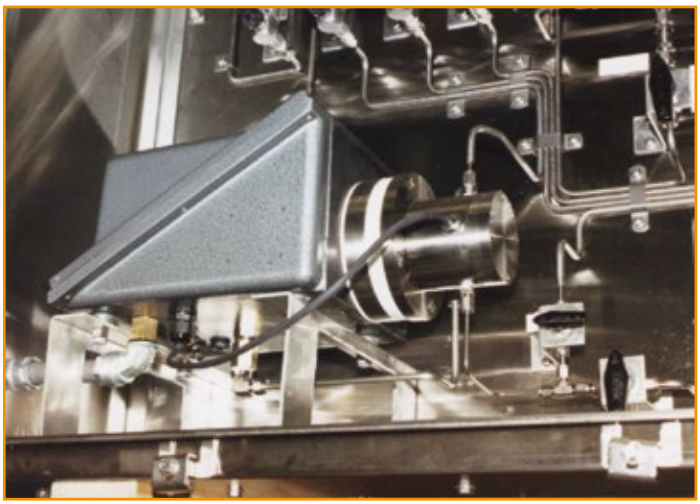
P300

Process Analyser



Overview

Protea P300 is an infra-red (IR), extractive multi component analyser to provide analysis of up to six gas-phase or liquid process components.

The analyser is certified for installation in hazardous area with options including, high pressure sample cell, heated sample cell and built in HMI with standard industrial communication.

Protea P300

Protea P300 is a versatile configurable photometric gas and liquid analyser technology from Protea. The P300 system is an extractive multi component analyser utilising Protea's advanced high pressure cell technology. The analyser is capable of monitoring up to six (6) gases or liquid process components simultaneously with a high level of accuracy. At the heart of P300 is a high-resolution, robust and proven Protea photometer offering high signal throughput, low-noise and long lifetime of components. The P300 has been developed to incorporate the latest techniques in photometry and our proven technologies developed over many years, resulting in:

- Low cost of ownership
- Low maintenance cost
- Advance Protea S – PC or P-HMI software options to calculate, display and retransmit monitor gas or liquid concentrations.
- Robust and light, the P300 combines the Protea P2000 optical bench analyser with our highly unique transmission sample cell.
- The sample cell is designed to operate at elevated pressures and temperatures.

The P300 is the result of many year experience in the Process and Continuous Emission Monitoring field suppling advanced instruments into many demanding applications.

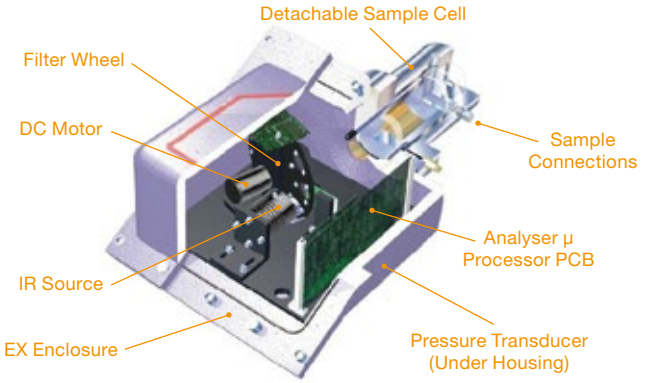
These advances have significantly improved performance over competitive products, due to combining the proven P2000 optics with the advanced external sample cell. The P300 is optical bench has seen extensive service over many years and incorporates all the features of the Protea P2000 including long 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 application such as marine CEMS so has a "second to non pedigree" requiring minimal maintenance with sophisticated diagnostic routines the analyser requires minimal intervention with a high availability.

Features	Benefits
Multi-component gas analysis	Each P300 can measure up to six components
High Pressure (Option)	In many applications negates the need for pressure reduction
Heated Cell (Option)	Avoids condensation in the cell
Automatic signal verification and recalibration	No operator intervention during routine use
Sample pressure monitoring	Automatic sample pressure compensation
Sample temperature monitoring	Automatic sample pressure compensation
Low maintenance	Only one moving part, designed for maximum availability
Detachable sample cell	Ease of maintenance
Hazardous Area Certification Atex / IEC	No need for EXp purge control
Diagnostics monitor analyser / system health	Enables preventive maintenance and remote support

Principle of operation		Single Beam Dual Wavelength Infra-Red with GFC when advantageous Up to 6 hetero-atomic molecular gases as determined by the application
Components monitored		**Minimum Range** (Normally up to 100%)
Carbon Monoxide	CO	0 – 0.2%
Ethane	C_2H_6	0 – 0.2%
Ethylene	C_2H_4	0 – 0.5%
Propane	C_3H_8	0 – 0.1%
Methane	CH_4	0 – 0.1%
Butane	C_4H_{10}	0 – 0.1%
Trichloroethane	$C_2H_3Cl_3$	0 – 0.1%
Carbon Dioxide	CO_2	0 – 0.1%
Ammonia	NH3	0 – 0.1%
Water in Gases	$H_2O(g)$	0 – 2%
Water in Organics		0 – 1%
Water in Oil (Homogenised)		0 – 200ppm
Sugar in Water		0 – 2%
Ammonia in Water		0 – 5%

Principles of Operation

The Protea IR analyser operates on the proven, single beam, dual-wavelength IR light principle. Mid IR Pulses, at two spe-cific wavelengths per monitored gas, are transmitted through the sample cell. The ‘measure’ pulse is partially absorbed by the gases being measured while the ‘reference’ pulse remains unaffected. Up to eight wavelengths are available, sometimes sharing reference wavelengths, allowing up to six gas-phase component concentrations to be monitored simultaneously. Uniquely, the operation, zero and calibraion are “fully DC Motor challenged” in that all operating modes use the same optical path and system components. The folded beam sample cell incorporates both sample temperature and pressure measure-ments allowing the reported concentration to be corrected for any effect of temperature or pressure. The robust demountable sample cell incorporates, cell windows manufactured from Cal-cium Fluoride (CaF2), retro reflector and sample pipe connections.

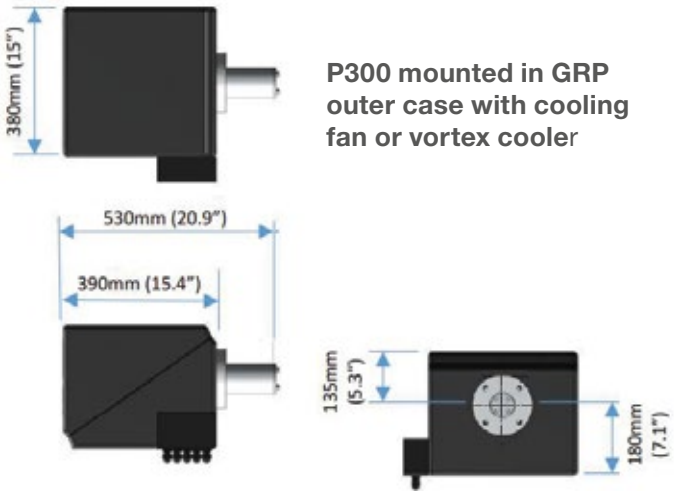





Examples of Monitoring Ranges

Spectral Range:	Specific application dependent wavelengths (up to 8) are selected between 2-12μm.	
Infra-red source	Enclosed nichrome filament.	
Infra-red detector	Solid state pyroelectric element.	
Gas Cell	Path length	0.5mm to 100mm application dependant.
	Materials	Standard Stainless Steel 316m optional Hastelloy C276.
	Temperature	ambient – 250°C.
Cross-sensitivity	Minimal due to the wavelength selection and advanced algorithms in the processor software.	
Accuracy	Typically ±2% of full scale concentration but dependent on application.	
Response time	Application dependent but typically 60 seconds to T90.	
Enclosure	Aluminium with high protection finish.	
Operating environment	Operating temperature range -20°C to 55°C (-4°F to 130°F).	
Materials-contact with gas	Calcium Fluoride, Glass, 316 Stainless Steel, Graphite.	
Services required	Power for analyser with PSU 115V/230V 175W.	
	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).	
Interconnection cable	2 twisted-pair cores with individual screen typically allows up to 1000m separa on between Ana-lyser and Protea P-PC or P-HMI Analyser Control Unit in atmosIRr version.	
Weight	15kg	
Physical dimensions	Analyser 530 (20.9") x 380 (15") x 315 (12.4").	

Dimensions P300



P300 mounted in GRP outer case with cooling fan or vortex cooler

Hazardous Area Approvals

ATEX	
Certificate number	Baseefa18ATEX0060X
Type of protection	Flameproof
Marking	Ⓔx II 2G Ex db IIB T✳Gb (application dependent) ✳T6 Ta ⁻20°C – ⁺40°C ✳T4 Ta ⁻20°C – ⁺60°C

IEC	
Certificate number	IECEx BAS 18.0040X
Type of protection	Flameproof
Marking	Ex db IIB T✳Gb (application dependent) ✳T6 Ta ⁻20°C – ⁺40°C ✳T4 Ta ⁻20°C – ⁺60°C

Protea Systems

Protea design and manufacture fully integrated bespoke systems housing our range of analysers in various enclosures and shelters to meet the project specification this includes supply and control of all the necessary sample handling components such as heated sample probes, heated lines.

This Datasheet is a guide to the product and Protea Ltd reserve the right to modify the product without notification.

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