

Buck Scientific, Inc.

910/310 Gas Chromatographs

The Buck 910/310 Gas Chromatographs

In the lab, the 910-series GCs perform routine industrial analyses and complicated research separations easily, generating accurate and reproducible results. Designed to be durable and portable, the compact 310-series is ideal for operation in the field, E.P.A. and A.S.T.M. methods can be easily performed on-site, even in adverse field environments. Use the 910 & 310 and obtain quality results.

A GC with the versatility to meet your lab's specific needs -

The unique architecture of the Buck GC systems allow various detector and injector combinations, so each GC can be configured to meet your specific lab requirements. The full-size 910-GC can accommodate multiple injectors and detectors for multi-functional applications, while the smaller 310-GC is equally flexible for portable and field analysis.

Automated Analyses... let the GC do the work so you don't have to -

The Buck 910/310 offer total control of application parameters using PeakSimple software. PeakSimple allows unlimited temperature programming, electronic pressure control, carrier gas pressure, gas valve position, gas solenoid actuation, autosampler control and other options. Just program your application parameters into the computer and let the 910 do the rest.



Features:

- Optional dual column ovens for multi-dimensional chromatography
- Programmed oven temperatures from 50°C/min up to 300°C and 20°C/min from 300°C to 450°C
- PeakSimple Software for Windows with built-in 4 channel serial data system
- Fast cool oven from 400°C to 50°C in less than 5 minutes for increased sample throughput
- Built-in valve systems for the flexibility and precision to handle various applications
- Electronic pressure controls (EPC) maintains flat baselines over full temperature range, with highly stable retention times
- Performs research quality analyses under rigorous lab or field conditions
- Over 12 different detector options to choose from for optimal measurement results

Detectors

There are **Nine (9)** specific detectors available for the **Buck 910- and 310-series GC systems**. The larger **910-GC** can accommodate up to **FOUR (4)** of these assorted detectors, either in series (from non-destructive to destructive) or in parallel (using a split stream), although there are a few limited combinations that are not feasible because of space conflicts. Detector types are selected by the User, depending on the application. All detectors must be factory installed.

Detectors

1) TCD (Thermal Conductivity Detector) A “universal” detector able to measure almost ALL molecules; inorganic and permanent gases as well as organic vapors. Operates below 275°C, and gives a typical DL of ~250PPM, with linearity to ~100% for most species. A good nondestructive detector for general Organic and Analytical testing, it is also used for Combustion Gas and Stack Gas testing, Atmospheric monitoring, and bulk measurements. Helium is the recommended carrier.

2) FID (Flame Ionization Detector) Commonly used for Organic analyses, it is specific for Hydrocarbon species with a working range from ~10PPM to 10% for C1-C10 compounds. It has a high temperature range, over 400°C, and can be interfaced with add-on detectors for selective-species measurements. Solvent and material characterization, environmental samples, TPH and petroleum analyses are primary applications. Air & Hydrogen are support gases, using Helium for a carrier gas.

3) DELCD (Dry Electro-Lytic Conductivity Detector) This detector, with FID, is ideal for environmental applications where Halogenated Hydrocarbons and Pesticides can be easily differentiated from Solvent matrix backgrounds. Cleaner and more linear response of DELCD compared to ECD still gives sensitivities in the 10PPB range; and meets most EPA specifications for the 600- and 8000-series methods. Works best using Helium for a carrier, with Air & Hydrogen as supplemental gases.

4) HID (Helium Ionization Detector) Provides “universal” detection; and is non-destructive, similar to TCD; for gaseous species with an Ionization Potential below that of Helium. Less expensive than similar detectors; it provides DLs of ~1-10PPM for most gases. Suited for special tests; such as Transformer Oil Gases, Road Bed Emissions and other non-Organic vapor measurement. High-quality Helium is required as Carrier.

5) NPD (Nitrogen Phosphorus Detector) Designed for Agricultural and Drug testing, this modified Thermionic Bead Detector responds to Nitrogen-bearing compounds to concentrations of ~100PPB or lower; with Phosphorus-containing materials detectable at ~500PPB. As part of an FID assembly, it needs the Air-Hydrogen jet to burn the eluting “peak” with a Helium carrier.

6) ECD (Electron Capture Detector) Originally designed for single PPB level detection of Chlorinated organic compounds, it requires a special carrier gas of Argon-Methane and low-bleed columns for optimal results Still the most sensitive detector available for the environmental monitoring of Halocarbons and Pesticides, with 1-5PPB detection limits. Usually run independent of other detectors.

7) PID (Photo-Ionization Detector) A high-intensity “UV” source, the 10.6eV Krypton Lamp generates powerful energy to “excite” UNSATURATED organic; such as Aromatics, Olefins, Ketones and Esters. The low 10-50PPB DLs for the Aromatic compounds make it ideal for environmental testing for BTEX, PAH and PNA species. Non-destructive measurements make it ideal for use with an FID/combo detector.

8) FPD (Flame Photometric Detector) Employs either a single- or double-phototube detector that “sees” the light from burning Sulfur or / and Phosphorus compounds. Crucial for Stack and Combustion Gas testing, Natural Gas, refined Hydrocarbons and even Pesticide materials. Superior detection limits in the 1-10PPB range are achieved with advance electronics and proprietary optical designs. Uses a rich Hydrogen flame, often used in conjunction with FID and with a Helium carrier gas.

9) CCD (Catalytic Combustion Detector) A unique and economical alternative to the FID for the detection of hydrocarbon compounds has a typical detection limit of about 500 ppm when run with a helium carrier. The CCD can also run at lower temperatures (<200°) when run on air to make a truly self contained GC.

Note: Many of these detectors can be, and often should be combined to maximize the usefulness of the Buck GC. Packages such as FID-DELCD, TCD-FID, PID-FID- DELCD, NPD-DELCD, FID-FPD. Call for specific application help on your application.

Several injection options are available for the Buck 910/310.

Injector types and configurations are selected by the user depending on the particular measurement application, detection limit required and regulatory specifications. All injectors require factory installation.

On-Column Injector

The On-Column injector is supplied standard on all 910/310 GCs. This mode of injection introduces the sample directly into the bore of the column, avoiding the possibility of boiling point discrimination or other uncertainties. A heated injector upgrade is available.

Heated Split/Splitless

The Heated Split/Splitless injector permits the use of narrow-bore capillary columns when needed. The injector temperature is adjustable from ambient to 300°C and the split flow is adjustable by means of a precision needle valve. This feature can be turned on/off by using a timed event from the PeakSimple software.

10 Port Gas Sampling Valve & Heated Valve Oven

The 10 Port Gas Sampling valve can be plumbed in many ways to perform a variety of analytical tasks, providing additional flexibility to the 910. Because the valve oven is immediately next to the column oven, tubing runs are short with no cold spots, which results in sharper peaks. Buck offers many plumbing configurations for optimized gas analyses. The heated valve oven consists of an insulated aluminum box mounted immediately next to the column oven. This means very little tubing is needed for connections which results in sharper peaks. The valve oven can accommodate 2 electrically operated plus one manually operated valve and can be thermostatted from ambient to 175°C. A heated oven is highly recommended for gas sampling valve mounting and is required for several other options

42 Vial Liquid And 20 Vial Internal AutoSampler

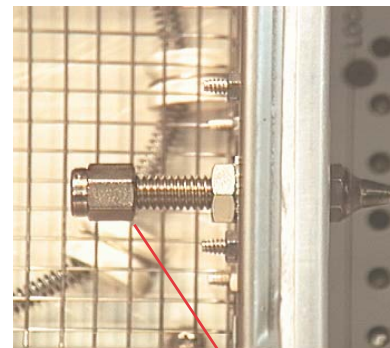
The autosampler uses readily available 2ml vials with crimp or screw tops. The autosampler flushes its syringe with the sample itself, so each vial must be filled with at least 1ml of sample. The PeakSimple data system tells the autosampler to flush the syringe, inject the sample and then advance the tray to the next vial position. The autosampler can be used with the on-column, heated, or split/splitless injectors. The 42 vial external Autosampler requires nitrogen, air or helium at 60 psi to actuate the moving parts. The internal 20 vial Autosampler is electronically actuated and is run from peaksimple sample queue. The injection volume is adjustable from 0-3 µl.

Heated Static Headspace Injector

The Heated Static Headspace Injector is useful for the analysis of volatiles, especially where the sample matrix is dirty. A standard 40ml VOA vial is inserted into a thermostatted sleeve, where two needles puncture the septum top of the vial. Purge gas enters through one needle to pressurize the vial and the other needle carries the headspace vapors to the loop of the gas sampling valve or trap.

EPA Method 5030/5035 Compliant Purge & Trap

The 5030 as well as the 5035 Compliant Purge & Trap concentrate the volatile organic compounds (VOCs) in a gas, water, or soil sample onto two adsorbent traps from which they are automatically desorbed into the GC column. The 5035 Purge & Trap is equipped with an adjustable temperature thermostatted sleeve that accommodates a standard 40ml VOA vial containing the water or soil/water sample. The entire sleeve is mechanically agitated during purging to comply with the requirements of EPA Method 5035.



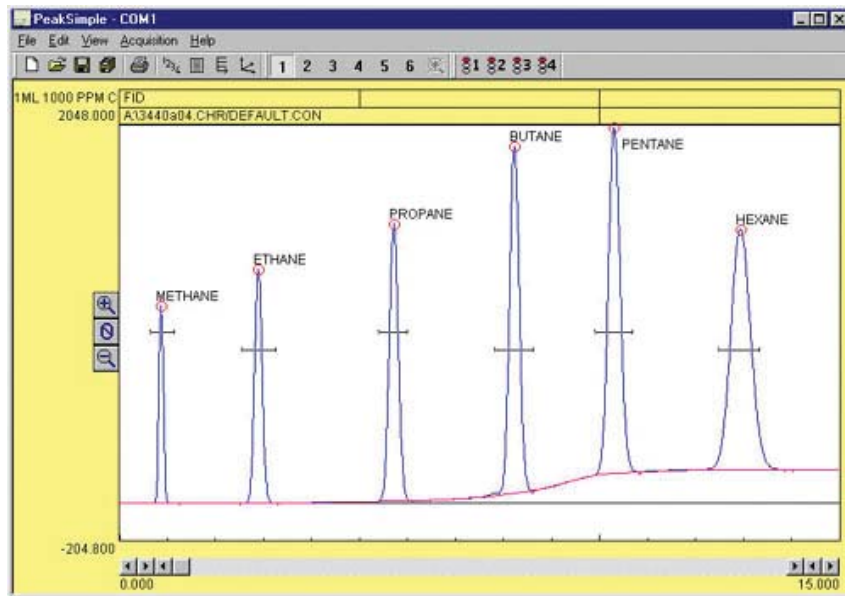
On-Column injector shown here



PeakSimple chromatography software combines quick learning, ease of use and convenient powerful features for GC and HPLC. PeakSimple is included in the price of every Buck Gas Chromatograph and Data System. PeakSimple's intuitive graphical functions and features are user-friendly, so most operators can produce results almost immediately and without specific training. Yet PeakSimple is packed with state-of-the-art features like draggable retention time windows, seldom found in other software packages costing much more.

PeakSimple has the ability to be used with a small portable notebook or a full-sized computer to control instrument functions and process data. This feature is highly desirable for field applications. There is no additional hardware or interfaces required.

PeakSimple even includes built-in data validation, an extra cost on other data systems. This option allows you to replay and load a stored chromatogram, to determine the reproducibility and precision of the entire system. PeakSimple also includes baseline subtraction, chromatogram overlays, DDE links, peak alarms, report generation, multi-level calibrations, autosampler queue, batch reprocessing and many other convenient features. PeakSimple data stations are available in 1, 4, and 6 channel systems and now with USB data connection.



Features Include:

- **Manually Re-integrate Chromatograms**
 - Allows the user to refine the integration method applied to any peak
- **Click and Drag Retention Windows**
 - Retention windows brackets are visible on-screen and may be dragged and modified.
- **Print Chromatograms in Color**
 - Print multiple color chromatograms per page for easy detector to detector comparisons
- **Autosampler Queue and Batch Processing**
 - Create customized autosampler sequences for any application
- **Zoom in on a Specific Area of Data**
 - Zoom to a particular channel or zoom to an expanded view for close examination of small peaks
- **Temperature Programming**
 - Program one or two GC column ovens from ambient to 450°C with unlimited ramps and holds
- **Overlay Chromatograms**
 - Overlay the data in any channel onto any other channel for retention time comparison or multi-detector correlation
- **Baseline Subtraction**
 - Useful to compensate for baseline drift due to blank contamination, column bleed, and temperature ramping
- **Multi-level Calibration Curves**
 - Calibrate peaks using single or averaged data at up to seven concentration levels
- **Manual/Automatic External Event Control**
 - Perform timed integration events and control external contact closure relays
- **EPC and HPLC Gradient Programming**
 - Program carrier gas pressure with unlimited ramps and holds on GC's and form binary HPLC gradients
- **Dynamic Data Exchange (DDE)**
 - Link PeakSimple results to your DDE compatible spreadsheet or word processor

Vacuum Pump Interface

This interface will allow control of an external vacuum pump by turning the power on and off on a built-in power outlet. Typically a vacuum pump is used to draw gaseous samples through the traps for ambient air monitoring applications or to load the loop of a gas sampling valve by pulling sample gas from a remote location. Because the vacuum pump can be turned on for a precise length of time, the gas flow through the trap is very reproducible and will vary with pump rate.

Packed and Capillary Columns

Buck can supply and install most types of columns. The metal megabore capillary columns are preferred because they are durable, can be coiled to a smaller diameter, yet cost and work the same as fused silica columns, which tend to break. For some applications (gases, freons, water, etc.) 1/8" packed columns are preferred. However, since every application is unique, consult a column manufacturer (Restek, Supelco, etc.) before selecting a column to purchase with your GC.



Methanizer Accessory

The methanizer accessory is a high efficiency catalyst which is mounted inside the FID and thermostatted to 380°C. The tube is packed with a special nickel catalyst powder where CO and CO₂ are converted to methane for detection by FID down to 1ppm. This methanize design must be configured with a FID detector.

Built-in Air Compressor And Hydrogen Generator

The built-in "whisper quiet" air compressor is mounted inside the chassis of the 910 GC where it provides a nearly silent supply of air for the FID or FID/DELCD detector flame. With the built-in air compressor, no air cylinder is required, simplifying field operations and saving the expense of replacing air cylinders on a regular basis. The hydrogen generator can run an FID detector for days on a single filling of water, saving even more money and space.

Gas Line Installation Kit

The Gas line installation kit includes everything you need to connect a single gas cylinder to the 910 GC. Each kit contains:

- Cylinder pressure regulator (0-100 PSI output)
- 50' length of 1/8" copper tubing
- Stainless steel gas line filter
- Handy tubing cutter
- Extra Swagelok nuts and ferrules

Note- Each type of gas cylinder has a different type of CGA connection to the regulator. Air is typically CGA 590 or 346, Helium and Nitrogen are CGA 580, while Hydrogen and Argon-Methane are CGA 350. Please specify CGA type.



GC Maintenance Kit

The GC maintenance kit includes most parts which could fail and is designed especially for our export customers who may have difficulty returning the GC to the factory for service.

Pre-Configured Systems

Buck offers an assortment of popular pre-configured systems for specific applications:

Educational GC TCD	Multiple Gas GC	PCB Analyzer
Multiple Gas GC w/ Sulphur	BTEX GC	Environmental GC
TO-14 Indoor Air GC	Gas-less Educational GC	Educational GC FID

910/310 Gas



Chromatographs

Specifications

Oven Size:	7 1/2" x 8" x 3"
Temperature:	Ambient to 450°C Accuracy: $\pm 0.1^\circ\text{C}$, to 400°C
Temperature Programming:	Column oven temperature is controlled by PeakSimple. Unlimited ramps & steps.
Temperature/Pressure:	Multifunctional LCD display indicates set and actual temperature for heated zones, detector voltages and currents. Temperature displays to 0.1° , pressure to 0.1 psi.
Carrier Gas Flow Control:	High precision pressure regulator w/ thermostatted flow controller, calibrated in PSI, regulating gas flow through the column.
Weight:	40 to 70 lbs. (18-32 kilos) depending on optional equipment.
Dimensions:	18"W x 14"D x 13"H 45.7 x 35.5 x 33.0 cm
Power requirements:	110 VAC/60Hz or 220VAC/50Hz Consumption approx. 750 Watts May be operated with 12VDC for isothermal operation.
Warranty:	One Year Parts and Labor.



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