Protea
technology leadership
in measurement solutions

PRODUCT DATASHEET: atmosFIR

atmosFIR

Multi-component FTIR gas analyser, measuring sub-ppm to low %Vol online

AtmosFIR is the latest generation of FTIR gas analyser technology from Protea. The atmosFIR system improves upon previous FTIR technology and represents one of the most cost-effective and flexible analytical products on the market today.

At the heart of atmosFIR is a high-resolution, robust and proven FTIR spectrometer offering high signal throughput, low-noise and long lifetime of components. AtmosFIR has been developed to incorporate the latest improvements and advantages in technology, including:

- Low cost of ownership
- Low maintenance cost
- Robust and light, including the latest in fabrication materials
- AtmosFIR combines an FTIR analyser with an in-built sampling system and is designed for ppm-level emissions monitoring as a portable or bench-top unit or as part of an installed CEM system.

These advantages come with the benefit of improved performance over existing products, due to the new small, robust, high resolution interferometer with low noise measurement. AtmosFIR is fitted with a sensitive DTGS detector, operating at ambient temperature without need for liquid nitrogen or other cooled detectors. Protea continues to offer our powerful PAS software suite, training and support, so that the user is able to achieve the best performance out of the product. PLS algorithms offer great advantages over more traditional chemometrics - please refer to the PAS brochure.

Multi-component, multi-range FTIR gas analyser

Measure 1000's of gases with single unit

PAS software offers no-limit on number of gas measurements at once, using powerful PLS algorithms

Data can be downloaded and re-analysed offline for new gases

Built in O_2 sensor, heated inlet filter and sampling control

Specific Applications for atmosFIR:

- Continuous Emission Monitoring Systems (CEMS)
- Stack Emission Testing
- RealTOC™ measurement
- Speciated VOC with use of high resolution
- Abatement plant efficiency – inlet and outlet
- Ambient air monitoring from 0.5ppm
- Fire Testing research
- Siloxane Measurements
- EX installation for Flammable Gas monitoring

Hardware Specifications

Double-pivot interferometer with increased robustness. Permanently aligned optics, giving repeatable measurements and high light throughput. The scanning mechanism has a lifetime guarantee.		
Resolution	$1cm^{-1}$, $2cm^{-1}$, $4cm^{-1}$, $8cm^{-1}$ typical resolutions, variable on application : $0.5cm^{-1}$ available as special	
Optics:	Zinc Selenide beam splitter (non-hygroscopic)	
Spectral Range:	485 - $8500cm^{-1}$	
Reference laser:	Solid state laser (no scheduled maintenance required). Long lifespan (10 years) compared with HeNe laser	
Source:	Mid-IR source, with electronic stabilization for long lifespan	
Detector:	DTGS with signal sampling at 24-bit ADC	
Sample Cell:	Materials: Ni-coated Al cell. Proprietary alloy mirror substrate with multi-layer coating. Volume: 300ml Pathlength: 4.2m standard pathlength. 6m available as special Temperature: 180°C standard for combustion emissions. Variable on application	
On-board Sampling system:	Heated pre-cell filter for extra protection against dust Zirconia oxygen sensor for parallel O2 measurement Automated Zero Purge valve, with flow control Mass Flow Control for dilution and/or analyte spiking No need for separate pre-analyser sample conditioning box	Alarm relays Sample Signal Output 4-20mA outputs (optional)
Weight	18-20kg, depending on options	
Dimensions	440 x 450 x 222 (5U 19" rack mountable) : 440 x 450 x 178 (4U option, ext. PSU)	
Supply	100 - 250 V / 50-60 Hz	
Consumption	250W	

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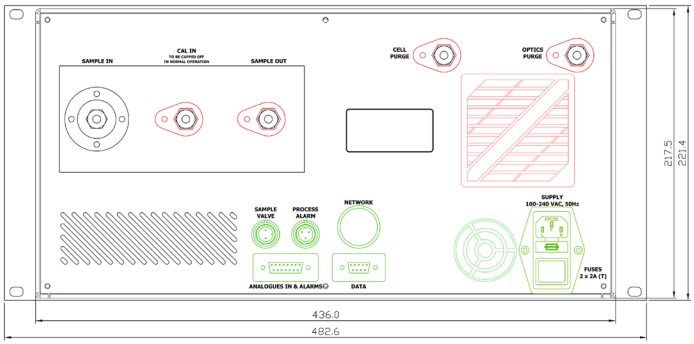

atmosFIR analysers are available as stand-alone gas monitoring units or can be customised for specific applications as portable or fixed systems. They are flexible and can be set-up according to the needs of the user; from fully automated systems through to a feature rich analyser for the expert user. As always, the user is fully supported by Protea's in-house technical support team.

atmosFIR is the successor to Protea's previous emissions monitoring FTIR systems, keeping all the features that users found valuable in achieving their measurement results, but offering the benefits of the new atmosFIR platform with increased portability, lower ownership costs and increased measurement performance. With long-lifetime VCSEL reference laser diode, unique cell design, and air cooled DTGS detector with 24-bit ADC, atmosFIR is a step-change in value and service lifetime for FTIR emission gas analysis.

atmosFIR can be considered a simple multi-gas analyser for combustion gas measurements; indeed for some users that is all it will be and as such it provides a cost-effective and complete measurement system. However, for the expert user atmosFIR will offer all the benefits of FTIR, with hundreds of gas measurements, multiple analytical ranges, in-depth chemometric result diagnoses and dedicated on- board sampling system. With Protea's in-house chemometrics application support and 15+ year history of emission monitoring projects, atmosFIRs offers the user the complete package for their monitoring needs.

Typical Measurements for atmosFIR

atmosFIR runs a Standard Analysis Model with fixed acquisition parameters and chemometric analysis for common emission gases. This makes it incredibly simple to use even for users with no extensive FTIR background. Further analysis methods can be uploaded by the trained user or remotely by Protea.

Typical measurement range(s)	0 – 10ppm; 0 – 100ppm; 0 – 10000ppm. Higher %Vol measurements can be achieved with dilution MFC		
Typical detection limit	<0.2ppm (gas dependent)		
Typical Response Time	120secs at 1cm^{-1} resolution. (T90, gas dependent).		
Linearity	<2% range	Repeatability (σ)	<1% range

Standard Application Model for common emission gases
Hardcoded analysis, no complex set-up required Switch on ➔ Zero ➔ Measure ➔ Report

Component	Ranges / mg/m3	Lower detection Limit (LDL) / mg/m3	Component	Ranges / mg/m3	Lower detection Limit (LDL) / mg/m3
CO	0-75; 0-1000	0.6	CH_4 (Methane)	0-50; 0-1000	0.1
NO	0-200; 0-600	1.0	C_2H_6 (Ethane)	0-50; 0-1000	0.1
NO_2	0-200; 0-600	0.6	C_3H_8 (Propane)	0-50; 0-1000	0.8
N_2O	0-50; 0-400	0.4	C_2H_4 (Ethene)	0-50; 0-1000	0.4
SO_2	0-75; 0-1000	0.6	HCHO (Formaldehyde)	0-20; 0-100	0.2
NH_3	0-15; 0-50	0.1	TOC (Indication only)	0-50; 0-1000	-
HCl	0-15; 0-100	0.2	H_2O	0-40%	0.02%
HF	0-15; 0-50	0.2	CO_2	0-20%	0.005%

Unlimited measurements	Standard Analysis Model ranges are not fixed – increase via simple span correction. Any number of additional gases can be added to the above list. Please contact Protea for specific gas requirements.
Measurement Units	Concentration: ppb, ppm, mg/m^3, %Vol Mass Emission: mg/hr, g/hr, kg/hr, te/a (utilising external flow input)