Model 5380 PFPD

High Performance Pulsed Flame Photometric Detector

- Superior sensitivity and increased selectivity for sulfur and phosphorus compared to conventional FPDs
- Selective detection of 28 specific elements
- Digital signal processing for emission spectra storage and post-processing
- Simultaneous S and P outputs with dual channel analog output
- Dual-gate capabilities for optimized selectivity
- Improved long-term stability and reduced maintenance costs compared to other S- and P-selective detectors
- Approximately ten-times lower gas usage requirements
- Self-cleaning design without soot formation
- No flameouts caused by water or solvents

Principal Applications

- Sulfur in petrochemical streams
- Phosphorus and sulfur pesticides
- Flavor and fragrance analyses
- Chemical warfare agents
- Simultaneous PFPD and MS detection
- Organotin compounds in environmental samples
- Explosives analysis
- SO_2 and NH_3 in beverage grade CO_2
- P, S, As, Si detection in the semiconductor industry
- Organometallic detection
- Sulfur and nitrogen in pharmaceuticals
- Process streams
- Arsenic

Accomplish unmatched selective detection of 28 specific elements with the Model 5380 Pulsed Flame Photometric Detector (PFPD), the latest advance in flame photometric detector design. Superior sensitivity and selectivity make the Model 5380 PFPD a powerful tool that handles the most demanding analytical challenges. Its dual-channel, dual-gate analog output permits simultaneous S and P outputs, S and C outputs, and many other dual-element outputs. The Model 5380 PFPD increases reliability, while lowering operating and maintenance costs. The Model 5380 PFPD is the detector of choice to enhance laboratory productivity.

Operating Principles

The PFPD technology uses a propagating flame that terminates within the combustor's reactive volume. The gas phase reactions in the flame result in molecular products emitting light with specific spectral emission and emission lifetimes. The elemental emission lifetime differences, combined with the flame's propagation and termination properties, provide both time and spectral information. These unique features improve PFPD selectivity, decrease overall observed noise, and increase sensitivity. The propagating flame uses combustible gas flow rates that are ten-times lower than conventional FPDs. The PFPD's gated electronics also permit noise rejection outside of the gate window, further increasing sensitivity.

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ISO 9001 SGS CE

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General Specifications

Detectivity

- Sulfur: <1 pg S/sec
- Phosphorus: <100 fg P/sec

Sensitivity

- Sulfur signal-to-noise ratio at 10 pg S/sec elution rate: S/N >300 (peak-to-peak noise)

Selectivity (at Optimum Detectivity Levels)

- Sulfur: $>10^6$ S/C
- Phosphorus: $>10^5$ P/C (selectivity is adjustable with a trade-off in detectivity.)

Detector Linearity

- Sulfur: Quadratic in response. Linear to approximately three orders of magnitude, which gives five orders signal response.
- Phosphorus: First order linear over four orders of magnitude.

Response Uniformity

- Equimolar ±8% (S, P)

Chromatographic Peak Tailing

- <0.2 sec in S and P

Drift

- Sulfur or phosphorus: <10 x peak-to-peak noise in 20 minutes

Controller Board Outputs

- Two channels (0–1 V)
- One serial RS-232-C
- One signal in (electrometer; PFPD)
- High voltage out (PMT 0–1,000 V)
- Ignitor current (0–3.4 A)
- Oscilloscope output (20 Hz, 25 ms display)
- GC start sense
- S/W HV protection (PMT protection)
- Timed events (from GC start sense): autozero, range, attenuation, ignitor, and mode-channel (e.g., S, P, N, C, E–S, E–P), custom, and record

Controller Dimensions

- 22.2 cm H x 14 cm W x 33 cm D
- 8.75" H x 5.5" W x 13" D

Pneumatics

- Manual control with pressure regulators, mass flow controllers, and fine metering needle valves
- Optional electronic pneumatic control

Performance Specifications

Temperature Limitations

- Minimum: 180 °C
- Maximum: 420 °C

Carrier Gas

- Maximum flow rate (He, N_2): 5 mL/minute
- Higher rates (up to 15 mL/minute) by using H_2 carrier gas

Typical Gas Consumption

- H_2: 11 mL/minute
- Air: 25 mL/minute

Options

- PFPDView software for post-acquisition processing
- 3-mm Combustor
- Filter and PMT configurations for 28 different elements

Environmental Considerations

Humidity

- 5–80% relative humidity

Temperature

- +10 ° to +40 °C (operating)
- –20 ° to +65 °C (nonoperating)

Altitude

- Maximum 2,000 m

Requirements

Gas Requirements

- Carrier: helium, nitrogen, or hydrogen, 80 psig; 99.98% purity or better
- Air: 60 psig; zero air (CGA grade E)
- Hydrogen: 60 psig; 99.995% or better (electrolytic grade)

Power Requirements

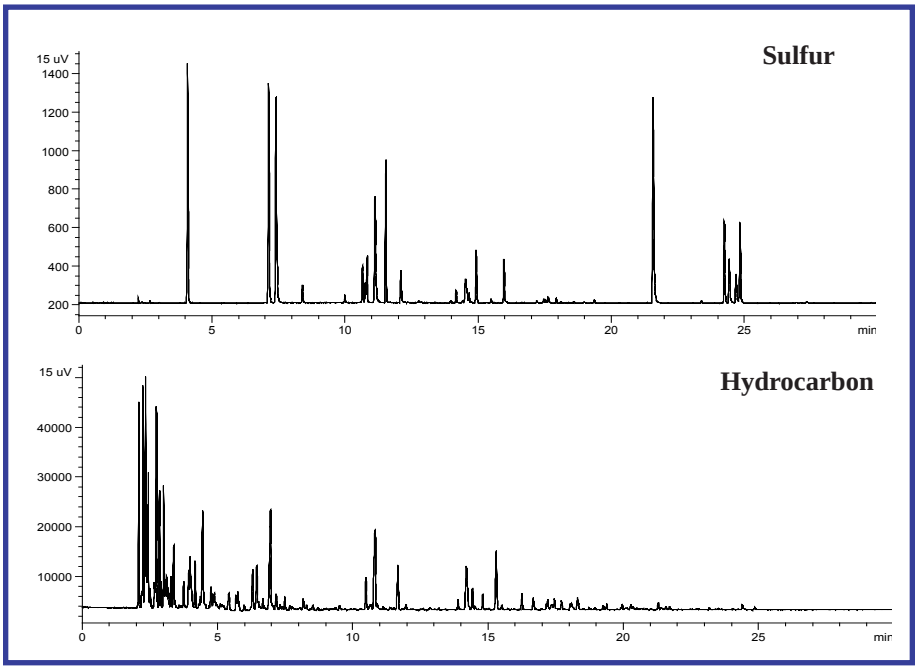
- 115/230 VAC, 50/60 Hz

Host Hardware Requirements

- CPU: Pentium®, 90 MHz or higher
- Video: Color VGA or higher
- Ports: One serial port (RS-232-C), 16550 UART highly recommended

Host Software Requirements

- Windows® Version 3.1x or greater



Simultaneous sulfur and hydrocarbon chromatogram of regular unleaded gasoline

Dr. Aviv Amirav, Professor of Chemistry at the University of Tel Aviv, Israel, developed and patented the PFPD, and licensed it to O.I. Corporation.

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