

atmosIRt

Portable Multigas IR gas analyser



Overview

Protea atmosIRt is an infra-red (IR), portable multi component analyser to provide analysis of up to seven gas-phase emission or process components.

The analyser is mounted in a robust case with integral auto verification and HMI with standard industrial communication.

AtmosIR is the latest generation of photometric gas analyser technology from Protea. The atmosIR system is an extractive multi component analyser utilising Protea's advanced multi pass cell technology. The analyser is capable of monitoring up to seven (7) gases simultaneously meeting the performance requirements of international standards.

At the heart of atmosIR is a high-resolution, robust and proven Protea photometer offering high signal throughput, low-noise and long lifetime of components. The AtmosIR has been developed to incorporate the latest techniques in GFC photometry and our proven technologies developed over many years, resulting in:

- * Low cost of ownership
- * Low maintenance cost
- * Advanced Protea P-HMI software options to calculate, display and retransmit gas concentrations
- * Robust and light, the AtmosIR combines the Protea P2000 optical bench analyser with our highly reliable multi pass sample cell incorporating an in-built sampling system.
- * Designed for ppm / mg/m³ - level emissions monitoring as a portable analyser, bench-top unit or as part of an fixed integrated CEM system.

The atmosIRt is the result of many years experience in the Process and Continuous Emission Monitoring field supplying advanced instruments into many demanding applications.

These advances have significantly improved performance over existing products, due to combining the proven In-Situ P2000 with the advanced multi pass sample cell used in the Protea atmos range of analysers. The optical bench has seen extensive service over many years and incorporates all the features of the Protea P2000 including long life IR source (>10 years), high specification DC filter wheel motor (>10 years) and state of the art signal processing. The optical bench was designed and utilised in high vibration applications such as marine CEMS so has a "second to none pedigree" running sophisticated diagnostic routines. The analyser requires minimal intervention and therefore high monitoring availability.

The atmosIRt in addition to monitoring six (6) IR absorbing gases can also monitor Oxygen which enables the analyser to report concentrations normalised to a set O₂ level as required by Environmental Agencies.

Features	Benefits
Multi-component gas analysis	Each atmosIRt can measure up to six components
Hot wet analysis	Meets requirements of environmental agencies
	No requirement for additional sample drying equipment
Wet or dry readings reporting	Can inherently report on Wet or Dry gas basis
Automatic signal verification and recalibration	No operator intervention during routine use
Oxygen or CO ₂ measurement normalisation (option)	Report measurement corrected to normalised O ₂ or CO ₂
Low maintenance	Only one moving part, designed for maximum availability
Sample line, sample probe, temperature status monitored	System protection
Sample pump activation when temperatures are above dew point	Analyser protection
Diagnostics monitor analyser / system health	Enables preventive maintenance and remote support

Components monitored		Minimum Range (Normally up to 100%)	
Carbon Monoxide	CO	0 - 50mg/m ³	0 - 40ppm
Ethane	C ₂ H ₆	0 - 67mg/m ³	0 - 50ppm
Ethylene	C ₂ H ₄	0 - 156mg/m ³	0 - 125ppm
Propane	C ₃ H ₈	0 - 49mg/m ³	0 - 25ppm
Methane	CH ₄	0 - 54mg/m ³	0 - 75ppm
Butane	C ₄ H ₁₀	0 - 65mg/m ³	0 - 25ppm
Trichloroethane	C ₂ H ₃ Cl ₃	0 - 149mg/m ³	0 - 25ppm
Carbon Dioxide	CO ₂	0 - 50mg/m ³	0 - 25ppm
Sulphur Dioxide	SO ₂	0 - 72mg/m ³	0 - 25ppm
Nitric Oxide	NO	0 - 100mg/m ³	0 - 75ppm
Nitrogen Dioxide	NO ₂	0 - 103mg/m ³	0 - 50ppm
Nitrous Oxide	N ₂ O	0 - 148mg/m ³	0 - 75ppm
Ammonia	NH ₃	0 - 19mg/m ³	0 - 25ppm
Water in Gases	H ₂ O(g)	0 - 400mg/m ³	0 - 500ppm
Hydrogen Chloride	HCl	0 - 122mg/m ³	0 - 75ppm
And many more			

Accessories

Heated Line

Protea can supply heated sample lines of suitable length for the application. These will be heated to 180°C to keep water vapour from condensing and impacting the gas measurements. The heated sample line includes an integral zero / span gas line for system check.

The heated sample line includes integral power lines for probe power supply and an integral alarm line for heated probe temperature alarm management.



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Transportable extractive Infra-Red multi component analyser housed in a rugged case, utilising a heated 4.2m multi pass cell, capable of monitoring up to six (6) gases plus Oxygen. The atmosIRt monitors the stack gas without modification, the majority of the competitive analysers have to remove the water vapour prior to analysis. In the process of removing the water vapour a proportion of soluble gases for example SO₂, NO₂, HCl would be removed adding to the uncertainty of the measurement.



The atmosIRt maintains the temperature at 180°C from sample probe to analyser exhaust. The atmosIRt built in HMI displays the gas concentrations (ppm, mg/m³, %), logs and transmits the data. Stack test results can be down loaded into formats such as MS Excel to assist in report writing. To validate before and after the stack testing the atmosIRt has a built in automatic validation system.

Portable Heated

For portable measurement systems, Protea can supply heated or unheated sample probes and tubes.

For stack emissions testing, this will be suitable heated sample probe with operation at 180°C. The probes Protea use include all the features required for this single measurement system:

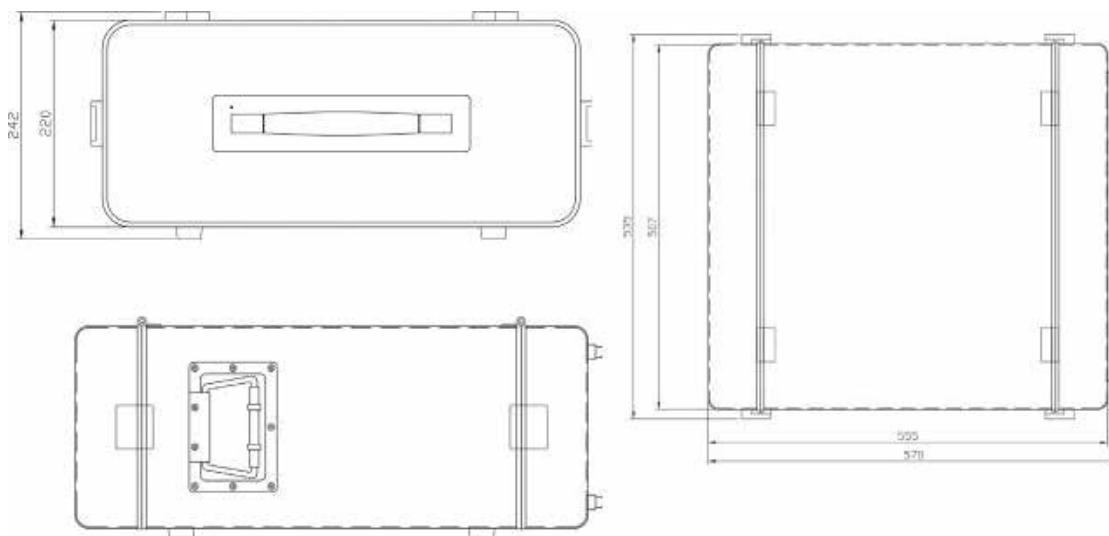
- * Temperature regulator on probe, set for 180°C operation
- * Easy replacement filter without probe removal from stack
- * Low temperature output alarm, to be recorded by atmosIRt software
- * Span gas port for system response checking
- * DN65/PN6 acc. EN 1092-1 flange fitting

Protea provides 2µm PTFE filters as an option for the heated probes

Specification

Principle of operation	Infra-red multi wavelength photometer.	
Spectral Range	Specific application dependent wavelengths (up to 8) are selected between 2-12 μ m.	
Infra-red source	Enclosed nichrome filament.	
Infra-red detector	Solid state pyroelectric element.	
Cross-sensitivity	Minimal due to the wavelength selection, Gas Filter Correlation and advanced algorithms in the processor software.	
Accuracy	Typically $\pm 2\%$ of full scale concentration but dependent on application.	
Response time	Application dependent but typically 60 seconds to T90.	
Enclosure	Mild Steel with high protection finish. .	
Operating environment	Operating temperature range -20°C to 55°C (-4°F to 130°F).	
Materials in contact with gas	Barium Fluoride (BaF ₂), Ni-coated Al cell, Kalrez®	
Gas Cell	Path length	4.2m standard, 6m available as special.
	Materials	Ni-coated Al cell. Proprietary alloy mirror substrate with multi-layer coating.
	Volume	300ml.
	Temperature	Selectable, 40°C, 60°C, 180°C application dependant.
Services required	Power for analyser with PSU 115V/230V 175W.	
	Power for heated line ~ 120W/m.	
	Power for heated sample probe 115V/230V 520W.	
	Instrument air for auto zero and sample cell protection, controlled by the analyser, 2 barG; flow rate 3 litre/min Intermittent during Auto-zero (typically 8 minutes every 12 hours).	
Physical dimensions	Analyser 440 (17.3") x 450 (17.7") x 222 (8.7") (5U 19" rack mountable)	

Dimensions atmosIRr



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