and sales of key products in our SERVOTOUGH gas analysis range including the Oxy 1800 and 1900 oxygen analyzers, Oxy 2200 high-performance oxygen analyzer and the FluegasExact 2700 combustion analyzer.



Email: [kwarren@servomex.com](mailto:kwarren@servomex.com)

Fulvio Sullini has been appointed Sales Manager for the IP&E sector in the EMEA region. Based in Manchester, UK, Fulvio will manage Servomex's IP&E team across Europe, Africa and the Middle East, with a particular focus on large projects.



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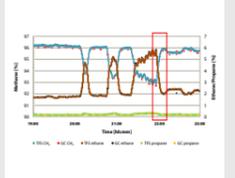
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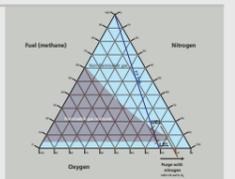
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# SEE THE FULL PICTURE ONLINE

## SERVOTOUGH Laser 3 Plus

See the advantages of Servomex's innovative product range as we introduce three compact TDL analyzers.



## UNBOXING THE OxyDetect

Discover what you get in the box when you order our non-depleting Paramagnetic oxygen monitor.



## SOLUTIONS FOR COMBUSTION CONTROL

Our experts discuss the Servomex solutions for safety and efficiency in combustion processes.



## SEE INSIDE SERVOMEX

Get an insight into our world-class manufacturing facilities where sensors and SERVOTOUGH and SERVOFLEX analyzers are built.



Watch at [servomex.expert/videos](http://servomex.expert/videos)

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# MARKET FOCUS: EUROPE

## EUROPEAN INDUSTRIAL, PROCESS & EMISSIONS MARKET GROWS DESPITE UNCERTAINTY



Dr Stephen Firth

Reducing emissions is a key concern for the European markets

Dr Stephen Firth, Servomex's Global Business Development Manager, looks at how emissions controls are affecting the IP&E market in Europe, and explains how Servomex is prepared for the UK's departure from the European Union.

Economic uncertainty and the continuing move towards renewable energy are two of the key factors affecting the Industrial Process and Emissions (IP&E) market in Europe for 2019 and beyond.

Forecasts have indicated that the European economy is likely to grow moderately, overall, for the year, with all EU member states seeing a rise in GDP. This will be the seventh consecutive year of economic expansion for the EU.

While global uncertainties continue to affect the region, domestic dynamics are set to support the European economy,

and growth looks likely to gather pace again next year.

High expectations for 2018 were quickly moderated by the slowing global economy, so European petrochemical producers began this year with a more cautious outlook. The picture has remained mixed as 2019 continues, with modest growth for France and Spain, while Germany and Italy face more of a struggle.

The outlook for 2019 has been further weakened by ongoing, unresolved issues such as the UK's impending departure from the EU and the trade war between the USA and China. This has forced European petrochemical companies to brace themselves for an uncertain year.

Renewable energy continues to dominate the agenda for the power industry in Europe.

The UK has recently announced its intention to reduce carbon emissions to net zero by 2050, while May 2019 saw the country mark a full week without burning coal for electricity for the first time since 1882.

According to the BP Energy Outlook for 2019, the EU will continue to lead the global transition towards a carbon-free economy. Renewables will become the largest source of energy by 2040, accounting for 29% of EU energy consumption.

The Outlook also suggests that primary energy use in power generation will grow by 10% over the next 20 years, but will fall in all end-use sectors. Carbon emissions for 2040 are expected to decrease by 36% compared to the 2017 levels.

# SERVOMEX IS READY FOR BREXIT

Although the details around the terms on which the UK will leave the EU remain unclear, leaving many UK-based manufacturing businesses with some uncertainty, Servomex is positioned to maintain full support to its customer base.

Servomex's UK Technical Centre in Crowborough is a centre of excellence and will remain the main manufacturing site for our global business for the foreseeable future. We are committed to remaining in the UK and we believe this will continue to benefit our customers, employees and other Servomex stakeholders.

Since the decision of the UK to leave the EU in June 2016, Servomex has been undertaking an ongoing review of the impact of Brexit on its business, with

various risk assessments. We will continue to monitor all aspects of our business including the potential impact of Brexit on our operations, products, services, supply chain, customs duties and tariffs, tax and regulatory compliance.

To prepare for the possibility of a No Deal Brexit, Servomex has conducted a full supply-chain review to understand our supply chain's readiness for uninterrupted availability of raw materials, maintenance of stock levels, any logistics challenges and possible tax impacts.

As a consequence of this activity, we have assessed our own risk areas and have taken relevant steps (including the advance purchase of raw materials and other components needed for our production) to

help mitigate against those risks. In addition, Servomex is building up its own stock levels of finished products.

We consider our actions to date appropriate and adequate to enable us to meet, as far as it is within our control, our customers' requirements after October 31, 2019.

Of course, we cannot assess all possible consequences of a No Deal Brexit, and with the UK Government's own levels of readiness uncertain, we cannot fully anticipate how cross-border trade may be impacted.

We therefore continue to monitor the situation so we may respond to further developments as they occur.



Servomex has taken steps to ensure sensor manufacture and supply will continue uninterrupted after Brexit

## SERVOMEX SOLUTIONS FOR EMISSIONS MONITORING

With the reduction of carbon emissions dominating the agenda for Europe, emissions control will only increase in importance for industries in the region. Servomex provides a range of emissions monitoring solutions which help plant operators achieve compliance. We also supply highly accurate measurement equipment to reduce emissions by optimizing the combustion or DeNOx processes.

### SERVOPRO 4900 Multigas

A high-specification digital continuous emissions monitoring systems (CEMS) analyzer designed for multi-gas measurement of criterion pollutants, greenhouse gases and reference oxygen.



### SERVOTOUGH NOx

A versatile analyzer for nitrogen monoxide (NO) or NO/nitrogen dioxide/NOx emissions testing, ideal for continuous monitoring in industrial stationary sources, ambient air, and vehicle engine testing.



### SERVOPRO SO<sub>2</sub>

A reliable gas analysis solution for industrial applications that require ultra-low emissions monitoring of sulfur dioxide.



### SERVOPRO HFID

A high-performance analyzer for the measurement of total hydrocarbons, methane and non-methane hydrocarbons in engine testing and industrial gas stack monitoring.



Let us help find the right analyzer for you: [servomex.expert/contact-us](http://servomex.expert/contact-us)

### SERVOFLEX MiniIMP 5200

The only truly portable MCERTS-approved carbon dioxide and oxygen monitor for CEMS testing and verification.



### SERVOTOUGH FluegasExact 2700

Reliable combustion process analysis of both oxygen and combustibles in a single analyzer, designed for use in the most hazardous and challenging locations.



### SERVOTOUGH Laser 3 Plus Combustion

A compact Tunable Diode Laser analyzer which can be optimized to measure oxygen, carbon dioxide and methane for in-situ, cross-stack combustion applications.



### SERVOTOUGH Laser 3 Plus Ammonia

A fast-response Tunable Diode Laser analyzer designed to measure ammonia in DeNOx applications, ensuring compliance and providing feedback control for dosing.



## SAFEGUARDING YOUR SYSTEM AGAINST EXPLOSION RISKS

Recycled waste gas by-products in ethylene plants or refineries are commonly used, either alone or blended with natural gas to create an inexpensive form of fuel for fired process heaters, dryer regenerators, boilers and turbines.

Sudden changes in the composition of the refinery/recycled fuel gas (RFG) can create an oxygen-deficient environment which, if not acted upon, can create an explosion. Most fired heaters are configured as natural draft air flow, so the only way to rapidly de-escalate a potential explosion is to reduce the firing rate until the proper air-to-fuel ratio can be restored. Early warning about how the fuel is changing can be lifesaving.

Since 2015, electric power generation in the US has been dominated by pipeline gas (35.1% in 2018), with renewable energy increasing every year (17.1% in 2018). The abundance of shale gas drilling has, however, resulted in dramatic pipeline

compositional changes, as high-value components are removed at the drill site, depositing the rest into the pipeline.

Like fired heaters, when turbines and engines experience sudden changes in gas composition, the same oxygen-deficient environment will impact the integrity of the turbine/engine and can lead to an explosive atmosphere.

Power generating turbines and engines are also increasingly being used for rapid back-up power to renewable sources, keeping the grid load stable. This requires multiple startups and shutdowns on demand, ensuring safe operation and mechanical longevity is now an essential concern for plant operators.

In both RFG and pipeline gas situations, even if explosion limits are not reached, compositional variability causes fluctuating heat loads, which can result in the lower fuel efficiency as well as loss

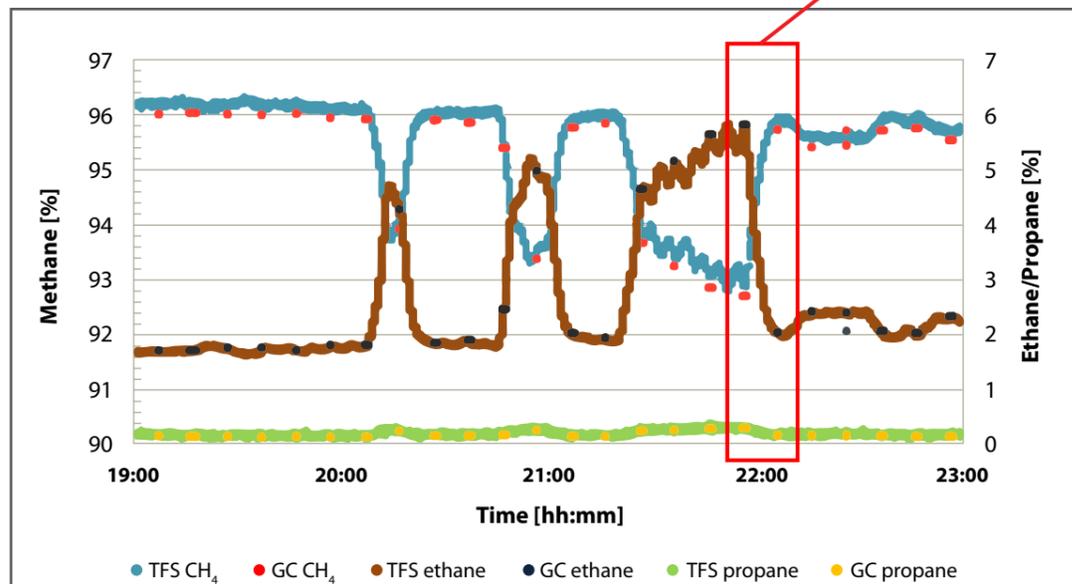
of product (process heaters) or electrical production (power turbines/engines). However, even these losses can be minor compared to excess emissions, resulting in substantial fines and earlier-than-expected mechanical failures.

Servomex offers the RFG Compositional BTU System to the process gas industry, providing real-time, feed-forward continuous compositional fuel measurements for more accurate calorific value (BTU/scf), and other density-corrected output values including CV, HHV, LHV, SG, and Wobbe Index.

For the power generation industry, we offer the Natural Gas Compositional System, which uses similar gas analysis components as the RFG Compositional BTU System, plus the addition of Methane Number output that can be used in natural gas distribution, storage, metering, blending and process applications.

GC Cycle time = ~7 min  
TFS Cycle time = 5 sec

3% increase in methane  
4% decrease in ethane



Example of comparison of GC and TFS for CNG



Servomex RFG BTU system featuring SERVOTOUGH SpectraScan 2400 and H2scan.

Each system provides a fully integrated enclosure, customizable HMI controller, and novel analysis technologies combining the SERVOTOUGH SpectraScan 2400 with thin film technology of the H2scan. The continuous flow-through operation of the analyzers is utilized to create an unattended in-line sampling system.

The SpectraScan 2400 is an innovative Tunable Filter Spectroscopic analyzer for rapid hydrocarbon composition. It uses a unique wavelength-scanning spectrometer, performing fast update rates for C1 through C6 gas molecule analysis. The reporting methodology is based upon the expected RFG or pipeline gas hydrocarbon composition, so that changes in concentrations are rapidly detected.

For more accurate BTU values an explosion-proof in-line hydrogen process analyzer, the H2scan, is added. This analyzer uses a solid-state, non-consumable thin film technology that provides a direct hydrogen measurement which is not cross-sensitive to other gases in the process stream.

Combining the technologies of the SpectraScan 2400 and the H2scan with the fully integrated sampling and reporting system challenges the traditional use of gas chromatography (GC) analysis of light hydrocarbons. This combination produces highly accurate measurements, comparable to GC results, but at a considerably faster speed, allowing the system to provide an early warning that the BTU and other density related indices may be changing.

### RFG COMPOSITIONAL BTU SYSTEM

#### FEATURES

- Remote, unattended continuous RFG compositional analysis
- Rapid response <4 seconds T90
- Density-corrected values via BTU, CV, HHV, LHV, SG, Wobbe Index
- Most effective technology for feed-forward control
- Easy integration into existing plant DCS systems
- North American Class1 Div2, ATEX Zone 2, IP66 rated

#### BENEFITS

- Improved heater efficiency, reduced emissions, and improved safety
- Ultra-low maintenance, high accuracy, low cross-sensitivity
- Longer fired-heater and heat-exchanger life from lowered heat stress
- Low cost of ownership – no carrier gas or instrument air needed
- Simple on-line proof testing

### NATURAL GAS COMPOSITIONAL SYSTEM

#### FEATURES

- Remote, unattended continuous natural gas compositional analysis
- Rapid response <4 seconds T90
- Methane Number output as MWN-MN, AVL, PKI, EN16726, or WMN
- Density-corrected output values include BTU, CV, HHV, LHV, SG, and Wobbe Index
- Most effective technology for feed-forward operational control
- Easy integration into existing DCS systems
- North American Class1 Div2, ATEX Zone 2, IP66 rated

#### BENEFITS

- Improved engine efficiency, reduced emissions, and improved safety
- Reduces engine damage from overheating or knocking
- Ultra-low maintenance, high accuracy, low cross-sensitivity responses
- Low cost of ownership – no carrier gas or instrument air needed
- Return on investment from efficiency gains in less than 5 months

Find out more – contact our experts today: [servomex.expert/contact-us](http://servomex.expert/contact-us)

# PRODUCT UPGRADES

## ENSURE YOUR PROCESS MEETS THE HIGHEST STANDARDS

IT'S TIME TO UPGRADE TO THE OXY 1900 FOR DIGITAL OXYGEN ANALYSIS IN HAZARDOUS AREAS.

Using our trusted Paramagnetic sensing technology, the SERVOTOUGH Oxy 1900 provides accurate, stable oxygen analysis in challenging industrial conditions.

Spares support for our analog 1900A/1900B oxygen analyzers ended in 2017, so upgrading to the more advanced model is strongly recommended.

The Oxy 1900 is a digital, microprocessor-based analyzer which delivers proven reliability to applications around the

world, with advanced software that allows the analyzer to self-diagnose faults and performance issues.

Delivering reliability in hazardous areas, it is certified for ATEX Cat 2, IECEx Zone 1 and CSA Class 1, Div 1, and also complies with Safety Integrity Level (SIL) 2 hardware compliance.

Its unique Flowcube sensor provides user configurable low-flow alarms during normal operation, while an

integrated pressure compensation sensor compensates the oxygen measurement if the sample pressure varies. A heated sample compartment offers unrivalled stability.

Backward-compatible with existing 1900 analog installations, the Oxy 1900 provides a full range of digital and analog communications options and an intuitive, easy-to-use graphic interface.



### SERVOTOUGH Oxy 1900

UPGRADE NOW:  
[servomex.expert/oxy1900](http://servomex.expert/oxy1900)

### SEE THE DIFFERENCE WHEN YOU UPGRADE:

	1900 Analog	Oxy 1900
Digital sensing technology	X	✓
Auto-validation and auto-calibration	X	✓
Self-diagnosis software	X	✓
Digital communications	X	RS485 or Modbus TCP
SIL 2 compliance	X	✓
Microprocessor-based flow sensor	X	✓
Full sample heating	X	✓
Pressure compensation	X	✓

## RELIABLE, SINGLE-ANALYZER COMBUSTION CONTROL

IMPROVE YOUR PROCESS AND REDUCE EMISSIONS WITH PROVEN MEASUREMENTS FROM OUR FEATURE-RICH ANALYZER.

The advanced, feature-rich SERVOTOUGH FluegasExact 2700 is the ideal upgrade for operators looking to keep their oxygen (O<sub>2</sub>) and combustibles (COe) analysis up to date.

The FluegasExact 2700 was launched in late 2013 as an update to the Fluegas 2700 range, and complies with the latest standards for hazardous area operation and electrical safety.

Spares support for the Fluegas 2700C is now coming to an end, and the 2700A and 2700B are already no longer supported.

In addition, the older 700 series is already obsolete and should be upgraded to avoid unnecessary downtime.

Moving to our newer analyzer provides proven analysis from the same reliable Zirconia and Thick Film Catalytic sensing technologies – providing O<sub>2</sub> and COe analysis in a single device – while adding many extra features that enhance performance and cost-effectiveness.

The FluegasExact 2700 has an integral sampling system for moisture-rich samples,

and aspirator interlocks that prevent sampling while the analyzer is heating or not up to optimum temperature.

It also has an optional continuous flow monitoring system to aid preventative maintenance, and uses an extractive measurement principle to keep the sensors out of the harsh process environment, extending sensor lifespan.

Retrofittable to existing 2700A, B and C installations, the FluegasExact 2700 is easy to maintain and calibrate.



### SERVOTOUGH FluegasExact 2700

UPGRADE NOW:  
[servomex.expert/fge2700](http://servomex.expert/fge2700)

### SEE THE DIFFERENCE WHEN YOU UPGRADE:

	Fluegas 2700A	Fluegas 2700B	Fluegas 2700C	FluegasExact 2700
Zirconia sensor	✓	✓	✓	✓
Tfx COe sensor has enhanced catalyst and Platinum Resistance Thermometer element FlowCube alarm	X	X	X	✓
High-sulfur Tfx COe	X	X	X	✓
ATEX Zone 2 Class 1 Division 2 MiniPurge	X	X	X	✓
Coated PCB option	X	X	✓	✓
Full flame trap protection	X	X	X	✓
Updated electronics	X	X	X	✓
Up-to-date certificates and compliance	X	X	X	✓
FlowCube option	X	X	X	✓

## A LASER-BASED SOLUTION FOR SRU THERMAL INCINERATORS

SERVOMEX HAS ACHIEVED SUCCESS IN THE MIDDLE EAST AND FURTHER AFIELD BY OFFERING A MORE RELIABLE AND COST-EFFECTIVE SOLUTION FOR COMBUSTION MEASUREMENTS AT SULFUR REMOVAL FACILITIES.

Sulfur removal facilities are located at the majority of oil and gas processing sites throughout the world.

A traditional Sulfur Recovery Unit (SRU) consists of a Claus section, a sulfur degassing section, a tail gas treating section and a thermal incinerator, and can achieve sulfur recovery of up to 99.9%.

The sulfur plant tail gas is routed to either a tail gas treatment unit for further processing, or to a thermal oxidizer where all of the sulfur compounds in the tail gas are incinerated to sulfur dioxide (SO<sub>2</sub>) before the effluent is dispersed in the atmosphere.

Tail gas from SRUs for acid gas contains a variety of sulfur compounds; these must

be destroyed by combustion before the gas is vented to the atmosphere.

SRU combustion applications are highly corrosive, because of the presence of high levels of sulfur compounds in the gas stream. This presents serious challenges for gas analyzers used for combustion control and efficiency.

### OVERCOMING PROBLEMS OF CORROSIVE CONDITIONS



Pictures from a Zirconia analyzer on a sulfur incinerator showing corrosion

In the Middle East region, existing analyzer installations tend to be either Zirconia or extractive solutions to monitor the combustion control. However, the Zirconia sensor can be attacked by sulfur compounds, while sample tubes can be clogged by the effects of sulfuric acid.

The corrosive conditions mean that these solutions require high levels of maintenance and frequent recalibrations.

Following successful field trials, several customers have switched to a Tunable Diode Laser (TDL) solution for all their SRU thermal oxidizer applications, specifying

the **SERVOTOUGH Laser 3 Plus Combustion** analyzer optimized for oxygen.

The laser has no contact with the sample, so there is no corrosion of the sensor, which significantly reduces maintenance and eliminates the need for cell replacement.

In the Laser 3 Plus, TDL sensing is supported by a line lock cuvette system which ensures the analyzer remains fixed on the target gas. This provides much greater stability, resulting in less frequent calibration requirements.

Tunable Diode Laser systems have been supplied to customers throughout the Middle East, USA, Singapore and Europe.

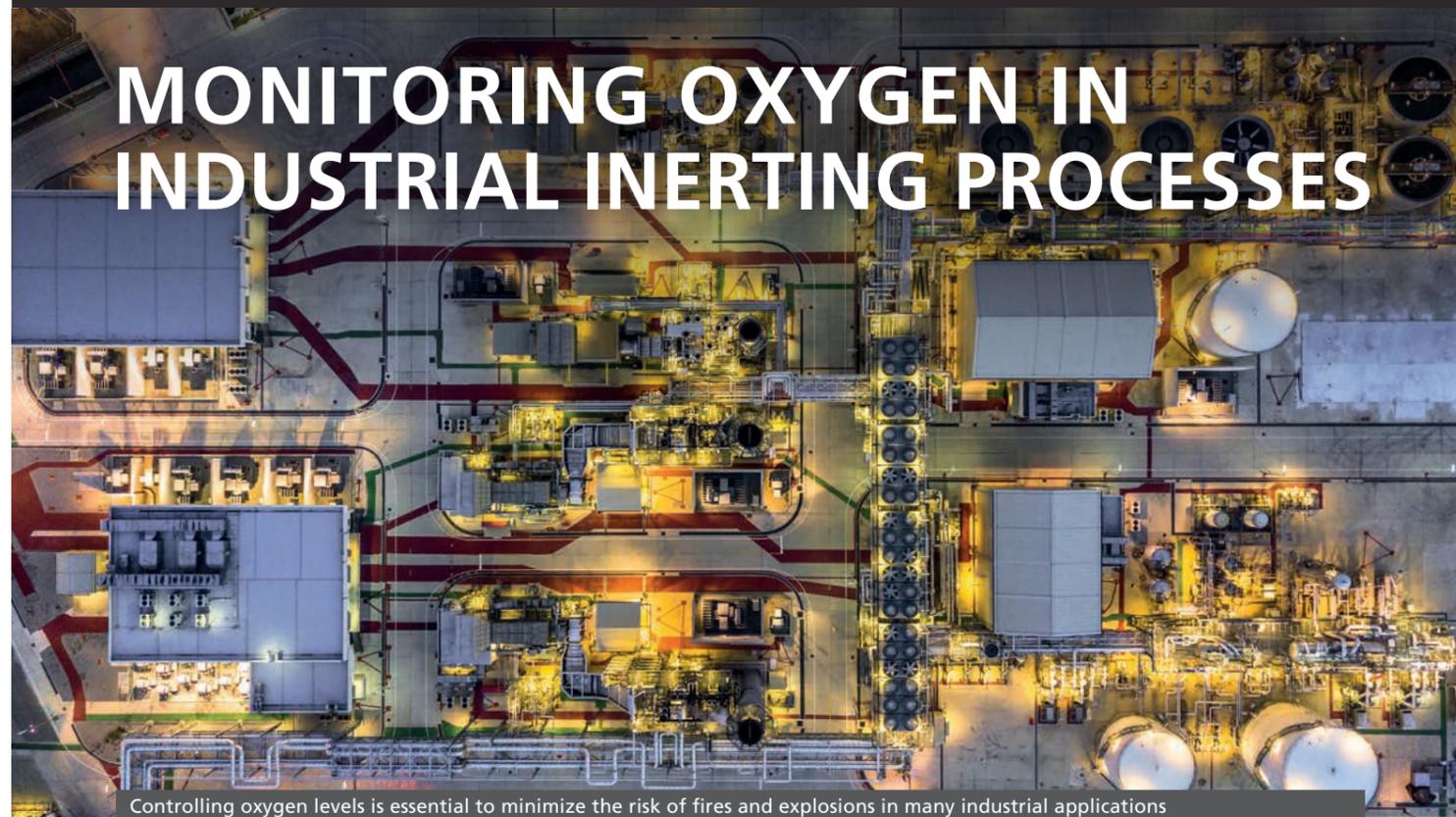


SERVOTOUGH Laser 3 Plus Combustion

Find out more about how our expert applications knowledge can create innovative solutions for your process: [servomex.expert/contact-us](http://servomex.expert/contact-us)



## MONITORING OXYGEN IN INDUSTRIAL INERTING PROCESSES



Controlling oxygen levels is essential to minimize the risk of fires and explosions in many industrial applications

Inerting is a relatively straightforward process that involves monitoring oxygen (O<sub>2</sub>) to ensure it is kept below a certain level. The acceptable level of O<sub>2</sub> is dependent on the process, but is typically between 2-8%.

Usually, when the O<sub>2</sub> monitoring system detects that the level has risen too high, it generates an alarm and an inert gas is pumped in to decrease the level again.

Adding an inert gas, most commonly nitrogen, dilutes and displaces the flammable vapors. The resultant mixture contains O<sub>2</sub> at an insufficient concentration to support combustion, even if an ignition source is inadvertently introduced.

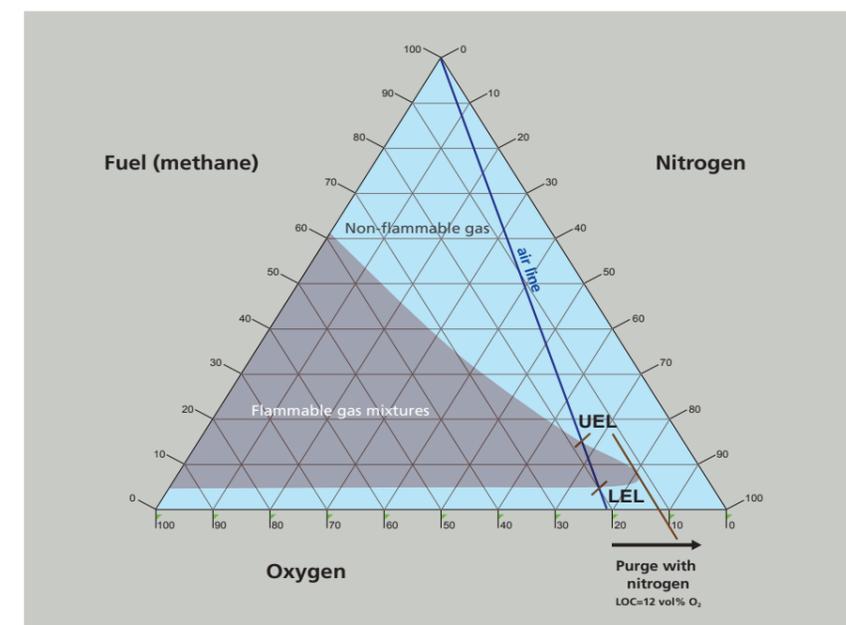
This inerting process is used in a multitude of applications across many industries, including pharmaceuticals, chemicals and petrochemicals, and is typically utilized to prevent explosions.

Oxygen is a key component of the fire triangle, along with fuel (hydrocarbon). An explosion will only occur if the concentration of O<sub>2</sub> and fuel is within the flammable region and there is a source of ignition. If the level of O<sub>2</sub> and hydrocarbon is outside the triangle, then even with a source of ignition there will be no explosion.

The common way of achieving this is to ensure the O<sub>2</sub> level is too low to support the explosion. While most processes are unable to eliminate the presence of fuel

sources, by limiting O<sub>2</sub> levels it is possible to reduce or remove the possibility of an explosion occurring.

### FLAMMABILITY TRIANGLE FOR OXYGEN/METHANE MIXTURES



## PARAMAGNETIC MONITORING



Historically, inerting processes are monitored using Paramagnetic technology, such as the Servomex-designed cell used in the SERVOTOUGH Oxy 1900. The Paramagnetic sensor is non-depleting and provides a fast response (less than five seconds) and is mostly unaffected by changes in background gases.

The Oxy 1900 is designed to handle samples with a high solvent content, and is extremely stable, typically requiring calibration only once every three months.

It is SIL 2 rated for safety systems, and can be used in Class I, Division 1 (IEC Zone 1) areas without the use of a purge. It can also be calibrated without needing a "hot work permit". A rugged NEMA 4X enclosure protects the analyzer electronics from dusty and corrosive atmospheres.

The chief advantage of the Oxy 1900, and of Paramagnetic sensors in general, is that the measuring cell (since it is non-depleting) does not require scheduled replacement, unlike electrochemical sensors.

In the unlikely event that the measuring cell fails, the analyzer's 4-20mA and alarm contact outputs can be configured to indicate the sensor failure. This is a fail-safe feature that allows the operator to have confidence that the cell is operating.

In contrast, electrochemical cells, because of their principle of operation, only produce a signal in the presence of O<sub>2</sub>.

If there is no signal, it means either that there is no O<sub>2</sub> present in the sample, or the cell has failed.

This means an operator using an electrochemical cell may believe the process is operating under safe conditions, when that may not be the case.

The Oxy 1900 is a key component of Servomex's oxygen monitoring system, which is used, for example, to control inerting in centrifuges.

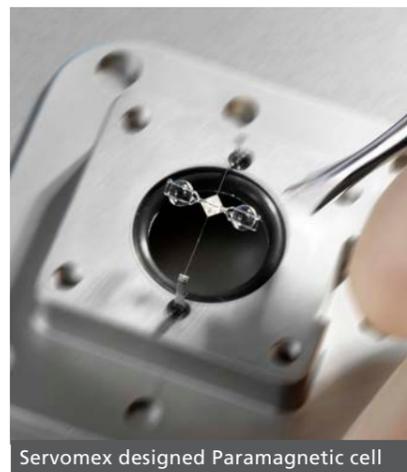
The maximum O<sub>2</sub> concentration levels are programmed by the customer. When these levels are reached, the relay contact opens and initiates the nitrogen purge until the O<sub>2</sub> returns to below customer-set levels.

This not only assures safe operation, but also saves on nitrogen consumption, since the purge is only activated once the O<sub>2</sub> levels become too high.

The sample-conditioning system is mounted just below the Oxy 1900 analyzer and offers a compact, flexible design with user and application-driven options. The entire system can be

panel-mounted or installed in a NEMA 4X IP65 stainless steel enclosure.

The system provides pressure and flow control, as well as an optional flow alarm and calibration assembly. Depending on specific process conditions, filters for light particulates or condensed solvents can also be provided.



Servomex designed Paramagnetic cell

## TUNABLE DIODE LASER MONITORING



While Paramagnetic analyzers deliver an accurate O<sub>2</sub> measurement for inerting, they also require a sampling system. For processes which require a faster speed of response, a Tunable Diode Laser (TDL) sensor provides an effective solution.

As an example, the SERVOTOUGH Laser 3 Plus TDL analyzer delivers proven results in monitoring O<sub>2</sub> levels in the heat treatment furnaces required for catalyst generation.

Producing specialty catalysts is a time-consuming process that requires great care. The temperatures, pressures and composition of the samples lead to different catalysts with a variety of properties.

Heat treatment is a key factor in this process, which typically sees O<sub>2</sub> levels change significantly.

The process begins with O<sub>2</sub> at 21%, and at room temperature and pressure. It is then inerted with nitrogen to reduce O<sub>2</sub> to less than 1%.

Heat is then applied to bring the process to about 580°C (1076°F) for approximately ten hours. During this time, it is important to keep the O<sub>2</sub> level below 1%, with an acceptable accuracy of 0.1% O<sub>2</sub>, to ensure the correct conditioning.

The temperature is then reduced back to ambient, and O<sub>2</sub> levels are raised back to that of the air.

Installing a Laser 3 Plus Process analyzer across the top of the reactor provides a direct measurement of O<sub>2</sub>, with a speed of response of only a few seconds. In addition, no sampling system is required, so ongoing maintenance costs are lower.

As the TDL sensor is a light-based, non-contact solution, it is unaffected by the hydrocarbons given off by the process, unlike the older Zirconia-based solutions used previously.

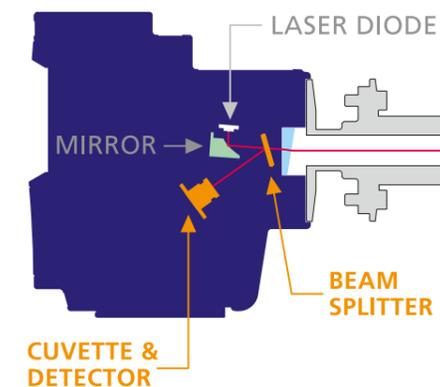
The Laser 3 Plus analyzer is SIL 2 rated for safety compliance. It also has a line lock cuvette system to ensure reliable measurements.

For the Laser 3 Plus Process, the cuvette is filled with oxygen, so the secondary detector always has an O<sub>2</sub> reading to sense. This prevents the main detector from drifting to measure another gas, even if the O<sub>2</sub> measurement is zero.

When monitoring O<sub>2</sub> at such low levels, this reliability is essential to provide a stable, correct reading.

The line lock system does not require any maintenance, and has built-in diagnostics to monitor the concentration within the cuvette.

### TRANSMITTER



Line lock cuvette system

### SERVOMEX'S PARAMAGNETIC SOLUTION

SIL 2 RATED

FAST RESPONSE

SENSOR FAILURE ALARMS



SERVOTOUGH Oxy 1900



Find out more at: [servomex.expert/oxy1900](http://servomex.expert/oxy1900)

### SERVOMEX'S TDL SOLUTION

SIL 2 RATED

FAST RESPONSE

LOW MAINTENANCE COSTS



SERVOTOUGH Laser 3 Plus



Find out more at: [servomex.expert/l3plus](http://servomex.expert/l3plus)

## DELIVERING THE BEST SUPPORT ANYWHERE IN THE WORLD



Servomex has taken a globally strategic approach to its service support for customers with the appointment of a new Global Head of Service.

Mark Calvert, who was previously the Service Manager for the EMEAI region, has taken up this new role, and will be responsible for the co-ordination of Servomex's service teams around the world.

Based in Crowborough, UK, he will ensure that customer support and service delivery

are provided quickly and effectively, maintaining a consistent, high-quality approach worldwide.

Mark said: *"I'm here to pull the service teams together and promote collaborative working to ensure our customers' needs are being met."*

*"To achieve this, I'll be looking at how to standardize Servomex's global service offering, reducing the complexity of doing business with us."*

*"I'm also implementing positive changes to our service teams to promote an even stronger customer-focused approach."*

Mark also aims to encourage sharing knowledge and promoting best practice between teams.

In addition, there will be new structured training programs for Servomex's engineers, channel partners and customers.

Mark added: *"One thing that's key is to ensure we provide the very best 'local for local' support, delivering customer assistance for our entire product range, anywhere in the world."*



mcalvert@servomex.com



*"Mark has demonstrated highly effective management of the entire EMEAI region over the past year, enhancing the provision of our expert support to customers. His knowledge of Servomex products and applications, along with his extensive customer support skills, will be a great advantage in this role."*

David Cantillon, Global Operations Director, Servomex. Email: dcantillon@servomex.com



## NINE GREAT PRODUCTS ONE GLOBAL SERVICE

PROVIDING A COMPREHENSIVE PACKAGE OF SERVICE AND SUPPORT FOR OPTIMUM PROCESS PERFORMANCE

- Global network of engineers and service centers
- Proven experience in analyzers and applications
- Cover for all operational maintenance needs
- Based locally for fast response

Servomex Service Network offers your business a full range of service products developed to ensure optimum process performance.

HEALTH CHECK	SPARES	RENTALS
SERVICE AGREEMENTS	TRAINING	COMMISSIONING
SERVICE PLANS	ON-SITE SERVICE SUPPORT	SERVICE CENTER SUPPORT

Get the expert support you need: [servomex.expert/service](http://servomex.expert/service)

# > IP&E PRODUCT GUIDE

The global industrial process and emissions industry is both demanding and competitive. It encompasses power generation, hydrocarbon processing (HP), and pollution monitoring, and requires effective gas analysis solutions.

As the world leader in gas analysis, Servomex delivers a comprehensive range of analyzer technologies that are used extensively in midstream and downstream HP processes, including refining and the production of chemical, petrochemicals, natural gas and fuels.

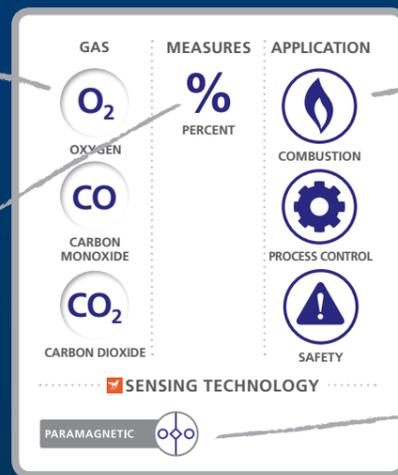
In addition, Servomex works closely with industry regulators to ensure that its gas analyzers meet global compliance standards and the specific demands of power generation applications throughout the world.

Supported by a global service and support network, Servomex analyzers and systems are chosen with confidence by operators internationally, in the knowledge that they provide operational safety, product quality and process efficiency, even in challenging process conditions.

# > HOW TO GUIDE

*Some analyzers are optimized for single gas measurements while others monitor multiple gas types.*

*We offer all measurement ranges from percentage to ultra trace parts per trillion analysis.*



*We identify which application types the analyzer is suitable for operating in.*

*The hummingbird sensing technologies used are listed.*

## SERVOTOUGH Oxy 1900

HAZARDOUS AREA

### AWARD-WINNING PARAMAGNETIC DIGITAL O<sub>2</sub> ANALYZER DESIGNED FOR HAZARDOUS AREA USE

Offering industry-standard features alongside revolutionary, value-added options, the Oxy 1900 O<sub>2</sub> gas analyzer sets new standards of flexibility, stability and reliability from a single, cost-effective unit.

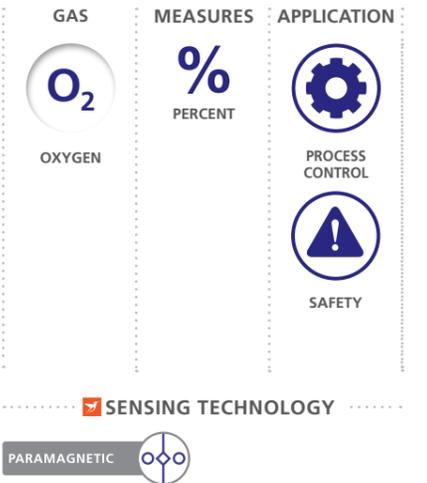


### FEATURES AND BENEFITS

- Can be used in Safe Area to Zone 1/Div 1 hazard-rated locations
- Heated sample cell allowing simplified sample system requirements
- Unique Servomex Flowcube flow sensor technology for improved safety
- SIL 2 compliant

### APPLICATIONS

- Process control
- Safety-critical oxidation, such as ethylene oxide and propylene oxide purity
- Flare stack analysis
- Vapor recovery



## SERVOTOUGH OxyExact 2200

HAZARDOUS AREA

### HIGH-SPEC PROCESS O<sub>2</sub> ANALYZER OFFERS SAFE OR HAZARDOUS AREA CONTROL WITH UP TO SIX TRANSMITTERS

The OxyExact 2200 high-specification O<sub>2</sub> analyzer offers an unrivaled combination of precision, flexibility and performance for optimum process and safety control. The OxyExact can be configured with a safe or hazardous area control unit with up to six transmitters.

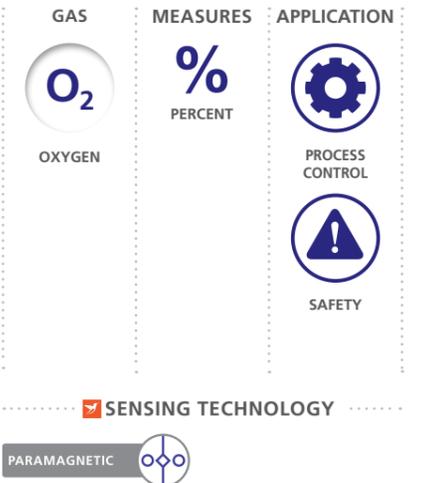


### FEATURES AND BENEFITS

- Zone 1 certified to ATEX Cat 2, IECEx and FM/CSA Class 1 Div 1
- Three enclosure systems allow sampling of any flammable gas up to 100% O<sub>2</sub> and pressures of up to 40psi
- High-temperature version eliminates the need to condense hot sample prior to analysis
- SIL 2 compliant

### APPLICATIONS

- Oxidation control reactions
- EO, PTA and EDC manufacturing
- Catalyst regeneration
- Solvent recovery



## SERVOTOUGH Oxy 1800

SAFE AREA

### ACCURATE AND STABLE SAFE AREA O<sub>2</sub> ANALYZER

Designed to reliably measure up to 100% O<sub>2</sub> in many industrial applications, the Oxy 1800 is a stable, accurate and highly specific O<sub>2</sub> analyzer for safe area use.

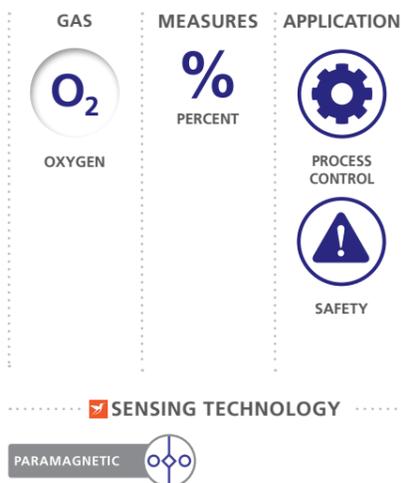


### FEATURES AND BENEFITS

- Internal/external use (IP66/NEMA 4X rated)
- Special version for solvent-bearing samples
- Range of alarm outputs aids integration with other systems

### APPLICATIONS

- Waste water treatment
- Food storage
- Marine inerting applications
- Inert blanketing



## SERVOTOUGH SpectraScan 2400

HAZARDOUS AREA

### REVOLUTIONARY INLINE REAL-TIME ANALYSIS OF HYDROCARBON COMPONENTS C1-C6

A real-time optical analyzer utilizing the Precise field-proven optical bench, the SpectraScan 2400 delivers a breakthrough capability in the continuous analysis of light hydrocarbons C1-C6.

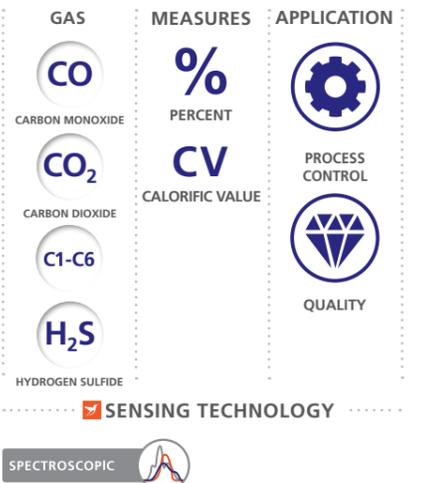


### FEATURES AND BENEFITS

- North American Cat 1, Div 2 ATEX Cat 3 IECEx Zone 2
- Tunable band-pass filter enables simultaneous scanning of selected wavelength bands for gases including methane, ethane, propane and iso-butane
- Unique tunable filter process with Infrared photometer technology delivers industry-leading interference compensation

### APPLICATIONS

- BTU/Wobbe content measurement
- Gas turbine, engines, fuel cells
- Flare stack monitoring



# SERVOTOUGH SpectraExact 2500

HAZARDOUS AREA

## RUGGED PHOTOMETRIC GAS ANALYZER FOR DEMANDING PROCESS APPLICATIONS

Servomex's iconic industry-leading Photometric analyzer delivers flexible single and multi-component gas analysis capability for corrosive, toxic and flammable sample streams. The SpectraExact 2500's reliable, accurate and stable real-time online process analysis makes it ideal for a range of process, combustion and emissions gas analysis applications.



### FEATURES AND BENEFITS

- IECEx and North American hazardous area approvals
- Easy integration with DCS – from 4-20mA to Modbus TCP
- Sample cell and electronics segregated – for easy maintenance and safe operation

### APPLICATIONS

- Water in EDC/solvents
- Ethylene production
- TDI production
- Chlorine production

GAS	MEASURES	APPLICATION
TOXIC	% PERCENT	PROCESS CONTROL
FLAMMABLE	ppm TRACE	PROCESS CONTROL
CORROSIVE		

SENSING TECHNOLOGY

GAS FILTER CORRELATION    INFRARED

# SERVOTOUGH DF-320E

HAZARDOUS AREA

## HIGH-RELIABILITY TRACE AND PERCENT O<sub>2</sub> 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 O<sub>2</sub> measurements, making it ideal for applications including hydrogen, propene and polyethylene production, oil refining and petrochemical process monitoring.



### FEATURES AND BENEFITS

- For use in Class 1/Div 2
- 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

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	ppb ULTRA TRACE ppm TRACE	PROCESS CONTROL QUALITY

SENSING TECHNOLOGY

COULOMETRIC

# SERVOTOUGH FluegasExact 2700

HAZARDOUS AREA

## ADVANCED FLUE GAS ANALYZER FOR HIGH-TEMPERATURE MEASUREMENT OF O<sub>2</sub> AND COMBUSTIBLES

Designed to measure O<sub>2</sub> and CO<sub>e</sub> 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, IECEx Zone 2 & North America Class I, Div 2
- Unique Flowcube flow sensor technology enables positive flow conditions to be validated
- Sulfur-resistant combustibles sensor enables sensor to operate at elevated sulfur levels
- Close-coupled extractive measurement principle

### APPLICATIONS

- Process heaters
- Utility boilers
- Thermal crackers
- Crematoria and incinerators

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	% PERCENT	COMBUSTION PROCESS CONTROL
CO <sub>e</sub> COMBUSTIBLES	ppm TRACE	PROCESS CONTROL

SENSING TECHNOLOGY

CALORIMETRY    ZIRCONIA

# SERVOTOUGH DF-340E

HAZARDOUS AREA

## HIGH-SENSITIVITY TRACE/PERCENT COULOMETRIC O<sub>2</sub> ANALYZER CERTIFIED FOR HAZARDOUS AREA USE

Designed for heated or external locations, the DF-340E remains stable in changing sample and flow rate conditions, and is designed to provide measurements of trace or percent level O<sub>2</sub> in pure gas streams and multi-gas backgrounds. It is ideal for upset-prone conditions.



### FEATURES AND BENEFITS

- ATEX II and IECEx Certified
- Class 1/Div 2 Groups A,B,C and D certified
- Suitable for outdoor installation, with NEMA 4-rated sensor enclosure options
- Multiple background gas stream monitoring, with simplified ongoing maintenance requirements

### APPLICATIONS

- Pressure swing absorber N<sub>2</sub> skids
- Reactor process control
- Blanketing and inerting
- Oil refinery monitoring
- Petrochemical process monitoring

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	ppb ULTRA TRACE ppm TRACE	PROCESS CONTROL QUALITY

SENSING TECHNOLOGY

COULOMETRIC

# SERVOTOUGH DF-140E

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 1, Div 1 or 2 areas
- STAB-EL option allows for accurate measurement in the presence of acid gases

### APPLICATIONS

- Reactor process control
- Pressure swing absorber nitrogen skids
- Blanketing and inerting

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	ppm TRACE	PROCESS CONTROL QUALITY

SENSING TECHNOLOGY

COULOMETRIC

# H2scan

HAZARDOUS AREA

## EXPLOSION-PROOF IN-LINE HYDROGEN PROCESS ANALYZER, USING A SOLID-STATE, NON-CONSUMABLE SENSOR CONFIGURED TO OPERATE IN PROCESS GAS STREAMS

The H2scan hydrogen process analyzer features thin film technology that provides a direct hydrogen measurement that is not cross-sensitive to other gases.



### FEATURES AND BENEFITS

- UL Class 1, Div 1, Groups B, C, D. ATEX & CSA certifications
- Easily configurable alongside SERVOTOUGH SpectraScan 2400
- Simple system integration

### APPLICATIONS

- Refinery
- Petrochemical
- Manufacturing
- Industrial gas supply

GAS	MEASURES	APPLICATION
H <sub>2</sub> HYDROGEN	% PERCENT	PROCESS CONTROL QUALITY

SENSING TECHNOLOGY

H2scan thin film

# SERVOTOUGH Laser 3 Plus Ammonia HAZARDOUS AREA

## WORLD-LEADING NH<sub>3</sub> MEASUREMENT, OPTIMIZED FOR AMMONIA SLIP DeNOx APPLICATIONS

This Tunable Diode Laser (TDL) analyzer specifically optimized for ammonia slip measurement provides all the benefits of Servomex's TDL technology in a compact, light unit, offering unparalleled installation flexibility plus cost and performance benefits.



### FEATURES AND BENEFITS

- High measurement reliability utilizing Servomex's own line lock cuvette technology
- ATEX, IECEx and North American hazardous area approvals
- A compact analyzer specifically optimized for the fast, accurate and responsive measurement of NH<sub>3</sub>
- Ideal for slip ammonia application on power plants and fired heaters

### APPLICATIONS

- Process heaters
- Incinerators
- Power stations
- Furnaces

GAS	MEASURES	APPLICATION
NH <sub>3</sub> AMMONIA DeNOx	ppm TRACE	PROCESS CONTROL EMISSIONS

**SENSING TECHNOLOGY**

TUNABLE DIODE LASER

# GAS DETECTION OxyDetect SERVOMEX

## NON-DEPLETING PARAMAGNETIC O<sub>2</sub> MONITOR DESIGNED FOR LIFE SAFETY APPLICATIONS

Life safety monitor designed for safe area or hazardous area environments, utilizing superior performance of award-winning, non-depleting Hummingbird Paramagnetic O<sub>2</sub> sensing technology.



### FEATURES AND BENEFITS

- IP66 (indoor use only)
- The most reliable O<sub>2</sub> detector on the market
- No more false readings or false alarms caused by depleting cell technologies
- SIL 2 compliant

### APPLICATIONS

- Pharmaceutical plants
- Helium production and storage
- Semiconductor facilities
- Laboratories and universities

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	% PERCENT	SAFETY

**SENSING TECHNOLOGY**

PARAMAGNETIC

# SERVOTOUGH Laser 3 Plus Combustion HAZARDOUS AREA

## THE REVOLUTIONARY COMPACT COMBUSTION ANALYZER OPTIMIZED FOR CO, O<sub>2</sub>, OR CO + CH<sub>4</sub> MEASUREMENTS

Containing all the benefits of Servomex's TDL technology in a light, compact unit, with unmatched installation flexibility plus cost and performance benefits, this analyzer is optimized for fast, accurate and responsive measurements in combustion and process control, making it a must for safety applications.



### FEATURES AND BENEFITS

- High safety integrity utilizing Servomex's own line lock cuvette technology
- Compact size means quick and easy installation by one person with on-board display negating the need for laptop configuration
- ATEX, IECEx and North American hazardous area approvals. Approved for process Zone 2. SIL 2 assessed and CE marked
- Optimized for combustion processes

### APPLICATIONS

- Process heaters
- Incinerators
- Power stations
- Furnaces

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	% PERCENT	PROCESS CONTROL
CO CARBON MONOXIDE	ppm TRACE	COMBUSTION
CO+CH <sub>4</sub> CARBON MONOXIDE + METHANE		

**SENSING TECHNOLOGY**

TUNABLE DIODE LASER

# SERVOPRO 4900 Multigas SAFE AREA

## AN ADVANCED DIGITAL MULTI-GAS CEMS ANALYZER

Specifically designed for Continuous Emissions Monitoring (CEMS) of flue gas, the SERVOPRO 4900 Multigas provides up to four simultaneous gas stream measurements. It combines Servomex's leading-edge sensing technologies with a modern digital platform for next-generation performance.



### FEATURES AND BENEFITS

- 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
- Automated calibration/validation routines triggered by internal timer or external triggers
- Completely updated icon-driven software interface for easy set-up and operation

### APPLICATIONS

- Utility boilers
- Chemical incinerators
- Crematoria
- Mobile labs

GAS	MEASURES	APPLICATION
MULTIPLE	% PERCENT ppm TRACE	EMISSIONS

**SENSING TECHNOLOGY**

GAS FILTER CORRELATION

INFRARED

PARAMAGNETIC

# SERVOTOUGH Laser 3 Plus Process HAZARDOUS AREA

## THE WORLD'S SMALLEST TDL GAS ANALYZER, OPTIMIZED FOR PROCESS O<sub>2</sub> MEASUREMENTS

All the benefits of Servomex's TDL technology in a small, light unit offering unparalleled installation flexibility plus cost and performance benefits. Optimized for the fast, accurate and responsive measurement of process oxygen in hot or hazardous conditions.



### FEATURES AND BENEFITS

- High safety integrity utilizing Servomex's own line lock cuvette technology
- ATEX, IECEx and North American hazardous area approvals. Approved for process Zone 2. SIL 2 assessed and CE marked
- Quick and easy installation by one person with on-board display negating the need for laptop configuration
- Suitable for a range of combustion and process control applications

### APPLICATIONS

- Oxidation control
- Inerting
- Safety monitoring
- Flare gas monitoring
- Combustion control (<500°C)
- Coal to chemical

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	% PERCENT	PROCESS CONTROL COMBUSTION

**SENSING TECHNOLOGY**

TUNABLE DIODE LASER

# SERVOMEX AquaXact 1688 SAFE AREA

## A FAST, ACCURATE AND RESILIENT MOISTURE MEASUREMENT SOLUTION

The AquaXact 1688 is a rugged ultra-thin film Aluminum Oxide moisture sensor that enables the measurement of moisture in a wide variety of gas phase process applications, such as glove boxes, air separation units, natural gas processing, transportation, and instrument air, with no calibration required after sensor replacement or dry-out.



### FEATURES AND BENEFITS

- Functions as a standalone 4-20 mA transmitter or remotely interfaces with our digital controller, MonoExact DF310E and MultiExact 4100
- NIST-traceable field-replaceable sensor element, for hassle-free recalibration
- Stainless steel, weatherproof casing (Class 1 Div 2 in 2019) enables operation in ambient temperatures ranging from -10°C to +70°C

### APPLICATIONS

- Glove boxes
- Solder reflow ovens
- Compressed air generation
- Ethylene production

GAS	MEASURES	APPLICATION
H <sub>2</sub> O WATER	DEW POINT ppmv	PROCESS CONTROL

**SENSING TECHNOLOGY**

ALUMINUM OXIDE

# SERVOPRO NOx

SAFE AREA

## CHEMILUMINESCENCE DETECTOR (CLD) ANALYZER FOR KEY EMISSIONS APPLICATIONS INVOLVING ULTRA-LOW NO, NO<sub>2</sub> AND NOx

Utilizing Chemiluminescence detection technology to measure NO or NO/NO<sub>2</sub>/NOx concentrations in industrial gas and vehicle emission applications, the versatile SERVOPRO NOx can be calibrated for four measurement ranges starting from ultra-low to high ppm and is easy to install and operate.



### FEATURES AND BENEFITS

- High-dynamic-range NOx emissions monitoring solution with a fast response
- Non-depleting light-based measurement and electronic flow control keeps costs low
- Heated version available for wet-to-dry conversion option
- Mobile Source emissions standard EPA 1065/1066 and LD Euro 6, HD Euro V1 compliant

### APPLICATIONS

- Continuous emissions monitoring (CEMS)
- Scrubber efficiency
- Turbine/generator feedback control
- SCR/SNCR feedback control

GAS	MEASURES	APPLICATION
NO NITRIC OXIDE	ppm TRACE	PROCESS CONTROL
NO <sub>2</sub> NITROGEN DIOXIDE		EMISSIONS
NOx NITROGEN OXIDES		QUALITY

**SENSING TECHNOLOGY**  
CHEMILUMINESCENCE

# SERVOPRO SO<sub>2</sub>

SAFE AREA

## USES PROVEN PULSED UV FLUORESCENCE TECHNOLOGY TO DELIVER A PRECISE AND RELIABLE MEASUREMENT OF ULTRA-LOW SULFUR DIOXIDE IN EMISSIONS AND AMBIENT AIR

For industrial applications that require ultra-low emissions monitoring of sulfur dioxide, this robust analyzer is designed to slot seamlessly into rack systems, making it easy to integrate with existing emissions monitoring systems to provide unrivaled performance.



### 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
- User selectable dual ranges with auto-ranging
- Easy maintenance procedures

### APPLICATIONS

- Continuous emissions monitoring (CEMS)
- Ambient air monitoring

GAS	MEASURES	APPLICATION
SO <sub>2</sub> SULFUR DIOXIDE	ppm TRACE ppb ULTRA TRACE	PROCESS CONTROL
		EMISSIONS
		QUALITY

**SENSING TECHNOLOGY**  
UV FLUORESCENCE

# SERVOPRO HFID

SAFE AREA

## HIGH-PERFORMANCE FAST ANALYSIS USING HEATED FID

Using a highly sensitive heated Flame Ionization Detector (HFID) for measuring volatile hydrocarbon concentrations in industrial or vehicle emission applications, the HFID utilizes an internally heated oven set to 190°C to maintain the sample gas above the dew point of most hydrocarbons expected to be present, for optimum performance in total hydrocarbon (THC) analysis. Can be equipped with a non-methane cutter for additional methane (CH<sub>4</sub>) and non-methane hydrocarbon (NMHC) reporting.



### FEATURES AND BENEFITS

- Four user-definable measurement ranges, reconfigurable in the field
- High-accuracy, gas-selective FID 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
- Heated FID detector at 190°C for the most accurate THC determination

### APPLICATIONS

- Continuous emissions monitoring (CEM)
- VOC abatement
- Scrubber efficiency
- Compliance monitoring and testing

GAS	MEASURES	APPLICATION
THC TOTAL HYDROCARBONS	ppm TRACE	PROCESS CONTROL
CH <sub>4</sub> METHANE		EMISSIONS
NMHC NON-METHANE HYDROCARBONS		QUALITY

**SENSING TECHNOLOGY**  
FLAME IONIZATION DETECTOR

# SERVOFLEX Micro i.s. 5100

PORTABLES

## INTRINSICALLY SAFE ANALYZER MEASURES O<sub>2</sub>, CO OR CO<sub>2</sub>

Designed for the measurement of toxic and flammable gas samples, the intrinsically safe Micro i.s. 5100 is a unique analyzer certified to Zone 0 and Zone 1 and suitable for measuring percent levels of O<sub>2</sub>, CO and CO<sub>2</sub>.



### FEATURES AND BENEFITS

- Intrinsically safe design to ATEX and IEC standards ensures safety operation in hazardous environments
- Ergonomic design ensures easy operation on the move
- Available in non-pump or pump versions with optional sample conditioning kit

### APPLICATIONS

- Hazardous area combustion optimization
- Refineries – catalytic cracker regeneration
- Process monitoring
- Inerting applications

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	% PERCENT	COMBUSTION
CO CARBON MONOXIDE		PROCESS CONTROL
CO <sub>2</sub> CARBON DIOXIDE		SAFETY

**SENSING TECHNOLOGY**  
PARAMAGNETIC    INFRARED

# SERVOFLEX MiniMP 5200

PORTABLES

## BENCHTOP ANALYZER OFFERING SINGLE OR DUAL MEASUREMENTS OF O<sub>2</sub> AND CO<sub>2</sub>

The only truly portable battery-powered gas analyzer with MCERTS certification, the MiniMP 5200 is designed to offer single or dual measurement of O<sub>2</sub> and CO<sub>2</sub> by utilizing Servomex's advanced Paramagnetic and Infrared sensing technologies.



### FEATURES AND BENEFITS

- EN15267-3 (MCERTS V3.3, Annex F) makes the MiniMP ideal for source testers that require reference O<sub>2</sub> analysis for CEMS verification
- Li-ion battery system offers unique true portability
- Non-depleting sensor design ensures long service with minimal calibration

### APPLICATIONS

- Laboratories and research
- Air separation and gas bottling plants
- Transfilling
- Combustion analysis

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	% PERCENT	EMISSIONS
CO <sub>2</sub> CARBON DIOXIDE		PROCESS CONTROL
		QUALITY

**SENSING TECHNOLOGY**  
PARAMAGNETIC    INFRARED

# SERVOFLEX MiniHD 5200

PORTABLES

## 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 O<sub>2</sub>, CO and CO<sub>2</sub> within common gas mixtures. The MiniHD 5200 utilizes Servomex's non-depleting Paramagnetic and Infrared sensors to give dependable and accurate results.



### 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 O<sub>2</sub>, CO and CO<sub>2</sub> levels with no background interference

### APPLICATIONS

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

GAS	MEASURES	APPLICATION
O <sub>2</sub> OXYGEN	% PERCENT	COMBUSTION
CO CARBON MONOXIDE		PROCESS CONTROL
CO <sub>2</sub> CARBON DIOXIDE		SAFETY

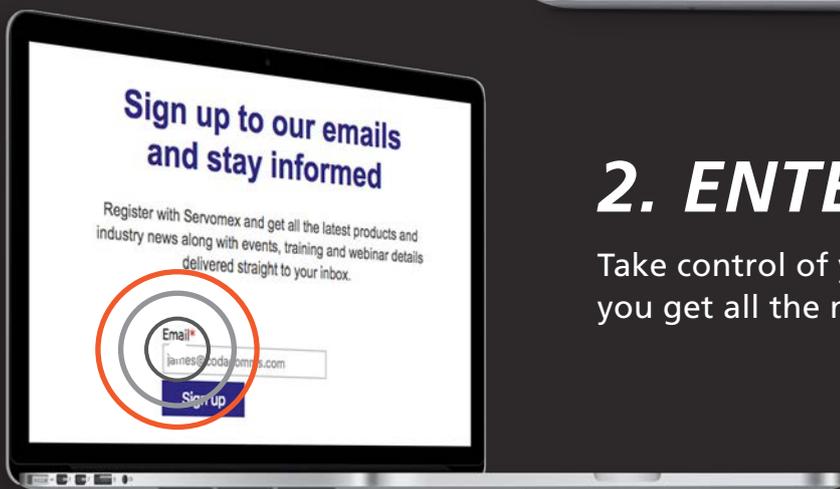
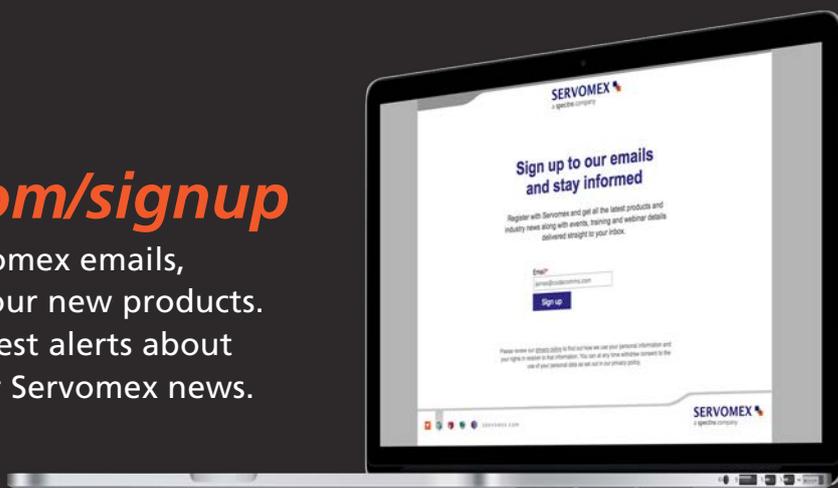
**SENSING TECHNOLOGY**  
PARAMAGNETIC    INFRARED

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Take control of your preferences and make sure you get all the news that's relevant to you.

## 3. RECEIVE RELEVANT EMAILS

