PROCAL

PULSI 200 CEM SYSTEM

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MCERTS European EN14181 QAL 3 Compliant

US EPA 40 CFR Part 60&75 Compliant

CE Ex ATEX IEC IECEx sira UKAS

PULSI 200 Series- System Description

The PULSI 200 series of instruments are designed for the in-stack analysis of up to six gas phase emission components.

The System comprises a Stack Mounted Analyser, an Auto Verification Unit and a Control Unit. In addition there are several options, for example an In-Situ Heater, supplied when low process temperatures are liable to result in water condensing in the analyser's in-situ cell.

Analyser

The instrument operates on the single beam dual wavelength infra-red principle where pulses of two specific wavelengths, are sent through the sample cell of the STACK MOUNTED ANALYSER. The 'measure' pulse is partially absorbed by the gaseous component(s) to be measured whilst the 'reference' pulse is relatively unaffected. A total of 8 wavelengths are available and in some circumstances reference wavelengths are shared. This allows up to six (6) gas phase concentrations to be measured simultaneously.

The specific wavelengths used for analysis are application dependent and selected by the Procal Analytics Application Group before each instrument is calibrated.

sample from the stack. This avoids the use of costly, high maintenance sample handling systems, but more importantly analyses an UNMODIFIED, truly representative gas sample.

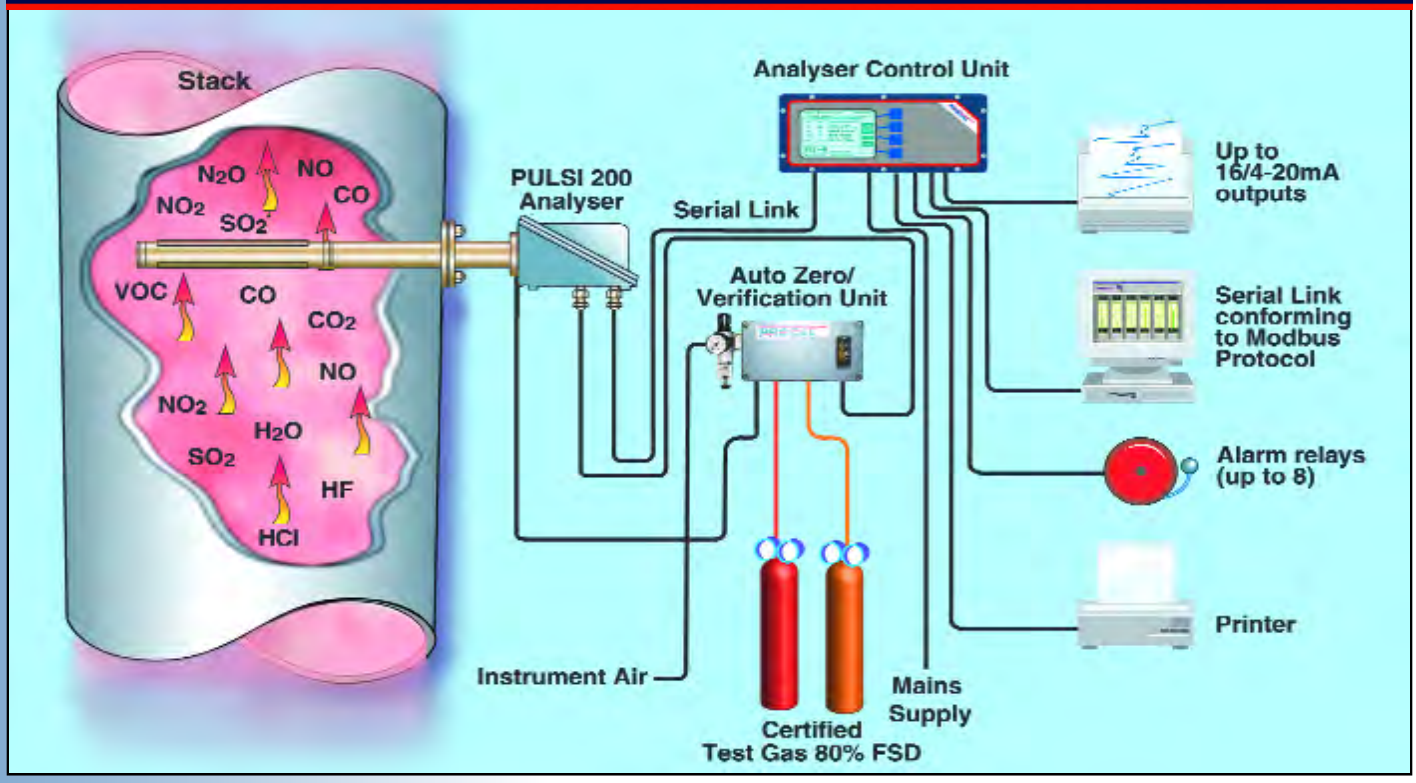
Sintered stainless steel filter panels fitted to the sides of the in-stack measuring cell allow the permeation of the stack gas whilst preventing the ingress of dust and particulates. The envelope formed by the sintered panels allows the introduction of zero and span gases.

Auto Verification Unit

The Analyser controls the AUTO VERIFICATION UNIT, on command from the ANALYSER CONTROL UNIT, the AVU will initiate a zero check on the system by filling the sample probe with zero gas, typically clean, dry instrument air. The ACU also initiates the span check filling the sample probe with certified span gas.

In addition to the verification function, the ACU has a safety feature which, in the event of power loss to the analyser, or a low sample temperature will purge the sample cell with instrument air. This is done to prevent highly corrosive condensates forming in the sample cell.

The Control Unit can support multiple analysers from the Procal range



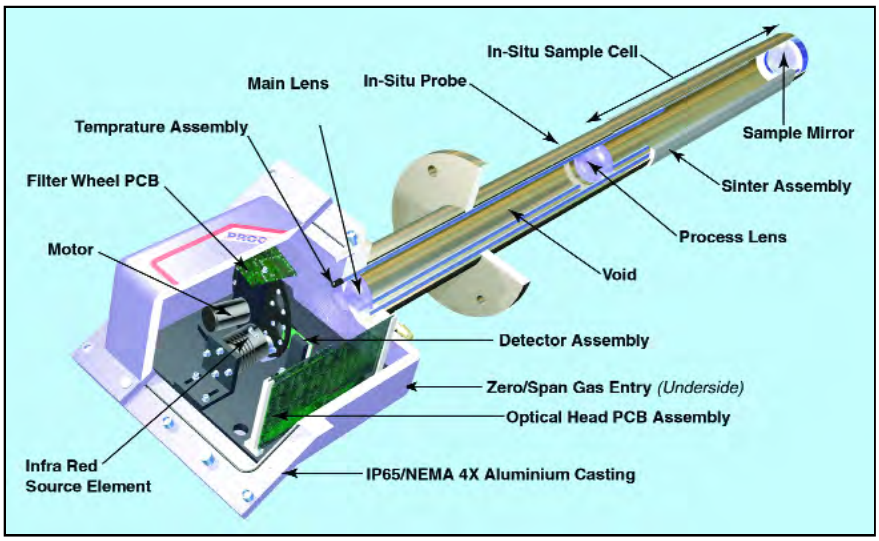
The selected infra-red wavelengths (8) used for analysis are obtained by means of interference filters and gas filled cells mounted on a rotating wheel located in the STACK MOUNTED ANALYSER.

The PULSI 200 Series has resulted from the culmination of many year's research and development into stack gas analysis. The advanced analyser utilises an in situ (inside the stack) sample cell thereby avoiding the need to extract a

In-Situ Heater - Option

The Analyser also controls the temperature of the optional IN-SITU HEATER which is used if the analyser is required to operate in stacks or ducts where the sample gas temperature is below its dew point. In this application the ISH requires a mains supply.

Enveloped Folded Beam Principal



MCERTS Conformity
Sira MC 050060/01 MC 990006/03

ATEX / IEC Approval (Option)

ATEX	
Certificate Number	Baseefa05ATEX0082X
Type of Protection	Flameproof
Marking	⟨Ex⟩ ATEX II 2 G Ex d IIB T6
IEC	
Certificate Number	IECEx BAS 05.0030X
Type of Protection	Flameproof
Marking	Ex d IIB T6

Minimal Cross Sensitivity

Cross sensitivity is overcome in the PULSI 200, using two techniques. Gas Filter Correlation (GFC) is one of the techniques, which provides greater prime sensitivity whilst reducing cross sensitivity.

The other technique utilises an additional measuring wavelength that is specific to the component causing cross sensitivity. This signal is used in equations which calculate the concentration of the gas being measured, thereby removing the cross sensitivity effect.

The sample cell of the PULSI 200 ANALYSER consists of a process lens mounted in a robust stainless steel tube with retro reflector mounted at the far end, protected from particulates by a sintered stainless steel filter. The collimated infra-red beam passes down the length of the sample cell and is returned by the retro reflector to the detector via the process and main lenses.

The enveloped folded beam principal means that the PULSI 200 ANALYSER has an effective sample path length of 1 metre, giving high sensitivity and hence low minimum detectable levels of gases to be measured.

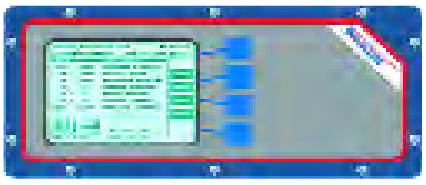
The IN-SITU Cell also incorporates Sample Temperature and Pressure Measurements enabling automatic compensation for fluctuations of these parameters. The Calibration / Auto Zero Port gives the PULSI 200 the capability to check both zero and calibration of each measured concentration.

Continuous Emissions Monitoring

CEM - US EPA 40 CFR part 60 & 75
AMS - Europe QAL 3 of EN 14181

The PULSI 200 is a truly verifiable CEM system designed to meet the requirements of both customers and environmental authorities worldwide. The system enables rapid upgrades with regard to measuring range, presentation and reporting format, thus ensuring compliance with reporting criteria such as US EPA 40 CFR part 60 & 75 legislation. The system calculates errors due to drift in Zero & Span Calibration before correction as required for QAL 3 of EN 14181.

Control Unit - Options



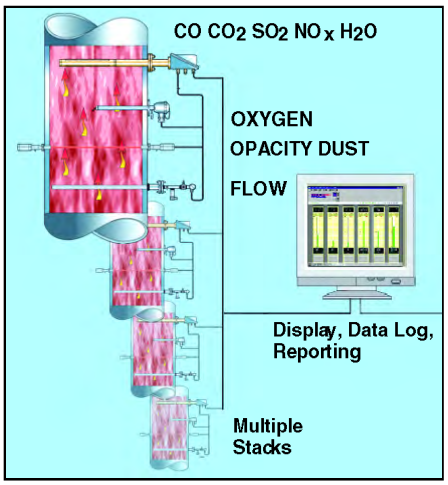
Analyser Control Unit (ACU)

In addition to powering four analysers the (IP65 NEMA 4X) industrial PC displays gas concentrations on the integral liquid crystal display along with information on sample conditions, diagnostic data and trends. The information can be retransmitted in the form of 4-20mA current outputs (one per measured component), parallel printer interface and optional RS485 serial output.
See data sheet 7-3008-05

Analyser Control for Windows™ Network (ACWn)

The ACWn is a stand-alone software package which provides all the display requirements of up to eight Procal analysers including the incorporation of third party data. In this way it can be the basis of a complete CEM / AMS System .
In addition to long term data logging the information can be retransmitted using the RS485 serial output or utilizing the optional Input Output Unit (IOU) in the form of 4-20mA (one per measured component) **See data sheet 7-3037-00**

Integrated Stack Monitoring System



The PULSI 200 CEM system is capable of receiving data, in the form of 4-20mA signals, from other instruments. These typically measure parameters such as: Oxygen Opacity/Dust and Velocity. In addition to displaying, data logging and retransmitting this the PULSI 200 system can use this data to correct the readings to a normalised level such as 11% Oxygen. The PULSI 200 measures the water content of the stack gas and can therefore display the measured component on either a wet or dry basis.

Typical Integrated System Monitors and Reports

CO	0 - 200ppm	O_2	0 - 21%
SO_2	0 - 200ppm	Dust	0 - 200mg/m3
NO	0 - 300ppm	Opacity	0 - 20%
CO_2	0 - 15%	Temperature	0 - 300°C
H_2O	0 - 12%		

FEATURES	BENEFITS
Multi Component	Each Pulsi 200 can measure up to six (6) components
Direct in situ measurements	No requirement for high cost, high maintenance sample handling system. No modification of the sample.
Automatic Auto Zero/Span	No operator adjustment, eliminates drift
Dynamic verification (option)	Proof of operation to environmental authorities
Integral data logger	At-a-glance record of plant performance and emissions
Printout	Daily hardcopy to conform to the authority's requirements
Flange mounted analyser	Reduced cost of installation
Low maintenance	Reduced cost of ownership
No consumables	Reduced cost of ownership
ATEX / IEC	Can be used in hazardous areas (option)

Specifications - P200 Analyser

Principle of operation: Infra-red absorption with multiple wavelength selection utilising gas Filter Correlation (GFC) method where advantageous: Interference filters and gas cells mounted on a rotating filter wheel. Sample cell uses the enveloped folded beam principle.

Gases measured: Up to 6 hetero - atomic molecular gases as determined by the application.

Spectral range: Specific application dependent wave lengths (up to 8) are selected between 2 -12 µm

Infra-red Source: Enclosed nichrome filament

Infra-red detector: Solid state pyroelectric element.

Sample path length: 1 metre

Sample temperature: Up to 350 °C (660°F) (higher temperatures on application)

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 120 Secs toT90.

Enclosure: Aluminium alloy casting with high protection finish, protected to IP65 (NEMA 4X)

Operating Environment: Operating temperature range - 10°C to + 45°C. Optional Analyser Cooler/Heater for greater temperature range.

Materials-contact with gas: Calcium fluoride, Glass, 316 Stainless Steel, graphite.

Services required: Power for electronics provided by associated Analyser Control Unit (ACU) or Local Power Supply if using ACWn 115/230V required for Analyser cooler fan and In-Situ Heater (application dependent).

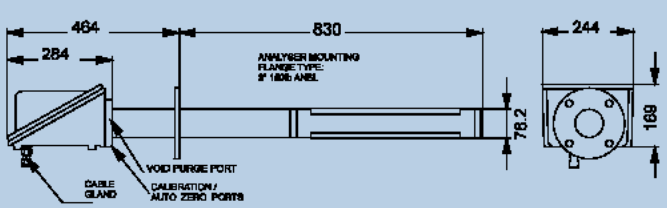
Instrument air for the analyser void purge, Autozero and sample cell protection, controlled by the Auto Verification Unit Pressure 2-6 barG; flow rate 0.5 litre/min constant and 6 litre/min intermittent during Autozero (typically 8 minutes every 12 hours).

Interconnection cable: 3 twisted-pair cores with individual screen typically, allows up to 100m separation between Analyser and Analyser Control Unit (ACU).

Weight: 21 kg (46.31b).

Dimensions: Analyser 1294 (51"0) x 244 (9.6") x 169mm (6.5")

Pulsi 200 mounting detail



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