INFRARED ANALYZERS

For Process and Environmental Monitoring

Model 202 NEMA 4 Wall Mount

CO_2, CH_4, HC, NH_3, N_2O, CO, Refrigerant Gases

PID ANALYZERS

202 INFRARED GAS ANALYZER

Carbon Dioxide, Carbon Monoxide, Methane, Hydrocarbons, NH_3, N_2O, Refrigerant Gases

Introduction

The Model 202 is a reliable & rugged non dispersive infrared (NDIR) monitoring system **used primarily for the measurement of CO_2, CO , NH_3, freons & hydrocarbons.** . These instruments have a wide dynamic range (high ppm to **%**). The PID Analyzers Infrared gas analyzer uses an interference filter instrument and has been designed with the process and plant environment in mind. This instrument can be easily interfaced with process control computers.

Other Continuous Analyzers in the 200 series include the **Model 201-B PID or FID Analyzer for total VOCs**, the **Model 203 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.

Principle of Operation

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

$I = I_o e^{-kx}$

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

The instrument consists of a pulsed IR source, a fixed path length cell, a measurement filter, and an IR detector (thermopile). Infrared radiation in the 1 to 5 micron region is absorbed by molecules (organic and inorganic) and converted into molecular vibration energy. This absorption is associated with a structural group stretching, or bending. Infrared absorption spectra are due to transitions between vibrational-rotational levels.

Infrared is best used for measuring chemical structures with a specific functional group in the presence of other compounds without that functional group ie CO2 or CO (at 4.3 and 4.6 m respectively. It can also be used to measure total hydrocarbons at the 3.3 m CH stretching frequency. Symmetric species that do not have a dipole moment will not absorb in the infrared (examples of this include N_2 and O_2).

Applications

Hydrocarbons & Methane

Natural Gas Composition (Total HC) & leaks
Drying oven % LEL
Pill Coating % LEL
Stack & Vent monitoring % or % LEL
Methane in sewage treatment plants
Landfill gas monitoring CH_4/CO_2
Leaks of refrigerant gases

Carbon Dioxide

CO2 in room or plant air- ppm
CO2 in process streams- %/
CO_2 in natural gas

Carbon Monoxide

CO %- combustion or process

Features-

Automatic Restart- 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 calibration- automatically adjusts response

RS232 digital output- can print to a serial printer or print to a PC; **4-20 mA analog** output (optional) to interface to PLC or DCS system

IR detector with no moving parts

Library of sensitivities

Audible alarm- internal

Datalogging (programmable) for 7,000 points

Easy to calibrate; Turn on/off functions via simple keypad

Interchangeable IR detectors

Infrared Analyzers & Sampling Systems

Specifications

IR Detectors available: CH_4, HC, CO, CO_2, NH_3, N_2O, Refrigerants

Measurement mode: Continuous

Response time- <20 sec. to 90%

Zero drift- Automatic compensation; <1% per month

Span drift- less than 1% every month

Single alarm- customer programmable

Wide range of response- from ppm (CO_2) to 100 %

Readout- $5^{1/2}$ digit LCD smart panel meter with backlighting

Standard output: RS232; optional outputs- 4-20 mA & RS485

Enclosure:Wall (NEMA 4)-General Purpose

7" W x 9"H x 5"D; Weight:

7.4 pounds

Above NEMA 4 wall mount with Z-

Purging- Weight: 15 pounds

Wall (NEMA 4)-(X-Proof)

8" W x10" H x 6" D

Weight: 35 pounds

Power requirements- 100-240VAC, 1 amp

CO2 range - 0 to 3,000 ppm; 0-100% v/v; other ranges, customer programmable

HC Range- 0-100% LEL; 0-100 % v/v; other ranges, customer programmable

Refrigrants Range

0-1,000 ppm Freon , Freon

CO Range- 0-10 or 0-100%; other ranges, customer programmable

N range - NH3-0 to 2 % v/v; N_2O ppm-100%

Options

4-20 mA output; RS485 output, MODBUS,

Single alarm setpoint- Customer Programmable

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

X Proof- explosion proof enclosure

Z purged for Zone 1 and Zone 2 respectively

Calibration gas and regulations for any of the gases at various levels- COntact PID Analyzers

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 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.

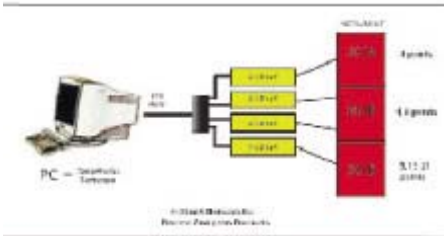
DataWorks Data Collection Software, Infrared Transmitters

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'. RF outputs available soon.

The software is written in visual C++ as an overlay/ interface for various hardware devices. One hardware version used for our Model 202, 201-B, 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.



Model 900- Infrared Transmitters

PID Analyzers offers a new ATEX approved infrared (IR) based transmitter for leak detection, oil well logging, fuel loading, waste water treatment... applications. . The 4-20 mA transmitter is in a explosionproof junction box at or near the IR sensor. The readout unit can be located > 300 meters away in the control room. The sensor is ATEX approved for Class I Groups BCD. The sensor is certified by Sira Certification Services to EN50014, 1997. There are a number of options for mounting the sensor. It an be mounted on the junction box or in a pipe. There are three different IR detectors: Methane and hydrocarbons, CO_2, and Acetylene. The readout unit has a microprocessor that controls the keyboard, display, diagnostics and data storage. The system can log > 7,000 data points that are stored in RAM.

Applications for the IR LEL Transmitters

Chemical plants
Compressors
Drilling Platforms
Fuel loading
Oil well logging
Refineries
Solvents
Waste water treatment

Features

- Sensor is 316 Stainless steel with stainless flame arrestor– to provide a flameproof sensor
- Fast response 35 sec. to 90% for IR
- **IR**– for CO_2; ranges-0 to 3,000, 0-2%, 0-5%, 0-30%, 0-100%; Also- (with HC sensor) total hydrocarbons, LEL, Methane
- Easy to access detector & electronics
- No moving parts
- Compensates for ambient changes
- ATEX Approval for Class I Groups A, B, C, D

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