



# **GC - 3000G** Portable Micro Mines



EPCC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

# **Analytical Technologies Limited**

An ISO 9001 Certified Company

www.analyticalgroup.net



In every mine there is a chance that the Gases naturally occurring might build up to a high enough concentration to become explosive. The monitoring of these gas concentrations, therefore becomes a concern to maintain the safety of the mine workers. The key compounds of interest are Hydrocarbons in the C1 - C2 range and Carbon Monoxide and Carbon Dioxide. These light hydrocarbon gases have always been a challenge to separate. The development of capillary columns for light hydrocarbon separations has helped tremendously. The Mines GC System is configured with these latest designed high resolution capillary column and the sensitive FID, to quickly detect these potentially explosive compounds in less than 2 minutes. We have added a Vacuum Pump and Gas Sample Valve to fully automate the sample analysis. The fast heating and rapid cooling column oven in every GC assures rapid sample turnaround. The fully integrated Mines GC System is small and lightweight and all systems are modular for expandability, upgrades, and easy service



# >> Available Configurations Include:

» Series 3000G Portable Micro Mines GC Analyzer (HID, Valve, 2 Columns)



#### Mines Safety Gases





The Portable Micro Mines GC Systems are ideal for separating the whole gas components Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide and Carbon Dioxide with one injection. Additionally, C2 through C6 hydrocarbons are easily separated in the same analysis. The sensitive and universal Helium Ionization Detector (HID) from Our innovative 2 column and valve configuration simplifies this analysis. With the addition of an Flame Ionization Detector (FID) and high resolution capillary column, hydrocarbons through C20+ can be analyzed from the same injection. GC Systems can be built into our Series 3000 G Lab GC, or the Portable Micro Mines 2, allowing you to take the analyzer with you into the field. Only a small tank of Helium is need to operate the basic GC System. The fast heating and rapid cooling column oven in every GC assures guick sample turnaround. The fully integrated GC Analyzer Systems are small and lightweight and all systems are modular for expandability, upgrades, and easy service.

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Series 3000G GC



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#### Permanent Gas Standard - 1000 ppm



Portable Micro Mines GC 2

# **>>** Portable Micro Mines 2 GC Layout





# Plumbing Diagram

**Sample Analysis** - The Gas Sample Valve and heated Valve Oven for the portable micro GC's are built right in to provide the shortest possible sample path. The Sample Line is connected to the Valve

Oven and from there all of there the entire sample path is heated to limit possible carry over. A fixed Sample Loop ensures reproducible sampling and is Flushed between analyses. The sampling and analysis sequence is automated through the Timeline of the GC Control Software. The analysis can be set up to run unattended 24/7 collecting, processing, and storing all of the data.

The unique 2 column configuration simplifies the compound separation and analysis. The columns are plumbed in series through the heated Sample Valve.

Plumbing Diagram - In the 1st Step the sample is loaded on the Sample Loop with the built-in vacuum pump. During Step 2 the Sample Valve is rotated to Inject the sample onto the analytical columns. The Silica Gel column retains CO2 & the C2+ hydrocarbons, while the lighter compounds (H2, O2, N2, CH4, & CO) pass through and are further separated on the Molecular Sieve column. Once the lighter compounds have been separated the valve is rotated back in Step 3 and the heavier compounds (CO2 & C2+ hydrocarbons) are separated on the Silica Gel column.



**Plumbing Diagram** 

## ► Results, Data & Connectivity

- **Results:** The results and chromatogram are stored on the hard drive. Additionally, for each channel a log file summary of the compounds detected is a convenient way of looking at large amounts of data collected over time.
- **Data and Connectivity:** The built-in computer is used to collect and store the data. Data can also be copied to a USB Stick to transfer to another computer. Data can be transferred from the built-in computer to another computer on the LAN through the Ethernet port using standard Windows protocols. Or, we can use a USB cable to connect the GC to the remote computer where the data can be collected and stored on that hard drive.

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# **Higher Boiling Hydrocarbons Option**

# Plumbing Diagram - The plumbing configuration works in exactly the same way as described on the previous page, except that when the sample is injected in Step 2, it

is split between the Silica Gel column and a high resolutuion capillary column. The back pressure of the columns are equal, so half of the sample is loaded onto each column. The Silica Gel still separates the light hydrocarbons as described in the basic plumbing. However, the capillary column is added to further separate C3+ hydrocarbons.

The sensitive FID detector is used to identify and quantitate these higher boiling hydrocarbons as shown in the chromatogram below.





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# **>>** Portable Micro Mines GC Specifications:

#### **Electronics Module:**

- Enter and store GC Methods via Color Touch Screen
- Actual and set-point display of all GC parameters
- Safety Limits on all user entered parameters
- Oven Temperature Programs (OTP) with Multiple Ramps
- Pressure Programs for Carrier Gases with Multiple Ramps
- Timeline for sequencing Relays and Valve
- Detector Control of all Parameters on one page
- Electronic Pressure Controllers (EPC's): Atmospheric Pressure & Temperature Compensation EPC Pressure Control with 0.1 kPa set-point resolution
- Plug and Play GC Control, Oven, and Detector Board
- Microprocessor Controlled
- Proprietary Digital Signal Processing
- Digital Signal Outputs for each Detector
- Universal voltage input (85 240 Vac) with line filter and breaker.

#### **Detector:**

- HID Helium Ionization Detector (10 ppm detection limit, dependent on sample loop size)
- FID Flamelonization Detector (1ng detection limit, dependent on sample loop size)
- 400°C Temperature Limit with 0.1°C set-point resolution
- 24-bit Digital Outputs for the detector via USB
- EPC Pressure Control with 0.1 kPa set-point resolution

#### Columns:

1m Molecular Sieve, 2m Silica Gel, 30m Capillary

#### **Results:**

Automatically calibration corrected and reported



#### Series 3000G Oven Module:

- Ambient to 400°C Column Oven
- Up to 100° C per/min Oven Ramp
- Fast Cooldown 300°C to 50°C in 3.5 min
- 1000 watt total Heater Elements
- Temperature Ramps with 0.1°C set-point resolution
- 23 x 23 x 20 cm area for Glass, SS, or Capillary Columns

#### **Portable Micro Mines Oven Module:**

- Ambient to 325°C Column Oven
- Up to 80°C per/min Oven Ramp
- Fast Cooldown 300°C to 50°C < 4 min
- 200 watt Heater Element
- Temperature Ramps with 0.1°C set-point resolution
- 12.5 x 10.5 x 12.5 cm area for Packed, or Capillary Columns

#### **Built-In Accessories:**

- Sample Valve Electronically Actuated
- Heated Valve Oven

#### **Injector:**

- Heated On-column Injectors
- Multiple Pressure Ramps with 0.1 kPa set-point resolution

#### **Data Communications:**

- Bi-directional communication with popular Data System

Network Connectivity:

- Enterprise Compatible Network GC running Windows XPe
- Ethernet Connection using Windows Network Protocol
- On Board ETX Computer for GC Control and Data Acquisition
- Remote Control of GC and Data Acquisition over LAN



# HPLC Servicing, Validation, Trainings and Preventive Maintenance :

HPLC Servicing :HPLC Servicing : We have team of service engineers who can attend to any make of HPLC promptly @the most affordable cost.

- Trainings :We also take up preventive Maintenace to reduce downtime of HPLC's Trainings. AMC's/CMC :AMC's/CMC :We offer user training both in-House and at customer sites on HPLC principles, operations, troubleshootina.
- Validations :Validations :We have protocols for carrying out periodic Validations as per GLP/GMP/USFDA norms.
- Instruments :Instruments :We offer instruments/Renting Services Modules like pumps,detector etc. on Rent.



### About Analytical Technologies

Analytical Technologies is synonymous for offering technologies for doing analysis and is the Fastest Growing Global Brand having presence in at least 96 countries across the global. Analytical Technologies Limited is an ISO:9001 Certified Company engaged in Designing, Manufaturing, Marketing & providing Services for the Analytical, Chromatography, Spectroscopy, Bio Technology, Bio Medical, Clinical Diagnostics, Material Science & General Laboratory Instrumentation. Analytical Technologies, India has across the Country operations with at least 4 Regional Offices, 6 Branch Offices & Service Centers. Distributors & Channel partners worldwide.

# Our Products & Technologies

Infra FTIR







**Optical Emission** Spectrophotometer



Fully Automated

CLIA



DSC/TGA







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**HEMA 2062** 

Optima Gas

Chromatograph

2979 Plus



Flash Chromatograph



Micro Plate Reader/Washer







Liquid Partical Counter



Total Organic Carbon 3800



Ion Chromatograph



system

NOVA-2100 Chemistry Analyzer

PCR/Gradient PCR/ RTPCR

TOC Analyzer Laser Particle Size Analyzer

URINOVA 2800 Urine Analyzer





# **Regulatory compliances**



# **Corporate Social Responsibility**

Analytical Foundation is a nonprofit organization (NGO) found for the purpose of:



1.Research & Innovation Scientist's awards/QC Professional Award : Quality life is possible by innovation only and the innovation is possible by research only, hence ANALYTICAL FOUNDATION is committed to identify such personallities for their contributions across various field of Science and Technology and awarding them yearly. To participate for award, send us your details of research / testing / publication at Info@analyticalfoundation.org

2. Improving quality of life by offering YOGA Training courses, Work shops/Seminars etc.

3. ANALYTICAL FOUNDATION aims to DETOXIFY human minds, souls and body by means of yoga, Meditation, Ayurveda, Health Care, Awards, Media, Events, Camps etc.





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