

Kaiser Optograf™ Analyzer Datasheet

Laser-based composition analyzer

Key Features

- State-of-the-art, laser-based, gas-phase Raman technology provides a replacement for legacy techniques such as GC, MS, lead acetate tape, and photometers
- Pipe-centric analysis enabled using process-hardened fiber optic probes that can be mounted at the sampling point
- Probes can operate at line pressure (up to 1000 psig) & temp (up to 150 °C) for minimal sample conditioning
- OptoAST™ and OptoDRS™ process sampling interfaces result in improved reliability**
- Simultaneous, multi-stream capability, with up to four streams, eliminates the need for stream switching and dramatically reduces sample update times
- Baseline-separated peaks allow the use of simple univariate methods for composition, similar to chromatogram analysis
- Lower cost of ownership
 - No routine calibration
 - No columns, valves, or ovens
 - No carrier gases
 - No instrument air

The Kaiser Optograf Analyzer is a turn-key, laser-based analyzer developed by Kaiser Optical Systems, Inc., for applications in the petrochemical and gas treatment markets. In many of these applications, the Optograf analyzer produces spectra that resemble and can be analyzed with the simplicity of chromatograms. However, unlike gas chromatographs, the Optograf analyzer does not require valves, ovens, or columns, and does not use carrier gas. Overall reliability and low cost of ownership are unparalleled in this category of advanced process analyzers.

Fiber-optic probes are used to interface the Optograf analyzer to the process sample in the preferred pipe-centric installation. The ease of installation and interfacing provides significant cost savings versus traditional gas chromatograph or mass spectrometer systems and their associated sampling systems.

The Optograf analyzer design incorporates customer requirements for serviceability and utilities, meeting the hazardous and harsh ambient requirements of typical petrochemical, chemical, and gas treatment plants.

Multi-component, multi-stream capability The Optograf analyzer provides composition analysis of gas mixtures containing many of the following gases at concentrations between 0.1 and 100% (by volume): H₂, N₂, O₂, CO, CO₂, H₂S, CH₄, C₂H₄, C₂H₆, Cl₂, F₂, HF, BF₃, SO₂, CO₂.*

Featuring four independent probes operating simultaneously, the Optograf analyzer eliminates the need for mechanical stream switching and allows for the application of four independent methods in one unit.



Optograf Analyzer with Four AirHead™ Probes

Analyzer reliability The Optograf analyzer incorporates numerous features that result in greatly improved reliability: no critical moving parts, no routine maintenance or calibration, no consumables, reduced technician skill level to operate and maintain, minimal spare parts, and the ability to operate in harsh environments without the need of shelter installation.

Integrated process & sampling interface The Optograf analyzer supports and is compatible with the pipe-centric OptoAST™ and OptoDRS™ process and sampling interfaces. This unique configuration of an integrated sampling system and analytical sensor is a major advancement in improving overall sampling system reliability.**

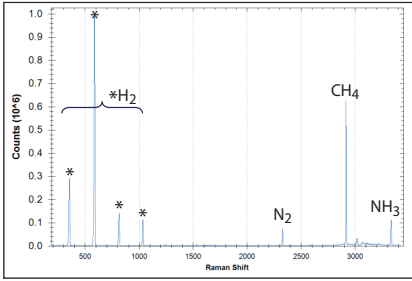
Proven technology Raman spectroscopy has been a well-known and established measurement technology since its discovery in 1928. While on-line gas-phase analysis is a recent application for Raman spectroscopy, Kaiser first successfully installed an Optograf analyzer for syngas analysis at a world-scale coal gasification facility in 2008, and has continued this success in numerous gas manufacturing facilities.

* See current application notes for stream types and stream compositions that can be measured at this time.

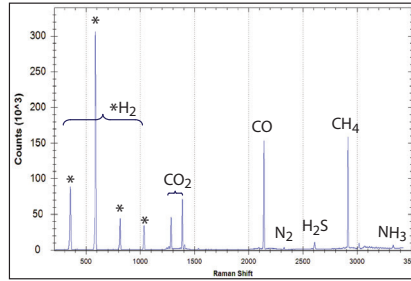
** For more details, see the OptoAST and OptoDRS Datasheet.

Application examples

Typical spectra from selected petrochemical and refining processes



NH₃ Synthesis Loop: Recycle Stream



Gasifier Raw Syngas

Current application areas

- Steam methane reforming
- Gasification
 - Coal
 - Petcoke
 - Waste
 - Biomass
- H₂ production
- Hydrotreaters
- Substitute Natural Gas (SNG)
- Ammonia
- Methanol
- Clean power (IGCC)
- LNG
 - Custody transfer (BTU)
 - Ballasting (Wobbe)
 - Mixed Refrigerants

Specifications

Principle of Measurement	Laser-based Gas-phase Raman Spectroscopy
Sample Interface	
Process Interface	OptoAST, OptoDRS, and Union Cross sample interfaces (Gas) Pilot™ probe for cryogenic liquids; WetHead™ probe (Liquid)
Fiber-optic Probe Temperature	Up to 150 °C (AirHead probe) -200 to +150 °C (Pilot probe)
Fiber-optic Probe Pressure	Up to 1000 psig (AirHead probe) Up to 3000 psig (Pilot probe)
Sample Flow Rate	Compatible with stop/flow measurement
Electrical Data	
Input Voltage	100 – 240VAC, 50-60 Hz - standard
Max Power	<300 Watts max (startup), 200 Watts typical
Communications	Serial: RS485, Modbus TCP/IP
User Interface	Touch-screen color LCD display
Physical	
Enclosure Type	Painted steel (IP56)
Dimensions	18.0 x 32.85 x 10.0 in (45.72 x 83.44 x 25.4 cm) WxHxD
Weight	~ 135 lbs (61 Kg)
Number of Probes	Up to four (a dedicated laser per probe allows for simultaneous operation)
Wetted Materials (gas probe)	SS316, Teflon and sapphire (window to process) - other metals optional
Environmental Temperature Range	-20 to 50 °C (solid state cooling – no vortex or other external cooling required)
Area Classification & Ratings	
Certifications	CSA: Class I Div 2 Groups B C D T4 IECEX/ATEX: II 3 (2) (1) G Ex [ia op is Ga] [op sh Gb] pz IIC T4 Gc Ta -20°C to +50°C (Analyzer) II 2/1 G Ex ia op is IIB + H2 T3 Ga (AirHead Probe with Sintered Filter)



For more information please go to
www.optograf.com

Contact

www.spectrasensors.com/contact

