

THERMAL CONDUCTIVITY ANALYZER

For Process and QC Monitoring



Model 204 NEMA 4 Wall Mount

Hydrogen, Helium, Argon in oxygen



204 THERMAL CONDUCTIVITY ANALYZER

INTRODUCTION, TCD DESCRIPTION, & FEATURES

**Datalogging (flash card memory module), Front panel programming,
Program like a PLC with the configuration utility program**

Introduction

The **Model 204 TCD** is a flexible and versatile Analyzer. The Analyzer is based on the Model 201 design that has sold more than three thousand photoionization detector (PID) based Analyzers worldwide. Applications range from carbon bed breakthrough, leak detection to stack and ambient air monitoring. This popularity is attributed to the rugged and durable design that is characteristic of all PID Analyzers products.

Other Continuous Analyzers in the 200 series include the Model 202 Infrared (IR), the Model 203 fixed wavelength UV-Near IR Photometer, and a Model 210 Paramagnetic Oxygen Analyzer. The addition of these new Analyzers greatly improves the capability and range of process analyzers from PID.

TCD-Description

The Thermal Conductivity Detector (TCD) measures the difference (change in resistance) in cooling between the sample and a reference stream (or sealed reference) through a Wheatstone Bridge circuit that detects changes in resistance. This difference in the signal between the measurement and reference sensors is amplified and the output is displayed on the digital meter.

The range for the TCD is between 1% and 100% with detection limits of 300 ppm depending on the gas. The span of the gas (range) can be re-programmed in the Meter.

A thermal conductivity analyzer can best be used to measure the concentration of a single component in a binary mixture at percentage levels. It can be used in a tertiary mixture when the conductivity of the third component is much lower than the component being measured.

The thermal conductivities for a number of gases are given in the Table below:

Component	Thermal Conductivity*
acetylene	0.78
ammonia	0.90
butane	0.68
carbon dioxide	0.55
chlorine	0.32
ethane	0.75
helium	5.97
hydrogen	7.15
methane	1.25
sulfur dioxide	0.35
xenon	0.21

* relative to air 0°C

Features-

Reliability- This rugged instrument has been improved and upgraded from a very durable line

Easy to operate- 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 low 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

No span or zero pots; all data stored in uProcessor memory

Autozero with gas for TCD

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

SPECIFICATIONS, APPLICATIONS, OPTIONS & SAMPLING SYSTEMS FOR TCD

Outputs: Analog- 0-1VDC, 4-20 mA; Serial- RS232, RS485, Modbus (RTU),
Device Net & Ethernet

Specifications

Detectors available: TCD

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 ppm to %

Support gases: The TCD has a sealed reference and no additional support gases are necessary

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

Standard output: 1 VDC, RS232

Enclosure:

Wall (NEMA 4)
23"W x 21"H x 10"D

Weight: -19 pounds

Power requirements- 100-240VAC,

Applications: TCD

-0-100 % Hydrogen in air

-0-100 % Methane in air

-0-100 % Carbon dioxide in air

-0-100% Helium in air

Power Generation- Hydrogen coolant for turbines

Air Liquifaction- argon in oxygen or nitrogen

Chemical plants- H₂ purity in process streams and purging operations; H₂ in nitrogen (ammonia)

Refineries- H₂ in hydrocarbons

Monitoring H₂ in CO₂ purging operations
ppm Levels of H₂ in CO

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.

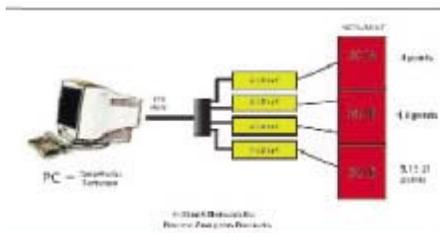


DataWorks

Data 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 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

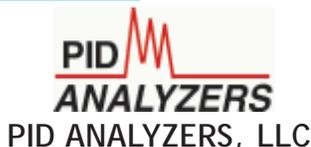
PID Analyzers offers a new ATEX approved infrared (IR) based transmitter for leak detection, oil well logging, fuel loading, waste water treatment... applications. . The 4-20 mA transmitter is in a explosionproof junction box at or near the IR sensor. The readout unit can be located > 300 meters away 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 can be mounted on the junction box or in a pipe. There are three different IR detectors: Methane and hydrocarbons, CO₂, 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 CO₂; 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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