

**Ethylene using shale gas feedstock:**  
Optimize your gas analysis

**Remote mounting:** The benefits of  
installing analyzers away from the process

**Marine vapor recovery:**  
Monitoring gases to reduce risk

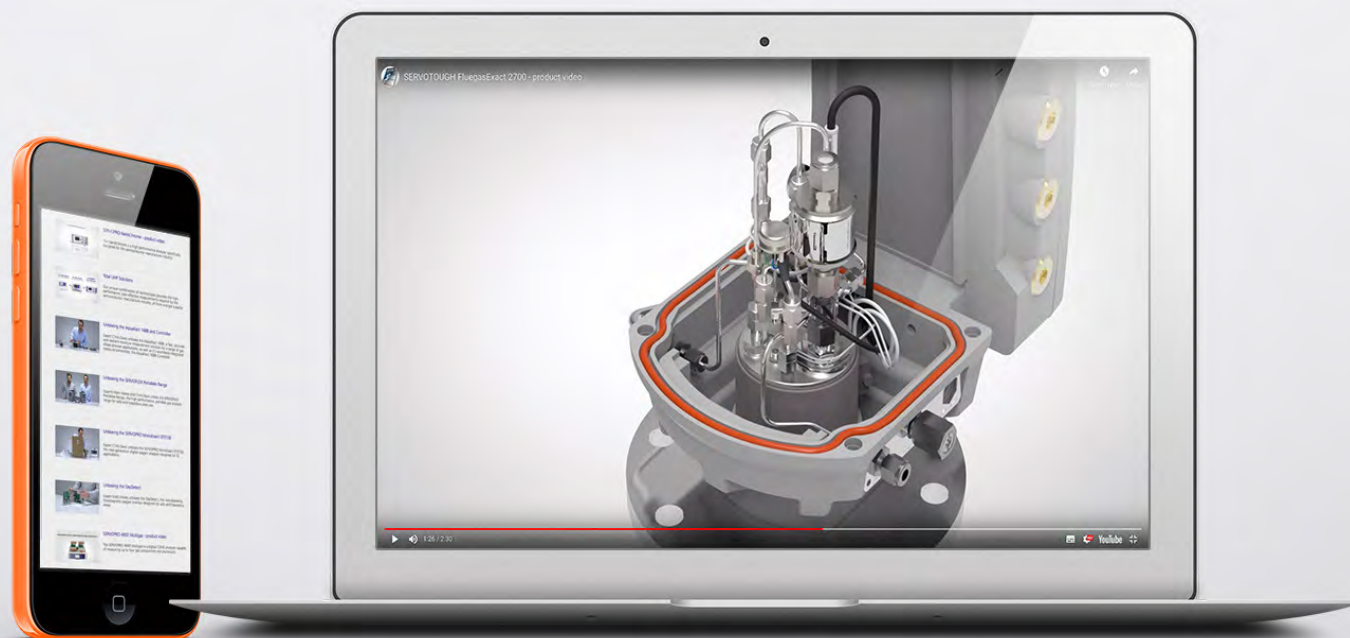


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## SERVOTOUGH FluegasExact 2700

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

HAZARDOUS  
AREA



Find out more: [servomex.expert/fge2700](http://servomex.expert/fge2700)

## SEE HOW WE SUPPORT YOUR IP&E PROCESSES

Welcome to the latest issue of our Industrial Process and Emissions (IP&E) magazine, focusing on expert solutions for the power generation and hydrocarbon processing industries.

In this edition, you can find out more about our expert team providing products and support for your key processes.

And there are examples of our innovative, comprehensive gas analysis solutions, including systems for ethylene production and marine vapor recovery.

I also give you my assessment of the opportunities available in the global hydrocarbon processing market.

Our IP&E team is ready to deliver solutions for your power generation, hydrocarbon processing and emissions monitoring applications.

Get in touch at [servomex.com/contact-us](http://servomex.com/contact-us)



**SANG WON PARK**  
IP&E BUSINESS UNIT DIRECTOR  
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## SPOTLIGHT ON COMMISSIONING

Delivered through our global Service Network, commissioning ensures optimum performance from your gas analyzer from day one.

Correct installation and configuration provides that performance, and makes sure your system meets safety, compliance and operational needs.

To guarantee the best performance and peace of mind for your measurement, find out more about our commissioning service offer.

Visit: [servomex.expert/service](http://servomex.expert/service)



# MEET THE EXPERTS

## GAS ANALYSIS SOLUTIONS FOR YOUR IP&E APPLICATIONS

SANG WON PARK LEADS OUR TEAM PROVIDING PRODUCTS, EXPERTISE AND SUPPORT TO THE INDUSTRIAL PROCESS AND EMISSIONS GAS MARKET. HERE, HE INTRODUCES TWO KEY EXPERTS AND SOME OF THE PRODUCTS DESIGNED FOR IP&E PROCESS CHALLENGES.

Our Industrial Process and Emissions (IP&E) Division is responsible for delivering Servomex's high-performance gas analysis solutions to the power generation, hydrocarbon processing and emissions monitoring markets.

The IP&E team provides expert knowledge of processes and solutions to our global customers, matching our diverse

range of sensing technologies to your application needs.

It's easy to access our sales, service and support to ensure your operation runs smoothly and with optimum efficiency, wherever you are based.

Our sales team understands the specific challenges facing the market in your region and will strive to provide the best gas

analysis solution available, fully supported by our global service network and dedicated systems teams.

Get the advice and applications expertise you need to achieve the best performance from your process – contact us today to find out how we can help.

Sang Won Park, IP&E Business Unit Director. [spark@servomex.com](mailto:spark@servomex.com)

### OUR TEAM SUPPORTING YOUR PROCESS



Karen Gargallo, Applications Manager for Petrochemical/Chemical, is committed to delivering the most suitable technological solution for your application.

[kgargallo@servomex.com](mailto:kgargallo@servomex.com)



Keith Warren, Product Manager, is focused on supporting your application with the best products available, ensuring you get the precision measurements required.

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

## OUR KEY IP&E PRODUCTS

**SERVOTOUGH Oxy 1900**  
Hazardous area oxygen analyzer

**SERVOTOUGH OxyExact 2200**  
High-specification process oxygen analyzer

**SERVOTOUGH SpectraScan 2400**  
In-line, real-time hydrocarbon analyzer

**SERVOTOUGH SpectraExact 2500**  
Rugged photometric gas analyzer

**SERVOTOUGH FluegasExact 2700**  
Advanced combustion analyzer

**SERVOTOUGH Laser 3 Plus Range**  
Fast, compact TDL gas analyzers

**SERVOPRO 4900 Multigas**  
Digital continuous emissions monitor

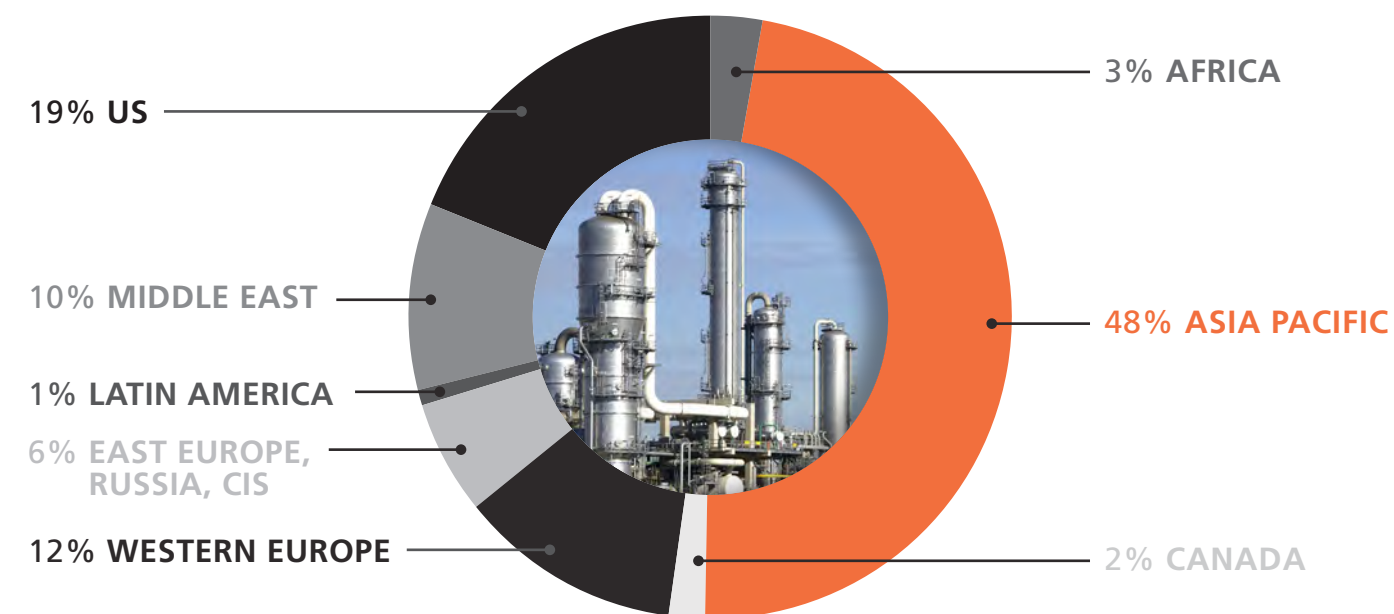
**SERVOPRO NOx**  
An analyzer for key emissions applications

See our full IP&E product range: **page 16 onwards**

# MARKET FOCUS: PETROCHEMICAL

## GLOBAL HP MARKET CONTINUES TO CREATE NEW OPPORTUNITIES

SANG WON PARK, SERVOMEX'S IP&E GLOBAL BUSINESS UNIT DIRECTOR, LOOKS AT THE PROSPECTS FOR THE HYDROCARBON PROCESSING INDUSTRY AROUND THE WORLD.



Market share of new petrochemical project announcements by region, December 2017–December 2018. Source: Hydrocarbon Processing

In its 2018 report, the International Energy Agency predicted that at least 25% of the increase in oil consumption over the next 25 years will be driven by growing demand for petrochemical feedstocks, particularly from the Asia-Pacific region.

This demand is likely to be met by new petrochemical production facilities in Asia, the Middle East, and United States, which are investing billions of dollars to increase their capacity.

Petrochemicals will be the largest driver of global oil demand over the coming decades. The key market trend is towards the

integration of refineries and petrochemical plants. This is highly advantageous; since the naphtha crackers are integrated with refineries, they can easily switch between naphtha, gas oil and LPG feedstock, based on the market conditions.

We've already seen more than 280 new hydrocarbon processing (HP) projects announced between 2016 and 2018, which creates significant new opportunities for gas analysis solution providers.

China and India lead the way in expansion in Asia, especially in olefin production, while Saudi Arabia plans to treble

its downstream production capability by 2030. The US HP industry is benefitting from the shale gas boom, and is looking to expand its production of ethylene (using ethane cracking), propylene (using the propane dehydrogenation process) and ethylene derivatives such as ethylene oxide, ethylene glycol, ethylene dichloride, etc.

With global capabilities in systems and service support, combined with wide-ranging applications knowledge, Servomex is well placed to offer the expertise needed in these rapidly growing markets, with a range of technologies and sensor options.



## EXTRACTING THE BENEFITS OF REMOTE MOUNTING



The **SERVOTOUGH FluegasExact 2700** is designed to measure oxygen and combustibles in the most demanding combustion environments, including process boilers, thermal crackers, incinerators and furnaces.

Sensor head mounting is a critical design consideration on any process, with implications for long-term measurement performance and maintenance requirements. Direct mounting – with the sensor head mounted on the measurement

point and secured to a process flange – is seen as the standard approach.

However, remote mounting offers many benefits, particularly in situations where the flange mount is too hot for equipment, or the location is difficult to access or dangerous for personnel.

In remote mounting, the sensor head is situated on a panel or cabinet away from the process, and is connected to the sample point via an insulated sample line.

The sample-in and exhaust lines are heated to minimize the risk of sample gas condensation. This makes maintenance much easier, with no need for a technician to climb high up a furnace to carry out repairs or basic troubleshooting checks.

The ease of access saves on downtime and overheads. Technicians do not have to worry about heat fatigue or the unit being in a hazardous area, since everything is at ground level in an area with reduced health and safety risks.

### BENEFITS

Easy access to the probe connections without the need to remove the sensor head.

Accessible sensor head for maintenance away from hot surfaces and high-risk working areas.

Possible to remove the sensor head from a zoned hazardous area to a safe area.

Flexible measurement point location.

Multi-point sampling possible with a single analyzer.

Common panel designs aid technicians and reduce training requirements.



**SERVOTOUGH**  
**FluegasExact 2700**

***“The innovative extractive sampling design of the FluegasExact 2700 makes it ideal for remote mounting, delivering a continuous measurement while providing a safer working environment for plant operators.”***

Matt Halsey, Applications  
Manager IP&E-Combustion.  
[mhalsey@servomex.com](mailto:mhalsey@servomex.com)





# APPLICATION FOCUS

## EXPERTS IN MARINE VAPOR RECOVERY SYSTEMS



Servomex has provided fixed and portable gas analysis solutions to the Marine Vapor Recovery (MVR) sector for more than 30 years.

This is supported by extensive experience in supplying all the major petrochemical companies globally with similar redundant-analyzer systems for safety-critical processes.

As cargo is transferred into tankers, either from ship-to-ship transfer (lightering), or from shore-based facilities such as refineries and terminals, vapor generation occurs.

Vapors containing volatile organic compounds (VOCs) are often combustible, presenting many hazards, including cargo tank overfilling, cargo spillage, and fire/detonation.

Large volumes of these vapors are generated during tank filling, and must be either vented or 'recovered'. Gas monitoring is important during these activities to ensure the safety of the vessel, terminal, and personnel, and to reduce harmful emissions.

Vapor control, however, introduces hazards of its own, including the possibility of over or under pressuring the tanker, and introducing an extra risk of ignition. This increases the need for accurate monitoring, and has led to stringent rules governing the systems involved.

### STRONG TRACK RECORD AND GLOBAL SUPPORT

The majority of our activities in MVR involve supplying gas analyzers to OEMs, though it may also involve updating analyzers in older systems.

System designs have become well-developed and the technology is long-proven, so the performance and cost-of-ownership benefits of the Servomex solutions mean we have become the go-to supplier for all the major manufacturers of marine vapor recovery systems.

We have supplied more than 100 systems to the USA, and many more globally. This strong track record has placed us at the forefront of marine vapor recovery gas analysis as a turnkey solutions provider for OEMs.



In addition, our global service network is a major benefit for end users, who can rely on rapid, expert support if their dock skid requires maintenance or repair. We understand that continuous uptime is essential for logistics companies, and have the structure in place to get processes up and running fast.

### SERVOMEX SOLUTIONS FOR MARINE VAPOR RECOVERY

For oxygen monitoring, two Paramagnetic analyzers are required, as regulations insist on redundancy within each system.

Our solution provides either the SERVOTOUGH Oxy 1900 or SERVOTOUGH OxyExact 2200, which both use Paramagnetic technology and meet the necessary certification for use in hazardous areas.

Paramagnetic sensors offer a very good response time, and use no

consumable parts, providing many years of service. While initially more expensive than electrochemical cells, they have a much longer lifespan, are non-depleting, and require infrequent calibration, so are much better value in the longer term.

Another important MVR monitoring requirement is emissions reduction. Where vapors are recovered by any means, operational performance is monitored by using a

hydrocarbon analyzer. Typically a multi-gas Infrared analyzer is also used to monitor combustion by-products, as they function effectively in air or inert gas environments.

To control emissions during vapor recovery or destruction, the SERVOTOUGH SpectraExact 2500 Infrared analyzer is used to monitor hydrocarbons, while the SERVOPRO 4900 Multigas monitors combustion by-products such as carbon monoxide and sulfur dioxide.

*"Our systems for the marine industry deliver proven performance and reliability. Together with our excellent field support, this has enabled us to build good customer relationships and a strong reputation as a turnkey solutions provider."*

Keith Warren, Product Manager – Process Oxygen, Zirconia & Oxygen Deficiency. [kwarren@servomex.com](mailto:kwarren@servomex.com)

### EXAMPLE MARINE VAPOR RECOVERY SYSTEMS



A redundant oxygen monitoring system, based on two SERVOTOUGH Oxy 1900 analyzers.



An emissions control system using the SERVOTOUGH SpectraExact 2500 Infrared analyzer to monitor hydrocarbons.



## EXAMPLES OF MARINE VAPOR RECOVERY SYSTEMS



A multi-gas monitoring system in a protective outdoor enclosure.



A redundant oxygen monitoring system, based on two SERVOTOUGH OxyExact 2200 analyzers.

## ETHYLENE PRODUCTION FROM SHALE GAS

In ethylene production plants, it is essential to analyze process gases accurately and reliably to ensure safety and efficiency.

These efficiencies can be achieved in a number of ways:

- Shortening the residence time in the cracking furnace
- Rapidly adapting to changing feed stocks
- Improving combustion control

- Optimizing fractionation
- Improving combustion reliability

Safety can also be improved through the use of fast, reliable process analysis technologies with high measurement availability.

The increasing use of shale gas to provide the feedstock for ethylene cracking has required a new approach to gas analysis solutions within the production

process, since feed gas quality is critical to the overall process. The cracked gas is processed and stripped of its ethane, which is then used to feed the cracker.

Servomex is well placed to adapt its proven analysis for traditional ethylene production processes to provide an effective solution for ethylene production using ethane feedstock from shale gas.

### SERVOMEX SOLUTIONS FOR ETHYLENE PRODUCTION USING SHALE GAS

SEE OVERLEAF FOR PROCESS DIAGRAM

#### SERVOTOUGH Oxy 1900



Stable, flexible digital oxygen analyzer designed for use in hazardous process conditions.

#### SERVOTOUGH OxyExact 2200



High-specification oxygen analyzer for optimum process and safety control in hazardous areas.

#### SERVOTOUGH SpectraScan 2400



Revolutionary in-line, real-time analysis of hydrocarbon components.

#### SERVOTOUGH SpectraExact 2500



Reliable, real-time photometric analysis of corrosive, toxic and flammable gas streams.

#### SERVOTOUGH FluegasExact 2700



Flue gas analyzer for high-temperature measurements of oxygen and combustibles.

#### SERVOTOUGH Laser 3 Plus



Compact Tunable Diode Laser analyzer providing fast, accurate gas measurements.

#### SERVOTOUGH DF-340E



High-sensitivity Coulometric oxygen analyzer certified for hazardous area use.

#### SERVOPRO 4900 Multigas



Designed specifically for continuous emissions monitoring of flue gas.

#### SERVOPRO NOx



Chemiluminescence detector analyzer for NO or NO<sub>2</sub>/NO<sub>x</sub> concentrations.

OUR EXPERTISE  
**YOUR  
SUCCESS**

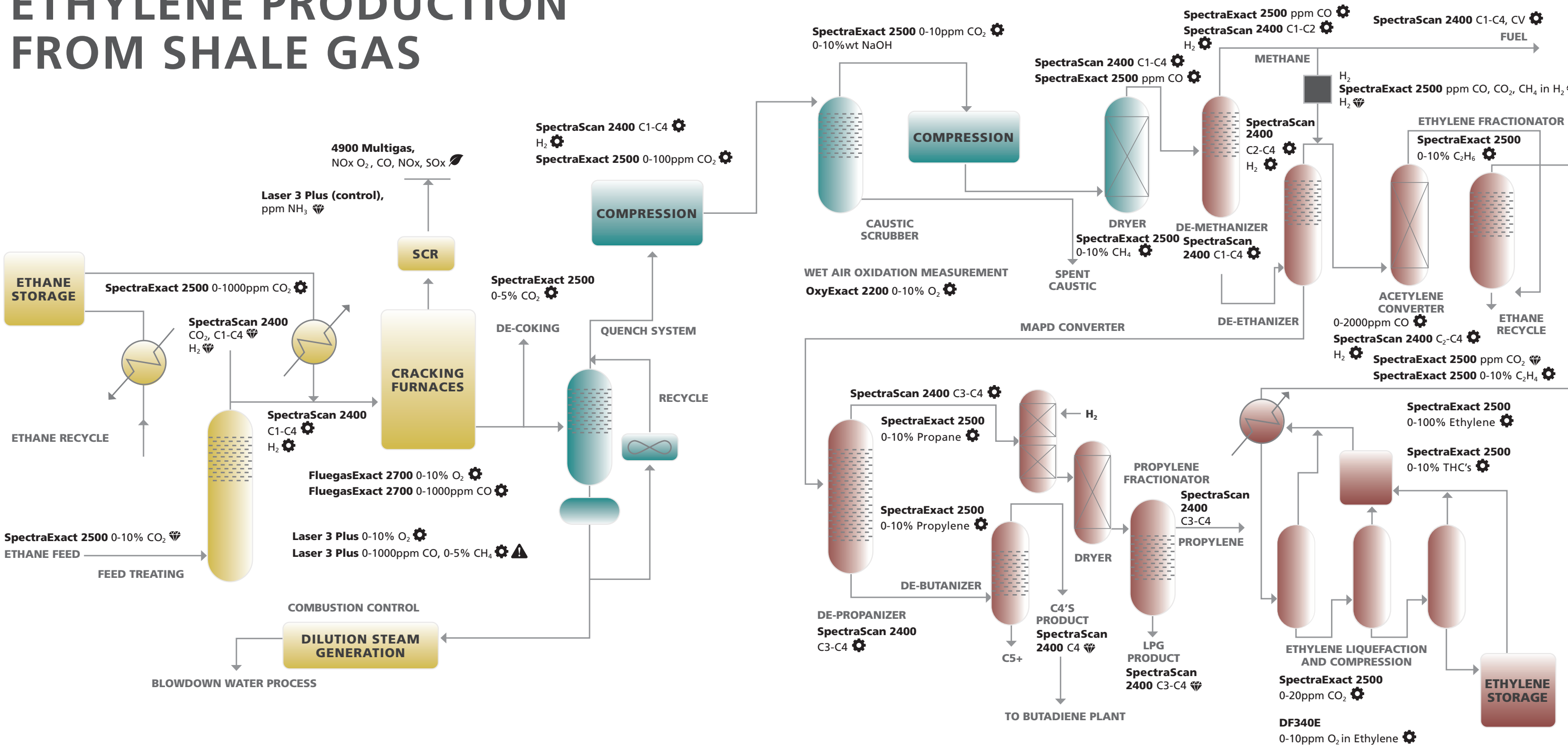
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ETHYLENE PRODUCTION FROM SHALE GAS



Refer to previous page for product details



## SIL 2 RATING FOR OxyExact 2200 TRANSMITTER UNIT (2222H)



The SERVOTOUGH OxyExact 2200 is a high-precision Paramagnetic oxygen analyzer designed for hazardous area installations in the process industry, configured with a control unit with up to six transmitters.

In addition to the existing 2223 transmitter versions, the high-temperature OxyExact transmitter unit (2222H) has now been assessed as being SIL 2 compliant for use in safety instrumented systems in respect of hardware integrity only, according to IEC 61508 part 2:2010. The assessment covers 2222Hs configured with or without the optional internal flow alarm feature.

As a result, a new Functional Safety manual has been released (02220006A) that covers both transmitter versions of the OxyExact 2200. This manual provides information and instructions that will be needed in order to use both versions of the transmitter in safety instrumented systems.



The 2222H transmitter is designed for use in process control applications where high-temperature, high-performance oxygen measurements are required. This includes the manufacture of ethylene oxide, propylene oxide, ethylene dichloride, and vinyl acetate monomer acid.

### IMPROVEMENTS

Field-proven Paramagnetic cell measurement technology.

Sample compartment temperature up to 110°C (230°F).

Sample gas pressure of up to 45psia.

Measurement of enriched oxygen in potentially flammable sample gases.

Certification for hazardous areas meeting ATEX, IECEx, FM & CSA compliance.

Multiple transmitter operation in conjunction with an OxyExact control unit (two-wire digital connection for easy installation).

## KEEP YOUR ZIRCONIA SENSOR AT PEAK PERFORMANCE



The SERVOTOUGH FluegasExact 2700 is designed for reliable operation in some of the most hazardous and challenging conditions. It uses trusted, industry-proven Zirconia sensing for measuring oxygen in combustion processes, with an extractive sampling system to protect against harsh process environments.

However, to ensure the analyzer continues to operate at the highest levels of performance, and to provide peace of mind that measurements continue to be as accurate as possible, regular health checks are recommended.

Conducted on-site by an expert engineer from our global Service Network, a health check delivers complete assurance that the analyzer is performing within specification.

See the table for checks that might be carried out by an engineer for the Zirconia analyzer on a FluegasExact 2700.



Choosing a health check allows for a proactive approach to maintenance for your FluegasExact 2700, detecting any anomalies before they become costly problems, and avoiding downtime for unscheduled repairs.

See all Service products at [servomex.expert/service](http://servomex.expert/service)

### CHECKS



Diagnostics, including sensor temperatures and signal voltages.

Enclosure doors are closed and cable glands secure.

Analyzer damage caused by heat, abrasion, misuse, etc.

Checking mA and relay operation.

Making sure the aspirator air setting is correct.

Testing the analyzer responds correctly to calibration gases.

Examining probes and probe filters.

Calibrating oxygen, COe and flow sensors.



## > 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.*

GAS	MEASURES	APPLICATION
HYDROGEN	PERCENT	PROCESS CONTROL
		QUALITY
PARAMAGNETIC		INFRARED

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

*The Hummingbird sensing technologies used are listed.*

## > FOLLOW US ON SOCIAL MEDIA

We regularly post on Twitter, LinkedIn and Facebook. Follow us for the latest news about our expert gas analysis solutions. Be the first to find out about our product releases, exhibition appearances, and career opportunities around the globe.



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servomex



ALL OUR ANALYZERS INCLUDE HUMMINGBIRD SENSING TECHNOLOGY  
WINNERS OF THE QUEEN'S AWARD FOR ENTERPRISE

## 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
HYDROGEN	PERCENT	PROCESS CONTROL
		QUALITY

#### SENSING TECHNOLOGY

H2scan thin film

## 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
- mA range and alarm outputs aids integration into control systems
- Easy to set-up, install and operate

#### APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
		SAFETY

#### SENSING TECHNOLOGY

PARAMAGNETIC

## 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

- Safe Area to Zone 1/Div 1 hazard-rated locations
- Heated sample gas compartment provides improved measurement performance with optional sample heater for simplified sample conditioning system design
- Unique Servomex Flowcube flow sensor technology for improved safety
- Internal pressure compensation option available for improved measurement performance
- Modbus communications available as standard
- SIL 2 hardware compliant

#### APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
		SAFETY

#### SENSING TECHNOLOGY

PARAMAGNETIC

## 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, TIIS and FM/CSA Class 1 Div 1
- Up to 6 transmitters can be connected to one control unit
- Control units use an option card based I/O system to allow expansion of I/O to suit system requirements
- Three enclosure systems allow sampling of any flammable gas up to 100% O<sub>2</sub> and pressures of up to 45psia
- High-temperature transmitter eliminates need to condense hot wet samples prior to analysis
- SIL 2 hardware compliant

#### APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
		SAFETY

#### SENSING TECHNOLOGY

PARAMAGNETIC



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

GAS	MEASURES	APPLICATION
CARBON MONOXIDE	PERCENT	PROCESS CONTROL
CARBON DIOXIDE	CALORIFIC VALUE	QUALITY
HYDROGEN SULFIDE		

SENSING TECHNOLOGY

SPECTROSCOPIC

SERVOTOUGH SpectraExact 2500

HAZARDOUS AREA

RUGGED PHOTOMETRIC GAS  
ANALYZER FOR DEMANDING  
PROCESS APPLICATIONS

Servomex's iconic industry-leading Photometric analyzer delivers flexible single and multicomponent 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
- Robust and high-performance NDIR analyzer for industrial and process applications
- Non-contact analysis, with the sample cell segregated from the electronics for ease of maintenance and safe operation

APPLICATIONS

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

GAS	MEASURES	APPLICATION
TOXIC	PERCENT	PROCESS CONTROL
FLAMMABLE	TRACE PPM	
CORROSIVE		

SENSING TECHNOLOGY

GAS FILTER CORRELATIONINFRARED

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 COe 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
- Flame traps incorporated as standard within sample compartment
- Wide selection of probe lengths and materials available

APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
COMBUSTIBLES	TRACE PPM	COMBUSTION

SENSING TECHNOLOGY

CALORIMETRYZIRCONIA

SERVOTOUGH Laser 3 Plus Ammonia

HAZARDOUS AREA

COMPACT NH<sub>3</sub> MEASUREMENT,  
OPTIMIZED FOR AMMONIA SLIP  
DENOX APPLICATIONS

This 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 DeNOX applications for power plants, furnaces and fired heaters

APPLICATIONS

- Process heaters
- Incinerators
- Power stations
- Furnaces

GAS	MEASURES	APPLICATION
AMMONIA DENOX	TRACE PPM	PROCESS CONTROL
		EMISSIONS

SENSING TECHNOLOGY

TUNABLE DIODE LASER

SERVOTOUGH Laser 3 Plus Combustion

HAZARDOUS AREA

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, furnaces and fired heaters

APPLICATIONS

- Process heaters
- Incinerators
- Power stations
- Furnaces

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
CARBON MONOXIDE	TRACE PPM	COMBUSTION
CARBON MONOXIDE + METHANE		

SENSING TECHNOLOGY

TUNABLE DIODE LASER

SERVOTOUGH Laser 3 Plus Process

HAZARDOUS AREA

COMPACT 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
OXYGEN	PERCENT	PROCESS CONTROL
		COMBUSTION

SENSING TECHNOLOGY

TUNABLE DIODE LASER



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 I/Division I or II 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
OXYGEN	TRACE PPM	PROCESS CONTROL
		QUALITY

SENSING TECHNOLOGY

COULOMETRIC

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 I/Division II
- Microprocessor-driven for easy configuration and maintenance
- Coulometric sensor delivers accurate results with negligible sensor drift, no false low readings, and no frequent calibration requirements

APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	ULTRA TRACE PPB	PROCESS CONTROL
	TRACE PPM	QUALITY

SENSING TECHNOLOGY

COULOMETRIC

SERVOTOUGH DF-340E

HAZARDOUS AREA

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

Designed for external locations, the DF-340E remains stable in changing sample conditions, and is designed to provide measurements of trace or percent level oxygen in pure gas streams and multi-gas backgrounds. It is ideal for upset-prone applications.



FEATURES AND BENEFITS

- ATEX II and IECEx certified
- Class I/Division II 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
OXYGEN	ULTRA TRACE PPB	PROCESS CONTROL
	TRACE PPM	QUALITY

SENSING TECHNOLOGY

COULOMETRIC

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 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
- Configurable alarm relays and mA output available as standard
- Modbus digital communications option available
- SIL 2 hardware compliant

APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	SAFETY

SENSING TECHNOLOGY

PARAMAGNETIC

SERVOPRO 4900 Multigas

SAFE AREA

GAS ANALYZER SUITABLE FOR FLAMMABLE GAS MIXTURES

The 4200/4210 multi-gas analyzer is designed to monitor flammable gas samples including H<sub>2</sub>/CO, 'HyCO' or 'Syngas' mixtures for trace level contaminants and percent level components. The 4200/4210 offers oxygen control using Servomex's unique Paramagnetic cell, trace level measurement of CO, CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> and percent levels of CO, CO<sub>2</sub>, CH<sub>4</sub> using photometric sensor technology.



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), Modbus RS485 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
OXYGEN	PERCENT	EMISSIONS
	TRACE PPM	

SENSING TECHNOLOGY

GAS FILTER CORRELATION

INFRARED

PARAMAGNETIC

SERVOPRO 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, regenerative skid dryers, combustion, and instrument air, with no calibration required after 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 seamless recalibration
- Stainless steel, weatherproof casing 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
WATER	DEW POINT	PROCESS CONTROL
	PPMV	

SENSING TECHNOLOGY

ALUMINUM OXIDE



SERVOPRO NO<sub>x</sub>

SAFE AREA

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

Utilizing Chemiluminescence detection technology to measure NO or NO/NO<sub>2</sub>/NO<sub>x</sub> concentrations in industrial gas and vehicle emission applications, the versatile SERVOPRO NO<sub>x</sub> 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 NO<sub>x</sub> 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
NITRIC OXIDE	TRACE PPM	PROCESS CONTROL
NITROGEN DIOXIDE		QUALITY
NITROGEN OXIDES		EMISSIONS

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 SO<sub>2</sub> 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
SULFUR DIOXIDE	TRACE PPM	PROCESS CONTROL
	TRACE PPB	QUALITY
		EMISSIONS

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 its dew point, for optimum performance in total hydrocarbon analysis (THC). 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

APPLICATIONS

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

GAS	MEASURES	APPLICATION
TOTAL HYDROCARBONS	TRACE PPM	PROCESS CONTROL
METHANE		QUALITY
NON-METHANE HYDROCARBONS		EMISSIONS

SENSING TECHNOLOGY

FLAME IONIZATION DETECTOR

SERVOFLEX Micro i.s. 5100

PORTABLES

INTRINSICALLY SAFE ANALYZER MEASURES O<sub>2</sub>

Designed for the measurement of oxygen in potentially 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>.



FEATURES AND BENEFITS

- Intrinsically safe design (Zone 0) to ATEX and IECEx standards ensures safety operation in hazardous environments
- IP65 rugged design and optional carry case allows for use in the most demanding environments
- Powered by integral rechargeable battery
- Ergonomic compact design ensures easy operation on the move
- Available in non-pump or internal pumped versions with optional sample conditioning kit

APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
		QUALITY
		EMISSIONS

SENSING TECHNOLOGY

PARAMAGNETIC

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 and TUV 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

- MCERTS V3.3, Annex F and TUV QAL 1 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

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
CARBON MONOXIDE		QUALITY
		EMISSIONS

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

APPLICATIONS

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

GAS	MEASURES	APPLICATION
OXYGEN	PERCENT	PROCESS CONTROL
CARBON MONOXIDE		COMBUSTION
CARBON DIOXIDE		SAFETY

SENSING TECHNOLOGY

PARAMAGNETIC

INFRARED



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