

## CONTINUOUS CO GAS ANALYZER SYSTEM

### *Fuel savings and Low emissions*

State of the art IR based CO Analyzer for Air Pre Heater Inlets with high dust (PM) loading

Air fuel ratio and emission control for coal based boilers in Power Plants

### **System components**

- PGEM23 Analyzer (other gases can be added)
- PMIF Inertial Probe
- Flow control Panel
- Calibration & Purge Panel (Option)
- Probe Heater Jacket (Option)



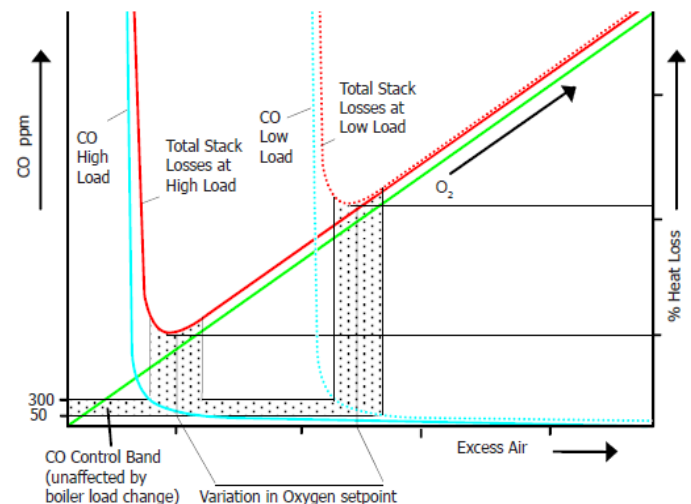
[INERTIAL PROBE AND IR ANALYZER]

PMIF Porous Metal Inertial Filter draws high flow flue gas samples from highly dust laden process gas in Air Pre Heater inlets in coal fired power plants and diffuses a small flow, dust free gas sample into the IR analyzer for continuous CO measurements for combustion optimization and air fuel ratio control to increase efficiency and reduce fuel costs and emissions.

### **Combustion Efficiency**

Incomplete combustion of carbon-based fuels, including coal and oil will always result in the formation of Carbon Monoxide (CO). Increased CO concentration equates to insufficient or inefficient combustion. It is not uncommon to have varying boiler loads and fuel quality. The greater the variation the most advantage can be gained by controlling with continuous monitoring of the levels of CO.

The graph illustrates the relationship between CO, Oxygen and minimum heat loss. **The Carbon Monoxide control band is load independent.**



### **Typical Fuel savings from Secondary Trim in Coal Power Plants**

While it is challenging to provide a specific numeric value without detailed information about a particular power plant, studies have shown that secondary trim can lead to fuel savings of 1 ~ 3 % in coal fired power plants.

Example: Let's assume a coal-fired power plant consumes 1 million tons of coal per year. A 2% improvement in fuel efficiency through secondary trim could result in a fuel savings of 20,000 tons per year. Cost benefit by fuel savings can be computed accordingly.



## All-metal strength, plus cross-flow efficiency – the PMIF approach to gas filtration

All-metal, inertial gas sampling (PMIF) filters allow the collection of particle-free samples from virtually any gas stream, even those which are very hot or heavily contaminated. And, unlike other gas filters which may quickly plug and need to be thrown away, filters are designed to provide long-term – in many cases, permanent – filtration. Benefits of PMIF's exclusive design include:

- Continuous, clog-resistant
- Filtration
- Fast generation of high-purity samples.
- High temperature tolerance.
- High corrosion resistance.
- High pressure tolerance.
- Fast, efficient, in-situ cleaning.
- Wide selection of materials

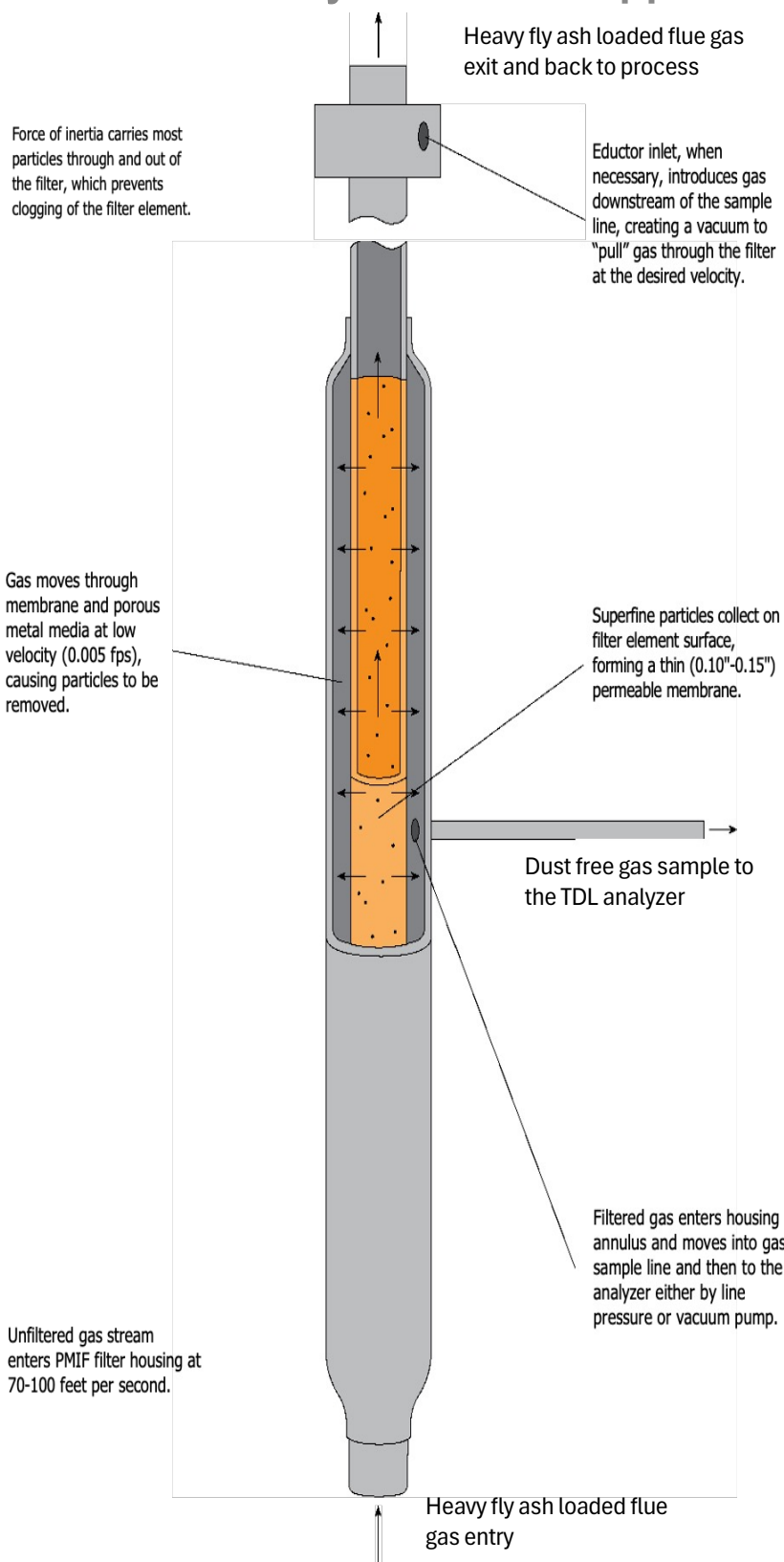


0.5µm (shown here, x100) is the recommended micrometer grade for filter applications. also provides filters with all-metal media in 0.2µm, 2µm, 5µm and 10µm.

Material	Oxidizing	Neutral/ Reducing
316L SS (std)	750° F/400°C	1000° F/540°C
Inconel® 600	1100° F/590°C	1500° F/820°C
Hastelloy® X	1450° F/790°C	1700° F/930°C

Material Code	Material	Porous	Hardware	Flange
A	316L SS	+	+	+
B	316 SS	--	+	+
C	304L SS	+	+	+
D	304 SS	--	+	+
E	347 SS	+	--	--
F	300 Series SS	--	+	+
G	430 SS	+	--	--
H	Nickel 200	+	--	--
J	Monel® 400	+	+	+
K	Inconel® 600	+	+	+
L	Hastelloy® C276	+	+	+
M	Hastelloy® X	+	--	--
N	Alloy 20	+	+	+
P	Carbon Steel	--	--	+

+ Available  
-- Not Economical



## IR ANALYZER OVERVIEW

The PGEM23 is a compact NEMA style wall-mounted NDIR gas analyzer designed for at line industrial analysis and environmental monitoring. Based on the optical measurement method of dual beam IR absorption spectroscopy (DBIR), the analyzer scans absorption peaks of the measured gas (without background gas absorption), and the gas concentrations are calculated by high precision second harmonic algorithm.



## FEATURES

### Universal structure, easy to integrate

Adopts compact NEMA style chassis with modularized design of internal key components.

### Strong anti-interference ability, high measurement accuracy, small drift and high stability

Utilizes the high stability and low noise semiconductor laser as the light source and adopts single line spectroscopy and laser wavelength scanning technology.

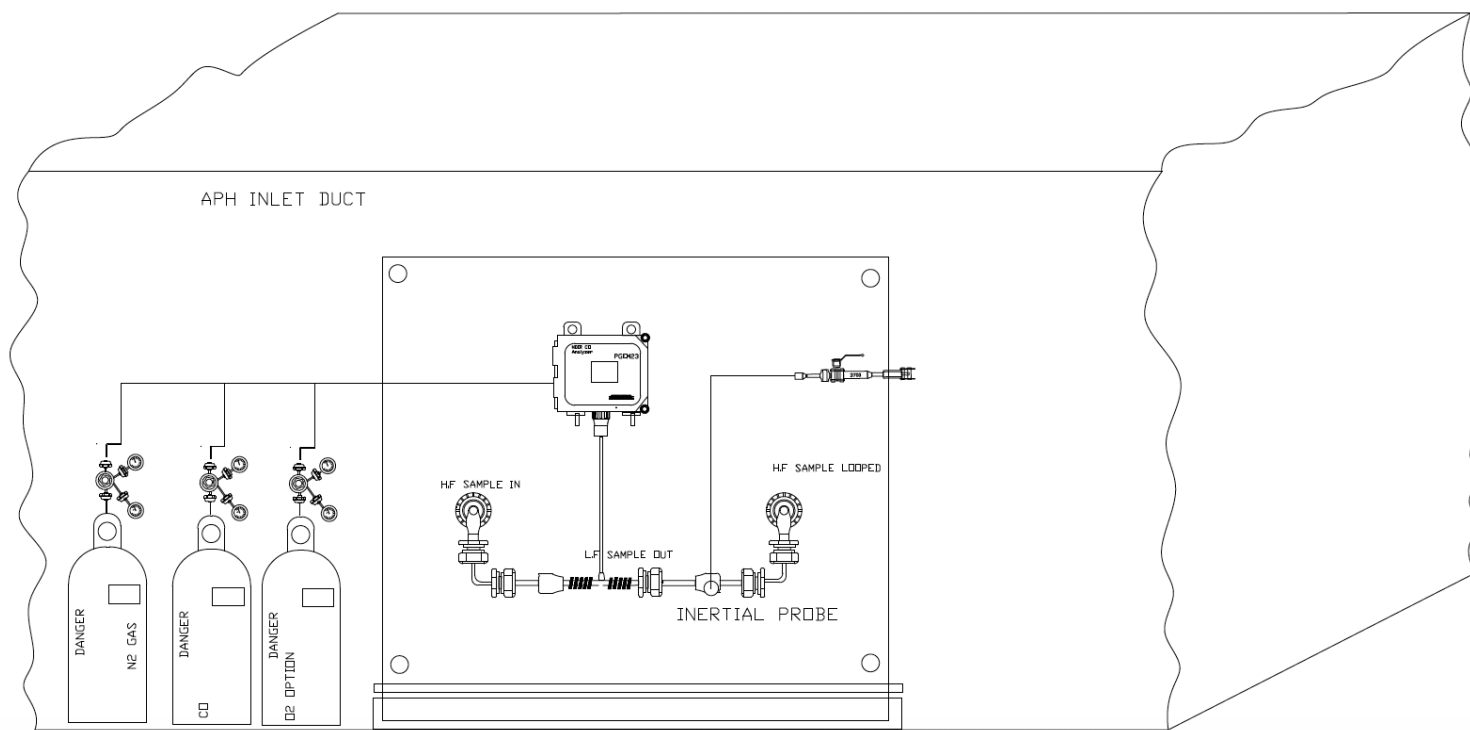
### Multiple parameters by single analyzer, rapid response

Contain 1~4 IR transmitter modules, highly integrated in a small size; supports measurements of 1~5 customizable parameters, which are measured with short response time and high sensitivity for closed loop controls.

### Strong adaptability to working conditions

The system adopts corrosion-resistant materials for the key components, making it applicable to petrochemical and other corrosive environments. Using extractive sampling, the system can be directly installed at the process pipeline for process and emissions control, with no moving parts with high reliability.

SYSTEM ARRANGEMENT IN AIR PRE HEATER-INLET DUCT



## System Specifications

PARAMETER	SPECIFICATION
Measurement Technology	Dual Beam NDIR and Porous Metal Inertial Probe
CO measurement range (Typ.)	0-500 PPM F.S (Lower / Higher ranges available)
Measurement error	<±2% F.S
Repeatability	<±2% F.S
Zero drift	<±2% F.S in 0.5 year
Span drift	<±2% F.S in 0.5 year
Maintenance cycle	Within 2 times/year, clean optical window
Calibration cycle	Within 2 times/year (manual/auto)
Response time ( $T_{90}$ )	Within 5s (flow rate dependent)
Analog output	4×4-20mA outputs (isolated, max load 750Ω)
Analog input	2×4-20mA inputs (temp, pressure compensation)
Digital output	4×outputs (24V, 1A)
Digital input	2×inputs
Comm interface	RS485/RS232
Power	AC (110V / 220V) 50/60Hz
Ambient temp	-30 °C~60 °C
Ambient humidity	Within 95% RH
Probe Material	See Page 3
Flue gas Dust load (typ.)	80 Grams / Nm <sup>3</sup>
Auto Cal Verification	Option
Heater Probe Jacket	Option
Auto Back Purge	Option
Probe Length	10 inches to 76 inches (Application Dependent)
Overall Dimensions (Typ.) & Weight	36 x 36 x 60 Inches & 300 LBS (unpacked)

