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Sindie^{ON-LINE}

Sulfur Analyzer



On-Line Sulfur Analysis in Petroleum Fuels

The Sindie[®] On-Line Analyzer is an industrial grade process sulfur analyzer with breakthrough detection capability for monitoring fuel streams as exacting as ultra low sulfur diesel and gasoline. This process analyzer presents the ultimate solution for pipeline terminals, where measurement speed and reliability are essential. The Sindie On-Line Analyzer is powered by Monochromatic Wavelength Dispersive X-Ray Fluorescence (MWD XRF) technology, offering a limit of detection (LOD) of 0.6 ppm and a dynamic range of 3000 ppm. This direct and non-destructive measurement technique does not require sample conversion or consumable gasses and does not involve high temperature operations. The result: a robust process analyzer with minimal maintenance and unprecedented detection capability and measurement speed.

Application Areas

- Refinery: hydrotreating, hydrofiner, and blending processes
- Pipeline terminals: interface cuts, custody transfer acceptance, and tank contamination prevention

Features & Benefits

- Excellent detection capability: LOD: 0.6 ppm
- Dynamic range from 0.6 ppm - 3000 ppm sulfur in diesel, gasoline, naptha, and kerosene
- Continuous monitoring with programmable response times:
 - 30 seconds: pipeline interface cuts
 - 5 minutes: most demanding refinery processes
- Direct measurement without sample conversion; Analysis in ppm (wt)
- No density conversion needed
- No consumables, no gasses, no high temperature processes
- Extremely low maintenance:
 - No heating elements
 - No quartz tubing
 - No columns
- Dynamic window module design is operator independent and ensures measurement stability
- Robust industrial design: wall mounted or stand alone
- Outstanding linearity: One calibration curve for diesel and gasoline matrixes, over full dynamic range
- Total sulfur determination using MWD XRF
- Extended range available for measurements above 3000 ppm up to weight percent levels

MWD XRF Technology

Monochromatic Wavelength Dispersive X-Ray Fluorescence

(MWD XRF) analysis provides dramatically improved S/B over conventional XRF techniques, in a compact and simplified on-line configuration. The improved S/B is achieved by eliminating the scattering of bremsstrahlung from the x-ray source.

The configuration of a MWD XRF unit is shown in Figure 1. It consists of an x-ray source, a point-focusing optic for excitation, a sample cell, a focusing optic for collection and an x-ray detector. In this system, the first excitation optic captures a narrow bandwidth of x-rays from the source and focuses an intense monochromatic beam in a small spot on the sample cell. The monochromatic primary beam excites the sample and secondary characteristic fluorescence x-rays are emitted. The second collection optic collects only the characteristic sulfur x-rays which are then focused onto the detector.

FIGURE 1
Analytical Engine Configuration

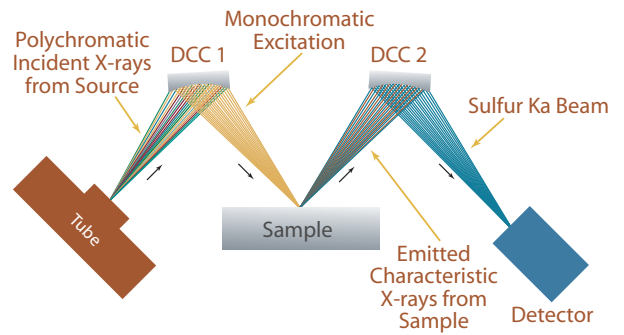


FIGURE 2
Linear Calibration
0-500 ppm

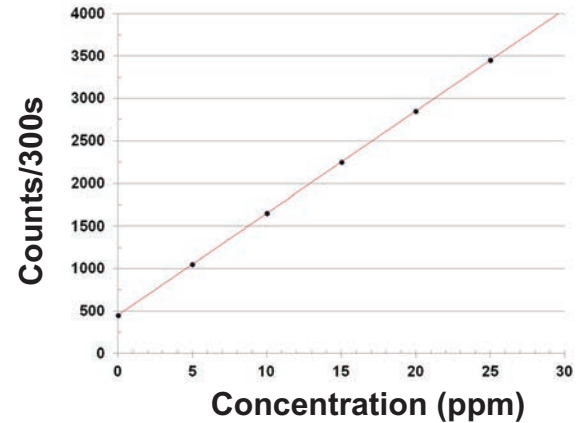
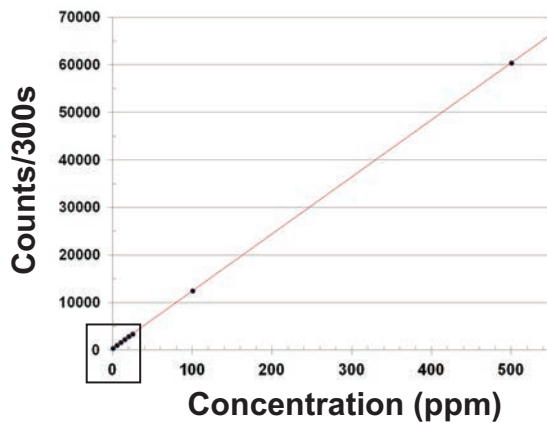
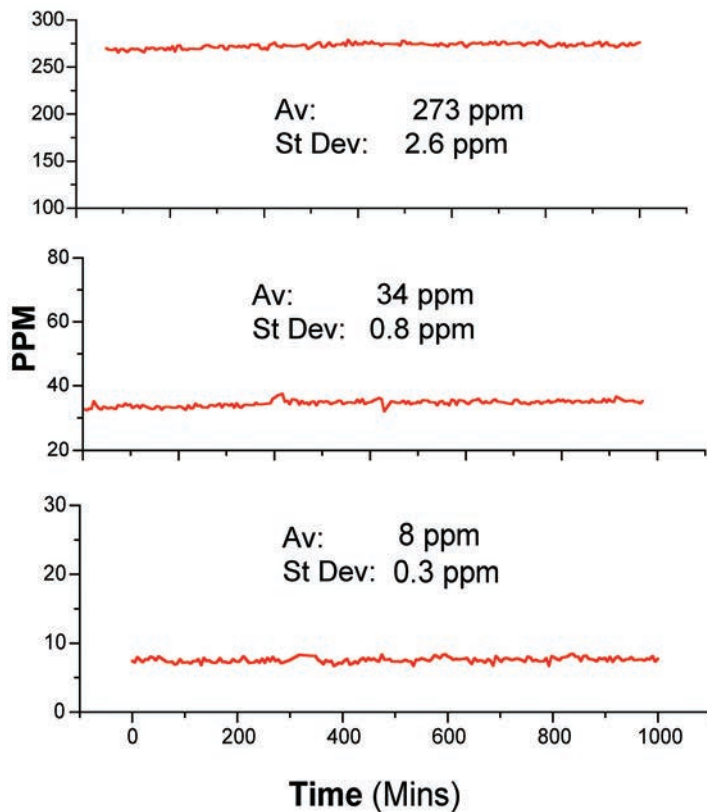


FIGURE 3
On-Line Monitoring of Diesel Fuels at Various Sulfur

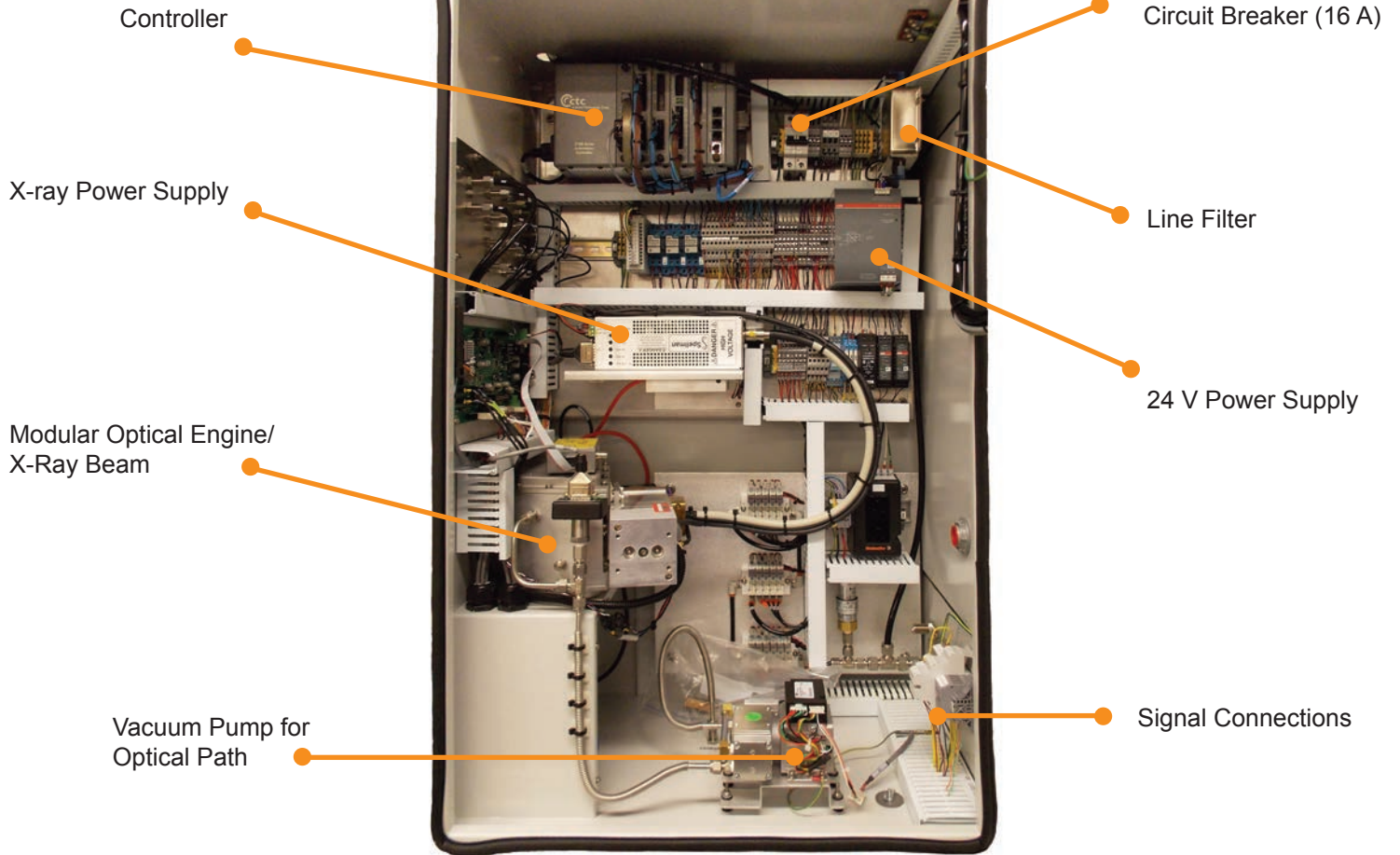


Repeatability
Typical values in diesel fuel
95% confidence
300 s measurement time

S Concentration (ppm)	r
2	0.6
8	1
15	1.5
100	5
500	9

A closer look at the Sindie On-Line Analyzer...

Open Unit



Outer Side Panel

NeSSI
Modular Valves

IS Circuits for
Sensors



DWM Measurement Cell

Sample Management System

Armored Flow Meter
with Alarm Switch

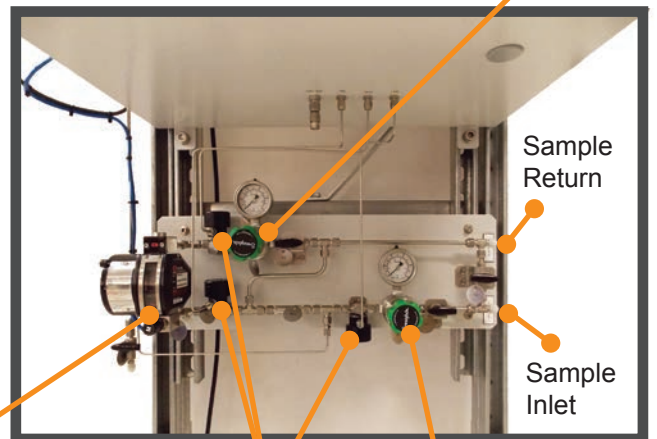
Pneumatically
Controlled
Valves

Pressure
Regulator

Back Pressure
Regulator

Sample
Return

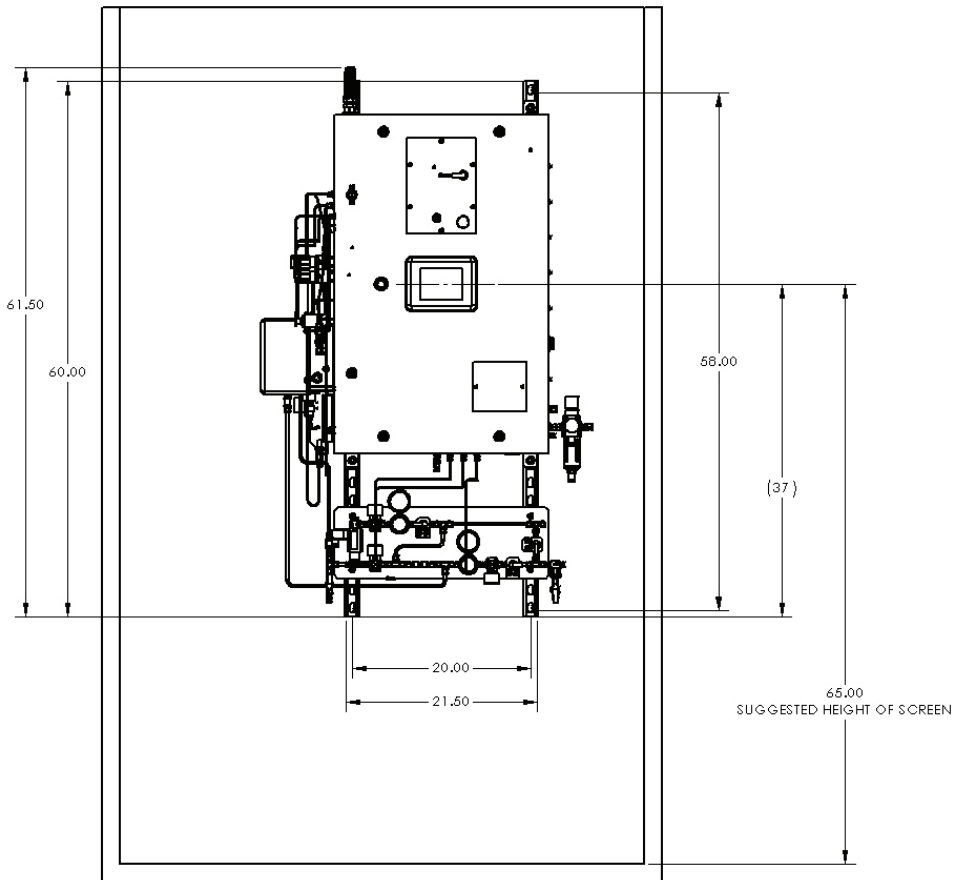
Sample
Inlet



Product Specifications

Electrical	Input voltage: 115/230 VAC Input frequency: 57-63 Hz Requires 15 amp, dedicated circuit with disconnect Entry Hub for 1" NPT conduit (RMC or IMC)
Purge	Instrument Air < 0.5 scfm @ 40-115 psig 4 scfm during initial purge cycle (21 minutes @ 40 -115 psig) Connections: (1) 3/8" SST tubing
Sampling Management System Included	Inlet: 1.5-3.0 gph @ 25-80 psig Outlet: 1.5-3.0 gph @ 10-65 psig (Approximately 15 psig pressure drop)
Ambient Temperature Requirements	0-35°C (32-95°F)
Size and Weight	38"w x 18"d x 60"h 280 lbs.
Communication	(2) 4-20mA proportional to sulfur concentration (standard) Modbus TCP (optional) Modbus RS-485 (optional) Modbus RS-232 (optional) Ethernet (optional)
Sample Conditioning Systems	Optional: Particle and H2O Removal
Classification	Class I, Division 2, Groups B, C, D, T4A (Z-Purge)

Sindie On-Line Schematic
(Dimensions in inches)



better analysis counts

15 Tech Valley Drive • East Greenbush, New York 12061, USA • 518.880.1500 • Fax: 518.880.1510
e-mail: info@xos.com • website: www.xos.com