

atmosFID CEM Integration



atmosFID Total VOC Analyser

atmosFID is a Flame Ionisation Detector (FID) analyser from Protea that can give Total VOC (TVOC) measurement in stack emissions and process applications. atmosFID is certified under EN 15267-3 and MCERTS for continuous emissions monitoring (CEM) applications.

The benefit of atmosFID from Protea is that it works alongside, and seamlessly integrates with, our other range of stack emissions gas analysers, such as the atmosFIR FTIR multigas analyser. Both FID and FTIR operate together with the same software control and data logging, giving a fully integrated and supported solution from a single UK manufacturer.

atmosFIR CEM with atmosFID TVOC analyser

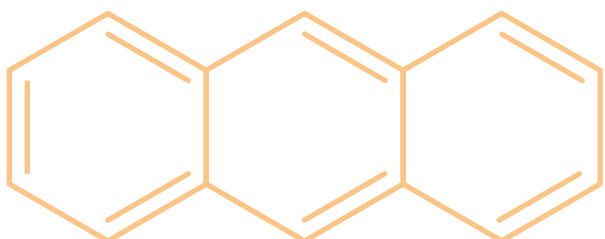
Protea is a UK manufacture of complete CEM systems and as such the atmosFID TVOC analyser can be provided integrated within our CEM system for combined operation with multigas FTIR.



Protea will provide a complete CEM with FTIR + FID that will include:

- * Common sampling system control
i.e. heated line and probe alarms
- * Common QAL3 validation system
- * Complete internal heated sampling path, using atmosFID heated line control
- * No mechanical pumps for sampling, less consumables
- * Complete health monitoring for FTIR + FID together
- * All emissions data collated, Dry/O₂ corrected and available for reporting over single Modbus or OPC communications protocol

Analyser	Gases measured
atmosFIR FTIR	CO, NO, NO ₂ , N ₂ O, SO ₂ , HCl, NH ₃ , HF, CH ₄ , H ₂ O, CO ₂ , O ₂
atmosFID FID	TVOC, nmHC



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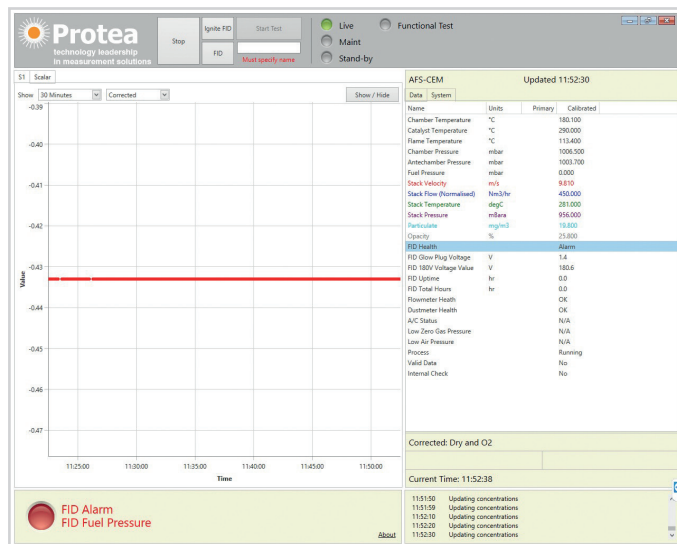
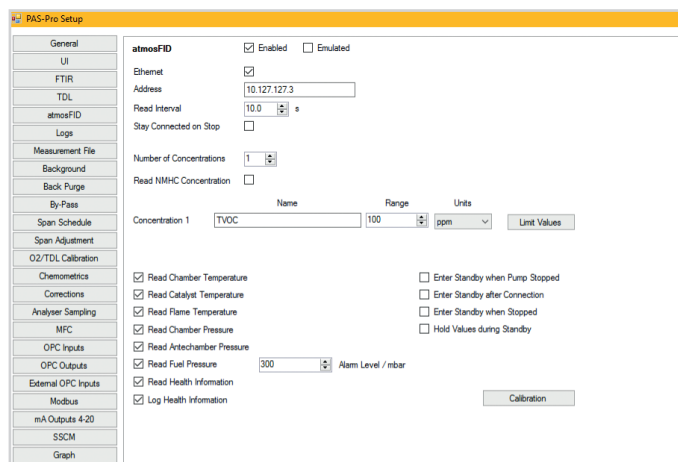
Feature	Advantage	Benefit of atmosFID	Benefits of fully integrated atmosFID with atmosFIR CEM System
Measurement			
Multiple auto-ranges	Certified over multiple measurement ranges for VOC emissions	Wide application range	Seamless integration, measurement and logging with no range switching needed
Dual Channel, nmHC result (option)	Two measurement channels, giving non-Methane Hydrocarbon result	For applications requiring information on methane and non-methane HC	Separate logging and reporting via Modbus of the dual channel measurement
Automated Operation Features			
Automatic start up	atmosFID will automatically start and does not need manual adjustment at start	No trained staff needed on start up	All health and diagnostic parameters displayed and logged in PAS-Pro CEM software
Automatic flame ignition	atmosFID will automatically ignite. No manual ignition needed.	Ideal for automated CEM applications	Ignition can be manually triggered from PAS-Pro CEM software if needed
Automatic calibration	atmosFID can carry out direct calibration automatically	Ideal for automated CEM applications	Calibration can be programmed in PAS-Pro CEM software to occur at a set period. For example, whilst FTIR is backgrounding
Calibration check	A poor calibration will be rejected and last good calibration always used	Removes errors in results	Calibration dates and times all logged in PAS-Pro CEM software
Dynamic P check for fuel and calibration gases	Gives clear warnings for low gas	Increases availability of atmosFID with less shutdowns	Gas pressure readings are recorded and warnings given in PAS-Pro CEM software
Flame adjustment	Continually optimised operating parameters	No manual adjustment and best results achieved	Flame temperature logged and reported in CEM software.
Sampling			
Eductor pump internal	No moveable parts as with pump and built into the FID	Low maintenance with no consumables	Eductor also used for FTIR sampling in CEM system. FTIR and FID combined flows balanced
Flow control	No external flow control needed into FID	Single unit, less parts and less cost	Keeps integration in Protea CEM simple and cost effective
Integrated heated sample transfer line	Ensures hot gas passing into atmosFID	No need for extra heated line controller	In Protea CEM system, ensures all gas sample paths are heated
Long-life inlet filter	Sintered inlet filter that protects internals of analyser with filtration	Reduces maintenance and increases uptime	Protea CEM provided with primary filtration on stack, chosen based on the application. Both FID and FTIR have internal secondary filtration.
Exchangeable filter	Changeable by site staff	Higher uptime of FID and exchangeable by end user	atmosFID inlet filter can be replaced at same time as atmosFIR FTIR inlet filter during preventative CEM maintenance
Utilities			
Negative pressure operation	No need for pre-FID pump to give positive pressure	Less issue of errors in results with pressure changes	FTIR + FID both operating without need for pre-analyser heated pump
Low gas consumption	Long lifetime of calibration + fuel gases	Less frequent and lower cost for calibration gas	Protea will provide complete set of calibration gas requirements for FTIR and FID
Calibration Gas management	Record of gases used and concentrations	Traceable and auditable for complete CEM	atmosFIR FTIR and atmosFID share common calibration gas management in PAS-Pro software. Allows QAL3 checks of both FTIR and FID to be managed in one place
H ₂ or He/H ₂ fuel mix	Can work with both fuels	H ₂ -only supply in CEM can remove the need for gas cylinders	A complete CEM from Protea will be provided with FID fuel integrated within CEM cabinet piping for ease of installation
Internal catalyst for zero gas (option)	No need for bottle of N ₂ zero gas	Saving on gas costs and use air for zero	Zero gas option can be provided as external unit that will also provide zero gas for FTIR as well as FID in complete Protea CEM system

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PAS-Pro CEM software

Protea's combined FTIR + FID CEM uses a single software platform, PAS-Pro, that does not just record the gas readings for atmosFID but offers full health diagnostic and control of the FID along with the FTIR.

By taking a modular approach, Protea can build a system with analyser and sampling control modules that can offer customisable features in a standard product suite.



PAS-Pro CEM software gives full FID alarm and health status as well as FTIR analyser control and integrated results for flow and dust

PAS-Pro CEM software gives full control of FID settings, alarms and calibration schedules

CEM Module	Operational Features	Settings Available
atmosFIR FTIR	Zero Background Span Gas Check Direct and to Probe O ₂ sensor calibration	Add more gases (.calib file) Change resolution and scan rate (.config file)
atmosFID FID	Calibration Zero Check Direct Span Check Direct Span Check to Probe Ignition of Flame Standby Mode	Calibration Schedule Dry/O ₂ Correction using FTIR readings Alarm setting for fuel, flame etc.
Combined Sampling System Control Module	Heated Line Alarm Heated Probe Alarms Probe Back-Purge Control Sample Dilution By-Pass Pump Control Two- Stream Measurement (e.g. inlet/outlet monitoring) Span Gas Pressure Check	QAL3 validation gas schedule Single Service Schedule in software for FTIR + FID

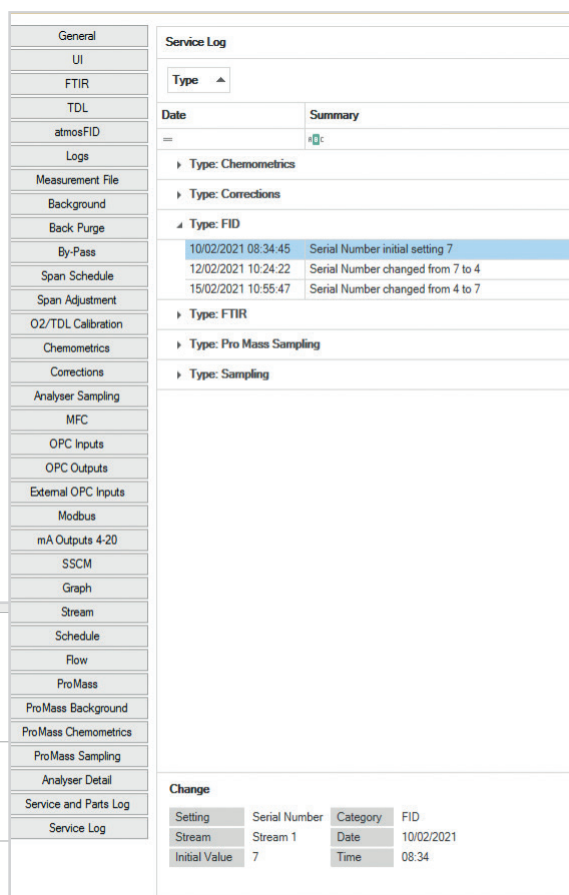


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Service Schedule and Settings in Software

Managing and recorded service of CEM systems is of increasing importance. As a supplier of a complete integrated CEM system, Protea's CEM software allows for recording of both FTIR and FID service actions and items replaced. The software logs all changes made to the configuration so alterations to system operation are auditable.

- Next service scheduler
- Standard replacement part logs
- Service notes
- Log of all changes to software configuration

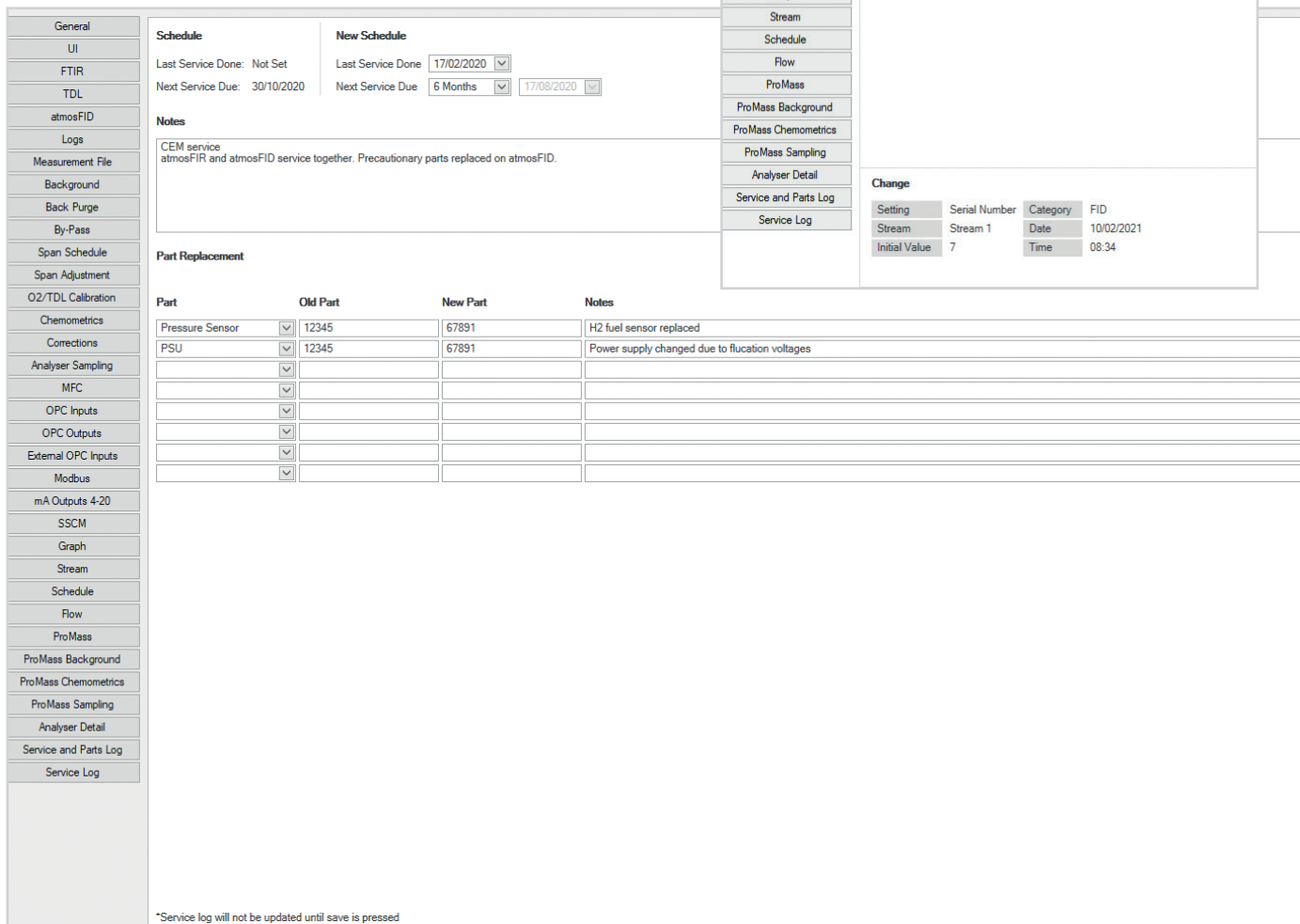


The screenshot shows the 'Service Log' window. On the left is a sidebar menu with options: General, UI, FTIR, TDL, atmosFID, Logs, Measurement File, Background, Back Purge, By-Pass, Span Schedule, Span Adjustment, O2/TDL Calibration, Chemometrics, Corrections, Analyser Sampling, MFC, OPC Inputs, OPC Outputs, External OPC Inputs, Modbus, mA Outputs 4-20, SSCM, Graph, Stream, Schedule, Flow, ProMass, ProMass Background, ProMass Chemometrics, ProMass Sampling, Analyser Detail, Service and Parts Log, and Service Log. The main window displays a 'Service Log' table with columns for 'Date' and 'Summary'. The log entries are:

Date	Summary
10/02/2021 08:34:45	Serial Number initial setting 7
12/02/2021 10:24:22	Serial Number changed from 7 to 4
15/02/2021 10:55:47	Serial Number changed from 4 to 7

Below the log table, there is a 'Change' section with a table:

Setting	Serial Number	Category	FID
Stream	Stream 1	Date	10/02/2021
Initial Value	7	Time	08:34



The screenshot shows the 'Schedule' and 'Part Replacement' sections of the software. The 'Schedule' section has fields for 'Last Service Done' (Not Set), 'Next Service Due' (30/10/2020), 'Last Service Done' (17/02/2020), and 'Next Service Due' (6 Months, 17/08/2020). The 'Notes' section contains the text: 'CEM service atmosFIR and atmosFID service together. Precautionary parts replaced on atmosFID.'

The 'Part Replacement' section contains a table with columns: Part, Old Part, New Part, and Notes.

Part	Old Part	New Part	Notes
Pressure Sensor	12345	67891	H2 fuel sensor replaced
PSU	12345	67891	Power supply changed due to fluctuation voltages

*Service log will not be updated until save is pressed



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