DPS Instruments, Inc.

Environmental

Foods, Flavors, & Fragrances

Solvents & Chemicals

Forensics

Petrochemical

Pharmaceuticals

Petrochemical

Oxygenates in Gasoline - D4815 Valve &

Instruments, Inc.

www.dps-instruments.com

With the dramatic increase in reformulated gasoline production around the world there is an ever increasing demand for the analysis of oxygenates, which are added boost the octane value of these fuels. The DPS Oxygenates GC System uses a polar TCEP pre-column to separate the oxygenates from early eluting hydrocarbons, then back-flushes the retained oxygenates to a high resolution capillary column for separation. Both columns are connected through a 10-port valve and the entire sequence is automated through the Timeline in the DPS Control Software. The identification and quantitation and are performed using a sensitive FID detector following ASTM D4815 guidelines. The DPS Oxygenates GC System is configured to quickly detect these oxygenates in less than 15 minutes. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Oxygenates GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

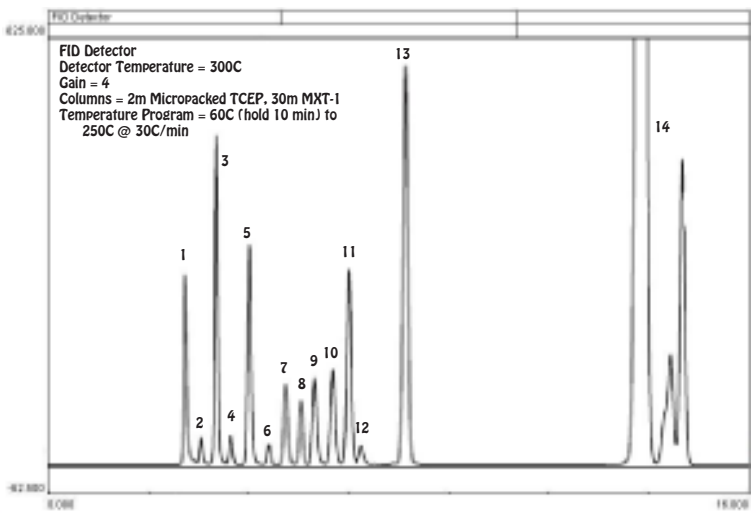
Available Configurations Include:

600-C-089 - Series 600 Oxygenates GC Analyzer (FID, Valve, 2m & 30m)
500-C-089 - Companion 1 Portable Oxygenates GC Analyzer
(FID, Valve, 2m & 30m)

Companion 1 Portable GC

Oxygenates in Gasoline

Peak	Component
1	Methanol
2	Ethanol
3	Isopropanol
4	Tert-Butanol
5	n-Propanol
6	MTBE
7	sec-Butanol
8	DIPE
9	Isobutanol
10	tert-Pentanol
11	DME
12	n-Butanol
13	TAME
14	Heavier Hydrocarbons



3/2019
Specifications may change without notice.

Petrochemical

Permanent Gases + Sulfur 2

DPS Instruments. Inc.

www.dps-instruments.com

The DPS Perma-gas 1 Plus Sulfur GC System is ideal for separating the whole gas components Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide and Carbon Dioxide with one injection. Additionally, H2S and 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. The DPS Perma-gas 1 + Sulfur GC Systems are ideal for ppm level measurements in your high percentage gas samples. Perma-gas 1 + Sulfur 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 GC System. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Perma-gas 1 + Sulfur GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-073 - Series 600 Perma-Gas 1 + Sulfur GC Analyzer (HID, PID, Valve, 3 Columns)

500-C2-073 - Companion 2 Portable Perma-Gas 1 + Sulfur GC Analyzer (HID, PID, Valve, 3 Columns)

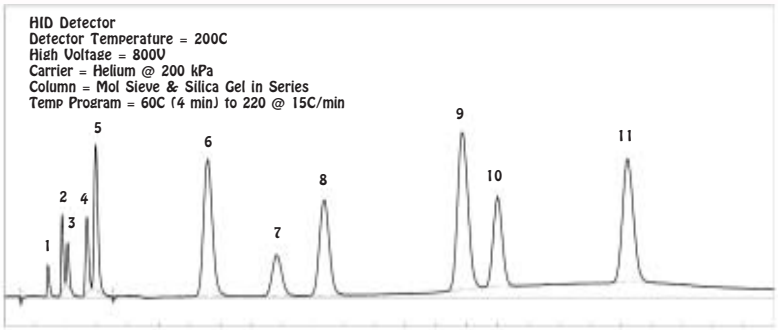
Series 600 GC

Companion 2 Portable GC

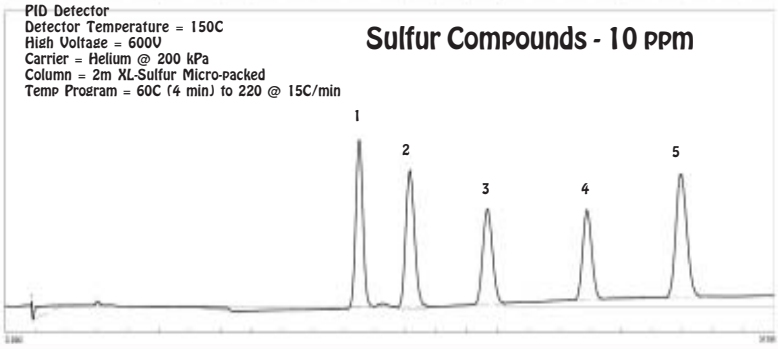
Peak	Component
1	Hydrogen
2	Oxygen
3	Nitrogen
4	Methane
5	Carbon Monoxide
6	Ethane
7	Carbon Dioxide
8	Ethylene
9	Propane
10	Acetylene
11	Propylene

Peak	Component
1	Hydrogen Sulfide
2	Carbonyl Sulfide
3	Methyl Mercaptan
4	Dimethyl Sulfide
5	Dimethyl Disulfide

Permanent Gases & Hydrocarbons - 1000 ppm



Sulfur Compounds - 10 ppm



11/2020
Specifications may change without notice.

Petrochemical

Bio-Fuels Methanol & Ethanol

DPS Instruments. Inc.

www.dps-instruments.com

With the dramatic increase in biofuels production around the world there is an ever increasing demand for the analysis of Methanol and Ethanol in these fuels. The classical method for analysis, ASTM Method D5501 uses very long columns (100 or 150m) to adequately separate these alcohols from other interfering compounds in these complex fuel mixtures, with run times of about 40 minutes. Many plants require the Ethanol content of the denatured fuels be analyzed before the fuel is transported, which is difficult with such long run times. The recent development of capillary columns for biofuels separations has helped tremendously. The DPS Alcohols GC System is configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds in less than 10 minutes. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Alcohols GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

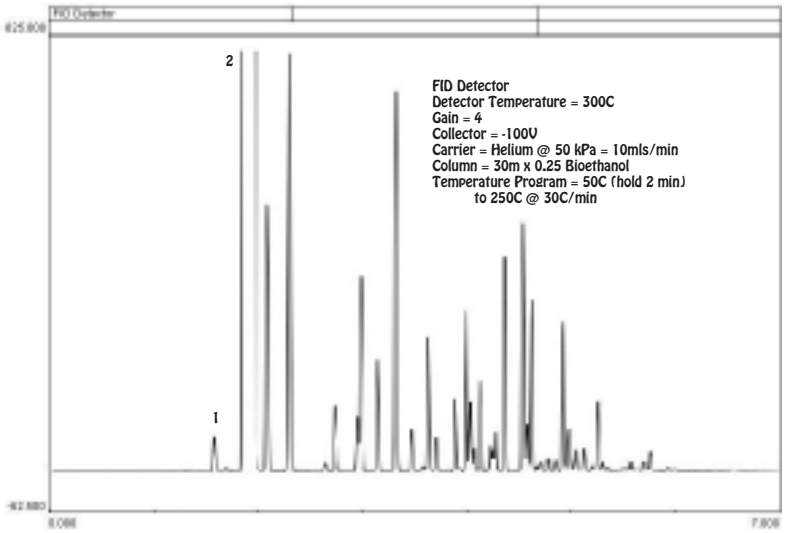
Available Configurations Include:

600-C-111 - Series 600 Alcohols GC Analyzer (FID, 30m)
500-C-111 - Companion 1 Portable Alcohols GC Analyzer (FID, 30m)

Companion 1 Portable GC

Methanol & Ethanol in Gasoline

Peak	Component	Area
1	Methanol	247.3
2	Ethanol	2173.5



5/2017
Specifications may change without notice.

Petrochemical

Sulfur Compounds

Instruments, Inc.

www.dps-instruments.com

The analysis of sulfur containing compounds in petroleum products is drawing more attention around the world as governments are passing regulations for products with lower sulfur concentrations, which lead to lower sulfur emissions. There are a host of problems associated with the sampling and analysis of sulfur compounds. First and foremost is that sulfur compounds degrade on metal surfaces, especially hot metal; making sulfur compounds difficult to store. Secondly, you need to differentiate them from the hydrocarbon mixtures for analysis. The DPS Sulfur GC Analyzers answer these problems with an inert sample path, free of hot metal surfaces, the latest analytical column technology, and the sensitive FPD detector. The DPS Sulfur GC Systems are ideal for your complex hydrocarbon mixtures requiring sensitive sulfur measurements. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Sulfur GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

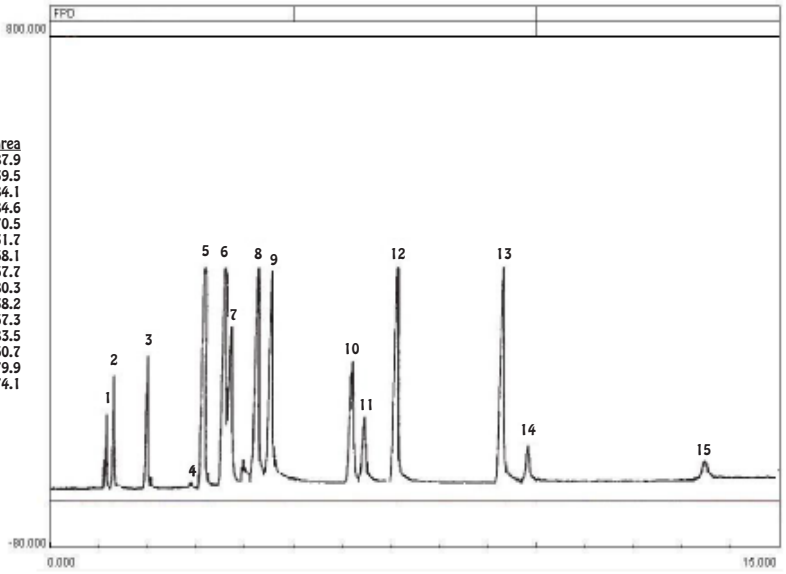
600-C-095 - Series 600 Sulfur Compounds GC Analyzer (FPD, 30m)
500-C2-095 - Companion 2 Portable Sulfur Compounds GC Analyzer (FPD, 30m)

Series 600 GC

Sulfur Compounds

Companion 2 Portable GC

Peak	Component	Area
1	Hydrogen Sulfide	1787.9
2	Carbonyl Sulfide	2639.5
3	Methyl Mercaptan	3484.1
4	Ethyl Mercaptan	284.6
5	Carbon Disulfide	8370.5
6	Dimethyl Sulfide	8031.7
7	2-Propyl Mercaptan	5168.1
8	Allyl Mercaptan	7467.7
9	1-Propyl Mercaptan	7080.3
10	Ethyl Sulfide	3838.2
11	Butyl Mercaptan	1367.3
12	Dimethyl Disulfide	8883.5
13	Allyl Sulfide	8360.7
14	Propyl Sulfide	979.9
15	Butyl Sulfide	874.1



Petrochemical

Transformer Oil Gas Analysis - TOGA

DPS Instruments, Inc.

www.dps-instruments.com

The DPS TOGA GC Systems are designed to analyze oil from electrical insulation materials that may have decomposed under thermal, or electrical stresses. The gaseous decomposition products indicate the type of fault inside the transformer. The DPS TOGA GC Systems separate all 11 components in one injection; Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide, Ethane, Carbon Dioxide, Ethylene, Propane, Acetylene, and Propylene. All compounds are detected with the sensitive and universal Helium Ionization Detector (HID). A Flame Ionization Detector (FID) and Methanizer can be added for even lower detection limits of the hydrocarbons, CO & CO2. Our innovative 2 column and valve configuration simplifies this analysis and follows ASTM 3612C for gas analysis using headspace injection. The headspace sample can be injected using a multi-vial autosampler, or a single sample headspace accessory can be built into our Series 600 Lab GC, or the Portable Companion 2 for analyses in the field. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated TOGA GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-078 - Series 600 TOGA GC Analyzer (HID, Headspace Concentrator, 2 Columns)
600-C-082 - Series 600 TOGA GC Analyzer (HID, FID/Methanizer, Headspace Concentrator, etc.)

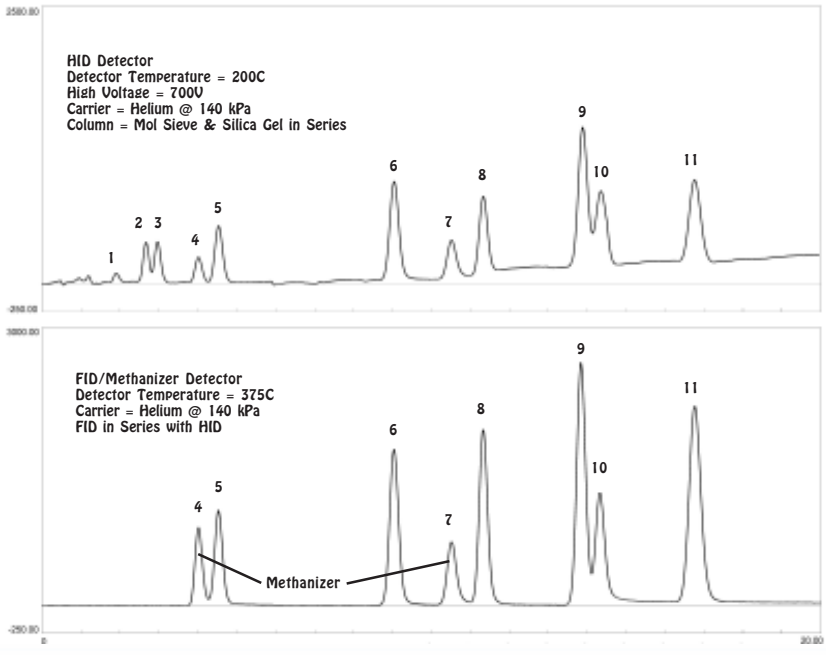
500-C2-078 - Companion 2 Portable TOGA GC Analyzer (HID, Headspace Concentrator, 2 Columns)
500-C2-082 - Companion 2 Portable TOGA GC Analyzer (HID, FID/Methanizer, Headspace Concentrator, etc.)

TOGA - Gas Analysis

Series 600 GC

Companion 2 Portable GC
(with Headspace Concentrator)

Peak	Component
1	Hydrogen
2	Oxygen
3	Nitrogen
4	CO
5	Methane
6	Ethane
7	CO2
8	Ethylene
9	Propane
10	Acetylene
11	Propylene



3/2022
Specifications may change without notice.

Petrochemical
Bio-Diesel

DPS Instruments, Inc.

www.dps-instruments.com

Bio-diesel is a renewable fuel used as a substitute for petroleum diesel fuel. Biodegradable and nontoxic, bio-diesel is made from soy oil, vegetable oil, recycled cooking oil, or animal fat. Bio-diesel made from vegetable oils and animal fat perform like petroleum diesel, but are much cleaner burning with reduced emissions. A high content of free and total glycerin lead to buildup and poor engine performance. Consequently, the glycerin content is one indicator of the quality of the bio-diesel fuel. For your convenience, DPS has configured the Bio-diesel GC Analyzers to help you define the free and total glycerin content using our standard cool on-column injector, guard column, analytical column, and our sensitive FID detector. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Bio-diesel GC Analyzer Systems are small, lightweight, and rugged to go where ever you need them. All DPS systems are modular for expandability, upgrades, and easy service.

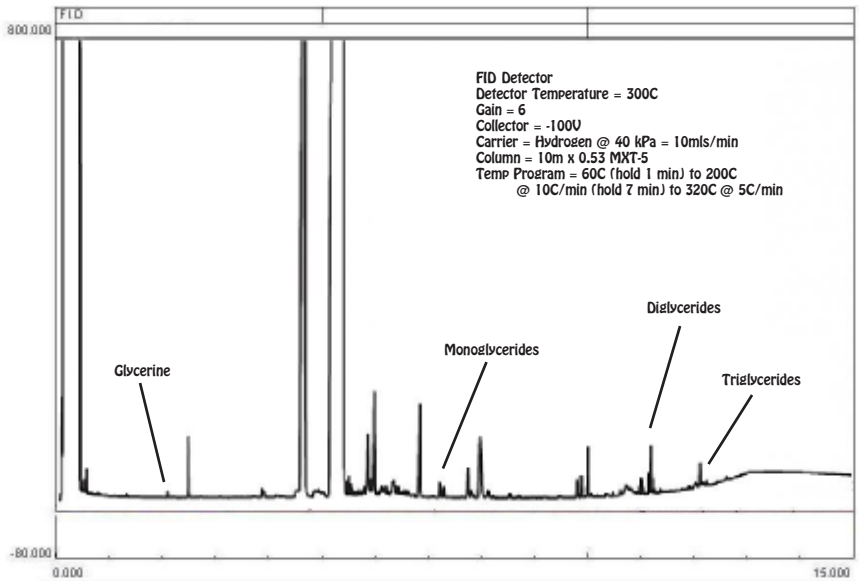
Series 600 GC

Available Configurations Include:

600-C-031 – Series 600 Bio-diesel GC Analyzer (FID, 10m)
500-C-031 – Companion 1 Portable Bio-diesel GC Analyzer (FID, 10m)

Companion 1 Portable GC

Glycerine in Bio-Diesel



Petrochemical

BTU - Heating Valve

DPS Instruments, Inc.

www.dps-instruments.com

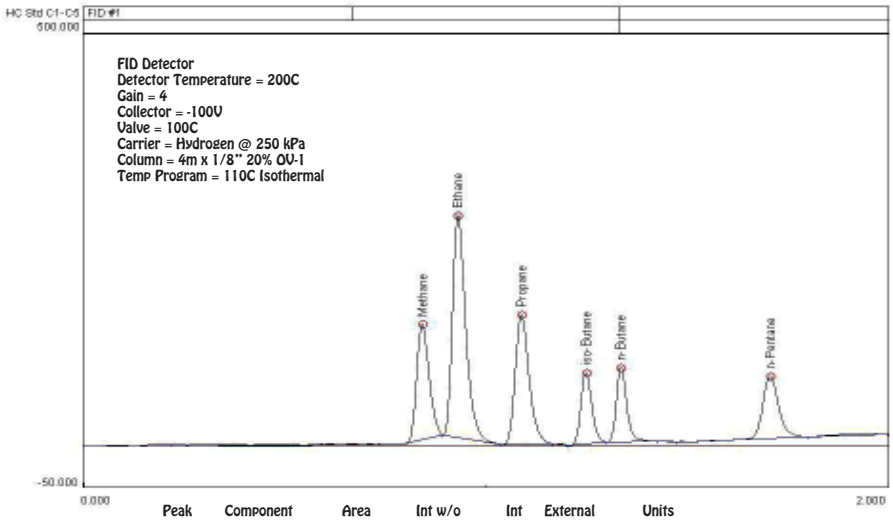
Every day millions of cubic feet of natural gas flow through pipelines around the world. The heating value, measured as BTU, determines the cost and ultimate value of the natural gas. The natural gas may either be in a gas or liquid phase, where larger hydrocarbons always have a higher heating value. The rugged and reliable Series 600 laboratory and Companion portable versions of the DPS BTU GC Systems automatically sample and analyze the natural gases coming from these pipelines. The analysis of C1 - C5 hydrocarbons by our sensitive FID detector takes less than 2 minutes, and we don't program the column oven, so that samples can be run one after another quickly. The BTU value is automatically calculated and reported after each analysis. The GC Systems can also be configured with a second detector to measure whole gas components and a methanizer for Carbon Dioxide. The fully integrated BTU GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-096 - BTU GC Analyzer (FID, Valve, 2m)
500-C-096 - Companion 1 Portable BTU GC Analyzer (FID, Valve, 2m)

Series 600 GC

Low Level Natural Gas Standard



Peak	Component	Area	Int w/o	Int	External	Units
1	Methane	295.5	0.02	20.2	18.2	1010
2	Ethane	604.1	0.019	33.6	31.2	1769.7
3	Propane	370.9	0.008	20.1	20.1	2516.1
4	iso-Butane	159.0	0.003	9.8	9.9	3251.9
5	n-Butane	159.7	0.003	9.9	9.9	3262.3
6	n-Pentane	205.5	0.003	12.0	12.0	4008.7
			0.056	105.5	101.3	

Heating Value of Compound

Mole Fraction

Total BTU Valve

Companion 1 Portable GC

11/2015
Specifications may change without notice.

Petrochemical

Freon Gases

DPS Instruments, Inc.

www.dps-instruments.com

For over 80 years, chlorofluorocarbons have been the compounds of choice to use as refrigerants, which are compounds used in heat cycles that undergo a phase change from a gas to a liquid and back. Until concerns about depletion of the ozone layer, global warming, and the rise in cases of skin cancer. In the 1980's, the most widely used refrigerants were the chlorofluoromethanes, R-12 and R-22, with R-12 being more common in automotive air conditioning and small refrigerators, and R-22 being used for residential and light commercial air conditioning, refrigerators, and freezers. More recently, less ozone destructive compounds like Freon 134, which is a fluorocarbon only, have been developed to replace the ozone depleting chlorofluorocarbons. The DPS Freon Gases GC Systems are designed with safety in mind to check the purity of the Freon, monitor workplace conditions, detect leaking refrigerants, or monitor concentrations in the atmosphere. Let the latest designed high resolution column and the sensitive FID detector do the hard work for you. We have also added a Gas Sampling Valve to automate your sampling and analysis. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Freon Gases GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

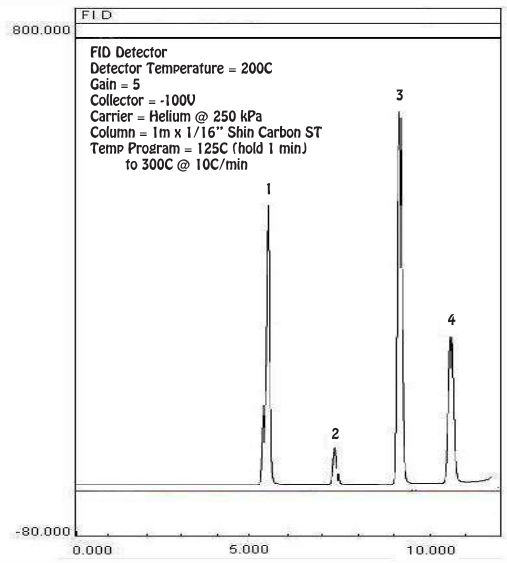
600-C-090 - Series 600 Freon Gases GC Analyzer (FID, Valve, 1m)
500-C-090 - Companion 1 Portable Freon Gases GC Analyzer (FID, Valve, 1m)

Series 600 GC

Companion 1 Portable GC

Freon Gases

Peak	Component	Area
1	Freon 134	2911.8
2	Freon 12	639.5
3	Freon 113	306.7
4	Freon 114	1684.6



11/2015
Specifications may change without notice.

Petrochemical
Hydrocarbon Fuels

DPS Instruments, Inc.

www.dps-instruments.com

From Aviation Fuel, to Gasoline, to Kerosene, to Crude oil and everything in between, Gas Chromatography has been the separation instrument of choice for over 50 years. There are literally hundreds of GC methods for liquid petroleum hydrocarbons analysis from the Petroleum, Chemical, and Environmental industries. Although each method is distinct, most rely on latest designed high resolution capillary columns and the sensitive FID detector. Let our experts help you determine the exact DPS Hydrocarbon Fuels GC System components for your specific requirements with either our Series 600 Lab GC, or the Portable Companion. With the Lab GC we have added a Split/Splitless injector to perform the dilutions for you. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Hydrocarbon Fuels GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

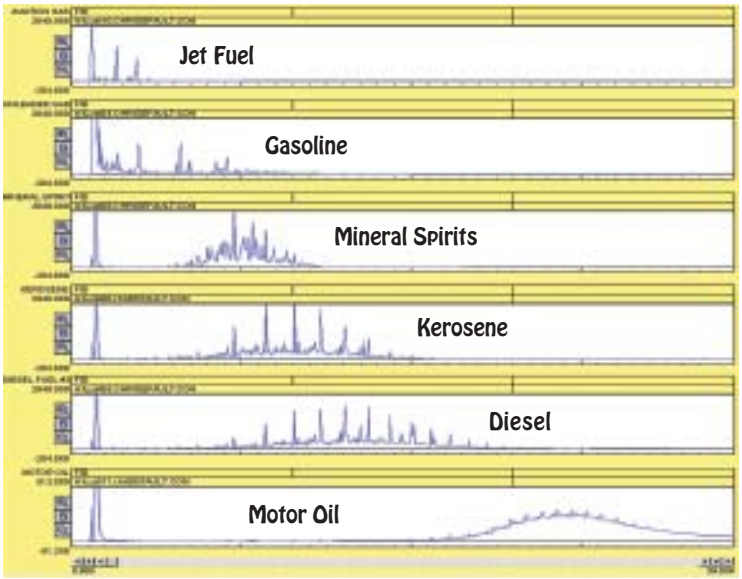
600-C-092 - Series 600 Hydrocarbon Fuels GC Analyzer (FID, S/S, 30m)
500-C-092 - Companion 1 Portable Hydrocarbon Fuels GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Hydrocarbon Fuels

FID Detector
Detector Temperature = 300C
Gain = 4
Collector = -100V
Carrier = Helium @ 40 kPa = 10mls/min
Column = 30m x 0.53 MXT-5
Temperature Program = 60C (hold 2 min)
to 250C @ 8C/min



11/2015
Specifications may change without notice.

Petrochemical
Hydrocarbon Gases

DPS Instruments, Inc.

www.dps-instruments.com

In Natural Gas and other hydrocarbon products, the separations of the light hydrocarbon gases in the C1 - C4 range have always been a challenge. The compound separations are economically critical, because the compounds determine the BTU value, which dictates the value of the gas product. The isomers of the C2's and C4's have, in the past, been particularly difficult to separate. GC Systems have been configured with multiple columns and detectors and complex valve systems to attempt to solve the analysis problem. The development of capillary columns for light hydrocarbon separations has helped tremendously. The DPS Hydrocarbon Gases GC System is configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. In the Series 600 we have added a Split/Splitless injector to dilute concentrated gas samples for you. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. We have added a gas sampling valve to increase your throughput by automating the sampling and then injecting samples for you. The fully integrated Hydrocarbon Gases GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

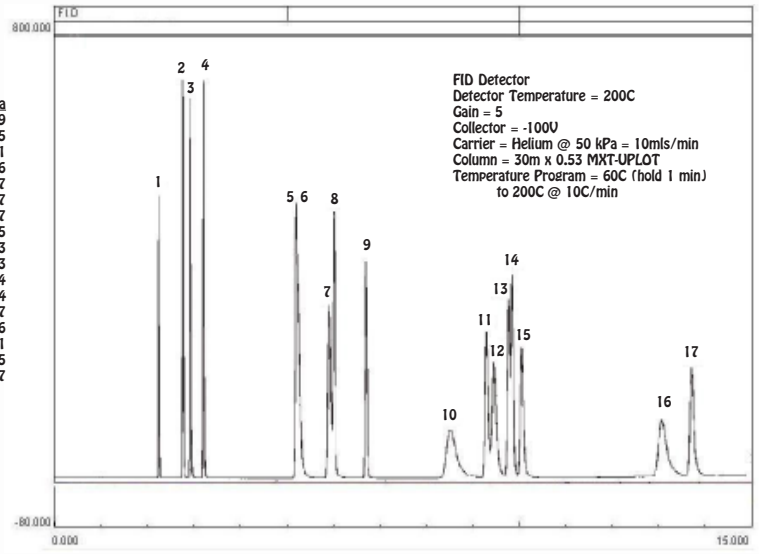
Available Configurations Include:

600-C-091 - Series 600 Hydrocarbon Gases GC Analyzer (FID, S/S, Valve, 30m)
500-C-091 - Companion 1 Portable Hydrocarbon Gases GC Analyzer (FID, Valve, 30m)

Companion 1 Portable GC

Hydrocarbon Gases

Peak	Component	Area
1	Methane	1487.9
2	Ethylene	2639.5
3	Ethene	2484.1
4	Acetylene	2684.6
5	Propane	1204.7
6	Propylene	1192.7
7	Cyclopropane	1204.7
8	Propadiene	1070.5
9	Propyne	980.3
10	iso-Butane	1288.3
11	n-Butane	767.4
12	1-Butene	583.4
13	cis-2-Butene	660.7
14	trans-2-Butene	750.6
15	1,3,-Butadiene	604.1
16	iso-Pentane	960.5
17	n-Pentane	556.7



11/2015
Specifications may change without notice.

Petrochemical

Methods 25 & 25A - C1-C6 Hydrocarbons

DPS Instruments. Inc.

www.dps-instruments.com

Methane is a gas that is naturally formed from the decomposition of biological materials and also produced in many industrial processes. Although Methane is not usually considered an environmental pollutant, the non-Methane composition of gas samples around cities, in industrial areas, and at waste sites is of greater concern. DPS has engineered the Method 25 & 25A GC System, utilizing a Backflush plumbing configuration, to analyze these compounds. Method 25 is for methane and non-methane hydrocarbons, while Method 25A is for total hydrocarbons. The GC System is exactly the same, but not only limited to these analyses, it can also separate the individual C1 - C6 hydrocarbons to further identify the gas sample. Using the rugged and reliable Series 600 Lab GC, or Companion 1 Portable GC, the DPS Method 25 & 25A GC System automatically samples and analyzes the C1 - C6 hydrocarbons using our sensitive FID detector. The fully integrated Method 25 & 25 A GC System is small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

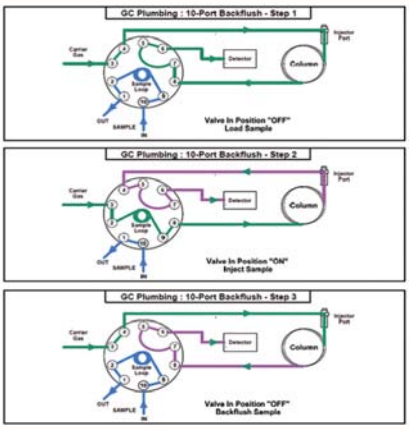
Available Configurations Include:

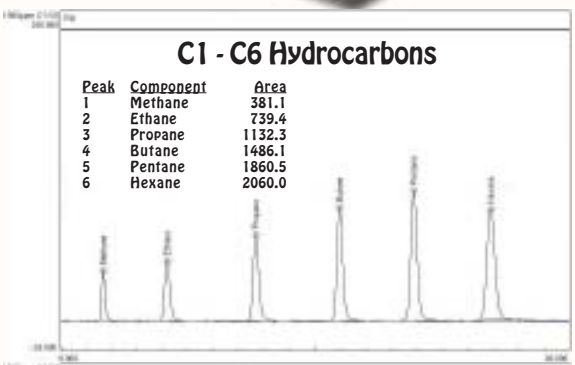
600-C-094 - Series 600 Method 25 & 25A GC Analyzer (FID, Valve, 1m Column)
500-C-094 - Companion 1 Portable Method 25 & 25A GC Analyzer (FID, Valve, 1m Column)

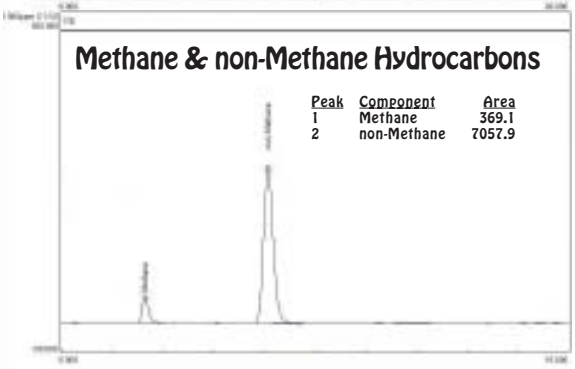
Companion1 Portable GC

Method 25 Hydrocarbons

FID Detector
Detector Temperature = 300C
Gain = 4
Valve = 150C
Collector = -100V
Carrier = Helium @ 120 kPa = 10mls/min
Column = 2m x 1/8" Silica Gel
Temperature Program = 80C (hold 2 min) to 240C @ 15C/min







11/2015
Specifications may change without notice.

Petrochemical

Mine Safety 12

DPS Instruments, Inc.

www.dps-instruments.com

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 DPS Mine Safety 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 DPS GC assures rapid sample turnaround. The fully integrated Mine Safety GC System is small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

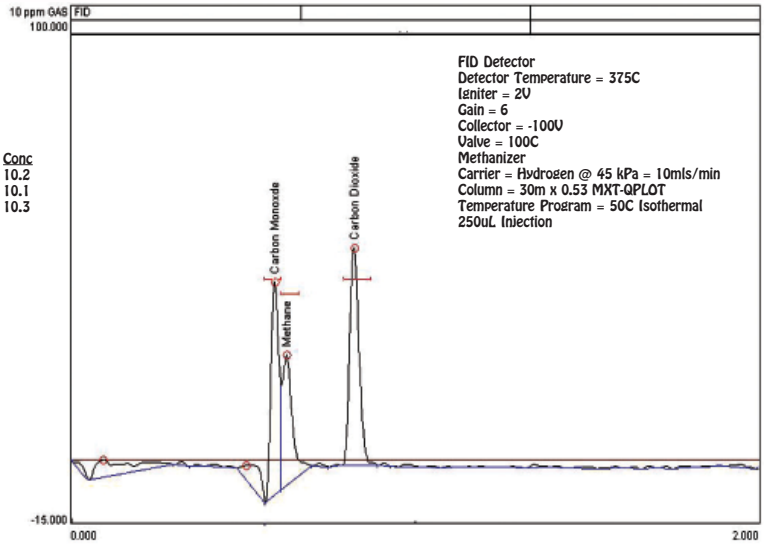
Available Configurations Include:

500-C2-091 - Companion 1 Portable Mine Safety GC Analyzer (FID, 30m)
Includes: 10-port Gas Sampling Valve, Valve Oven, Vacuum Pump, Methanizer, and "Ultra Quiet" Air Compressor

Companion 1 Portable GC

Mine Safety Gases

Peak	Component	Area	Conc
1	Carbon Monoxide	81.4	10.2
2	Methane	61.2	10.1
3	Carbon Dioxide	95.7	10.3



11/2015
Specifications may change without notice.

Petrochemical
Mud-Logging

DPS Instruments. Inc.

www.dps-instruments.com

The process of Mud-logging involves collecting, analyzing and recording the meaningful solids, fluids, and gasses brought to the surface by the drilling fluid (mud). For the gas analysis portion of the mud-logging process, the rugged and reliable DPS Mud-logging GC System automatically samples and analyzes the gases coming out of the mud for methane and heavier hydrocarbons using a sensitive FID detector. The entire cycle time for speciation of C1 - C5 hydrocarbons is less than 2 minutes and the BTU value is automatically calculated. A 2nd FID detector is added to determine total hydrocarbons at the same time. Using a built-in air compressor, the entire system runs off one tank of hydrogen. Adding a methanizer to the FID to analyze CO2 is especially helpful for monitoring a well once you have hit pay dirt! The fully integrated Mud-logging GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

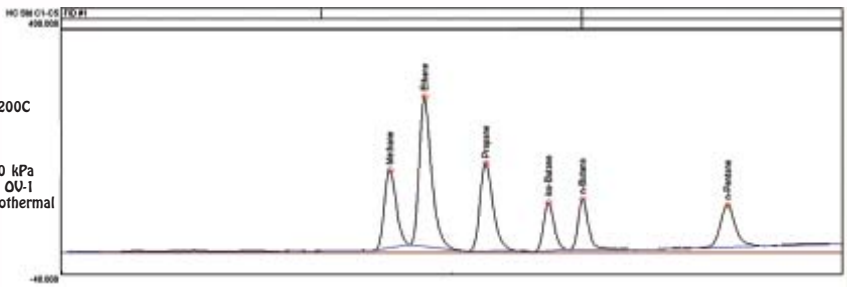
Available Configurations Include:

600-C-093 - Series 600 Mud Logging GC Analyzer (FID, FID, Valve, 2m)
500-C2-093 - Companion 2 Portable Mud Logging GC Analyzer (FID, FID, Valve, 2m)

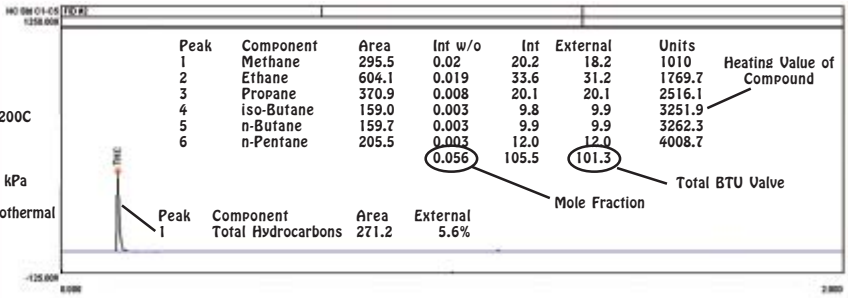
Companion 2 Portable GC

Low Level Natural Gas Standard

FID Detector #1
Detector Temperature = 200C
Gain = 4
Collector = -100V
Valve = 100C
Carrier = Hydrogen @ 250 kPa
Column = 4m x 1/8" 20% OV-1
Temp Program = 110C Isothermal



FID Detector #2
Detector Temperature = 200C
Gain = 3
Collector = -100V
Valve = 100C
Carrier = Hydrogen @ 50 kPa
Column = None
Temp Program = 110C Isothermal



Peak	Component	Area	Int w/o	Int	External	Units	
1	Methane	295.5	0.02	20.2	18.2	1010	Heating Value of Compound
2	Ethane	604.1	0.019	33.6	31.2	1769.7	
3	Propane	370.9	0.008	20.1	20.1	2516.1	
4	iso-Butane	159.0	0.003	9.8	9.9	3251.9	
5	n-Butane	159.7	0.003	9.9	9.9	3262.3	
6	n-Pentane	205.5	0.003	12.0	12.0	4008.7	
			0.056	105.5	101.3		Total BTU Valve

Mole Fraction

Peak	Component	Area	External
1	Total Hydrocarbons	271.2	5.6%

Petrochemical

Natural Gas - Heating Valve & Permanent Gases

DPS Instruments. Inc.

www.dps-instruments.com

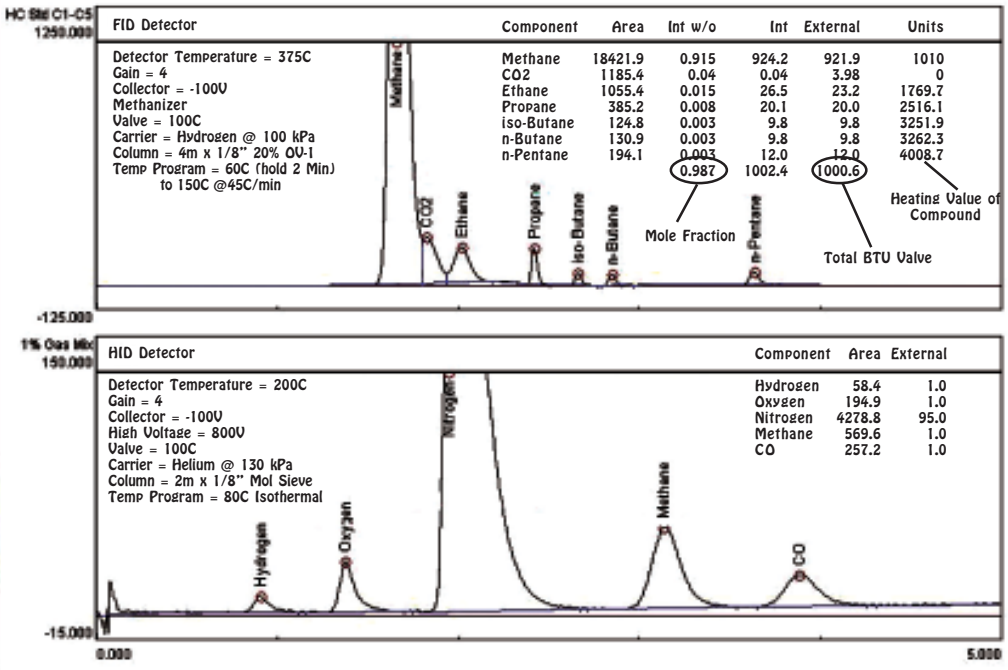
Every day millions of cubic feet of natural gas flow through pipelines around the world. The heating value, sometimes measured as BTU, determines the cost and ultimate value of the natural gas. The natural gas may either be in a gas or liquid phase. Larger hydrocarbons always have a higher heating value. Additionally, it is important to know the contribution of the Permanent Gases (H2, O2, N2, CO & CO2) in the sample. DPS has engineered a GC system to analyze all of these compounds simultaneously using the reliable Series 600 Lab GC, or the rugged Companion 2 Portable GC. The DPS Natural Gas GC Systems automatically sample and analyze the natural gases coming from these pipelines. The analysis of C1 - C5 hydrocarbons with our sensitive FID detector, Permanent Gases with the universal HID detector, and a Methanizer for the Carbon Dioxide. The Heating Value is automatically calculated and reported after each analysis. The fully integrated Natural Gas GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-135 - Series 600 Natural Gas GC Analyzer (HID, FID/Methanizer, Valve, 2 Columns)
500-C2-135 - Companion 2 Natural Gas GC Analyzer (HID, FID/Methanizer, Valve, 2 Columns)

Series 600 GC

High Level Natural Gas Standard



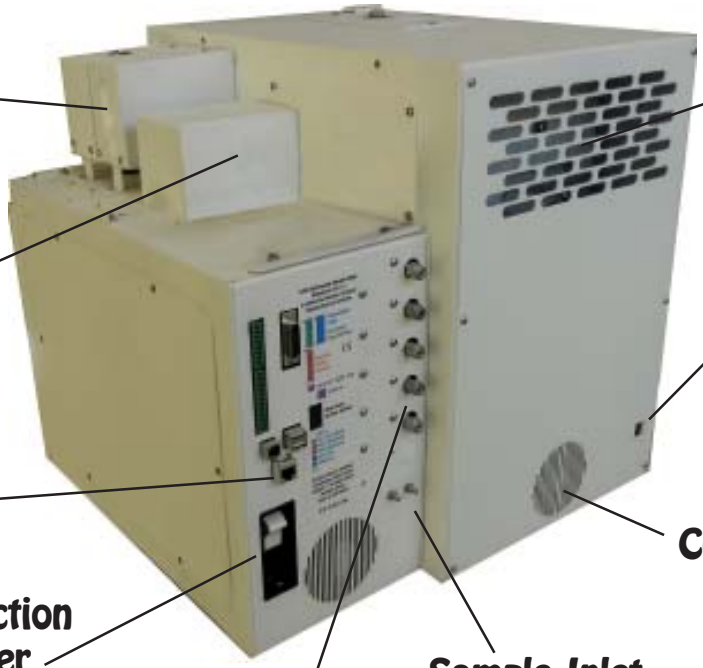
Companion 2 Portable GC

2/2020 Specifications may change without notice.

DPS Natural Gas Layouts

Companion 2 GC

Series 600 GC



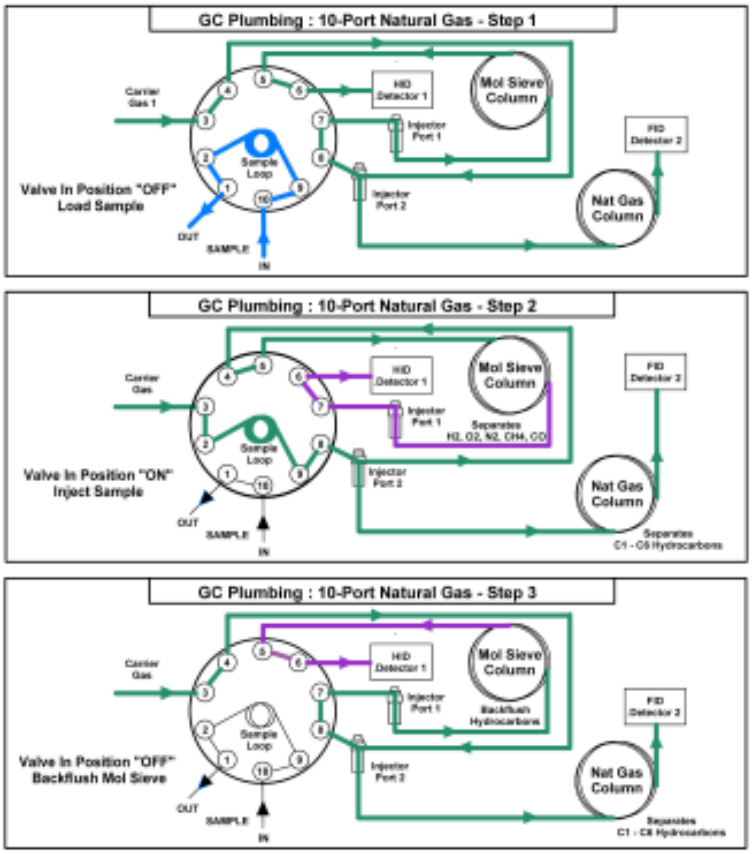
Plumbing Diagram

Load: In Step 1 the sample is loaded onto the fixed volume sample loop with the valve in the OFF position. The sample can be loaded either under positive pressure, or the with the aid of a built-in Vacuum Pump. The same carrier gas flows through each column, however a sample, or standard can always be manually injected into either Injector.

Inject: The Sample Valve is rotated to the ON position and the carrier gases sweep the components from the Sample Loop and splits it between the the analytical columns. The permanent gases are separated in a molecular sieve column going to the HID detector. For the C1-C5 hydrocarbon separation we use a 2m packed column which goes to the FID detector.

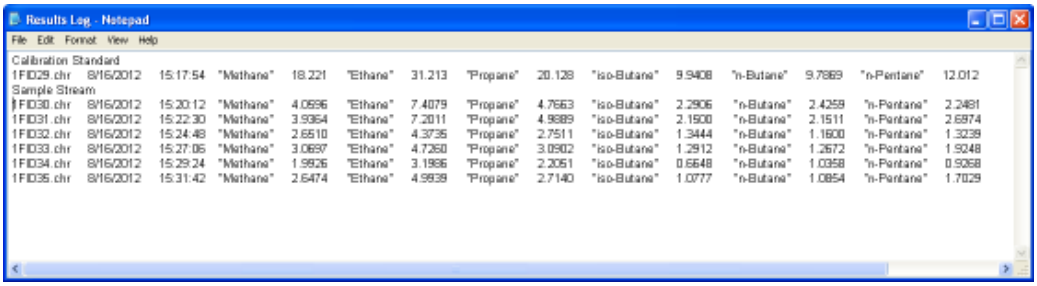
Backflush: The Sample Valve is rotated back to the OFF position and the heavier compounds are swept from the molecular sieve column to keep it clean.

Fast Cycle Times: For the fastest cycle times the Column Oven temperature is held constant, so that one sample can be run iommediately after another. We use a Pressure Program Ramp to push the heavier compounds through the column faster.



Natural Gas Plumbing Diagram

Results Log



Results Log - Notepad

File Edit Format View Help

Calibration Standard

1FID29.chr	8/16/2012	15:17:54	"Methane"	18.221	"Ethane"	31.213	"Propane"	20.128	"iso-Butane"	9.9408	"n-Butane"	9.7869	"n-Pentane"	12.012

Sample Stream

1FID30.chr	8/16/2012	15:20:12	"Methane"	4.0696	"Ethane"	7.4079	"Propane"	4.7663	"iso-Butane"	2.2906	"n-Butane"	2.4258	"n-Pentane"	2.2481
1FID31.chr	8/16/2012	15:22:30	"Methane"	3.9364	"Ethane"	7.2011	"Propane"	4.9889	"iso-Butane"	2.1500	"n-Butane"	2.1511	"n-Pentane"	2.6974
1FID32.chr	8/16/2012	15:24:48	"Methane"	2.6510	"Ethane"	4.3735	"Propane"	2.7511	"iso-Butane"	1.3444	"n-Butane"	1.1600	"n-Pentane"	1.3239
1FID33.chr	8/16/2012	15:27:06	"Methane"	3.0697	"Ethane"	4.7260	"Propane"	3.0902	"iso-Butane"	1.2912	"n-Butane"	1.2672	"n-Pentane"	1.9248
1FID34.chr	8/16/2012	15:29:24	"Methane"	1.9926	"Ethane"	3.1986	"Propane"	2.2051	"iso-Butane"	0.6648	"n-Butane"	1.0358	"n-Pentane"	0.9368
1FID35.chr	8/16/2012	15:31:42	"Methane"	2.6474	"Ethane"	4.9939	"Propane"	2.7140	"iso-Butane"	1.0777	"n-Butane"	1.0854	"n-Pentane"	1.7029

The sample results can be stored and reported in various ways. One convenient method of storing a vast amount of sample data is in a Results Log. A separate Results Log can be generated for each detector. In the example above the first analysis is a low level calibration standard. The subsequent analyses are from a sample stream coming from the well. The BTU value is reported next to each compound. The sample results can be stored on the hard drive of the computer inside the GC, or on an external computer via an ethernet connection.

GC Control Software

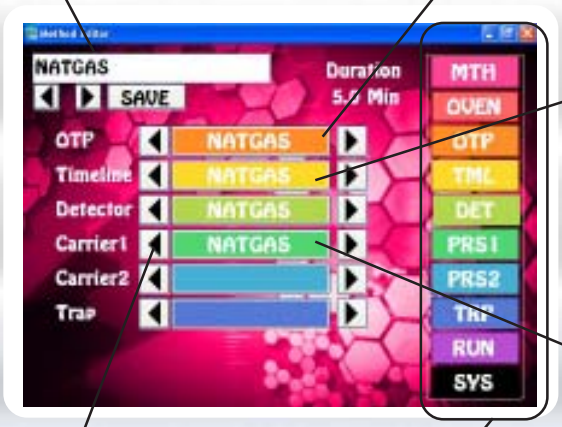
Easy to learn and master using a Graphical User Interface (GUI) and Color Touch Screen.

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

Oven Temp Program Editor

Timeline Editor

Method Name



File Selection Arrows

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

Carrier Pressure 1 Editor

Keyboard to Enter Filenames

Number Pad for entering Values

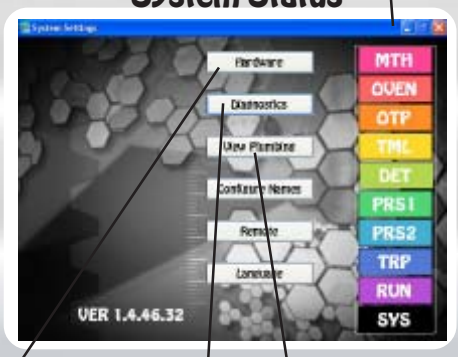
GC Status pages display the parameters in the method, both graphically and as text and values.

Oven Status

Method Editor

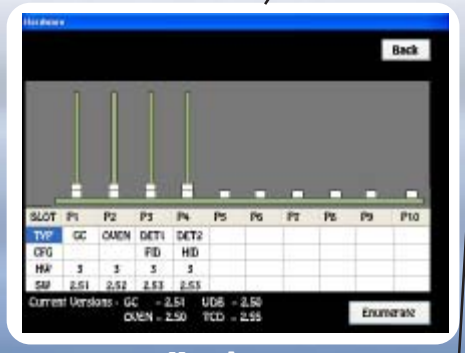
FID Detector Status

System Status



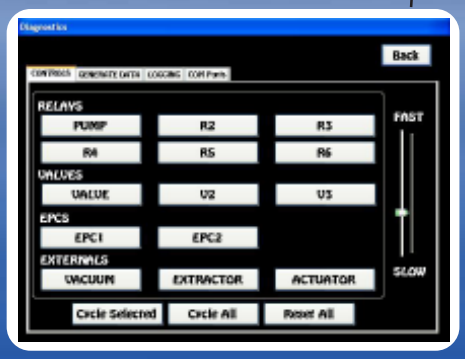
HID Detector Status

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

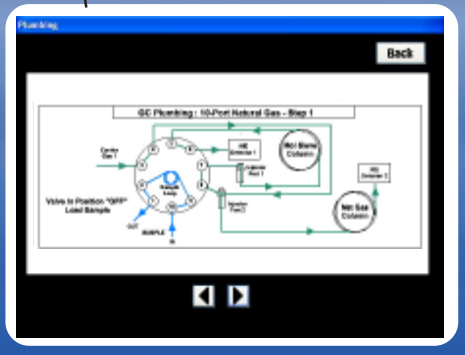


Hardware

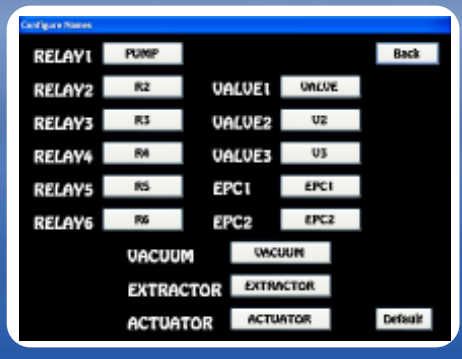
Run Status



Diagnostics



Plumbing



Configure Names

Specifications may change without notice.
01/2016

Natural 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, dependent on sample loop size)
FID – Flameionization 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 20% Ov-1

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!"

DPS Instruments, Inc.

DPS Mudlogging Layouts

Companion 2 GC

Valve Oven

Small High Pressure Gas Cylinder

Gas Connections

Power connection with breaker and line filter

Detectors

Rugged watertight case

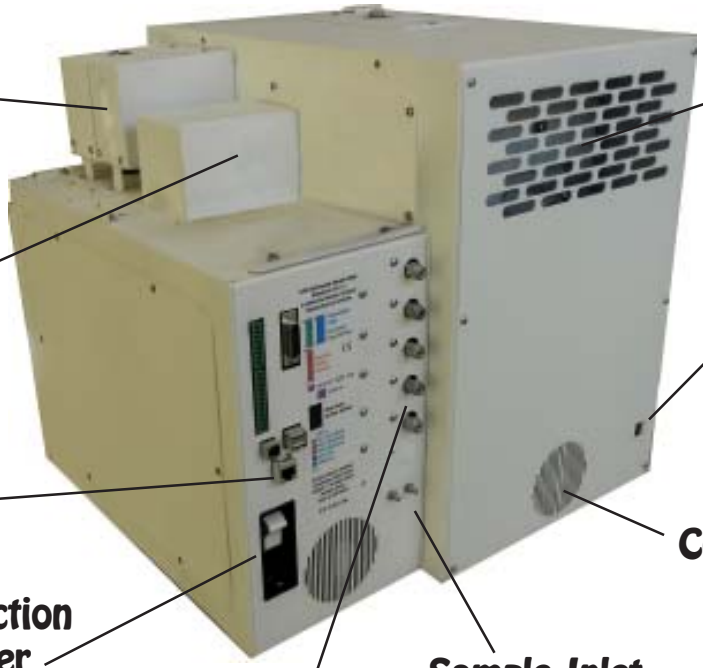
Color Touchscreen

USB & Ethernet Connections

GC Oven

On-Column Injectors

Series 600 GC



Detectors

Flow Through Oven Cooling

Sample Valve and Valve Oven

Voltage Selection (120 or 240Vac)

USB & Ethernet Connections

Cooling Fan

Power connection with breaker and line filter

Sample Inlet

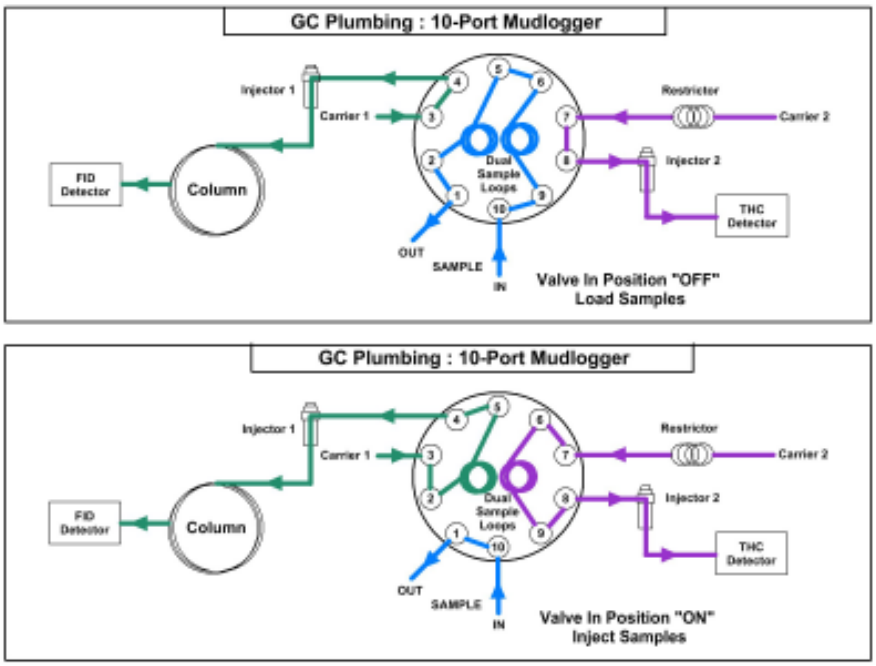
EPC Inlets

Plumbing Diagram

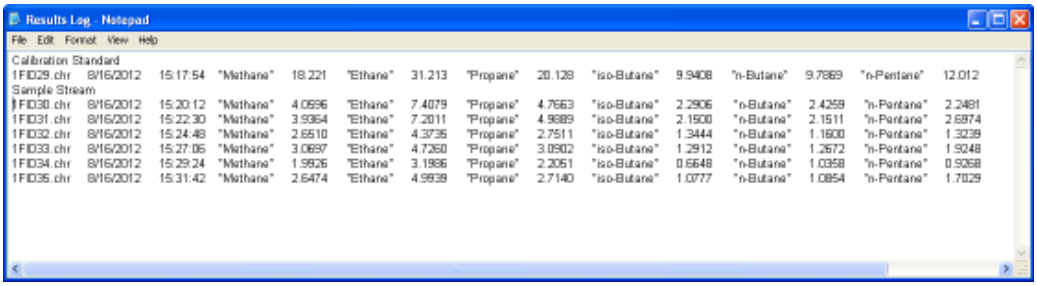
Load: The sample is simultaneously loaded onto both sample loops, either under positive pressure, or the with the aid of a built-in Vacuum Pump. Independent carrier gases connect to each injector. A sample, or standard can always be manually injected into either Injector.

Inject: The Sample Valve is rotated to the ON position and the carrier gases sweep the components from the Sample Loop onto the analytical column and to the THC detector. For the C1-C5 hydrocarbon separation we use a 2m packed column. For the fastest cycle times the Column Oven temperature is held constant, however we use a Pressure Program Ramp to push the heavier compounds through the column faster. For the Total Hydrocarbon analysis there is no column connected to the 2nd injector and all of the hydrocarbons pass to the detector together generating a THC peak, that can be quantitated and reported.

Dual Sample Loop Plumbing Diagram



Results Log



Results Log - Notepad

File Edit Format View Help

Calibration Standard													
1FID29.chr	8/16/2012	15:17:54	"Methane"	18.221	"Ethane"	31.213	"Propane"	20.128	"iso-Butane"	9.9408	"n-Butane"	9.7869	"n-Pentane"	12.012
Sample Stream													
1FID30.chr	8/16/2012	15:20:12	"Methane"	4.0696	"Ethane"	7.4079	"Propane"	4.7663	"iso-Butane"	2.2906	"n-Butane"	2.4258	"n-Pentane"	2.2481
1FID31.chr	8/16/2012	15:22:30	"Methane"	3.9364	"Ethane"	7.2011	"Propane"	4.9889	"iso-Butane"	2.1500	"n-Butane"	2.1511	"n-Pentane"	2.6974
1FID32.chr	8/16/2012	15:24:48	"Methane"	2.6510	"Ethane"	4.3735	"Propane"	2.7511	"iso-Butane"	1.3444	"n-Butane"	1.1600	"n-Pentane"	1.3239
1FID33.chr	8/16/2012	15:27:06	"Methane"	3.0697	"Ethane"	4.7260	"Propane"	3.0902	"iso-Butane"	1.2912	"n-Butane"	1.2672	"n-Pentane"	1.9248
1FID34.chr	8/16/2012	15:29:24	"Methane"	1.9926	"Ethane"	3.1986	"Propane"	2.2051	"iso-Butane"	0.6648	"n-Butane"	1.0358	"n-Pentane"	0.9368
1FID35.chr	8/16/2012	15:31:42	"Methane"	2.6474	"Ethane"	4.9939	"Propane"	2.7140	"iso-Butane"	1.0777	"n-Butane"	1.0854	"n-Pentane"	1.7029

The sample results can be stored and reported in various ways. One convenient method of storing a vast amount of sample data is in a Results Log. A separate Results Log can be generated for each detector. In the example above the first analysis is a low level calibration standard. The subsequent analyses are from a sample stream coming from the well. The BTU value is reported next to each compound. The sample results can be stored on the hard drive of the computer inside the GC, or on an external computer via an ethernet connection.

GC Control Software

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

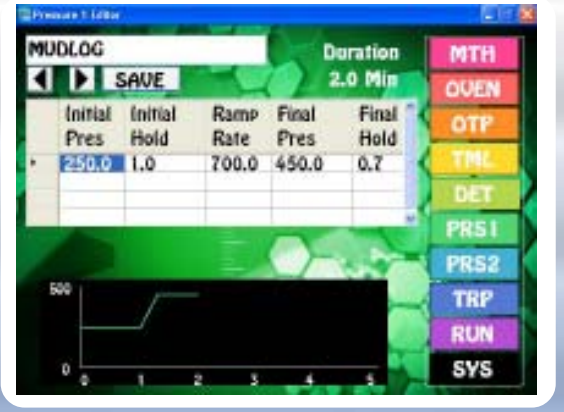
Editors let you customize the files associated with the GC Method.

Oven Temp Program Editor

Timeline Editor

Method Name

File Selection Arrows



Carrier Pressure 1 Editor

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

Carrier Pressure 2 Editor

Keyboard to Enter Filenames

Number Pad for entering Values

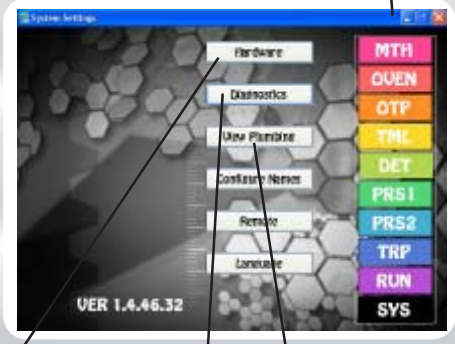
GC Status pages display the parameters in the method, both graphically and as text and values.

Oven Status

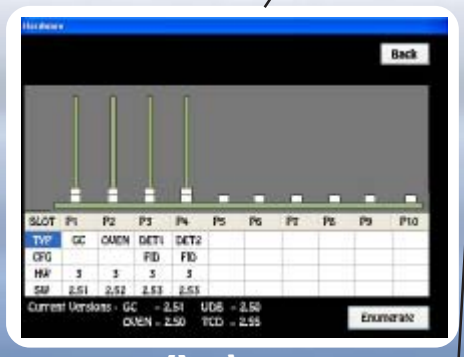
Method Editor

FID1 Detector Status

System Status

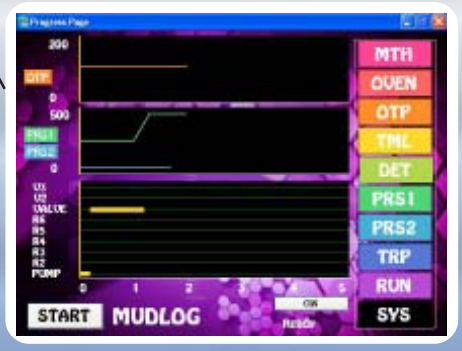


FID2 Detector Status

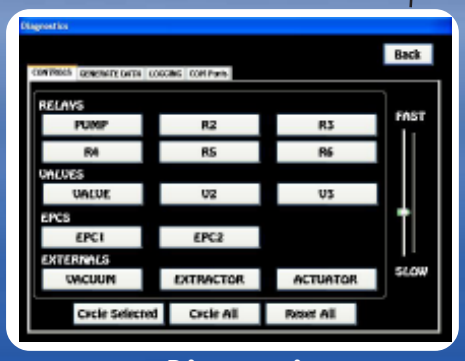


Hardware

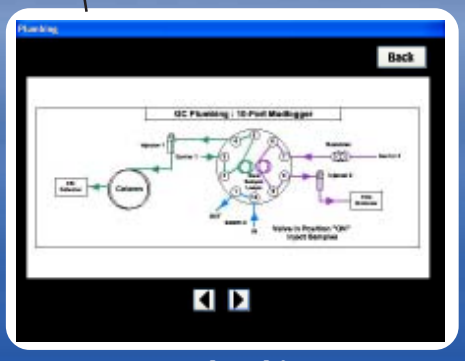
System status pages display the health and viability of the GC instrument.



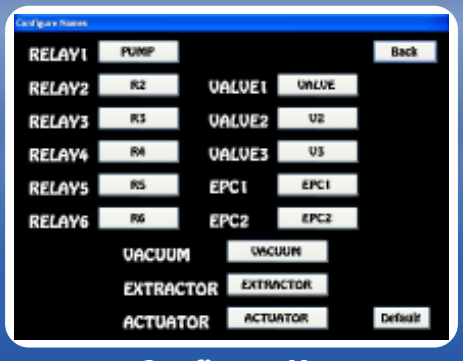
Run Status



Diagnostics



Plumbing



Configure Names

Specifications may change without notice.
01/2016

Mudlogging 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.

Detectors:
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

Column:
2m 20% OV-1

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

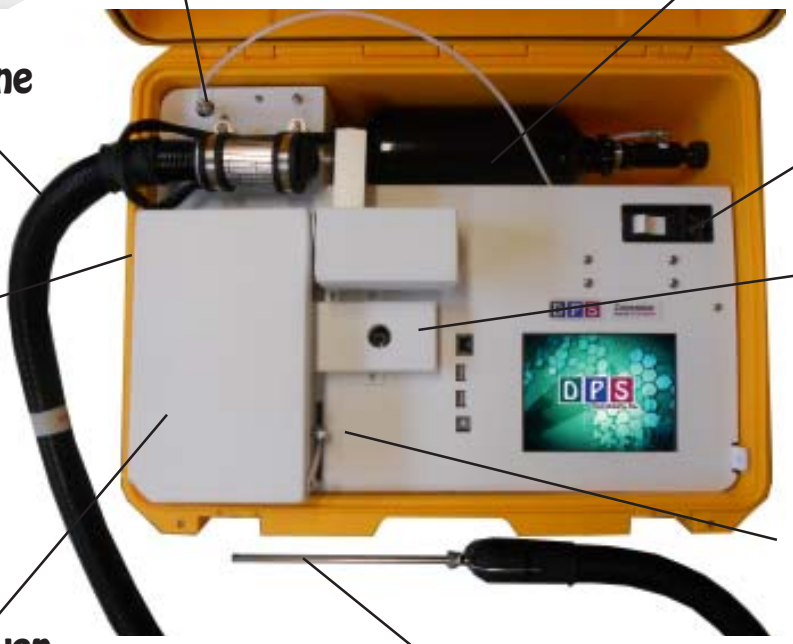
Data Communications:
- Bi-directional communication with popular Data System

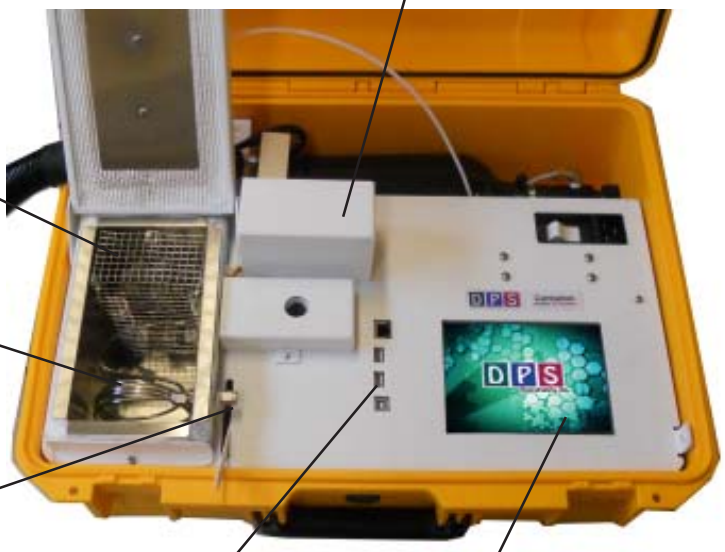
Network Connectivity:
- Enterprise Compatible Network GC running Windows XPe
- Ethernet Connection using Windows Network Protocol
- On Board ETX Computer for GC Control and Data Acquisition
- Remote Control of GC and Data Acquisition over LAN

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

DPS Instruments, Inc.

DPS Companion Method 25 Layout

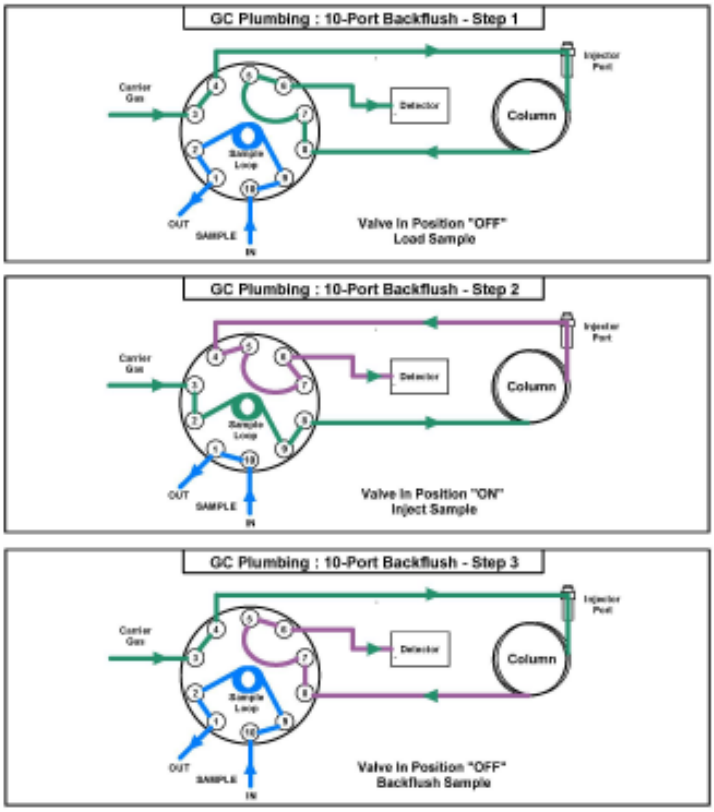




Plumbing Diagram

Load Air Sample: The vacuum pump draws the sample from the Transfer Line through the fixed Sample Loop to the pump to limit any possible cross contamination between samples. The entire sequence of the Method 25 GC Analyzer is automated through the Timeline of the DPS Control Software for the analysis of one sample, or the system can be set up to run unattended 24/7, collecting and analyzing samples every few minutes.

Backflush Configuration: With the Backflush plumbing configuration the sample is injected into the column by rotating the valve. The valve and sample lines are heated creating a inert sample path. When the compounds of interest have eluted from the column, the rest of the compounds can be Backflushed out of the column to the detector as one peak, which represents the total of all other compounds. For a Method 25 analysis Methane is allowed to elute form the column and then the valve is rotated back to Backflush all of the other compounds forming the non-Methane peak. Both Methane and non-Methane constituents are calibrated separately. By simply adjusting the time at which the valve rotates back, the analysis could be altered to separate Methane, Ethane and then a total of C3+ compounds. Using the same technique the valve can be rotated to Backflush after any carbon group C1, C2, C3, C4, C5 etc.



Backflush Plumbing Diagram

Results, Data & Conncetivity

Results: The Results can be saved for each sample, or they can be printed, or they can be tabulated into a .LOG file, when you are collecting a vast amount of data over a long time period. The format of the. LOG file is text, so it can be opened by any word processing program.

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.

Method 25 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.

Detectors:
FID – Flame Ionization Detector

- 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:
Packed, or Capillary Columns

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 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:
- Backflush Sample Plumbing
- Heated Transfer Line
- Air Compressor for FID

Injectors:
- Heated On-column Injector
- 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!"

DPS Instruments, Inc.

CHROMalytic +61(0)3 9762 2034
TECHnology Pty Ltd
Australian Distributors
Importers & Manufacurers
www.chromtech.net.au
Website NEW : www.chromalytic.net.au E-mail : info@chromtech.net.au Tel: 03 9762 2034 . . . in AUSTRALIA

Micro-TCD GC Applications

Transformer Oil Gas Analysis - TOGA

The DPS Micro-TCD TOGA GC System is designed to analyze oil from electrical insulation materials that may have decomposed under thermal, or electrical stresses following ASTM 3612C for gas analysis using headspace injection. The gaseous decomposition products indicate the type of fault inside the transformer.

The DPS Micro-TCD TOGA GC System separates all 11 components in one injection; Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide, Ethane, Carbon Dioxide, Ethylene, Propane, Acetylene, and Propylene. All compounds are detected to 1ppm with the ultra-sensitive Micro-TCD Detector (Micro-machined Thermal Conductivity Detector) in less than 2 minutes.

The headspace sample is heated and stirred by the 42 vial Autosampler prior to injection into the 2 channel TOGA GC System. The 1st Channel separates the permanent gases and the 2nd Channel separates the C2-C3 hydrocarbons and CO2. With the 6 heating chamber oven, the Autosampler can inject a sample every 5 min, making this the fastest TOGA analyzer ever.

The combined power of a 42 vial Dynamic Headspace Autosampler and the rugged and versatile DPS Micro-TCD GC make this routine analysis quick and easy.

Micro-TCD TOGA GC System
Permanent Gases &
Light Hydrocarbons
Dissolved in oil!

Powerful Combination

Headspace Autosampler

Micro-TCD GC System

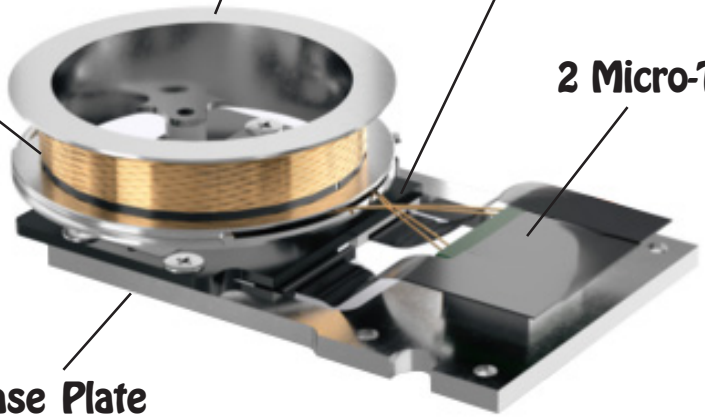
General Specifications:

- Micro-TCD Gas Chromatograph
- 42 Vial Headspace Autosampler
- TOGA analysis in less than 2 min
- 2 Channels - GC Column Oven/Micro-TCD´s
- Fast & Accurate with Low Maintenance
- Easy Chromatography Data System
- Ultra Compact and Lightweight,
  GC (20 x 15 x 10 cm), approximately 8 kg
  AS (33 x 64 x 32 cm), approximately 10 kg

DPS Instruments, Inc.

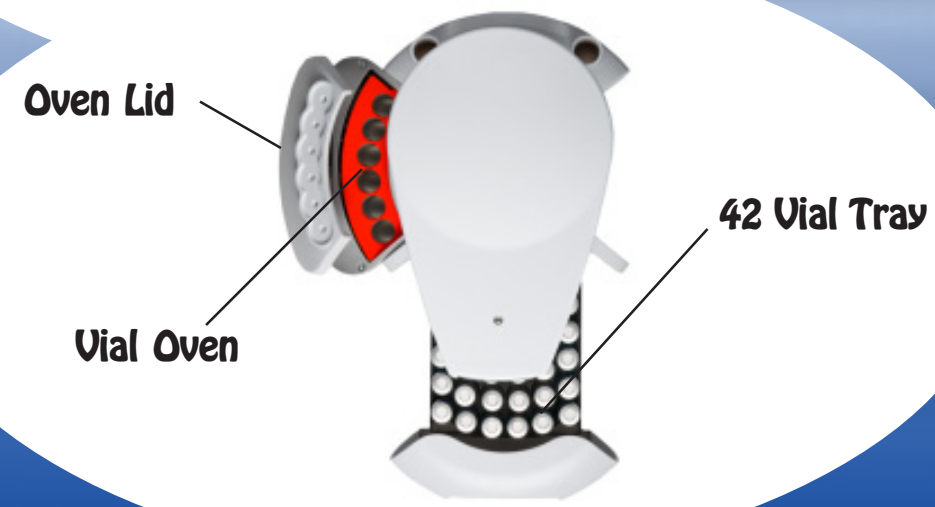
DPS Micro-TCD GC Layout

DPS Micro GC Channel



Dynamic Headspace Autosampler

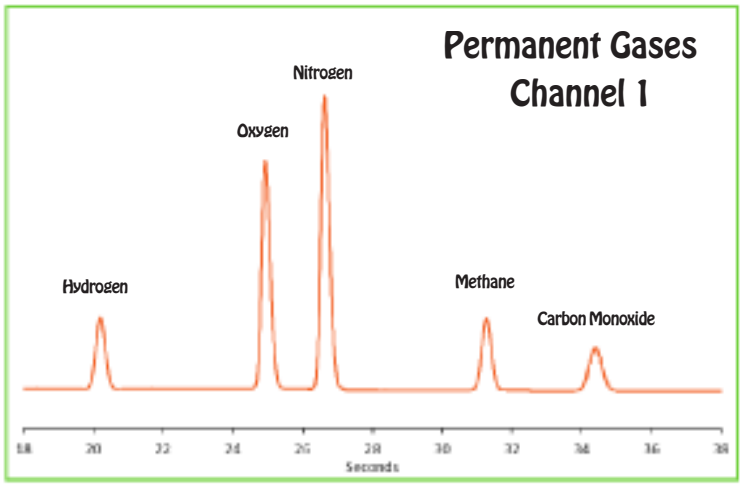
Top View



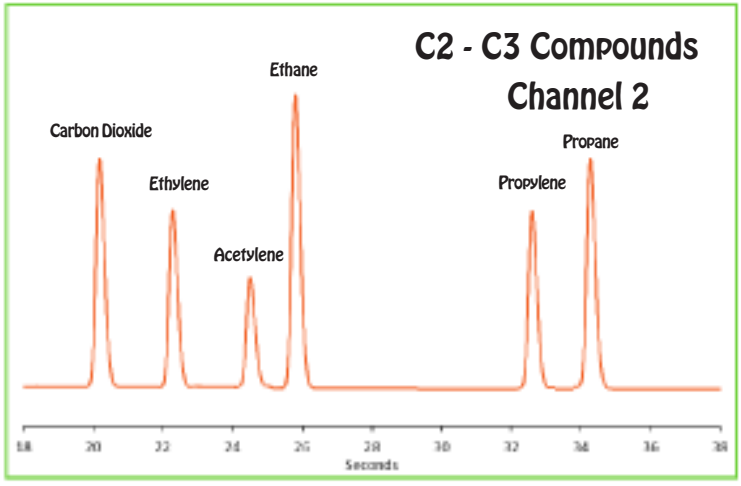
DPS Micro-TCD TOGA GC System

Channel 1 - A Molecúlar Sieve column is used to separate the Permanent Gas components: Hydrogen, Oxygen, Nitrogen, Methane & Carbon Monoxide using helium as a carrier gas.

After the compounds elute we back-flush the pre-column to keep the Molecular Sieve free of heavier compounds.



Channel 2 - A BOND column is used to separate the C2 - C3 Gas components: Ethane, Carbon Dioxide, Ethylene, Propane, Acetylene & Propylene using helium as a carrier gas.



DPS Micro-TCD TOGA GC Features

System Configuration - A Simple and efficient configuration combining the power of the rugged Micro-TCD GC with 2 Channels and versatile 42 vial Dynamic Headspace Autosampler. Each Channel contains a GC Oven, Analytical Column, Pre-Column, 2 Micro-TCD Detectors, Injection Valve, Back-Flush valve and Electronic & Gas Connections.

Sample Information - The eleven most common compounds are included in this analysis scheme which meets ASTM-D3612C methodology. The compounds included in this method are H2, O2, N2, CH4, CO, C2H6, CO2, C2H4, C2H2, C3H6, and C3H4. The results from the analysis of these compounds helps target the underlying fault condition of the transformer. The action levels indicate the concentration levels where the falut is severe and action should be taken to mitigate any possible dangerous situation.

Micro-TCD - Parts per Million (ppm)

No.	Compound	DL	Action Level
1	Hydrogen	1-5**	100-500
2	Oxygen	1	NA
3	Nitrogen	1	NA
4	Methane	1	100-400
5	Carbon Monoxide	1	100-1000
6	Ethane	1	100-400
7	Carbon Dioxide	1	150-3000
8	Ethylene	1	500-2000
9	Propane	1	100-500
10	Acetylene	1	100-400
11	Proplyene	1	100-500

** **Hydrogen** - For the lowest possible Hydrogen Detection Limit a 3rd Channel can be addded to the system specifically for Hydrogen and Nitrogen would be used as the carrier gas, instead of Helium.

Specifications may change without notice.
02/2023

DPS Micro-TCD TOGA GC System Specifications:

Micro-TCD GC:

Micro GC Channels:
- 2 Micro GC Channels in an Exchangeable Cartridge
- Each GC Channel contains GC Oven, Analytical Column,
  Pre-Column, 2X Micro-TCD Detectors, Injection and

Software/GC Control Interface:
- Enter and store GC Methods via Computer connection
- Safety Limits on all user entered parameters
- Communications: RS232, RS485, Ethernet, Digital I/O
- Protocols: Modbus, TCP
- Sequencing for Sampling, Injection, Backflush, etc.
- Memory Storage - up to 256Gb
- Control for Carrier Gas(s)
- Control for Valves (Injection, Backflush, Sample)
- Universal voltage input (85 – 240 Vac, 50-60Hz)
- Power Supply - (20 – 28 Vdc)

Features:
- 150 °C Temperature Limit with 0.1 °C set-point resolution
- Isothermal Operation
- Repeatability - < 0.05% RSD
- Cycle Time (Typical) - 60 sec
- Detection Limit (500ppb - 100%)
- Sequence Controlled Injection Time
- 1 Micro-machined Injector per Channel
- 1 Pre-Column with Backflush per Channel
- 1 Analytical Column per Channel
- Dimensions: 20 x 15 x 10 cm
- Weight: 10.0kg

Headspace Autosampler:

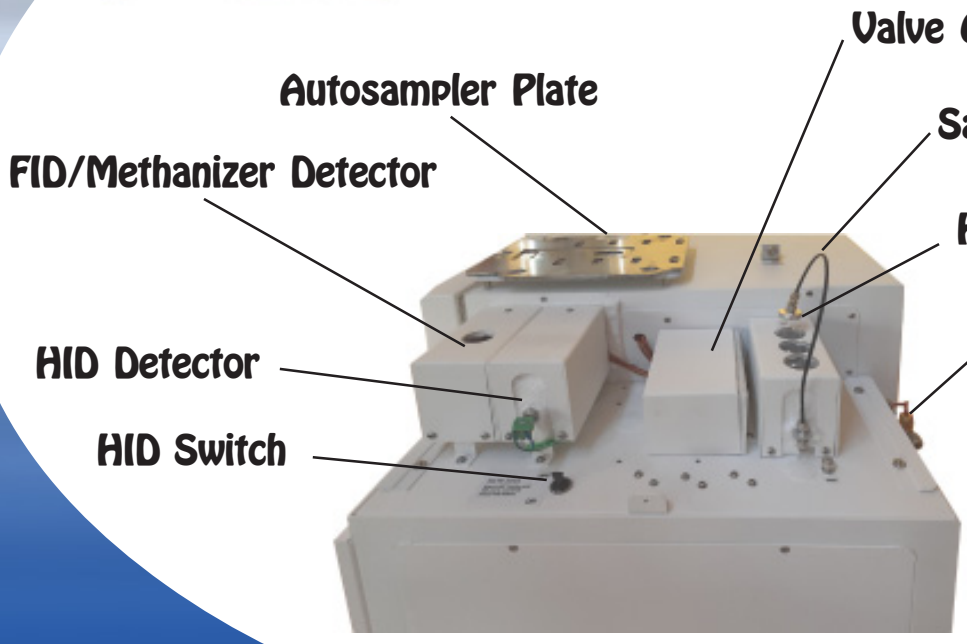
Features:
- Sampling: 42 Vials 20ml Headspace
- 2X Sample Probes
- Pull Up Strokes: Up to 15 Strokes
- Filling Speed: 0.5 - 100ml/min
- Time between Samples: 0 - 100 mins
- Shaking Method: Orbital
- Incubation Oven: 6 position
- Incubation Time: 0 - 999 mins
- Oven Temperature: 40 - 170C
- Shaker Speed: Very Low to Very High
- Shaking Cycles: 0 - 9.9 mins
- Probe Injection Depth: Varaible
- Electrical Control: LAN & TTL
- Dimensions: 330 x 640 x 320mm
- Weight: 10.0kg
- Power Supply: 100-240VAC, 50-60Hz

Headspace Autosampler

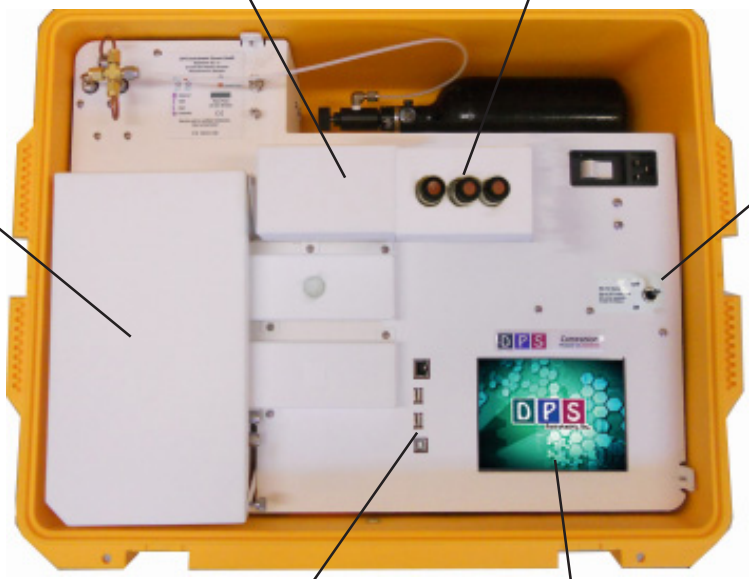
Micro-TCD GC System

Transformer Oil Gas Analysis - TOGA

DPS Series 600 TOGA Layout



DPS Companion 2 TOGA Layout



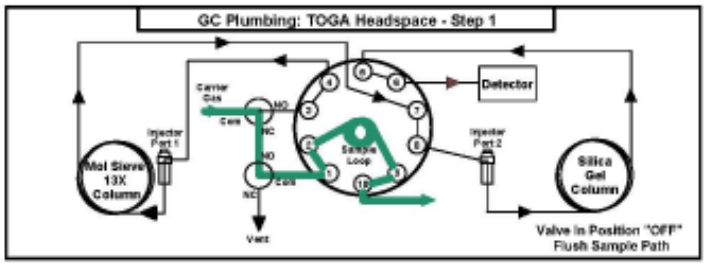
TOGA Plumbing Diagram

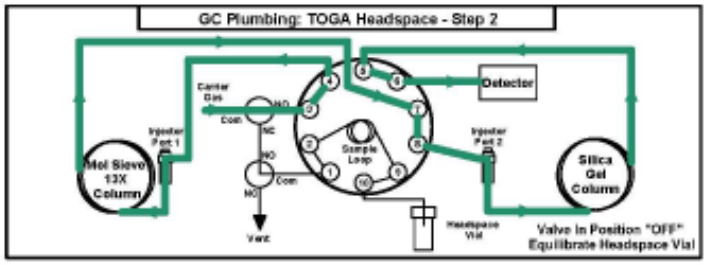
TOGA Headspace Concentrator - The Headspace Concentrator for Companion GC's are built right in to provide the shortest possible sample path. The Sample Vial is heated and then consistently Pressurized before loading the Sample Loop. A fixed Sample Loop ensures reproducible sampling and the sample lines are Flushed between analyses to limit any cross over contamination. The entire sequence of the Headspace Concentrator is automated through the Timeline sequence of the DPS GC Control Software for the analysis of one sample at a time, while two other samples are heated to equilibrate.

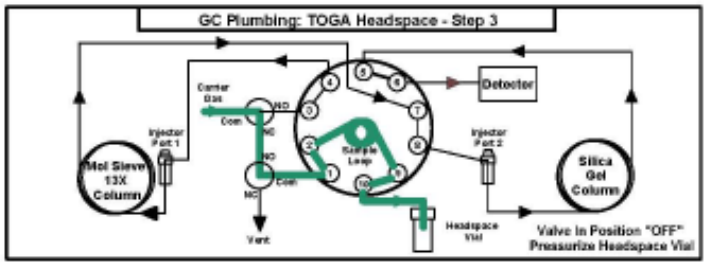
TOGA Plumbing Diagram - In the 1st Step the carrier gas is diverted to Flush out the Sample Lines between runs. During the 2nd Step the carrier gas flows to the analytical column and the Headspace Vial is heated with the Vial Heater and allowed to equilibrate. The Sample Probe is then inserted into the Headspace Vial. During the 3rd Step the Headspace Vial is pressurized for a few seconds. In the 4th Step the sample is loaded onto the Sample Loop by releasing the pressure in the headspace vial. In the 5th Step the Sample Valve is rotated to the ON position and the carrier gas sweeps the components from the Sample Loop onto the analytical columns.

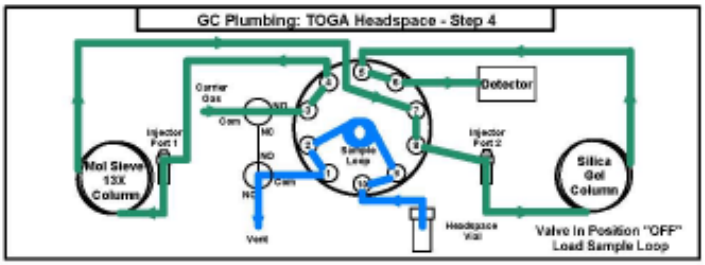
TOGA Column Configuration - The unique 2 column configuration simplifies the compound separation and analysis of the TOGA Headspace sample. The columns are plumbed in series through the same Sample Valve as the Headspace Concentrator.

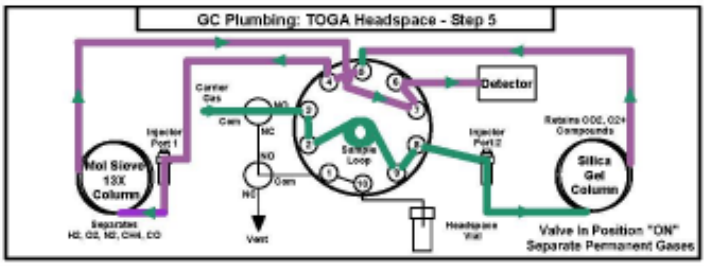
In Step 5 the Sample Valve is rotated to Inject the sample onto the analytical columns. The Silica Gel column retains CO2 & the C2+ hydrocarbons, while the lighter compounds (H2, O2, N2, CH4, & CO) pass through and are further separated on the Molecular Sieve column. Once the lighter compounds have been separated the valve is rotated back in Step 6 and the heavier compounds (CO2 & C2+ hydrocarbons) are separated on the Silica Gel column.

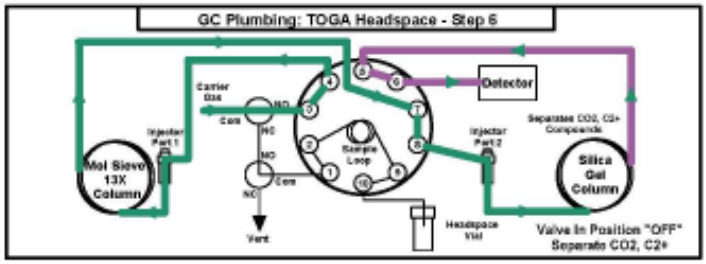












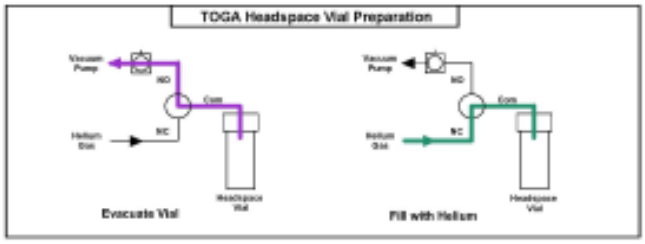
TOGA Headspace Plumbing Diagram

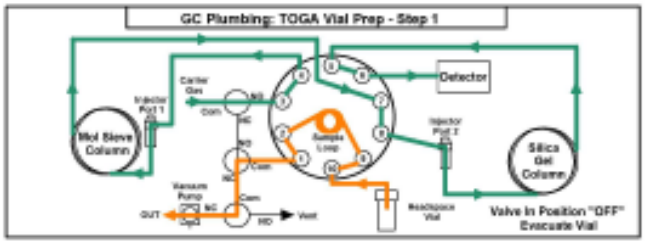
Vial Preparation Station

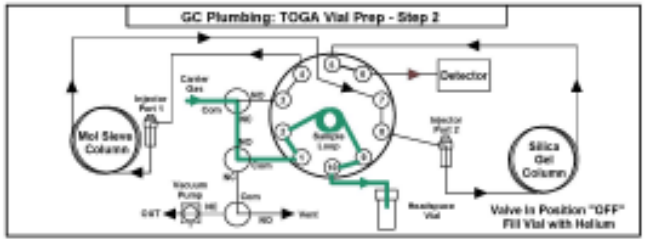
Clean Headspace Vials - One of the most difficult parts of the TOGA analyses is the sampling proceedure. The first step is taking a gas tight syringe and inserting the needle under the sureface of the oil to get a representative sample. The second step in injecting the oil into a clean vial. If either step is not sucessful, then you will see Oxygen and Nitrogen contamination from the air.

To insure that the sample vial is clean we have built in a Vial Preparation Station. Using the same technique that cylinder manufacturers employ to clean gas cylinders between uses; we evacuate, then re-fill the vial with helium several times to reduce Oxygen and Nitrogen to low ppm levels. The helium comes from the same supply as the carrier gas. A 2nd Method is loaded in the DPS Software to automatically clean the vials. The sample probe is inserted through the septum and the START button is pressed. The vials are prepared one at a time, but several can be prepared at once to be used throughout the day.

Plumbing Diagram - The first diagram is simplified to show that we evacuate and re-fill the vial using carrier gas. The 2nd diagram is the atual plumbing configuration when the Vial Preparation Station is connected to the rest of the TOGA plumbing.





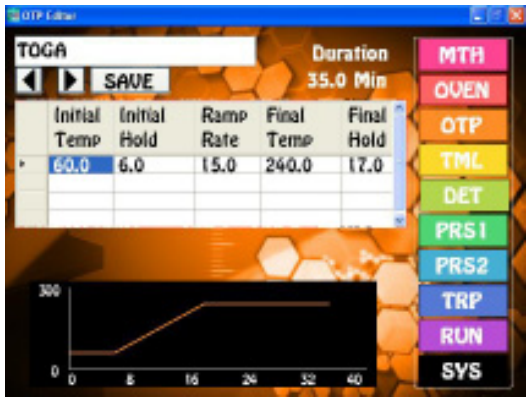


TOGA Vial Preparation Diagrams

TOGA GC Control Software

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

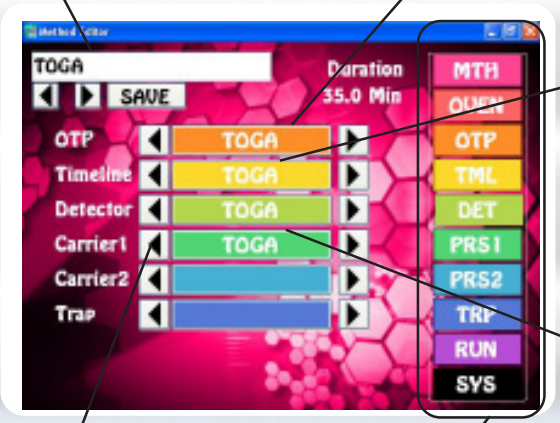
Editors let you customize the files associated with the GC Method.



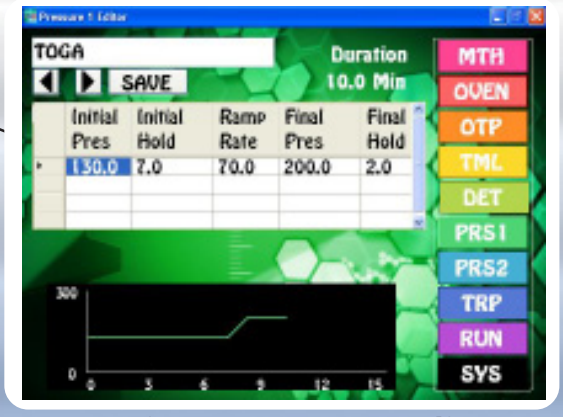
Oven Temp Program Editor

Timeline Editor

Method Name



File Selection Arrows



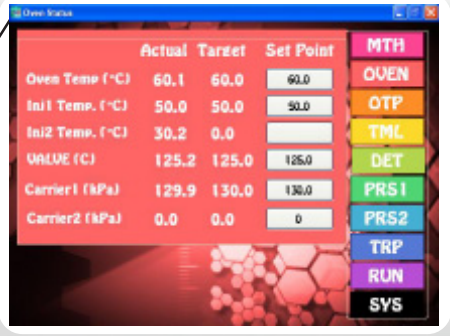
Carrier Pressure 1 Editor

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

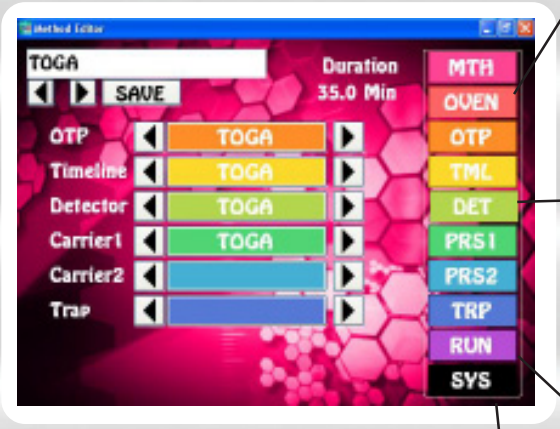
Keyboard to Enter Filenames

Number Pad for entering Values

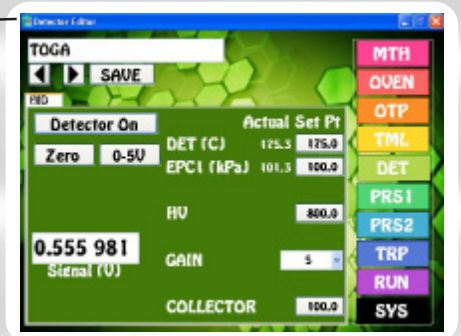
GC Status pages display the parameters in the method, both graphically and as text and values.



Oven Status

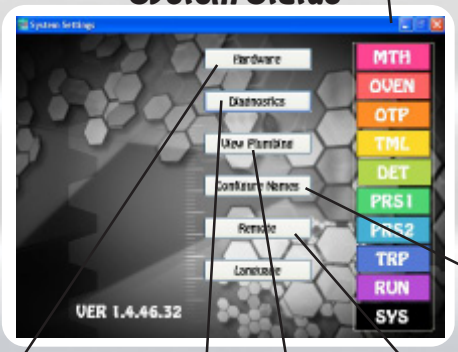


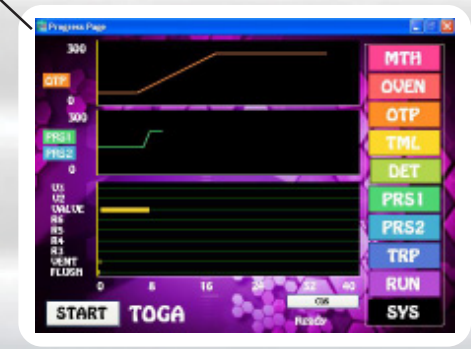
Method Editor



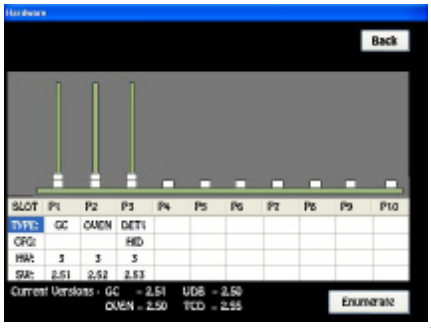
Detector Status

System Status



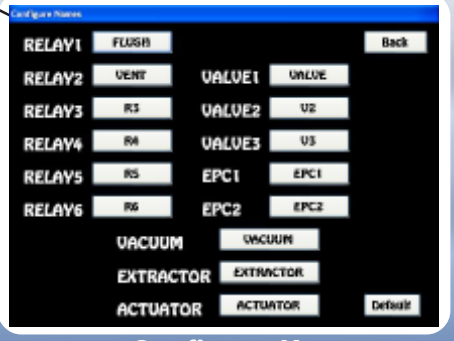


Run Status

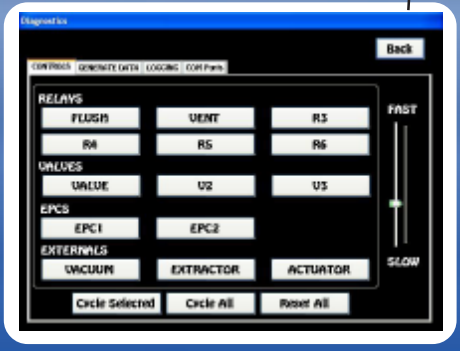


Hardware

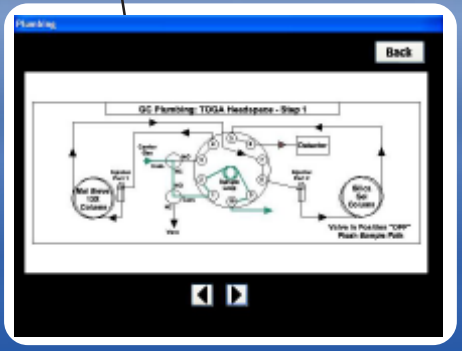
System status pages display the health and viability of the GC instrument.

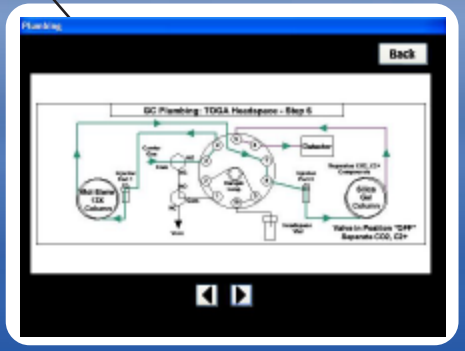


Configure Names



Diagnostics





Plumbing - Steps 1...6

TOGA Gas Chromatograph Features

System Configuration - A Simple and efficient configuration using two packed columns, one valve, and a single HID Detector, or the HID in series with a FID/Methanizer The Silica Gel column separates all of the compounds except it has trouble with the permanent gases. To solve this problem, we have added a Molecular Sieve column in series with the Silica Gel column to separate the permanent gases. Once they are separated we switch the valve back to take the Molecular Sieve column out of the sample path and let the remaining compounds travel through the Silica Gel column to the HID detector.

Sample Information - The eleven most common compounds are included in this analysis scheme which meets ASTM-D3612C methodology. The compounds included in this method are H2, O2, N2, CH4, CO, C2H6, CO2, C2H4, C2H2, C3H6, and C3H4. The results from the analysis of these compounds helps target the underlying fault condition of the transformer. The action levels indicate the concentration levels where the falut is severe and action should be taken to mitigate any possible dangerous situation.

Parts per Million (ppm)

No.	Compound	HID Detection Limit	FID/Methanizer Detection Limit	Action Level
1	Hydrogen	50	NA	100-500
2	Oxygen	10	NA	NA
3	Nitrogen	10	NA	NA
4	Methane	10	1	100-400
5	Carbon Monoxide	10	1	100-1000
6	Ethane	10	1	100-400
7	Carbon Dioxide	10	1	150-3000
8	Ethylene	10	1	500-2000
9	Propane	10	1	100-500
10	Acetylene	10	1	100-400
11	Proplyene	10	1	100-500

Headspace Accessory - The built-in headspace vial accessory, including vial heater, sample valve, pressure and vent solenoids, and sampling probe help automate the TOGA analysis in either the Companion or Series 600 GC TOGA Systems. The pre-purged vial containing the oil sample is heated and allowed to equilibrate in the vial heater prior to analysis. There are positions for 3 vials, so once the first has equilibrated, the analysis can proceed one sample after another. The analysis is only manual as far as the user needs to insert the sample probe into the headspace vial. The remainder of the analysis sequence is automated.

Headspace Autosampler - For a completely automated TOGA System the Series 600 GC can be equipped with a Headspace Autosampler with a 42 vial capacity. The Series 600 TOGA GC and autosampler work in unison to auotmate vial preparation, oil analysis, and reporting.

TOGA 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)
Methanizer - Converts CO & CO2 to Methane (1ppm DL)

- 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:
Molecular Sieve
Silica Gel

Results:
Automatically calibration corrected and reported in % or ppm

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
- Headspace Concentrator
- Headspace Vial Prep Station
- Flow Control Solenoids

Injector:
- Heated On-column Injector
- 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!"

DPS Instruments, Inc.

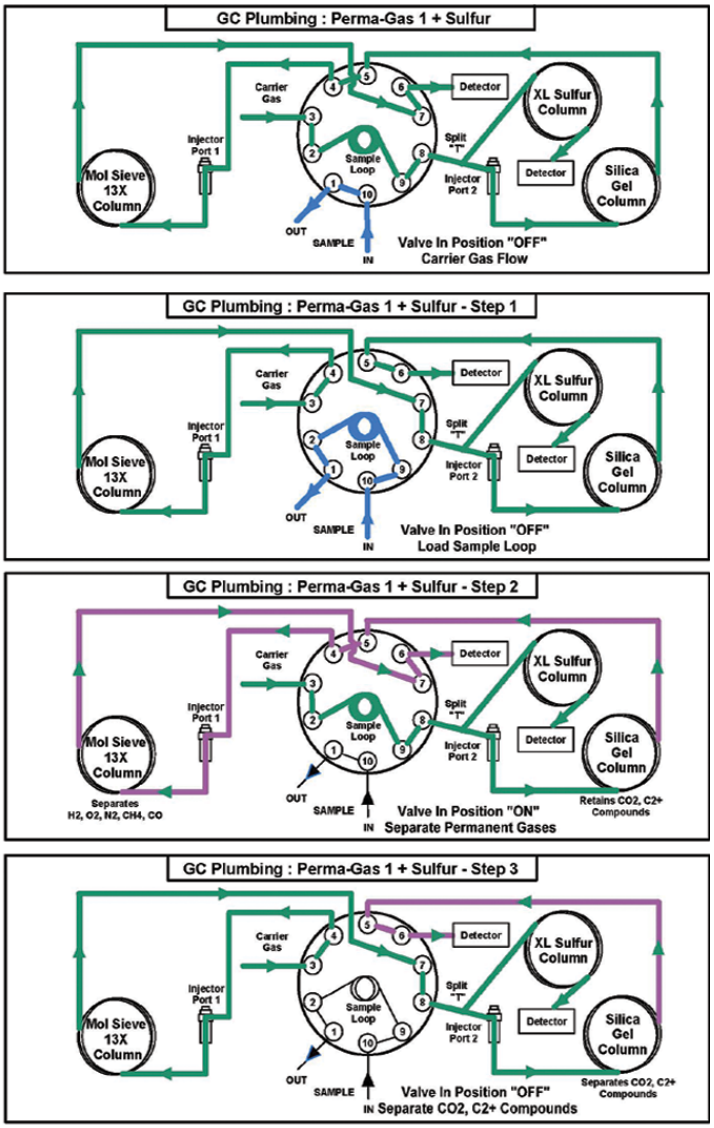
DPS Companion 2 Perma-Gas + Sulfur GC Layout

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 simultaneously onto the Silica Gel and XL-Sulfur analytical columns. The XL-Sulfur separates the Sulfur compounds,which are detected by the PID detector down into the ppb range. 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 + Sulfur Plumbing Diagram

Results, Data & Connectivity

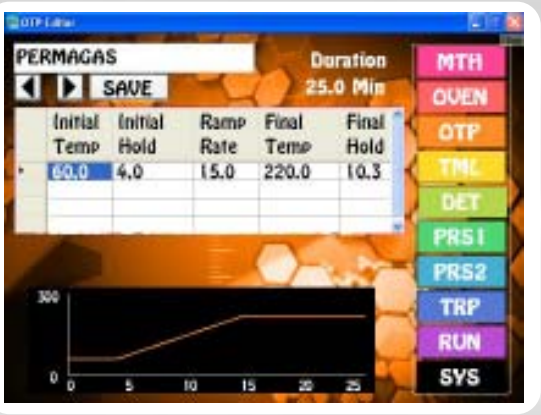
Results: The results and chromatogram are stored on the hard drive. Additionally, for each channel a log file summary of the compounds detected is a convenient way of looking at large amounts of data collected over time.

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.

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.



Oven Temp Program Editor

Timeline Editor

Method Name

File Selection Arrows

Carrier Pressure 1 Editor

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

Keyboard to Enter Filenames

Number Pad for entering Values

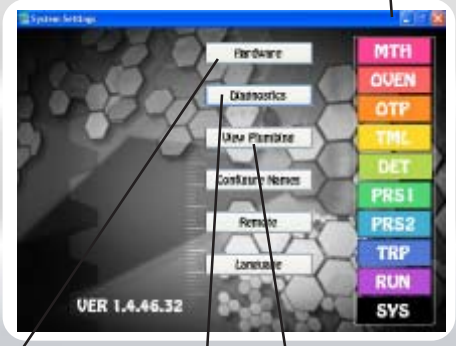
GC Status pages display the parameters in the method, both graphically and as text and values.

Oven Status

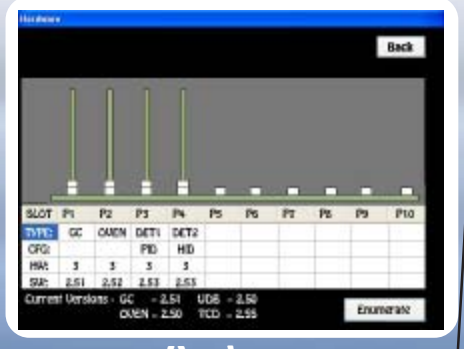
Method Editor

PID Detector Status

System Status

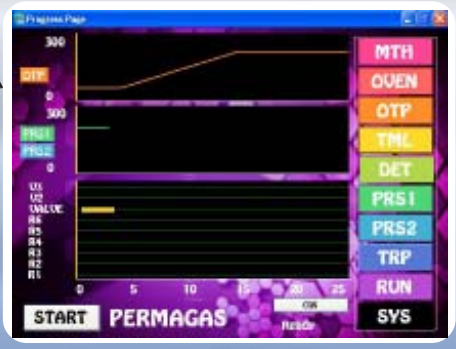


HID Detector Status

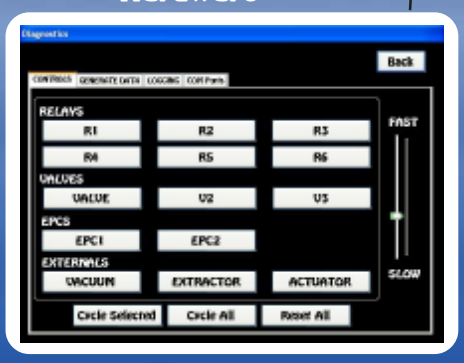


Hardware

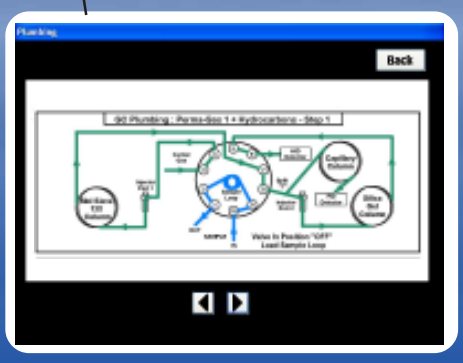
System status pages display the health and viability of the GC instrument.



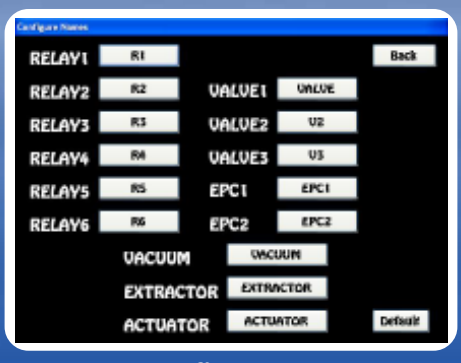
Run Status



Diagnostics



Plumbing



Configure Names

Specifications may change without notice.
01/2016

Perma-Gas + Sulfur 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)
PID – Photoionization Detector (100ppb 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, 2m Micro-packed

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
- 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!"

DPS Instruments, Inc.

DPS Instruments, Inc.

Solvents & Chemicals

Solvents & Chemicals

Alcohols

Instruments, Inc.

www.dps-instruments.com

Alcohols are used to form many important components in many commercial products. The lower alcohols are employed as solvents and antifreezes. Esters of the alcohols are employed extensively as solvents for lacquers, paints, varnishes, inks, and adhesives. The plasticizer-range alcohols find their primary use in the form of esters as plasticizers and also as lubricants in high-speed applications such as jet engines. The detergent-range alcohols are used in the form of sulfate esters in detergents and surfactants. Because the analysis of alcohols is so far reaching the DPS Alcohols GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to detect all of these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Alcohols GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

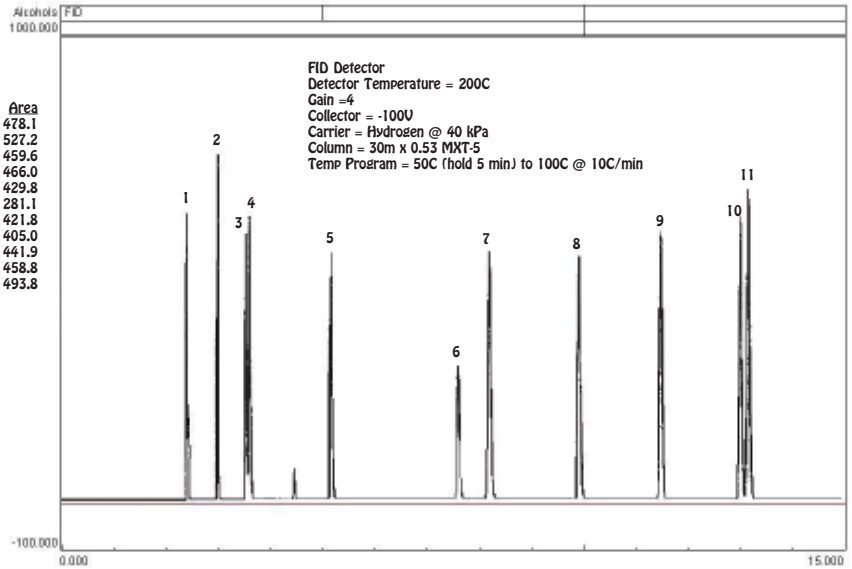
600-C-111 - Series 600 Alcohols GC Analyzer (FID, 30m)
500-C-111 - Companion 1 Portable Alcohols GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Alcohols

Peak	Component	Area
1	Methanol	478.1
2	Ethanol	527.2
3	Acetone	459.6
4	Isopropanol	466.0
5	1-Propanol	429.8
6	Ethyl Acetate	281.1
7	2-Methyl-1-Propanol	421.8
8	1-Butanol	405.0
9	3-Pentanol	441.9
10	3-Methyl-1-Butanol	458.8
11	2-Methyl-1-Butanol	493.8



11/2015
Specifications may change without notice.

Solvents & Chemicals

Glycols

DPS Instruments, Inc.

www.dps-instruments.com

Ethylene glycol is the simplest and most common of the class of glycols and is used as antifreeze in cooling and heating systems. The next larger compound is propylene glycol, which is similar to ethylene glycol but not toxic, and is used extensively in foods, cosmetics, and oral hygiene products as a solvent, preservative, and moisture-retaining agent. As you go up in size, other important glycols are used as raw materials for plastics and other chemicals, insect repellents, and even tranquilizers. Glycols are used in so many industries that the need for analysis has dramatically increased. To meet this need, the DPS Glycols GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Glycols GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

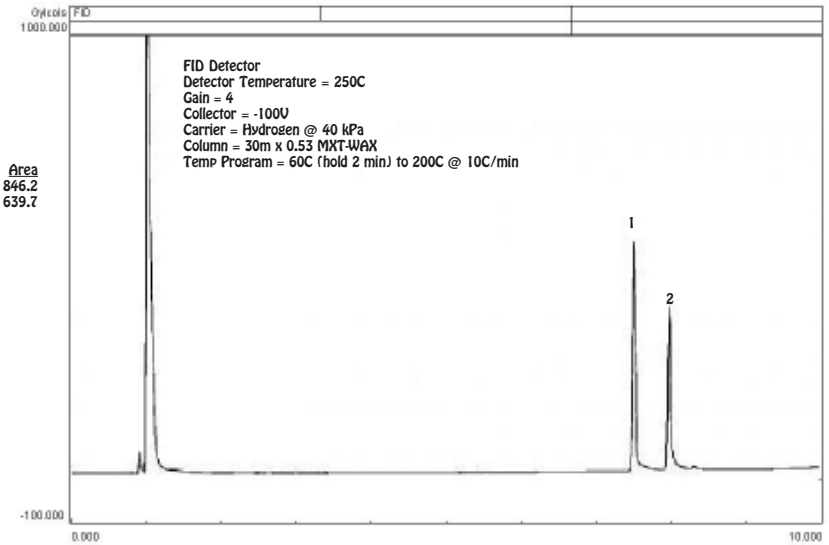
Available Configurations Include:

600-C-118 - Series 600 Glycols GC Analyzer (FID, 30m)
500-C-118 - Companion 1 Portable Glycols GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Glycols



Peak	Component	Area
1	Ethylene Glycol	846.2
2	Propylene Glycol	639.7

11/2015
Specifications may change without notice.

Solvents & Chemicals

Formaldehyde

DPS Instruments, Inc.

www.dps-instruments.com

Formaldehyde is a simple, highly reactive hydrocarbon that is used as a fixative in the pathology laboratory, as a fumigant, disinfectant, in photographic materials, and in the manufacture of foam insulation, cosmetics, drugs, clothing, and furniture. It is also a major toxic component of photochemical smog. Because of its extreme reactivity, even with itself, it cannot be readily isolated or handled in the pure state. Therefore, it is produced and marketed as an aqueous solution. Due to the health concerns arising from exposure to formaldehyde there has be an increasing need for the analysis of this reactive compound. To meet this need, the DPS Formaldehyde GC Systems are configured with the latest designed high resolution capillary column and the Sensitive HID detector to measure water and other impurities in formaldehyde. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Formaldehyde GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

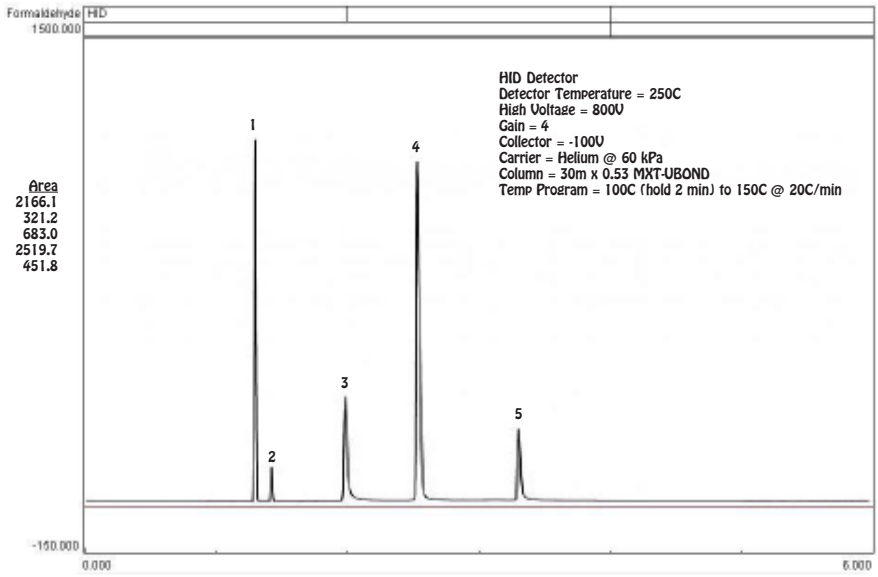
Available Configurations Include:

600-C-117 - Series 600 Formaldehyde GC Analyzer (HID, 30m)
600-C-117 - Companion 1 Portable Formaldehyde GC Analyzer (HID, 30m)

Series 600 GC

Companion 1 Portable GC

Formaldehyde in Water



Peak	Component	Area
1	Air	2166.1
2	Carbon Dioxide	321.2
3	Formaldehyde	683.0
4	Water	2519.7
5	Methanol	451.8

Solvents & Chemicals

Aromatics

DPS Instruments, Inc.

www.dps-instruments.com

Benzene is the most common aromatic hydrocarbon, however several other commercially important aromatics are also produced on a scale of millions of pounds annually. Benzene, toluene, and the xylenes are added to unleaded gasoline to raise the octane number. Other aromatics, derived from the petrochemical industry, are used in products such as polyesters, polyurethanes, polystyrene, synthetic rubber, detergents, pharmaceuticals, flavors, perfumes, plasticizers, and many others. The meet the ever increasing need for the analysis of all of these various aromatic hydrocarbons, the DPS Aromatics GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Aromatics GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

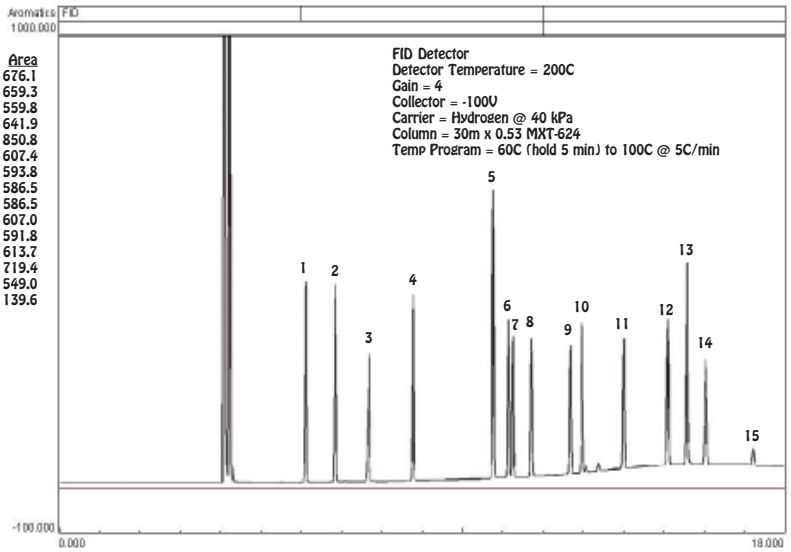
Available Configurations Include:

600-C-114 - Series 600 Aromatics GC Analyzer (FID, 30m)
500-C-114 - Companion 1 Portable Aromatics GC Analyzer (FID, 30m)

Companion 1 Portable GC

Aromatics

Peak	Component	Area
1	n-Undecane	676.1
2	Benzene	659.3
3	n-Docecane	559.8
4	Toluene	641.9
5	Ethylbenzene	850.8
6	p-Xylene	607.4
7	m-Xylene	593.8
8	Cumene	586.5
9	n-Propylbenzene	586.5
10	o-Xylene	607.0
11	Mesitylene	591.8
12	1-Ethyl-2-Methylbenzene	613.7
13	m-Diethylbenzenee	719.4
14	p-Diethylbenzenee	549.0
15	o-Diethylbenzenee	139.6



11/2015
Specifications may change without notice.

Solvents & Chemicals

Amines

Instruments, Inc.

www.dps-instruments.com

Amines play prominent roles in biochemical systems where they are widely distributed in nature in the form of amino acids, alkaloids, and vitamins. Amines such as epinephrine, thiamin, and Novocaine have pronounced physiological activity. The odor of decaying fish is due to simple amines produced by bacterial action. Amines are used to manufacture many medicinal chemicals, such as sulfa drugs and anesthetics and the important synthetic fiber nylon is also an amine derivative. Because the use amines are critical to so many industries the DPS Amines GC Systems are specifically configured with your application in mind. We use the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Amines GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

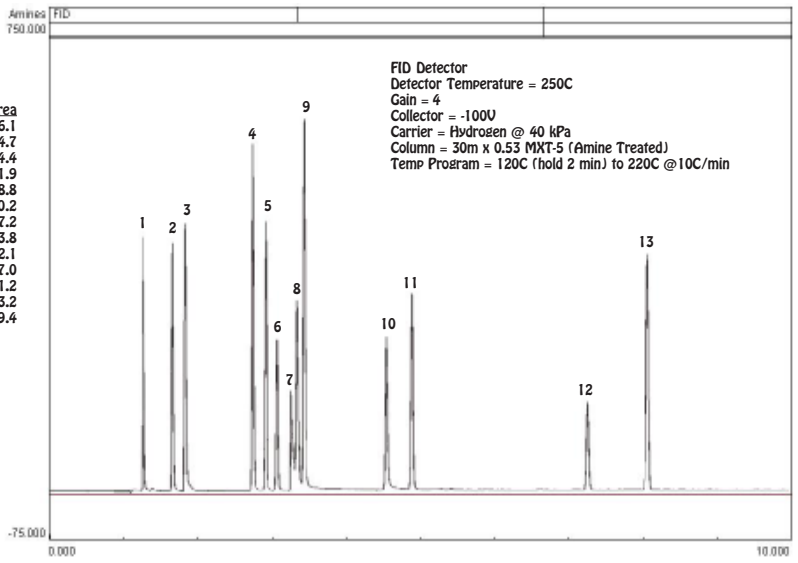
Available Configurations Include:

600-C-113 - Series 600 Amines GC Analyzer (FID, 30m)
500-C-113 - Companion 1 Portable Amines GC Analyzer (FID, 30m)

Series 600 GC

Amines & Phenols

Peak	Component	Area
1	Diethylamine	326.1
2	Pyridine	314.7
3	Morpholine	344.4
4	Phenol	391.9
5	Aniline	368.8
6	2-Chlorophenol	240.2
7	Diethylenetriamine	167.2
8	Octylamine	293.8
9	1-Methyl-2-Pyrrolidinone	452.1
10	2-Nitrophenol	267.0
11	2,6-Dimethylaniline	281.2
12	Nicotine	183.2
13	2-Nitroanaline	339.4



Companion 1 Portable GC

11/2015
Specifications may change without notice.

Solvents & Chemicals

Acrylates

Instruments, Inc.

www.dps-instruments.com

Plastics are a multi-billion dollar industry worldwide. One of the most common forms of plastic are produced from acrylates. Acrylates and methacrylates are common monomers, which easily form polymer plastics because their double bonds are very reactive. These groups of polymers are generally referred to as acrylic plastics and are noted for their transparency and resistance to breakage. Plexiglas is an example of a clear break resistant acrylic polymer. Because the composition and impurities in the plastics are so critical to their strength and performance, the DPS Acrylates GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Acrylates GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

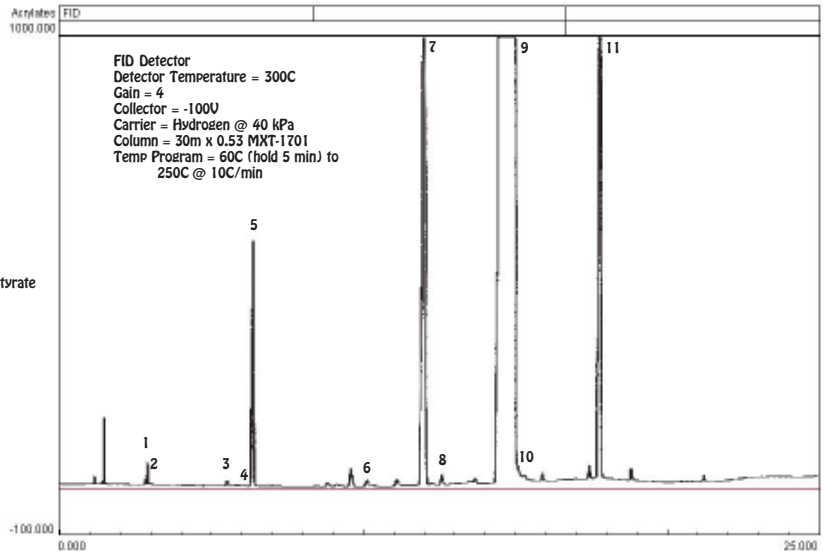
600-C-110 - Series 600 Acrylates GC Analyzer (FID, 30m)
500-C-110 - Companion 1 Portable Acrylates GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Acrylic Impurities

Peak	Component
1	n-Butanol
2	Methyl Methacrylate
3	n-Butyl Acetate
4	Isopropyl Methacrylate
5	N-Butyl Ether
6	Isobutyl Isobutyrate
7	Isobutyl Methactrylate
8	n-Butyl Isobutyrate
9	Butyl Methactylate
10	n-Butyl n-Butyrate
11	n-Butyl α-Hydroxyisobutyrate



11/2015
Specifications may change without notice.

Solvents & Chemicals

Cresols

DPS Instruments, Inc.

www.dps-instruments.com

The mixture of cresols obtained from coal tar is called cresylic acid. The cresols, which are aromatic methylphenols, are used in the manufacture of disinfectants, household cleaners, deodorizers, certain pesticides, and synthetic resins. They have also been used as antiseptics, although they have largely been displaced by less toxic compounds. Cresols are found in many foods and are also used as a wood preservative. These important chemicals are used in so many industries that the need for analysis has dramatically increased. To meet this need, the DPS Cresol GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Cresol GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

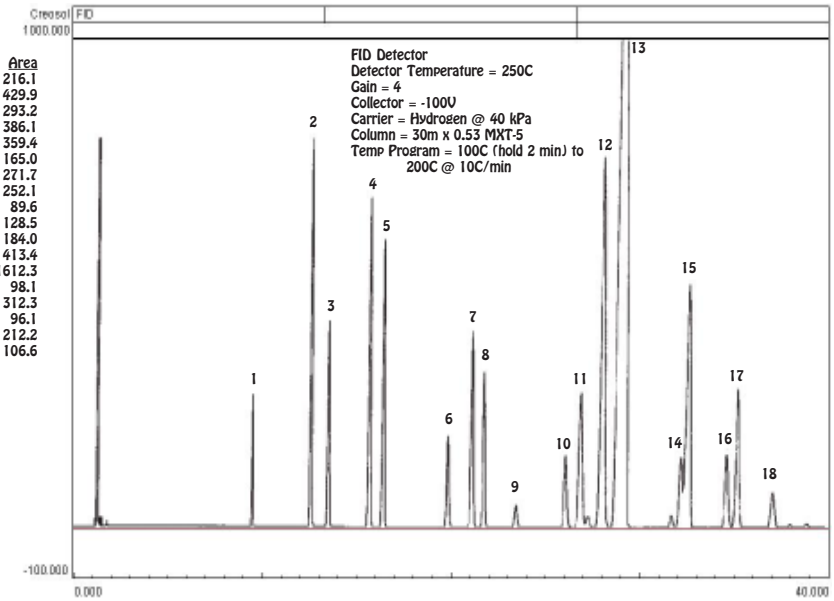
Available Configurations Include:

600-C-116 - Series 600 Cresol GC Analyzer (FID, 30m)
500-C-116 - Companion 1 Portable Cresol GC Analyzer (FID, 30m)

Cresols & Phenols

Companion 1 Portable GC

Peak	Component	Area
1	Phenol	216.1
2	o-Cresol	429.9
3	2,6-Xylenol	293.2
4	p-Creosol	386.1
5	m-Creosol	359.4
6	o-Ethylphenol	165.0
7	2,4-Xylenol	271.7
8	2,5-Xylenol	252.1
9	2,4,6-Trimethylphenol	89.6
10	2,3-Xylenol	128.5
11	p-Ethylphenol	184.0
12	m-Ethylphenol	413.4
13	3,5-Xylenol	1612.3
14	C3 Phenol	98.1
15	3,4-Xylenol	312.3
16	C3 Phenol	96.1
17	4-Ethyl-2-Methylphenol	212.2
18	5-Ethyl-2-Methylphenol	106.6



11/2015
Specifications may change without notice.

Solvents & Chemicals

Solvents

DPS Instruments, Inc.

www.dps-instruments.com

Organic solvents are a broad class of compounds that include aromatics, alcohols, esters, ethers, ketones, amines, and other liquid hydrocarbons. Their chief uses are as media for chemical syntheses, as industrial cleaners, in extractive processes, in pharmaceuticals, in inks, and in paints, varnishes, and lacquers. There are so many different kinds and so many uses for solvents that we have configured the DPS Solvents GC Systems to be as versatile a possible to handle all of your solvents analysis requirements. We have included the latest designed high resolution capillary column and the sensitive FID detector to quickly detect all of these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Solvents GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

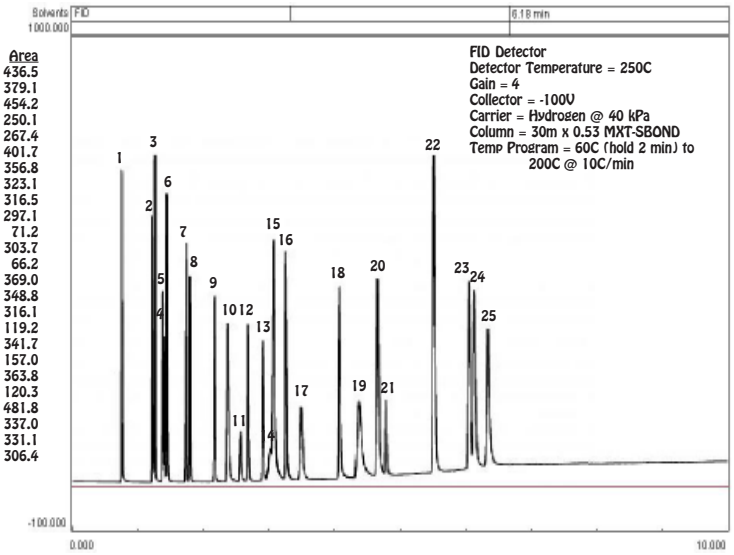
600-C-121 - Series 600 Solvents GC Analyzer (FID, 30m)
500-C-121 - Companion 1 Portable Solvents GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Industrial Solvents

Peak	Component	Area
1	Methanol	436.5
2	Ethanol	379.1
3	Acetonitrile	454.2
4	Dichloromethane	250.1
5	1,1-Dichloroethane	267.4
6	Acetone	401.7
7	trans-1,2-Dichloroethylene	356.8
8	Nitromethane	323.1
9	cis-1,2-Dichloroethylene	316.5
10	Tetrahydrofuran	297.1
11	Chloroform	71.2
12	Ethyl Acetate	303.7
13	1,2-Dichloroethane	66.2
14	1,1,1-Trichloroethane	369.0
15	Benzene	348.8
16	Trichloroethylene	316.1
17	1,4-Dioxane	119.2
18	Pyridine	341.7
19	Methylcyclohexane	157.0
20	Toluene	363.8
21	Dimethylformamide	120.3
22	Chlorobenzene	481.8
23	Ethylbenzene	337.0
24	m & p-Xylene	331.1
25	o-Xylene	306.4



11/2015
Specifications may change without notice.

Solvents & Chemicals

Silanes

DPS Instruments, Inc.

www.dps-instruments.com

Silanes are structural analogs of saturated hydrocarbons, but are much less stable. All burn or explode when exposed to air and react readily with olefins to form alkylsilanes, which are products used as water repellents, masonry protection, starting materials for silicones, and in the manufacture of semiconductors. Silanes are also used as coupling agents to adhere glass fibers to a polymer matrix, or a synthetic layer on a titanium implant. With so many uses for silanes, and keeping safety in mind, the DPS Silanes GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Silanes GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

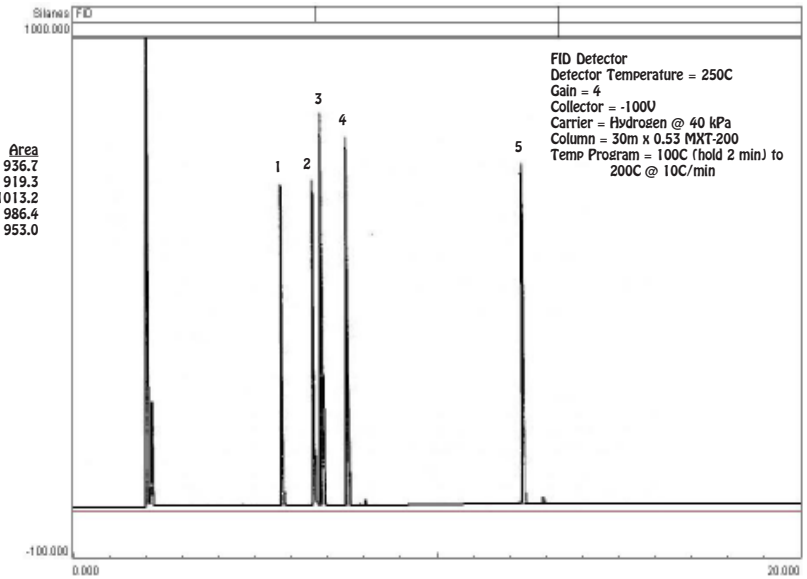
600-C-119 - Series 600 Silanes GC Analyzer (FID, 30m)
500-C-119 - Companion 1 Portable Silanes GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Silanes

Peak	Component	Area
1	Phenyldichlorosilane	936.7
2	Phenyltrichlorosilane	919.3
3	Methylphenyl Dichlorosilane	1013.2
4	Phenylvinyl Dichlorosilane	986.4
5	Diphenyl Dichlorosilane	953.0



11/2015
Specifications may change without notice.

Solvents & Chemicals

Siloxanes

DPS Instruments, Inc.

www.dps-instruments.com

The word Siloxane is derived from the words Silicon, Oxygen, and Alkane. Siloxanes can be found in products such as cosmetics, deodorants, water repelling windshield coatings, and some soaps. They occur in landfill gas and are being evaluated as alternatives to perchloroethylene for dry cleaning, which is widely considered environmentally undesirable. The polymerized form of siloxanes (polysiloxanes) are similar to silicones and also used as adhesives and moisture barriers. To make sure that all of these compounds can be separated and identified, the DPS Siloxanes GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Siloxanes GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

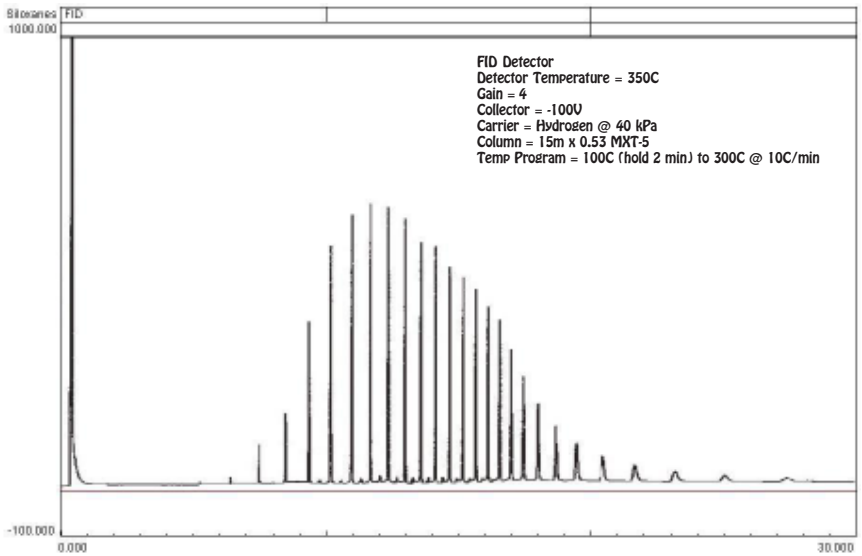
Available Configurations Include:

600-C-120 - Series 600 Siloxanes GC Analyzer (FID, 15m)
500-C-120 - Companion 1 Portable Siloxanes GC Analyzer (FID, 15m)

Series 600 GC

Companion 1 Portable GC

Polysiloxane



11/2015
Specifications may change without notice.

Solvents & Chemicals

Solvents

DPS Instruments, Inc.

www.dps-instruments.com

Organic solvents are a broad class of compounds that include aromatics, alcohols, esters, ethers, ketones, amines, and other liquid hydrocarbons. Their chief uses are as media for chemical syntheses, as industrial cleaners, in extractive processes, in pharmaceuticals, in inks, and in paints, varnishes, and lacquers. There are so many different kinds and so many uses for solvents that we have configured the DPS Solvents GC Systems to be as versatile a possible to handle all of your solvents analysis requirements. We have included the latest designed high resolution capillary column and the sensitive FID detector to quickly detect all of these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Solvents GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

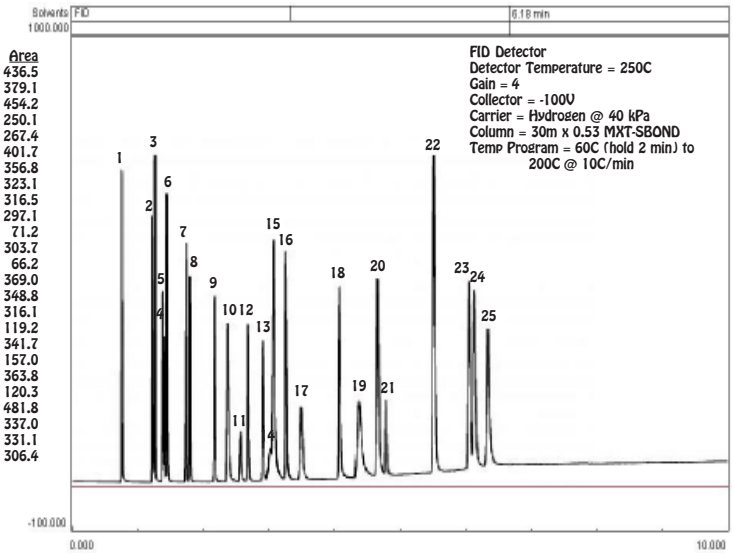
600-C-121 - Series 600 Solvents GC Analyzer (FID, 30m)
500-C-121 - Companion 1 Portable Solvents GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Industrial Solvents

Peak	Component	Area
1	Methanol	436.5
2	Ethanol	379.1
3	Acetonitrile	454.2
4	Dichloromethane	250.1
5	1,1-Dichloroethane	267.4
6	Acetone	401.7
7	trans-1,2-Dichloroethylene	356.8
8	Nitromethane	323.1
9	cis-1,2-Dichloroethylene	316.5
10	Tetrahydrofuran	297.1
11	Chloroform	71.2
12	Ethyl Acetate	303.7
13	1,2-Dichloroethane	66.2
14	1,1,1-Trichloroethane	369.0
15	Benzene	348.8
16	Trichloroethylene	316.1
17	1,4-Dioxane	119.2
18	Pyridine	341.7
19	Methylcyclohexane	157.0
20	Toluene	363.8
21	Dimethylformamide	120.3
22	Chlorobenzene	481.8
23	Ethylbenzene	337.0
24	m & p-Xylene	331.1
25	o-Xylene	306.4



11/2015
Specifications may change without notice.

Solvents & Chemicals

Styrene

DPS Instruments, Inc.

www.dps-instruments.com

Styrene is a colorless oily liquid which is produced annually by the millions of pounds. The majority of the styrene used is converted into polystyrene, which is a rigid clear thermoplastic polymer that can be molded into objects or made into foam, which is used as a packing material and thermal insulator. Other thermoplastic or even thermosetting resins are prepared from styrene by copolymerization with suitable comonomers. A smaller quantity of styrene goes into the manufacture of synthetic rubbers. Because the composition and impurities in polystyrene are so critical to its performance, the DPS Styrene GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Styrene GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

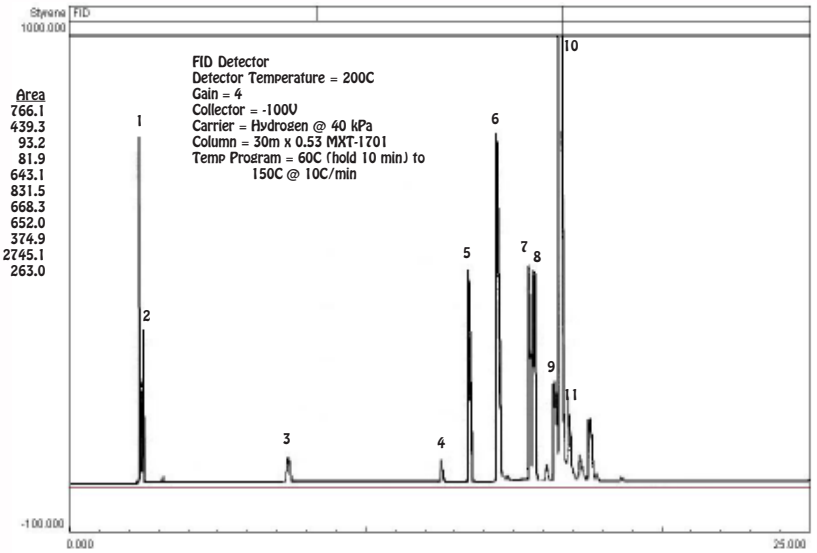
600-C-122 - Series 600 Styrene GC Analyzer (FID, 30m)
600-C-122 - Companion 1 Portable Styrene GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Styrene Impurities

Peak	Component	Area
1	1,3-Butadiene	766.1
2	Butene	439.3
3	Acrylonitrile	93.2
4	Diethylhydroxylamine	81.9
5	Toluene	643.1
6	Vinylcyclohexene	831.5
7	Ethylbenzene	668.3
8	m-Xylene	652.0
9	o-Xylene	374.9
10	Styrene	2745.1
11	Cumene	263.0



11/2015
Specifications may change without notice.

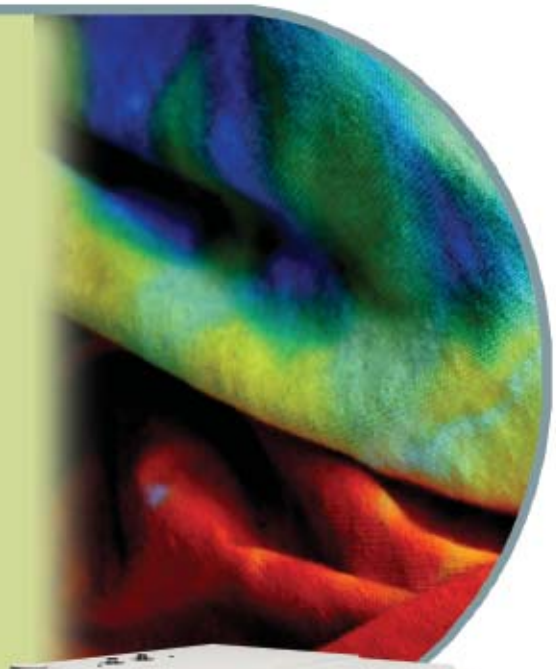
Solvents & Chemicals

Aldehydes

DPS Instruments, Inc.

www.dps-instruments.com

Aldehydes are used for the manufacture of synthetic resins, dyestuffs, flavorings, perfumes, and other chemicals. Low molecular weight aldehydes, such as formaldehyde and acetaldehyde have sharp, unpleasant odors. Whereas, higher molecular weight aldehydes, such as benzaldehyde and furfural have pleasant, often flowery, odors and are found in the essential oils of certain plants. Aldehydes are also used as preservatives and disinfectants. Because of the wide range of components and mixtures the DPS Aldehydes GC Systems are configured specifically with you in mind. We have included the latest designed high resolution capillary column and the sensitive FID detector to quickly detect all of these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Aldehydes GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.



Series 600 GC

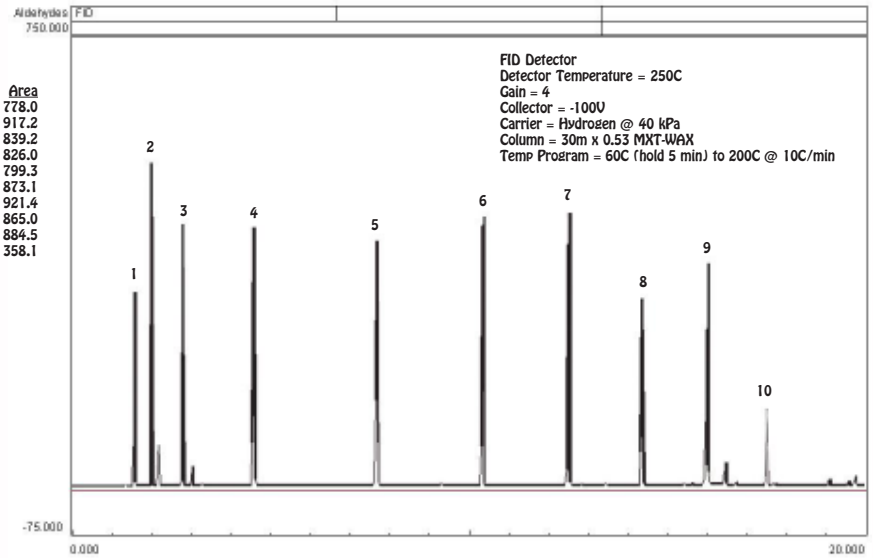
Available Configurations Include:

600-C-112 - Series 600 Aldehydes GC Analyzer (FID, 30m)
500-C-112 - Companion 1 Portable Aldehydes GC Analyzer (FID, 30m)

Companion 1 Portable GC

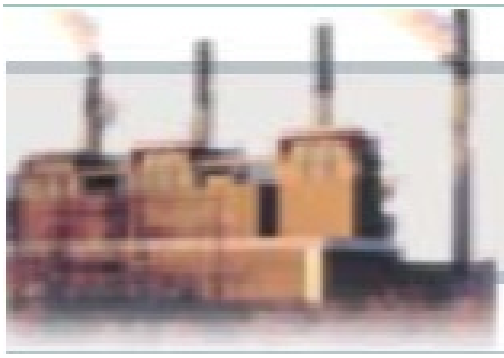
Aldehydes

Peak	Component	Area
1	Ethanal	778.0
2	Propanal	917.2
3	Butenal	839.2
4	Pentanal	826.0
5	Hexanal	799.3
6	Heptanal	873.1
7	Octanal	921.4
8	Nonanal	865.0
9	Decanal	884.5
10	Undecanal	358.1



11/2015
Specifications may change without notice.

DPS Instruments, Inc.



Environmental

Environmental

Disinfection By-products

DPS Instruments, Inc.

www.dps-instruments.com

We all want clean water to drink for ourselves and our kids. The lakes, streams, springs, and wells that are the source of our drinking water have naturally occurring organic compounds from plant decomposition and contaminants from man made sources. When distribution companies and water treatment plants add chlorine or other disinfectants to purify the water, disinfection by-products are formed that can be harmful to human health. The most common of these are Trihalomethanes, such as Chloroform. However, Haloacetic Acids, Chlorophenols, and other chlorinated and brominated compounds can be formed. Water companies go to great lengths to reduce the concentrations of these harmful by-products, but they are always present. The Disinfection By-products GC Analyzers from DPS use the nonradioactive BCD detector to identify these by-products in the low part per billion (ppb) range. The fully integrated Disinfection By-products GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

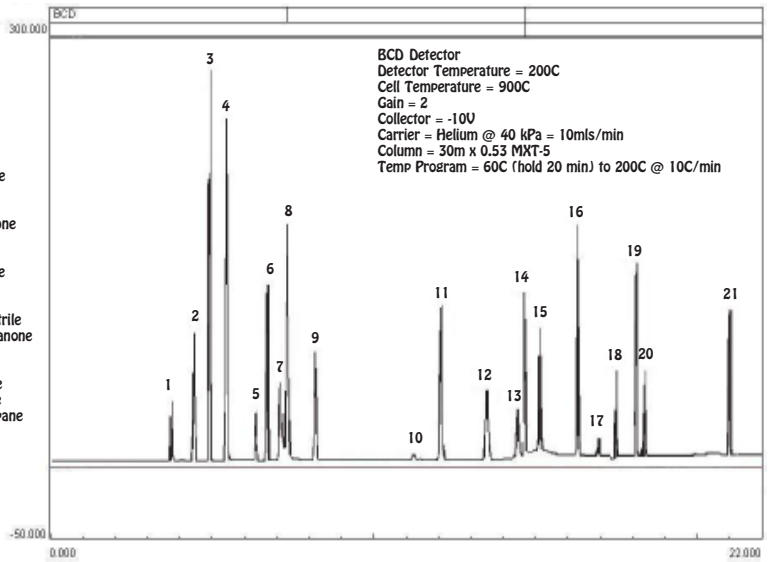
600-C-021 - Series 600 Disinfection By-products GC Analyzer (BCD, 30m)
500-C2-021 - Companion 2 Portable Disinfection By-products GC Analyzer (BCD, 30m)

Series 600 GC

Chlorinated Disinfection By-Products

Companion 2 Portable GC

1. Chloroform
2. 1,1,1-Trichloroethane
3. Carbon Tetrachloride
4. Trichloroacetonitrile
5. Trichloroethylene
6. Bromodichloromethane
7. Chloral Hydrate
8. Dichloroacetonitrile
9. 1,1-Dichloro-2-Propanone
10. 1,1,2-Trichloroethane
11. Chloropicrin
12. Dibromochloromethane
13. 1,2-Dibromomethane
14. Tetrachloroethylene
15. Bromodichloroacetonitrile
16. 1,1,1-Trichloro-2-Propanone
17. Bromoform
18. Dibromoacetonitrile
19. 1,2,3-Trichloropropane
20. 4-Bromofluorobenzene
21. 1,2-Dromo-3-Cloropropane



11/2015
Specifications may change without notice.

Environmental
Diesel Range Organics

DPS Instruments, Inc.
www.dps-instruments.com

Diesel has been used for heating homes and as a fuel for trucks and engines for over 100 years. Diesel is not environmentally friendly when it leaks out of holding tanks and seeps into the soil and subsequent groundwater. Modern double layer tanks have a built-in second containment system to handle leaks and these have been installed underground in many areas. However, many older tanks are still in existence and these are prone to leaks causing local contamination and the need for thousands of sample analyses per year. For your convenience, DPS has configured the Diesel Range Organics Analyzers to help you define the extent of the contaminant plume as well as assist you in determining the age of the spill. The sensitive FID detector is ideal for identifying the hydrocarbon backbone found in Diesel and the fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Diesel Range Organics GC Analyzer Systems are small, lightweight, and rugged to go where ever you need them. All DPS systems are modular for expandability, upgrades, and easy service.

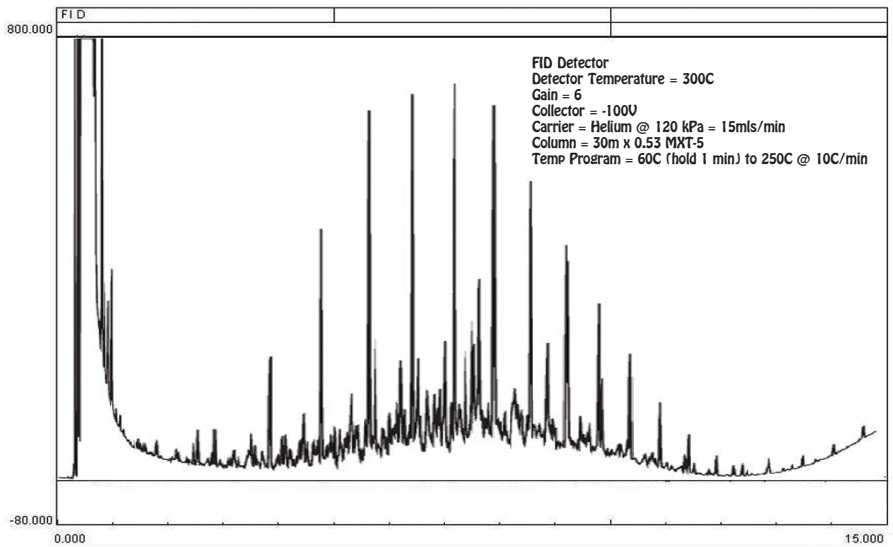
Available Configurations Include:

600-C-020 - Series 600 Diesel Range Organics GC Analyzer (FID, 30m)
500-C-020 - Companion 1 Portable Diesel Range Organics GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Diesel Range Organics



11/2015
Specifications may change without notice.

Environmental

Environmental Pollutants Analyzers

DPS Instruments, Inc.

www.dps-instruments.com

Some of the millions of gallons of chlorinated solvents used in industry over the years have spilled, polluting our air, soil, rivers, lakes, streams, and ground water. Environmentally conscious legislation has been passed in many parts of the world to limit future spills, clean up existing polluted sites, and lessen the overall risk to ourselves and to our children. DPS has configured a full range Environmental GC analyzers to assist in the detection of common pollutants. All of these Environmental GC Systems allow direct injection of sample extracts. However, DPS has also added a built-in Air Concentrator and Purge & Trap for low ppb level analysis of air, water, or soil samples all in one GC. The Series 600 GC is for analyses in the lab, or the Portable Companion 2 GC Systems are for analyses right where the samples are taken. The FID detector is sensitive to hydrocarbons, which can assist in defining the source of the pollutant, the PID is very sensitive to aromatics such as Benzene, and the BCD is ultra-sensitive to chlorinated compounds. A combination of detectors covers most environmental methods. All DPS GC systems are small, lightweight and modular for expandability, upgrades, and easy service.

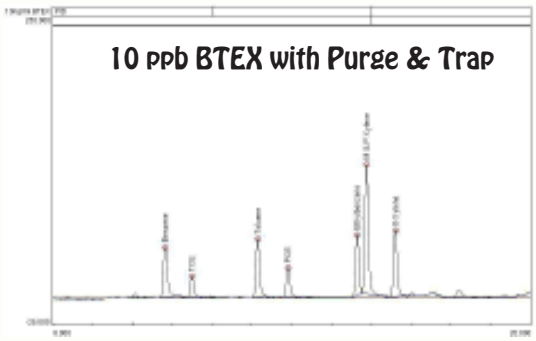
Series 600 GC

Available Configurations Include:

600-C-014 - Series 600 Environmental GC Analyzer (FID, PID, BCD, 2 x 30m, Air and Purge & Trap Concentrators)

500-C2-014 - Companion 2 Portable Environmental GC Analyzer (PID, BCD, 30m Air and Purge & Trap Concentrators)

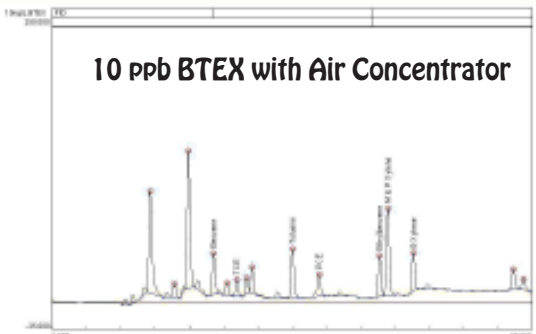
Companion 2 Portable GC (With Purge & Trap and Air Concentrators)



10 ppb BTEX with Purge & Trap

PID Detector
Detector Temperature = 150C
High Voltage = 600V
Gain = 3
Collector = -100V
Valve = 100C
Carrier = Helium @ 40 kPa = 10mls/min
Column = 30m x 0.53 MXT-624
Temperature Program = 60C (hold 9 min) to 150C @ 10C/min

Peak	Component	Area	Conc
1	Benzene	305.0	10.8
2	Trichloroethylene	105.3	10.6
3	Toluene	306.7	10.5
4	Tetrachloroethylene	162.0	10.5
5	Ethylbenzene	301.7	10.2
6	M & P Xylenes	686.6	20.2
7	O-Xylene	351.5	10.8



10 ppb BTEX with Air Concentrator

Peak	Component	Area	Conc
1	Benzene	296.1	10.2
2	Trichloroethylene	89.9	10.6
3	Toluene	288.6	11.0
4	Tetrachloroethylene	146.9	11.1
5	Ethylbenzene	287.1	10.2
6	M & P Xylenes	621.5	20.5
7	O-Xylene	278.6	9.7

11/2015
Specifications may change without notice.

Environmental
Explosives

DPS Instruments, Inc.

www.dps-instruments.com

Since the Chinese first mixed gun powder, people have been devising ways of harnessing it's power to move mountains in the name of progress, or to keep enemies at bay. For more than a century many parts of the world have been littered with un-exploded ordinances. Bombs, shells, and land mines create a current and future threat to ourselves and our kids. DPS has configured the Explosives Analyzers to identify the nature and type of explosive. We have specifically designed the portable and rugged Companion 1 GC to help detect explosives in the field. The sensitive TID detector is ideal for identifying the nitrosamines and nitro-aromatic compounds responsible for the deadly nature of the ordinances. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Explosives GC Analyzer Systems are small, lightweight, and rugged to go where ever you need them. All DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

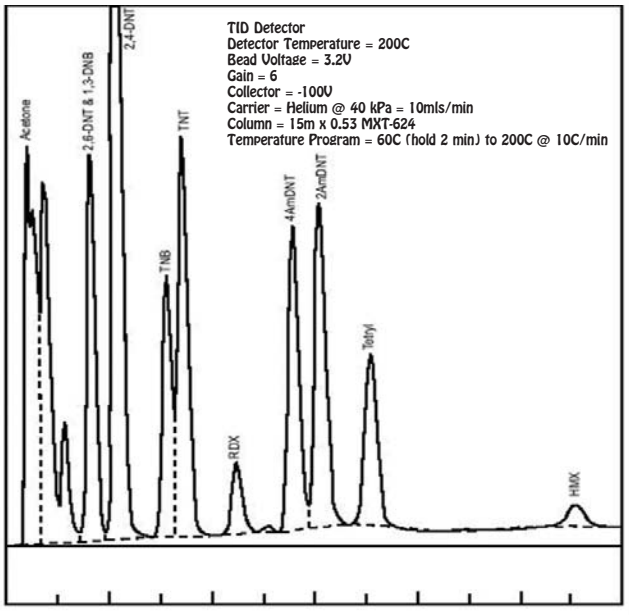
Available Configurations Include:

600-C-023 – Series 600 Explosives GC Analyzer (TID, 15m)
500-C-023 - Companion 1 Portable Explosives GC Analyzer (TID, 15m)

Companion1 Portable GC

Explosives Analytes

Peak	Component
1	2,6-Dinitrotoluene & 1,3-Dinitrobenzene
2	2,4-Dinitrotoluene
3	1,3,5-Trinitrobenzene
4	2,4,6-Trinitrotoluene
5	Hexahydro-1,3,5-trinitro-1,3,5-triazine
6	4-Amino-4,6-dinitrotoluene
7	2-Amino-2,6-dinitrotoluene
8	2,4,6-Trinitrophenylmethylnitramine
9	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrotzocine



11/2015
Specifications may change without notice.

Environmental

Fast BTEX Analyzers

DPS Instruments, Inc.

www.dps-instruments.com

When you need speedy BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes) analyses to satisfy your clients choose one of our full range of BTEX Analyzers. We offer both Series 600 Lab GC's and Companion Portable GC's configured for Direct Injection for your extracts, or gas samples. The FID has sensitivity down to 1 ppm, while the PID is 20X more sensitive to aromatic compounds and has Detection Limits in the low to mid ppb range for BTEX compounds. You can run the detectors individually, or in Series to cover both the ppm and ppb ranges with one injection.

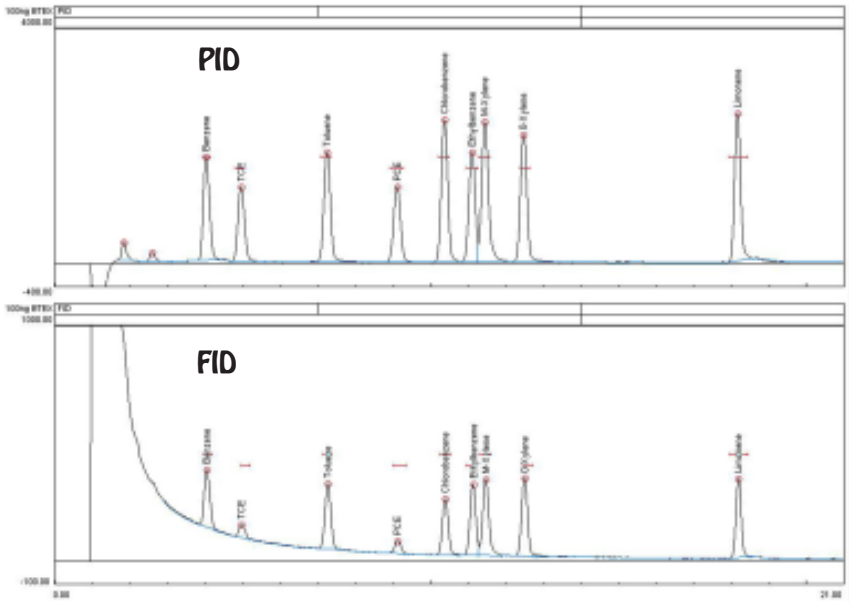
For the automated analysis of gas samples, choose the Gas Sample Valve option. The integrated Sample loop is either filled using a sample bag, or an electronically controlled vacuum pump can automatically draw the sample through the Sample Loop for highly precise and reproducible analyses. All of the BTEX Analyzers are fully integrated GC Systems that are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

Available Configurations Include:

600-C-010 - Series 600 BTEX GC Analyzer (PID, FID, 30m)
500-C2-011 - Companion 1 Portable BTEX GC Analyzer (PID, FID, 30m)

100 ng BTEX with PID and FID in Series



Companion 2 Portable GC

11/2019
Specifications may change without notice.

Environmental

Greenhouse Gases

DPS Instruments, Inc.

www.dps-instruments.com

The earth has been naturally warming since the last ice age, however due to man's influence the warming process has significantly accelerated since the industrial revolution. The burning of fossil fuels, coal, and wood has increased carbon dioxide, carbon monoxide, and methane concentrations in the atmosphere. These Greenhouse gases hold in infrared radiation, which would normally escape, and warm the lower atmosphere. The small and lightweight DPS Greenhouse Gas GC Analyzers are well suited for monitoring ambient air, gases from stacks, atmospheric air, or use it anywhere you need to measure emissions. The Greenhouse configuration includes a sensitive FID detector with Methanizer for measuring methane, carbon dioxide and carbon monoxide. The sample is automatically loaded with the built-in vacuum pump and injected onto the latest designed capillary column with the gas sample valve. Let's all do our part to help lower the amount of Greenhouse gases released into the atmosphere; our kids and grand kids will appreciate that we did. The Greenhouse Gas GC Analyzers are fully integrated GC Systems that are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

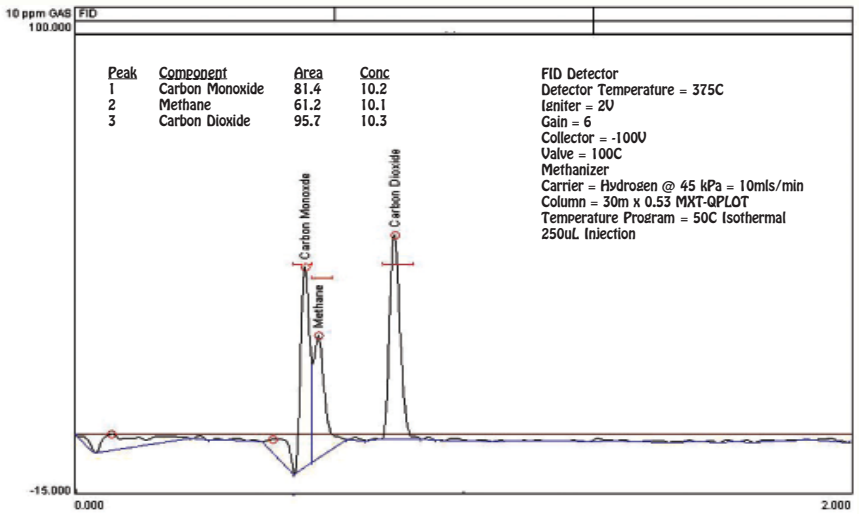
Available Configurations Include:

600-C-032 - Series 600 Greenhouse Gas GC Analyzer (FID, Methanizer, Valve, 30m)
500-C-032 - Companion 1 Portable Greenhouse Gas GC Analyzer (FID, Methanizer, Valve, 30m)

Series 600 GC

Companion 1 Portable GC

Greenhouse Gases - 10 ppm



11/2015
Specifications may change without notice.

Environmental

Gasoline Range Organics & BTEX

DPS Instruments, Inc.

www.dps-instruments.com

When you need speedy BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes) analyses to satisfy your clients choose one of our full range of BTEX Analyzers. We offer both Series 600 Lab GC's and Companion Portable GC's configured for Direct Injection of your extracts. For the analysis of BTEX in water samples choose the Purge & Trap BTEX Analyzers with compound sensitivities in the low part per billion (ppb) range. The integrated Purge & Trap is built right into the Series 600, or Companion chassis, so there is no need for a bulky heated transfer line. In some areas of the world the preferred method involves concentrating a soil gas sample on an absorbent trap. We have designed the Soil Gas BTEX Analyzers for this application. For your convenience, we build the Air Concentrator right in, which includes an electronically controlled vacuum pump with a flow controller for precise and reproducible air sampling. In other parts of the world the soil sample is placed in a vial, heated, and then a portion of the headspace is injected into the GC. We have configured the Headspace BTEX Analyzers for this method. All of the BTEX Analyzers are fully integrated GC Systems that are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

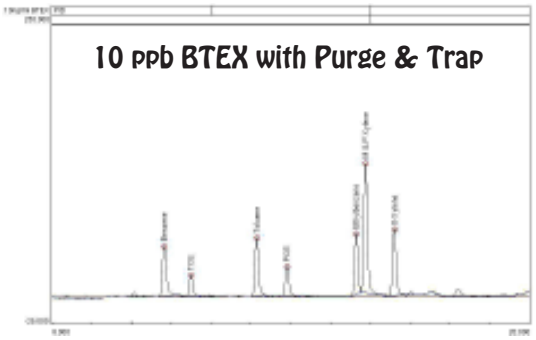
Series 600 GC

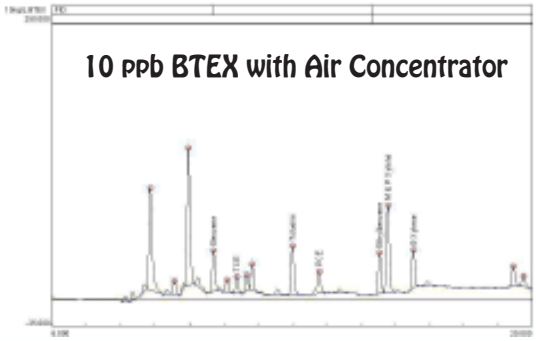
Available Configurations Include:

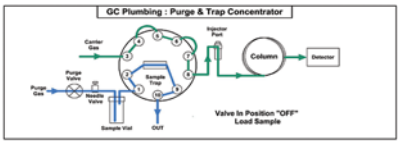
600-C-010 - Series 600 BTEX GC Analyzer (FID, PID, 30m)
500-C2-011 - Companion 2 Portable BTEX GC Analyzer (FID, PID, 30m)

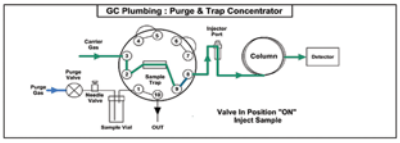
Options:
- Purge & Trap Concentrator
- Air Sample Concentrator
- Headspace Concentrator

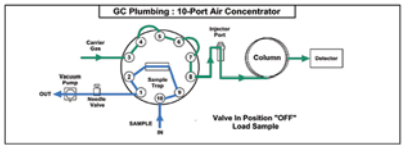
Companion 2 Portable GC
(with Purge & Trap Concentrator)

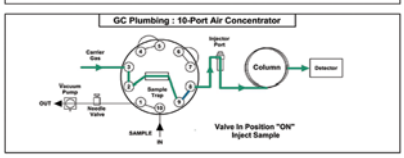












Environmental

Nitrogen/Phosphorus Pesticides

DPS Instruments, Inc.

www.dps-instruments.com

Nitrogen and Phosphorus containing pesticides, such as Diazinon have been produced extensively for decades for use in agriculture. Although production and use have decreasing in many countries, widespread occupational exposure to Nitrogen/Phosphorus Pesticides is known to have occurred during their production, formulation, application and disposal. It has been well documented that these chemicals cause nerve damage in humans and food from many countries may still be contaminated. The DPS Nitrogen/ Phosphorus Pesticides GC Analyzers are configured using the selective NPD detector to identify these pesticides in food and other products. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Nitrogen/Phosphorus Pesticides GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

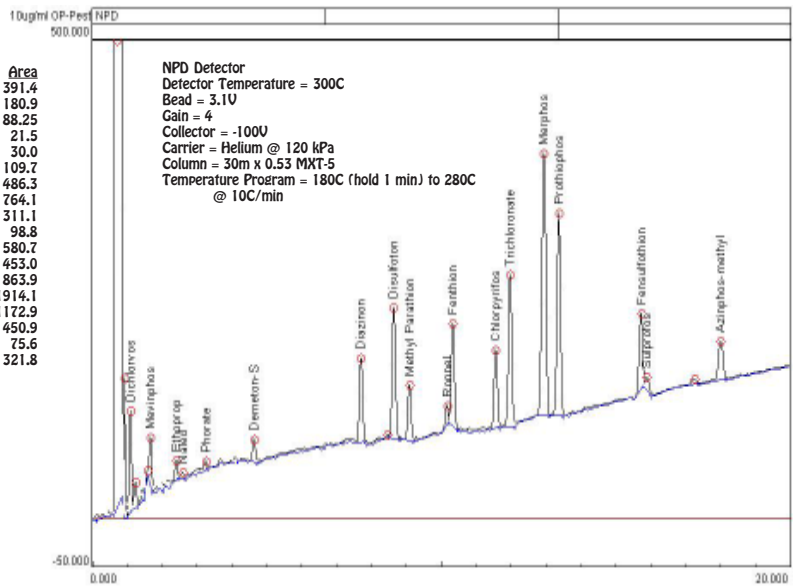
600-C-033 - Series 600 Nitrogen/Phosphorus GC Analyzer (NPD, 30m)
500-C-033 - Companion 1 Portable Nitrogen/Phosphorus GC Analyzer (NPD, 30m)

Series 600 GC

Nitrogen/Phosphorus Pesticides - 10 ng

Companion 1 Portable GC

Peak	Component	Area
1	Dichlorvos	391.4
2	Mevinphos	180.9
3	Ethoprop	88.25
4	Naled	21.5
5	Phorate	30.0
6	Demeton-S	109.7
7	Diazinon	486.3
8	Disulfoton	764.1
9	Methyl Parathion	311.1
10	Ronnel	98.8
11	Fenthion	580.7
12	Chlorpyrofos	453.0
13	Trichloronate	863.9
14	Merphos	1914.1
15	Prothiophos	1172.9
16	Fensulfothion	450.9
17	Sulprofos	75.6
18	Azinphos-methyl	321.8



11/2015
Specifications may change without notice.

DPS BTEX GC Layouts

Companion 2 GC

Small High Pressure Gas Cylinder

Gas Connections

Power connection with breaker and line filter

Valve Oven

Detectors

Rugged watertight case

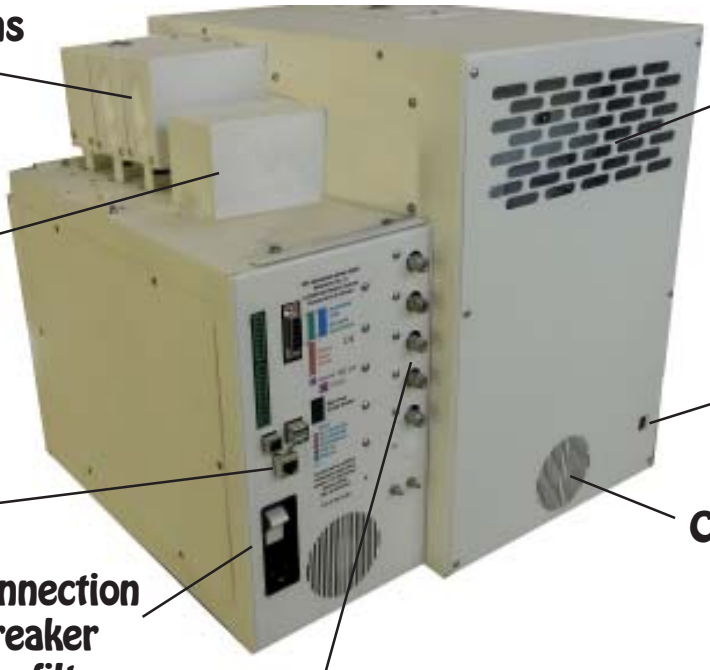
Color Touchscreen

USB & Ethernet Connections

GC Oven

On-Column Injectors

Series 600 GC



3 Detector Positions (FID & PID, etc.)

Flow Through Oven Cooling

Sample Valve and Valve Oven

Voltage Selection (120 or 240Vac)

USB & Ethernet Connections

Cooling Fan

Power connection with breaker and line filter

EPC Inlets

Environmental

Polychlorinated Biphenyls - PCB's

DPS Instruments, Inc.

www.dps-instruments.com

Polychlorinated biphenyls (PCB's) are synthetic chemical compounds that are relatively fire-resistant, very stable, and do not conduct electricity. These properties have made them desirable components in a wide range of industrial and consumer products for the past 80 years. Unfortunately, PCB's have been routinely disposed of over the years, without any precautions being taken. As a result, large volumes of PCB's have been introduced into the environment through open burning, vaporization from paints and plastics, by dumping into sewers and streams, and by dumping into the oceans. Many of the PCB's dumped years ago are still around today because of their extreme resistance to chemical and biological breakdown. The DPS PCB's GC Analyzers are designed to help clean up this mess. The nonradioactive BCD Detector can detect and identify the specific PCB contamination quickly. The fully integrated PCB's GC Analyzer systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

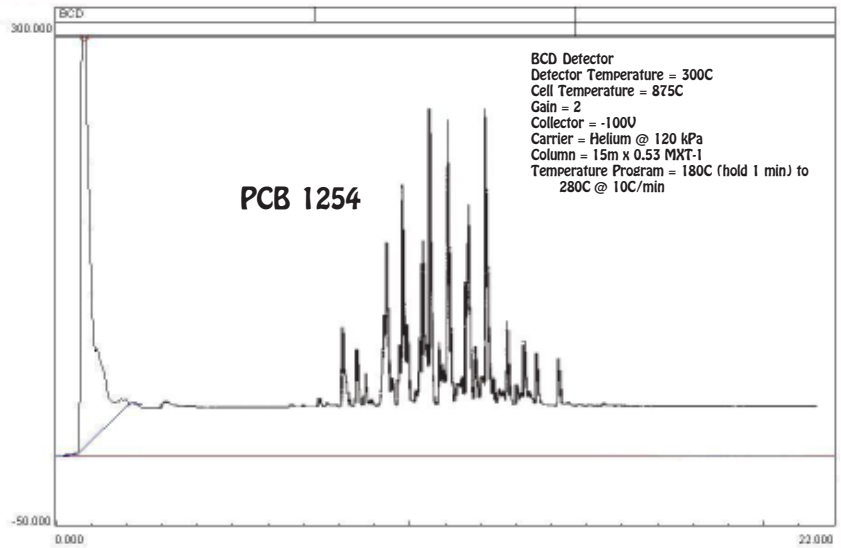
Available Configurations Include:

600-C-026 - Series 600 PCB's GC Analyzer (BCD, 15m)
500-C2-026 - Companion 2 Portable PCB's GC Analyzer (BCD, 15m)

Series 600 GC

Companion 2 Portable GC

PCB's - Arochlor Screening with BCD



11/2015
Specifications may change without notice.

Environmental

Phthalates

DPS Instruments, Inc.

www.dps-instruments.com

Phthalates are used in a large variety of products, from coatings of pharmaceutical pills to viscosity control agents, gelling agents, film formers, stabilizers, dispersants, lubricants, binders, emulsifying agents, and suspending agents. Phthalates are found in adhesives and glues, building materials, personal-care products, medical devices, detergents, packaging, children's toys, modelling clay, waxes, paints and coatings, pharmaceuticals, food products, and textiles. Phthalates are also frequently used to soften Polyvinyl Chloride (PVC). Since the phthalate does not form a molecular bond with the plastic it can be removed with heat, or organic solvents creating a potential environmental risk. DPS configures the Phthalates GC Analyzers with the sensitive FID detector to identify Phthalates in these common products, or the environment. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Phthalates GC Analyzer systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

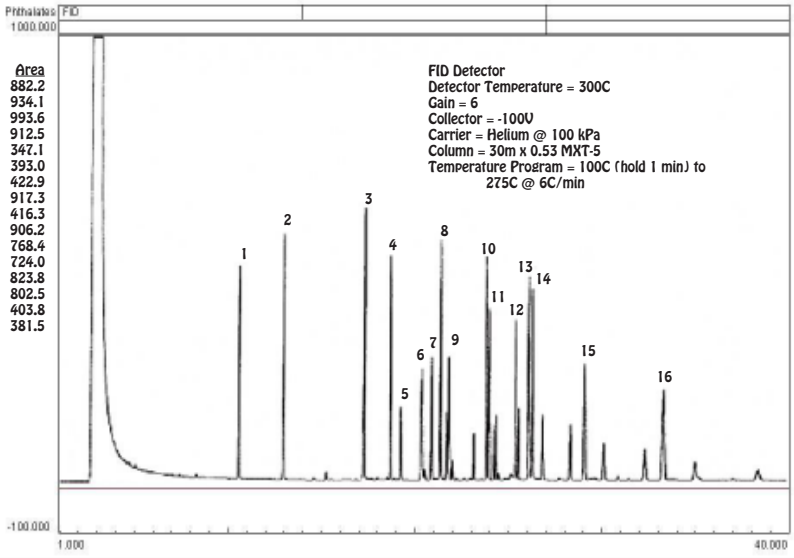
600-C-027 - Series 600 Phthalates GC Analyzer (FID, 30m)
500-C-027 - Companion 1 Portable Phthalates GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Phthalate Esters

Peak	Component	Area
1	Dimethyl Phthalate	882.2
2	Diethyl Phthalate	934.1
3	Diisobutyl Phthtalate	993.6
4	Di-n-Butyl Phthalate	912.5
5	Bis(methoxyethyl) Phthalate	347.1
6	Bis(4-methyl-2-pentyl) Phthalate	393.0
7	Bis(ethoxyethyl) Phthalate	422.9
8	Diamyl Phthalate	917.3
9	Hexyl-2-Ethylhexyl Phthalate	416.3
10	Di-n-Hexyl Phthalate	906.2
11	Butyl Benzyl Phthalate	768.4
12	Bis(2-n-Butoxyethyl) Phthalate	724.0
13	Dicyclohexyl Phthalate	823.8
14	Bis(2-Ethylhexyl) Phthalate	802.5
15	Di-n-Octyl Phthalate	403.8
16	Dinonyl Phthalate	381.5



8/2016
Specifications may change without notice.

Environmental

Semi-Volatiles

DPS Instruments, Inc.

www.dps-instruments.com

Semi-volatiles is a catch all phrase for many classes of higher boiling organic compounds. These can be Polynuclear Aromatics, Phenols, Phthalate Esters, Nitrosamines, Chlorinated Hydrocarbons, and others. Since everyone is looking for lower detection limits, these compounds are usually extracted, concentrated and shot by direct injection. The common link between these compounds is their hydrocarbon backbone, which can be easily detected by the FID detector. DPS configures the Semi-volatiles GC Analyzers with the sensitive FID detector and the column of your choice to separate and identify these classes of compounds. Or, let our experts assist you in selecting a good general purpose column to cover most of the applications. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Semi-volatiles GC Analyzer systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

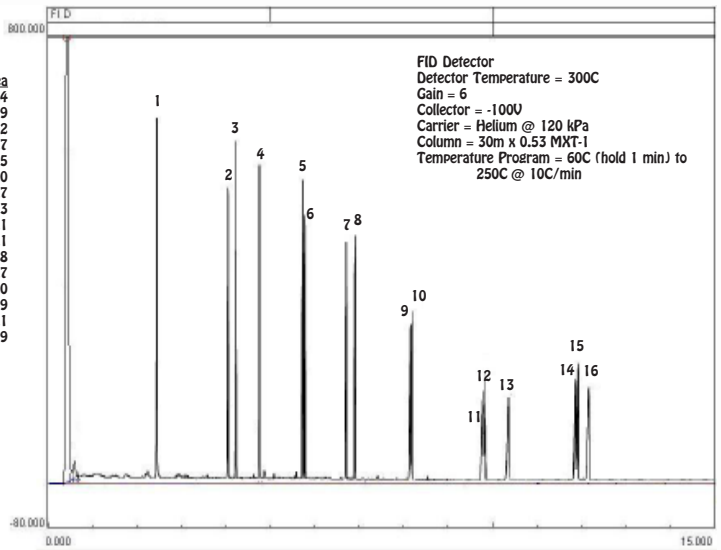
600-C-030 - Series 600 Semi-Volatiles GC Analyzer (FID, 30m)
500-C-030 - Companion 1 Portable Semi-Volatiles GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

PNA's - Polynuclear Aromatic Hydrocarbons

Peak	Component	Area
1	Naphthalene	1439.4
2	Acenaphthylene	1243.9
3	Acenaphthene	1374.2
4	Fluorene	1284.7
5	Phenanthrene	1212.5
6	Anthracene	1165.0
7	Fluoranthene	1074.7
8	Pyrene	1103.3
9	Benzo(a)anthracene	827.1
10	Chrysene	940.1
11	Benzo(b)fluoranthene	498.8
12	Benzo(k)fluoranthene	632.7
13	Benzo(a)pyrene	399.0
14	Indeno(1,2,3-cd)pyrene	579.9
15	Dibenzo(a,h)anthracene	627.1
16	Benzo(ghi)perylene	428.9



11/2015
Specifications may change without notice.

Environmental

Soil Gas Analyzers

DPS Instruments, Inc.

www.dps-instruments.com

Millions of liters of chlorinated solvents used in industry over the years have spilled, polluting our air, soil, rivers, lakes, and streams. Environmentally conscious legislation has been passed in many parts of the world to limit future spills, clean up existing polluted sites, and lessen the overall risk to ourselves and to our children.

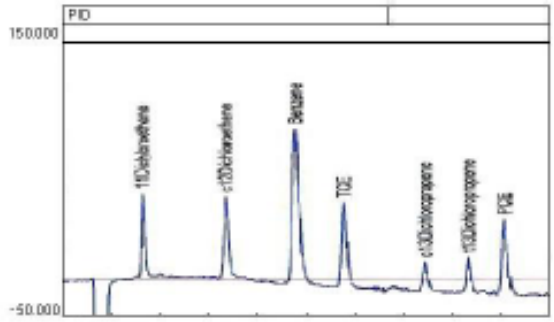
Looking towards a greener world, DPS has configured a Companion 2 Portable Soil Gas GC Analyzer, enabling analysis in the field for Type 1 hazardous substances (11 compounds) specified in the Soil Contamination Countermeasures Law in Japan. The DPS Soil Gas GC has a built-in Sample Concentrator with Trap and dry purge functions for low ppb level analysis of these 11 compounds, and the newly added compound, Chloroethylene. The PID is very sensitive to aromatics and alkenes, and the BCD is ultra-sensitive to chlorinated and brominated compounds. This combination of detectors covers all of the compounds in the Countermeasures Law, and more. All DPS GC systems are small, lightweight and modular for expandability, upgrades, and easy service.

Available Configurations Include:

500-C2-013 - Companion 2 Portable Soil Gas GC Analyzer (PID, BCD, 30m)
500-C2-019 - Companion 2 Portable Low-Level GC Analyzer (PID, BCD, 30m, and Sample Concentrator)

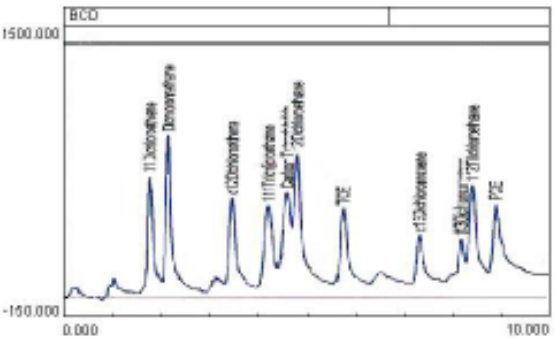
Companion 2 Portable GC
(With Air Concentrator)

1 ppm Hazardous Substances



PID Detector
Detector Temperature = 175C
High Voltage = 800V
Gain = 6
Collector = -100V
Carrier = Helium @ 60 kPa = 10mls/min
Column = 30m x 0.53 MXT-502.2
Temperature Program = 50C (hold 3 min) to 120C @ 10C/min

Peak	Component	Area	ppm
1	1,1-Dichelroethene	195.6	1
2	cis-1,2,-Dichloroethene	295.2	1
3	Benzene	672.7	1
4	Trichloroethylene	322.4	1
5	cis-1,3-Dichloropropene	90.4	1
6	trans-1,3-Dichloropropene	106.2	1
7	Tetrachloroethylene	270.6	1



BCD Detector
Detector Temperature = 175C
Cell Temperature = 800C
Gain = 2
Collector = -100V

Peak	Component	Area	ppm
1	1,1-Dichelroethene	5598.7	1
2	Dichloromethane	7122.3	1
3	cis-1,2,-Dichloroethene	5880.7	1
4	1,1,1-Trichloroethane	5615.1	1
5	Carbon Tetrachloride	3126.5	1
6	1,2-Dichloroethane	4668.1	1
7	Trichloroethylene	5903.7	1
8	cis-1,3-Dichloropropene	3056.6	1
9	trans-1,3-Dichloropropene	1262.2	1
10	1,1,2-Trichloroethene	5295.4	1
11	Tetrachloroethylene	4838.6	1

8/2018
Specifications may change without notice.

Environmental
Air Analyzers

DPS Instruments, Inc.

www.dps-instruments.com

When you need the lowest level air analyses possible count on the Air Analyzers from DPS Instruments. All of our Air Analyzers include detectors tuned to their highest sensitivity and the largest dynamic range. For your convenience, we build the Air Concentrator right into the system, which includes an electronically controlled vacuum pump with a flow controller for precise and reproducible air sampling, microelectronic sampling valve, and adsorbent trap. The Series 600 GC is ideal for analyses in the lab, or use the Portable Companion 2 GC Systems for analyses right where the samples are taken. Common configurations include a FID for hydrocarbons, PID for aromatics such as Benzene, and the ultra-sensitive BCD for chlorinated compounds. A combination of detectors covers most environmental methods. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Air GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

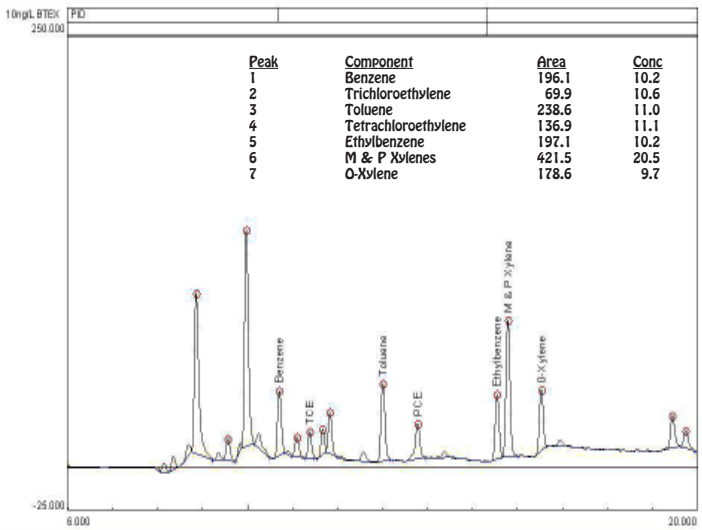
Available Configurations Include:

600-C-019 - Series 600 Air GC Analyzer (FID, PID, BCD, Air Concentrator, 2 x 30m)
600-C-018 - Series 600 Air Pollutants GC Analyzer (PID, BCD, Air Concentrator, 30m)
500-C2-018 - Companion 2 Air GC Analyzer (PID, BCD, Air Concentrator, 30m)

Series 600 GC

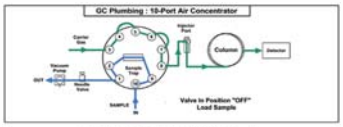
Companion 2 Portable GC
(with Air Concentrator)

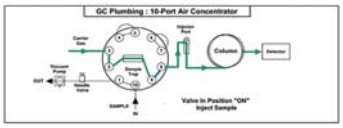
BTEX with Air Concentrator - 10 ppb



Peak	Component	Area	Conc
1	Benzene	196.1	10.2
2	Trichloroethylene	69.9	10.6
3	Toluene	238.6	11.0
4	Tetrachloroethylene	136.9	11.1
5	Ethylbenzene	197.1	10.2
6	M & P Xylenes	421.5	20.5
7	O-Xylene	178.6	9.7

PID Detector
Detector Temperature = 150C
High Voltage = 600V
Gain = 4
Collector = -100V
Valve = 100C
Carrier = Helium @ 40 kPa = 10mls/min
Pump 5min @ 50mls/min = 250mls
Column = 30m x 0.53 MXT-624
Temp Program = 60C (hold 9 min) to 150C @ 10C/min





11/2015
Specifications may change without notice.

Environmental
Air Analyzers

DPS Instruments, Inc.

www.dps-instruments.com

When you need the lowest level air analyses possible count on the Air Analyzers from DPS Instruments. All of our Air Analyzers include detectors tuned to their highest sensitivity and the largest dynamic range. For your convenience, we build the Air Concentrator right into the system, which includes an electronically controlled vacuum pump with a flow controller for precise and reproducible air sampling, microelectronic sampling valve, and adsorbent trap. The Series 600 GC is ideal for analyses in the lab, or use the Portable Companion 2 GC Systems for analyses right where the samples are taken. Common configurations include a FID for hydrocarbons, PID for aromatics such as Benzene, and the ultra-sensitive BCD for chlorinated compounds. A combination of detectors covers most environmental methods. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Air GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

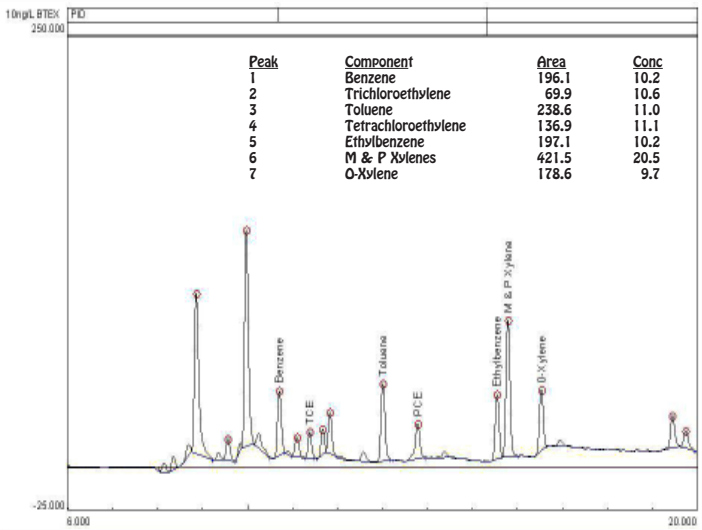
Available Configurations Include:

600-C-019 - Series 600 Air GC Analyzer (FID, PID, BCD, Air Concentrator, 2 x 30m)
600-C-018 - Series 600 Air Pollutants GC Analyzer (PID, BCD, Air Concentrator, 30m)
500-C2-018 - Companion 2 Air GC Analyzer (PID, BCD, Air Concentrator, 30m)

Series 600 GC

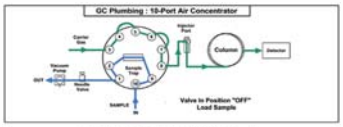
Companion 2 Portable GC
(with Air Concentrator)

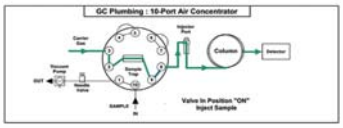
BTEX with Air Concentrator - 10 ppb



Peak	Component	Area	Conc
1	Benzene	196.1	10.2
2	Trichloroethylene	69.9	10.6
3	Toluene	238.6	11.0
4	Tetrachloroethylene	136.9	11.1
5	Ethylbenzene	197.1	10.2
6	M & P Xylenes	421.5	20.5
7	O-Xylene	178.6	9.7

PID Detector
Detector Temperature = 150C
High Voltage = 600V
Gain = 4
Collector = -100V
Valve = 100C
Carrier = Helium @ 40 kPa = 10mls/min
Pump 5min @ 50mls/min = 250mls
Column = 30m x 0.53 MXT-624
Temp Program = 60C (hold 9 min) to 150C @ 10C/min





11/2015
Specifications may change without notice.

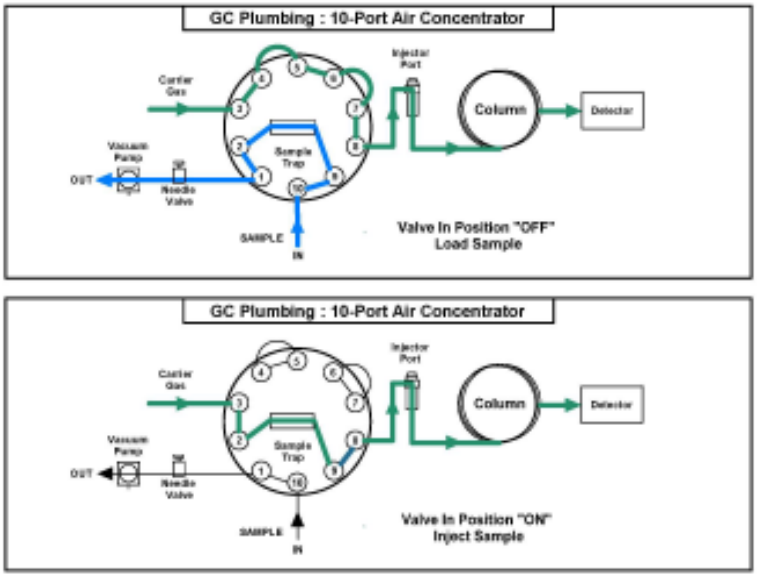
DPS Companion 2 Soil Gas GC Layout

Plumbing Diagram

Sample Concentrator: The Air Sample Concentrator is built right into the Companion 2 GC Chassis to provide both a compact portable sample concentrator and a shortest possible sample path. The valve and sample lines are heated creating a inert sample path.

Load Sample: The vacuum pump draws the sample from the inlet through the Trap and then to the flow controller and pump to limit any possible cross contamination between samples. The entire sequence of the Air Sample Concentrator is automated through the Timeline of the DPS Control Software for the analysis of one sample at a time, or the system can be set up to run unattended 24/7, collecting and analyzing samples every hour, or so. A dry purge option can be added to eliminate extra water from the sample if needed.

Inject Sample: The carrier gas sweeps the components from the trap to the analytical column. The entire sample path is heated to facilitate a smooth transfer of components to the analytical column and to limit any potential carry-over from high concentation samples.



Built-in Air Concentrator Plumbing Diagram

Results, Data & Conncetivity

Results: In this unique plumbing configuration, which utilizes a precise sample flow path and precision metering, so you get the same peak areas on the chromatogram from run to run. Both detectors are stable, rugged, and reliable.

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.

DPS Soil Gas Data Summary

Reproducibility Data - 3 Consecutive day Summary

Standard Preparation - 5 uL of the Original JEOL Standard diluted into 1L
200uL Direct Injection

PID Detector Data

Area

	Day 1	Day2	Day3	Average	AVE DEV	% DEV
1,1-Dichloroethene	202.6	186.0	226.1	207.9	12.2	5.85
cis-1,2-Dichloroethene	286.1	276.5	293.2	285.3	5.8	2.05
Benzene	680.8	665.8	732.7	693.1	26.4	3.81
TCE	316.9	306.0	328.1	317.0	7.4	2.33
cis-1,3-Dichloropropene	93.5	84.8	94.1	90.8	4.0	4.41
trans-1,3-Dichloropropene	101.0	86.1	98.4	95.2	6.0	6.33
PCE	276.0	279.6	287.5	281.0	4.3	1.54

Retention Time

	Day 1	Day2	Day3	Average	AVE DEV	% DEV
1,1-Dichloroethene	1.733	1.743	1.749	1.742	0.006	0.34
cis-1,2-Dichloroethene	3.450	3.459	3.462	3.457	0.005	0.14
Benzene	4.849	4.851	4.854	4.851	0.002	0.04
TCE	5.832	5.828	5.828	5.829	0.002	0.03
cis-1,3-Dichloropropene	7.465	7.462	7.453	7.460	0.005	0.07
trans-1,3-Dichloropropene	8.350	8.342	8.338	8.343	0.004	0.05
PCE	9.075	9.067	9.065	9.069	0.004	0.05

BCD Detector Data

Area

	Day 1	Day2	Day3	Average	AVE DEV	% DEV
1,1-Dichloroethene	4765	4140	4252	4386	252.7	5.76
Dichloromethane	7123	6711	7383	7072	240.8	3.40
cis-1,2-Dichloroethene	5419	5673	5132	5408	183.8	3.40
1,1,1-Trichloroethane	5566	4401	5060	5009	405.2	8.09
Carbon Tetrachloride	3253	3030	3548	3277	180.8	5.52
1,2-Dichloroethane	4055	4009	4295	4119	116.8	2.84
TCE	5627	4989	5004	5210	278.0	5.34
cis-1,3-Dichloropropene	2803	2161	2660	2541	253.5	9.98
trans-1,3-Dichloropropene	1235	1048	1163	1149	66.9	5.83
1,1,2-Trichloroethane	5147	5237	5142	5175	41.3	0.80
PCE	4411	4332	4006	4250	162.3	3.82

Retention Time

	Day 1	Day2	Day3	Average	AVE DEV	% DEV
1,1-Dichloroethene	1.872	1.878	1.888	1.879	0.006	0.33
Dichloromethane	2.217	2.216	2.231	2.222	0.006	0.29
cis-1,2-Dichloroethene	3.613	3.615	3.631	3.620	0.007	0.21
1,1,1-Trichloroethane	4.414	4.404	4.419	4.412	0.006	0.13
Carbon Tetrachloride	4.784	4.777	4.790	4.783	0.004	0.09
1,2-Dichloroethane	5.010	5.007	5.023	5.013	0.006	0.12
TCE	6.017	6.019	6.026	6.021	0.004	0.06
cis-1,3-Dichloropropene	7.663	7.643	7.649	7.651	0.007	0.10
trans-1,3-Dichloropropene	8.550	8.535	8.533	8.539	0.007	0.08
1,1,2-Trichloroethane	8.774	8.772	8.769	8.772	0.002	0.02
PCE	9.285	9.278	9.267	9.277	0.007	0.07

Results are Reproducible Day after Day

DPS Soil Gas Calibration Data

PID Detector Data

Calibration

Run	B156 1 vol	B157 0.5 vol	B159 0.1 vol	Average Calibration Factor	r2
1,1-Dichloroethene	210.3	110.3	21.5	215	0.999
cis-1,2-Dichloroethene	294.9	125.3	29.0	279	0.992
Benzene	679.1	336.0	65.6	669	1.000
TCE	306.5	139.9	37.8	321	0.995
cis-1,3-Dichloropropene	75.4	37.7	8.4	78	0.999
trans-1,3-Dichloropropene	71.2	31.3	7.8	71	0.993
PCE	256.4	130.0	25.1	256	0.999

Run	B156 1 vol	B157 0.5 vol	B159 0.1 vol	Average	AVE DEV	% DEV
1,1-Dichloroethene	1.763	1.736	1.753	1.751	0.010	0.56
cis-1,2-Dichloroethene	3.493	3.436	3.480	3.470	0.022	0.65
Benzene	4.900	4.836	4.883	4.873	0.025	0.51
TCE	5.886	5.813	5.863	5.854	0.027	0.47
cis-1,3-Dichloropropene	7.523	7.446	7.520	7.496	0.034	0.45
trans-1,3-Dichloropropene	8.416	8.346	8.400	8.387	0.028	0.33
PCE	9.146	9.080	9.116	9.114	0.023	0.25

BCD Detector Data

Run	B156 1 vol	B157 0.5 vol	B159 0.1 vol	Average Calibration Factor	r2
1,1-Dichloroethene	4533	1686	365	3985	0.992
Dichloromethane	7290	4164	546	7026	0.989
cis-1,2-Dichloroethene	4838	2977	461	5134	0.978
1,1,1-Trichloroethane	4641	1859	440	4253	0.986
Carbon Tetrachloride	3794	2051	356	3819	0.999
1,2-Dichloroethane	4379	2296	411	4360	0.997
TCE	5001	2671	424	4861	0.997
cis-1,3-Dichloropropene	2236	1031	320	2499	0.993
trans-1,3-Dichloropropene	919	561	105	1030	0.982
1,1,2-Trichloroethane	6672	2702	570	5925	0.988
PCE	4138	2220	159	3389	0.993

Run	B156 1 vol	B157 0.5 vol	B159 0.1 vol	Average	AVE DEV	% DEV
1,1-Dichloroethene	1.900	1.873	1.883	1.885	0.010	0.52
Dichloromethane	2.250	2.213	2.243	2.235	0.015	0.67
cis-1,2-Dichloroethene	3.663	3.610	3.663	3.645	0.024	0.65
1,1,1-Trichloroethane	4.446	4.386	4.410	4.414	0.021	0.48
Carbon Tetrachloride	4.830	4.760	4.841	4.810	0.034	0.70
1,2-Dichloroethane	5.063	4.996	5.043	5.034	0.025	0.50
TCE	6.073	6.003	6.041	6.039	0.024	0.40
cis-1,3-Dichloropropene	7.716	7.643	7.684	7.681	0.025	0.33
trans-1,3-Dichloropropene	8.616	8.543	8.584	8.581	0.025	0.30
1,1,2-Trichloroethane	8.856	8.783	8.710	8.783	0.049	0.55
PCE	9.360	9.290	9.320	9.323	0.024	0.26

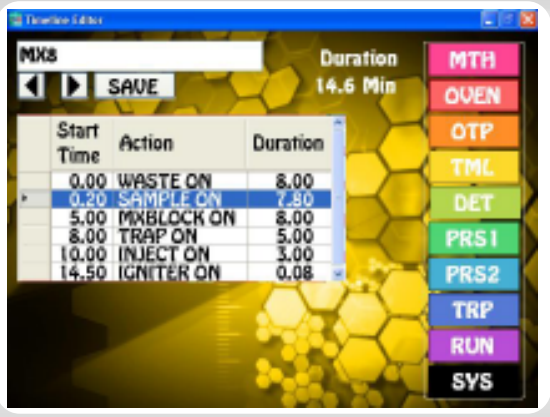
Calibrations are very Stable over Time

DPS 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.

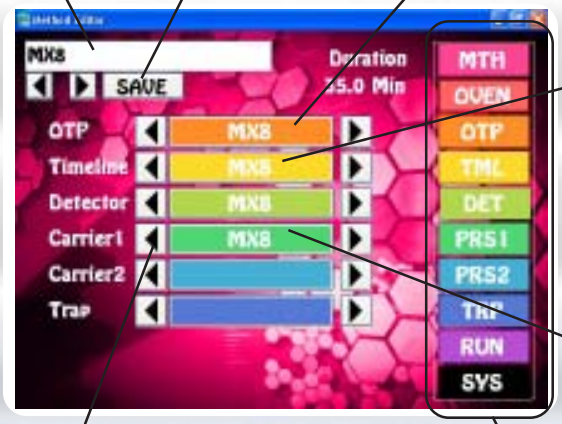
Oven Temp Program Editor



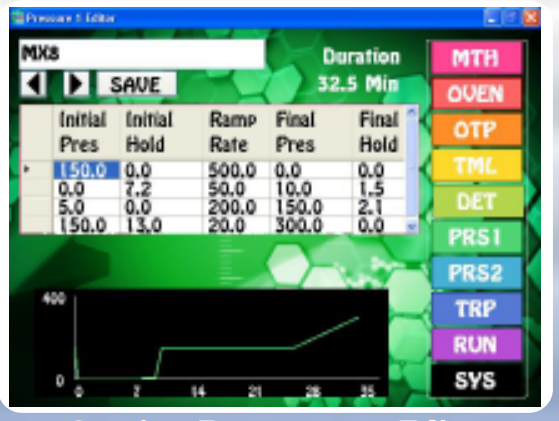
Timeline Editor

Method Name

Save the current name or create a new one



File Selection Arrows



Carrier Pressure 1 Editor

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

Keyboard to Enter Filenames

Number Pad for entering Values

Carrier Pressure 2 Editor

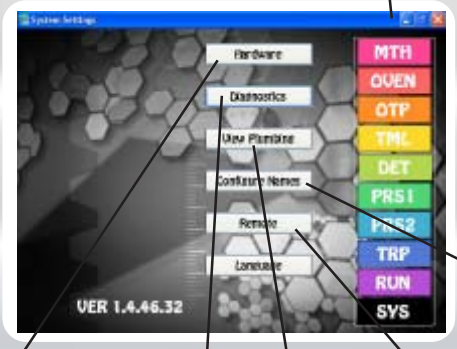
GC Status pages display the parameters in the method, both graphically and as text and values.

Oven Status

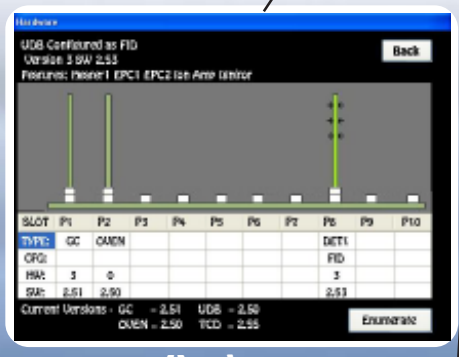
Method Editor

Detector Status

System Status

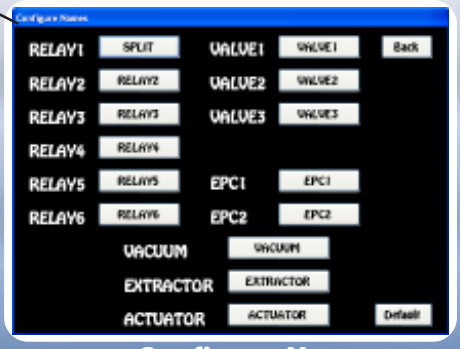


Run Status

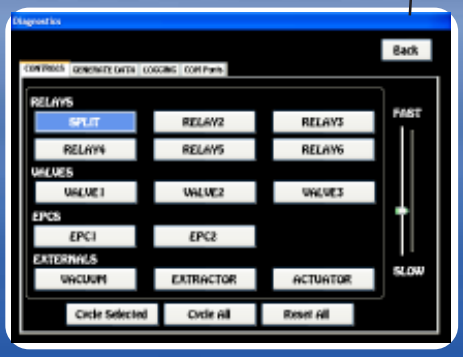


Hardware

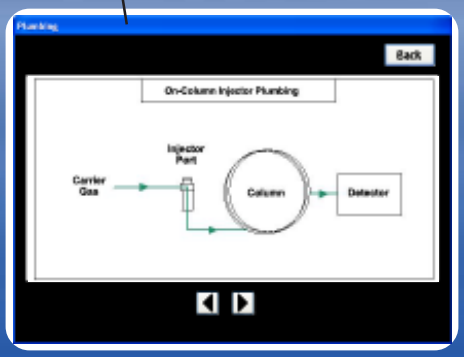
System status pages display the health and viability of the GC instrument.



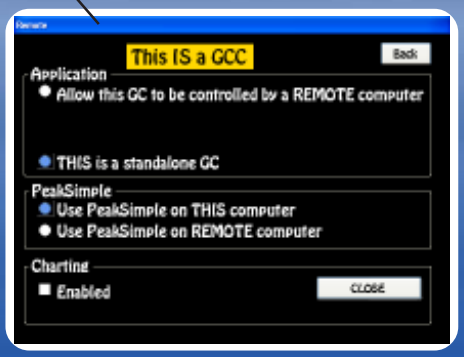
Configure Names



Diagnostics



Plumbing



Remote Control

Companion 2 Portable Soil 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.

Detectors:

PID – Photoionization Detector
BCD – Bromide Chloride Detector

- 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:

15m, 30m, or 60m Capillary Columns

Results:

Automatically calibrated, corrected and reported

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:

- Air Sample Concentrator

Injectors:

- 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!"

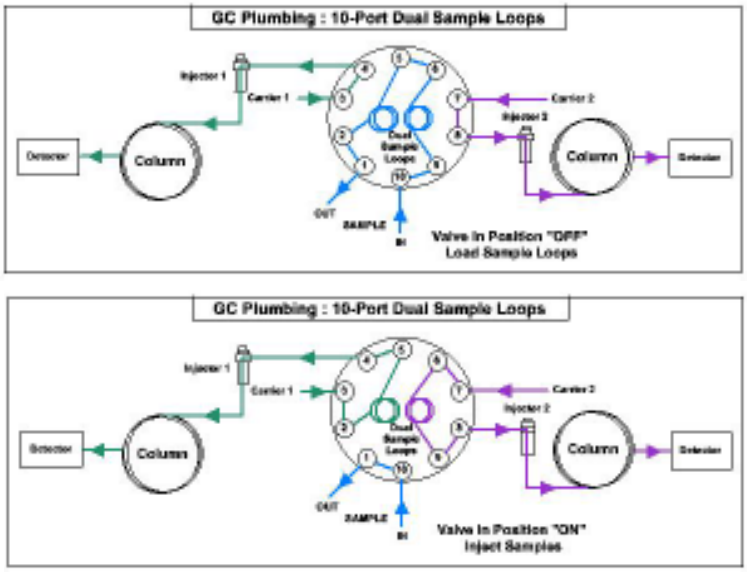
DPS Instruments, Inc.

Plumbing Diagram

Gas Sample Valve: The Gas Sample Valve can be configured in many different ways. For example, it can be configured for a dual Sample Loops, where the gas sample fills 2 different size loops, that are subsequently injected onto 2 difrferent Injectors.

Load Air Sample: Eitjer positive pressure, or an optional vacuum pump can be used to draw the sample through each of the Sample Loops, which are in series. The entire sequence is automated through the Timeline of the DPS Control Software for the analysis of one sample, or the system can be set up to run unattended 24/7, collecting and analyzing samples every hour, or so.

Inject Sample: No matter how the sample was loaded on the Sample Loops, the carrier gas sweeps the components from the Loops to the analytical columns. Tghere is a separate carrier gas for each column, which means that 2 different carrier gases can be used in this configuration.



Dual Sample Loops, two different size Sample Loops going to 2 Injectors

Results, Data & Conncetivity

Results: In this unique plumbing configuration you get the same peak areas on the chromatogram no matter where the sample comes from. If the Sample is pushed through the Sample Loops, or pulled with the Vacuum Pump, the Sample Loops are filled in the same way.

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.

BTEX 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.

Detectors:
FID – Flame Ionization Detector
PID – Photoionization Detector
BCD, HID, TID, NPD, FPD can also be added.

- 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:
15m, 30m, or 60m Capillary Columns

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:
- Gas Sample Valve
- Air Compressor for FID's

Injectors:
- Cool On-column Injectors
- Heated On-column Injectors
- Split/Splitless Injectors
- Multiple Pressure Ramps with 0.1 kPa set-point resolution

Data Communications:
- Bi-directional communication with popular Data System

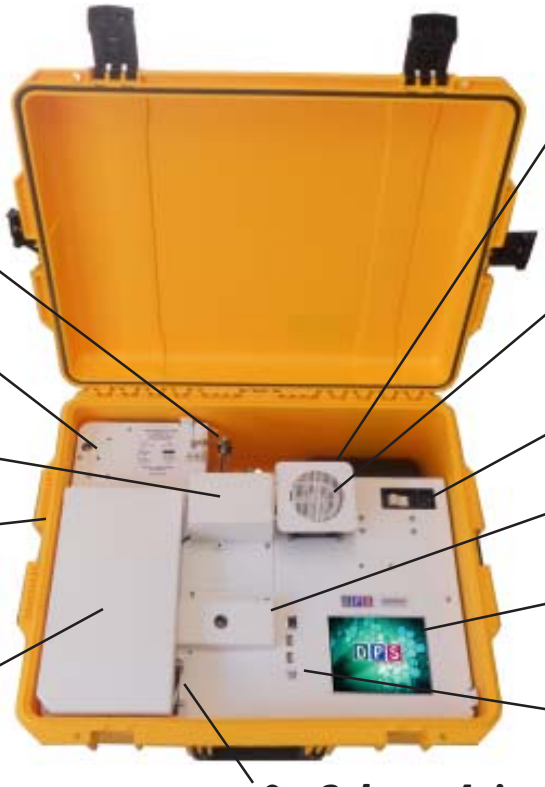
Network Connectivity:
- Enterprise Compatible Network GC running Windows XPe
- Ethernet Connection using Windows Network Protocol
- On Board ETX Computer for GC Control and Data Acquisition
- Remote Control of GC and Data Acquisition over LAN

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

DPS Instruments, Inc.

DPS Environmental GC Layouts

Companion 2 GC



Small High Pressure Gas Cylinder

Purge Head

Trap & Cooling Fan

Gas Connections

Power connection with breaker and line filter

Valve Oven

Detectors

Rugged watertight case

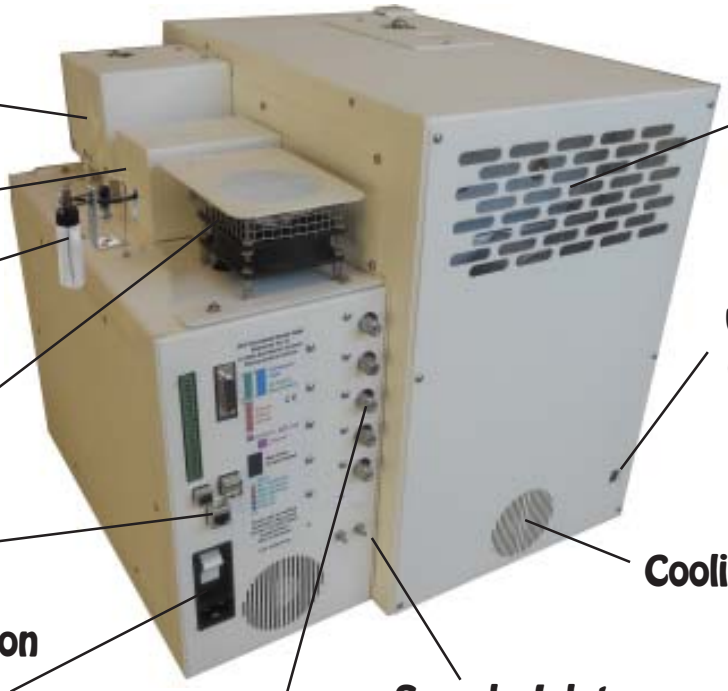
Color Touchscreen

USB & Ethernet Connections

GC Oven

On-Column Injectors

Series 600 GC



Detectors

Flow Through Oven Cooling

Sample Valve and Valve Oven

Purge Head

Voltage Selection (120 or 240Vac)

Trap & Cooling Fan

USB & Ethernet Connections

Cooling Fan

Power connection with breaker and line filter

Sample Inlet

EPC Inlets

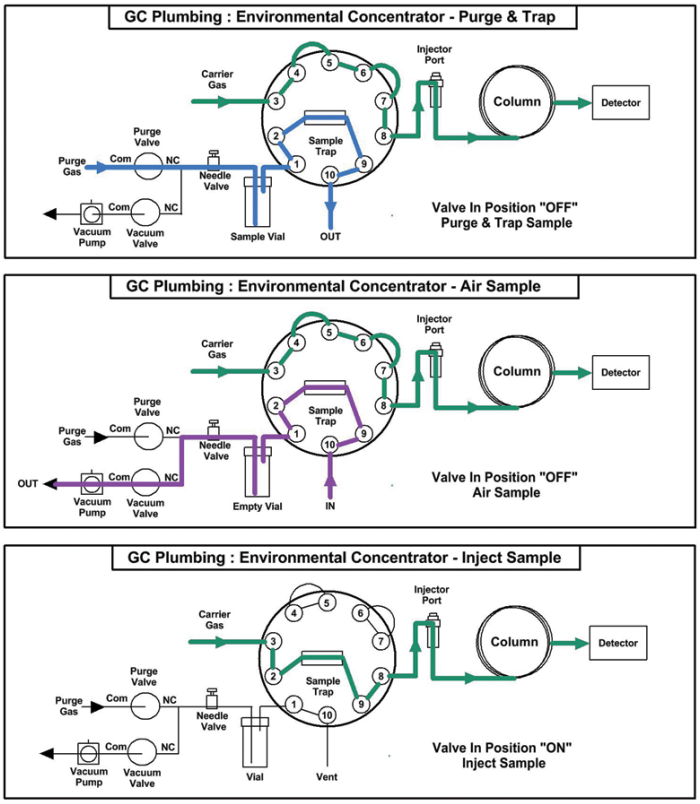
Plumbing Diagram

Sample Concentrators: Both the Purge & Trap Concentrator and Air Sample Concentrator are built right into the GC Chassis to provide both a compact portable sample concentrator and a shortest possible sample path. The valve and sample lines are heated creating a inert sample path. There is no need to change any plumbing to switch between analyzing water, or air samples. Simply loading a different GC Method in the DPS Control Software is all that you have to do. Both Sample Concentrators use the same flow control valve to precisely meter the amount of sample loading on the Trap.

Load Water Sample: The water sample is purged with inert gas to extract the sample compounds and load them onto the Trap. The entire sequence of the Purge & Trap Concentrator is automated through the Timeline of the DPS Control Software for the analysis of one sample at a time.

Load Air Sample: The vacuum pump draws the sample from the inlet through the Trap and then to the flow controller and pump to limit any possible cross contamination between samples. The entire sequence of the Air Sample Concentrator is automated through the Timeline of the DPS Control Software for the analysis of one sample, or the system can be set up to run unattended 24/7, collecting and analyzing samples every hour, or so.

Inject Sample: No matter how the sample was loaded on the Trap, the carrier gas sweeps the components from the trap to the analytical column.



Built-in Combination Purge & Trap Concentrator, & Air Concentrator Plumbing Diagram

Results, Data & Conncetivity

Results: In this unique plumbing configuration, which utilizes the same sample flow path and precision metering, you get the same peak areas on the chromatogram no matter which source the sample comes from. The results presented on the first page demonstrate this. A BTEX standard was spiked into clean water for the Purge & Trap analysis and the same standard was spiked into a 1L Tedlar bag containing room air for the Air Analysis. Since 10 nanograms of each component are loaded on the Trap in each case, the detector responds with the same value.

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.

Environmental 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.

Detectors:

FID – Flame Ionization Detector
PID – Photoionization Detector
BCD – Bromide Chloride Detector

- 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:

15m, 30m, or 60m Capillary Columns

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:

- Purge & Trap Sample Concentrator
- Air Sample Concentrator
- Air Compressor for FID's

Injectors:

- Cool On-column Injectors
- Heated On-column Injectors
- Split/Splitless 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!"

DPS Instruments, Inc.

Foods, Flavors, & Fragrances

Alcohol & Spirits

DPS Instruments, Inc.

www.dps-instruments.com

Distilled spirits, wine, and beer all contain flavoring agents, esters, acids, and aldehydes. While the ethanol content is closely monitored and regulated by government agencies, the unique flavor of each spirit is the unique combination of the individual compounds. While other methods can determine the ethanol content, only Chromatography can measure the ethanol and separate the individual constituents for identification. When you want to know what makes your favorite tequila, rum, or whiskey taste so special you need a DPS Alcohol & Spirits GC System. The latest designed high resolution column and the sensitive FID detector does the hard work for you. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Alcohol & Spirits GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

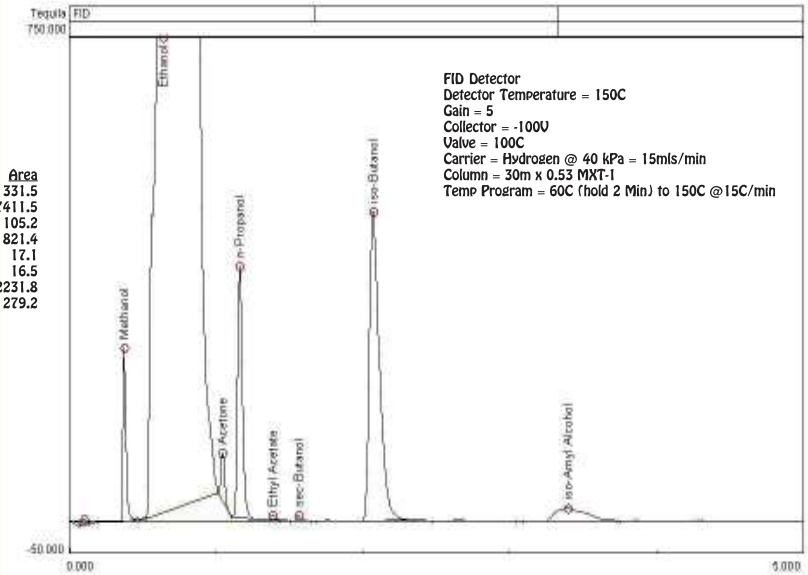
600-C-040 - Series 600 Alcohol & Spirits GC Analyzer (FID, 30m)
500-C-040 - Companion 1 Portable Alcohol & Spirits GC Analyzer (FID, 30m)

Series 600 GC

Gold Label Tequila

Companion 1 Portable GC

Peak	Component	Area
1	Methanol	331.5
2	Ethanol	67411.5
3	Acetone	105.2
4	n-Propanol	821.4
5	Ethyl Acetate	17.1
6	sec-Butanol	16.5
7	iso-Butanol	2231.8
8	iso-Amyl Alcohol	279.2



11/2015
Specifications may change without notice.

Forensics

Arson Accelerants

DPS Instruments, Inc.

www.dps-instruments.com

An accelerant is a fuel that causes a fire to burn hotter, spread more quickly, or be unusually difficult to extinguish. Investigators can prove that a fire was set intentionally by finding an accelerant, such as gasoline, kerosene, turpentine, or diesel fuel at the scene of a fire. Various techniques such as DFLEX strips, headspace concentration, or sample extraction can be used to detect accelerants at a fire scene. Although the sampling techniques vary the DPS Arson Accelerants GC Systems are configured for multiple sampling techniques. An extract can be directly injected by hand, or a debris sample can be placed in a vial and automatically heated and injected using our built-in Headspace Concentrator. In either case, a high resolution column and the sensitive FID detector quickly identify the accelerant fingerprint. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Arson Accelerants GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

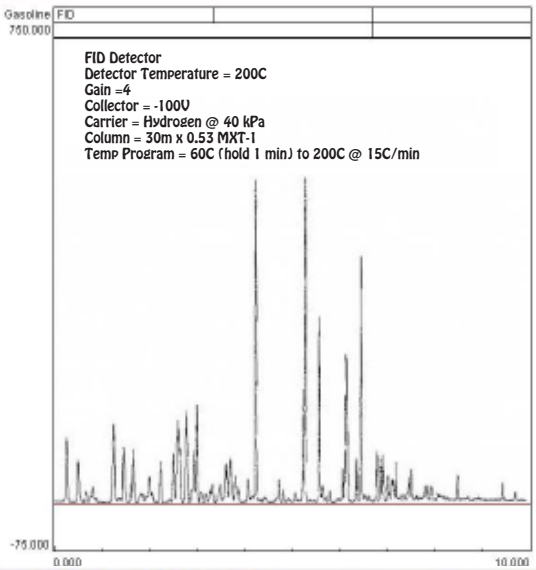
Available Configurations Include:

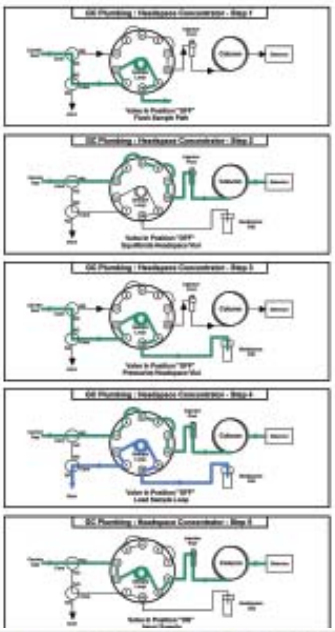
600-C-061 - Series 600 Arson Accelerants GC Analyzer (FID, Headspace, 30m)
600-C-061 - Companion 1 Portable Arson Accelerants GC Analyzer (FID, Headspace, 30m)

Series 600 GC

Companion 1 Portable GC (with Headspace

Gasoline - Headspace





11/2015
Specifications may change without notice.

Petrochemical

Oxygenates in Gasoline - D4815 Valve &

DPS Instruments, Inc.

www.dps-instruments.com

With the dramatic increase in reformulated gasoline production around the world there is an ever increasing demand for the analysis of oxygenates, which are added boost the octane value of these fuels. The DPS Oxygenates GC System uses a polar TCEP pre-column to separate the oxygenates from early eluting hydrocarbons, then back-flushes the retained oxygenates to a high resolution capillary column for separation. Both columns are connected through a 10-port valve and the entire sequence is automated through the Timeline in the DPS Control Software. The identification and quantitation and are performed using a sensitive FID detector following ASTM D4815 guidelines. The DPS Oxygenates GC System is configured to quickly detect these oxygenates in less than 15 minutes. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Oxygenates GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

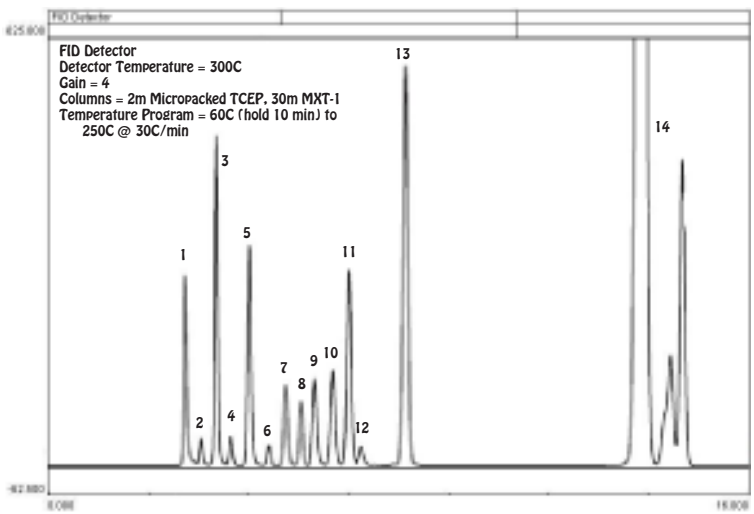
600-C-089 - Series 600 Oxygenates GC Analyzer (FID, Valve, 2m & 30m)
500-C-089 - Companion 1 Portable Oxygenates GC Analyzer
(FID, Valve, 2m & 30m)

Series 600 GC

Companion 1 Portable GC

Oxygenates in Gasoline

Peak	Component
1	Methanol
2	Ethanol
3	Isopropanol
4	Tert-Butanol
5	n-Propanol
6	MTBE
7	sec-Butanol
8	DIPE
9	Isobutanol
10	tert-Pentanol
11	DME
12	n-Butanol
13	TAME
14	Heavier Hydrocarbons



3/2019
Specifications may change without notice.

Petrochemical

Permanent Gases + Sulfur 2

DPS Instruments. Inc.

www.dps-instruments.com

The DPS Perma-gas 1 Plus Sulfur GC System is ideal for separating the whole gas components Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide and Carbon Dioxide with one injection. Additionally, H2S and 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. The DPS Perma-gas 1 + Sulfur GC Systems are ideal for ppm level measurements in your high percentage gas samples. Perma-gas 1 + Sulfur 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 GC System. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Perma-gas 1 + Sulfur GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-073 - Series 600 Perma-Gas 1 + Sulfur GC Analyzer (HID, PID, Valve, 3 Columns)

500-C2-073 - Companion 2 Portable Perma-Gas 1 + Sulfur GC Analyzer (HID, PID, Valve, 3 Columns)

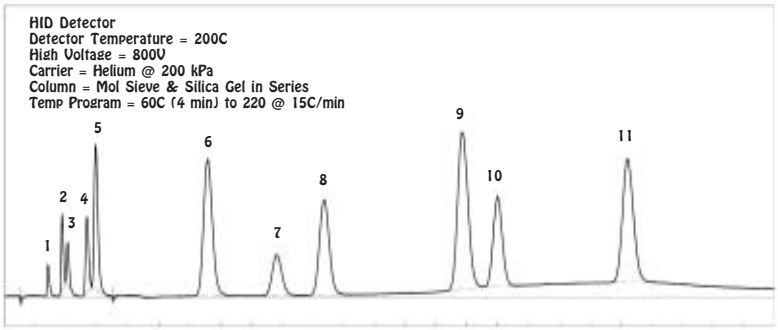
Series 600 GC

Companion 2 Portable GC

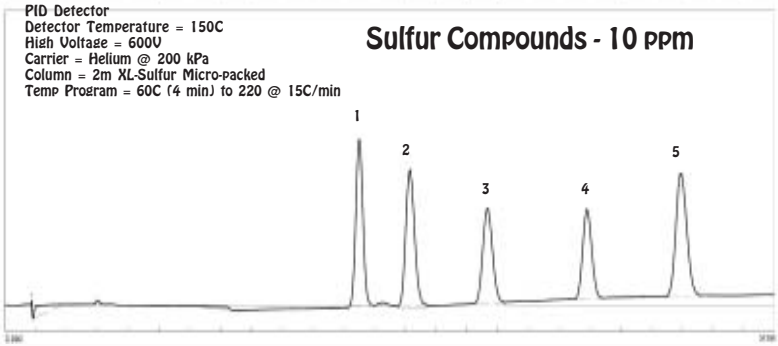
Peak	Component
1	Hydrogen
2	Oxygen
3	Nitrogen
4	Methane
5	Carbon Monoxide
6	Ethane
7	Carbon Dioxide
8	Ethylene
9	Propane
10	Acetylene
11	Propylene

Peak	Component
1	Hydrogen Sulfide
2	Carbonyl Sulfide
3	Methyl Mercaptan
4	Dimethyl Sulfide
5	Dimethyl Disulfide

Permanent Gases & Hydrocarbons - 1000 ppm



Sulfur Compounds - 10 ppm



11/2020
Specifications may change without notice.

Petrochemical

Bio-Fuels Methanol & Ethanol

DPS Instruments. Inc.

www.dps-instruments.com

With the dramatic increase in biofuels production around the world there is an ever increasing demand for the analysis of Methanol and Ethanol in these fuels. The classical method for analysis, ASTM Method D5501 uses very long columns (100 or 150m) to adequately separate these alcohols from other interfering compounds in these complex fuel mixtures, with run times of about 40 minutes. Many plants require the Ethanol content of the denatured fuels be analyzed before the fuel is transported, which is difficult with such long run times. The recent development of capillary columns for biofuels separations has helped tremendously. The DPS Alcohols GC System is configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds in less than 10 minutes. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Alcohols GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

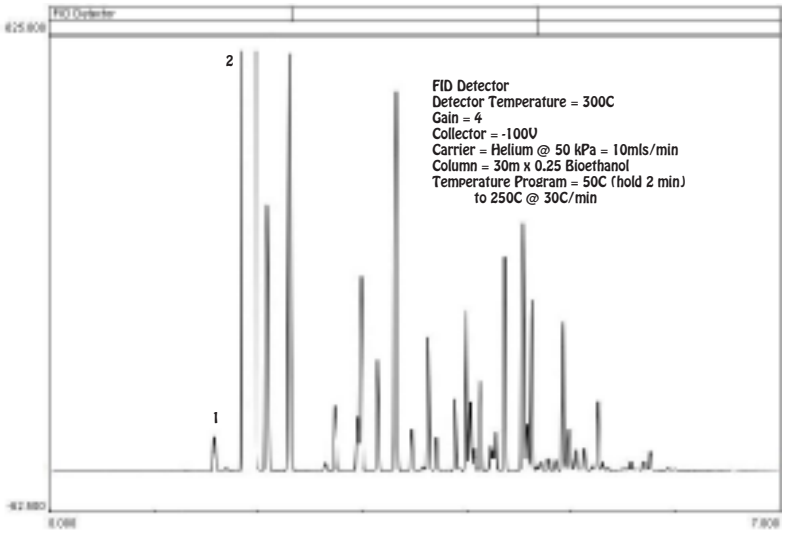
Available Configurations Include:

600-C-111 - Series 600 Alcohols GC Analyzer (FID, 30m)
500-C-111 - Companion 1 Portable Alcohols GC Analyzer (FID, 30m)

Companion 1 Portable GC

Methanol & Ethanol in Gasoline

Peak	Component	Area
1	Methanol	247.3
2	Ethanol	2173.5



5/2017
Specifications may change without notice.

Petrochemical

Sulfur Compounds

Instruments, Inc.

www.dps-instruments.com

The analysis of sulfur containing compounds in petroleum products is drawing more attention around the world as governments are passing regulations for products with lower sulfur concentrations, which lead to lower sulfur emissions. There are a host of problems associated with the sampling and analysis of sulfur compounds. First and foremost is that sulfur compounds degrade on metal surfaces, especially hot metal; making sulfur compounds difficult to store. Secondly, you need to differentiate them from the hydrocarbon mixtures for analysis. The DPS Sulfur GC Analyzers answer these problems with an inert sample path, free of hot metal surfaces, the latest analytical column technology, and the sensitive FPD detector. The DPS Sulfur GC Systems are ideal for your complex hydrocarbon mixtures requiring sensitive sulfur measurements. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated Sulfur GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

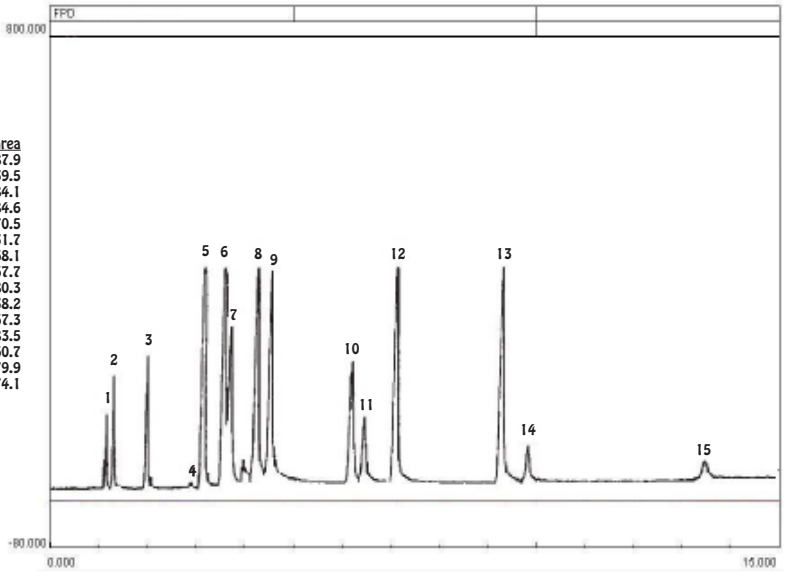
600-C-095 - Series 600 Sulfur Compounds GC Analyzer (FPD, 30m)
500-C2-095 - Companion 2 Portable Sulfur Compounds GC Analyzer (FPD, 30m)

Series 600 GC

Sulfur Compounds

Companion 2 Portable GC

Peak	Component	Area
1	Hydrogen Sulfide	1787.9
2	Carbonyl Sulfide	2639.5
3	Methyl Mercaptan	3484.1
4	Ethyl Mercaptan	284.6
5	Carbon Disulfide	8370.5
6	Dimethyl Sulfide	8031.7
7	2-Propyl Mercaptan	5168.1
8	Allyl Mercaptan	7467.7
9	1-Propyl Mercaptan	7080.3
10	Ethyl Sulfide	3838.2
11	Butyl Mercaptan	1367.3
12	Dimethyl Disulfide	8883.5
13	Allyl Sulfide	8360.7
14	Propyl Sulfide	979.9
15	Butyl Sulfide	874.1



Petrochemical

Transformer Oil Gas Analysis - TOGA

DPS Instruments, Inc.

www.dps-instruments.com

The DPS TOGA GC Systems are designed to analyze oil from electrical insulation materials that may have decomposed under thermal, or electrical stresses. The gaseous decomposition products indicate the type of fault inside the transformer. The DPS TOGA GC Systems separate all 11 components in one injection; Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide, Ethane, Carbon Dioxide, Ethylene, Propane, Acetylene, and Propylene. All compounds are detected with the sensitive and universal Helium Ionization Detector (HID). A Flame Ionization Detector (FID) and Methanizer can be added for even lower detection limits of the hydrocarbons, CO & CO2. Our innovative 2 column and valve configuration simplifies this analysis and follows ASTM 3612C for gas analysis using headspace injection. The headspace sample can be injected using a multi-vial autosampler, or a single sample headspace accessory can be built into our Series 600 Lab GC, or the Portable Companion 2 for analyses in the field. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. The fully integrated TOGA GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-078 - Series 600 TOGA GC Analyzer (HID, Headspace Concentrator, 2 Columns)
600-C-082 - Series 600 TOGA GC Analyzer (HID, FID/Methanizer, Headspace Concentrator, etc.)

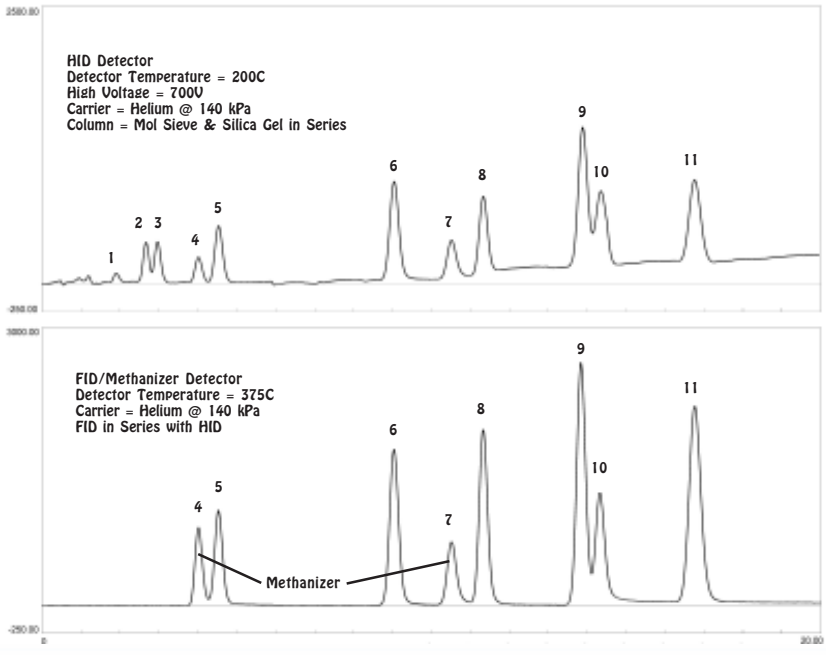
500-C2-078 - Companion 2 Portable TOGA GC Analyzer (HID, Headspace Concentrator, 2 Columns)
500-C2-082 - Companion 2 Portable TOGA GC Analyzer (HID, FID/Methanizer, Headspace Concentrator, etc.)

TOGA - Gas Analysis

Series 600 GC

Companion 2 Portable GC
(with Headspace Concentrator)

Peak	Component
1	Hydrogen
2	Oxygen
3	Nitrogen
4	CO
5	Methane
6	Ethane
7	CO2
8	Ethylene
9	Propane
10	Acetylene
11	Propylene



3/2022
Specifications may change without notice.

Petrochemical
Bio-Diesel

DPS Instruments, Inc.

www.dps-instruments.com

Bio-diesel is a renewable fuel used as a substitute for petroleum diesel fuel. Biodegradable and nontoxic, bio-diesel is made from soy oil, vegetable oil, recycled cooking oil, or animal fat. Bio-diesel made from vegetable oils and animal fat perform like petroleum diesel, but are much cleaner burning with reduced emissions. A high content of free and total glycerin lead to buildup and poor engine performance. Consequently, the glycerin content is one indicator of the quality of the bio-diesel fuel. For your convenience, DPS has configured the Bio-diesel GC Analyzers to help you define the free and total glycerin content using our standard cool on-column injector, guard column, analytical column, and our sensitive FID detector. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Bio-diesel GC Analyzer Systems are small, lightweight, and rugged to go where ever you need them. All DPS systems are modular for expandability, upgrades, and easy service.

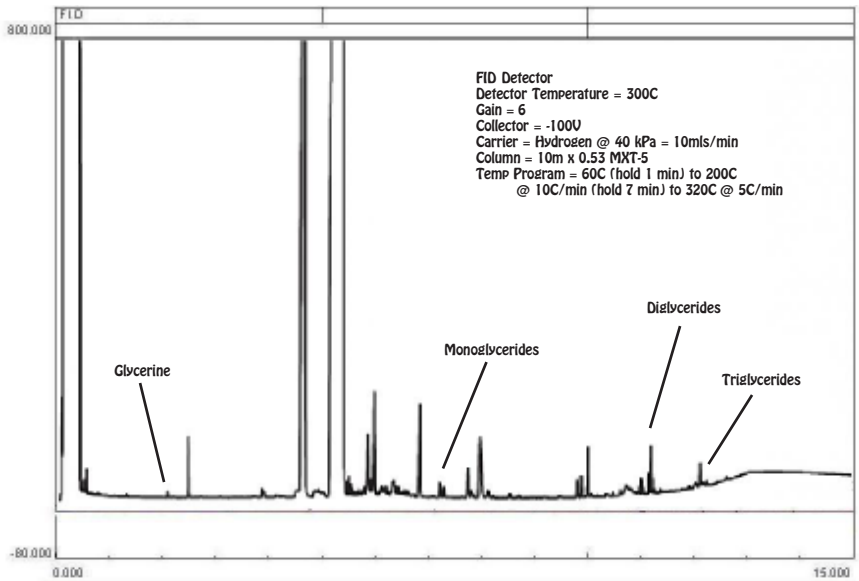
Series 600 GC

Available Configurations Include:

600-C-031 – Series 600 Bio-diesel GC Analyzer (FID, 10m)
500-C-031 – Companion 1 Portable Bio-diesel GC Analyzer (FID, 10m)

Companion 1 Portable GC

Glycerine in Bio-Diesel



Petrochemical

BTU - Heating Valve

DPS Instruments, Inc.

www.dps-instruments.com

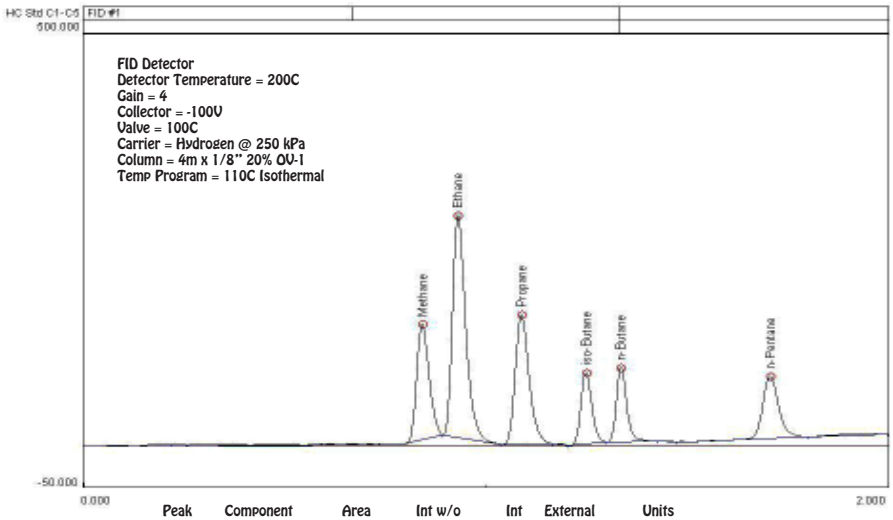
Every day millions of cubic feet of natural gas flow through pipelines around the world. The heating value, measured as BTU, determines the cost and ultimate value of the natural gas. The natural gas may either be in a gas or liquid phase, where larger hydrocarbons always have a higher heating value. The rugged and reliable Series 600 laboratory and Companion portable versions of the DPS BTU GC Systems automatically sample and analyze the natural gases coming from these pipelines. The analysis of C1 - C5 hydrocarbons by our sensitive FID detector takes less than 2 minutes, and we don't program the column oven, so that samples can be run one after another quickly. The BTU value is automatically calculated and reported after each analysis. The GC Systems can also be configured with a second detector to measure whole gas components and a methanizer for Carbon Dioxide. The fully integrated BTU GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-096 - BTU GC Analyzer (FID, Valve, 2m)
500-C-096 - Companion 1 Portable BTU GC Analyzer (FID, Valve, 2m)

Series 600 GC

Low Level Natural Gas Standard



Peak	Component	Area	Int w/o	Int	External	Units
1	Methane	295.5	0.02	20.2	18.2	1010
2	Ethane	604.1	0.019	33.6	31.2	1769.7
3	Propane	370.9	0.008	20.1	20.1	2516.1
4	iso-Butane	159.0	0.003	9.8	9.9	3251.9
5	n-Butane	159.7	0.003	9.9	9.9	3262.3
6	n-Pentane	205.5	0.003	12.0	12.0	4008.7
			0.056	105.5	101.3	

Heating Value of Compound

Mole Fraction

Total BTU Valve

Companion 1 Portable GC

11/2015
Specifications may change without notice.

Petrochemical

Freon Gases

DPS Instruments, Inc.

www.dps-instruments.com

For over 80 years, chlorofluorocarbons have been the compounds of choice to use as refrigerants, which are compounds used in heat cycles that undergo a phase change from a gas to a liquid and back. Until concerns about depletion of the ozone layer, global warming, and the rise in cases of skin cancer. In the 1980's, the most widely used refrigerants were the chlorofluoromethanes, R-12 and R-22, with R-12 being more common in automotive air conditioning and small refrigerators, and R-22 being used for residential and light commercial air conditioning, refrigerators, and freezers. More recently, less ozone destructive compounds like Freon 134, which is a fluorocarbon only, have been developed to replace the ozone depleting chlorofluorocarbons. The DPS Freon Gases GC Systems are designed with safety in mind to check the purity of the Freon, monitor workplace conditions, detect leaking refrigerants, or monitor concentrations in the atmosphere. Let the latest designed high resolution column and the sensitive FID detector do the hard work for you. We have also added a Gas Sampling Valve to automate your sampling and analysis. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Freon Gases GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

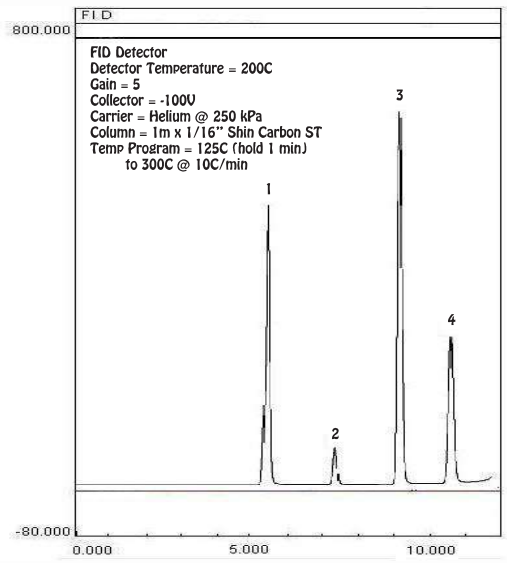
600-C-090 - Series 600 Freon Gases GC Analyzer (FID, Valve, 1m)
500-C-090 - Companion 1 Portable Freon Gases GC Analyzer (FID, Valve, 1m)

Series 600 GC

Companion 1 Portable GC

Freon Gases

Peak	Component	Area
1	Freon 134	2911.8
2	Freon 12	639.5
3	Freon 113	306.7
4	Freon 114	1684.6



11/2015
Specifications may change without notice.

Petrochemical
Hydrocarbon Fuels

DPS Instruments, Inc.

www.dps-instruments.com

From Aviation Fuel, to Gasoline, to Kerosene, to Crude oil and everything in between, Gas Chromatography has been the separation instrument of choice for over 50 years. There are literally hundreds of GC methods for liquid petroleum hydrocarbons analysis from the Petroleum, Chemical, and Environmental industries. Although each method is distinct, most rely on latest designed high resolution capillary columns and the sensitive FID detector. Let our experts help you determine the exact DPS Hydrocarbon Fuels GC System components for your specific requirements with either our Series 600 Lab GC, or the Portable Companion. With the Lab GC we have added a Split/Splitless injector to perform the dilutions for you. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Hydrocarbon Fuels GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

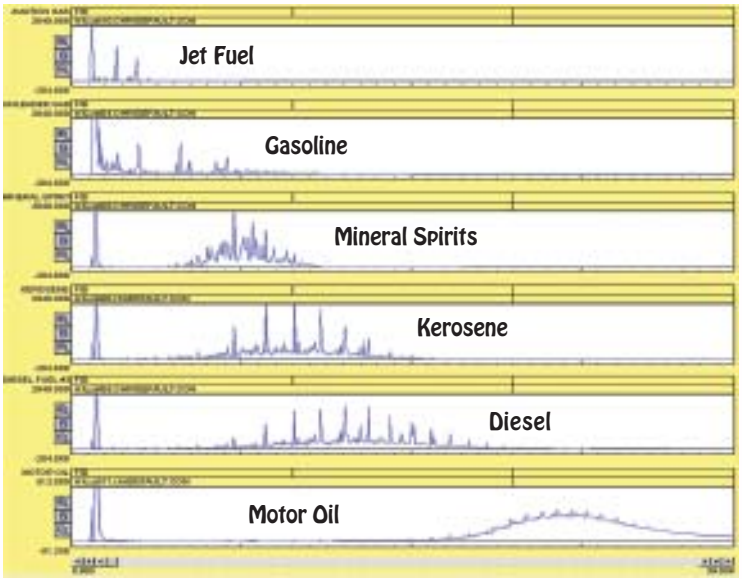
600-C-092 - Series 600 Hydrocarbon Fuels GC Analyzer (FID, S/S, 30m)
500-C-092 - Companion 1 Portable Hydrocarbon Fuels GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Hydrocarbon Fuels

FID Detector
Detector Temperature = 300C
Gain = 4
Collector = -100V
Carrier = Helium @ 40 kPa = 10mls/min
Column = 30m x 0.53 MXT-5
Temperature Program = 60C (hold 2 min)
to 250C @ 8C/min



11/2015
Specifications may change without notice.

Petrochemical
Hydrocarbon Gases

DPS Instruments, Inc.

www.dps-instruments.com

In Natural Gas and other hydrocarbon products, the separations of the light hydrocarbon gases in the C1 - C4 range have always been a challenge. The compound separations are economically critical, because the compounds determine the BTU value, which dictates the value of the gas product. The isomers of the C2's and C4's have, in the past, been particularly difficult to separate. GC Systems have been configured with multiple columns and detectors and complex valve systems to attempt to solve the analysis problem. The development of capillary columns for light hydrocarbon separations has helped tremendously. The DPS Hydrocarbon Gases GC System is configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. In the Series 600 we have added a Split/Splitless injector to dilute concentrated gas samples for you. The fast heating and rapid cooling column oven in every DPS GC assures rapid sample turnaround. We have added a gas sampling valve to increase your throughput by automating the sampling and then injecting samples for you. The fully integrated Hydrocarbon Gases GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

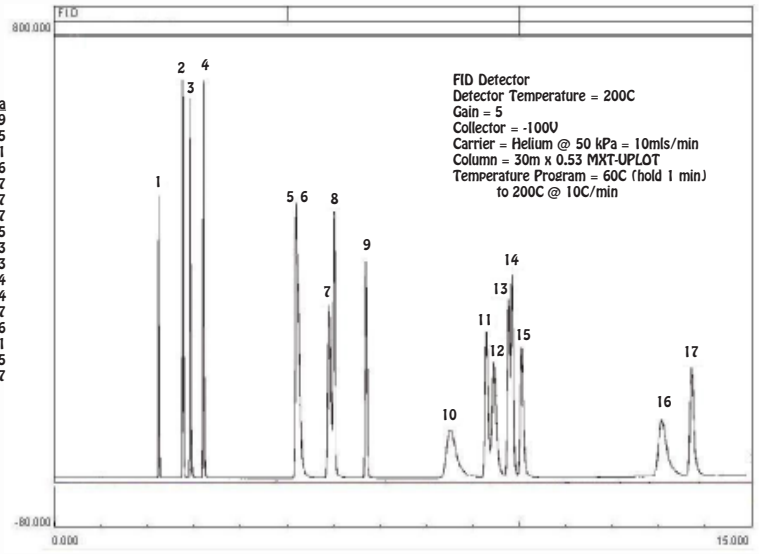
Available Configurations Include:

600-C-091 - Series 600 Hydrocarbon Gases GC Analyzer (FID, S/S, Valve, 30m)
500-C-091 - Companion 1 Portable Hydrocarbon Gases GC Analyzer (FID, Valve, 30m)

Companion 1 Portable GC

Hydrocarbon Gases

Peak	Component	Area
1	Methane	1487.9
2	Ethylene	2639.5
3	Ethene	2484.1
4	Acetylene	2684.6
5	Propane	1204.7
6	Propylene	1192.7
7	Cyclopropane	1204.7
8	Propadiene	1070.5
9	Propyne	980.3
10	iso-Butane	1288.3
11	n-Butane	767.4
12	1-Butene	583.4
13	cis-2-Butene	660.7
14	trans-2-Butene	750.6
15	1,3,-Butadiene	604.1
16	iso-Pentane	960.5
17	n-Pentane	556.7



11/2015
Specifications may change without notice.

Petrochemical

Methods 25 & 25A - C1-C6 Hydrocarbons

DPS Instruments. Inc.

www.dps-instruments.com

Methane is a gas that is naturally formed from the decomposition of biological materials and also produced in many industrial processes. Although Methane is not usually considered an environmental pollutant, the non-Methane composition of gas samples around cities, in industrial areas, and at waste sites is of greater concern. DPS has engineered the Method 25 & 25A GC System, utilizing a Backflush plumbing configuration, to analyze these compounds. Method 25 is for methane and non-methane hydrocarbons, while Method 25A is for total hydrocarbons. The GC System is exactly the same, but not only limited to these analyses, it can also separate the individual C1 - C6 hydrocarbons to further identify the gas sample. Using the rugged and reliable Series 600 Lab GC, or Companion 1 Portable GC, the DPS Method 25 & 25A GC System automatically samples and analyzes the C1 - C6 hydrocarbons using our sensitive FID detector. The fully integrated Method 25 & 25 A GC System is small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

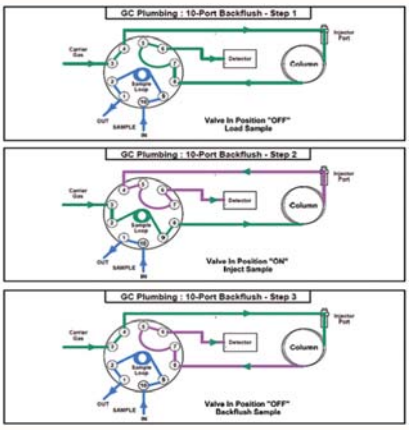
Available Configurations Include:

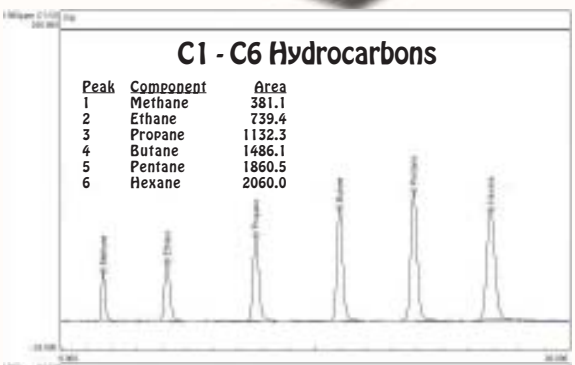
600-C-094 - Series 600 Method 25 & 25A GC Analyzer (FID, Valve, 1m Column)
500-C-094 - Companion 1 Portable Method 25 & 25A GC Analyzer (FID, Valve, 1m Column)

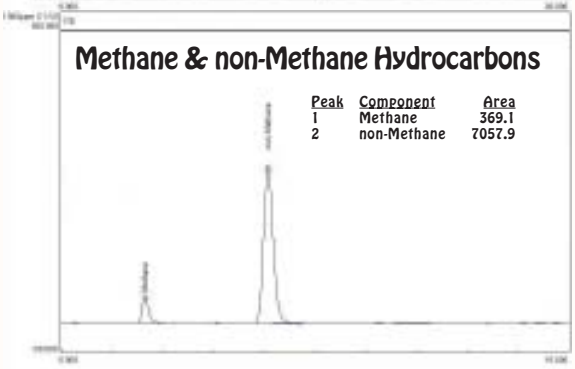
Companion1 Portable GC

Method 25 Hydrocarbons

FID Detector
Detector Temperature = 300C
Gain = 4
Valve = 150C
Collector = -100V
Carrier = Helium @ 120 kPa = 10mls/min
Column = 2m x 1/8" Silica Gel
Temperature Program = 80C (hold 2 min) to 240C @ 15C/min







11/2015
Specifications may change without notice.

Petrochemical

Mine Safety 12

DPS Instruments, Inc.

www.dps-instruments.com

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 DPS Mine Safety 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 DPS GC assures rapid sample turnaround. The fully integrated Mine Safety GC System is small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

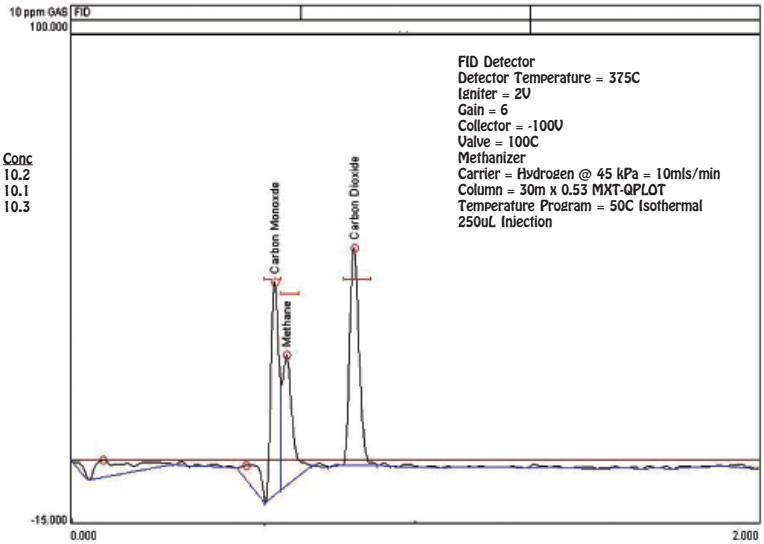
Available Configurations Include:

500-C2-091 - Companion 1 Portable Mine Safety GC Analyzer (FID, 30m)
Includes: 10-port Gas Sampling Valve, Valve Oven, Vacuum Pump, Methanizer, and "Ultra Quiet" Air Compressor

Companion 1 Portable GC

Mine Safety Gases

Peak	Component	Area	Conc
1	Carbon Monoxide	81.4	10.2
2	Methane	61.2	10.1
3	Carbon Dioxide	95.7	10.3



11/2015
Specifications may change without notice.

Petrochemical
Mud-Logging

DPS Instruments. Inc.

www.dps-instruments.com

The process of Mud-logging involves collecting, analyzing and recording the meaningful solids, fluids, and gasses brought to the surface by the drilling fluid (mud). For the gas analysis portion of the mud-logging process, the rugged and reliable DPS Mud-logging GC System automatically samples and analyzes the gases coming out of the mud for methane and heavier hydrocarbons using a sensitive FID detector. The entire cycle time for speciation of C1 - C5 hydrocarbons is less than 2 minutes and the BTU value is automatically calculated. A 2nd FID detector is added to determine total hydrocarbons at the same time. Using a built-in air compressor, the entire system runs off one tank of hydrogen. Adding a methanizer to the FID to analyze CO2 is especially helpful for monitoring a well once you have hit pay dirt! The fully integrated Mud-logging GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

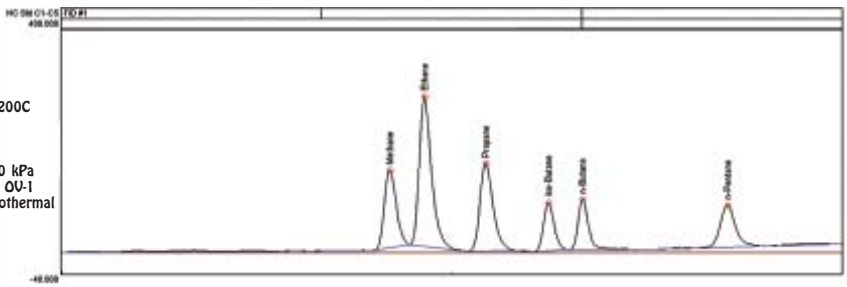
Available Configurations Include:

600-C-093 - Series 600 Mud Logging GC Analyzer (FID, FID, Valve, 2m)
500-C2-093 - Companion 2 Portable Mud Logging GC Analyzer (FID, FID, Valve, 2m)

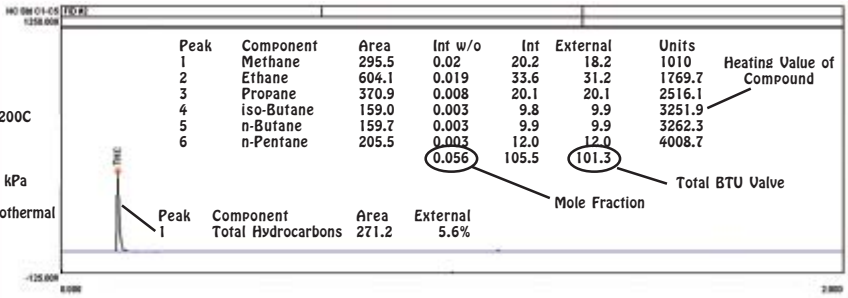
Companion 2 Portable GC

Low Level Natural Gas Standard

FID Detector #1
Detector Temperature = 200C
Gain = 4
Collector = -100V
Valve = 100C
Carrier = Hydrogen @ 250 kPa
Column = 4m x 1/8" 20% OV-1
Temp Program = 110C Isothermal



FID Detector #2
Detector Temperature = 200C
Gain = 3
Collector = -100V
Valve = 100C
Carrier = Hydrogen @ 50 kPa
Column = None
Temp Program = 110C Isothermal



Peak	Component	Area	Int w/o	Int	External	Units	
1	Methane	295.5	0.02	20.2	18.2	1010	Heating Value of Compound
2	Ethane	604.1	0.019	33.6	31.2	1769.7	
3	Propane	370.9	0.008	20.1	20.1	2516.1	
4	iso-Butane	159.0	0.003	9.8	9.9	3251.9	
5	n-Butane	159.7	0.003	9.9	9.9	3262.3	
6	n-Pentane	205.5	0.003	12.0	12.0	4008.7	
			0.056	105.5	101.3		Total BTU Valve

Mole Fraction

Peak	Component	Area	External
1	Total Hydrocarbons	271.2	5.6%

Petrochemical

Natural Gas - Heating Valve & Permanent Gases

DPS Instruments. Inc.

www.dps-instruments.com

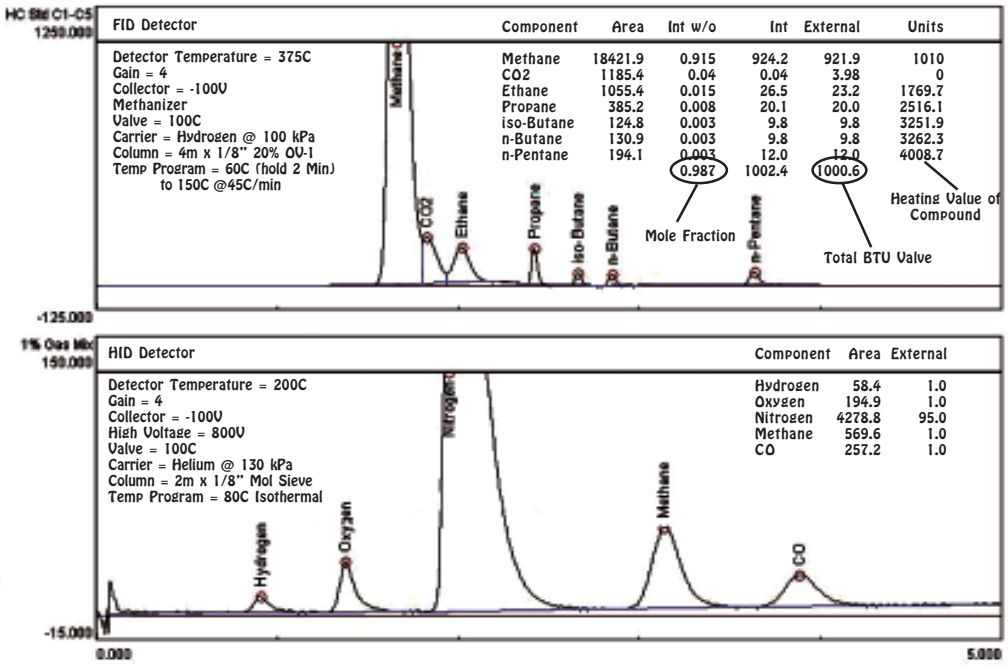
Every day millions of cubic feet of natural gas flow through pipelines around the world. The heating value, sometimes measured as BTU, determines the cost and ultimate value of the natural gas. The natural gas may either be in a gas or liquid phase. Larger hydrocarbons always have a higher heating value. Additionally, it is important to know the contribution of the Permanent Gases (H2, O2, N2, CO & CO2) in the sample. DPS has engineered a GC system to analyze all of these compounds simultaneously using the reliable Series 600 Lab GC, or the rugged Companion 2 Portable GC. The DPS Natural Gas GC Systems automatically sample and analyze the natural gases coming from these pipelines. The analysis of C1 - C5 hydrocarbons with our sensitive FID detector, Permanent Gases with the universal HID detector, and a Methanizer for the Carbon Dioxide. The Heating Value is automatically calculated and reported after each analysis. The fully integrated Natural Gas GC Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

600-C-135 - Series 600 Natural Gas GC Analyzer (HID, FID/Methanizer, Valve, 2 Columns)
500-C2-135 - Companion 2 Natural Gas GC Analyzer (HID, FID/Methanizer, Valve, 2 Columns)

Series 600 GC

High Level Natural Gas Standard



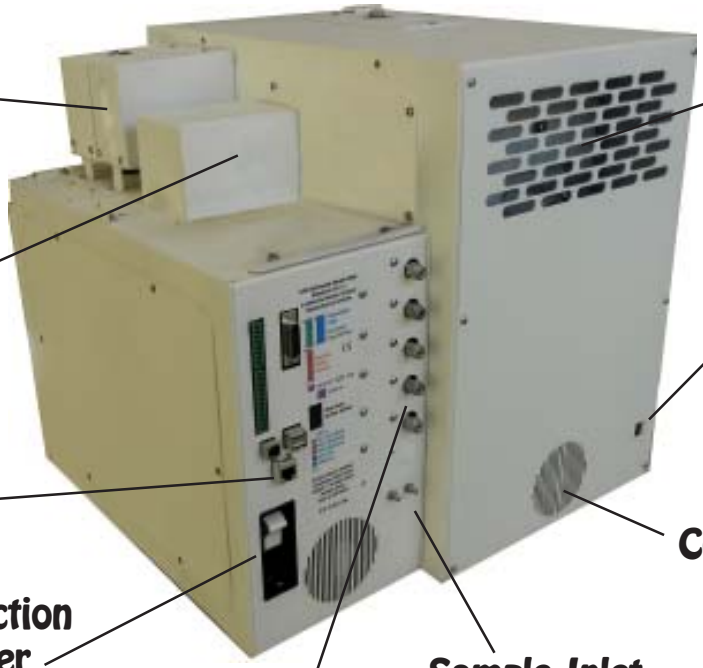
Companion 2 Portable GC

2/2020 Specifications may change without notice.

DPS Natural Gas Layouts

Companion 2 GC

Series 600 GC



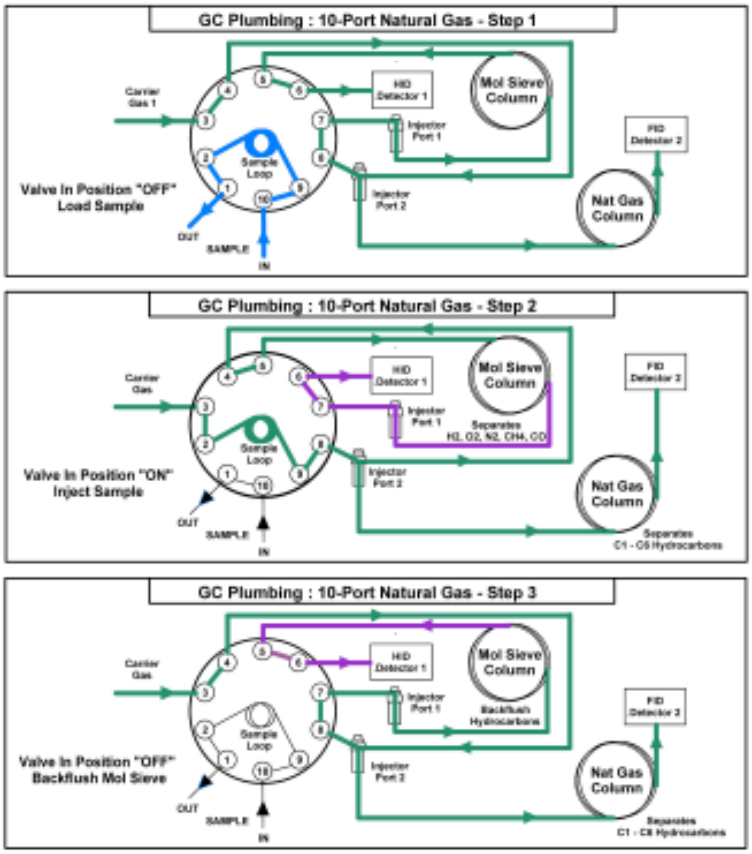
Plumbing Diagram

Load: In Step 1 the sample is loaded onto the fixed volume sample loop with the valve in the OFF position. The sample can be loaded either under positive pressure, or the with the aid of a built-in Vacuum Pump. The same carrier gas flows through each column, however a sample, or standard can always be manually injected into either Injector.

Inject: The Sample Valve is rotated to the ON position and the carrier gases sweep the components from the Sample Loop and splits it between the the analytical columns. The permanent gases are separated in a molecular sieve column going to the HID detector. For the C1-C5 hydrocarbon separation we use a 2m packed column which goes to the FID detector.

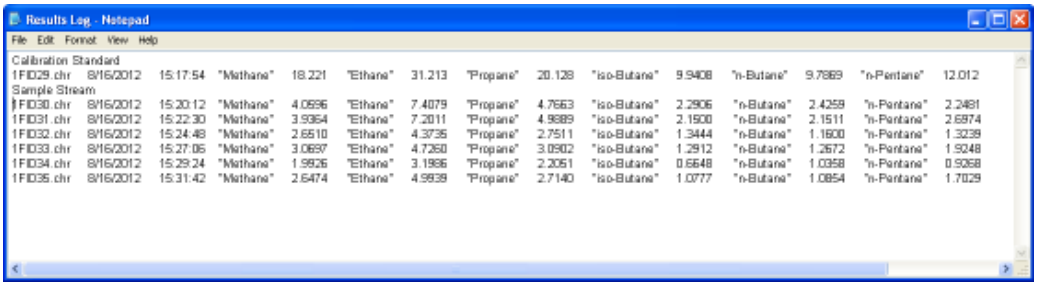
Backflush: The Sample Valve is rotated back to the OFF position and the heavier compounds are swept from the molecular sieve column to keep it clean.

Fast Cycle Times: For the fastest cycle times the Column Oven temperature is held constant, so that one sample can be run iommediately after another. We use a Pressure Program Ramp to push the heavier compounds through the column faster.



Natural Gas Plumbing Diagram

Results Log



Results Log - Notepad

File Edit Format View Help

Calibration Standard

1FID29.chr	8/16/2012	15:17:54	"Methane"	18.221	"Ethane"	31.213	"Propane"	20.128	"iso-Butane"	9.9408	"n-Butane"	9.7869	"n-Pentane"	12.012

Sample Stream

1FID30.chr	8/16/2012	15:20:12	"Methane"	4.0696	"Ethane"	7.4079	"Propane"	4.7663	"iso-Butane"	2.2906	"n-Butane"	2.4258	"n-Pentane"	2.2481
1FID31.chr	8/16/2012	15:22:30	"Methane"	3.9364	"Ethane"	7.2011	"Propane"	4.9889	"iso-Butane"	2.1500	"n-Butane"	2.1511	"n-Pentane"	2.6974
1FID32.chr	8/16/2012	15:24:48	"Methane"	2.6510	"Ethane"	4.3735	"Propane"	2.7511	"iso-Butane"	1.3444	"n-Butane"	1.1600	"n-Pentane"	1.3239
1FID33.chr	8/16/2012	15:27:06	"Methane"	3.0697	"Ethane"	4.7260	"Propane"	3.0902	"iso-Butane"	1.2912	"n-Butane"	1.2672	"n-Pentane"	1.9248
1FID34.chr	8/16/2012	15:29:24	"Methane"	1.9926	"Ethane"	3.1986	"Propane"	2.2051	"iso-Butane"	0.6648	"n-Butane"	1.0358	"n-Pentane"	0.9368
1FID35.chr	8/16/2012	15:31:42	"Methane"	2.6474	"Ethane"	4.9939	"Propane"	2.7140	"iso-Butane"	1.0777	"n-Butane"	1.0854	"n-Pentane"	1.7029

The sample results can be stored and reported in various ways. One convenient method of storing a vast amount of sample data is in a Results Log. A separate Results Log can be generated for each detector. In the example above the first analysis is a low level calibration standard. The subsequent analyses are from a sample stream coming from the well. The BTU value is reported next to each compound. The sample results can be stored on the hard drive of the computer inside the GC, or on an external computer via an ethernet connection.

GC Control Software

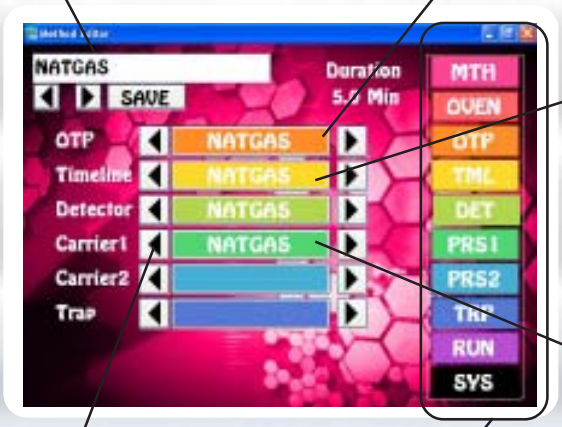
Easy to learn and master using a Graphical User Interface (GUI) and Color Touch Screen.

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

Oven Temp Program Editor

Timeline Editor

Method Name



File Selection Arrows

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

Carrier Pressure 1 Editor

Keyboard to Enter Filenames

Number Pad for entering Values

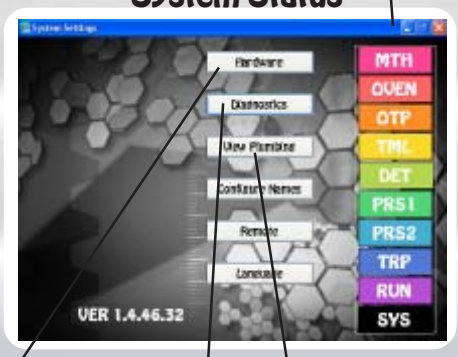
GC Status pages display the parameters in the method, both graphically and as text and values.

Oven Status

Method Editor

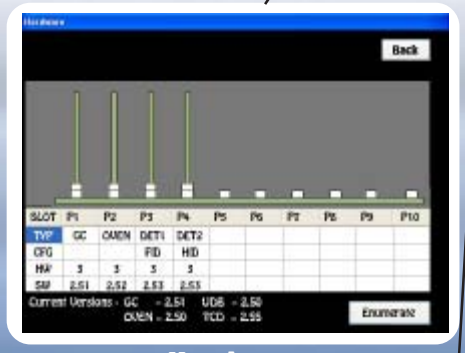
FID Detector Status

System Status



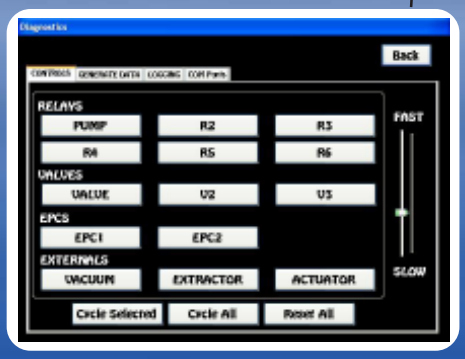
HID Detector Status

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

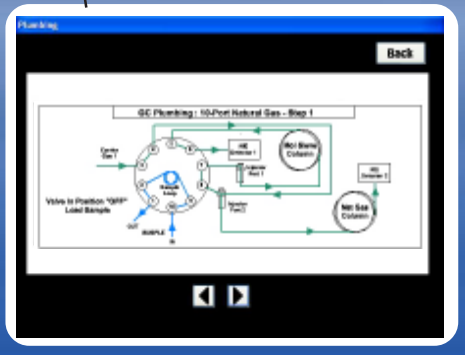


Hardware

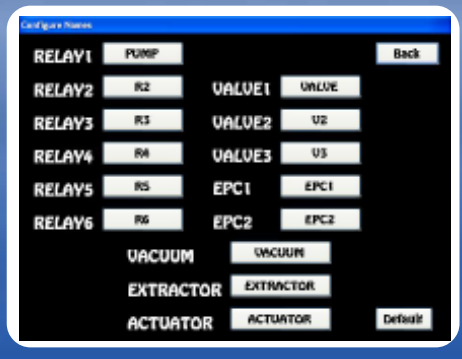
Run Status



Diagnostics



Plumbing



Configure Names

Specifications may change without notice.
01/2016

Natural 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, dependent on sample loop size)
FID – Flameionization 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 20% Ov-1

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

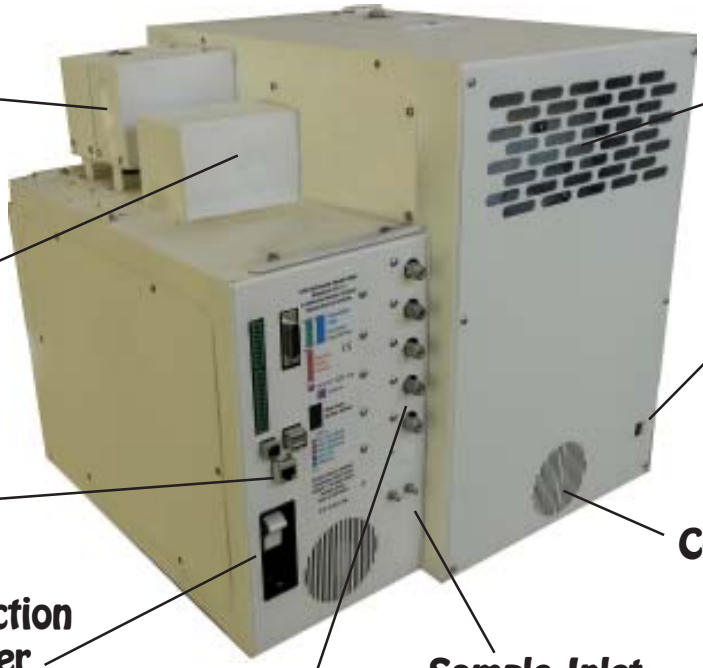
Lab Quality Analyses in the Field,
"It Goes with you Anywhere!"

DPS Instruments, Inc.

DPS Mudlogging Layouts

Companion 2 GC

Series 600 GC

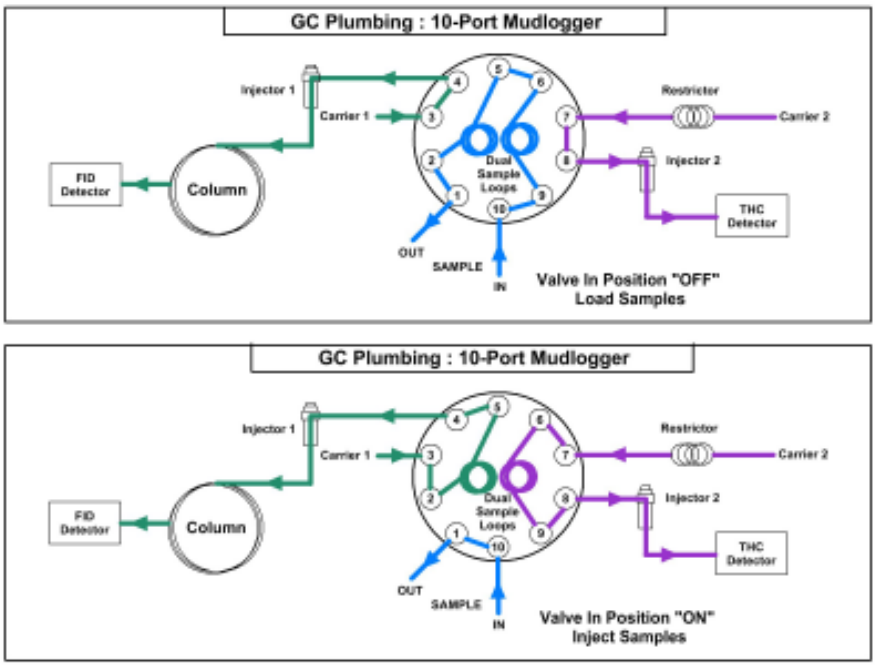


Plumbing Diagram

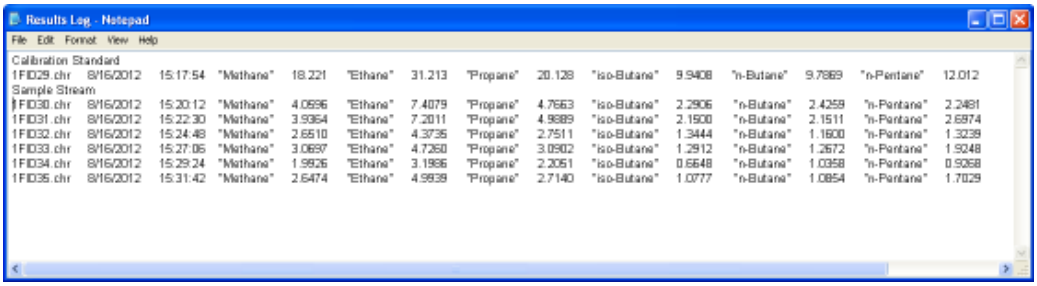
Load: The sample is simultaneously loaded onto both sample loops, either under positive pressure, or the with the aid of a built-in Vacuum Pump. Independent carrier gases connect to each injector. A sample, or standard can always be manually injected into either Injector.

Inject: The Sample Valve is rotated to the ON position and the carrier gases sweep the components from the Sample Loop onto the analytical column and to the THC detector. For the C1-C5 hydrocarbon separation we use a 2m packed column. For the fastest cycle times the Column Oven temperature is held constant, however we use a Pressure Program Ramp to push the heavier compounds through the column faster. For the Total Hydrocarbon analysis there is no column connected to the 2nd injector and all of the hydrocarbons pass to the detector together generating a THC peak, that can be quantitated and reported.

Dual Sample Loop Plumbing Diagram



Results Log



Results Log - Notepad

File Edit Format View Help

Calibration Standard													
1FID29.chr	8/16/2012	15:17:54	"Methane"	18.221	"Ethane"	31.213	"Propane"	20.128	"iso-Butane"	9.9408	"n-Butane"	9.7869	"n-Pentane"	12.012
Sample Stream													
1FID30.chr	8/16/2012	15:20:12	"Methane"	4.0696	"Ethane"	7.4079	"Propane"	4.7663	"iso-Butane"	2.2906	"n-Butane"	2.4258	"n-Pentane"	2.2481
1FID31.chr	8/16/2012	15:22:30	"Methane"	3.9364	"Ethane"	7.2011	"Propane"	4.9889	"iso-Butane"	2.1500	"n-Butane"	2.1511	"n-Pentane"	2.6974
1FID32.chr	8/16/2012	15:24:48	"Methane"	2.6510	"Ethane"	4.3735	"Propane"	2.7511	"iso-Butane"	1.3444	"n-Butane"	1.1600	"n-Pentane"	1.3239
1FID33.chr	8/16/2012	15:27:06	"Methane"	3.0697	"Ethane"	4.7260	"Propane"	3.0902	"iso-Butane"	1.2912	"n-Butane"	1.2672	"n-Pentane"	1.9248
1FID34.chr	8/16/2012	15:29:24	"Methane"	1.9926	"Ethane"	3.1986	"Propane"	2.2051	"iso-Butane"	0.6648	"n-Butane"	1.0358	"n-Pentane"	0.9368
1FID35.chr	8/16/2012	15:31:42	"Methane"	2.6474	"Ethane"	4.9939	"Propane"	2.7140	"iso-Butane"	1.0777	"n-Butane"	1.0854	"n-Pentane"	1.7029

The sample results can be stored and reported in various ways. One convenient method of storing a vast amount of sample data is in a Results Log. A separate Results Log can be generated for each detector. In the example above the first analysis is a low level calibration standard. The subsequent analyses are from a sample stream coming from the well. The BTU value is reported next to each compound. The sample results can be stored on the hard drive of the computer inside the GC, or on an external computer via an ethernet connection.

GC Control Software

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

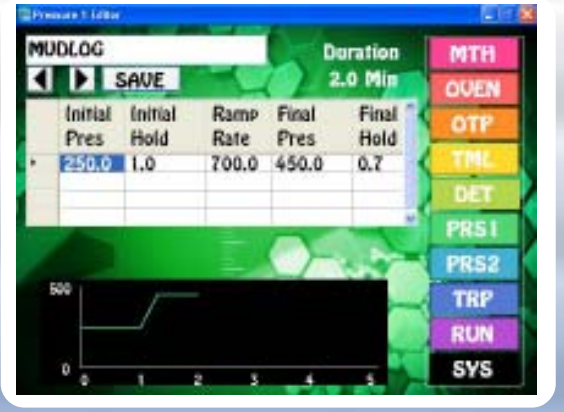
Editors let you customize the files associated with the GC Method.

Oven Temp Program Editor

Timeline Editor

Method Name

File Selection Arrows



Carrier Pressure 1 Editor

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

Carrier Pressure 2 Editor

Keyboard to Enter Filenames

Number Pad for entering Values

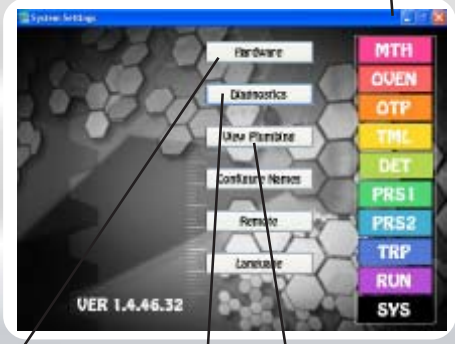
GC Status pages display the parameters in the method, both graphically and as text and values.

Oven Status

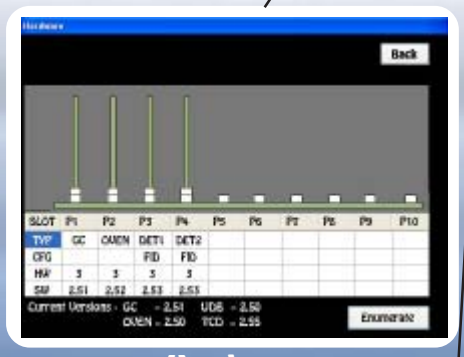
Method Editor

FID1 Detector Status

System Status

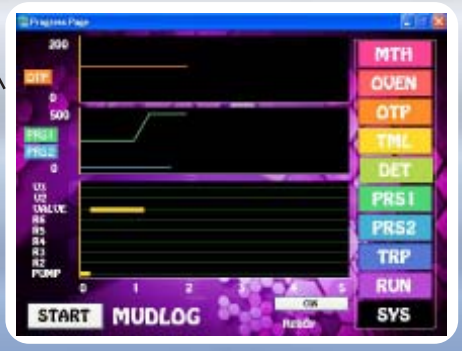


FID2 Detector Status

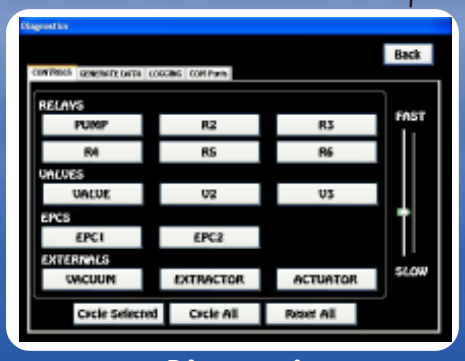


Hardware

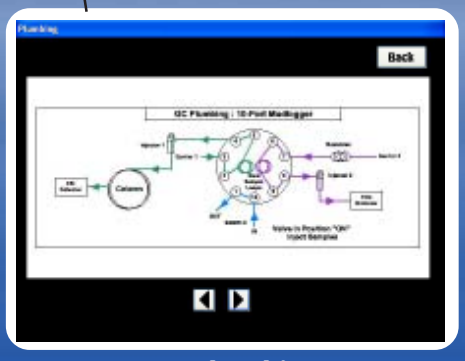
System status pages display the health and viability of the GC instrument.



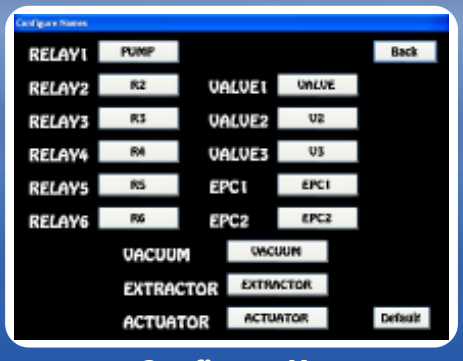
Run Status



Diagnostics



Plumbing



Configure Names

Specifications may change without notice.
01/2016

Mudlogging 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.

Detectors:
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

Column:
2m 20% OV-1

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

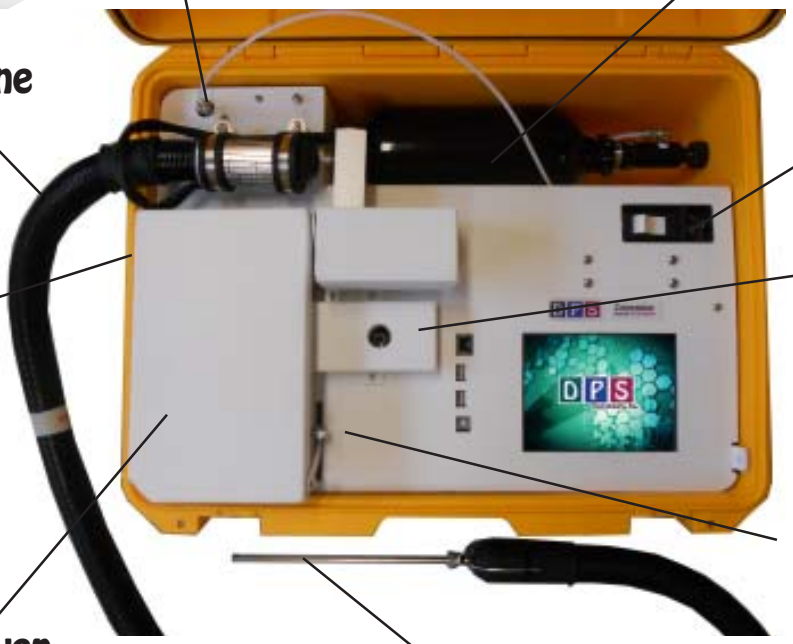
Data Communications:
- Bi-directional communication with popular Data System

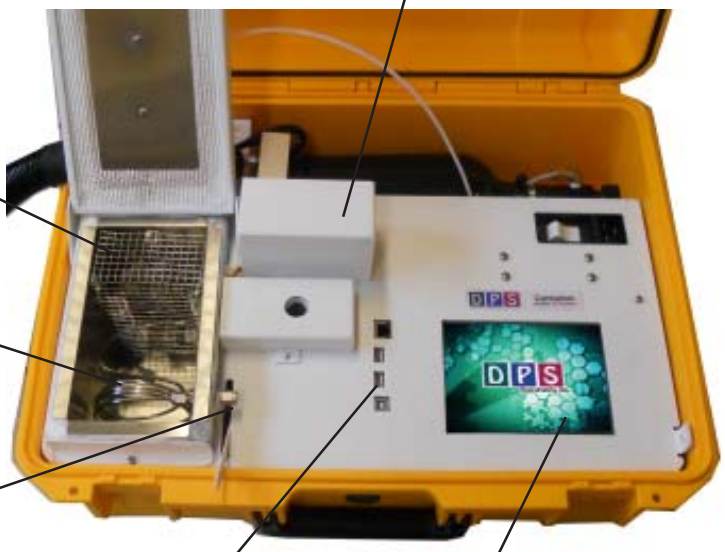
Network Connectivity:
- Enterprise Compatible Network GC running Windows XPe
- Ethernet Connection using Windows Network Protocol
- On Board ETX Computer for GC Control and Data Acquisition
- Remote Control of GC and Data Acquisition over LAN

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

DPS Instruments, Inc.

DPS Companion Method 25 Layout

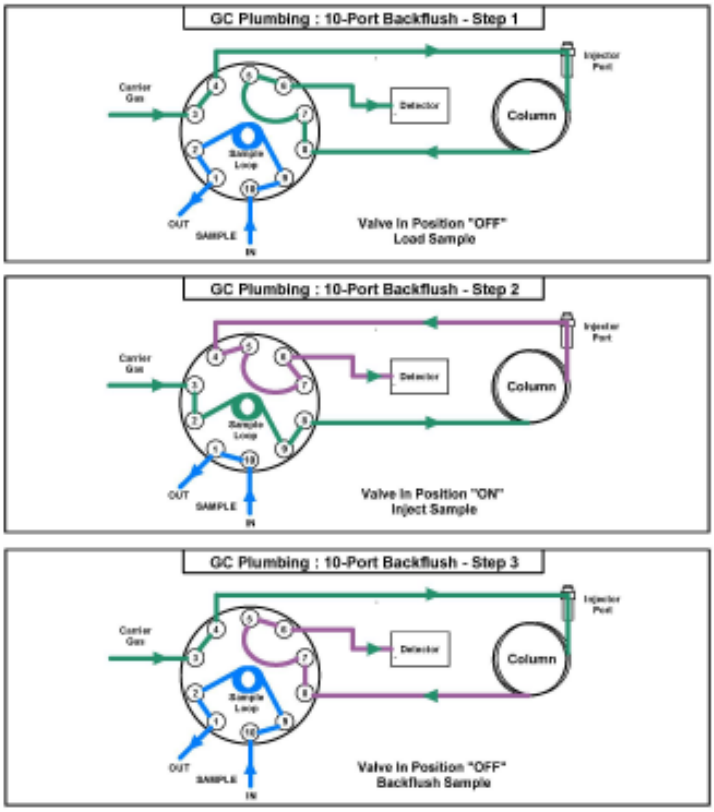




Plumbing Diagram

Load Air Sample: The vacuum pump draws the sample from the Transfer Line through the fixed Sample Loop to the pump to limit any possible cross contamination between samples. The entire sequence of the Method 25 GC Analyzer is automated through the Timeline of the DPS Control Software for the analysis of one sample, or the system can be set up to run unattended 24/7, collecting and analyzing samples every few minutes.

Backflush Configuration: With the Backflush plumbing configuration the sample is injected into the column by rotating the valve. The valve and sample lines are heated creating a inert sample path. When the compounds of interest have eluted from the column, the rest of the compounds can be Backflushed out of the column to the detector as one peak, which represents the total of all other compounds. For a Method 25 analysis Methane is allowed to elute form the column and then the valve is rotated back to Backflush all of the other compounds forming the non-Methane peak. Both Methane and non-Methane constituents are calibrated separately. By simply adjusting the time at which the valve rotates back, the analysis could be altered to separate Methane, Ethane and then a total of C3+ compounds. Using the same technique the valve can be rotated to Backflush after any carbon group C1, C2, C3, C4, C5 etc.



Backflush Plumbing Diagram

Results, Data & Conncetivity

Results: The Results can be saved for each sample, or they can be printed, or they can be tabulated into a .LOG file, when you are collecting a vast amount of data over a long time period. The format of the. LOG file is text, so it can be opened by any word processing program.

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.

Method 25 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.

Detectors:
FID – Flame Ionization Detector

- 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:
Packed, or Capillary Columns

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 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:
- Backflush Sample Plumbing
- Heated Transfer Line
- Air Compressor for FID

Injectors:
- Heated On-column Injector
- 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!"

DPS Instruments, Inc.

CHROMalytic +61(0)3 9762 2034
TECHnology Pty Ltd
Australian Distributors
Importers & Manufacurers
www.chromtech.net.au
Website NEW : www.chromalytic.net.au E-mail : info@chromtech.net.au Tel: 03 9762 2034 . . . in AUSTRALIA

Micro-TCD GC Applications

Transformer Oil Gas Analysis - TOGA

The DPS Micro-TCD TOGA GC System is designed to analyze oil from electrical insulation materials that may have decomposed under thermal, or electrical stresses following ASTM 3612C for gas analysis using headspace injection. The gaseous decomposition products indicate the type of fault inside the transformer.

The DPS Micro-TCD TOGA GC System separates all 11 components in one injection; Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide, Ethane, Carbon Dioxide, Ethylene, Propane, Acetylene, and Propylene. All compounds are detected to 1ppm with the ultra-sensitive Micro-TCD Detector (Micro-machined Thermal Conductivity Detector) in less than 2 minutes.

The headspace sample is heated and stirred by the 42 vial Autosampler prior to injection into the 2 channel TOGA GC System. The 1st Channel separates the permanent gases and the 2nd Channel separates the C2-C3 hydrocarbons and CO2. With the 6 heating chamber oven, the Autosampler can inject a sample every 5 min, making this the fastest TOGA analyzer ever.

The combined power of a 42 vial Dynamic Headspace Autosampler and the rugged and versatile DPS Micro-TCD GC make this routine analysis quick and easy.

Micro-TCD TOGA GC System
Permanent Gases &
Light Hydrocarbons
Dissolved in oil!

Powerful Combination

Headspace Autosampler

Micro-TCD GC System

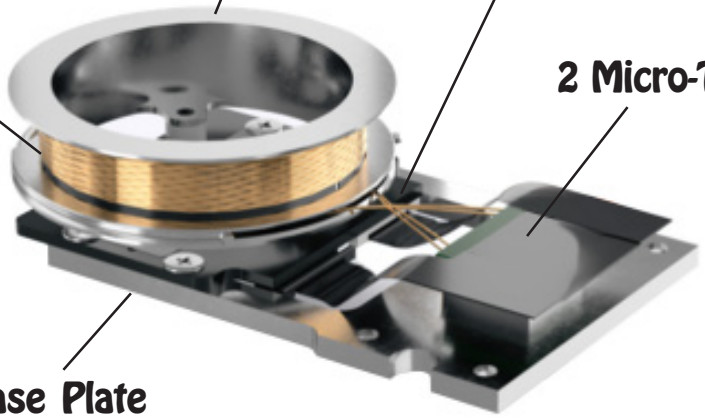
General Specifications:

- Micro-TCD Gas Chromatograph
- 42 Vial Headspace Autosampler
- TOGA analysis in less than 2 min
- 2 Channels - GC Column Oven/Micro-TCD´s
- Fast & Accurate with Low Maintenance
- Easy Chromatography Data System
- Ultra Compact and Lightweight,
  GC (20 x 15 x 10 cm), approximately 8 kg
  AS (33 x 64 x 32 cm), approximately 10 kg

DPS Instruments, Inc.

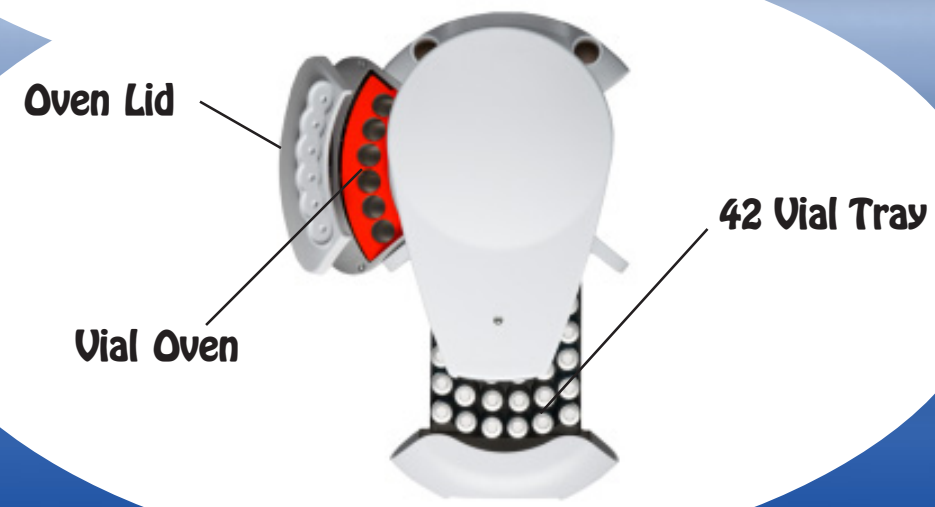
DPS Micro-TCD GC Layout

DPS Micro GC Channel



Dynamic Headspace Autosampler

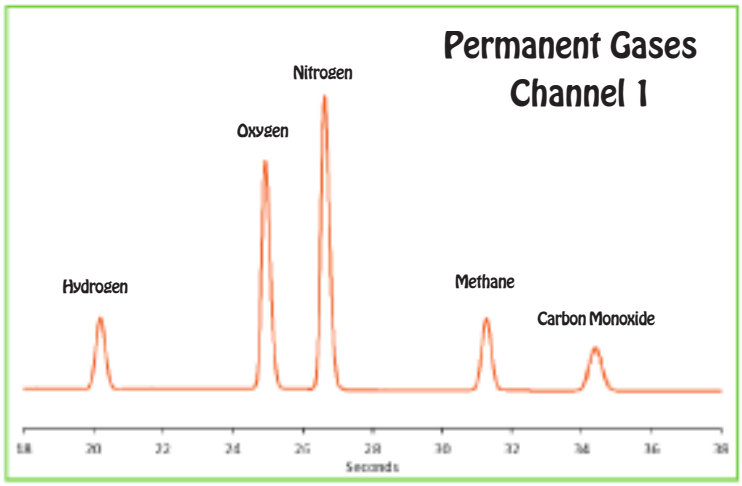
Top View



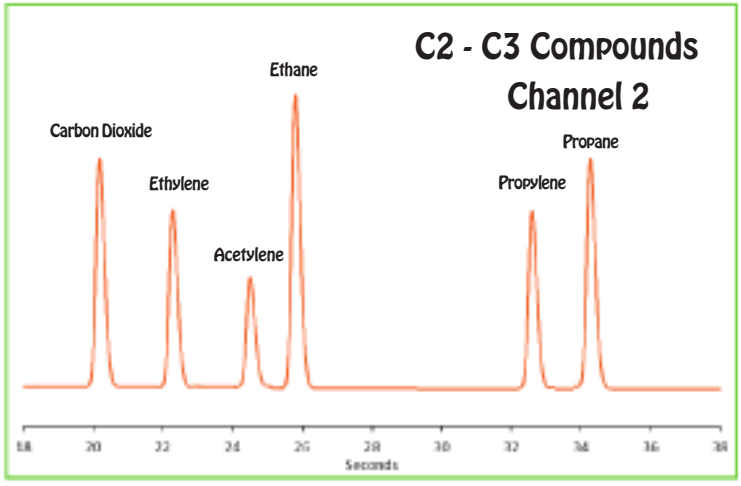
DPS Micro-TCD TOGA GC System

Channel 1 - A Molecúlar Sieve column is used to separate the Permanent Gas components: Hydrogen, Oxygen, Nitrogen, Methane & Carbon Monoxide using helium as a carrier gas.

After the compounds elute we back-flush the pre-column to keep the Molecular Sieve free of heavier compounds.



Channel 2 - A BOND column is used to separate the C2 - C3 Gas components: Ethane, Carbon Dioxide, Ethylene, Propane, Acetylene & Propylene using helium as a carrier gas.



DPS Micro-TCD TOGA GC Features

System Configuration - A Simple and efficient configuration combining the power of the rugged Micro-TCD GC with 2 Channels and versatile 42 vial Dynamic Headspace Autosampler. Each Channel contains a GC Oven, Analytical Column, Pre-Column, 2 Micro-TCD Detectors, Injection Valve, Back-Flush valve and Electronic & Gas Connections.

Sample Information - The eleven most common compounds are included in this analysis scheme which meets ASTM-D3612C methodology. The compounds included in this method are H2, O2, N2, CH4, CO, C2H6, CO2, C2H4, C2H2, C3H6, and C3H4. The results from the analysis of these compounds helps target the underlying fault condition of the transformer. The action levels indicate the concentration levels where the falut is severe and action should be taken to mitigate any possible dangerous situation.

Micro-TCD - Parts per Million (ppm)

No.	Compound	DL	Action Level
1	Hydrogen	1-5**	100-500
2	Oxygen	1	NA
3	Nitrogen	1	NA
4	Methane	1	100-400
5	Carbon Monoxide	1	100-1000
6	Ethane	1	100-400
7	Carbon Dioxide	1	150-3000
8	Ethylene	1	500-2000
9	Propane	1	100-500
10	Acetylene	1	100-400
11	Proplyene	1	100-500

** **Hydrogen** - For the lowest possible Hydrogen Detection Limit a 3rd Channel can be addded to the system specifically for Hydrogen and Nitrogen would be used as the carrier gas, instead of Helium.

Specifications may change without notice.
02/2023

DPS Micro-TCD TOGA GC System Specifications:

Micro-TCD GC:

Micro GC Channels:
- 2 Micro GC Channels in an Exchangeable Cartridge
- Each GC Channel contains GC Oven, Analytical Column,
  Pre-Column, 2X Micro-TCD Detectors, Injection and

Software/GC Control Interface:
- Enter and store GC Methods via Computer connection
- Safety Limits on all user entered parameters
- Communications: RS232, RS485, Ethernet, Digital I/O
- Protocols: Modbus, TCP
- Sequencing for Sampling, Injection, Backflush, etc.
- Memory Storage - up to 256Gb
- Control for Carrier Gas(s)
- Control for Valves (Injection, Backflush, Sample)
- Universal voltage input (85 – 240 Vac, 50-60Hz)
- Power Supply - (20 – 28 Vdc)

Features:
- 150 °C Temperature Limit with 0.1 °C set-point resolution
- Isothermal Operation
- Repeatability - < 0.05% RSD
- Cycle Time (Typical) - 60 sec
- Detection Limit (500ppb - 100%)
- Sequence Controlled Injection Time
- 1 Micro-machined Injector per Channel
- 1 Pre-Column with Backflush per Channel
- 1 Analytical Column per Channel
- Dimensions: 20 x 15 x 10 cm
- Weight: 10.0kg

Headspace Autosampler:

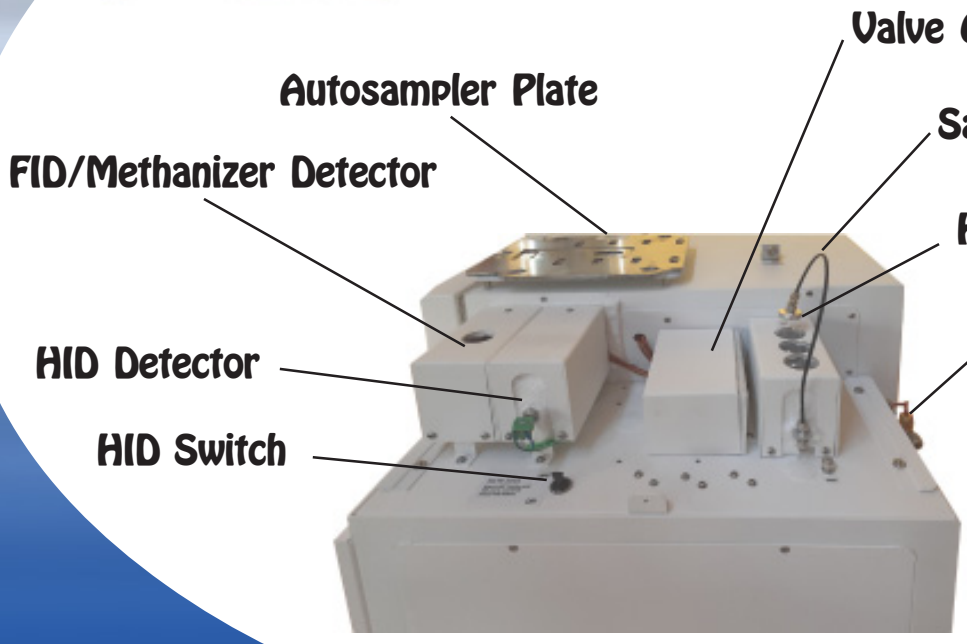
Features:
- Sampling: 42 Vials 20ml Headspace
- 2X Sample Probes
- Pull Up Strokes: Up to 15 Strokes
- Filling Speed: 0.5 - 100ml/min
- Time between Samples: 0 - 100 mins
- Shaking Method: Orbital
- Incubation Oven: 6 position
- Incubation Time: 0 - 999 mins
- Oven Temperature: 40 - 170C
- Shaker Speed: Very Low to Very High
- Shaking Cycles: 0 - 9.9 mins
- Probe Injection Depth: Varaible
- Electrical Control: LAN & TTL
- Dimensions: 330 x 640 x 320mm
- Weight: 10.0kg
- Power Supply: 100-240VAC, 50-60Hz

Headspace Autosampler

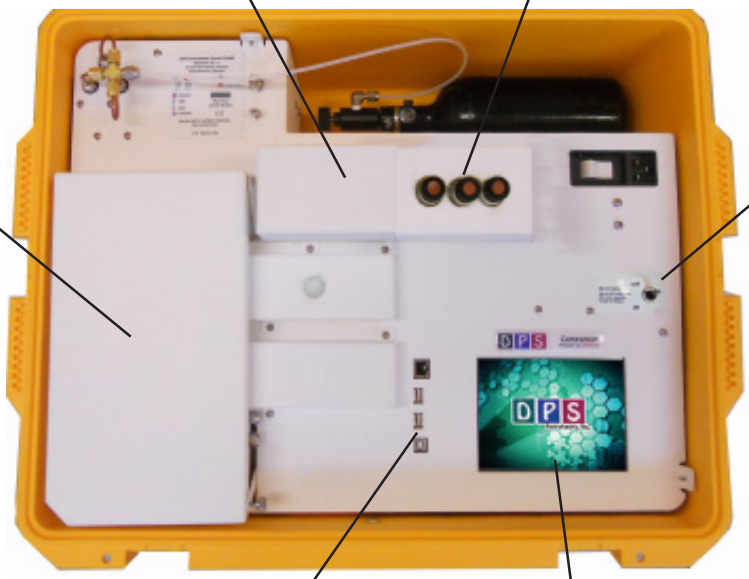
Micro-TCD GC System

Transformer Oil Gas Analysis - TOGA

DPS Series 600 TOGA Layout



DPS Companion 2 TOGA Layout



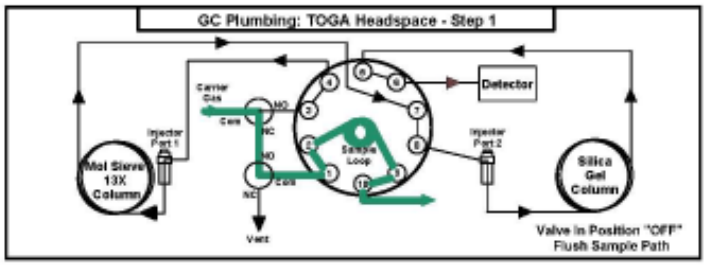
TOGA Plumbing Diagram

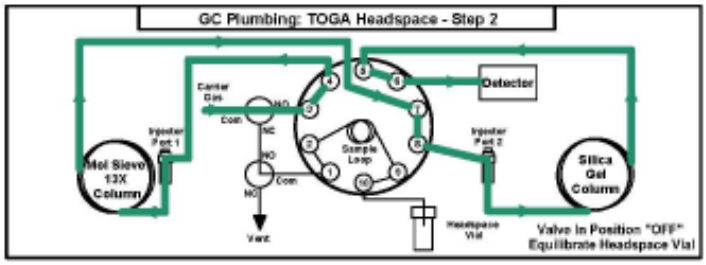
TOGA Headspace Concentrator - The Headspace Concentrator for Companion GC's are built right in to provide the shortest possible sample path. The Sample Vial is heated and then consistently Pressurized before loading the Sample Loop. A fixed Sample Loop ensures reproducible sampling and the sample lines are Flushed between analyses to limit any cross over contamination. The entire sequence of the Headspace Concentrator is automated through the Timeline sequence of the DPS GC Control Software for the analysis of one sample at a time, while two other samples are heated to equilibrate.

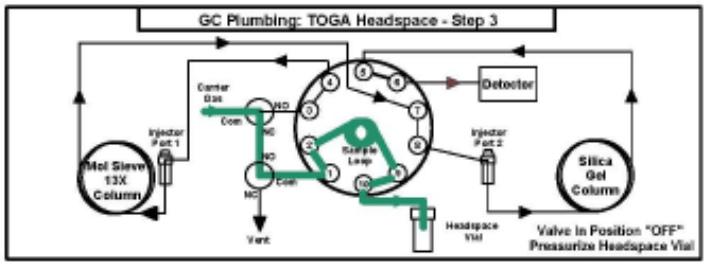
TOGA Plumbing Diagram - In the 1st Step the carrier gas is diverted to Flush out the Sample Lines between runs. During the 2nd Step the carrier gas flows to the analytical column and the Headspace Vial is heated with the Vial Heater and allowed to equilibrate. The Sample Probe is then inserted into the Headspace Vial. During the 3rd Step the Headspace Vial is pressurized for a few seconds. In the 4th Step the sample is loaded onto the Sample Loop by releasing the pressure in the headspace vial. In the 5th Step the Sample Valve is rotated to the ON position and the carrier gas sweeps the components from the Sample Loop onto the analytical columns.

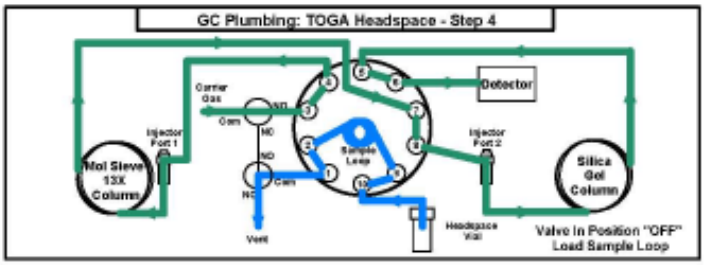
TOGA Column Configuration - The unique 2 column configuration simplifies the compound separation and analysis of the TOGA Headspace sample. The columns are plumbed in series through the same Sample Valve as the Headspace Concentrator.

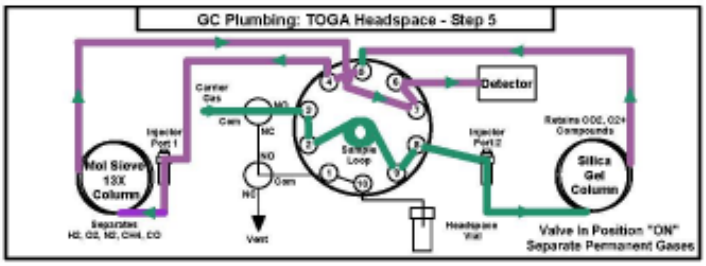
In Step 5 the Sample Valve is rotated to Inject the sample onto the analytical columns. The Silica Gel column retains CO2 & the C2+ hydrocarbons, while the lighter compounds (H2, O2, N2, CH4, & CO) pass through and are further separated on the Molecular Sieve column. Once the lighter compounds have been separated the valve is rotated back in Step 6 and the heavier compounds (CO2 & C2+ hydrocarbons) are separated on the Silica Gel column.

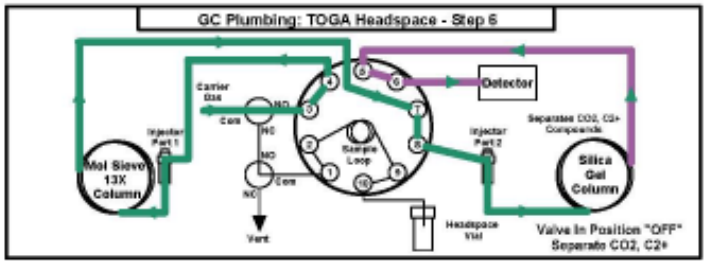












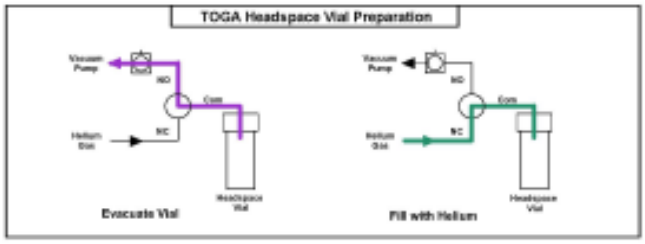
TOGA Headspace Plumbing Diagram

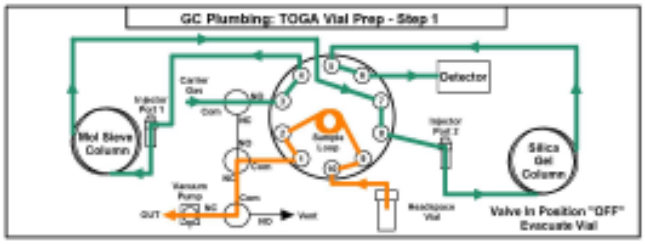
Vial Preparation Station

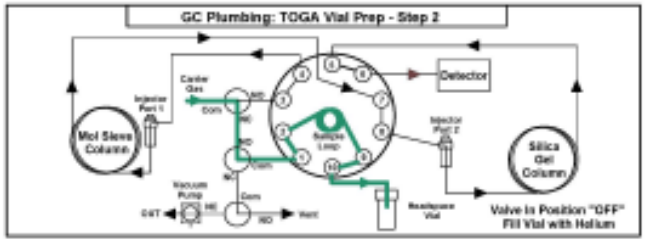
Clean Headspace Vials - One of the most difficult parts of the TOGA analyses is the sampling proceedure. The first step is taking a gas tight syringe and inserting the needle under the sureface of the oil to get a representative sample. The second step in injecting the oil into a clean vial. If either step is not sucessful, then you will see Oxygen and Nitrogen contamination from the air.

To insure that the sample vial is clean we have built in a Vial Preparation Station. Using the same technique that cylinder manufacturers employ to clean gas cylinders between uses; we evacuate, then re-fill the vial with helium several times to reduce Oxygen and Nitrogen to low ppm levels. The helium comes from the same supply as the carrier gas. A 2nd Method is loaded in the DPS Software to automatically clean the vials. The sample probe is inserted through the septum and the START button is pressed. The vials are prepared one at a time, but several can be prepared at once to be used throughout the day.

Plumbing Diagram - The first diagram is simplified to show that we evacuate and re-fill the vial using carrier gas. The 2nd diagram is the atual plumbing configuration when the Vial Preparation Station is connected to the rest of the TOGA plumbing.





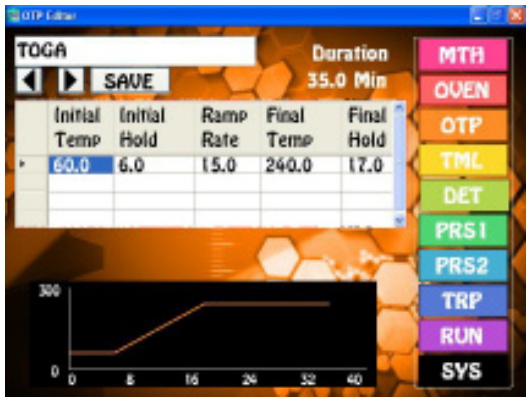


TOGA Vial Preparation Diagrams

TOGA GC Control Software

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

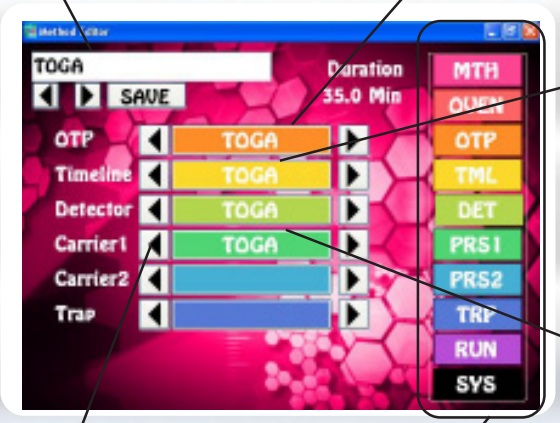
Editors let you customize the files associated with the GC Method.



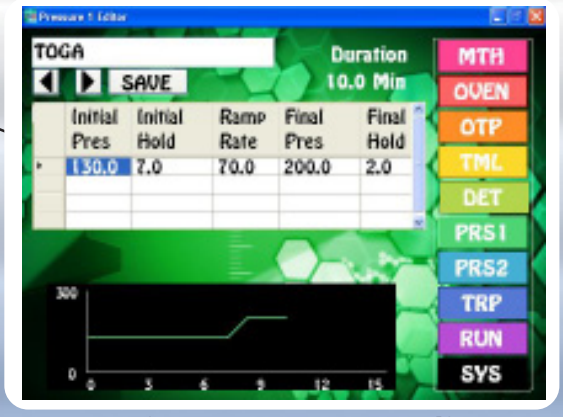
Oven Temp Program Editor

Timeline Editor

Method Name



File Selection Arrows



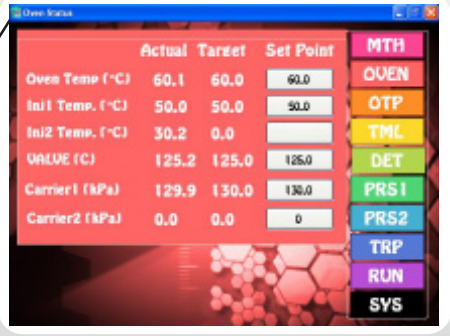
Carrier Pressure 1 Editor

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

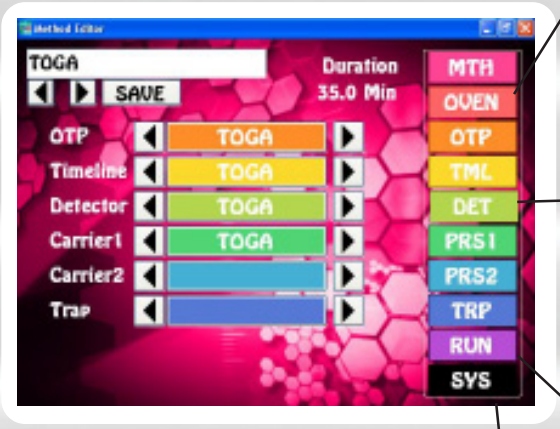
Keyboard to Enter Filenames

Number Pad for entering Values

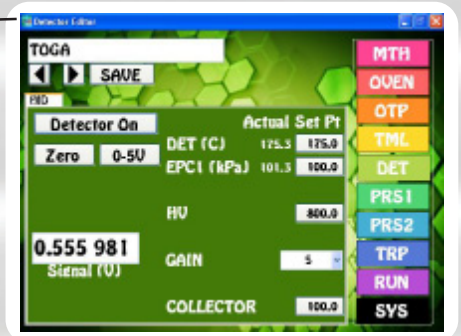
GC Status pages display the parameters in the method, both graphically and as text and values.



Oven Status

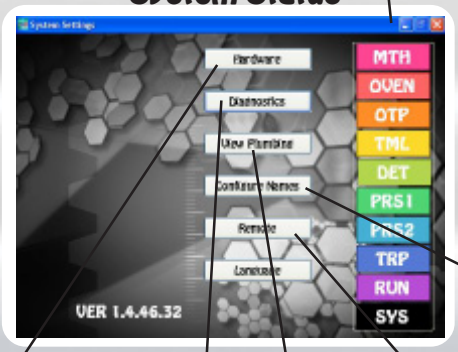


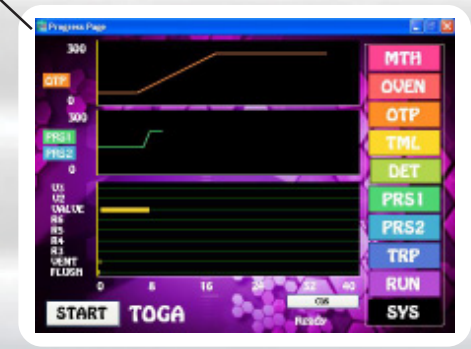
Method Editor



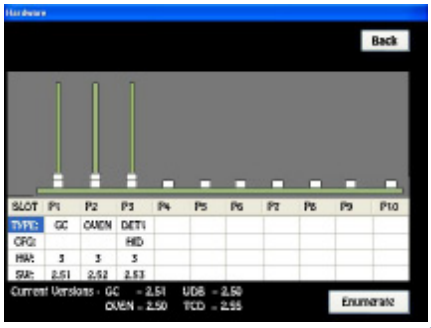
Detector Status

System Status



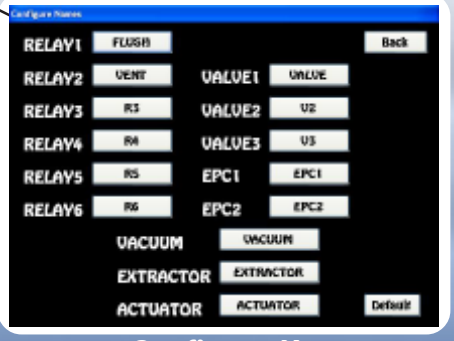


Run Status

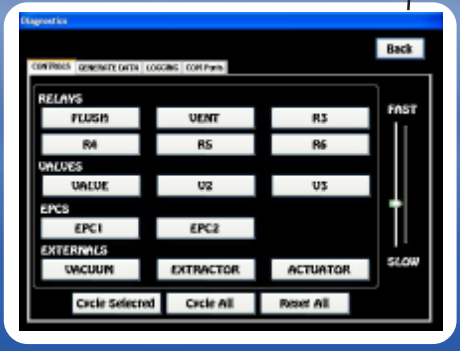


Hardware

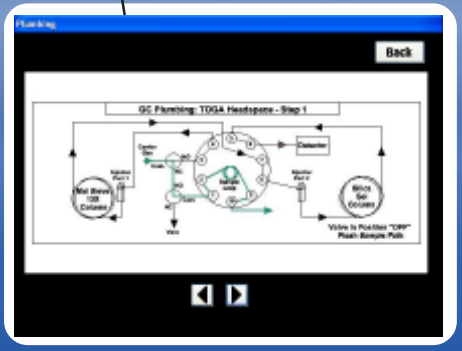
System status pages display the health and viability of the GC instrument.

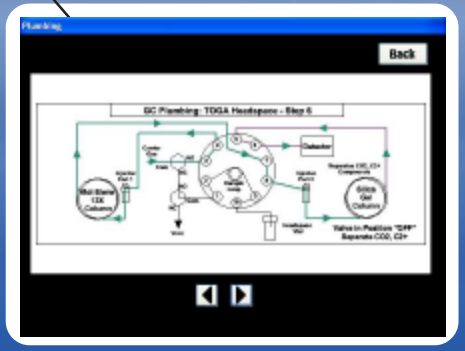


Configure Names



Diagnostics





Plumbing - Steps 1...6

TOGA Gas Chromatograph Features

System Configuration - A Simple and efficient configuration using two packed columns, one valve, and a single HID Detector, or the HID in series with a FID/Methanizer The Silica Gel column separates all of the compounds except it has trouble with the permanent gases. To solve this problem, we have added a Molecular Sieve column in series with the Silica Gel column to separate the permanent gases. Once they are separated we switch the valve back to take the Molecular Sieve column out of the sample path and let the remaining compounds travel through the Silica Gel column to the HID detector.

Sample Information - The eleven most common compounds are included in this analysis scheme which meets ASTM-D3612C methodology. The compounds included in this method are H2, O2, N2, CH4, CO, C2H6, CO2, C2H4, C2H2, C3H6, and C3H4. The results from the analysis of these compounds helps target the underlying fault condition of the transformer. The action levels indicate the concentration levels where the falut is severe and action should be taken to mitigate any possible dangerous situation.

Parts per Million (ppm)

No.	Compound	HID Detection Limit	FID/Methanizer Detection Limit	Action Level
1	Hydrogen	50	NA	100-500
2	Oxygen	10	NA	NA
3	Nitrogen	10	NA	NA
4	Methane	10	1	100-400
5	Carbon Monoxide	10	1	100-1000
6	Ethane	10	1	100-400
7	Carbon Dioxide	10	1	150-3000
8	Ethylene	10	1	500-2000
9	Propane	10	1	100-500
10	Acetylene	10	1	100-400
11	Proplyene	10	1	100-500

Headspace Accessory - The built-in headspace vial accessory, including vial heater, sample valve, pressure and vent solenoids, and sampling probe help automate the TOGA analysis in either the Companion or Series 600 GC TOGA Systems. The pre-purged vial containing the oil sample is heated and allowed to equilibrate in the vial heater prior to analysis. There are positions for 3 vials, so once the first has equilibrated, the analysis can proceed one sample after another. The analysis is only manual as far as the user needs to insert the sample probe into the headspace vial. The remainder of the analysis sequence is automated.

Headspace Autosampler - For a completely automated TOGA System the Series 600 GC can be equipped with a Headspace Autosampler with a 42 vial capacity. The Series 600 TOGA GC and autosampler work in unison to auotmate vial preparation, oil analysis, and reporting.

TOGA 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)
Methanizer - Converts CO & CO2 to Methane (1ppm DL)

- 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:
Molecular Sieve
Silica Gel

Results:
Automatically calibration corrected and reported in % or ppm

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
- Headspace Concentrator
- Headspace Vial Prep Station
- Flow Control Solenoids

Injector:
- Heated On-column Injector
- 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!"

DPS Instruments, Inc.

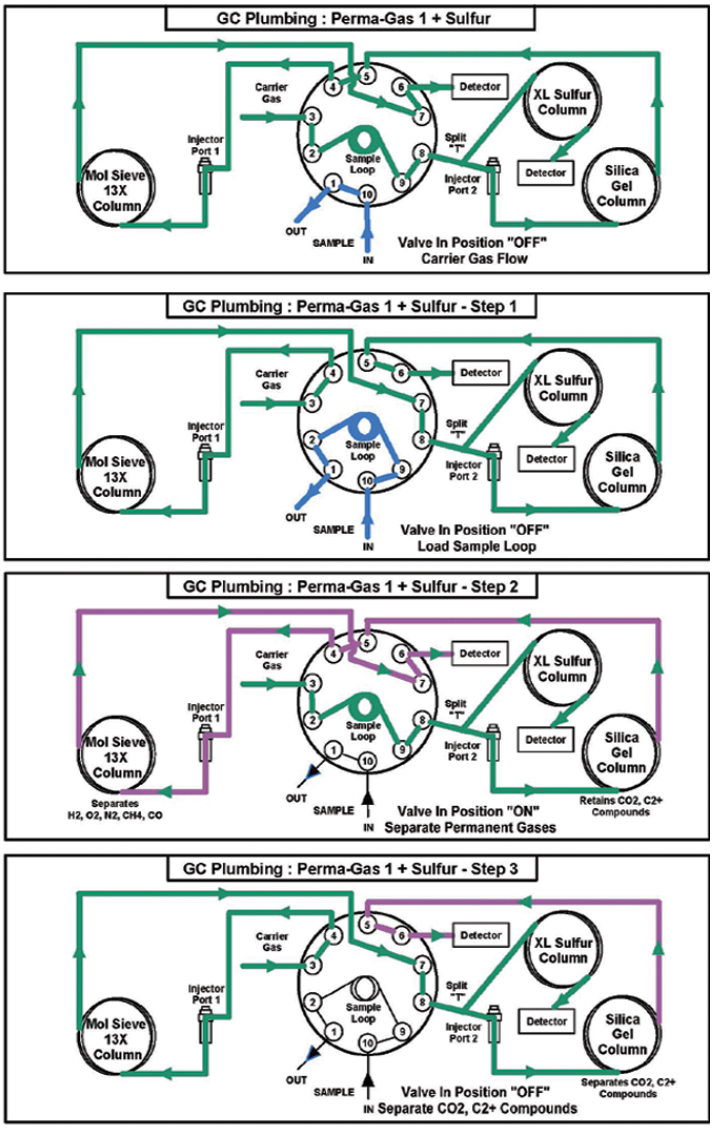
DPS Companion 2 Perma-Gas + Sulfur GC Layout

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 simultaneously onto the Silica Gel and XL-Sulfur analytical columns. The XL-Sulfur separates the Sulfur compounds,which are detected by the PID detector down into the ppb range. 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 + Sulfur Plumbing Diagram

Results, Data & Connectivity

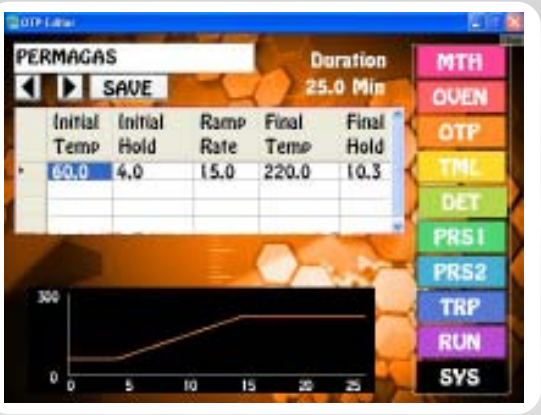
Results: The results and chromatogram are stored on the hard drive. Additionally, for each channel a log file summary of the compounds detected is a convenient way of looking at large amounts of data collected over time.

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.

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.



Oven Temp Program Editor

Timeline Editor

Method Name

File Selection Arrows

Carrier Pressure 1 Editor

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

Keyboard to Enter Filenames

Number Pad for entering Values

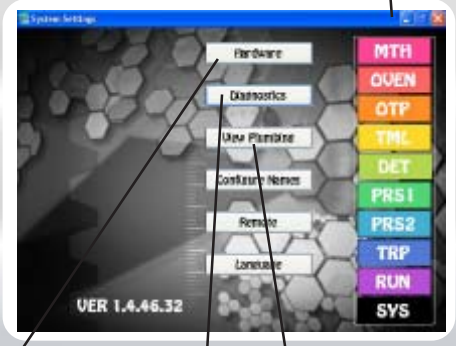
GC Status pages display the parameters in the method, both graphically and as text and values.

Oven Status

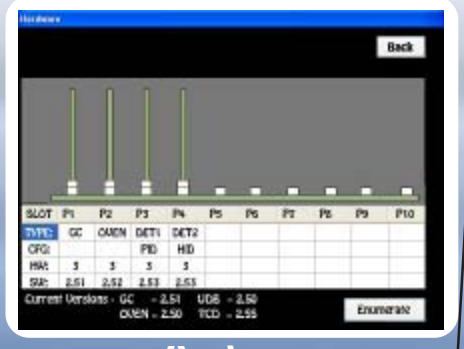
Method Editor

PID Detector Status

System Status

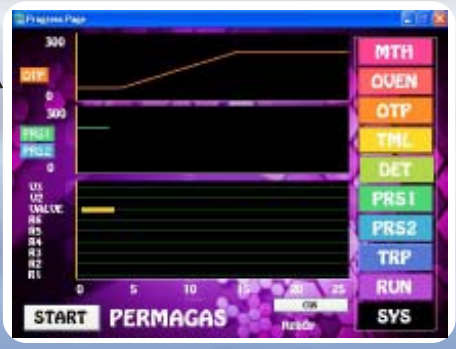


HID Detector Status

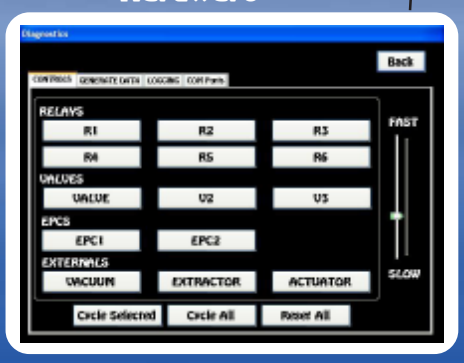


Hardware

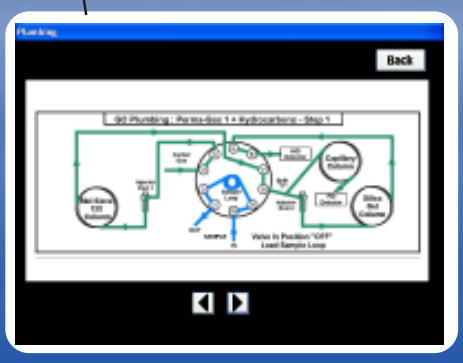
System status pages display the health and viability of the GC instrument.



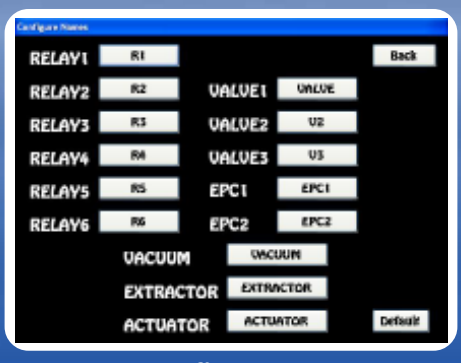
Run Status



Diagnostics



Plumbing



Configure Names

Specifications may change without notice.
01/2016

Perma-Gas + Sulfur 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)
PID – Photoionization Detector (100ppb 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, 2m Micro-packed

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
- 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!"

DPS Instruments, Inc.

Forensics

DPS Instruments, Inc.

www.dps-instruments.com

The analysis of ethanol in blood, breath, and urine are the highest volume tests performed in forensic labs today. In the past these biological samples have been injected directly on the analytical columns causing injection port build up and column plugging. To vastly reduce the sample preparation time and GC System maintenance headaches, headspace methods have been adopted and verified. The DPS Blood Alcohol GC Systems are configured with a built-in Headspace Concentrator, the latest designed high resolution capillary column, and the sensitive FID detector to quickly detect ethanol and the other major constituents in less than 3 minutes. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Blood Alcohol GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

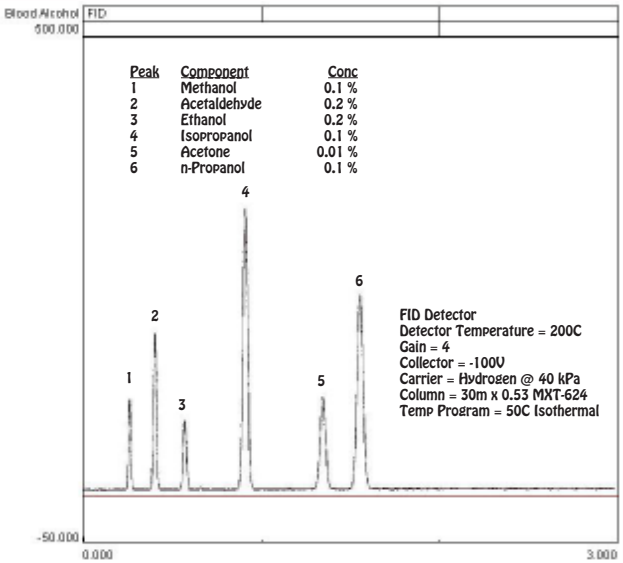
Series 600 GC

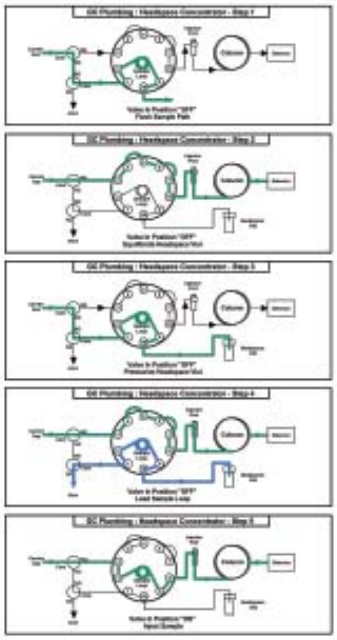
Available Configurations Include:

600-C-062 - Series 600 Blood Alcohol GC Analyzer (FID, Headspace, 30m)
500-C-062 - Companion 1 Portable Blood Alcohol GC Analyzer
(FID, Headspace, 30m)

Companion 1 Portable GC
(with Headspace Concentrator)

Blood Alcohol - Headspace





11/2015
Specifications may change without notice.

Forensics

DPS Instruments, Inc.

www.dps-instruments.com

Drug screening of employees is increasing around the world. Many employers have been forced to administer programs due to the high costs of drug related work incidents. Additionally, a resent study had shown that about two-thirds of patient visits to hospital emergency rooms for drug abuse would have been misdiagnosed without lab testing. Many times doctors and are not sure what patients have taken, and the same holds true for many DOA cases. The only way to determine what a patient may have taken is by drug testing. The DPS Drugs of Abuse GC Systems are configured with the latest designed high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Drugs of Abuse GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

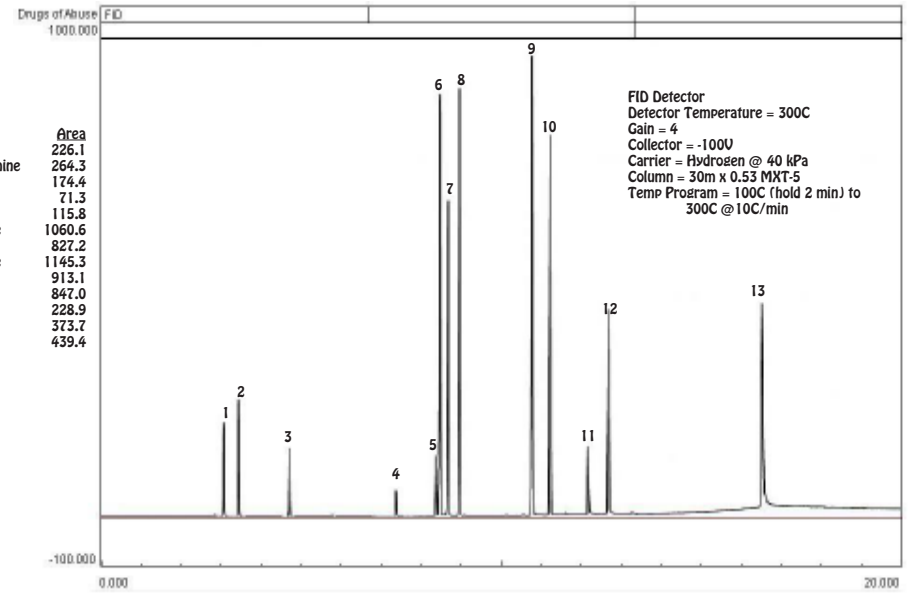
Available Configurations Include:

600-C-063 - Series 600 Drugs of Abuse GC Analyzer (FID, 30m)
500-C-063 - Companion 1 Portable Drugs of Abuse GC Analyzer (FID, 30m)

Series 600 GC

Drugs of Abuse

Companion 1 Portable GC



Peak	Component	Area
1	Amphetamine	226.1
2	Methamphetamine	264.3
3	Nicotine	174.4
4	Cotinine	71.3
5	Caffeine	115.8
6	Benzphetamine	1060.6
7	Ketamine	827.2
8	Phenylcyclidine	1145.3
9	Methadone	913.1
10	Cocaine	847.0
11	Codeine	228.9
12	Scopolamine	373.7
13	Alprazolam	439.4

11/2015
Specifications may change without notice.

Forensics

DPS Instruments, Inc.

www.dps-instruments.com

There are more than 1000 ordinary household products that may be abused via inhalation, such as hair spray, glue/adhesives, gasoline, paint, solvents, marker pens, correction fluid, butane lighter fluid, propane gas, cooking sprays, and household cleaners. These products are easy to obtain, inexpensive, and contain volatile substances that the user perceives as being free of toxic components. The availability and low cost of these products make them more accessible to children than tobacco, alcohol, or drugs. Consequently, inhalant abuse is on the rise, especially among young people. The DPS Inhalants GC Systems are configured with the latest designed high resolution column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC System for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Inhalants GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

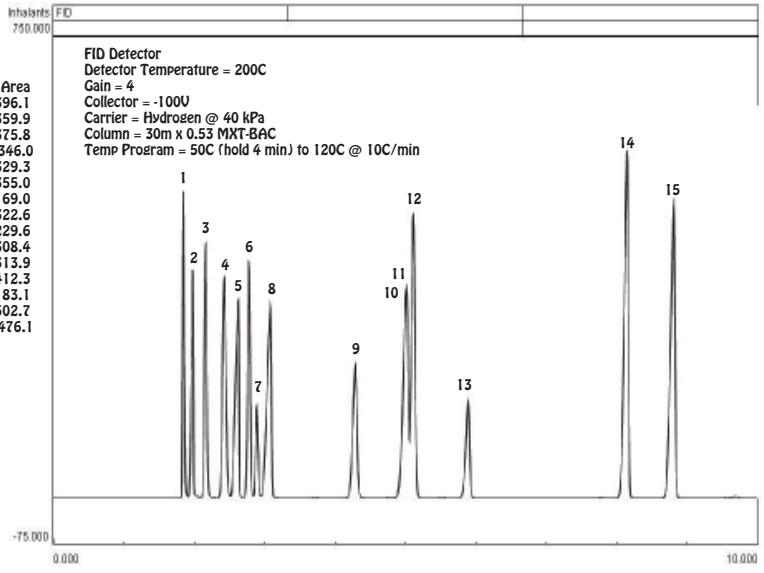
Available Configurations Include:

600-C-064 - Series 600 Inhalants GC Analyzer (FID, 30m)
500-C-064 - Companion 1 Portable Inhalants GC Analyzer (FID, 30m)

Companion 1 Portable GC

Inhalants of Abuse

Peak	Component	Area
1	Diethyl Ether	396.1
2	Methanol	359.9
3	Hexane	375.8
4	Methyl-tert-Butyl Ether	346.0
5	Ethanol	329.3
6	Acetone	355.0
7	Methylene Chloride	169.0
8	Isopropanol	322.6
9	Ethyl Acetate	229.6
10	Chloroform	308.4
11	Methyl Ethyl Ketone	313.9
12	Benzene	412.3
13	Trichloroethylene	183.1
14	Toluene	502.7
15	Methyl Isobutyl Ketone	476.1



11/2015
Specifications may change without notice.

Forensics

DPS Instruments, Inc.

www.dps-instruments.com

This broader group of organic solvents contains many of the compounds identified by the more specifically configured Blood Alcohol and Inhalants GC Systems. These solvents can be major components, or impurities in household cleaners, paints, glues, and many other readily available products, as well as solvents found in biological fluids. Since you are not quite sure what you are going to find, or what concentration it may be, we have configured the DPS Forensic Solvents GC Systems with the highest resolution general purpose column available and the sensitive FID detector. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Forensic Solvents GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

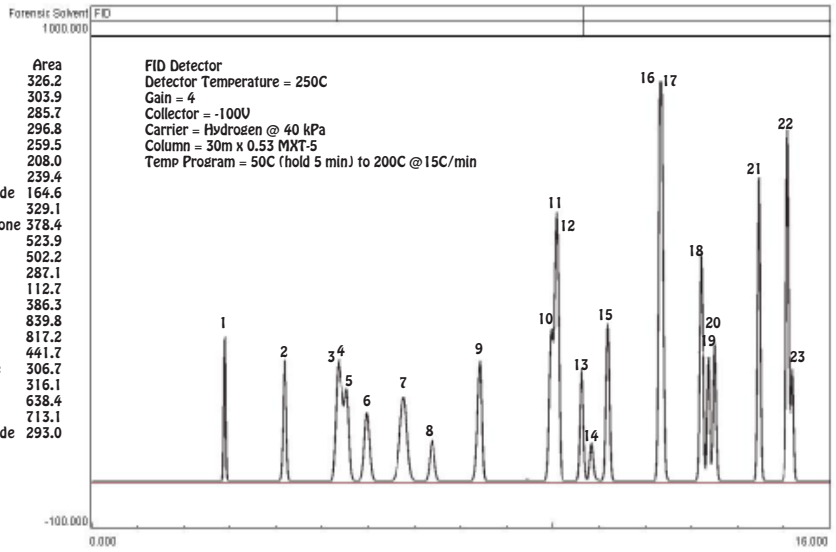
600-C-065 - Series 600 Forensic Solvents GC Analyzer (FID, 30m)
500-C-065 - Companion 1 Portable Forensic Solvents GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Forensic Solvents

Peak	Component	Area
1	Methanol	326.2
2	Ethanol	303.9
3	Acetone	285.7
4	Acetonitrile	296.8
5	Isopropanol	259.5
6	Ether	208.0
7	tert-Butanol	239.4
8	Methylene Chloride	164.6
9	n-Propanol	329.1
10	Methyl Ethyl Ketone	378.4
11	sec-Butanol	523.9
12	Hexane	502.2
13	Ethyl Acetate	287.1
14	Chloroform	112.7
15	Tetrahydrofuran	386.3
16	Benzene	839.8
17	Cyclohexane	817.2
18	Heptane	441.7
19	Trichloroethylene	306.7
20	1,4-Dioxane	316.1
21	Pyridine	638.4
22	Toluene	713.1
23	Dimethylformamide	293.0



11/2015
Specifications may change without notice.

Forensics
Anesthetics

DPS Instruments, Inc.

www.dps-instruments.com

Government agencies generally recommend that no worker should be exposed to concentrations greater than 2ppm of any halogenated anesthetic agent over a period of time. There are no documented adverse effects of chronic exposure to Waste Anesthetic Gases (WAG's) in the workplace. Although results of some studies suggest a link between exposures to halogenated anesthetics and increased health problems. Precautions include adequate ventilation in the operating room, a scavenging system, and work practices to minimize leaks. The DPS Anesthetics GC Systems are designed with safety in mind to check the purity of the concentrated anesthetic, monitor workplace concentrations, or analyze sample concentrations during anesthesia. The latest designed high resolution column and the sensitive FID detector does the hard work for you. We have added a built-in Headspace Concentrator for your convenience. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Anesthetic GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

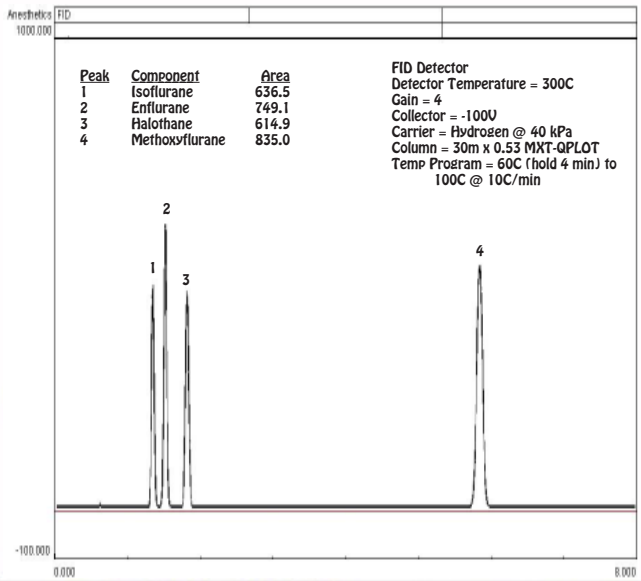
Series 600 GC

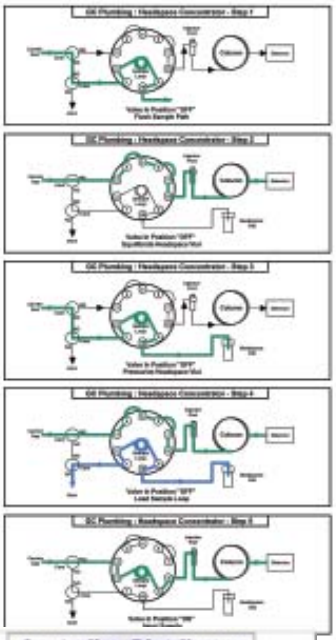
Available Configurations Include:

600-C-060 - Series 600 Anesthetics GC Analyzer (FID, Headspace, 30m)
500-C-060 - Companion 1 Portable Anesthetics GC Analyzer (FID, Headspace, 30m)

Companion 1 Portable GC
(with Headspace Concentrator)

Anesthetics - Headspace





11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

Alcohol & Spirits

DPS Instruments, Inc.

www.dps-instruments.com

Distilled spirits, wine, and beer all contain flavoring agents, esters, acids, and aldehydes. While the ethanol content is closely monitored and regulated by government agencies, the unique flavor of each spirit is the unique combination of the individual compounds. While other methods can determine the ethanol content, only Chromatography can measure the ethanol and separate the individual constituents for identification. When you want to know what makes your favorite tequila, rum, or whiskey taste so special you need a DPS Alcohol & Spirits GC System. The latest designed high resolution column and the sensitive FID detector does the hard work for you. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Alcohol & Spirits GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

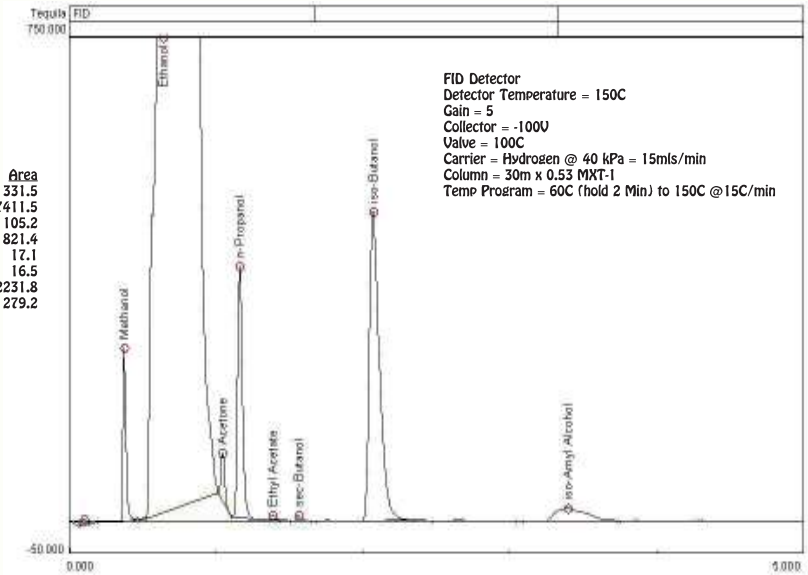
600-C-040 - Series 600 Alcohol & Spirits GC Analyzer (FID, 30m)
500-C-040 - Companion 1 Portable Alcohol & Spirits GC Analyzer (FID, 30m)

Series 600 GC

Gold Label Tequila

Companion 1 Portable GC

Peak	Component	Area
1	Methanol	331.5
2	Ethanol	67411.5
3	Acetone	105.2
4	n-Propanol	821.4
5	Ethyl Acetate	17.1
6	sec-Butanol	16.5
7	iso-Butanol	2231.8
8	iso-Amyl Alcohol	279.2



11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

Essential Oils

DPS Instruments, Inc.

www.dps-instruments.com

Essential oils are used in aromatherapy products, vitamins and food supplements, flavoring agents, and perfumes. There is nothing like the smell of fresh roses in the air, or the taste of spearmint in your favorite chewing gum. However, since these are naturally occurring products the chemical composition varies through each region and growing season. Maintaining a consistent concentration in your product takes considerable effort and constant monitoring, and unfortunately there are always producers cutting the expensive oils with less expensive fillers. The DPS Essentials Oils GC Analyzers can answer these quality questions and assure you are getting what you are paying for. Specially designed columns and the sensitive FID detector do the hard work. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Essentials Oils GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

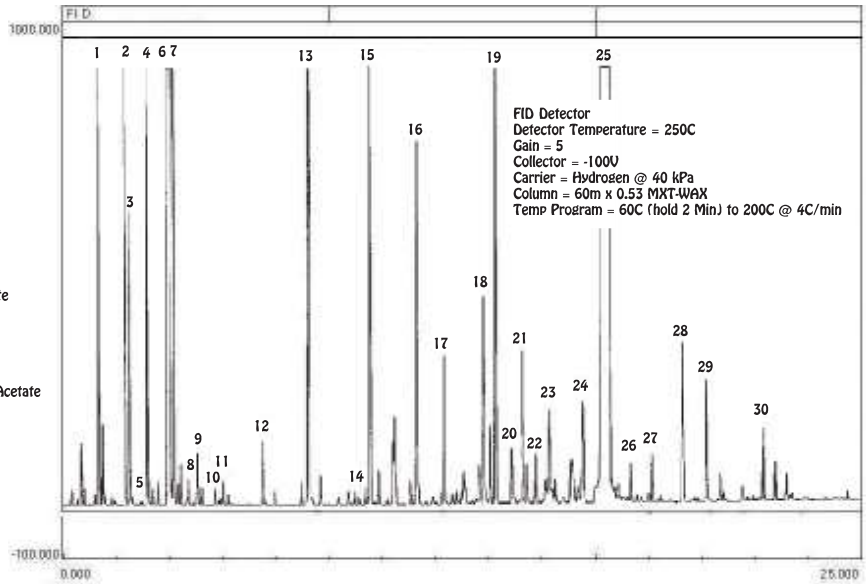
600-C-042 - Series 600 Essential Oils GC Analyzer (FID, S/S, 30m)
500-C-042 - Companion 1 Portable Essential Oils GC Analyzer (FID, 30m)

Series 600 GC

Spearmint Oil

Companion 1 Portable GC

Peak	Component
1	α-Pinene
2	β-Pinene
3	Sabinene
4	Myrcene
5	α-Terpinene
6	Limonene
7	1,8-Cineole
8	cis-Ocimene
9	γ-Terpinene
10	p-Cymene
11	Terpinolene
12	3-Octyl Acetate
13	3-Octanol
14	Menthone
15	trans-Sabinenehydrate
16	β-Bourbonene
17	Linalool
18	Terpinene-4-ol
19	β-Caryophyllene
20	Dihydrocarvone
21	trans-Dihydrocarvyl Acetate
22	trans-β-Farnescene
23	α-Terpineol
24	Germacrene
25	Carvone
26	cis-carvyl Acetate
27	trans-Carveol
28	cis-Carveol
29	cis-Jasmone
30	Viridiflorol



11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

Fatty Acid Methyl Esters - FAME's

DPS Instruments, Inc.

www.dps-instruments.com

Fatty acid methyl esters (FAME) are used extensively as intermediates in the manufacture of detergents, emulsifiers, wetting agents, stabilizers, textile treatments, and waxes. FAME's are also used in a variety of food additive applications, including the dehydration of grapes to produce raisins, as synthetic flavoring agents, and as intermediates in the manufacture of a variety of food ingredients. The quality of your product is dependent on maintaining the concentrations of specific FAME compounds. The DPS FAME's GC Analyzers are specifically designed to separate these compounds. Specially designed columns and the sensitive FID detector do the hard work. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated FAME's GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

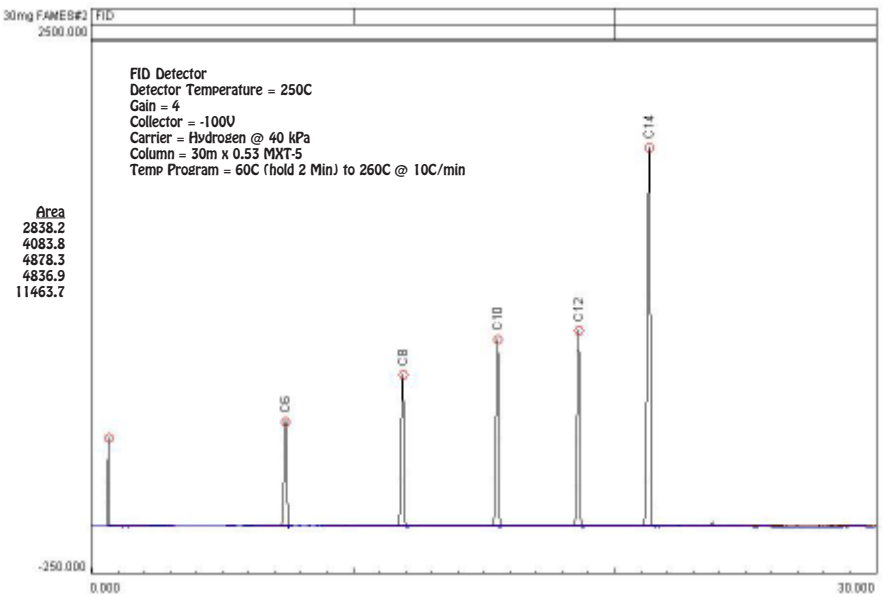
Series 600 GC

Available Configurations Include:

600-C-043 - Series 600 FAME's GC Analyzer (FID, 30m)
500-C-043 - Companion 1 Portable FAME's GC Analyzer (FID, 30m)

Companion 1 Portable GC

Faty Acid Methyl Esters - FAME's - C6 - C14



Peak	Component	Area
1	Methyl Caproate	2838.2
2	Methyl Caprylate	4083.8
3	Methyl Carpate	4878.3
4	Methyl Laurate	4836.9
5	Methyl Myristate	11463.7

11/2015
Specifications may change without notice.

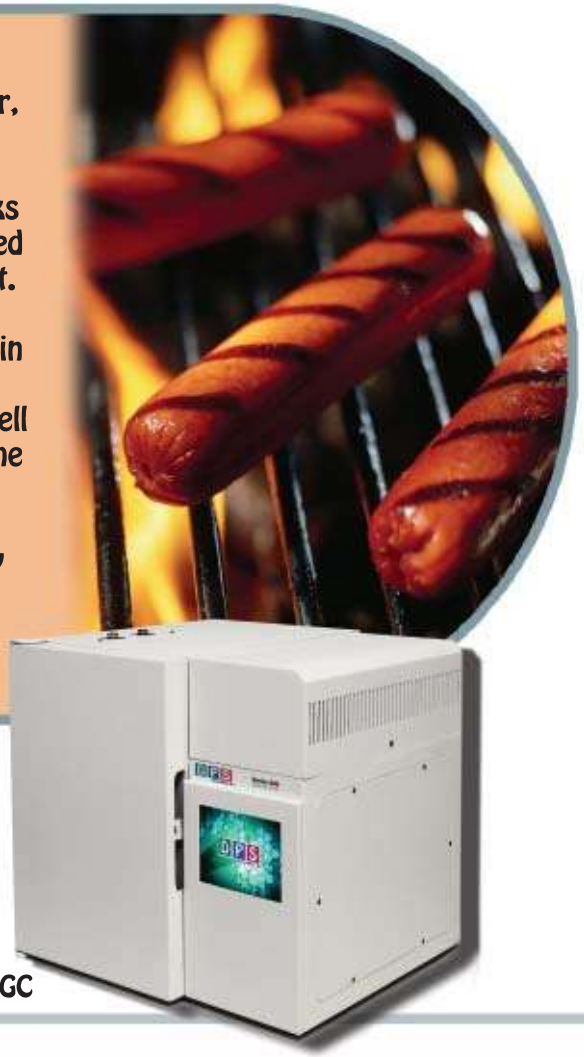
Foods, Flavors, & Fragrances

Fatty Acids

DPS Instruments, Inc.

www.dps-instruments.com

The fact is we all need fats to help nutrient absorption, promote nerve transmission, and to maintain cell membrane integrity. However, when consumed in excess amounts, fats contribute to weight gain, heart disease and certain types of cancer. Fats are not created equal. Some fats promote our health positively, while some increase our risks of heart disease. The key is to replace bad fats (trans fat and saturated fat) with good fats (monosaturated and polysaturated fats) in our diet. As much of the world is finally becoming concerned with diet and health, there is an increase needed in the analysis of the components in fats. The DPS Fatty Acid GC Analyzers measures underivatized free fatty acids in oils, animal products such as meat, fish, and dairy, as well as commercial frying oils, and vegetable oils. Capillary columns and the sensitive FID detector do the hard work. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Fatty Acid GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.



Available Configurations Include:

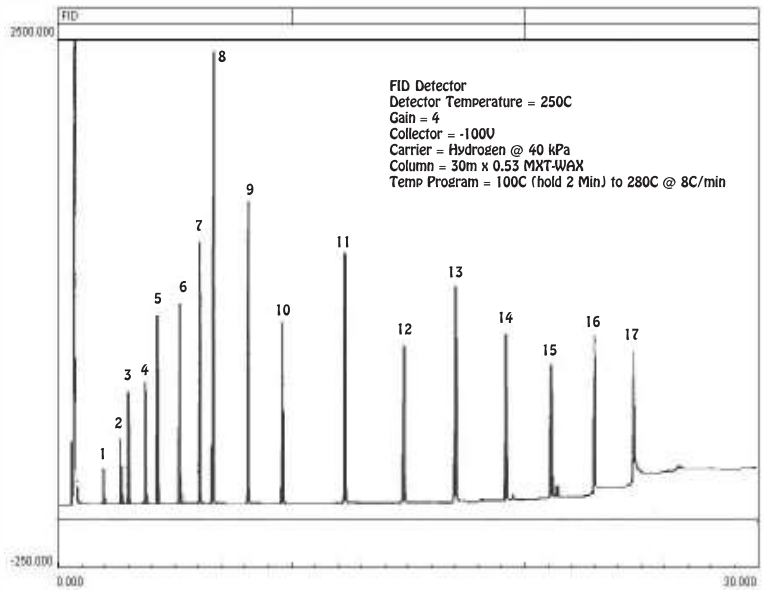
600-C-044 - Series 600 Fatty Acids GC Analyzer (FID, 30m)
500-C-044 - Companion 1 Portable Fatty Acids GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Fatty Acids - C2 - C22

Peak	Component	Area
1	Acetic Acid	438.2
2	Proprionic Acid	583.4
3	Isobutyric Acid	678.3
4	n-Butyric Acid	736.1
5	Isovaleric Acid	1063.5
6	n-Valeric Acid	1138.7
7	Isocaproic Acid	1263.2
8	Caproic Acid	2478.9
9	Heptanoic Acid	1336.2
10	Caprylic Acid	1163.1
11	Capric Acid	1246.7
12	Lauric Acid	1063.4
13	Mysteric Acid	1218.7
14	Palmitic Acid	1083.0
15	Steric Acid	1078.6
16	Arachidic Acid	1136.5
17	Behenic Acid	963.4



11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

Flavors & Fragrances

DPS Instruments, Inc.

www.dps-instruments.com

Although the perception of flavor is a complex phenomenon, odor is the most important single factor contributing to the overall characteristics of flavor. A large number of hydrocarbons, alcohols, acids, aldehydes, ketones, sulfides, and heterocyclic compounds have been identified as the volatile components contributing to odor in meats and plant foodstuffs. Since, it is very difficult for people to eat something that does not smell good the analysis of flavor volatiles is critically important to the perceived quality of food. The DPS Flavors & Fragrances GC Analyzers are configured to analyze the broadest range of flavor volatiles. The sensitive FID detector easily detects all of the classes of flavor compounds and the capillary column does a good job of separating the compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Flavors & Fragrances GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

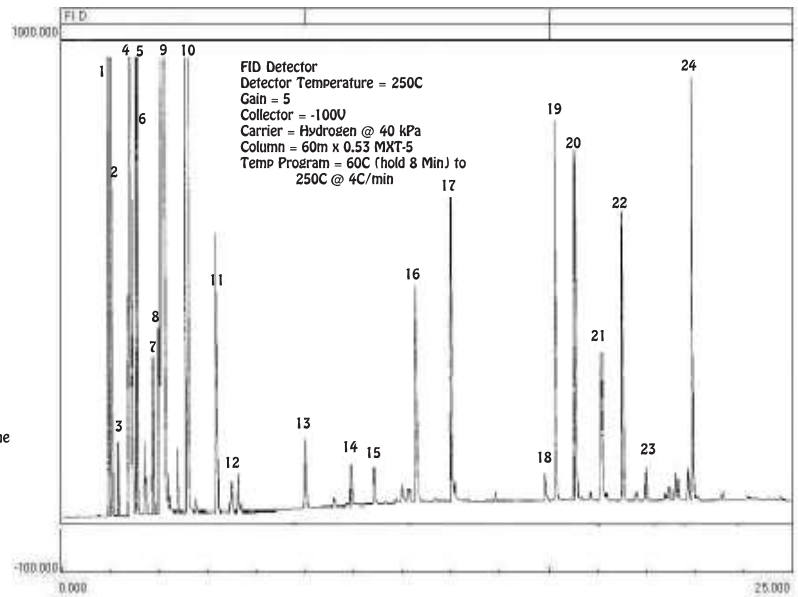
600-C-045 - Series 600 Flavors & Fragrances GC Analyzer (FID, 30m)
600-C-045 - Companion 1 Flavors & Fragrances GC Analyzer (FID, 30m)

Series 600 GC

Lemon Oil - Flavor & Fragrance

Companion 1 Portable GC

Peak	Component
1	α-Thujene
2	α-Pinene
3	Camphene
4	Sabinene
5	β-Pinene
6	Myrcene
7	α-Terpinene
8	p-Cymene
9	Limonene
10	γ-Terpinene
11	Terpinolene
12	Linalool
13	Citronellal
14	Terpinene-4-ol
15	α-Terpineol
16	Neral
17	Geranial
18	Citronellyl Acetate
19	Neryl Acetate
20	Geranyl Acetate
21	β-Caryophyllene
22	trans-α-Bergamotene
23	α-Humulene
24	β-Bisabolene



11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

Food Contaminants

DPS Instruments, Inc.

www.dps-instruments.com

Volatile compounds from food packaging, sulfur contaminants in beer, and acrylamide in potato chips are all problems facing the quality of prepared and packaged food. Alcohols, aldehydes, ketones, and hydrocarbons all play a role in the odor of the packaged food. These odors coming from the food itself are highly desirable, whereas odors coming from the materials used to prepare, process, and package the foods are always a problem and should be limited as much as possible. The DPS Food Contaminants GC Analyzers are a great starting place, they use a built-in Purge & Trap Concentrator to fully automate the sampling and analysis of these materials and a sensitive FID detector for parts per billion (ppb) level detection of these contaminants. DPS Food Contaminants GC Analyzers are designed to meet your most demanding analysis requirements. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Food Contaminants GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

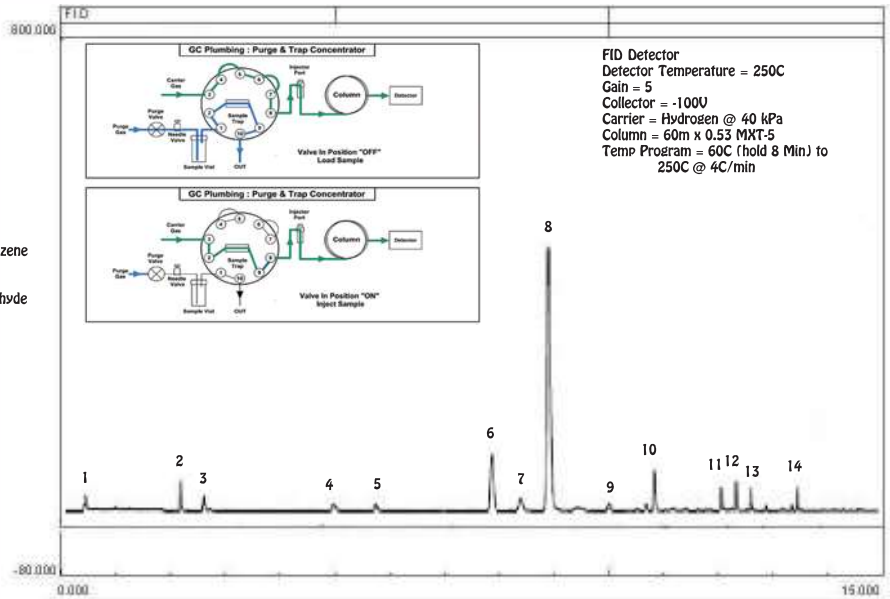
600-C-046 - Series 600 Food Contaminants GC Analyzer (FID, Purge & Trap, 30m)
500-C-046 - Companion 1 Portable Food Contaminants GC Analyzer (FID, Purge & Trap, 30m)

Series 600 GC

Potato Chip Bag - Purge & Trap

Companion 1 Portable GC
(with Purge & Trap Concentrator)

Peak	Component
1	Tetrahydrofuran
2	1-Butanol
3	Toluene
4	Hexanal
5	Ethylbenzene
6	Butyl Ether
7	Styrene
8	1-Methylethylbenzene
9	Propylbenzene
10	Benzaldehyde
11	Benzeneacetaldehyde
12	Acetophenone
13	Benzoic Acid
14	Decanal



11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

Fruit Ripening - Ethylene

DPS Instruments, Inc.

www.dps-instruments.com

Ripening agents are used to speed up fruit ripening, allowing many fruits to be picked prior to being fully ripe, since many ripe fruits do not ship well. For example, bananas are picked when green and artificially ripened after shipment, by being gassed with the ripening agent Ethylene. In nature, Ethylene is produced and released by rapidly-growing plant tissues, such as the tips of roots, flowers, and damaged tissue. This hormone promotes the starch in the fleshy part of the fruit to be converted to sugar. DPS has configured the Ethylene GC Analyzer Systems to detect this hormone in the air surrounding the fruit. Our Air Concentrator automatically samples and traps the Ethylene, which is then detected by the sensitive FID detector in the 1-5 parts per billion (ppb) levels. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Ethylene Analyzer GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

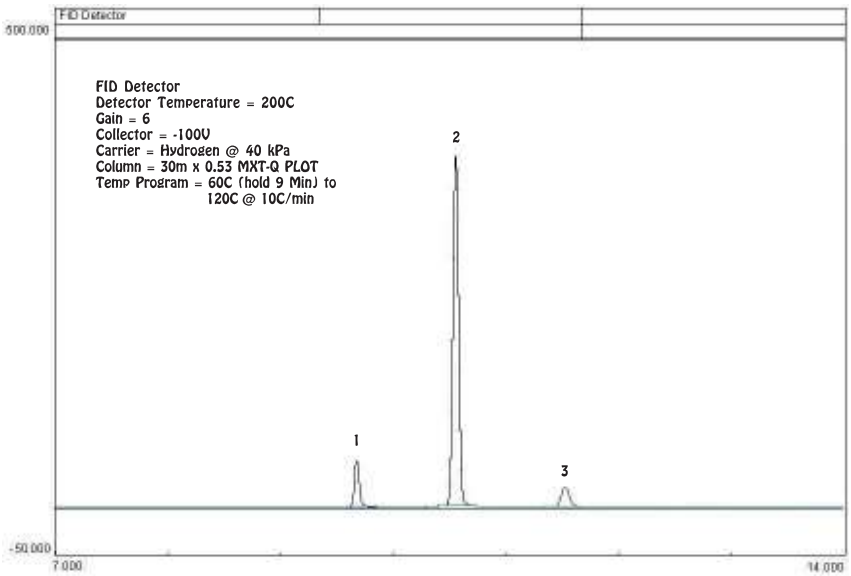
600-C-051 - Series 600 Ethylene GC Analyzer (FID, Air Concentrator, 30m)
500-C-051 - Companion 1 Ethylene GC Analyzer (FID, Air Concentrator, 30m)

Series 600 GC

Ethylene - 5 ppb

Companion 1 Portable GC
(with Air Concentrator)

Peak	Component
1	Methane
2	Ethylene
3	Ethane



5/2019
Specifications may change without notice.

Foods, Flavors, & Fragrances

Packaging Contaminants

DPS Instruments, Inc.

www.dps-instruments.com

Alcohols, aldehydes, ketones, aromatics, and other hydrocarbons all play a role in the odor of packaged food and beverages. These odors coming from the food itself are highly desirable, whereas odors coming from the materials used to package the foods are always a problem. DPS Instruments has designed and developed a convenient way to determine the contribution from the packaging materials. The DPS Packaging Contaminants GC Analyzers use a built-in Dynamic Headspace Concentrator to fully automate the sampling and analysis of these materials, and a sensitive FID detector for low ppb level detection of Benzene, Toluene, Limonene and other hydrocarbons contaminants. The concentration of volatile compounds in everything from potato chip bags to PET pellets can be determined using one of the versatile DPS Packaging Contaminants GC Analyzers. The Series 600 GC is for analyses in the lab, or use the Portable Companion 2 GC Systems for analyses right where the samples are taken. The fully integrated Packaging Contaminants GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

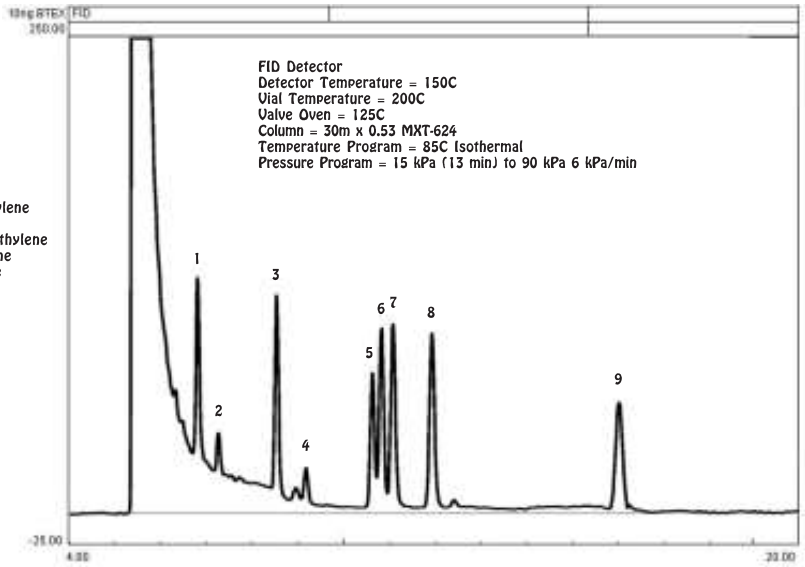
Available Configurations Include:

600-C-056 - Series 600 Packaging Contaminants GC Analyzer (FID, 30m Column, Vial Heater, Dynamic Headspace Concentrator

500-C2-056 - Companion 2 Portable Packaging Contaminants GC Analyzer (FID, 30m Column, Vial Heater, Dynamic Headspace Concentrator

Companion 2 Portable GC
With Dynamic Headspace Concentrator,
(Vial Heater, "Cathedral" Trap, Sample Valve)

10 ppb BTEX & Limonene with Dynamic Headspace Concentrator



Peak	Componenta
1	Benzene
2	Trichloroethylene
3	Toluene
4	Tetrachloroethylene
5	Chlorobenzene
6	Ethylbenzene
7	M-Xylene
8	O-Xylene
9	Limonene

2/2021
(Specifications may change without notice.

DPS Packaging Contaminants GC Layout

Companion 2 GC

Foods, Flavors, & Fragrances

Sugar Alcohols

DPS Instruments, Inc.

www.dps-instruments.com

Sugar alcohols are neither sugars nor alcohols. They are carbohydrates with a chemical structure that partially resembles sugar and partially resembles alcohol, but they don't contain ethanol as alcoholic beverages do. They are incompletely absorbed and metabolized by the body, and consequently contribute fewer calories, which is why they have recently have been used in new products. Technical advances have added to the range of sugar alcohols available for food use and they are found in sugar-free and reduced-sugar products, and in foods intended for individuals with diabetes. Since the general population over the last few decades has developed a sweet tooth, the replacement of sucrose with sugar alcohols has become big business. The DPS Sugar Alcohols GC Analyzers are configured to meet the demand of ever increasing sugar alcohol analysis requirements. The sensitive FID detector and selective capillary column combination easily separate and identify these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Sugar Alcohols GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

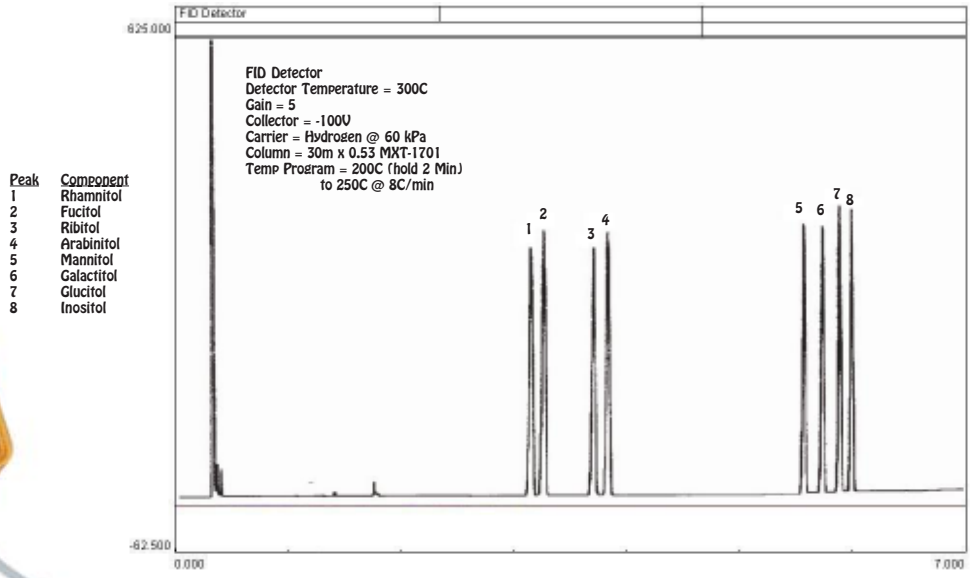
Available Configurations Include:

600-C-048 - Series 600 Sugar Alcohols GC Analyzer (FID, 30m)
500-C-048 - Companion 1 Portable Sugar Alcohols GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Sugar Alcohols



Peak	Component
1	Rhamnitol
2	Fucitol
3	Ribitol
4	Arabinitol
5	Mannitol
6	Galactitol
7	Glucitol
8	Inositol

11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

Triglycerides & Fats

DPS Instruments, Inc.

www.dps-instruments.com

Triglycerides are the chemical form in which most fat exists in food as well as in the body. They're also present in blood plasma and, in association with cholesterol, form the plasma lipids. Triglycerides in plasma are derived from fats eaten in foods or made in the body from other energy sources like carbohydrates. Calories ingested in a meal and not used immediately by tissues are converted to triglycerides and transported to fat cells to be stored. In other words, triglycerides are the energy storehouses of the body. The DPS Triglycerides GC Analyzers are a necessary component of any laboratory monitoring the fat content of foods. The FID detector is sensitive to the hydrocarbon backbone structure of the triglycerides and the analytical column separates the fat matrix. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Triglycerides GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

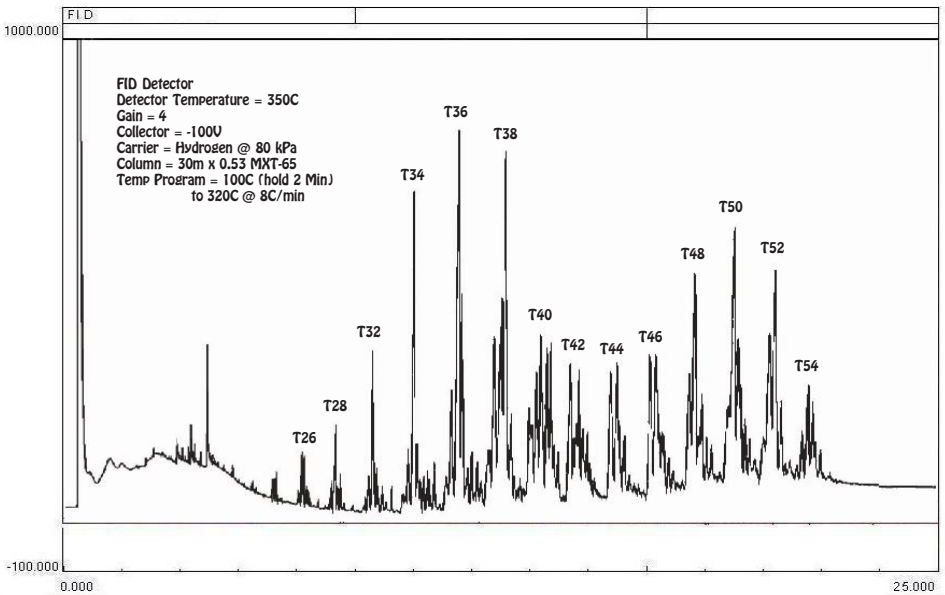
Available Configurations Include:

600-C-049 – Series 600 Triglycerides GC Analyzer (FID, 30m)
500-C-049 – Companion 1 Portable Triglycerides GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Butter Triglycerides



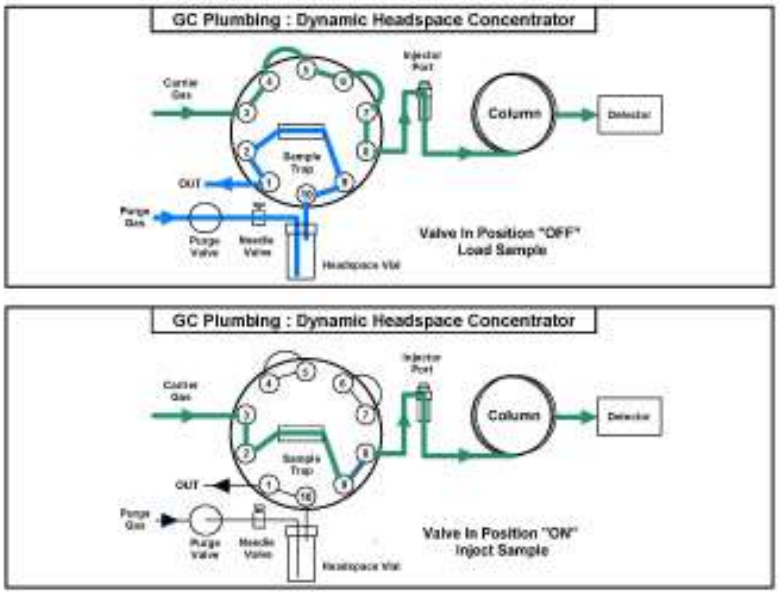
Plumbing Diagram

Dynamic Headspace Concentrator - The Dynamic Headspace Concentrator is built right in with multi-position Vial Heater, "Cathedral" Trap and Heater, 10-port Electronically actuated Valve in a Heated Valve Oven. The Headspace Vial is purged with inert gas to load the sample compounds onto the Trap. The Purge Gas is regulated with a variable flow controller for consistent sample trapping. The Automated Vial Purge, Trap, Pre-heat, Desorb, and Bake sequences of the Dynamic Headspace Concentrator are controlled through the Timeline of the DPS Control Software for the analysis of one sample at a time.

Load - The Purge Valve turns ON to start the stream of gas flowing to the Headspace Vial transfering the sample to the "Cathedral" Trap for concentration.

Inject - The carrier gas sweeps the components from the Trap to the analytical column.

Bake - Using a clean Vial the Purge Valve can be turned ON to Bake out the Trap between analyses.



Built-in Dynamic Headspace Concentrator Plumbing Diagram

Results, Data & Conncetivity

Results: In this unique plumbing configuration the sample is placed inside a heated vial. The sample can be water, pellets, packaging material, or a PET Blank. You get the same peak areas on the chromatogram no matter which source the sample comes from. For example, the results presented on the first page are from a BTEX standard spiked into clean water. The same results would be obtained if BTEX was spiked onto pellets, because in either case 10 nanograms of each component are loaded on the Trap and the detector responds with the same value.

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.

GC Control Software

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

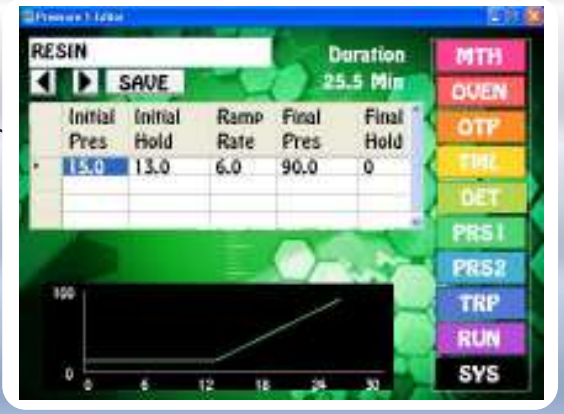
Editors let you customize the files associated with the GC Method.

Oven Temp Program Editor

Timeline Editor

Method Name

File Selection Arrows



Carrier Pressure 1 Editor

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

Keyboard to Enter Filenames

Number Pad for entering Values

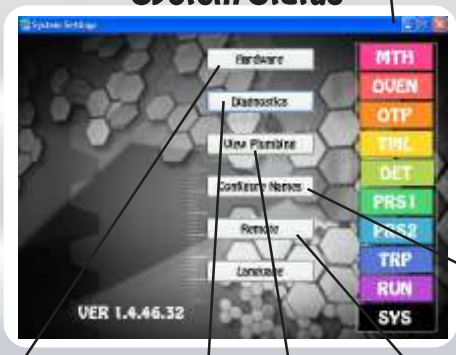
GC Status pages display the parameters in the method, both graphically and as text and values.

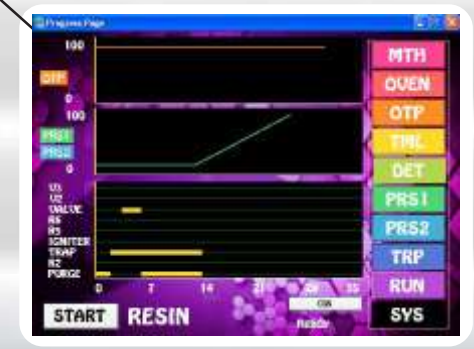
Oven Status

Method Editor

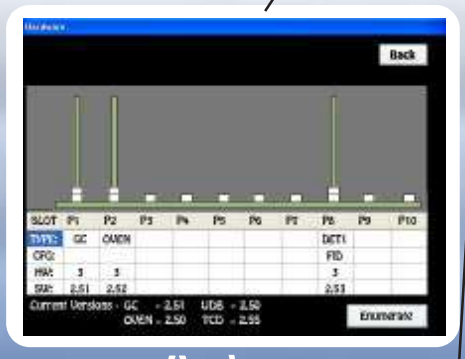
Detector Status

System Status



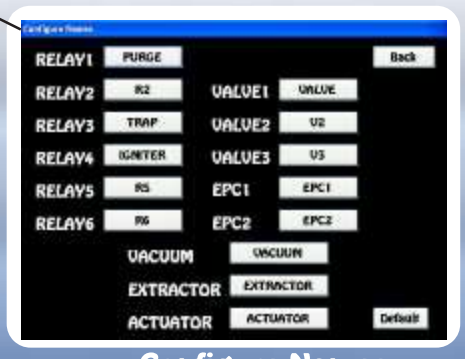


Run Status

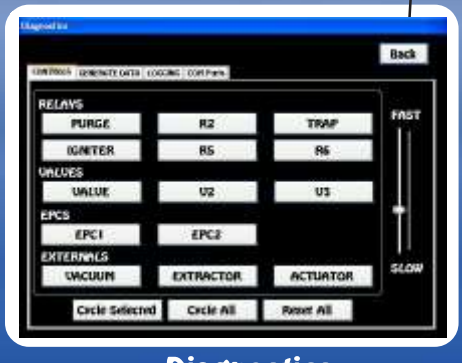


Hardware

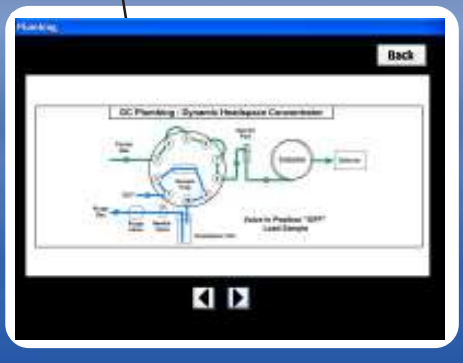
System status pages display the health and viability of the GC instrument.

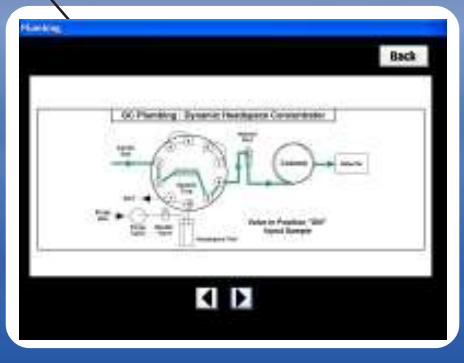


Configure Names



Diagnostics





Plumbing Load and Inject

Packaging Contaminants 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.

Detectors:
FID – Flame Ionization Detector

- 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:
15m, 30m, or 60m Capillary Columns

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
- 12 amps at 48 Vdc total power consumption

Built-In Accessories:
- Dynamic Headspace Sample Concentrator
- Vial Heater - 3-Position
- Headspace Vial Cleaner

Injectors:
- Heated On-column Injector
- Split/Splitless Injector
- 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!"

DPS Instruments, Inc.

DPS Ethylene GC Layouts

Companion 1 GC

Small High Pressure Gas Cylinder

Trap & Cooling Fan

Power connection with breaker and line filter

FID Detector

Color Touchscreen

USB & Ethernet Connections

On-Column Injector

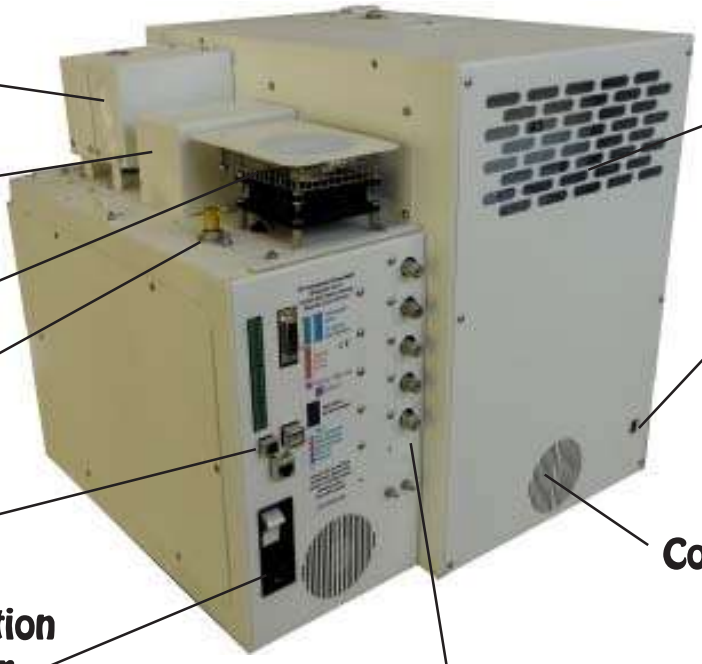
GC Oven

Rugged watertight case

Valve Oven

Gas Connections

Series 600 GC



Detector

Sample Valve and Valve Oven

Trap & Cooling Fan

Flow Controller

USB & Ethernet Connections

Power connection with breaker and line filter

EPC Inlets

Cooling Fan

Voltage Selection (120 or 240Vac)

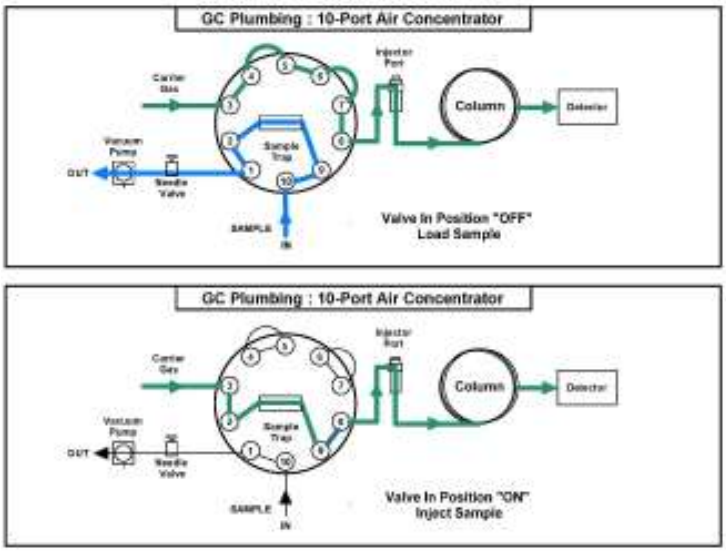
Flow Through Oven Cooling

Plumbing Diagram

Air Concentrator: The Air Sample Concentrator is built right into the GC Chassis to provide both a compact portable sample concentrator and the shortest possible sample path. The valve and sample lines are heated creating a inert sample path. The Sample Flow Controller precisely meters the amount of sample loading on the Trap.

Load Air Sample: The vacuum pump draws the sample from the inlet through the Trap and then to the flow controller and pump to limit any possible cross contamination between samples. The entire sequence of the Air Sample Concentrator is automated through the Timeline of the DPS Control Software for the analysis of one sample, or the system can be set up to run unattended 24/7, collecting and analyzing samples every hour, or so.

Inject Sample: The carrier gas sweeps the components from the trap to the analytical column.



Air Concentrator Plumbing Diagram

Results, Data & Conncetivity

Results: The Results can be saved for each sample, or they can be printed, or they can be tabulated into a .LOG file, when you are collecting a vast amount of data over a long time period. The format of the. LOG file is text, so it can be opened by any word processing program.

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.

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.

Oven Temp Program Editor

Timeline Editor

Method Name

File Selection Arrows

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

Carrier Pressure 1 Editor

Keyboard to Enter Filenames

Number Pad for entering Values

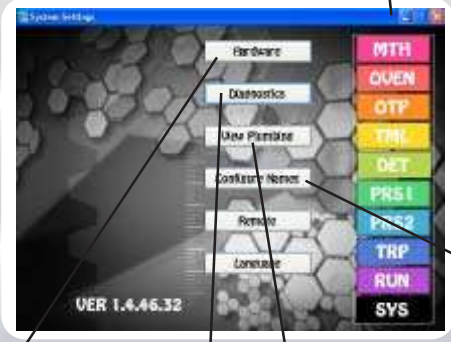
GC Status pages display the parameters in the method, both graphically and as text and values.

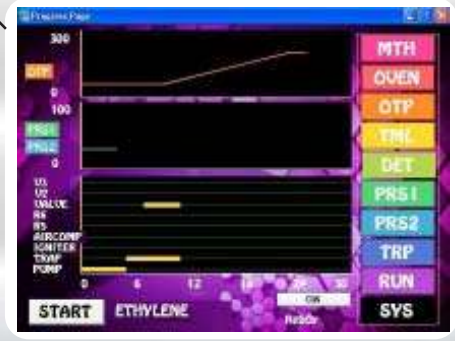
Oven Status

Method Editor

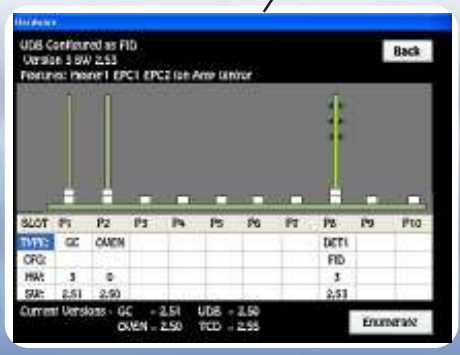
Detector Status

System Status



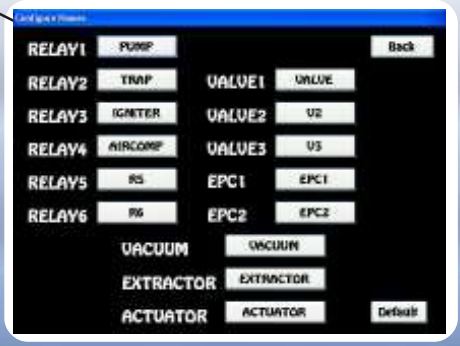


Run Status

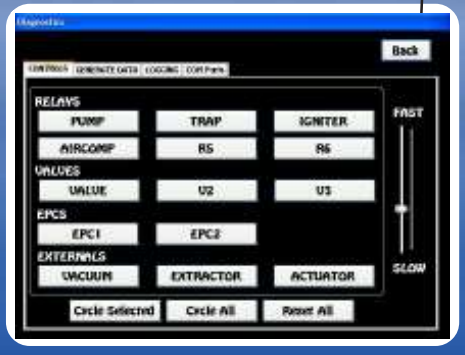


Hardware

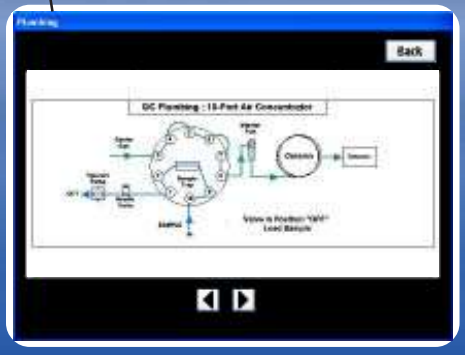
System status pages display the health and viability of the GC instrument.



Configure Names



Diagnostics



Plumbing

Ethylene 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.

Detectors:
FID – Flame Ionization Detector (1ppb Detection Limit)
- 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:
Packed, or Capillary Column

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 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:
- Air Sample Concentrator (Vacuum Pump, Flow Controller & Trap)
- Air Compressor for FID

Injectors:
- Heated On-column Injector
- 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!"

DPS Instruments, Inc.

Foods, Flavors, & Fragrances

Sterols

DPS Instruments, Inc.

www.dps-instruments.com

Cholesterol and other sterols are naturally occurring compounds from fats in many plant and animal extracts. With the global rise in heart and other diseases, primarily due to the increased consumption of dietary fats, the concentrations of cholesterol and other sterols in food products are monitored by many government agencies. The increase in awareness from consumers has also fueled the food industry to respond by reducing health related compounds, such as cholesterol and trans fats in processed foods. The DPS Sterols GC Analyzers are configured with the sensitive FID detector to meet the ever increasing need for cholesterol analysis. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Sterols GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

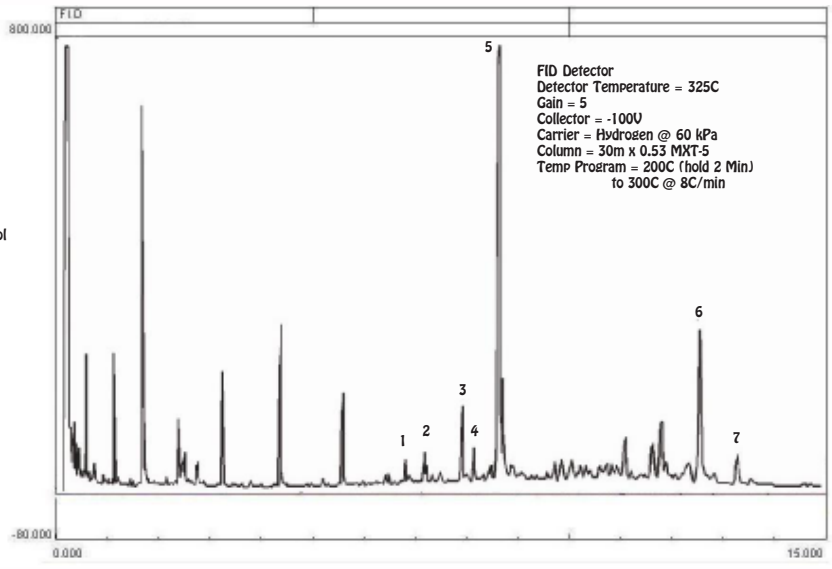
600-C-047 - Series 600 Sterols GC Analyzer (FID, 30m)
500-C-047 - Companion 1 Portable Sterols GC Analyzer (FID, 30m)

Series 600 GC

Olive Oil - Sterols

Companion 1 Portable GC

Peak	Component
1	Cholesterol
2	Brassicasterol
3	Campesterol
4	Stigmasterol
5	β-Sitosterol
6	Erythrodiol
7	Uvacol



Foods, Flavors, & Fragrances

Preservatives

DPS Instruments, Inc.

www.dps-instruments.com

Fats play an important role in nutrient absorption, nerve transmission, and to maintain cell membrane integrity. However, fats in foods are subject to oxidation and can turn rancid. Oxidation reactions still occur relative rapidly even in frozen or refrigerated foods. Antioxidants, such as tocopherols and other active Vitamin E compounds, are used as food additives and as food preservatives to prevent oils from going rancid. Vitamin E is also widely used as an inexpensive antioxidant in cosmetics. The DPS Preservatives GC Analyzer measures antioxidant compounds in oils, animal products such as meat, fish, and dairy, as well as commercial frying oils, and vegetable oils. The sensitive FID detector and analytical column combination separate and detect these preservatives. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Preservatives GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

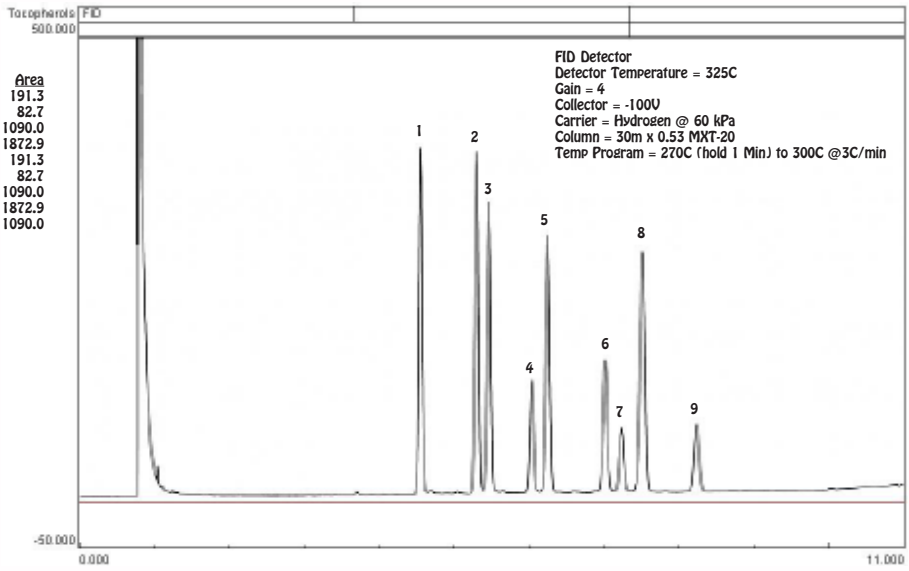
600-C-055 - Series 600 Preservatives GC Analyzer (FID, 30m)
500-C-055 - Companion 1 Portable Preservatives GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Antioxidant Preservatives - Tocopherals

Peak	Component	Area
1	δ-Tocopherol	191.3
2	β-Tocopherol	82.7
3	γ-Tocopherol	1090.0
4	dl-δ-Tocopherol	1872.9
5	α-Tocopherol	191.3
6	dl-δ-Tocotrienol	82.7
7	dl-γ-Tocotrienol	1090.0
8	Int. Standard	1872.9
9	dl-α-Tocotrienol	1090.0



11/2015
Specifications may change without notice.

Foods, Flavors, & Fragrances

e-Cigarette

DPS Instruments, Inc.

www.dps-instruments.com

Electronic cigarettes do not burn tobacco, instead they produce an aerosol from a battery powered heating element and liquid-containing cartridge. The liquid typically consists of propylene glycol, glycerin, flavorants, and nicotine. The heating element vaporizes the liquid to form a mist, which the end user inhales, imitating tobacco smoke visually and replicating the burning sensation in the throat and lungs. These similarities to tobacco smoke, combined with the same hand-to-mouth behaviors, have contributed to it's rapid acceptance. The DPS e-Cigarette GC Analyzers are configured to meet the ever increasing demand for these analysis requirements. The sensitive FID detector and selective capillary column combination easily separate and identify these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated e-Cigarette GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

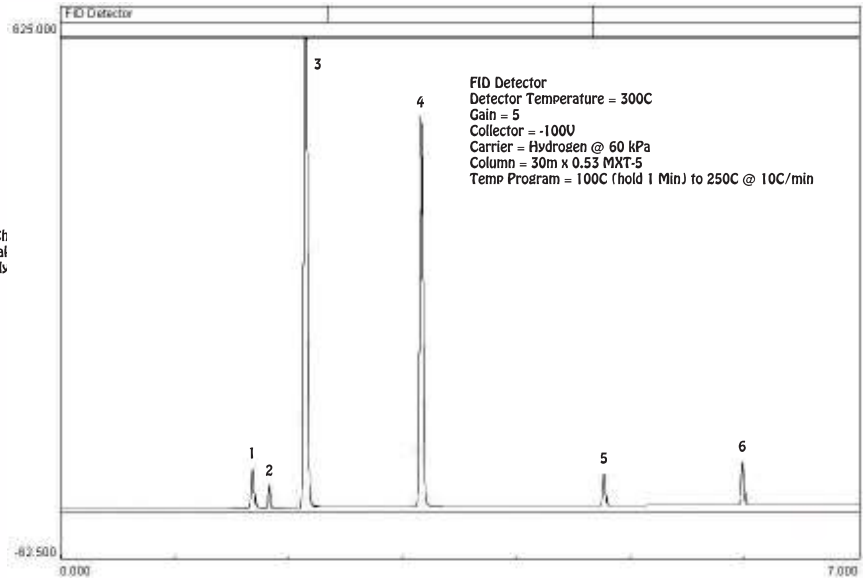
Available Configurations Include:

600-C-039 - Series 600 e-Cigarette GC Analyzer (FID, 30m)
500-C-039 - Companion 1 Portable e-Cigarette GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

e-Cigarette Liquid



Peak	Component
1	Methanol
2	Ethanol
3	Methylene Ch (Solvent Peal
4	Propylene Gly
5	Glycerin
6	Nicotine

8/2016
Specifications may change without notice.

Foods, Flavors, & Fragrances

Cork Taint

DPS Instruments, Inc.

www.dps-instruments.com

You've opened a bottle of wine that should be outstanding, but when you put your nose to the glass, it smells like something rotting in a damp basement. The problem is most likely TCA, which is 2,4,6-Trichloroanisole, a chemical so powerful that even at parts per billion (ppb), it can cause musty aromas and flavors in wines. The compound forms through the interaction of plant phenols, chlorine, and mold and most frequently occurs in natural corks. DPS has configured the Cork Taint GC System to detect this nasty smell in wine. Our sensitive PID detector and ultra-sensitive BCD detector are ideal for identifying TCA and other Chlorinated Phenols in the low (ppb) to high parts per trillion (ppt) levels. We offer Cork Taint GC Systems with both PID and BCD detectors, or just the BCD alone, which is blind to the non-chlorinated compounds in wine. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Cork Taint GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

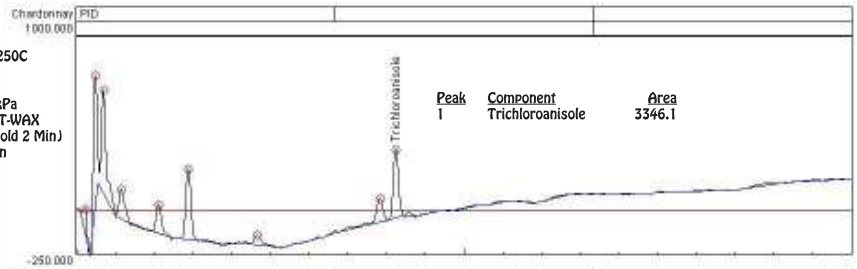
600-C-052 - Series 600 Cork Taint GC Analyzer (PID, BCD, 30m)
500-C2-052 - Companion 2 Portable Cork Taint GC Analyzer (PID, BCD, 30m)
500-C2-053 - Companion 2 Portable Cork Taint GC Analyzer (BCD, 30m)

Series 600 GC

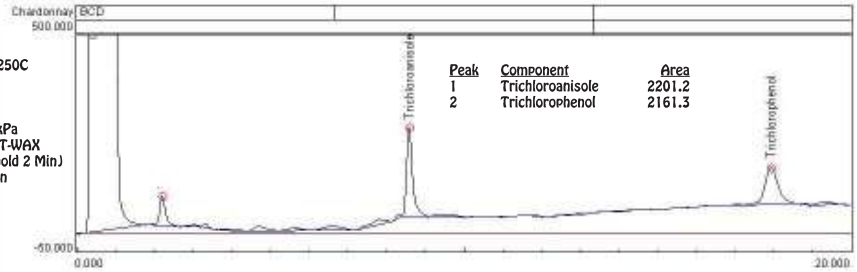
Trichloroanisole (TCA) in Chardonnay - 1 ppb

Companion 2 Portable GC

PID Detector
Detector Temperature = 250C
Gain = 6
Collector = -100V
Carrier = Helium @ 160 kPa
Column = 30m x 0.53 MXT-WAX
Temp Program = 100C (hold 2 Min) to 240C @ 10C/min



BCD Detector
Detector Temperature = 250C
Cell Temperature = 825C
Gain = 2
Collector = -100V
Carrier = Helium @ 160 kPa
Column = 30m x 0.53 MXT-WAX
Temp Program = 100C (hold 2 Min) to 240C @ 10C/min



11/2015
Specifications may change without notice.

Personal Care

Personal Care Fragrances

DPS Instruments, Inc.

www.dps-instruments.com

Eucalyptol, menthol, and camphor can be used in a surprising variety of ways. These aromatic and medicinal plants extracts enhance the flavor of many dishes, but their therapeutic virtues have been known for years. Among the best-known uses are rubbing these compounds on to soothe aching muscles, inhaling them to free up the sinuses, and also as an antiseptics. Consequently, they are found in a variety of creams, ointments, and other personal care products. The DPS Personal Care Fragrances GC Systems are designed to check the purity of the plant extract and verify the concentration of these compounds in the final product. The latest designed high resolution column and the sensitive FID detector does the hard work for you. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Personal Care Fragrances GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

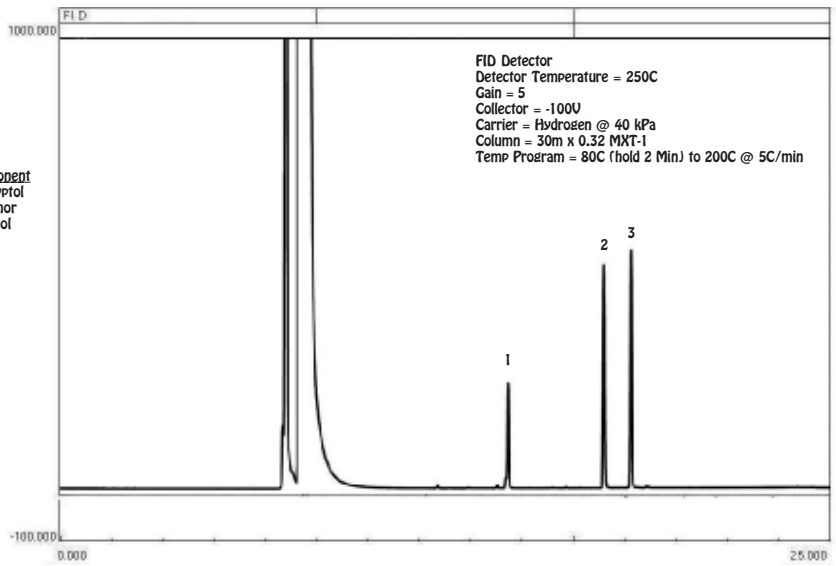
Available Configurations Include:

600-C-080 - Series 600 Personal Care Fragrances GC Analyzer (FID, 30m)
500-C-080 - Companion 1 Portable Personal Care Fragrances GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Personal Care Product Fragrances



11/2015
Specifications may change without notice.

Personal Care

Cleaning Solvents

DPS Instruments, Inc.

www.dps-instruments.com

The average cleaning products industry consumer uses a wide range of products to promote both personal and public heath. Soaps, detergents, deodorants, mouthwashes, rug cleaners, drain openers, and a host of other products make up this multi-billion dollar worldwide industry. These products are designed to improve personal hygiene, reduce levels of bacteria, improve personal appearance, and offer cleaning convenience for the consumer. To help ensure consistent product performance and environmental safety there is an ongoing need to test the solvents contained on both the raw and final products. The DPS Cleaning Solvents GC Systems, equipped with a high resolution column and the sensitive FID detector is a great place to start. The extract or a liquid sample can be directly injected by hand, or a flake, solid, or cream sample can be placed in a headspace vial and automatically heated and injected using our built-in Headspace Concentrator. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Cleaning Solvents GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

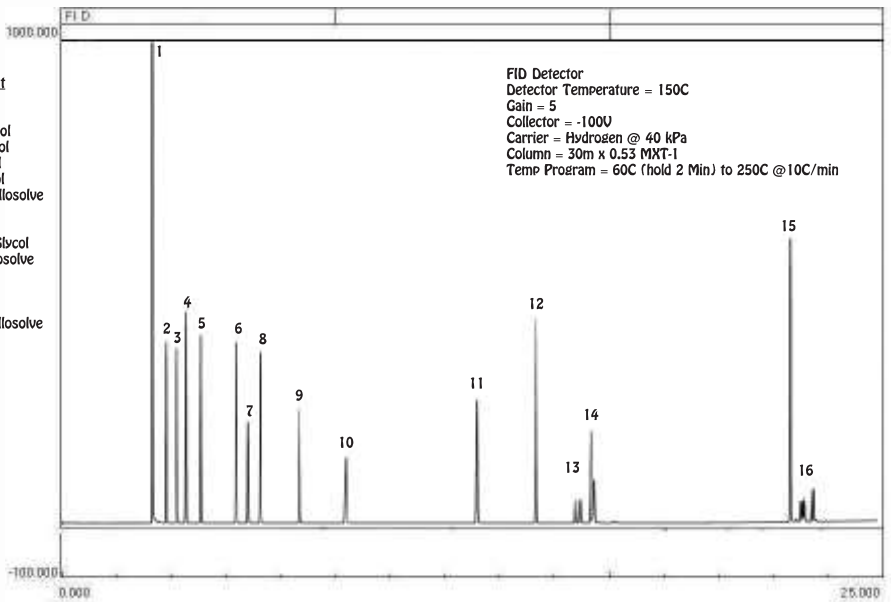
Series 600 GC

Available Configurations Include:

600-C-081 - Series 600 Cleaning Solvents (FID, Headspace, 30m)
500-C-081 - Companion 1 Portable Cleaning Solvents (FID, Headspace, 30m)

Companion 1 Portable GC
(with Headspace Concentrator)

Cleaning Solvents



Peak	Component
1	Methanol
2	Ethanol
3	iso-propanol
4	tert-Butanol
5	n-Propanol
6	iso-Butanol
7	Methyl Cellosolve
8	n-Butanol
9	Cellosolve
10	Ethylene Glycol
11	Butyl Cellosolve
12	Limonene
13	DPGMME
14	DEGEE
15	Phenyl Cellosolve
16	TPGMME

11/2015
Specifications may change without notice.

DPS Instruments, Inc.

Pharmaceuticals

Pharmaceuticals

Antihistamines

DPS Instruments, Inc.

www.dps-instruments.com

Antihistamines are medicines that help stop allergy symptoms such as itchy eyes, sneezing and a runny nose. They work by preventing the effects of a substance called histamine, which is produced by the body in response to an allergic reaction. In some people histamine can also close up air passages of the lungs making breathing difficult. The DPS Antihistamines GC Systems are configured with the latest designed high resolution capillary columns and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Antihistamines GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

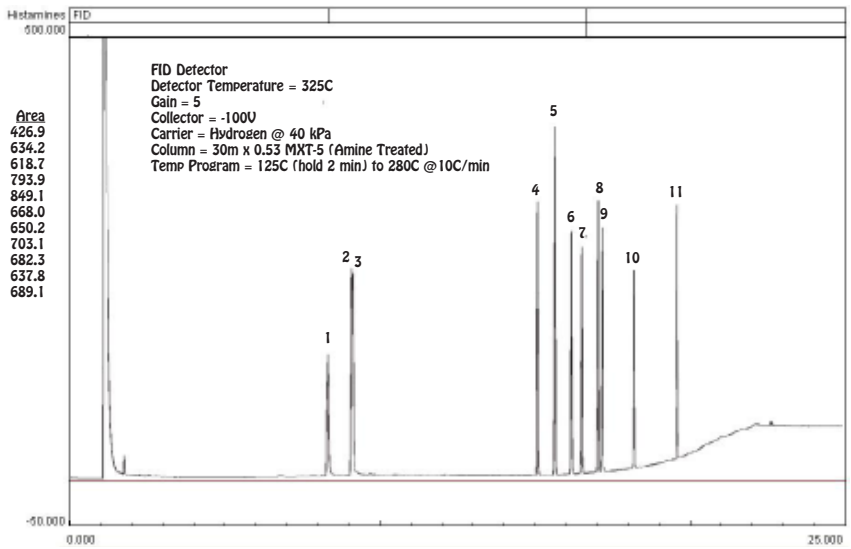
600-C-102 - Series 600 Antihistamines GC Analyzer (FID, 30m)
500-C-102 - Companion 1 Portable Antihistamines GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Antihistime Drugs

Peak	Component	Area
1	Phenylpropanolamine	426.9
2	Ephidrine	634.2
3	Pseudoephidrine	618.7
4	Pheniramine	793.9
5	Diphenhydramine	849.1
6	Doxylamine	668.0
7	Phenyltoloxamine	650.2
8	Methapyrilene	703.1
9	Chlorpheniramine	682.3
10	Brompheniramine	637.8
11	Triprolidine	689.1



11/2015
Specifications may change without notice.

Pharmaceuticals

Cold Medicines

DPS Instruments, Inc.

www.dps-instruments.com

One of the most important pharmaceutical applications is the GC analysis of basic drugs. This broad category encompasses a variety of stimulants, and sedatives, which includes cold medicines. Each of these drugs has rigid specifications placed on the purity of the products formulation, which we as consumers appreciate most when we feel the onset of the common cold. The DPS Cold Medicines GC Systems are designed with safety in mind to check the drug purity throughout the manufacturing process. Each GC System is configured with the latest high resolution capillary column and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Cold Medicines GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

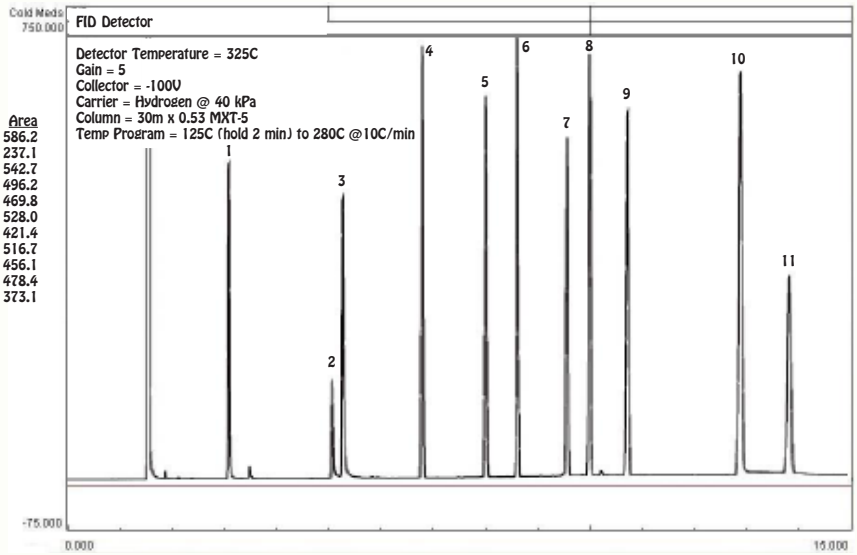
600-C-124 - Series 600 Cold Medicines GC Analyzer (FID, 30m)
500-C-124 - Companion 1 Portable Cold Medicines GC Analyzer (FID, 30m)

Series 600 GC

Cold Medicines

Companion 1 Portable GC

Peak	Component	Area
1	Phenylpropanolamine	586.2
2	Phenylephrine	237.1
3	Guaifensin	542.7
4	Pheniramine	496.2
5	Phenyltoloxamine	469.8
6	Chlorpheniramine	528.0
7	Brompheniramine	421.4
8	Dextromethorphan	516.7
9	Pyrilamine	456.1
10	Codeine	478.4
11	Hydrocodone	373.1



11/2015
Specifications may change without notice.

Pharmaceuticals

Antidepressants

DPS Instruments, Inc.

www.dps-instruments.com

Antidepressants drugs help reduce the extreme sadness, hopelessness, and lack of interest in life that are typical in people with depression. Most antidepressants are believed to work by slowing the removal of certain neurotransmitters, such as serotonin and norepinephrine, from the brain. Neurotransmitters are needed for normal brain function and are involved in the control of mood and in other responses and functions, such as eating, sleep, pain, and thinking. The DPS Antidepressants GC Systems are configured with the latest designed high resolution capillary columns and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Antidepressants GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

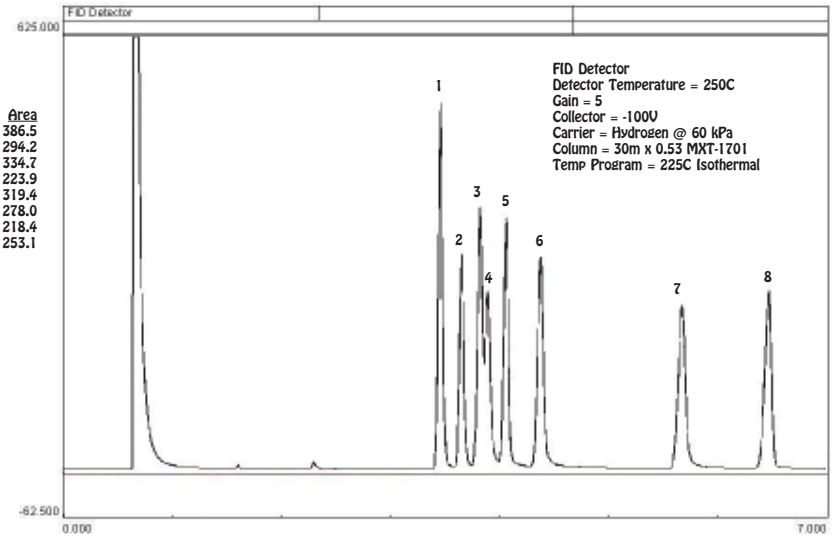
600-C-100 - Series 600 Antidepressants GC Analyzer (FID, 30m)
500-C-100 - Companion 1 Portable Antidepressants GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Antidepressant Drugs

Peak	Component	Area
1	Amitriptyline	386.5
2	Trimipramide	294.2
3	Imipramine	334.7
4	Nortriptyline	223.9
5	Doxepin	319.4
6	Desipramine	278.0
7	Maprotyline	218.4
8	Clomipramine	253.1



11/2015
Specifications may change without notice.

Pharmaceuticals

Antihistamines

DPS Instruments, Inc.

www.dps-instruments.com

Antihistamines are medicines that help stop allergy symptoms such as itchy eyes, sneezing and a runny nose. They work by preventing the effects of a substance called histamine, which is produced by the body in response to an allergic reaction. In some people histamine can also close up air passages of the lungs making breathing difficult. The DPS Antihistamines GC Systems are configured with the latest designed high resolution capillary columns and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Antihistamines GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

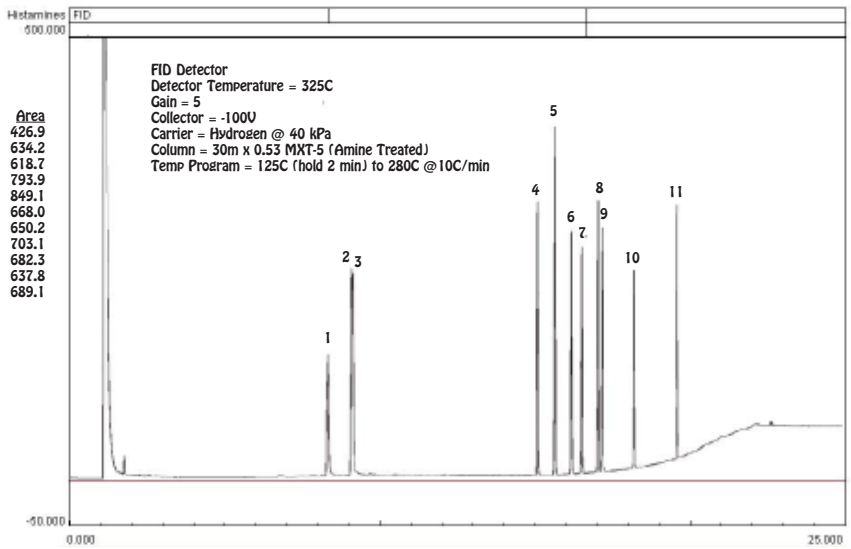
600-C-102 - Series 600 Antihistamines GC Analyzer (FID, 30m)
500-C-102 - Companion 1 Portable Antihistamines GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Antihistime Drugs

Peak	Component	Area
1	Phenylpropanolamine	426.9
2	Ephidrine	634.2
3	Pseudoephidrine	618.7
4	Pheniramine	793.9
5	Diphenhydramine	849.1
6	Doxylamine	668.0
7	Phenyltoloxamine	650.2
8	Methapyrilene	703.1
9	Chlorpheniramine	682.3
10	Brompheniramine	637.8
11	Triprolidine	689.1



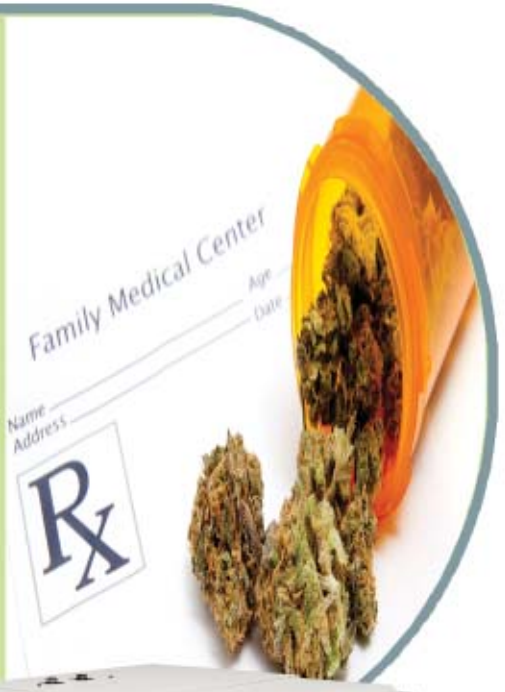
11/2015
Specifications may change without notice.

Pharmaceuticals

DPS Instruments, Inc.

www.dps-instruments.com

Medical cannabis, also referred to as medical marijuana, refers to the use of constituents of cannabis, THC and other cannabinoids, as a physician-recommended form of medicine therapy. The medicinal value of cannabis has several well-documented beneficial effects, such as the amelioration of nausea and vomiting, stimulation of hunger in chemotherapy and AIDS patients, lowered intraocular eye pressure for treating glaucoma, as well as general analgesic pain relieving effects. DPS has configured the Cannabis GC Systems with the sensitive FID detector to identify the major cannabinoids THC, CBD, and CBN as well as identifying and determining Terpene concentrations. For extra product safety we can add our ultra-sensitive BCD Detector to analyze for Pesticide contamination at the same time. The Series 600 GC is for analyses in the lab, or use the Portable Companion 2 GC System for analyses in the growing fields, or at the dispensary. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Cannabis GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

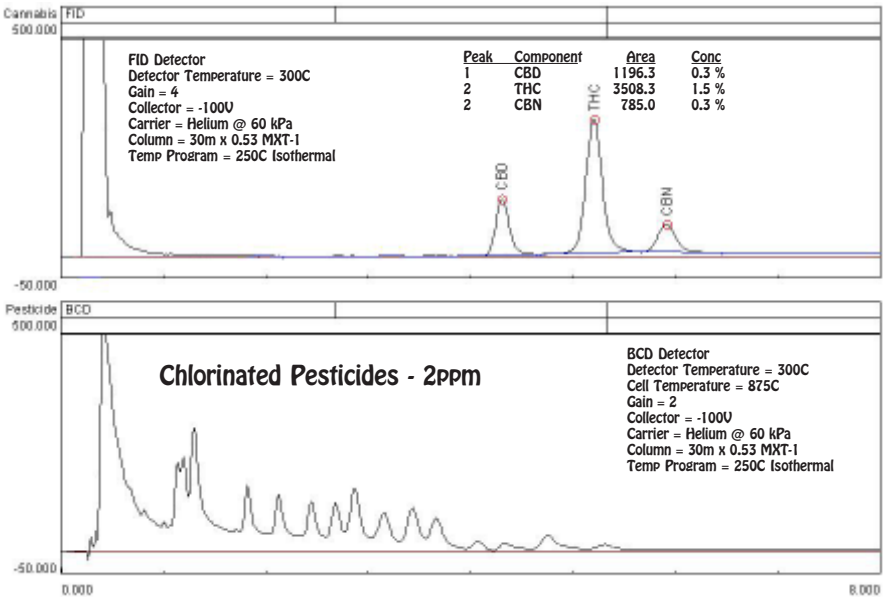


Series 600 GC

Available Configurations Include:

600-C-107 - Series 600 Cannabis GC Analyzer (FID, BCD, 2 x 30m)
500-C2-107 - Companion 2 Portable Cannabis GC Analyzer
(FID, BCD, 2 x 30m)

Cannabinoids & Pesticides



Companion 2 Portable GC

11/2015
Specifications may change without notice.

Pharmaceutical

DPS Instruments, Inc.

www.dps-instruments.com

There is no way around it, residual process solvents are commonly detected in pharmaceutical products. Consequently, many government agencies have made it mandatory to measure the residual solvents for the release testing of all active pharmaceutical ingredients. Analyses are also routinely performed on process intermediates used during the drug synthesis. The help with these regulations the DPS Residual Solvents GC Analyzers use a built-in Headspace Concentrator to fully automate the sampling and analysis and a sensitive FID detector for low level detection of these residual solvents. Liquid samples can also be analyzed in these GC Analyzers by direct injection. The Series 600 GC is for analyses in the lab, or use the Portable Companion 2 GC Systems for analyses right where the samples are taken. The fully integrated Residual Solvents 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:

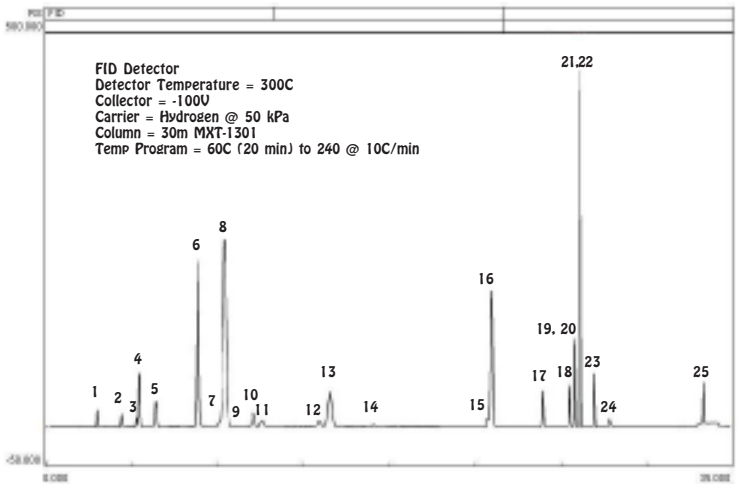
600-C-145 - Series 600 Residual Solvents GC Analyzer (FID, Headspace Concentrator, 30m Column)

500-C2-145 - Companion 2 Portable Residual Solvents GC Analyzer (FID, Headspace Concentrator, 30m Column)

Residual Solvents Analysis

Companion 2 Portable GC
(with Headspace Concentrator)

Peak	Component
1	Methanol
2	1,1-Dichloroethane
3	Acetonitrile
4	Methylene Chloride
5	Hexane
6	cis-1,2,-Dichloroethane
7	Chloroform
8	1,1,1-Trichloroethane
9	Carbon Tetrachloride
10	Benzene
11	1,1-Dichloroethane
12	1,1,2-Trichloroethene
13	Methylcyclohexane
14	1,4-Dioxane
15	Pyridine
16	Toluene
17	2-Hexanone
18	Chlorobenzene
19	DMF
20	Ethylbenzene
21	m-Xylene
22	p-Xylene
23	O-Xylene
24	N,N-Dimethylacetamide
25	1,2,3,4-Tetrahydronaph



04/2019
Specifications may change without notice.

Pharmaceuticals

DPS Instruments, Inc.

www.dps-instruments.com

Steroids, androgenic and anabolic, are a class of synthetic drugs related to male sex hormones. Androgenic steroids are used to increase masculine characteristics when the body produces abnormally low amounts of testosterone, such as delayed puberty, some types of impotence, and body wasting, as in patients with AIDS. Anabolic steroids, on the other hand, are used by athletes to enhance performance and also to improve physical appearance. Abuse of anabolic steroids can lead to serious health problems including, liver tumors, cancer, jaundice, fluid retention, high blood pressure, and increased cholesterol. The DPS Steroids GC Systems are configured with the latest designed high resolution capillary columns and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fully integrated Steroids GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Series 600 GC

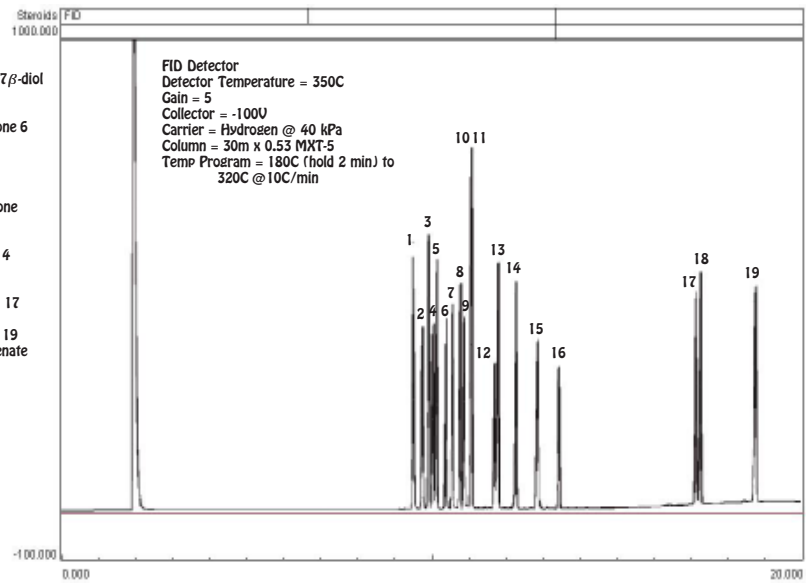
Available Configurations Include:

600-C-106 - Series 600 Steroids GC Analyzer (FID, 30m)
500-C-106 - Companion 1 Portable Steroids GC Analyzer (FID, 30m)

Companion 1 Portable GC

Steroids

Peak	Component
1	5-Androstene-3β,17β-diol 2
	17α-Methyl-5-5androstene-3β,17β-diol
3	5α-Androstan-17β-ol-3-one 4
	19-Nortestosteronel 5
	17α-Methylandrostan-17β-ol-3-one 6
	Mesterolone
7	Testosterone
8	17α-Methyltestosterone 9
	1-Dehydrotestosterone 10
	1-Dehydro-17α-methyltestosterone
11	Bolasterone 12
	Oxymethalone 13
	19-Nortestosterone-17-acetate 14
	Testosterone Propionate 15
	Fluoxymesterone 16
	4-Chlorotestosterone-17-acetate 17
	Testosterone-17β-cypionate 18
	1-Dehydotestosterone Benzoate 19
	1-Dehydrotestosterone Undecylenate



11/2015
Specifications may change without notice.

Pharmaceuticals

DPS Instruments, Inc.

www.dps-instruments.com

Barbiturates are sedatives which depress or slow down the body's functions. Often these drugs are referred to as tranquilizers and sleeping pills, or sometimes just as sedatives. Their effects range from calming down anxious people to promoting sleep. Both tranquilizers and sleeping pills can have either effect, depending on how much is taken. At high doses or when they are abused, many of these drugs can even cause unconsciousness and death. The DPS Barbiturates GC Systems are configured with the latest designed high resolution capillary columns and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Barbiturates GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

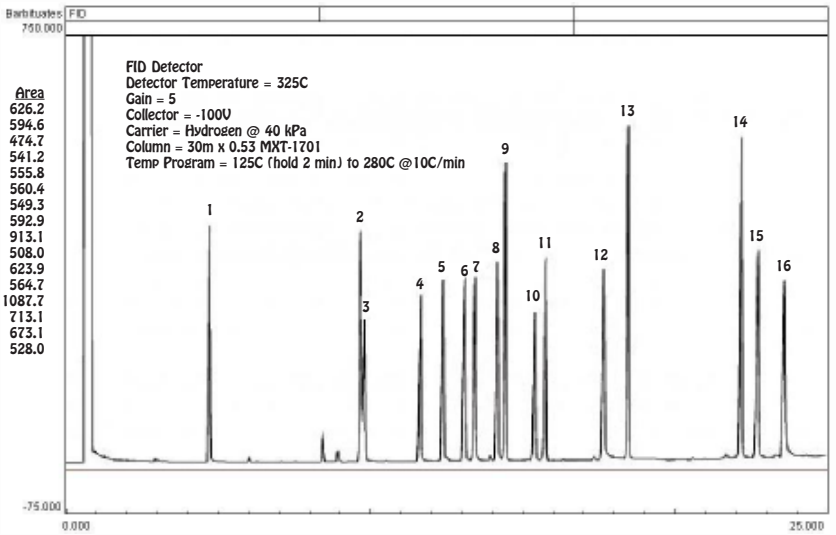
600-C-103 - Series 600 Barbituates GC Analyzer (FID, 30m)
500-C-103 - Companion 1 Portable Barbituates GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Barbiturate Drugs

Peak	Component	Area
1	Ethosuximide	626.2
2	Barbital	594.6
3	Methyprylon	474.7
4	Aprobarbital	541.2
5	Butalbital	555.8
6	Amobarbital	560.4
7	Pentobarbital	549.3
8	Secobarbital	592.9
9	Glutethimide	913.1
10	Meprobamate	508.0
11	Carisoprodal	623.9
12	Phenobarbital	564.7
13	Methaqualone	1087.7
14	Carbamazepine	713.1
15	Primidone	673.1
16	Diphenylhydantoin	528.0



11/2015
Specifications may change without notice.

Pharmaceuticals

Antiepileptics

DPS Instruments, Inc.

www.dps-instruments.com

Antiepileptics are anticonvulsants that belong to a diverse group of pharmaceuticals used to prevent seizures. The goal is to suppress the rapid and excessive firing of neurons that start a seizure. If the seizure can not be prevented, then a good anticonvulsant will limit the spread of the seizure within the brain and offer protection against possible brain damage. The DPS Antiepileptics GC Systems are configured with the latest designed high resolution capillary columns and the sensitive FID detector to quickly detect these compounds. The Series 600 GC is for analyses in the lab, or use the Portable Companion 1 GC Systems for analyses right where the samples are taken. The fast heating and rapid cooling column oven in every DPS GC vastly increases your sample throughput. The fully integrated Antiepileptics GC Analyzer Systems are small and lightweight and all DPS systems are modular for expandability, upgrades, and easy service.

Available Configurations Include:

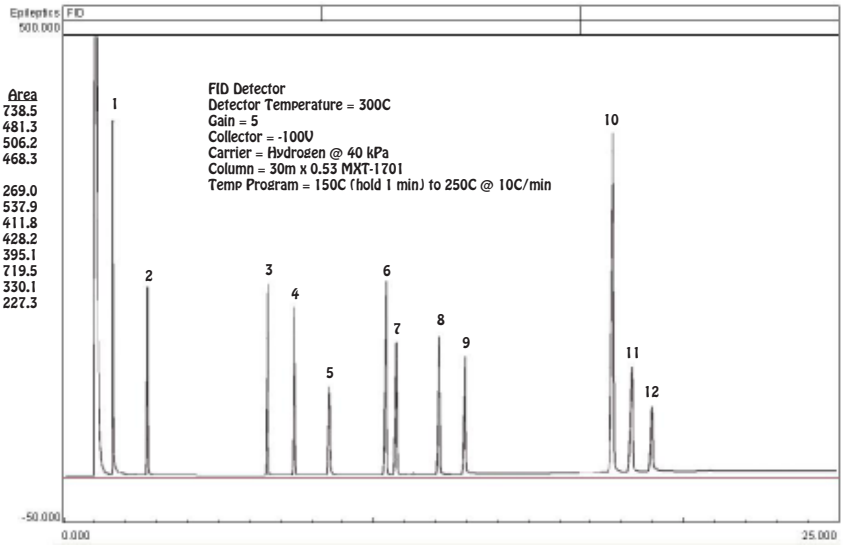
600-C-101 - Series 600 Antiepileptics GC Analyzer (FID, 30m)
500-C-101 - Companion 1 Portable Antiepileptics GC Analyzer (FID, 30m)

Series 600 GC

Companion 1 Portable GC

Antiepileptic Drugs

Peak	Component	Area
1	Valproic Acid	738.5
2	Ethosuximide	481.3
3	Methsuximide	506.2
4	Phensuximide	468.3
5	Desmethyl Methsuximide	269.0
6	Mephenytoin	537.9
7	Ethotoin	411.8
8	PEMA	428.2
9	Phenobarbitoal	395.1
10	Primidone	719.5
11	Carbamazepine	330.1
12	Diphenylhydantoin	227.3

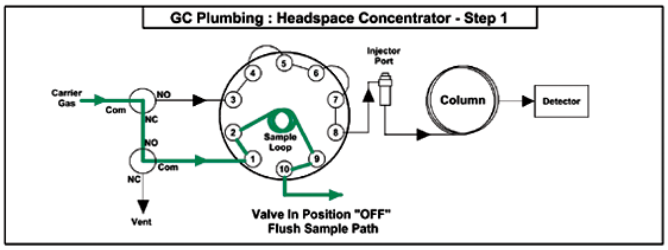


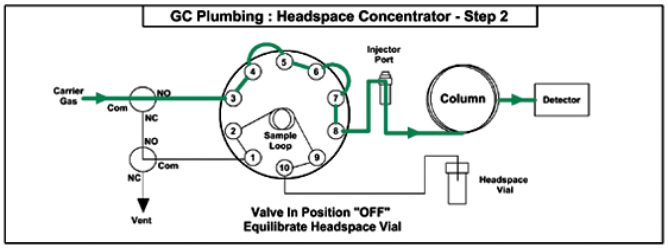
DPS Companion 2 Residual Solvents Layout

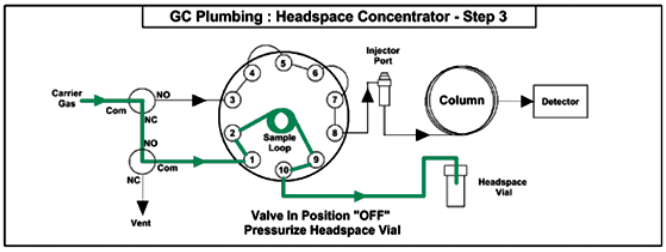
Plumbing Diagram

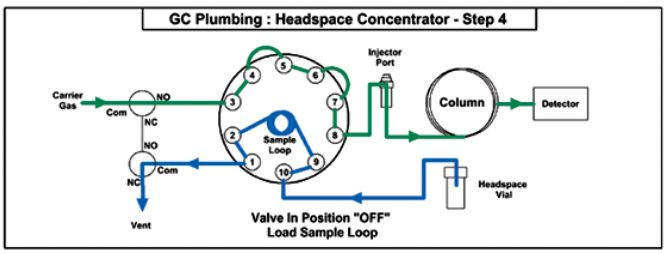
Headspace Concentrator - The Headspace Concentrator for Series 600's and Companion GC's are built right in to provide the shortest possible sample path. The Sample Vial is heated and then consistently Pressurized before loading the Sample Loop. A fixed Sample Loop ensures reproducible sampling and the sample lines are Flushed between analyses to limit any cross over contamination. The entire sequence of the Headspace Concentrator is automated through the Timeline sequence of the DPS GC Control Software for the analysis of one sample at a time, while two other samples are heated and allowed to equilibrate.

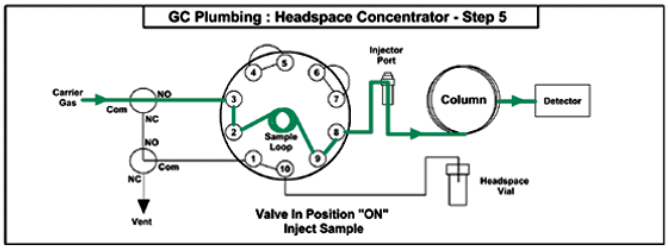
Plumbing Diagram - In the 1st Step the carrier gas is diverted to Flush out the Sample Lines between runs. During the 2nd Step the carrier gas flows to the analytical column and the Headspace Vial is heated with the Vial Heater and allowed to equilibrate. The Sample Probe is then inserted into the Headspace Vial. During the 3rd Step the Headspace Vial is pressurized for a few seconds. In the 4th Step the sample is loaded onto the Sample Loop by releasing the pressure in the headspace vial. In the 5th Step the Sample Valve is rotated to the ON position and the carrier gas sweeps the components from the Sample Loop onto the analytical column.











Headspace Plumbing Diagram

Results, Data & Conncetivity

Results: In this Headspace plumbing configuration the sample is placed inside a vial and then heated. The sample can be raw materials, tablets, pellets, or packaging material. The detector will respond with the same peak areas for the same concentration no matter which source the sample comes from.

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.

GC Control Software

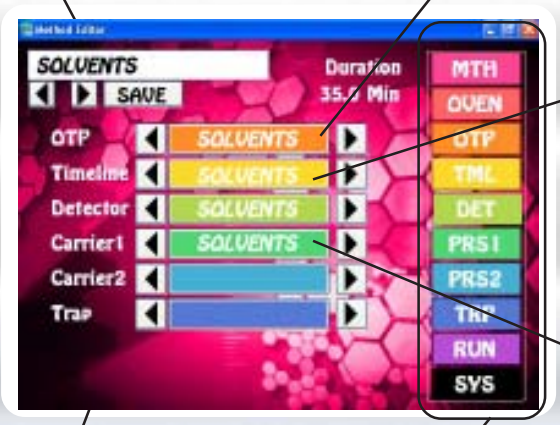
Easy to learn and master using a Graphical User Interface (GUI) and Color Touch Screen.

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

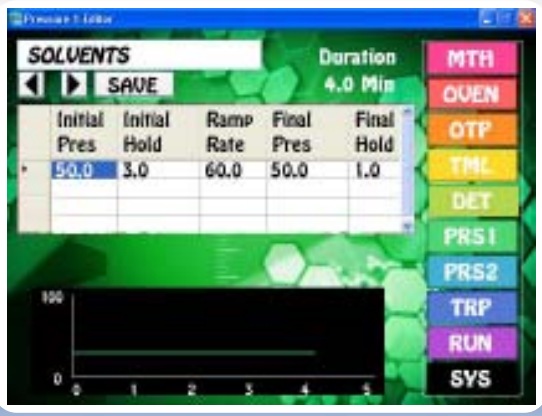
Oven Temp Program Editor

Timeline Editor

Method Name



File Selection Arrows



Carrier Pressure 1 Editor

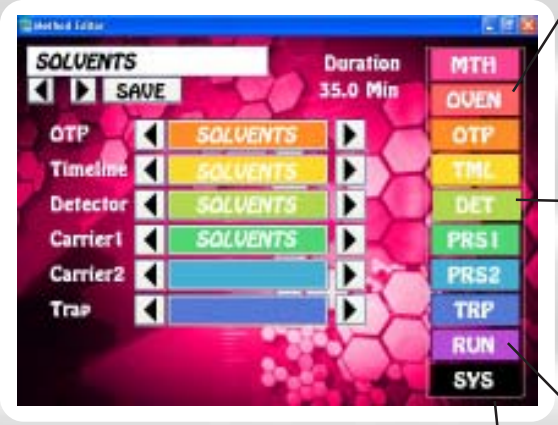
Navigation Buttons to Quickly jump from one screen to another. Most pages are one button away!

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.

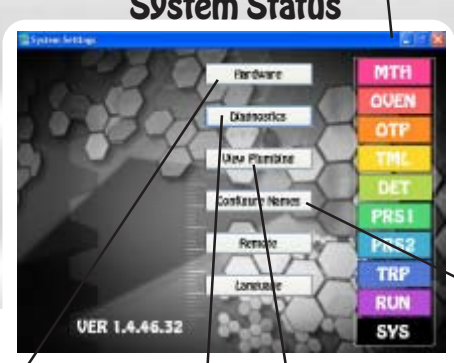
Oven Status

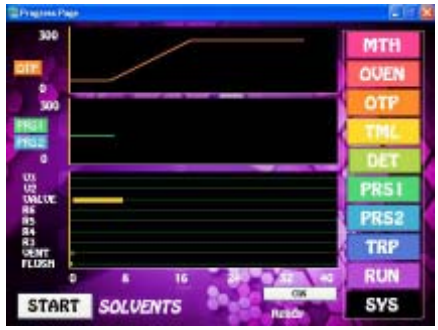


Method Editor

Detector Status

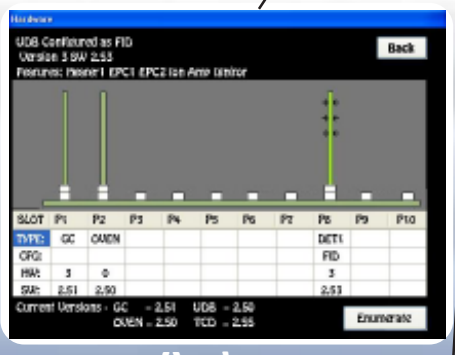
System Status



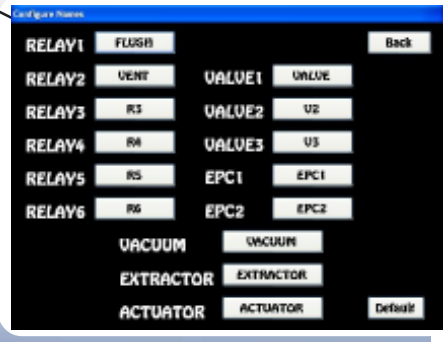


Run Status

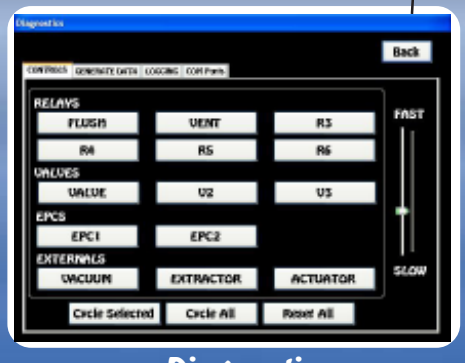
System status pages display the health and viability of the GC instrument.



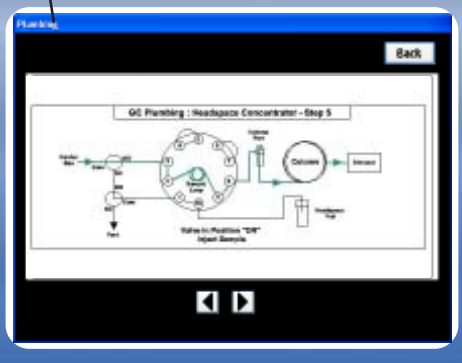
Hardware



Configure Names



Diagnostics



Plumbing

Residual Solvents 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:
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:
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
- 14 amps at 48 Vdc total power consumption

Built-In Accessories:
- Sample Valve - Electronically Actuated
- Heated Valve Oven
- Headspace Concentrator
- Flow Control Solenoids

Injector:
- Heated On-column Injector
- 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!"

DPS Instruments, Inc.