

Total Hydrocarbon Gas Analyzers

Series 23-550 and 23-750



Series 23-550

The GOW-MAC Total Hydrocarbon Gas Analyzers are designed to continuously measure concentrations of hydrocarbons and CO and CO₂ in gas streams. The instruments provide long term stability and accurate performance in gas manufacturing facilities and laboratory applications.

The analyzers are ideal quantitative instruments for petrochemical industries, gas manufacturers and various other chemical industries. The analyzers can be either bench or rack mounted.

Principal of Operation

The flame ionization detector (FID) operates on the principle that the electrical conductivity of a gas is directly proportional to the concentration of charged particles within the gas. Ionized carbon atoms are produced when burned in a hydrogen flame. Positive ions, negative ions and electrons present between an electrode gap decrease the gap resistance and cause an electrical current to flow across the gap.¹ The resulting voltage decrease is measured by an amplifier electrometer and then read by a digital meter or potentiometric recorder.

The advantages of digital readout are apparent upon use:

Series 23-550 & 23-750

Range 1 = 0.0 ppm to 99.99 ppm

Range 2 = 0.0 ppm to 999.9 ppm

Range 3 = 0.0 ppm to 9,999 ppm

Operates on 100% H₂, 40/60% H₂/N₂ or H₂/He Fuel Mixes

Individual Flow Control Systems

3 Range Sensitivity

Optional Pump Assembly

Consistent, Precise, Flexible, Compact

19" Rack Mount

A recorder terminal strip is included for permanent records.

Balanced pneumatics and electronic stability allow for resolution of 0.1 ppm (23-550) total hydrocarbons over normal temperature ranges using zero grade H₂ as fuel (0.03 ppm on the 23-750). Electronic stability at maximum sensitivity is $\pm 1\%$ of full scale throughout an ambient temperature range of 25 °C \pm 10 °C.

The Series 23-550 and 23-750 analyzers incorporate flow systems that can be used for ambient air analysis where low levels of hydrocarbons are monitored on a continuous basis. The analyzers can be used for other analyses such as engine exhaust monitoring, stack gas emissions and environmental studies. Samples can be introduced by pump or by pressurized tanks.

The analyzers are engineered to operate on either zero grade H₂, a 40/60% H₂/N₂ or a 40/60% H₂/He fuel mix.

¹McNair, H.M.; Bonelli, E.J. Basic Gas Chromatography; Varian; Berkeley, CA 1968.

SB-THA



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Ruthenium Methanizer

The Series 23-750 includes a catalytic methanizer for sensitive, in-line determination of CO and CO₂. The catalytic conversion is:



Maximum conversion of CO and CO₂ to CH₄ is achieved with a fully reduced ruthenium catalyst. The hydrogen gas flow to the FID burner is routed through the methanizing unit. An auxiliary flow of gas is then introduced to obtain the proper gas ratio for optimum detector sensitivity. The resulting conversion is read as CH₄ by the analyzer.

Flow Control

23-550: Individual pneumatic controls are used to deliver regulated streams of air, fuel and sample to the FID. In the sample line, which requires a minimum of 3 psig, a back pressure regulator is used to maintain a constant flow to the detector. The Series 23-550 utilizes internal, adjustable pressure regulators for the air and fuel to provide for controlled pressure on the downstream side. Excess sample

gas is discharged through a sample by-pass outlet. This by-pass feature allows for stable, constant, sample flow rates into the FID while providing high velocity flow through the analyzer to minimize system response time. A newly designed fuel enrichment system contains porous metal flow restrictors on the fuel line. This creates easier lighting of the FID.

23-750: Flow rates are determined by adjusting external, individual regulators, depending upon the type of fuel used.

Safety Features

A stable and reliable FLAME OUT circuit is engineered into each analyzer. The FLAME OUT circuit will indicate an extinguished flame and automatically shut off the fuel and sample lines to the flame ionization detector.

Visit our web site at
www.gow-mac.com
to see our entire line of
gas analysis instrumentation

Specifications

Full Scale Sensitivity Range:	Zero Grade H ₂ or Fuel Mix: spanning from 0.1 ppm CH ₄ to 9999 ppm CH ₄
Fuel Gas Requirements:	Zero Grade H ₂ : 25-35 cc/min. clean, zero grade H ₂ (THC ≤ 0.2 ppm) @ 25 psig Fuel Mix: 50-120 cc/min. 40/60% fuel mix (THC ≤ 0.5 ppm) @ 25 psig*
Sample Gas Requirements:	Minimum of 3 psig with a minimum flow rate of 0.35 to 1.5 liters/minute
Burner Air Requirements:	Minimum of 25 psig with a minimum flow rate of 230-300 cc/min. zero air (THC ≤ 1.0 ppm)
Electronic Stability:	At max. sensitivity: ± 1% of F.S. throughout an ambient temperature range of 25 °C ± 10 °C
Ambient Temperature:	25 °C ± 10 °C
Output:	23-550: Digital Meter, 4½ digit LED 23-750: Digital Meter, 4½ digit LED 4-20 mA output mV recorder output Hi or Hi/Low alarms (optional)
Ranges:	23-550: x10, x100, x1000 with 4½ digit DPM 23-750: x10, x100, x1000 with 4½ digit DPM
Safety:	Flame out indication with fuel and sample line shut off (standard)
Drift:	< 1% full scale drift over 24 hours
Reproducibility:	± 1% F.S. for successive samples
Operation:	Minimum controls with pressure gauges for sample, air and fuel Large meter, wide dynamic range, easily accessible for maintenance
Mounting:	Bench top or 19" rack mount
Power:	Series 23-550/23-750: 100 W @ 115 V, 60 Hz Series 23-552/23-752: 50 W @ 230 V, 50 Hz
Dimensions:	Series 23-550: 19" W x 5.25" H x 16.5" D (48.22 cm x 13.33 cm x 41.91 cm) Series 23-750: 19" W x 10.5"H x 15.75" D (48.22 cm x 26.67 cm x 40.10 cm)
Weight:	Series 23-550: Net: 34 lbs. (15.42 kg) Shipping: 48 lbs. (21.77 kg) Series 23-750: Net: 60 lbs. (27.24 kg) Shipping: 75 lbs. (34.02 kg)

*Note: There is a decrease in sensitivity when using a fuel mix other than zero grade H₂.

Ordering Information

115 V Model	230 V Model	
23-550-1	23-552-1	Total Hydrocarbon Gas Analyzer w/Voltage to Current Converter, 4-20 mA
23-550-2	23-552-2	Total Hydrocarbon Gas Analyzer w/Voltage to Current Converter, 4-20 mA, and Hi/Low Alarms
23-550-4	23-552-4	Total Hydrocarbon Gas Analyzer w/Voltage to Current Converter, 4-20 mA, and Hi Alarm
23-750-1	23-752-1	Total Hydrocarbon Gas Analyzer w/Catalytic Methanizer and Voltage to Current Converter, 4-20 mA
23-750-2	23-752-2	Total Hydrocarbon Gas Analyzer w/Catalytic Methanizer, Voltage to Current Converter, 4-20 mA, and Hi/Low Alarms
23-750-4	23-752-4	Total Hydrocarbon Gas Analyzer w/Catalytic Methanizer, Voltage to Current Converter, 4-20 mA, and Hi Alarm
Optional Accessory		Part No. 59-300 Pump Assembly, external