



Petrochemical

Permanent Gas & Hydrocarbons



www.dps-instruments.com

The DPS Perma-Gas 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 DPS and 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. Perma-gas GC Systems can be built into our Series 600 Lab GC, or the Portable Companion 2, allowing you to take the analyzer with you into the field. Only a small tank of Helium is need to operate the basic Perma-Gas GC System. The fast heating and rapid cooling column oven in every DPS GC assures quick sample turnaround. The fully integrated Perma-Gas GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.



Series 600 GC

Available Configurations Include:

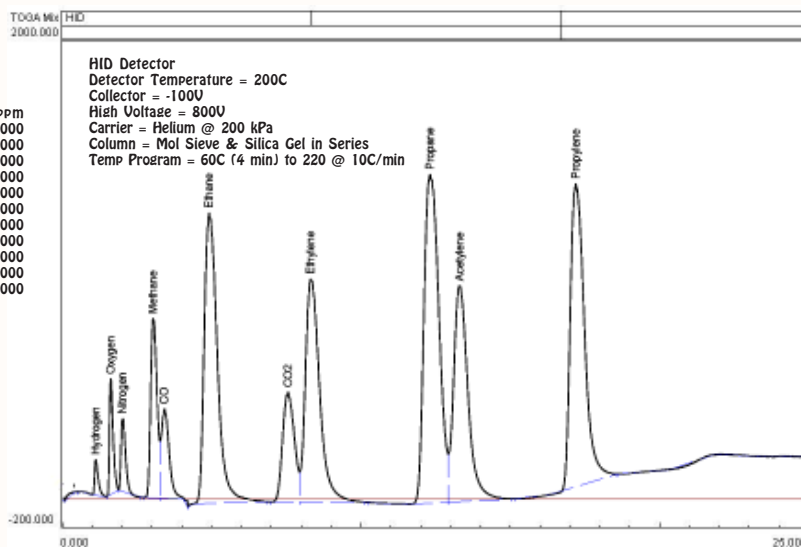
- 600-C-075 - Series 600 Perma-Gas GC Analyzer (HID, Valve, 2 Columns)
- 500-C2-075 - Companion 2 Portable Perma-Gas GC Analyzer (HID, Valve, 2 Columns)

Permanent Gas Standard - 1000 ppm



Companion 2 Portable GC

Component	Area	ppm
Hydrogen	831.2	1000
Oxygen	2722.6	1000
Nitrogen	2147.6	1000
Methane	7037.0	1000
CO	3685.2	1000
Ethane	24484.2	1000
CO2	7996.0	1000
Ethylene	19515.4	1000
Propane	30906.7	1000
Acetylene	18363.6	1000
Propylene	27521.3	1000



DPS Companion 2 Perma-Gas GC Layout

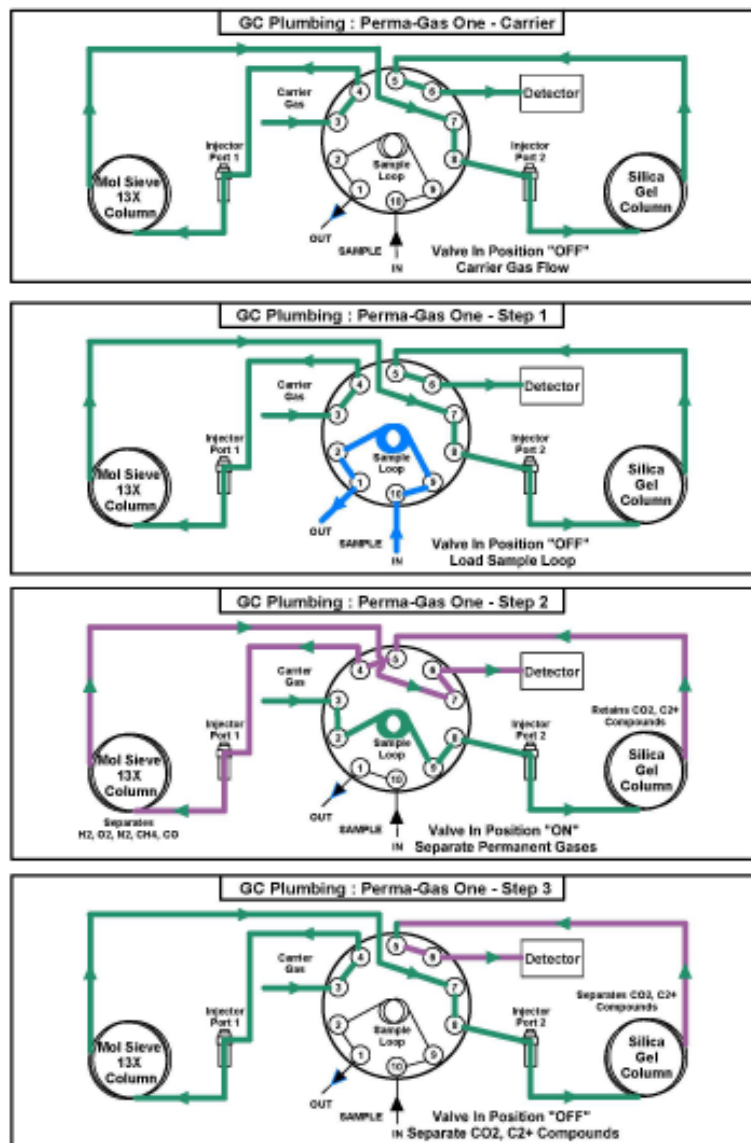


Plumbing Diagram

Sample Analysis - The Gas Sample Valve and heated Valve Oven for the Companion 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 DPS 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.



**Perma-Gas
Plumbing Diagram**

Results, Data & Connectivity

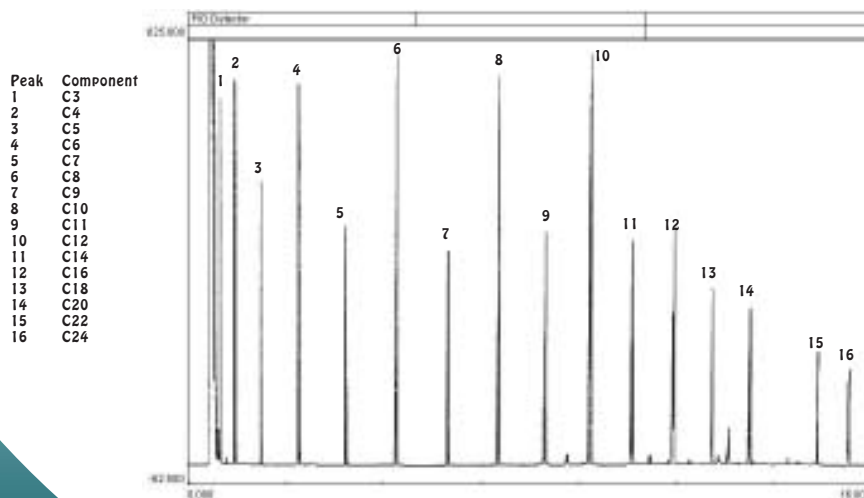
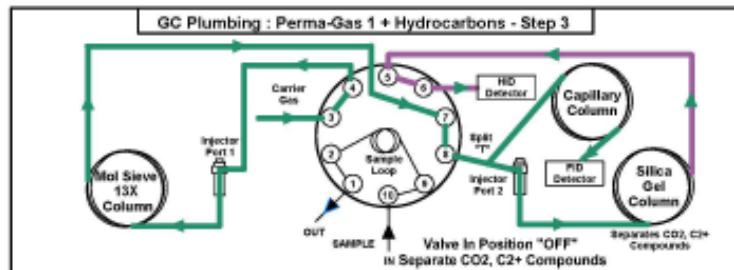
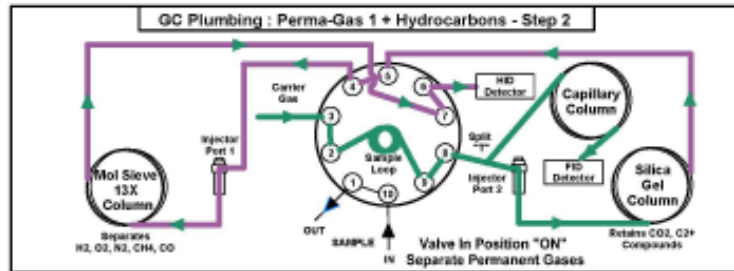
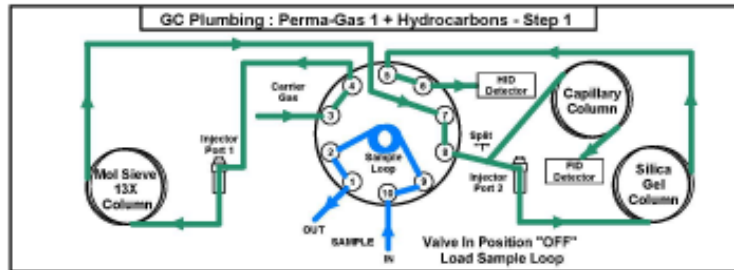
Results: The results and chromatogram are stored on the hard drive. Additionally, for each channel a log file summary of the compounds detected is a convenient way of looking at large amounts of data collected over time.

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.

Option - Higher Boiling Hydrocarbons

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 3rd column, where the back pressure of the columns are equal, so half of the sample is loaded onto each column.

Hydrocarbons - The Silica Gel still separates the light hydrocarbons as described in the basic Perma-Gas plumbing. However, a 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.



DPS Companion Accessories

Gas Sample Valve

Sample Inlet

Sample Loop



Sample Valve

Heated Lines

Small High Pressure Refill Kit

ON/OFF Valve

Small Tank Pressure Gauge

High Pressure Cylinder

SLP Regulator



Fill Pressure Gauge

Connection to Main Tank

Fill/Pressure Release Knob

Tank Pressure Gauge

Accessory Kits

GC Maintenance Kit

Tools, Keyboard, Mouse, Voltmeter



Gas Line Kit

Regulator, Tubing, Cutters, Fittings



Shipping Kit

Syringes, Power Cord, Nuts, Ferrules, Screws (Included with each GC)



GC Control Software

Easy to learn and master using a Graphical User Interface (GUI) and Color Touch Screen.

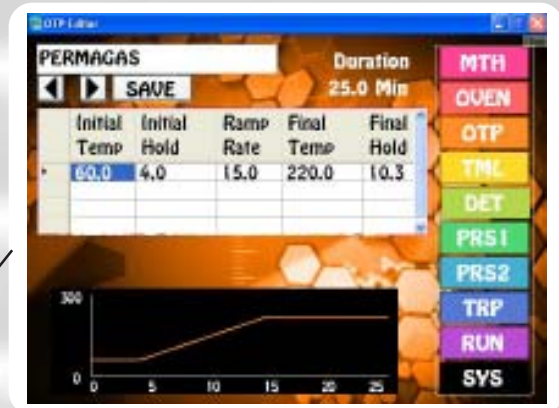
Editors let you customize the files associated with the GC Method.

Method Name



File Selection Arrows

Navigation Buttons to Quickly jump from one screen to another. Most pages are one button away!



Oven Temp Program Editor



Timeline Editor



Carrier Pressure 1 Editor



Keyboard to Enter Filenames



Number Pad for entering Values

GC Status pages display the parameters in the method, both graphically and as text and values.



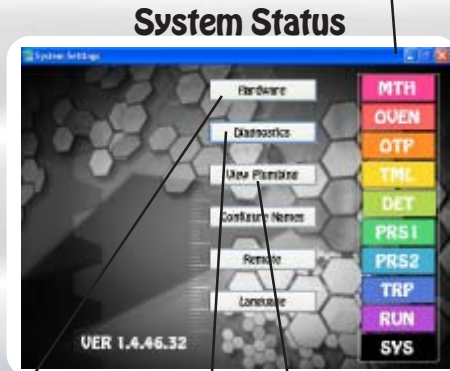
Oven Status



Method Editor



PID Detector Status

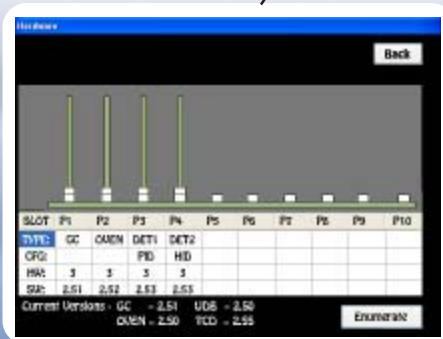


System Status



HID Detector Status

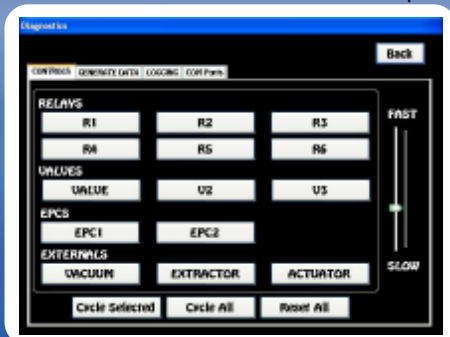
System status pages display the health and viability of the GC instrument.



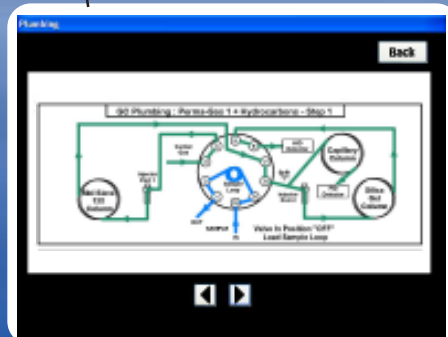
Hardware



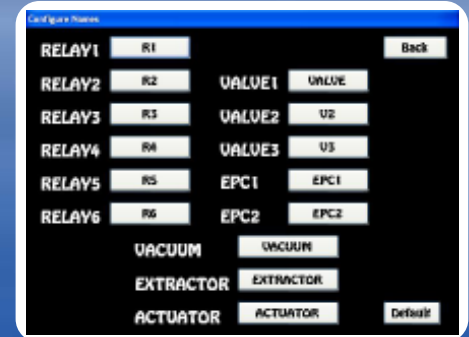
Run Status



Diagnostics



Plumbing



Configure Names

Perma-Gas 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)

FID – Flame Ionization Detector (1 ppm 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 600 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

Companion 2 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
- 7 amps at 48 Vdc total power consumption

Built-In Accessories:

- Sample Valve - Electronically Actuated
- Heated Valve Oven
- Vacuum Pump
- Air Compressor for FID's
- Calibration Gas & Stream Selection Solenoid

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



*Lab Quality Analyses in the Field,
"It Goes with you Anywhere!"*