

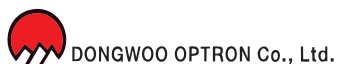


SWAN ENVIRONMENTAL MONITORING SOLUTIONS

CEMS & Process Monitoring Instruments



OUR GLOBAL PARTNERS



Continuous Emission Monitoring System (CEMS)

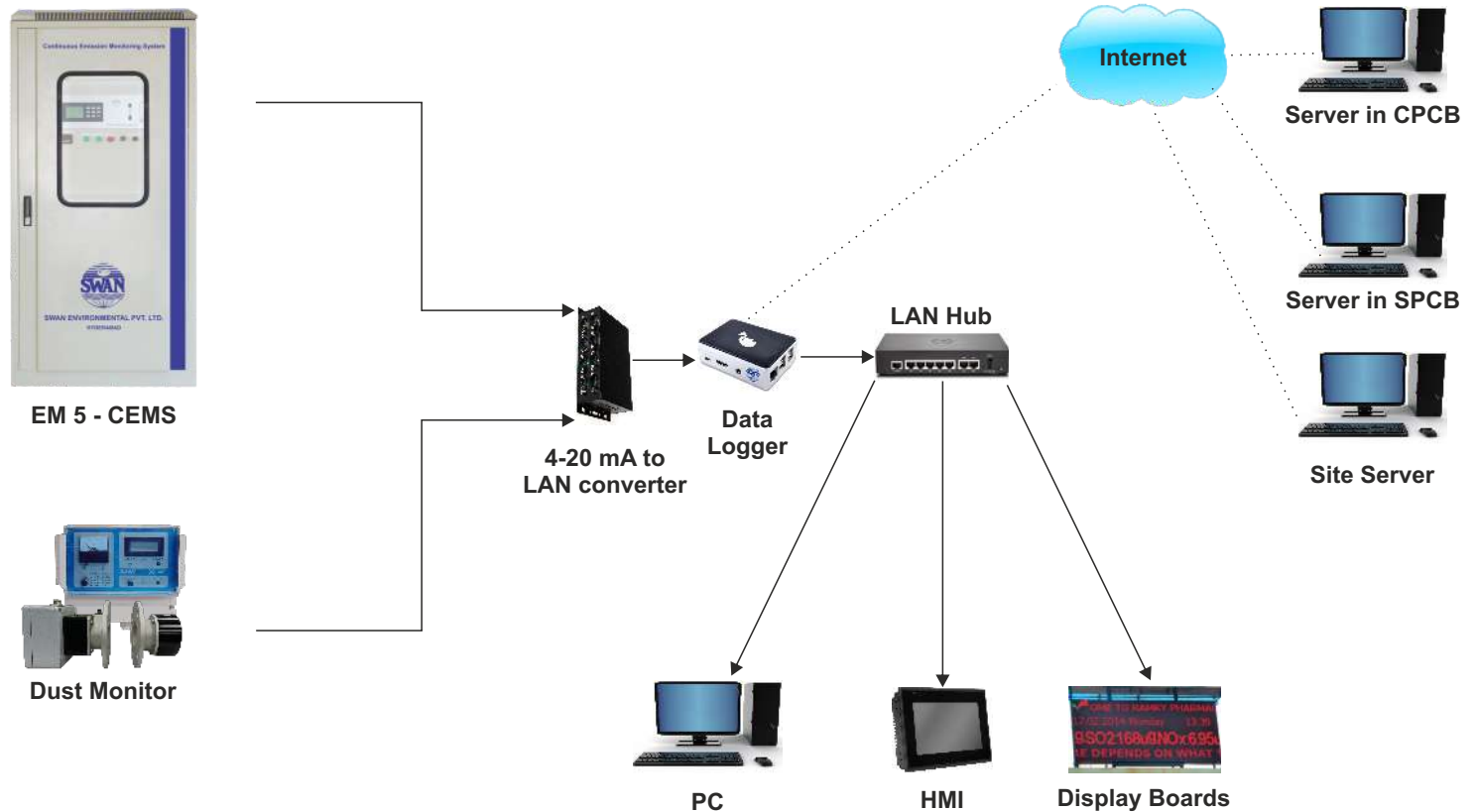
Continuous Emission Monitoring System (CEMS) is integrated with multi channel analysers which measures gases like SO₂, NO₂, NO, CO, CO₂, O₂, TOC/VOC/THC etc. with all options connected to data logging system and PC/client server.

Turnkey Solutions:

- SWAN offers turnkey solutions for CEMS that span from design and detailed engineering, system integration, supply to installations, commissioning and uploading of data to PCB and company corporate servers.
- SWAN offers entire range of associated products as part of CEMS solution that include prefabricated shelter, UPS, PC, display boards, networking components, Wi-Fi units, gateways, A/D converters etc.
- Requirements are thoroughly studied to identify the items needed & engineering carried out to bring out most economical and sustaining customized solutions.
- Dedicated trained and experienced service team for after sales support across India.

Features:

- As per US EPA, TUV Methods and CPCB Guidelines
- In line with CPCB regulations
- Uploading of data to CPCB, SPCBs, PCC and company corporate servers.
- Cloud server facility.
- Remote calibration facility.



TUV (India) Certified SO₂, NO₂ & NO Analyzer

- Based on UV DOAS principle. Light source adopts the pulse source.
- Extractive type.
- High accuracy and reliability, fast response time.
- No cross interference between the gas being measured.
- Undisturbed by moisture and dust.
- NO and NO₂ can be measured at the same time, with converter.
- Low detection limit. Small amount of zero drift & span drift.
- Modular design. No optical moving parts and no vibration influence.
- Spectrum automatic adjustment technology, long free maintenance cycle.



CO, CO₂ and O₂ Analyzer

- Based on NDIR principle.
- Excellent prolonged stability.
- Virtually unaffected by the interference of moisture.
- Standard 19" 3U industrial enclosure design.
- LCD display shows data. Tactile keypad for easy operation.
- Equipped with sample gas flow meter and needle valve to regulate the inlet gas flow and internal gas filter to protect the gas sensor from impurities.
- Constant temperature enclosure for NDIR sensors, avoids influence by temperature fluctuation.
- Auto-zeroing function. Easy maintenance.
- The software has many function, such as automatic zeroing, self-diagnosis, alarm setting and so on.



TUV (QAL1) Certified Multi Gas Analyzer

- TUV QAL 1 & MCERTS certified Cold gas measuring system for continuous emission measurement of pollutants in flue gas and for process control.
- Multi gas analyser for extractive gas component measurement
- Measuring Methods: NDIR, ECD, Paramagnetic and Thermal conductivity detection.
- Parameters: SO_2 , NO , NO_2 , N_2O , CO , CO_2 , O_2 , CH_4 , H_2 , H_2S .
- Simultaneous measurement of up to eight gas components.
- Two separated gas paths possible.
- QAL 1 & MCERTS according to EN 15267-3
- Compensation for temperature, pressure and water cross-sensitivities by internal spectral filter
- Internal monitoring for condensate ingress with switch contact for pump switch-off



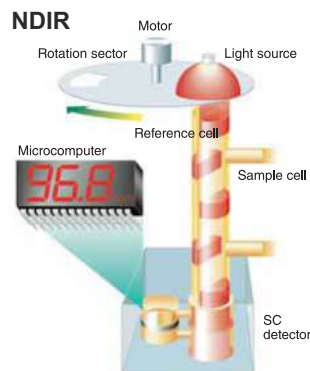
TUV (QAL1) Certified TOC/THC Analyzer

- TUV & MCERTS Certified, stationary Flame-Ionisation-Detector (FID) analyzer is designed for continuous stack monitoring, process control and also for VOC measurement.
- Heated integrated Sample gas filter 300°C. Whole gaspath is heated to 300°C
- User-friendly Touchpanel 7" TFT
- Graphic Display of HC-concentration
- Internal response factor correction
- Pyrolysis cleaning function for a self-cleaning procedure of the gas path and cell
- Internal Datalogging by USB Stick
- Single Range – no switch between ranges
- Built in Zero Gas generator (optional)
- Injector version available (optional)

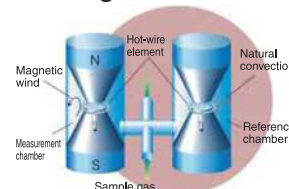


Shimadzu NDIR Based Emission Monitoring System

- Infrared Gas Analyzer for Monitoring Stationary Sources
- Can measure up to five components NO_x , SO_2 , CO , CO_2 , and O_2 with a high degree of accuracy.
- NO_x , SO_2 , CO , CO_2 : Ratio photometric NDIR principle. O_2 : Paramagnetic / Zirconia principle.
- Ratio infrared absorption method ensures highly stable measurements.
- Probe is installed in the stack and Analyser is installed in the room connected with Sample Line measures high range % to ppm levels.
- The slim front door type cubicle structure makes maintenance and daily inspections extremely easy to perform.
- Highly reliable sampling can also be performed with ease.
- Fast Response time, High Sensitivity, High Precision, Low Drift and easy for Maintenance.
- It incorporates a variety of functions including automatic calibration, remote calibration, logical calculation functions, and alarms.
- A large LCD screen displays the concentrations of all measured components at the same time.
- A dry calibration system is adopted so very little gas from gas cylinders is used, thus reducing running costs.
- An integrated barometer enables air pressure correction. (optional)

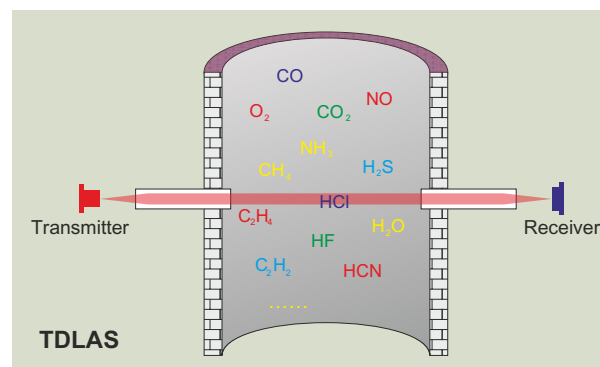


Paramagnetic



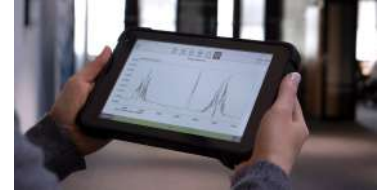
Laser Based Stack Gas Analyzers

- Based on unique Tunable Diode Laser Absorption Spectrum (TDLAS) technology.
- LGT series laser gas analyzer for industrial online analysis and environmental online monitoring.
- Different models available are: in-situ probe type, bypass type, multi-channel type, panel mounted type and flameproof type etc.
- Laser gas analyzers are used in a wide variety of applications to measure O_2 , CO , NH_3 , CO_2 , CH_4 , H_2O , H_2S , HCl and HF etc.
- Measuring concentration ranges from constant to trace.
- High sensitivity, high resolution, fast response.
- Modular design, can replace laser module and detector module at the scene, don't need to adjust the light path.
- High, laser integrated in transmit unit, algorithm is directly realized within the receive unit, no additional central unit.
- Flame-proof, only positive pressure purge gas is needed.
- Support the X and Y direction coupling optical path adjustment technology (patent technology), convenient installation



Portable FTIR Stack Gas & Emission Analyzer

- Powerful, Reliable, Rapid, Portable & Robust Instrument.
- Gives clear OK / Not OK in software to indicate if device is ready or not.
- Designed to be used with the portable sampling system
- PSS utilizes hot-and-wet measurement principle (no drying or dilution)
- PSS can be optionally equipped with a ZrO₂ sensor for accurate oxygen measurement.
- Typically set up to measure H₂O, CO₂, CO, NO, NO₂, N₂O, SO₂, NH₃, CH₄, HCl, HF and different VOCs.
- Can measure up to 50 gases simultaneously. Additional gases can be easily added without any hardware changes.
- Even the smallest concentrations are measured with high accuracy.
- Measurements can be monitored on-site or even remotely.
- Results can be accessed via PC or tablet with Calcmeter software.
- With Calcmeter software reanalyze measured data to identify unknown gases.



FTIR Based Continuous Emission Monitoring System

- TÜV and MCERTS certified solution (QAL1) for a wide range of demanding emission monitoring applications.
- As all system parts are heated up to 180 °C, this extractive system is ideal to measure trace concentrations of pollutants from hot, wet and corrosive gas streams.
- Based on Fourier Transform Infra Red (FTIR) measurement principle.
- Typical measuring parameters like H₂O, CO₂, CO, N₂O, NO, NO₂, SO₂, HCl, HF, NH₃, CH₄, C₂H₆, C₃H₈, C₂H₄. Optional TOC (ZID), O₂ (Zirconium) also.
- The system can be easily configured for a new set of compounds.
- Measured components and calibration ranges can be designed according to the application.
- The operation of the system is fully automatic and controlled by the Calcmeter™ software. Additionally all functions can be manually controlled.
- Both measuring data and alarm information can be transferred to other automation or reporting systems with analog or digital format.



CEMS

Key Advantages

- EN 15267 certified
- Flexible design with options according to your need
- Reliable system with low need for maintenance



FTIR Analyzer

CVAF Based Mercury Monitor

- TÜV and MCERTS certified solution (QAL1) for measuring mercury continuously from hot, wet and corrosive gas streams.
- Based on Cold Vapor Atomic Fluorescence (CVAF) measurement principle.
- Consists of dilution probe, heated sample line, Gasmet mercury analyzer and Gasmet test gas generator.
- Heated dilution probe with a two-stage blowback system ensures the durability and low maintenance of the system even in demanding conditions.
- Simple probe design: Direct sampling with sample dilution and effective filter blowback system.
- The integrated thermal converter converts all mercury compounds to elemental mercury to measure total gaseous mercury.
- Has the lowest certified range in the world (0-5 µg/m³).
- Very low detection limit (ng/Nm³).
- Virtually no interference from other gases such as SO₂, HCl
- Low operating costs: No need for separate chemicals, gold amalgamation concentrators, acid scrubbers or additional gases

Key Advantages

- Lowest certified range in the world
- EN 15267 certified
- Online results
- Quick response
- Fully automatic system
- Future-proof with the highest sensitivity in the market
- Reliable system with low need for maintenance



CMMS



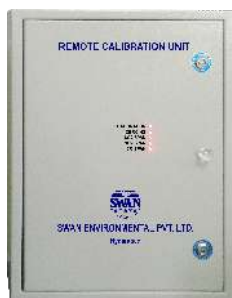
Hg Analyzer



Sampling Probe

Remote Calibrator

- Receives commands from CPCB/SPCB servers and performs calibration checks as per CPCB regulations.
- Status LEDs for "Calibration", "Zeroing", "SO₂ Span", "NO Span", "CO Span"
- Remote calibration verification software
- Built in 24 VDC power supply to drive internal modules and solenoid valve.
- Reliable long lasting solenoid valves.
- Built in Control-Communication module.



HCl and HF Analyzer

- TDLAS (tunable diode laser absorption spectroscopy)
- Non-contact optical measurement, low drift and with long service life
- One-side installation, no complex optical path adjustment required
- Reference gas cell adopted; online calibration; no disassemble needed
- "Single line spectrum" technology, free from interference of background gas
- In-situ measurement, no sample conditioning required and avoiding the problems that sample is absorbed during conditioning process, blocking, unit damage and etc.
- Low maintenance cost



Pressure, Temperature & Flow-rate Integrated Monitor

- Specially developed for continuously monitoring high temperature, high humidity and low flow rate of emission flue gas.
- 2m/s low flowrate measurement by pressure sensor of ultra-low range
- Operation unit with LCD screen: perfect HMI provided
- Settable parameters: timing purge, velocity field, pitot coefficient and etc.
- Protection for over pressure to avoid damage to pressure sensor and lower operation cost
- Auto zeroing calibration
- Anti-blocking and anti corrosion for pitot
- Strengthen protection for signal output



Stack Moisture Monitor

- Used to measure pollutant emissions flue gas humidity whereby wet gas concentration being converted to dry gas concentration, also used for industrial on-line moisture monitoring.
- Portable structure, easily installed and easy to demolition.
- Can measure humidity of flue gas(300°C).
- On-site commission & maintenance with display screen directly.
- High performance, high reliability.
- Probe heated to prevent humidity capacitance and thermal resistance damaged by the flue condensate.



Continuous Scrubber Vent TOC / VOC Monitor

- To comply with process vent emission standards for TOC / VOC monitoring.
- Sampling probe will be installed on Stack/Exhaust/Vent with pipe which can be connected to Fixed VOC.
- Sample conditioning system checks Humidity and particles.
- RAE Guard 2 PID measures VOCs up to 1000 PPM.
- Graphic display and LED status indicator for fault and alarm conditions.
- Explosion-proof enclosure to use in Class I, Division 1 (Zone 1)



Portable TOC / THC & NMHC Analyzer

- Adopts catalytic oxidation + double FIDs technology to simultaneously analyzes TOC / THC & NMHC.
- Highly integrated design to ensure the total weight within 12KG.
- Analyze THC & NMHC at the same time in one single unit.
- High test efficiency. Low pre-heating time.
- Large-capacity battery (45Ah) power supply, which can run for a long time even without utility power on site.
- Detachable touch screen terminal with Wi-Fi communication
- Measurement Range: 0~10/100/1000/10000mg/m³ (Extendable)
- H₂ is supplied by mini built-in metal hydride cylinder
- US EPP Method 25 compliant.



Portable NDIR Stack Gas Analyzer

- SO₂, NO, CO and CO₂ are measured by micro-flow infrared sensors and O₂ by electrochemical sensor, with optional gas temperature, pressure, flow velocity etc.
- Less interference of H₂O for SO₂ and NO measurement.
- Built-in zero pump and auto zero calibration with fresh air.
- Built-in heated filter prevents sampling loss.
- Efficient peltier dehumidifiers for humidity measurement of low concentrations. PID temperature control. Needle valve flow control.



Portable Stack Gas Analyzer - 4 or 8 Sensors

- The rugged combustion analyzer can be equipped with up to 4 or 8 sensors.
- Basic unit has O₂, CO or O₂, CO, NO and SO₂ Sensors. The other sensors are customer selectable as well as the measuring ranges.
- Can optionally measure NO₂, H₂S, HC etc.
- Automatic zero calibration
- Integrated self-check program
- Simultaneous display parameters on the illuminated display
- Printer with programmable print out cycles
- Rechargeable battery with charger



TUV (India) Certified Double Pass Laser Dust Monitor

The dust monitor is TUV certified, based on double pass principle, equipped with a semiconductor laser. It is excellent for measuring from medium to long distances (0.5m - 10m).

Features

- Based on the double pass measurement principle.
- Laser Light Source - Ultimate Wavelength Stability
- Excellent Collimation, Better Accuracy and High Sensitivity.
- Minimum optics needed - less maintenance.
- Optimal for stacks from 0.5m to 10m. (with optional 100mm lens up to 40m)
- No moving parts-minimal maintenance.
- Large operation range (0 ... 90 %).
- Good stability and reliability.

Principle of Operation:

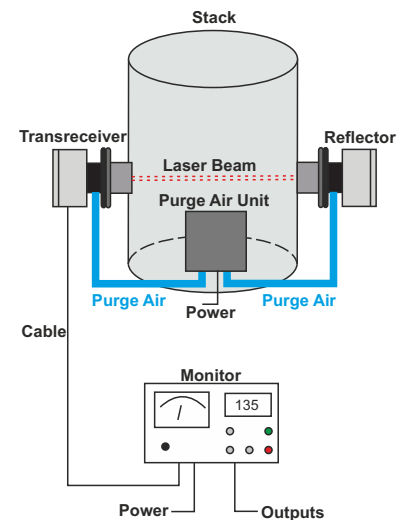
The measuring system is based on the Double Pass Transmissometry principle. The light beam crosses the measuring section twice and the transceiver unit measures and evaluates the light beam's weakening caused by the dust content. The optical value will be shown as optical density on analogue display and optical density related to mass value on digital display. Manual-calibration check can be done using optical filter.

Advantages of using a Laser Light Source

- Measuring path from 0.5m to 10m possible, due to a narrow and intense laser light beam.
- Excellent beam collimation (0.04°) - no need to use lenses or mirrors in the transmitter making the system reliable and simple.
- Standard wavelength guarantees long-term accuracy and stability.
- The analyzer can be transferred to another location without factory calibration.
- The alignment of the beam is easy because the beam is narrow.

Features of Monitoring Unit

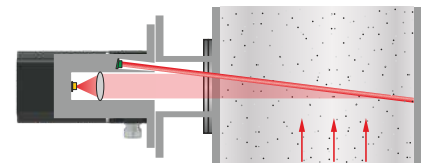
- 4 operator selectable measuring ranges.
- Analogue and digital display.
- Settable alarm relay limit.
- 0 ... 1 V DC and 4 ... 20 mA current outputs.
- RS485 Modbus Output.



Double Pass Transmissometry

Back Scattering based Dust Monitor

- Laser backward scattering type dust monitor
- In-situ type installation
- 4-20 mA analog output
- LCD Display for easy view.
- Measuring method as per CPCB guidelines
- Has In-situ zeroing and span calibration
- Automatic gain control function & temperature compensation
- Easy installation and convenient disassembly
- Without background light influence



Back Scattering

Extractive Type Dust Monitor

- Adopts laser forward scattering method
- Low detection limit.
- Full-process heat tracing, which heats water vapor to gaseous state to prevent dust from caking and blocking gas path when encountering water. Thus it applies to high humidity applications.
- Pitot tube isokinetic sampling method
- Supports automatic purging to clean gas path and avoid dust blocking
- Supports automatic zeroing technology under high temperature and automatic calibration technology of all optical paths
- Supports on-site manual span calibration
- Supports automatic double range switching



Integrated Dust Monitor

- Adopts laser forward scattering principle, high sensitivity and resolution.
- It can be applied to high humidity occasions through the unique sampling design with extraction, heating and return mode.
- Supports automatic purging to clean gas path and avoids dust blocking.
- Support automatic zero calibration and span calibration.
- Support automatic double range switching.
- Simple disassembly and easy maintenance.
- Adopts pitot tube isokinetic sampling method to control extraction flow rate.



CO Monitoring in Economizer Outlet

- Accurate in-situ type CO & CO₂ analyzer using NDIR.
- Improved accuracy by complementing CO absorption wavelength of the infrared and the signals of the surrounding section.
- Designed for operations in extreme conditions and best suited for efficiency control at boiler.
- Applied Detector with high sensitivity
- Simple optical path increases efficiency of optical transmission from light source to detector
- With air purge unit.



Slip Gas Analyzer (SCR / SNCR) - NH₃, NO_x, SO₂

- The Analyser is based on Ultraviolet Difference Absorption Spectroscopy (DOAS) Technology.
- Simultaneous measurements for two components among NO_x, SO₂ and NH₃
- Features almost no interference by moisture and particles as it uses UV light source
- NO_x converter is not required as it measures NO and NO₂ separately
- Enclosure level up to IP66 and NEMA4X
- Real Gas Calibration using patented Auto Calibration Unit, ACU



Zirconia Oxygen Analyzers



Designed for continuous measurement of oxygen in combustion and other industrial processes, as well as for reference values in emission measurements.

- High quality zirconium sensors, reinforced platinum electrode layer.
- Simple installation and operation - 4-key user interface controlling all functions.
- Direct integration into the plant control system.
- On-site service and maintenance - all parts can be replaced

Wide range of products, distinguished by performance and quality:

- Low-temperature oxygen analyser - Combined Version: Control unit is integrated with probe. Easy & Low cost.
- Low-temperature oxygen analyser - Separated Version: Up to 700°C. Reading displayed remotely.
- High-temperature oxygen analyser (in-situ): Up to 1250°C. with Variety of probe lengths and protective covers.
- Oxygen analyser certified for use in hazardous (in-situ) areas: Housed in a special protective cover that allows it to be installed in potentially explosive atmospheres.
- Modular oxygen analyser (extractive): For continuous measurement of oxygen concentrations in exhaust gas emission centers. Designed for installation in a measuring cabinet.

Bag Leak Detection

- Employing charge induction sensing for measuring particulates in stacks, ducts, pipes, filter leak detection, and indication of powder flow.
- Fully isolated probe with induction sensing for the highest reliability in moist, corrosive and conductive media applications
- Diagnostics to NAMUR 107 for insight and efficiency
- EPA self-testing to ASTM D7392 for EPA MACT, NESHAP, OSHA etc.
- HART communications, data and event logging
- Remote electronics (for safe, easy access) or integral
- Rotatable graphic display and housing
- Easily removable molded electronics module



Calorific Value (CV) Analyzer

- Automatic industrial gas analyzer which can measure hydrocarbons in natural gas and gaseous fuels.
- Uses Thermal Conductivity Detector (TCD).
- Continuous monitoring with automatic online sampling.
- A pressure safety is located at detector outlet to protect the filament.
- Calorific value unit is configurable.
- Full traceability of results and calibration, more than 10 years data storage.
- Automatic control with process device.
- Intelligence system with tunable and interactive alarms levels.



Gas Impurities Analyzer (N₂, H₂ etc.)

- For the analysis of permanent gases and/or hydrocarbons.
- Continuous monitoring with automatic online sampling.
- Analytical performances: Specific, linear and very sensitive TCD (Thermal Conductivity Detector) detection.
- Automatic calibration/validation of the data from external cylinder.
- Long term stability.
- More than 10 years data storage.
- Automatic control with process device.
- Intelligents system with tunable and interactive alarm levels.



Moisture (H₂O) Analyzer

- Moisture measurement by industrial electrolyser in gaseous samples for concentration between 30 ppb and 5,000 ppm(v) H₂O.
- The analyser is realized both as process or portable version.
- Reference instrument : fundamental measuring principle based on Faraday's law of electrolysis, does not require calibration.
- Long term accuracy has been proved while other type of instrument required frequent recalibration.
- Contamination resistance even for corrosive gases such as chlorine or H₂S.
- The complete sampling system is engineered for the application and the assembly ATEX certified for zones 1 & 2 when required.



Odourous Sulfur Compounds Monitor

- Online analysis and monitoring of odorous sulfur compounds (H_2S , Mercaptans, Sulfides).
- TRSMEDOR is based on Gas Chromatograph - Electrochemical Wet Cell Detection.
- ISO 19739:2004, DIN 51855/7, ASTM D 7493-08 Compliant.
- Automatic calibration/validation of the data
- Useful for Fence line, Fermentation process, Deodorization process, Fugitive emission.
- Intelligent system with tunable and interactive alarm levels.
- Automatic control with process device.
- Remote monitoring & injection control



Online Syngas Analyzer

- Used for measurement of the concentration of up to 6 gases such as CO , CO_2 , H_2 , O_2 , CH_4 , C_nH_m , C_2H_2 and C_2H_4 simultaneously, and calculate the gas heating value (caloric value) and N_2 balance automatically.
- Adopts intl. advanced NDIR & TCD gas analysis technology.
- Modular sensor design. Easy operation and maintenance.
- Integrated RS232/RS485 digital output & 4-20mA analog output
- Equipped with a Bluetooth module. Assist with a Smartphone APP software, it can realize Remote Control, Data download, and Remote online diagnosis function



Portable Infrared Syngas Analyzer

- Ideal measurement solution for direct sampling from pipe at industrial site and gas-bag sampling analysis in laboratory, etc.
- Measures the concentration of up to 8 gases such as CO , CO_2 , H_2 , O_2 , CH_4 , C_nH_m , C_2H_2 and C_2H_4 simultaneously.
- Also calculated the gas heating value (caloric value) and N_2 balance automatically.
- Small size, high accuracy, short response time, simple operation, rechargeable lithium battery power supply system.



Portable Natural Gas Analyzer

- Advanced NDIR gas analysis technology.
- Compact & robust design with light weight, convenient for different sites usage.
- Measures natural gas composition and heating value in real time.
- Std configuration: $CH_4 + C_nH_m + CO_2 + \text{Calorific Value} + \text{Wobbe Index (optional)}$
- In-built sampling pump for low pressure application.
- External safety filter to protect analyzer from impurities
- Ideal for Coal bed gas and natural gas components monitoring and calorific value calculating.



Online Biogas Analyzer

- Designed to measure CH_4 , CO_2 , H_2S and O_2 concentration simultaneously
- Based on NDIR technology for CH_4 , CO_2 gases and ECD technology for H_2S and O_2 gases.
- Applications: Biogas plants, landfill sites, water treatment, sludge digestion, biomethane production, CDM project, Anaerobic digestion and other fermentation processes.
- 4-20mA output and RS232 communication are available
- Modular sensor design. Easy operation and maintenance
- Self-developed gas conditioning device to remove vapor and dust in biogas for analyzer's protection in long term operation



Handheld Biogas Analyzer

- Measures up to 6 gases : CH_4 , CO_2 , H_2S , O_2 , H_2 , CO gases for biogas flow monitoring
- Powered by lithium battery and can be used without AC power.
- Modular sensor design. Easy operation & maintenance.
- Blue tooth communication to upload testing data into Mobile by specified APP directly
- GPS positioning and location
- Precision filters to remove moisture & dust in sample gas.



Ultrasonic Bio-Gas Flowmeter

- Uses the latest ultrasonic transit-time differential method to measure natural gas flow and other kind of gases flow.
- No moving part, corrosion resistant, few pressure losses.
- Reliable accuracy in real time and need no routine maintenance.
- All-in-one detect probe, measure flow velocity, temperature and composition directly.
- Widely applied in industries of petroleum, chemical, electricity, metallurgy, urban gas supply etc.



Ex-proof Wall Mounted Online Biogas Analyzer

- Ex-proof enclosure which can be installed in Zone 2 hazardous zone.
- Continuous monitoring on CH_4 , CO_2 , H_2S , O_2 for better process control, N_2 calculation is supported
- Long lifetime H_2S modular sensor with auto-air purge function
- Modular sensor design enables easy calibration and maintenance
- Equipped with LCD display for real time data checking
- RS232, 4-20mA output available
- Stainless steel protective cabinet, to avoid corrosion on analyzer in long term operation
- Can equip gas conditioning configuration externally



Contact SWAN ENVIRONMENTAL PVT. LTD.



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