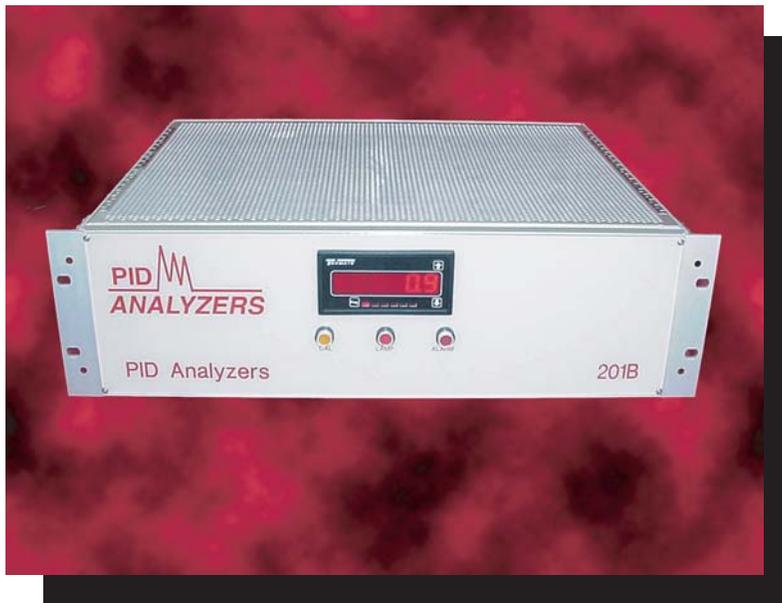


Continuous Monitors for Total VOCs, Total Hydrocarbons, Solvents- (PID/FID) & H₂S, SO₂, Cl₂, CS₂, ..(NDUV-NDNIR)



Model 201B Rackmount



Model 201B Wallmount

For Stacks, Process, Carbon Bed Breakthrough, Drying Ovens, Leak Detection
Environmental & Process Measurement in Chemical, Petrochemical, & Manufacturing Plants

PID
ANALYZERS

MODEL 201B CONTINUOUS GAS ANALYZER

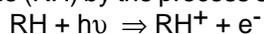
Introduction

The **Model 201-B PID** is a flexible and versatile Analyzer. More than three thousand of these photoionization detector (PID) based Analyzers have been sold worldwide for applications ranging from carbon bed breakthrough, leak detection to stack and ambient air monitoring. This is attributed to the rugged and durable design that is characteristic of all PID Analyzers products.

Several years ago, we added the flame ionization detector (**FID**) to the 201 series product line. **Other continuous Analyzers in the 200 series include the Model 202 Infrared (IR), the Model 201B fixed wavelength UV-Near IR Photometer, a thermal conductivity detector (TCD), Model 204 and a Model 210 Paramagnetic Oxygen Analyzer.** The addition of these new Analyzers greatly improves the capability and range of process analyzers from PID.

PID-description

The process of photoionization is initiated by the absorption of a photon of ultraviolet radiation energetic enough to ionize a molecule (RH) by the process shown below:



where $h\nu$ represents a photon with an energy \geq the ionization potential of species RH. The ions are collected in an ionization chamber which is adjacent to the lamp and contains an accelerating electrode (biased positively) and a collection electrode where the current is measured. After amplification, the current measured is proportional to concentration. The response measured will be a summation (total) of the hydrocarbons ionized.

FID Description

In the FID, the sample is burned in a hydrogen-air flame and the ions formed from carbon containing compounds are collected by applying a positive potential to the jet and measuring the current at collection electrode just above the flame. After amplification, the current measured is proportional to concentration.

Applications: PID or FID

Monitoring effluents from chemical, refining, or manufacturing
Carbon bed breakthrough
Leak detection- from process equipment
Non methane Hydrocarbons in Ambient or Stack-FID/Catalyst
Drying ovens for removing solvents
Incineration
THC in ambient or plant
ppb levels of VOCs- PID only
Remediation site monitoring
Intake air in chemical or manufacturing plants- used to control recirculation of air
VOC's in water with optional Sparging system (Model 650) for Total VOCs in water at ppm-ppb levels

Features-

Automatic Restart- In the event of a power outage, the instrument will automatically restart

Low cost of ownership- The long lifetime of the analyzer coupled with the minimal level of maintenance results in a low cost of ownership

Wide operating range with no range changing necessary- **16 Bit ADC**

Push button Automatic calibration; automatically adjusts response

Autozero for PID; Automatically injects zero gas & adjusts auto zero for FID

PID- lamp out alarm; FID-flame out-shuts off hydrogen and provides alarm

RS232 digital output; 0-1 VDC analog output

Up to 6 dual setpoints that are programmable- can be used to shut down a process, remotely dial a number...

Specifications

Detectors available: PID & FID

Measurement mode: Continuous

Zero drift- Automatic compensation; <1% per month

Span drift- Auto cal each 24 hours (with contact closure), may require manual set of span: less than 1% every 24 hours

Wide range of response- from sub ppm on PID to % on the FID

Support gases: PID requires no support gases; FID requires H₂ and zero air

Readout- 5^{1/2} digit bright red LED smart panel meter

Standard output: 1 VDC, RS232

Enclosure: Rack (NEMA 2)-

Rack: 19" W x 5^{1/4}"H x 14"D

Weight: 12.2 pounds PID

14 pounds FID

Wall (NEMA 4)

23"W x 21"H x 10"D- PID

27"W x 21"H x 10"D- FID

Weight: -19 pounds PID

- 22 pounds FID

Power requirements- 100-240VAC, 1 amp

PID and FID Range

PID range - 0.1 to 3,000 ppm (higher levels can be detected via a dilution system

hydrocarbons > C4 plus, VOC's, inorganic species such as H₂S, NH₃, I₂, PH₃, AsH₃, etc.

FID Range- 1- 200,000 ppm

VOC's (hydrocarbons) only

Options

4-20 mA output; RS485 output, MODBUS,

Dual setpoints- Customer Programmable

Data acquisition and storage using **DataWorks software**- runs under Windows or Windows NT on a Pentium PC

2 point, Separate Display of Each Sample Point- ideal for inlet/outlet measurements

4, 8, 16, 32 point sequencer (with contact closure to indicate point being sampled), Three line display- Display of Concentration, Sampling Point & Sample Flow (measured by mass flowmeter)

X or Z purged for Zone 1 and Zone 2 respectively

Sampling Systems

One of the most difficult challenges is to deliver a sample stream saturated with water at an elevated temperature to the analyzer without any change in the composition of the VOC's or other compounds to be measured. [A photo of our sample conditioning system is shown below.](#) For additional information, please contact PID Analyzers.

The system below requires only compressed air for operation and removes all liquid water from the sample. It can be used in a Class I Div 1 area. We also offer heat exchangers and heated sample lines for other types of samples.



UV-NIR ABSORBANCE DETECTORS

*NH₃, Hg, Ozone, H₂S, SO₂, Mercaptans, CS₂, Cl₂, Br₂, I₂,
Aromatics, Aldehydes, Ketones in air, water & process streams*

Introduction

The **Model 201 B UV-NIR Absorbance Analyzer** is a flexible and versatile non dispersive (ND) Spectroscopic Analyzer. The design is based on ultra stable lamps with single or dual beam optical benches, a detachable sample cell, a photodiode detector and very stable electronics. This Analyzer has a wide dynamic range (from ppb to > percent levels). This rugged and durable design is characteristic of all PID Analyzers products.

Principle of Operation

The technique for measuring the concentration depends upon the Lambert Beer Law:

$$I = I_0 e^{-kx}$$

Where- I is the measured intensity, I₀ is the incident intensity, k is the absorption coefficient, and x is the pathlength

The instrument consists of a UV source, a fixed path length cell (can be varied for the application), an interference filter and an UV detector.

This instrument operates in the near UV to near IR region (200-1,500 nm). The types of electronic transitions in this region are electronic and for organic molecules involve sigma electrons (unsaturated compounds). The types of electrons are found in C=C (PI-PI* transitions) or C=O (N-PI* transitions) in organic compounds.

Features-

The LED meter displays three parameters (concentration (ppb/ppm/%) , temperature, and pressure) and will provide an output for a single parameter.

Easy to operate- In the event of a power outage, the instrument will automatically restart

Wide operating range with no range changing necessary- **16 Bit ADC**

Push button Automatic calibration ; automatically adjusts response

No span or zero pots; all calibration data stored in RAM

Automatic calibration for Absorbance

Can be setup to run without a cal gas standard via an absorbance standard

UV/Visible/Near IR lamp out alarm

Temperature & Pressure correction

Digital Outputs:

Standard- RS232 Optional- RS485, Device Net

Analog Outputs:

Standard-0-1 VDC analog output; Optional- 4-20 mA

NDUV-NDIR ANALYZERS

Specifications

Detectors available: UV-NIR lamps and detectors from 200-1200 nm

Measurement mode: Continuous

Zero drift- < 0.1%/day

Span drift- < 0.1% FS per week

Readout- 5 digit LED smart panel meter with 32 bit arithmetic calculation capability

Displays- Concentration, T/°C, and P/atm

Response time- 20 sec.

Flow rate- 0.5-1.5 LPM

Operating temperature- 15-30° C

Standard output: 1 VDC, RS232 (print with a serial printer or print to a PC in hyperterminal)

Programmable Voltage Output- Analog outputs (0-1VDC or 4-20 mA) can be programmed from the front panel

Enclosure: Rack (NEMA 2)- 19" W x 5^{1/4}"H x 14"D; Weight: 12.2 pounds

Power requirements- 100-240VAC, 1.5 amps

Range- Depends of application

Linearity- 1%

UV to NIR Applications

The Analyzer can be configured for the UV with a mercury lamp with/without interference filters, a cold cathode elemental lamp or a deuterium lamp with interferences filters, and/or a tungsten lamp for visible-NIR with interference filters. Using various combinations of lamps/filters and detectors, a number of different applications are available including the following:

Applications

Air

Aromatics, Amines, Aldehydes, Alcohols and Ketones in stack gases

NH₃, Cl₂, NO, NO₂, H₂S, SO₂, Hg in stack gases or process streams

Process

Solvent purity

Lower explosive limit

Water

Aromatics, Amines, Aldehydes, Alcohols and Ketones in water

Chlorine dioxide, or nitrate, and other ions in water

Metal ion chelates in water

Additional Enclosures:

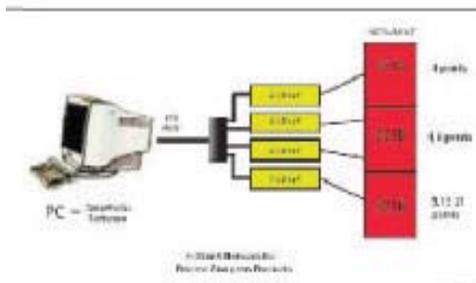
The UV analyzers are available in a standard 19" rack mount enclosure or a NEMA 4 wall mount enclosure. The latter can be X or Z purged to meet Class 1 Div.1 or 2 electrical requirements.

DataWorks

Data Works is PIDs data collection and logging software that can be used with a wide variety of Sensor or Analyzer outputs such as Ethernet, RS485 & 4-20 mA . The latter two outputs are for long distance transmission of data as shown in Table I below. In-plant installations are typically 4-20 mA or RS485 because of the long distances involved 1,000-5,000'.

The software is written in visual C++ as an overlay/interface for various hardware devices. One hardware version used for our Model 201-B, 202, 203, 204, 210, 301B GC, 501 B GC or other manufacturer's instruments that have 4-20 mA outputs or an RS485 output. There is a 12 bit ADC on board with 16 digital input/outputs. The latter can be used to control calibration,diagnostics for the PID Analyzers units. Low and high alarm levels and concentration range can be set in the PC.

Each day at midnight, a new CSV or text file is created and named (by date). These files can be directly imported into EXCEL. The 4-20 mA output from multiple PID Analyzers instruments can be networked as shown below.



Multipoint Sequencer

The 201-B has several multipoint options The first is a simple 2 point system that can be used to monitor the input and output of a scrubber, carbon bed etc. to determine the efficiency of the system. This 201-B has a two channel display; one for each channel.

The second option is a 4, 8, 12, 16, 24 or 32 point system. This system employs a manifold with a needle valve and a 3 way valve for each channel. This version has a three channel display. One channel is for the concentration, the second is for the channel # and the third is for the sample flow for that channel. The flow is measured with a mass flow sensor. The setpoint for the flow channel can be set to indicate a low flow or blockage for a channel. An alarm can be programmed for each channel in the system. this system provides an inexpensive alternative to a sensor for each point. The cost of maintaining and/or calibrating this single system is considerably less expensive than maintaining a 16 or 24 sensor system.

The multipoint system can be interfaced with DataWorks, a PLC or DCS system that is already at the Plant. Contact PID for additional information on in this area.

A three channel display for the multipoint is shown below:



PID ANALYZERS

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