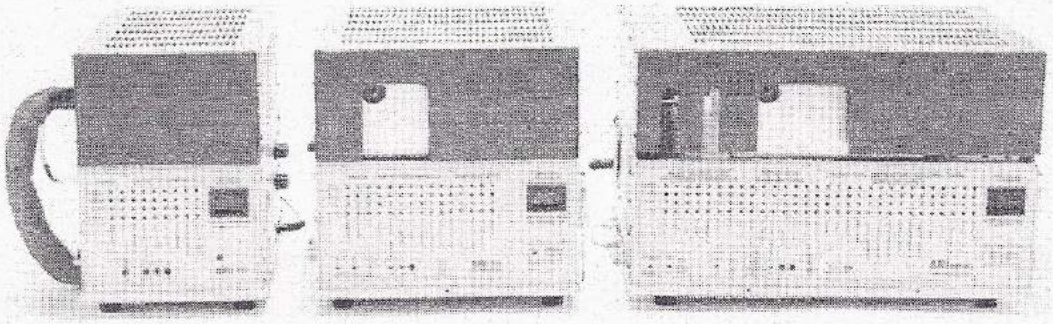
SRI Instruments
Operation Manual and Reference Guide



Model 110 Standalone Detector Chassis

Model 310 Ultra-compact GC

Model 8610C Compact GC

SRI Instruments
20720 Earl St.
Torrance CA 90503

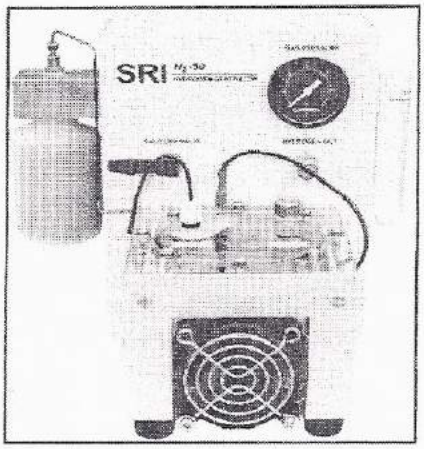
Phone: 310-214-5092
Fax: 5097

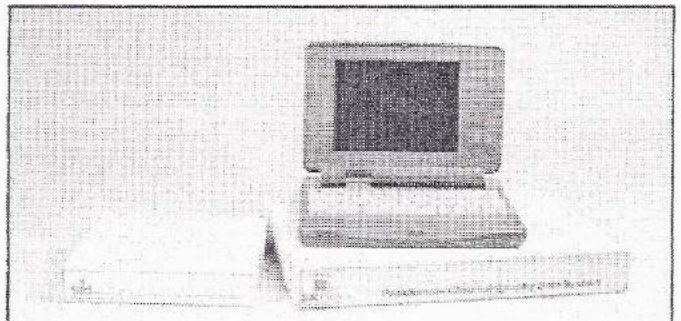
Web: http://www.srigc.com

E-mail: sales@srigc.com

January 2005

Model H2-50 Stand-alone Hydrogen Generator





Model 203 Single Channel Data System

Model 202 Four Channel Chromatography Data System

UNITS OF PRESSURE EQUIVALENCE (EQUAL TO 1 PSI)

1 psi = 2.036 in. Hg (inches of mercury)

= 27.68 in. w.c. (inches of water column)

= 51.715 mmHg or torr

= 0.068947 bar

= 0.06804 atm (atmospheres)

= 6.8947 kilopascals or KPa

= 0.0703 kg/cm^2

= 2.307 ft. H_20

WARRANTY AND WARNINGS

WARRANTY:

SRI will repair or replace any defective parts within two years from the date of shipment. Consummable items such as lamps, heaters, septa, NPD beads, ECD detector cell, DELCD heaters, FPD photomultiplier tubes, traps, filters, TCD filaments, columns, syringes, etc. are excluded. Replacement or repair shall be the purchaser's only remedy, and in no case shall SRI's liability exceed the original purchase price. The equipment is purchased without any other warranty expressed or implied, including, without limitation, any warranty of merchantability, any warranty arising from a course of dealing, performance of usage of trade and/or any warranty that the equipment is fit for any particular purpose or trade. The purchaser agrees to assume all risks of defects relating to the design, construction, purchase, operation, condition, maintenance, possession and use of the equipment, and to release SRI, to the maximum extent allowed by law, from any and all liabilities, claims or demands of any nature, including without limitation any claims based on incidental or consequential damages (forseeable or not), lost earnings, negligence (active or passive), strict liabitlity, breach of agreement or misconduct. The purchaser is aware of and waives the provisions of California Civil Code Section 1542, ("A general release does not extend to claims which the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him must have materially affected his settlement with the debtor"), and/or all other laws, local, state, federal, or international, of similar intent, scope or purpose, relating to the release of unknown or unexpected claims. It is expressly agreed that the possibility of such unknown or undiscovered claims exist and has been explicitly taken into account in determining the equipment's purchase price and that consideration has been adjusted, having been bargained for in full knowledge of the possibility of such unknown claims. In the event the equipment is sold, loaned, or otherwise transferred, purchaser agrees to bind the third party to the terms of this agreement as a condition of transfer. Purchaser is aware of the dangers, and hazards inherent in operating chromatographs and data systems including but not limited to the warnings listed below. No agent, representative, distributor or employee of SRI has authority to amend this warranty in any way. In the event that any term or provision of this warranty is subject to valid claim of unenforceability, such term or provision shall be narrowly construed, the remaining provisions shall nevertheless survive, granting SRI the greatest possible protection then available under law.

WARNINGS AND HAZARDS:

Purchaser is aware of and accepts complete responsibility for operation of the equipment knowing that:

1) Flammable gases such as hydrogen and argon/methane are required for operation of some detectors, and adaquate precautions must be taken by the user to install safe and leak-free gas line tubing with flow snubbers, quick shutoff valves, etc. in accordance with all local fire department regulations. Flammable gases should not be used as carrier gas.

2) High temperatures may burn the operator. Safety gloves should be worn, and all surfaces touched only after making sure they are not hot.

3) High voltages on the PID lamp or FPD Photo-multiplier tube may shock the operator. Be sure the power is off before touching these parts.

4) Radioactive material is present inside the ECD detecter. It is the user's responsibility to comply with all regulations and safety precautions, and to dispose of the detecter in the manner prescribed by regulatory agencies. ECD detectors are transferred directly from Valco Inc.,Houston Texas, to the purchaser, and all licenses, details of operation, warranty, disposal, etc. are solely the responsibility of Valco and the purchaser.

5) Toxic, hazardous, or poisonous solvents such as N-Propanol are required for operation of the ELCD detecter. Other detectors may release or form toxic compounds, requiring operation under a fume hood or use of a respirator. Standards or samples required to calibrate the GC may be toxic, hazardous, or flammable.

6) Eye damaging ultra-violet light is emited by the PID lamp. Eye protection should be worn at all times when operating the GC.

7) Both qualitive and quantitive results from GC/Data System are subject to many sources of error. The magnitude of the error is variable, and must be statistically evaluated and controlled by the operator. Responsibility for the accuracy of the results obtained is solely the operator's. SRI makes no claims regarding the accuracy, bias, or precision of the results.

8) All SRI equipment is intended for operation by trained laboratory personnel only. It is the purchaser's responsibility to limit access so that only qualified laboratory technicians may operate the equipment and to ensure that they are provided with all neccesary safety apparatus, training, and procedures to minimize injury and/or damage in the event of an accident or malfunction (forseeable or not)

9) Errors and/or "bugs" may exist in integration software.

OPERATING THIS EQUIPMENT SHALL CONSTITUTE ACCEPTANCE OF ALL TERMS AND PROVISIONS ABOVE.

PLEASE READ!!!

ATTENTION !
AVOID THESE COMMON ERRORS

1. In general, SRI Instruments does not recommend using nitrogen as a carrier gas. If nitrogen carrier must be used with a TCD, the current must be set to LOW. High current TCD operation with nitrogen carrier will destroy the filaments. Using nitrogen as carrier gas in capillary columns will drastically reduce the separating ability of the column. Use of helium carrier is suggested wherever possible. NEVER TURN ON THE TCD FILAMENT CURRENT BEFORE CARRIER AND REFERENCE GAS FLOWS EXIST THROUGH THE DETECTOR AND HAVE BEEN VERIFIED. THE TCD FILAMENTS WILL BE DESTROYED IF ENERGIZED WITHOUT THESE FLOWS! The 8610C gas chromatograph, in programmable and educational models, is equipped with a filament protection cutout circuit. This circuit will de-energize the filaments if the column carrier gas head pressure falls below a preset value (factory set to 3psi). This will prevent the filaments from incandescing if the carrier gas is interrupted to the detector by a removed septum nut, disconnected column, or empty carrier gas cylinder. It will not prevent filaments from damage if nitrogen carrier gas is used in conjunction with high filament current, which is prohibited and will void the warranty of the TCD detector. NEVER OPERATE THE TCD ON HIGH CURRENT WHEN USING NITROGEN CARRIER.

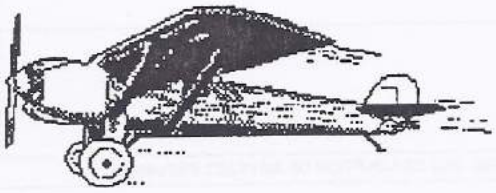
2. The SRI educational TCD-equipped gas chromatograph is equipped with a manual pressure regulator in lieu of a flow controller for carrier gas flow. The full-featured 8610C GC is equipped with programmable electronic pressure control (EPC) of carrier gas flow. Therefore, hydrogen carrier gas should not be used with either GC configuration. If a leak, column breakage, or other failure occurs, hydrogen gas could be released in dangerous concentrations, creating the potential for a fire or explosion to occur. Helium carrier offers an almost identical Van Deemter curve and performance to hydrogen carrier gas, and is the recommended substitute carrier gas.

3. When selecting a port address for the serial data acquisition interface built into your 8610C gas chromatograph, you must verify that you are not using a COM port on the data system host PC that is being shared with a mouse. Some PCs offer a DB-9 serial port labeled COM1, and have a DIN-plug type mouse with a separate, small, round plug and port. This may also be on the COM1 address. Consult your PC manual for information. If you are connecting to COM 2, and your PC is equipped with an internal modem, change the modem's COM port address from COM2 to COM3 or COM4 to avoid conflicts. Failure to do so will prevent the PC-based data system from communicating with the GC via the serial port. If you have any doubts regarding the configuration of your PC's COM ports, use the MS-DOS MSD.EXE utility to inspect your hardware settings.

4. If you have an NPD detector, do not use hydrogen as a carrier. The detector bead will overheat if the hydrogen flow is above 5 ml/min. Also, do not forget to install the NPD restrictor and resistor supplied, if your NPD also performs as a convertible FID detector. Do not turn the bead voltage above 4 volts or the detector bead will burn up. The voltage can be monitored with the digital display on the front of the unit. The display reads out in 1/100ths of a volt - 4 volts will be displayed as 400 units on the digital display.

Chapter: PREFACE

Topic: RETURNS OF EQUIPMENT FROM OUTSIDE U.S.A



In the event an item of SRI equipment needs to be returned to the factory from outside the U.S. A., please make a copy of the U. S. Customs form 3311 provided on the facing or reverse page, and include the filled out form with the shipping documents. This form will allow the equipment back into the U. S. without any customs duties, and will speed up customs clearance delay.

Before returning any goods, please obtain a RMA number (return material authorization) from SRI. At the time the RMA is issued, you will be advised on preferred methods of shipment and shipping companies. SRI will normally request pre-paid FEDX delivery.

To obtain an RMA contact:

SRI Instruments Technical Support
20720 Earl St.
Torrance CA 90503 U.S.A.
310-214-5092
fax 5097

DEPARTMENT OF THE TREASURY
UNITED STATES CUSTOMS SERVICE

Form Approved
OMB No. 1515-0043

DECLARATION FOR FREE ENTRY OF RETURNED AMERICAN PRODUCTS

19 CFR 10.1, 10.5, 10.6, 10.66, 10.67, 12.41, 123.4, 143.23, 145.35

1. PORT & DISTRICT	2. DATE	3. ENTRY NO. & DATE
4. NAME OF MANUFACTURER		5. CITY AND STATE OF MANUFACTURE
6. REASON FOR RETURN		7. U.S. DRAWBACK PREVIOUSLY ☐ CLAIMED ☐ UNCLAIMED 8. PREVIOUSLY IMPORTED UNDER TSUSA 864.05? ☐ YES ☐ NO

9. MARKS, NUMBERS, AND DESCRIPTION OF ARTICLES RETURNED	10. VALUE *

* If the value of the article is $10,000 or more and the articles are not clearly marked with the name and address of U.S. manufacturer, please attach copies of any documentation or other evidence that you have that will support or substantiate your claim for duty free status as American Goods Returned.

11. I declare that the information given above is true and correct to the best of my knowledge and belief; that the articles described above are the growth, production, and manufacture of the United States and are returned without having been advanced in value or improved in condition by any process of manufacture or other means; that no drawback bounty, or allowance has been paid or admitted thereon, or on any part thereof; and that if any notice(s) of exportation of articles with benefit of drawback ☐ was ☐ were filed upon exportation of the merchandise from the United States, such notice(s) ☐ has ☐ have been abandoned.

12. NAME OF DECLARANT	13. TITLE OF DECLARANT
14. NAME OF CORPORATION OR PARTNERSHIP (If any)	15. SIGNATURE (See note)

16. SIGNATURE OF AUTHORIZING CUSTOMS OFFICER

NOTE: If the owner or ultimate consignee is a corporation, this form must be signed by the president, vice president, secretary, or treasurer of the corporation, or by any employee or agent of the corporation who holds a power of attorney and a certificate by the corporation that such employee or agent has or will have knowledge of the pertinent facts.

Notice required by Paperwork Reduction Act of 1980: This information is needed to ensure that importers/exporters are complying with U.S. customs laws, to allow us to compute and collect the right amount of money, to enforce other agency requirements, and to collect accurate statistical information on imports. Your response is mandatory.

Statement required by 5 CFR 1320.21: The estimated average burden associated with this collection of information is 6 minutes per respondent or recordkeeper depending on individual circumstances. Comments concerning the accuracy of this burden estimate and suggestions for reducing this burden should be directed to U.S. Customs Service, Paperwork Management Branch, Washington, DC 20229, and the Office of Management and Budget, Paperwork Reduction Project (1515-0043), Washington, DC 20503.

ChromLab
A Chromatography Technology and Development Company

12 Vernon Lane
Malvern, PA 19355-2933
(610) 644-2260

GC & GC Data Handling Application Support and Training Services

Application Support and Training Services

ChromLab provides a full range of support, training and method development services for chromatography and data handling instrumentation, including:

- Complete installation and setup services for GC instrumentation and sample introduction systems including Headspace and Thermal Desorption.
- On-site training in GC and GC Data Handling for laboratory personnel.
- Development of effective operator manuals and in-house training programs.
- Method development for GC, HS/GC, capillary GC and fast GC analysis.

Benefits Provided to GC Customers

ChromLab gives your company the benefits of on-site chromatography expertise. We provide application support and training services for your GC instrumentation tailored to meet the needs of your laboratory when you need them and on a cost-effective basis.

- Reduced setup and training costs with on-site training for your personnel.
- On-site GC and GC data handling method setup and calibration for quick implementation of cost saving QC/QA chromatography methods.
- Customized Headspace GC, Thermal Desorption methods to solve difficult sample analysis challenges.
- Setup and training in regulatory compliance methods - EPA, OSHA, ASTM

ChromLab provides its support services to the following industries:

- Petroleum, Chemical, Energy, Environmental
- Flexible Packaging, Converting, Paper and Flooring Products, Inks and Coatings
- Pharmaceutical, Food and Beverage

Customized On-site GC Support and Training Services

ChromLab will train of your personnel in the efficient setup, operation and routine calibration of your GC equipment. We will assist in the transfer of new GC methods to your laboratory site. We will also optimize your GC data handling methods and develop standard operating procedures for your personnel to use after the training is complete. Training is available in the following areas:

- **Basic GC**
- **Capillary Column GC**
- **Headspace GC**
- **Thermal Desorption GC**
- **GC Data Handling.**

These support and training services will greatly reduce your GC downtime and overall operational costs to give your organization real long term saving. Your personnel will gain a solid understanding of their GC system and the confidence to perform routine calibration, maintenance and troubleshooting.

Providing Expert Technical Leadership

Burton S. Todd, is the Technical Director of ***ChromLab*** with over 30 years of hands-on expertise in providing application support and training in GC, HS/GC, GC/MS and GC data handling. He has worked with hundreds of companies, large and small assisting in the specification and setup of GC and data handling instrumentation. He has provided successful solutions to solve difficult analytical challenges and helped to build the confidence and skills of laboratory personnel through customized training tailored to meet their needs.

For More Information

For more information on these and other GC support and training services please contact ***ChromLab*** at 610-644-2260 or Fax your inquires and questions to Burton Todd. We will be glad to assist you in developing a support program to help meet your laboratory's goals.

THE ENVIRONMENTAL TECHNOLOGY VERIFICATION PROGRAM

ETV

EPA
U.S. Environmental Protection Agency

ESTCP
Environmental Security Technology Certification Program

ornl
Oak Ridge National Laboratory

Joint Verification Statement

TECHNOLOGY TYPE:	**GAS CHROMATOGRAPHY**		
APPLICATION:	**MEASUREMENT OF EXPLOSIVES IN CONTAMINATED SOIL**		
TECHNOLOGY NAME:	**Model 8610C Gas Chromatograph/Thermionic Ionization Detection**		
COMPANY:	**SRI Instruments**		
ADDRESS:	**20720 Earl Street** **Torrance, CA 90503**	**PHONE:** **FAX:**	**(310) 214-5092** **(310) 214-5097**
WEB SITE: **EMAIL:**	**www.srigc.com** **hagoldsmith@earthlink.net**		

The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification Program (ETV) to facilitate the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. The goal of the ETV Program is to further environmental protection by substantially accelerating the acceptance and use of improved and cost-effective technologies. ETV seeks to achieve this goal by providing high quality, peer-reviewed data on technology performance to those involved in the design, distribution, financing, permitting, purchase, and use of environmental technologies.

ETV works in partnership with recognized standards and testing organizations, stakeholder groups consisting of regulators, buyers, and vendor organizations, with the full participation of individual technology developers. The program evaluates the performance of innovative technologies by developing test plans that are responsive to the needs of stakeholders, conducting field or laboratory tests (as appropriate), collecting and analyzing data, and preparing peer-reviewed reports. All evaluations are conducted in accordance with rigorous quality assurance protocols to ensure that data of known and adequate quality are generated and that the results are defensible.

The Department of Defense (DoD) has a similar verification program known as the Environmental Security Technology Certification Program (ESTCP). The purpose of ESTCP is to demonstrate and validate the most promising innovative technologies that target DoD's most urgent environmental needs and are projected to pay back the investment within 5 years through cost savings and improved efficiencies. ESTCP demonstrations are typically conducted under operational field conditions at DoD facilities. The demonstrations are intended to generate supporting cost and performance data for acceptance or validation of the technology. The goal is to transition mature environmental science and technology projects through the demonstration/ validation phase, enabling promising technologies to receive regulatory and end user acceptance in order to be field tested and commercialized more rapidly.

The Oak Ridge National Laboratory (ORNL) is one of the verification organizations operating under the Site Characterization and Monitoring Technologies (SCMT) program. SCMT, which is administered by EPA's National Exposure Research Laboratory, is one of 12 technology areas under ETV. In this verification test, ORNL evaluated the performance of explosives detection technologies. This verification statement provides a summary of the test results for SRI Instruments' Model 8610C gas chromatograph with thermionic ionization detection (GC/TID). This verification was conducted jointly with DoD's ESTCP.

VERIFICATION TEST DESCRIPTION

This verification test was designed to evaluate technologies that detect and measure explosives in soil. The test was conducted at ORNL in Oak Ridge, Tennessee, from August 21 through 30, 2000. Spiked samples of known concentration were used to assess the accuracy of the technology. Environmentally contaminated soil samples, collected from DoD sites in California, Louisiana, Iowa, and Tennessee and ranging in concentration from 0 to approximately 90,000 mg/kg, were used to assess several performance characteristics. The primary constituents in the samples were 2,4,6-trinitrotoluene (TNT); isomeric dinitrotoluene (DNT), including both 2,4-dinitrotoluene and 2,6-dinitrotoluene; hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX); and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX). The results of the soil analyses conducted under field conditions by the GC/TID were compared with results from reference laboratory analyses of homogenous replicate samples analyzed using EPA SW-846 Method 8330. Details of the verification, including a data summary and discussion of results, may be found in the report entitled *Environmental Technology Verification Report: Explosives Detection Technology—SRI Instruments, GC/TID*, EPA/600/R-01/065.

TECHNOLOGY DESCRIPTION

The SRI Model 8610C gas chromatograph (GC) is a transportable instrument that can provide on-site analysis of soils for explosives. Coupling this transportable gas chromatograph with a thermionic ionization detector (TID) allows for the determination of explosives in soil matrices following simple sample preparation procedures. Samples are extracted in acetone, diluted, and injected directly onto the GC column within a heated injection port. The high temperature of the injection port instantaneously vaporizes the solvent extract and explosives, allowing them to travel as a vapor through the GC column in the presence of the nitrogen carrier gas. The stationary phase of the GC column and the programmable oven temperature separate the components present in sample extracts based on their relative affinities and vapor pressures. Upon elution from the column's end, compounds containing nitro groups are ionized on the surface of the thermionic bead, and the increased conductivity of atmosphere within the heated detector is measured with a collector electrode. In this verification test, the instrument was verified for its ability to detect and quantify 2,4-dinitrotoluene (2,4-DNT), RDX, and TNT. Analytical run times were typically less than 7 min and reporting limits were typically 0.5 mg/kg.

VERIFICATION OF PERFORMANCE

The following performance characteristics of SRI's GC/TID were observed.

Precision: The mean relative standard deviations (RSDs) for 2,4-DNT, RDX, and TNT were 15%, 14% and 23%, respectively, indicating that the determinations of all analytes were precise.

Accuracy: Accuracy was assessed using the performance evaluation (PE) soil samples, which were spiked to nominal TNT and RDX concentrations of 0, 10, 50, 100, 250, and 500 mg/kg each by an independent laboratory. The mean percent recoveries for RDX and TNT were 91% and 97%, respectively, indicating that the analyses were unbiased.

False positive/false negative results: Of the 20 blank soils, SRI reported TNT in five samples (25% false positives). No false positives were reported for 2,4-DNT and RDX. False positive and false negative results were also estimated by comparing the GC/TID result to the reference laboratory result for the environmental and spiked samples (e.g., whether SRI reported a result as a nondetect that the reference laboratory reported as a detection, and vice versa). For these soils, 3% of the 2,4-DNT results and 7% of the TNT results were reported as false positives relative to the reference laboratory results, but none of the RDX results were reported as false positives. Similarly, a small percentage of the results were reported as nondetects by SRI (i.e., false negatives) when the laboratory reported a detection (2% for RDX , 4% for TNT, none for 2,4-DNT).

Completeness: The GC/TID generated results for all 108 soil samples for a completeness of 100%.

Comparability: A one-to-one sample comparison of the GC/TID results and the reference laboratory results was performed for all samples (spiked and environmental) that were reported as detects. The correlation coefficient (r) for the comparison of the entire soil data set for TNT (excluding one suspect measurement for the reference laboratory) was 0.95 (slope (m) = 1.32). When comparability was assessed for specific concentration ranges, the r value did not change dramatically for TNT, ranging from 0.89 to 0.93 depending on the concentrations selected. RDX correlation coefficient with the reference laboratory for all soil results was slightly lower than TNT ($r = 0.85$, $m = 0.91$). The GC/TID's results for RDX correlated better with the reference laboratory for concentrations <500 mg/kg ($r = 0.96$, $m = 0.83$) than for samples where concentrations were >500 mg/kg ($r = 0.49$, $m = 0.56$). For the limited number of data points where both the reference laboratory and SRI reported results for 2,4-DNT ($n = 14$), the correlation was 0.44 ($m = 0.33$).

Sample Throughput: Throughput was approximately three samples per hour. This rate was accomplished by two operators and included sample preparation and analysis.

Ease of Use: No particular level of educational training is required for the operator, but knowledge of chromatographic techniques and experience in field instrument deployments would be advantageous.

Overall Evaluation: The overall performance of the GC/TID for the analysis of 2,4-DNT, RDX, and TNT was characterized as precise and unbiased. As with any technology selection, the user must determine if this technology is appropriate for the application and the project's data quality objectives. For more information on this and other verified technologies, visit the ETV web site at http://www.epa.gov/etv.

Gary J. Foley, Ph.D.
Director
National Exposure Research Laboratory
Office of Research and Development

W. Frank Harris, Ph.D.
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Biological and Environmental Sciences
Oak Ridge National Laboratory

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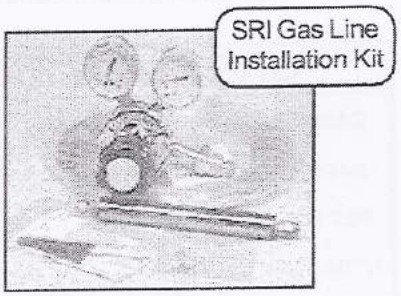
Director
Environmental Security Technology Certification Program
Department of Defense

Quick Start SRI GC Installation Guide

I. Gas Installation & Connection



1. To connect your GC to a gas supply, we recommend the following:
   - A 50 foot length of copper tubing
   - A stainless steel gas line filter
   - At least 2 sets of stainless steel Swagelok nuts and brass ferrules (it is a good idea to keep a few extras on hand)
   - A cylinder pressure regulator with 0-100psi output

NOTE: each type of cylinder has a different CGA connection to the regulator (CGA = Compressed Gas Association). Air is typically CGA 590 or 346. Helium and nitrogen are CGA 580. Hydrogen and argon-methane are CGA 350.

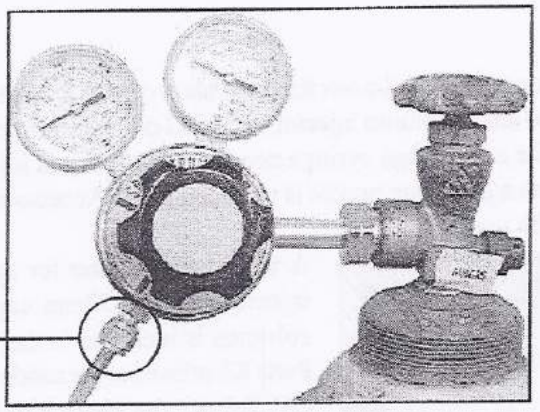
Gas line installation kits that include everything you need are available from SRI:

8600-C590	Air gas line kit (with both CGA 590 and 346 inlet fittings)
8600-C580	Helium/nitrogen gas line kit
8600-C350	Hydrogen/argon-methane gas line kit (the hydrogen CGA is equipped with a flow restrictor to limit the escape of gas in the event of a leak)

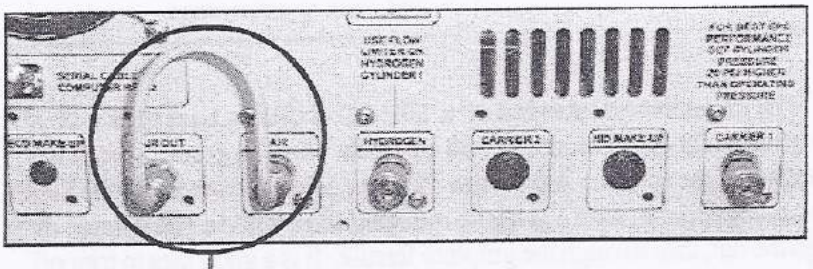
These kits include everything in the list of recommended supplies above, plus a tubing cutter. Each regulator is supplied with a 1/8" Swagelok fitting for easy connection to the copper tubing.

2. Using the appropriate CGA connection as described above, attach the regulator securely to the gas cylinder.

3. Secure one end of the 1/8" copper tubing to the regulator with a Swagelok nut and ferrule. Cut the tubing to the desired length before connecting it to the GC. Make sure to leave it long enough to allow you to move your GC around your work area.



4. If you don't already filter your gas, install gas line filter(s) in the gas line(s) where it is convenient to replace when needed.



5. Connect the gas or gases to the inlets on the left-hand side of the GC as labeled.

NOTE: the GC shown here is equipped with a built-in air compressor. When using the internal air compressor instead of cylinder air, a jumper tube is secured to the air inlet and outlet. If you ordered your GC with an air compressor, it is shipped with the jumper tube in place as shown.

("Gas Installation & Connection" *continued*)

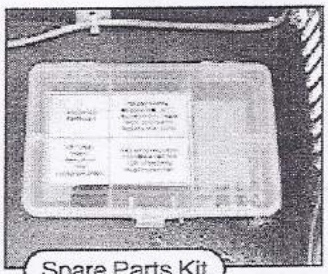
GAS FLOW RATES						
CARRIER 1:		:	7	PSI =	10	ml/min
CARRIER 2:		:		PSI =		ml/min
P&T PURGE:		:		PSI =		ml/min
HYDROGEN 1:	FID	:	21	PSI =	25	ml/min
HYDROGEN 2:		:		PSI =		ml/min
AIR 1:	FID	:	9	PSI =	250	ml/min

6. The pressure that correlates with the flow rate for the column, make-up gases, and detector supplies is labeled on the right-hand side of the GC. For best EPC performance, set the incoming gas pressure(s) 15-20psi higher than the operating pressure listed on the right-hand side of the GC.

II. Column Installation

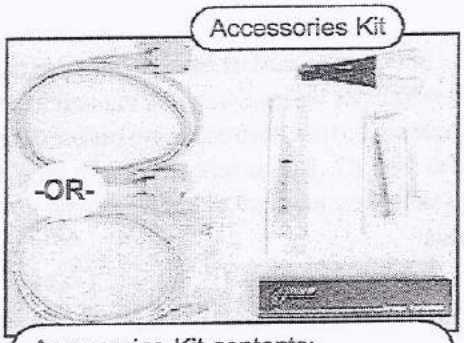
1. If you ordered a column with your GC, it is shipped installed in the column oven and you can skip this section. Otherwise, open the GC lid and the column oven lid.

2. These instructions will cover the installation of a 0.53mm capillary column into an on-column injector. The SRI on-column injector is designed for a 26 gauge syringe needle; a 10µL liquid injection syringe with a 26 gauge needle is included in the Accessories Kit shipped with your GC.

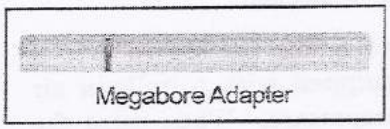


Spare Parts Kit

A megabore adapter for syringe injection onto 0.53mm capillary columns is included in the Spare Parts Kit affixed to the inside of the GC lid on the right-hand rear corner.



Accessories Kit contents:
- 6' Serial *or* USB cable
- Tubing cutter
- 10µL liquid injection syringe
- 1mL gas injection syringe & needle
- 3mL leak check syringe



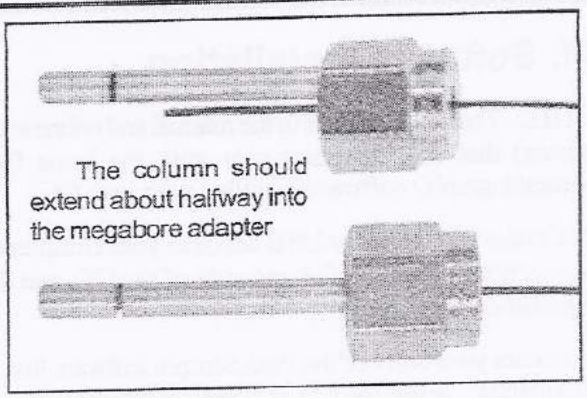
Megabore Adapter

3. The megabore adapter is a 1" x 1/8"OD stainless steel tube with a perpendicular gash cut into it, and a conical entry to guide the syringe needle into the column. A 0.53mm capillary column connects to the SRI on-column injector with a graphite reducing ferrule and a 1/8" Swagelok nut. Insert one end of the column through the nut, then through the graphite ferrule. It is a good idea to trim off about one inch of the column to avoid possible peak tailing from any graphite shavings left behind after inserting the column through the ferrule; make sure the cut is clean, with no jagged edges.

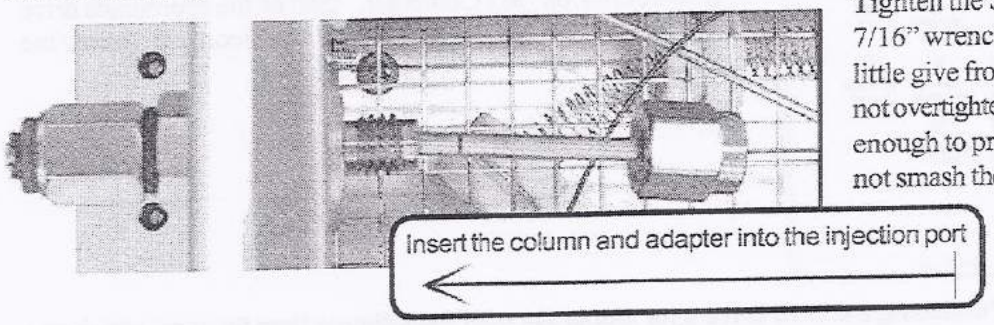
Quick Start GC Installation Guide

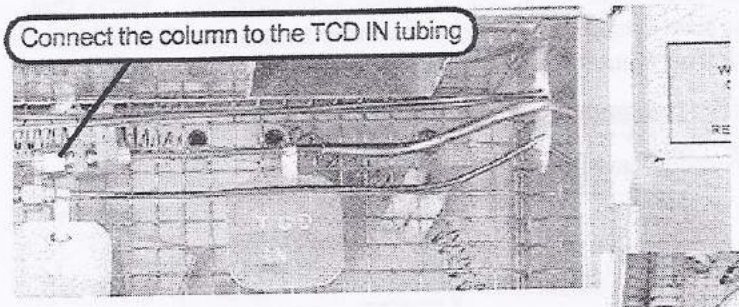
("Column Installation" *continued*)

4. Insert the column end with the graphite ferrule and Swagelok nut about halfway into the megabore adapter and tighten it with the nut and ferrule.



5. After inserting the column into the adapter, insert the column and adapter together into the injection port. Tighten the Swagelok nut with a 7/16" wrench. You should feel a little give from the ferrule, but do not overtighten it. You want it tight enough to prvent leakage, but do not smash the ferrule.

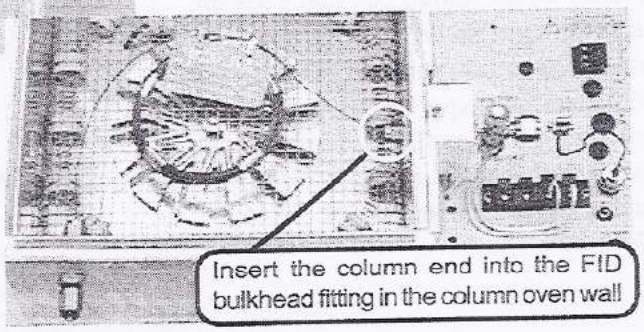




For an FID detector, leave about 1" of the column protruding through the nut and ferrule. Insert the column into the FID bulkhead fitting in the column oven wall and tighten the Swagelok nut.

Please see "Analytical Column Installation" in the INSTALLATION section of your manual for more detailed information on column installation.

6. Slide another 1/8" Swagelok nut and graphite ferrule over the other end of the column. For a TCD detector, connect the nut to the fitting labeled "TCD IN" in the column oven.



Quick Start GC Installation Guide

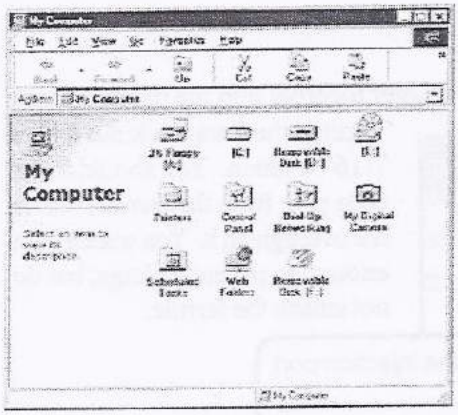
III. Software Installation

NOTE: There are tutorials in the manual and online at www.srigc.com (click on the "Download Our Documents" button) that will acquaint you with the basic functions of the PeakSimple chromatography software included with your GC.

1. Connect the serial or USB cable to your computer and the GC. The serial port connection is on the left-hand side of the GC, and the USB connection is on the right-hand side.

2. Locate your copy of the PeakSimple software just inside the front cover of your SRI manual. Insert the CD or floppy disks into your computer's appropriate drive.

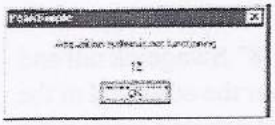
SRI Manual



3. Double click on "My Computer," then on the appropriate drive to open it. Double click on the "setup.exe" icon, and follow the instructions.

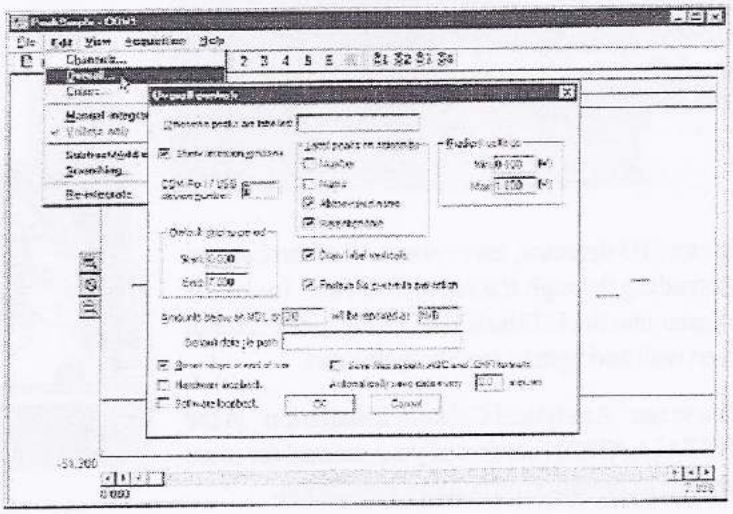
Setup

4. For USB, refer to "**Installing the USB Drivers for Model 302 USB PeakSimple Data System**" which you will find immediately behind these instructions in your manual, or online at www.srigc.com. Return to step #5 below when you are finished installing the USB drivers. For serial port, proceed to the next step.



5. Double-click on the PeakSimple icon to launch the program. Verify that communication has been established between the computer and the GC. An error message will appear if communication is not established.

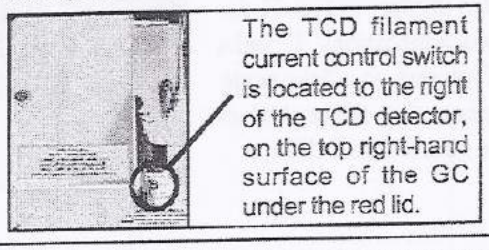
6. Open the Edit menu and choose Overall. In the dialog box that pops up, enter the number of the COM port to which you have connected the GC. For USB, enter the unique USB device number that is printed on your PeakSimple disk(s), and on the back of the GC. It is a 4-digit number that always begins with "5" (5093, 5276, etc.).



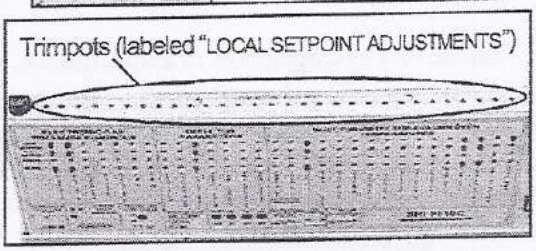
IV. Detector Activation

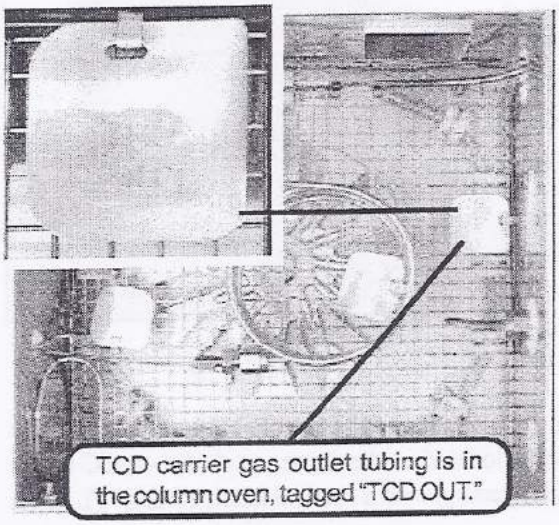
IMPORTANT: If you have a pre-configured GC system, please see the manual section for instructions on operating procedures. The manual is organized into sections with labeled tabs. In addition to preconfigured GCs, there are sections on detectors, injectors, autosamplers, valves, and more.

A. TCD Detector



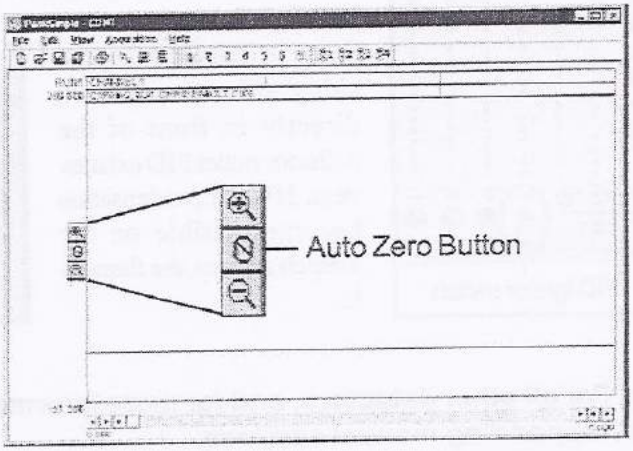
1. Your GC power should still be ON, and the filaments should still be OFF. The TCD oven is set to 150°C at the factory. It is adjustable by turning the trimpot while observing the TCD CELL LOCAL SETPOINT temperature on the LED display. The trimpots are located on the top edge of the GC front control panel. Allow the TCD to reach desired operating temperature and stabilize.





2. TCD filaments will be damaged or destroyed if current is applied in the absence of flowing carrier gas. Therefore, always verify that carrier gas is exiting the TCD carrier gas outlet before energizing the TCD filaments. The TCD carrier gas outlet tubing is in the column oven, labeled "TCD OUT." Place the end of the tubing in some liquid; if no bubbles are exiting the tube, there is a flow problem. *DO NOT* turn the TCD current ON if you cannot detect carrier gas flow. A filament protection circuit prevents filament damage if carrier gas pressure is not detected at the GC, but it cannot prevent filament damage under all circumstances. Correct any lack of carrier gas flow before proceeding.

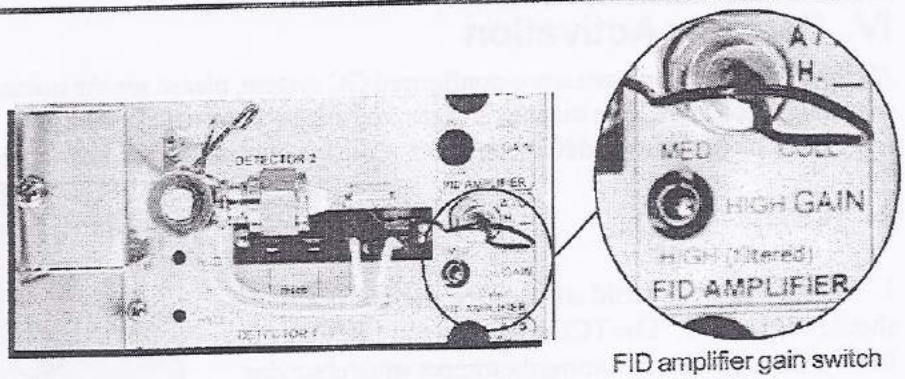
3. With the TCD filaments still OFF, zero the data system signal by clicking on the Auto Zero icon on the left side of the chromatogram. Switch the TCD current to LOW. The data system signal's deflection should not be more than 5-20mV for a brand-new TCD detector. There is also a HIGH current TCD filament setting, but to avoid filament damage, we recommend you use only the LOW setting until you are familiar with your GC and TCD detector.



Quick Start GC Installation Guide

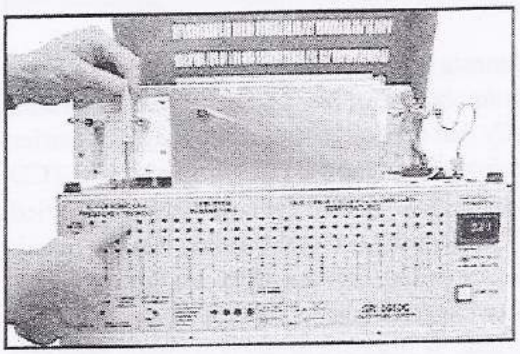
B. FID Detector

1. Set the FID amplifier gain switch to HIGH for most applications. If peaks of interest go off the scale (greater than 5000mV), set the gain to MEDIUM.

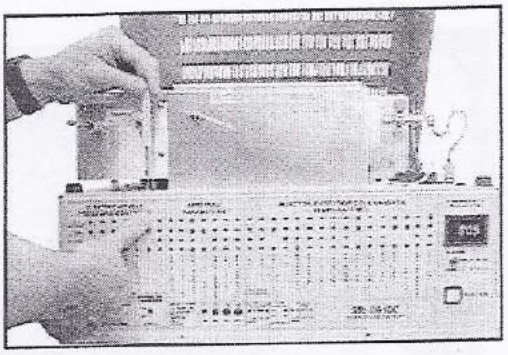


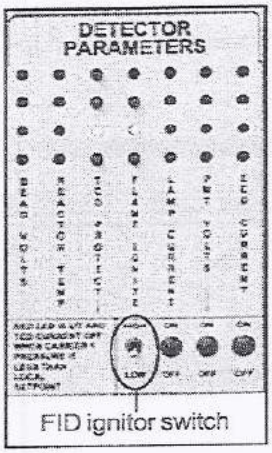
FID amplifier gain switch

2. Set the FID hydrogen flow to 25mL/minute, and the FID air to 250mL/minute. The approximate pressures required for this flow through your GC are labeled on the right-hand side of the GC chassis. In most cases, the pressure will have been set correctly at the factory. Check the hydrogen and air flow settings by pressing the LOCAL SETPOINT button while observing the LED display. The gas flow settings are adjusted using the trimpots on the top edge of the GC front control panel.



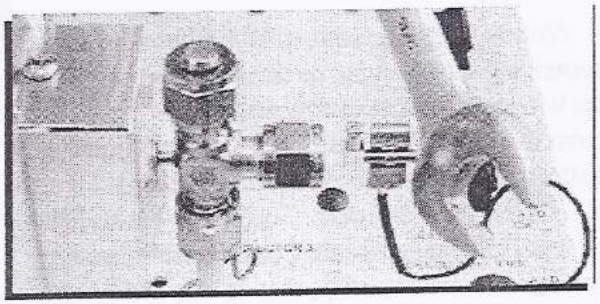
Turn the trimpot while holding down the "LOCAL SETPOINT" button until you read your desired setting in the LED display.





FID ignitor switch

3. Ignite the FID by holding the ignitor switch up for a couple of seconds, until you hear a small POP. The ignitor switch is located on the front panel of your GC under the "DETECTOR PARAMETERS" heading, with a vertical label reading "FLAME IGNITE." Verify that the flame is lit by holding the shiny side of a wrench directly in front of the collector outlet/FID exhaust vent. If water condensation becomes visible on the wrench surface, the flame is lit.



C. For all other detectors, and for more information on the TCD and FID, please see the corresponding manual sections.

V. Inject Your Sample

NOTE: If you are injecting with a Purge & Trap, TO-14, or Headspace concentrator, a thermal desorber, an autosampler, or any of the heated on-column injectors (PTV, Split/Splitless, etc.), please see the corresponding manual section for operating procedures.

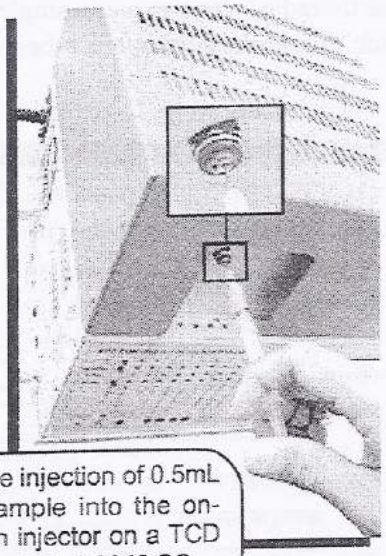
A. Syringe Injection

1. Enter a temperature program for the column oven. The temperature program is determined by the sample and the goals of the analysis.

2. For gas samples, fill the 1mL gas syringe with 0.5-1mL. For liquid samples, fill the 10µL liquid syringe with 1µL, removing the bubbles before injecting.

The Auto Zero button is on the left side of the chromatogram window.

3. Click on the Auto Zero button to zero the data system signal. Hit the computer keyboard spacebar.



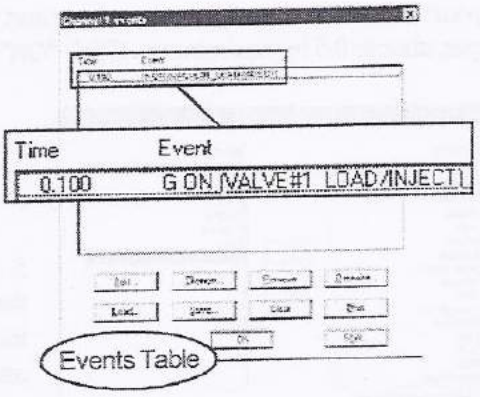
Syringe injection of 0.5mL gas sample into the on-column injector on a TCD equipped Model 310 GC

4. Pierce the septum in the on-column injector with the syringe needle. Insert the needle straight into the on-column injector port; avoid bending the needle. Depress the syringe plunger to inject the sample, then withdraw the syringe. For the best and most consistent results, use an easily reproducible injection technique with quick, smooth movements.

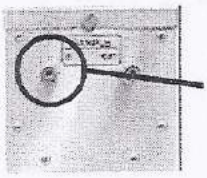
B. Valve Injection

1. Set the valve oven temperature between ambient and 175°C using the trimpot on the top edge of the front control panel. Enter a temperature program for the column oven.

2. Enter an event program to automatically inject the contents of the valve sample loop. The valve is usually in the LOAD position (default), during which Relay G is OFF. When relay G is activated, the valve is rotated to the INJECT position, in which the carrier gas stream sweeps the contents of the sample loop onto the column(s). Set the valve to INJECT (Relay G ON) 0.1 minutes into the run unless you have specific run parameters that require different timing.



Events Table

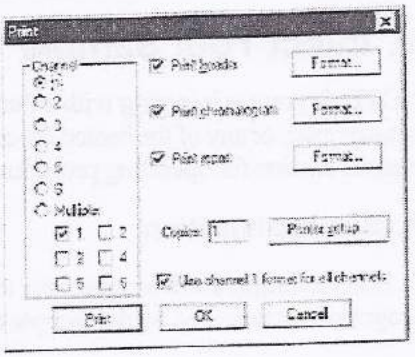


3. Sample is injected into the bulkhead fitting labeled "SAMPLE IN" on the front of the valve oven. The fitting is equipped with a 1/8" Swagelok nut for easy connection of sample streams.

4. Press the computer keyboard spacebar to initiate the run. The valve will automatically rotate to the INJECT position at 0.1 minutes (or whatever time you entered in the Events Table).

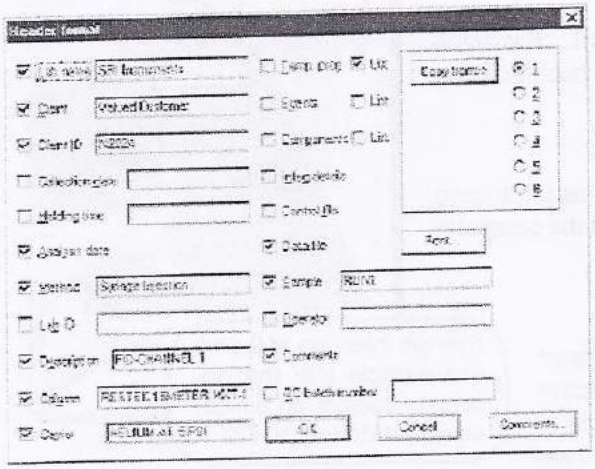
Quick Start GC Installation Guide

VI. Print Your Chromatogram

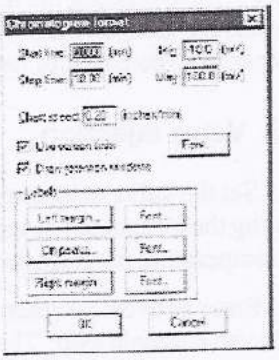


1. Choose File / Print from the main menu bar.

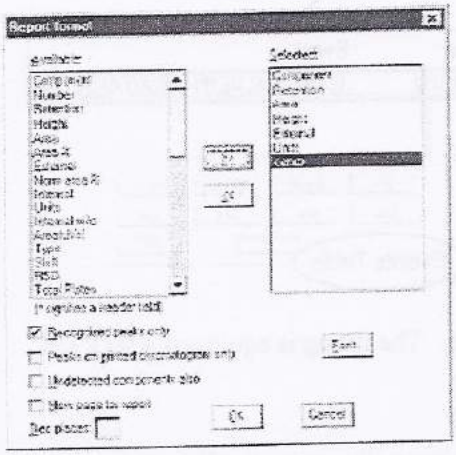
2. In the Print screen, designate which channel(s) you want printed. Use the radio buttons to pick a single channel, or select "Multiple:" and click the checkboxes to select the channels you want to print.



3. Click the checkbox to select "Print header," then click on the "Format..." button to set up the Header. The Header is printed above the chromatogram on the page, and can contain such information as the analysis date, the sample and injection type, column and carrier gas used, client and lab names, and any special comments about the analysis that you want printed with the chromatogram. Click "OK" when finished formatting your header. The Print screen is still open.



4. In the Print screen, click the checkbox to select "Print chromatogram," then click on the "Format..." button. Choose "Use screen limits" to print the chromatogram as you see it onscreen. You can also choose the chart speed, which determines the number of inches per minute displayed in the chromatogram timeline. For example, if your chromatogram is 10 minutes long and you want it to occupy 5 inches on the paper, choose 0.5 inches/minute. Click "OK" when finished.

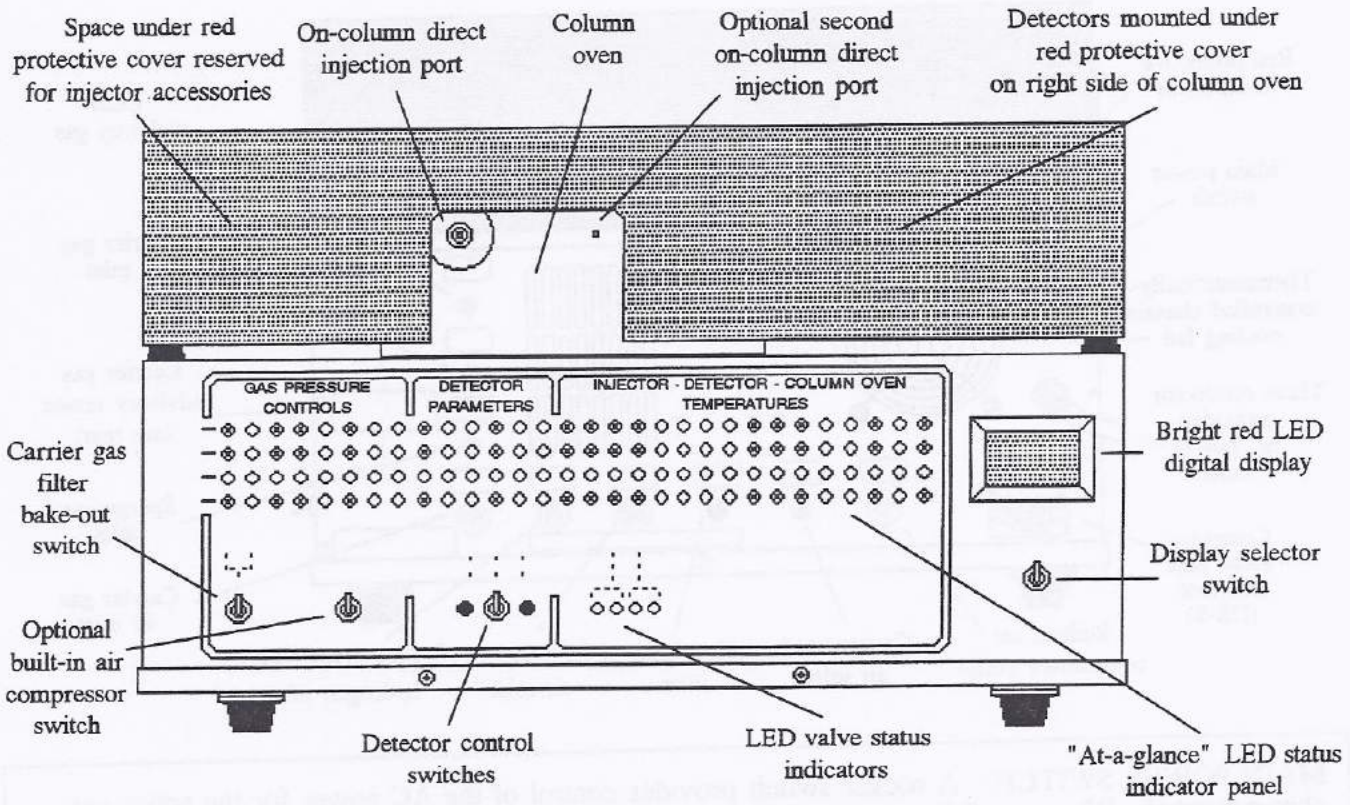


5. In the Print screen, click the checkbox to select "Print report," then click on the "Format..." button to choose the data that will be included in the report at the bottom, such as the component name, retention time, peak area and height, etc. Click "OK" when finished.

6. Now that your chromatogram is ready to print, click on the Print button in the Print screen.

Chapter: INSTALLATION

Topic: FRONT PANEL ORIENTATION - 8610C GC CHASSIS



"AT-A-GLANCE" STATUS INDICATOR PANEL - All controlled zones on the gas chromatograph are displayable on this panel. Multicolored light-emitting diodes (LEDs) indicated when zones are active (on), or are being thermostatically-controlled (heated zones - pulsing).

DISPLAY SELECTOR SWITCH - This switch toggles between constant display of the column oven temperature, and display of zone setpoints and actual valueswhen a specific button is pushed. Each "at-a-glance" status panel zone LED is accompanied by push-buttons that permit display of local and total setpoint values, and actual zone values on the digital LED panel meter.

DIGITAL PANEL METER - A high-visibility, bright red 3-digit panel meter displayed either the current column oven temperature, or the temperatures, voltages, and pressures of all controlled zones. Zone value display is momentary, and is shown as long as a button is depressed.

VALVE STATUS INDICATORS - On gas chromatographs equipped with optional sampling valves, an LED glows to indicate the valve's current position. Up to two valves may be displayed.

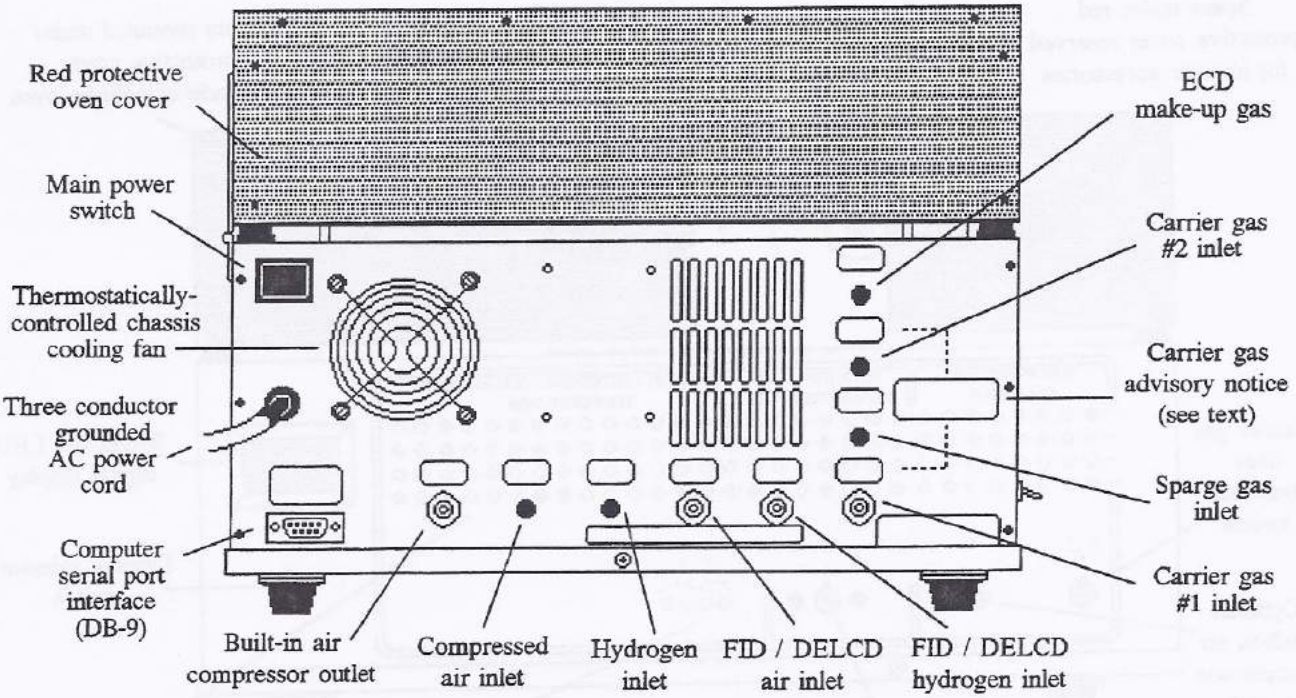
INJECTOR PORT - A direct on-column inject port is provided, and supports the use of both packed and capillary analytical columns. A capillary column adapter is provided for installation of wide-bore capillary columns. Optional heated injection ports and heated split-splitless injection ports are available. A second injection port may be installed on the same column oven.

DETECTOR CONTROL SWITCHES - All detector control switches are located on the front control panel, including FID ignitor and PID current, and FPD voltage.

ADDITIONAL SWITCHES - A carrier gas filter bake-out switch is provided to bake impurities from the gas polishing filter. If the GC is equipped with an optional built-in air compressor for FID or DELCD use, a switch is also provided on the lower left corner of the front control panel.

Chapter: INSTALLATION

Topic: LEFT SIDE PANEL ORIENTATION - 8610C GC CHASSIS



MAIN POWER SWITCH: A rocker switch provides control of the AC power for the entire gas chromatograph. When the GC power switch is turned off, the built-in serial data acquisition interface is also inactive, and communications with the computer cease.

COMPUTER SERIAL PORT INTERFACE: This port, a standard RS-232 serial interface, connects the gas chromatograph to any IBM PC-compatible desktop or notebook computer serial port. The computer collects the data and controls the gas chromatograph. No data storage occurs in the chromatograph. A six-foot DB-9 type serial cable is provided for connection to the PC.

CARRIER GAS INLETS (1 AND 2): The 8610C GC may be equipped with up to two independent carrier gas systems for independent injectors, columns, and detectors. An important advisory message, regarding the use of helium carrier gas only, is printed on the chassis and refers to all 8610C models. A dangerous condition could occur if hydrogen carrier gas were being used and a leak (such a break in the column) occured downstream of the pressure control circuitry. The leak would not be detected by the system, and gas would be continuously vented at the set pressure, permitting explosive gas to accumulate in the vecinity of the chromatograph.

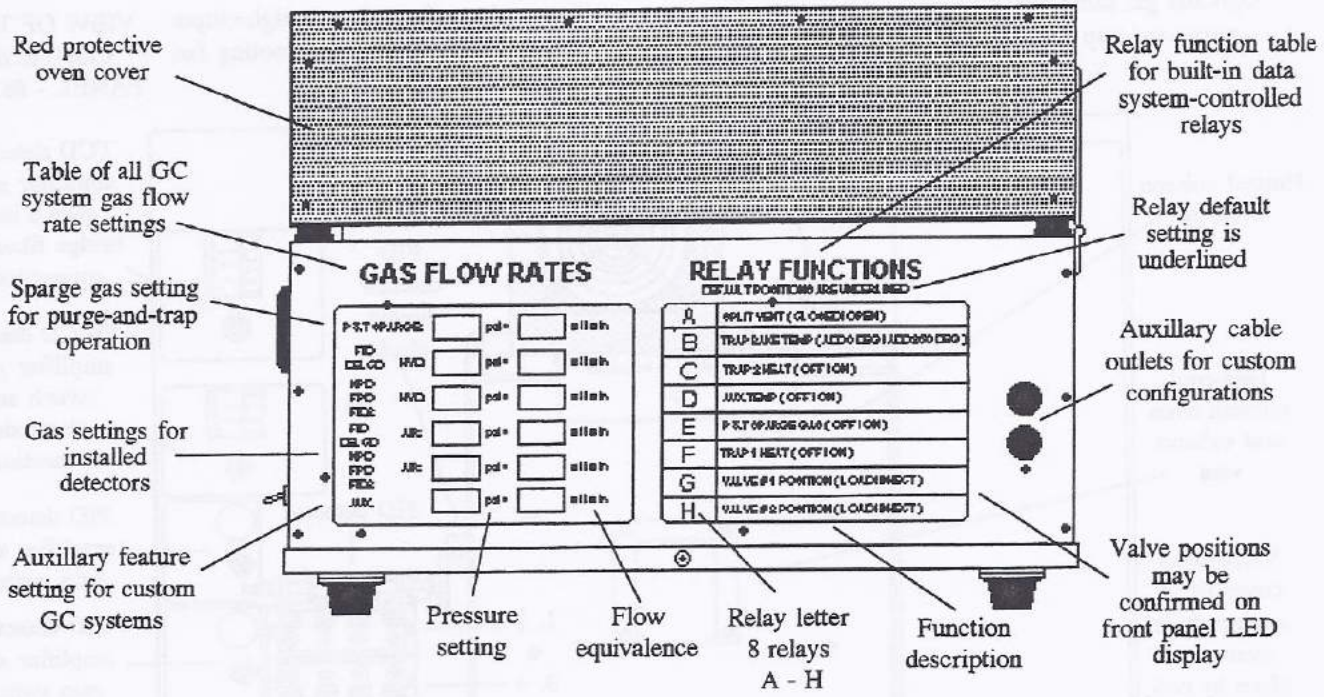
GAS INLETS: Stainless steel gas bulkhead fittings are provided for connection of all system gases. Separate inlets are provided for sparge, FID, DELCD, and ECD gases. If the GC is equipped with a built-in air compressor, a compressed air outlet is also provided.

CHASSIS COOLING FAN: This fan is thermostatically-controlled and draws ambient air into the chassis electronics compartment to maintain the internal electronic and pneumatic components at a stable, controlled temperature. The temperature setpoint is pre-set at the factory.

POWER CORD: A permanently-attached six foot, three-conductor cord is provided for connection to a grounded 110VAC power outlet. 220VAC models are supplied with the appropriate plug for standard grounded 220V outlets. Never defeat the safety feature inherent in the grounded cord by connecting it to a two-prong, ungrounded outlet.

Chapter: INSTALLATION

Topic: RIGHT SIDE PANEL ORIENTATION - 8610C GC CHASSIS



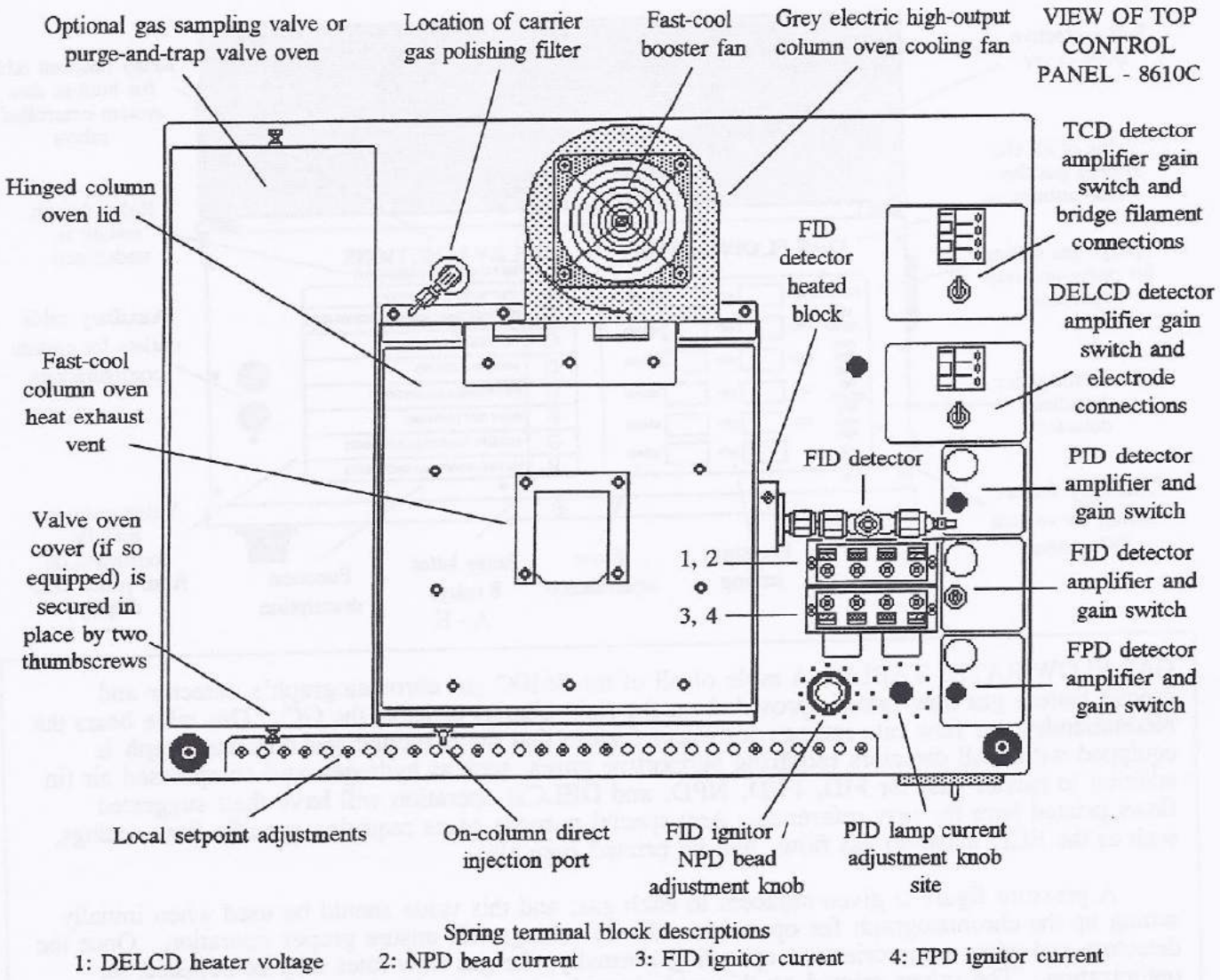
GAS FLOW RATES TABLE: A table of all of the 8610C gas chromatograph's detector and special feature gas flow rates is provided on the right chassis panel of the GC. This table bears the recommended gas flow rate settings for every feature that the particular gas chromatograph is equipped with. All detectors requiring supportive gases, such as hydrogen and compressed air (in addition to carrier gas) for FID, FPD, NPD, and DELCD operation will have their suggested flows printed here for easy reference. Any special purpose gases requiring specific flow settings, such as the ECD make-up gas flow, will be printed here also.

A pressure figure is given adjacent to each gas, and this value should be used when initially setting up the chromatograph for operation. These settings will ensure proper operation. Once the detectors and other accessories are operating normally, the gas flow rates may be adjusted for optimization. The values printed on this table have been tested with the particular chromatograph in the SRI quality control laboratory. Flow equivalences for each pressure setting are also provided for your convenience. The indicated pressure setting should provide you with the flow rate shown to its right on the table. For precise flow measurements, a bubble or digital flowmeter should be used.

RELAY FUNCTIONS TABLE: Adjacent to the gas flow rate table, you will find a relay functions table that lists each of the eight data system-controlled relays (labeled A through H) available within the gas chromatograph. These relays may be operated by means of either a timed event table within any of the PeakSimple software programs, or directly by keyboard control. When using event table control, each relay called in the event table will activate or deactivate at the exact same time during each run. This makes these event table-controlled relays perfect for operation of solenoids, autosampler injector control, and rotation of automated gas sampling and stream selection valves. A description of the function of each relay is printed on the table. The default setting for each relay is identified by underlining of the descriptive text. Special purpose relays, such as the trap temperature toggle implemented via relay B, permit you to increase your trap temperatures from their normal desorption temperature, to a bake-out temperature fifty degrees above the desorb setpoint, when performing purge-and-trap analyses.

Chapter: INSTALLATION

Topic: Top Control Panel Orientation - 8610C GC Chassis



The 8610C top control panel is divided into four main areas:

COLUMN OVEN - The insulated column oven and associated cooling hardware is mounted in the middle of the top control panel. A direct, on-column injection port is located on the front left face of the column oven. The oven cover is hinged at the rear, and is equipped with an exhaust vent to facilitate evacuation of heat during operation of the high-output, fast cooling fans.

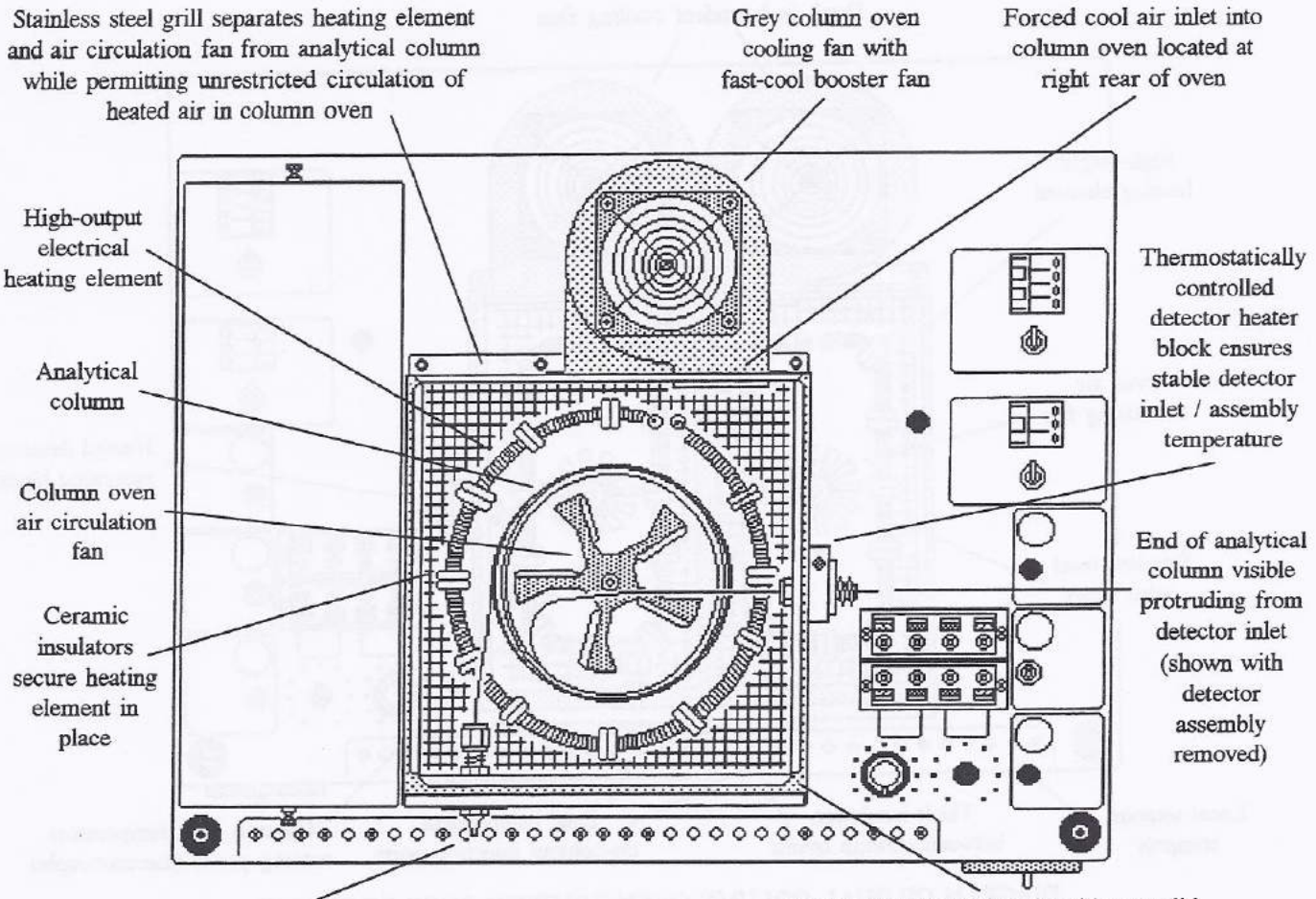
DETECTOR AMPLIFIER CONTROLS - All amplifier controls, including gain switches, current controls, and connectors, are located on the right side of the top control panel.

LOCAL SETPOINT ADJUSTMENTS - All user-selectable setpoint potentiometers are located on the front edge of the top control panel, immediately above the front panel "at-a-glance" display. A small blade screwdriver is needed to adjust these trimpots.

VALVE OVEN / PURGE-AND-TRAP ACCESSORY - Accessories, such as gas sampling valves, or the built-in purge-and-trap system, may be mounted to the left of the column oven, in a heated, insulated valve oven, which permits direct connection of enclosed hardware with the column oven.

Chapter: INSTALLATION

Topic: Column Oven Interior - 8610C GC Chassis



TOP VIEW OF 8610C COLUMN OVEN (WITH COLUMN OVEN LID REMOVED FOR CLARITY)

The product of ten years of gas chromatograph design and manufacturing, the 8610C column oven is an insulated design that permits operation from ambient temperature to 400°C, with rapid ramping to maximum temperature and rapid cooling to initial oven temperature when operating in temperature-programmed mode. The high-output heating element permits heating at up to 40°C per minute, and the assisted cooling fan configuration permits return to 50°C from 250°C in five minutes or less. The oven lid is equipped with an exhaust vent that speeds the evacuation of heat from the oven during cooling. The oven may also be operated isothermally with excellent stability.

The open air circulation design eliminates gradients throughout the oven which could affect performance. Prepunched openings in both the left and right oven walls permit easy future implementation of accessories and detector additions. Up to four detectors may be mounted on the right oven wall for maximum analytical versatility. The outlet from non-destructive detectors, such as the PID, are routed within the column oven for convenient series detector operation. The column oven may be equipped with an optional second direct on-column injection port for use with a second analytical column, and also may be equipped with a heated injection port, with or without split-splitless capability.

Chapter: INSTALLATION

Topic: Dual Oven 8610C Gas Chromatograph Chassis

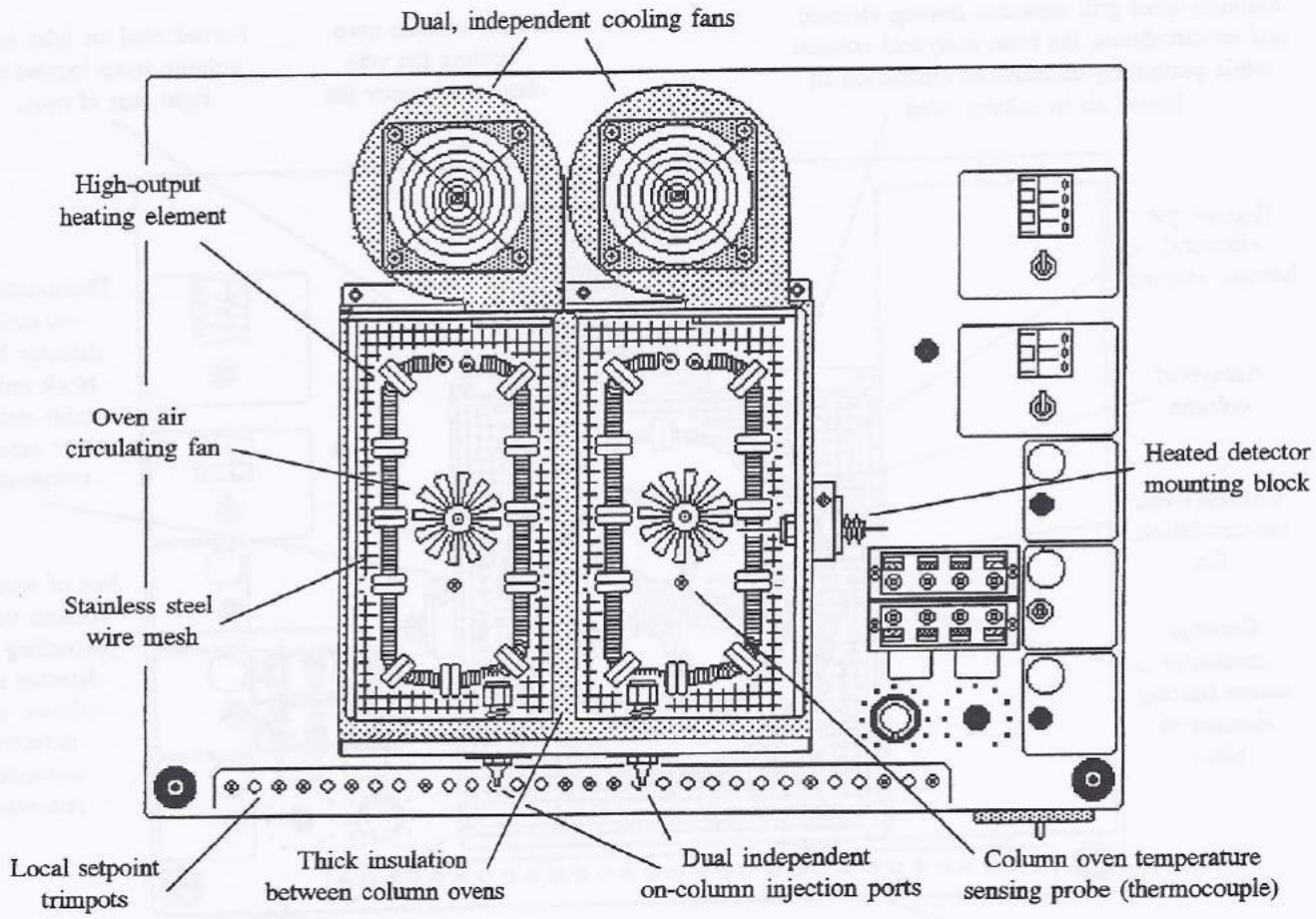


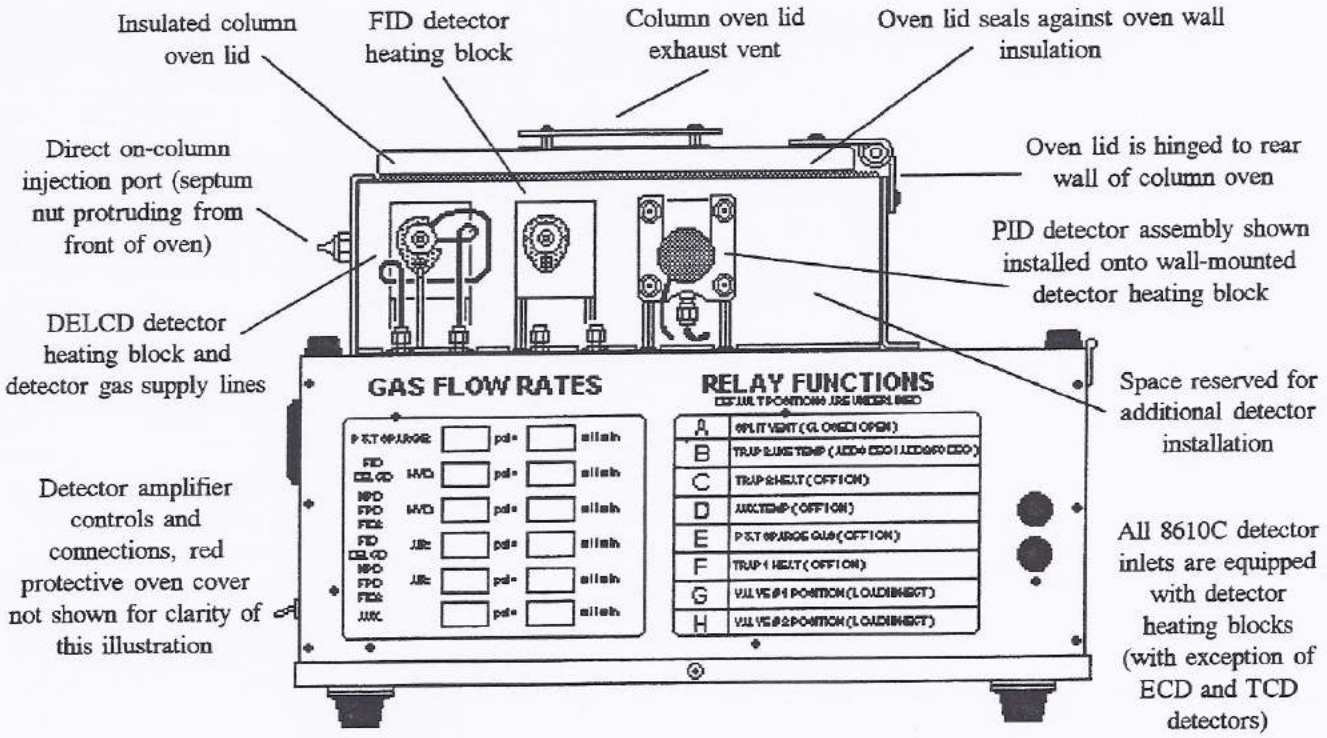
DIAGRAM OF DUAL COLUMN OVEN-EQUIPPED 8610C GC CHASSIS

For certain special applications, the SRI 8610C gas chromatograph chassis may be fitted with dual, independently-programmable column ovens. Dual column ovens permit a single 8610C gas chromatograph to perform two separate, unrelated analyses simultaneously with independent start times and temperature programs. The immediately apparent advantage to having a GC equipped with two column ovens is the ability, for instance, to perform a direct on-column injection of a BTEX sample onto a capillary column and flame ionization detector (FID) using a temperature program, such as 50°C to 200°C at a temperature ramp of 10°C per minute, while also performing a gas analysis by direct on-column injection at either an isothermal temperature or at a low-level temperature ramp, onto a packed column connected to a thermal conductivity detector (TCD) in one column oven. By placing one temperature program on channel 1 for the FID, and a different temperature program on channel 2 for the TCD, two separate column operating conditions may be simultaneously controlled.

A more sophisticated method to employ dual column ovens is multidimensional gas chromatography. Briefly, multidimensional GCs permit one sample to be analyzed normally on one column in a main column oven (connected to a dedicated detector), with the ability to "slice" a timed segment of the sample elution and place it onto the second column in the second column oven, to analyze it "under a magnifying glass", of sorts. The first column effluent is directed momentarily onto the second column and oven, where this "injection" is separated by a much longer, lower temperature column and second detector, providing a well-separated close-up of the time segment slice.

Chapter: INSTALLATION

Topic: Detector Mounting Platforms on Column Oven Wall



RIGHT SIDE VIEW OF COLUMN OVEN WITH DETECTOR MOUNTING HARDWARE VISIBLE (PID DETECTOR PRESENT)

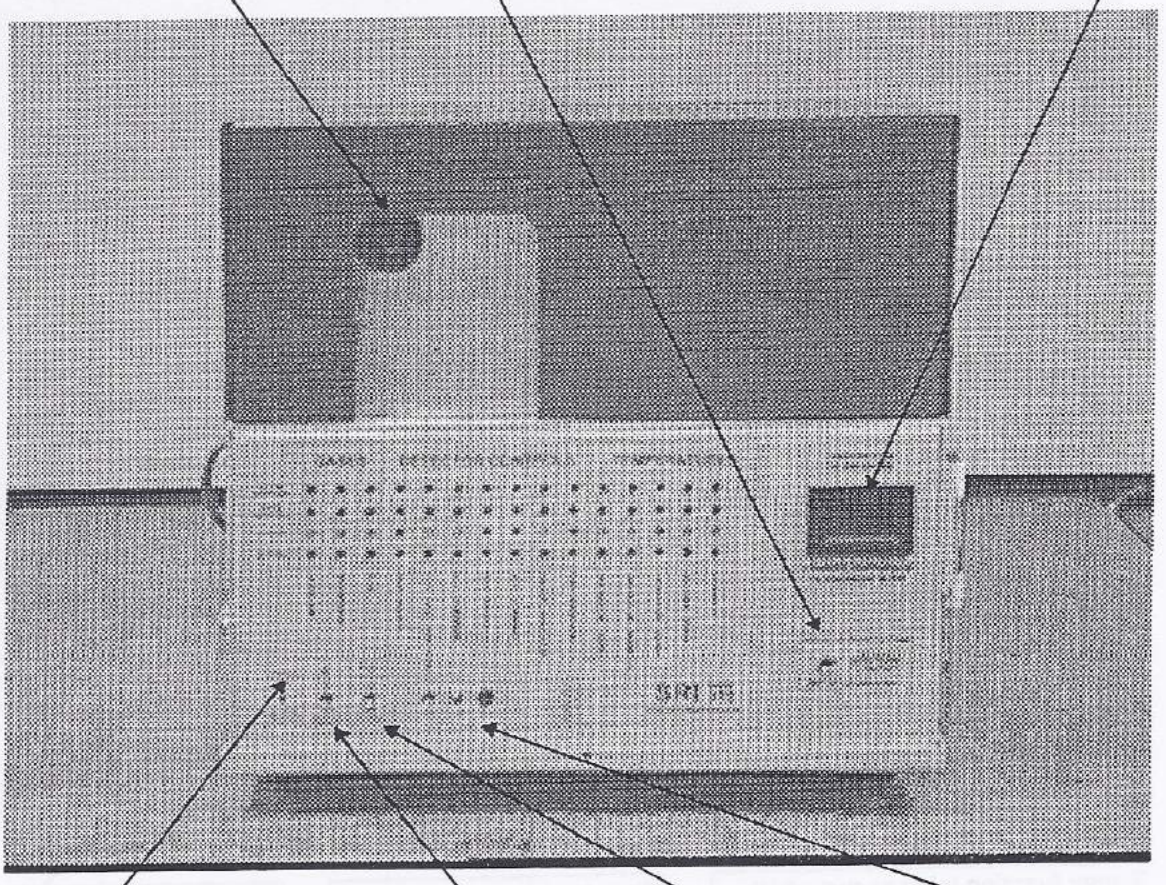
All 8610C gas chromatographs are equipped with a thermostatically-controlled heating block mounted at the base (or inlet) of each detector. This new feature permits the user to preset the temperature of the detector inlet. This is convenient for methods prescribing a specific detector operating temperature, and ensures the temperature stability of each detector. Each detector heating block temperature may be accessed from the "at-a-glance" display panel on the front of the GC for viewing on the bright red, digital LED panel meter. The respective setpoint potentiometer, located on the top control panel immediately forward of the column oven, is easily adjusted using a small blade screwdriver. The TCD and ECD detectors, due to their enclosure in a temperature-controlled detector oven, do not require a heating block. These two detectors are mounted directly to the column oven wall, and the detector inlets and outlets are well-heated by the column oven.

The heated detector mounting blocks, or platforms, permit easy access to, and maintenance of the different detectors. The entire FID and DELCD detector assemblies may be removed for service in seconds. A new PID detector cell and platform design mount horizontally onto a heating block secured to the column oven, and the spring-loaded PID stage accepts compact O-I or Tracor-type PID lamps (a 10.2 eV lamp is standard equipment on SRI PID detectors).

A special electric heating cartridge is used in place of electrical heat ropes used on earlier models. The cartridges in use for detector heating blocks should provide years of service before requiring maintenance. The heating cartridge is installed in a well, drilled into the top of each cast aluminum heating block, and cartridge servicing and replacement is simple to perform, should it become necessary in the future.

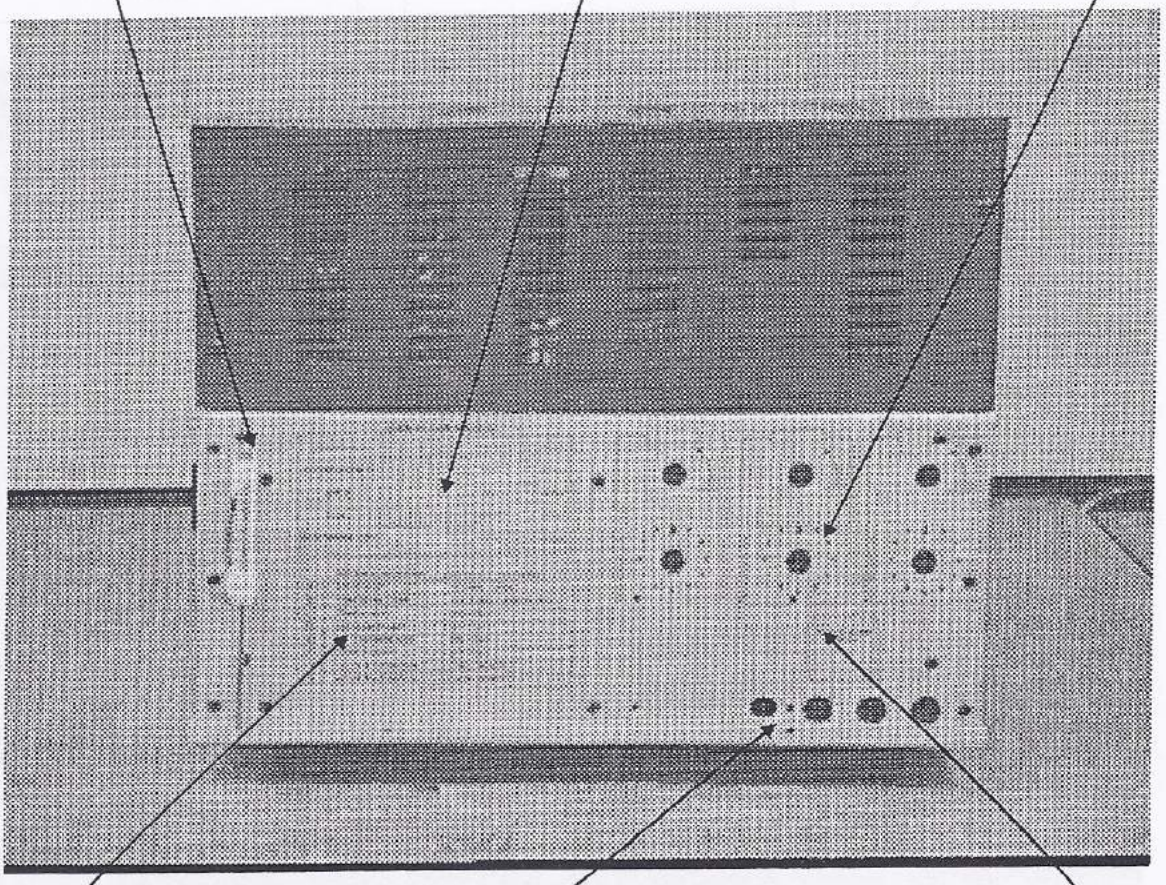
Chapter: MODEL 310 GC CHASSIS

Topic: FRONT PANEL ORIENTATION



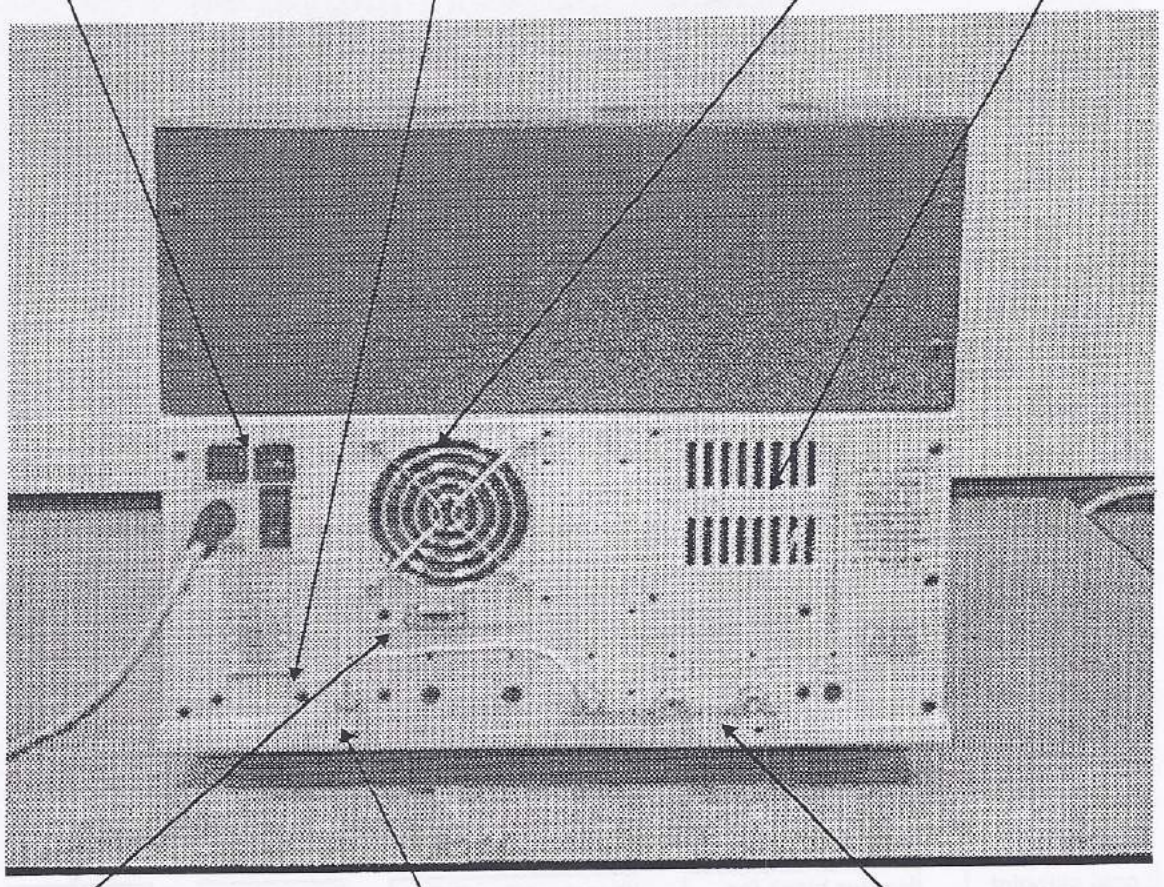
Chapter: MODEL 310 GC CHASSIS

Topic: RIGHT SIDE PANEL ORIENTATION



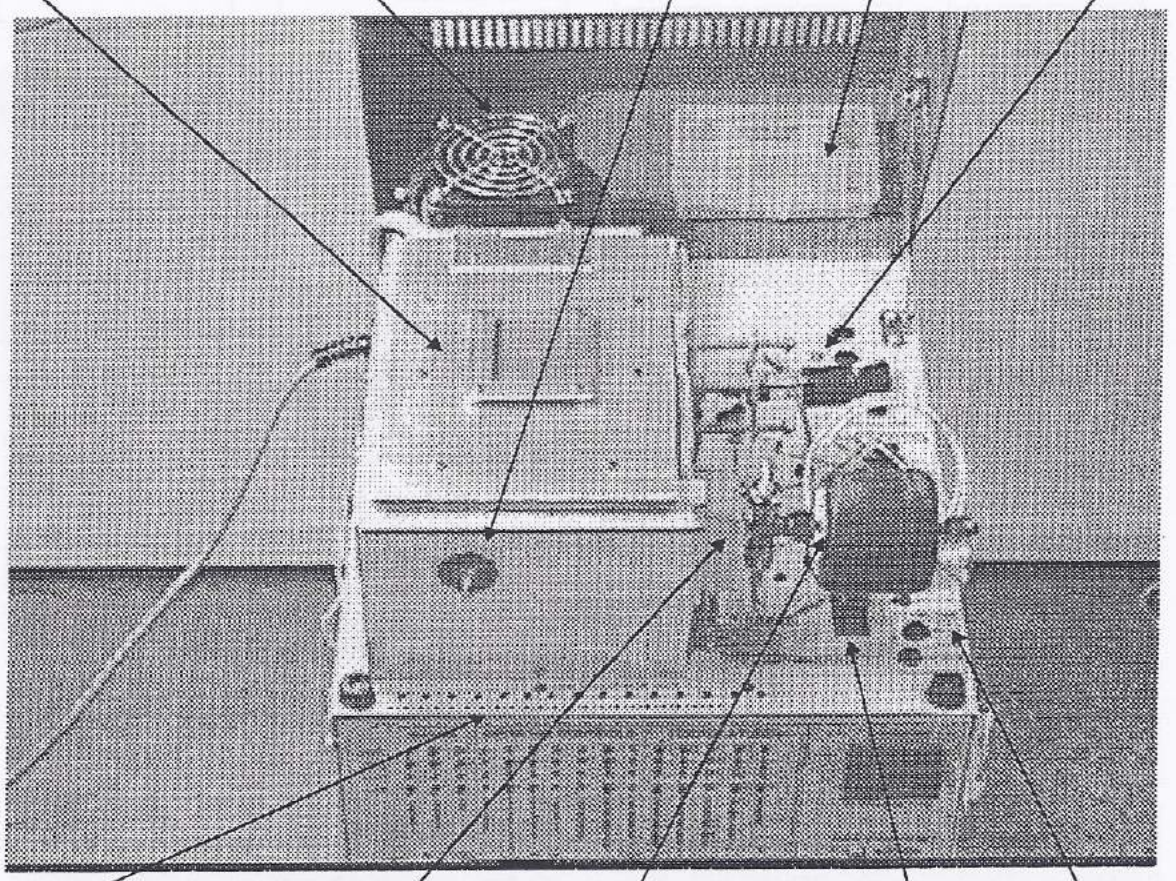
Chapter: MODEL 310 GC CHASSIS

Topic: LEFT SIDE PANEL ORIENTATION



Chapter: MODEL 310 GC CHASSIS

Topic: TOP PANEL ORIENTATION



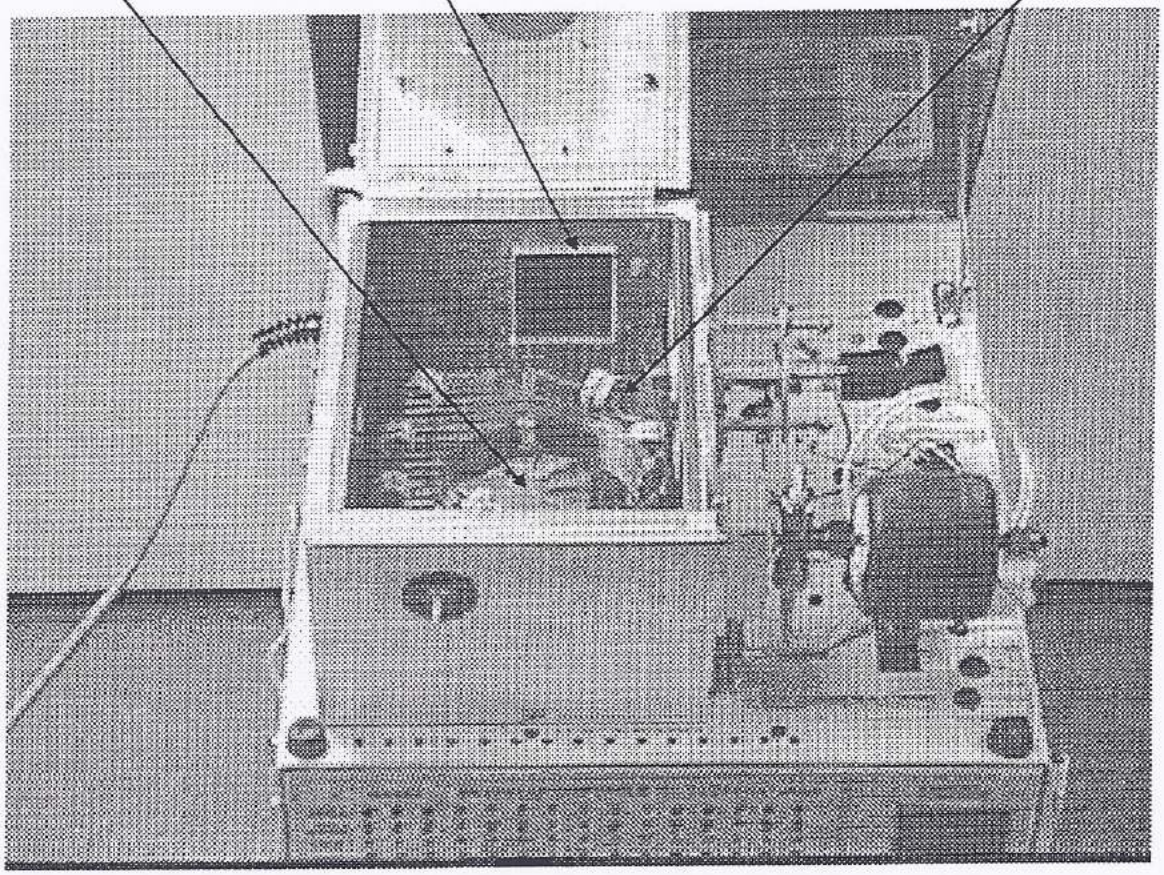
Chapter: MODEL 310 GC CHASSIS

Topic: COLUMN OVEN INTERIOR

60 meter .53 mm. I.D. capillary column shown mounted in column oven.

Duct for cooling air from oven cooling fans.

Circulation fan and heater coils on bottom of column oven. All heater circuits and circulation fan are disabled by interlock switch which is de-activated when red lid is raised.



The column oven on the SRI Model 310 GC is designed for column diameters up to 4" (10 cm.). While this column diameter is smaller than average, most packed and capillary columns can be ordered with the recommended 3.5" coil diameter. Metal capillary columns are suggested because of their ruggedness and long life.

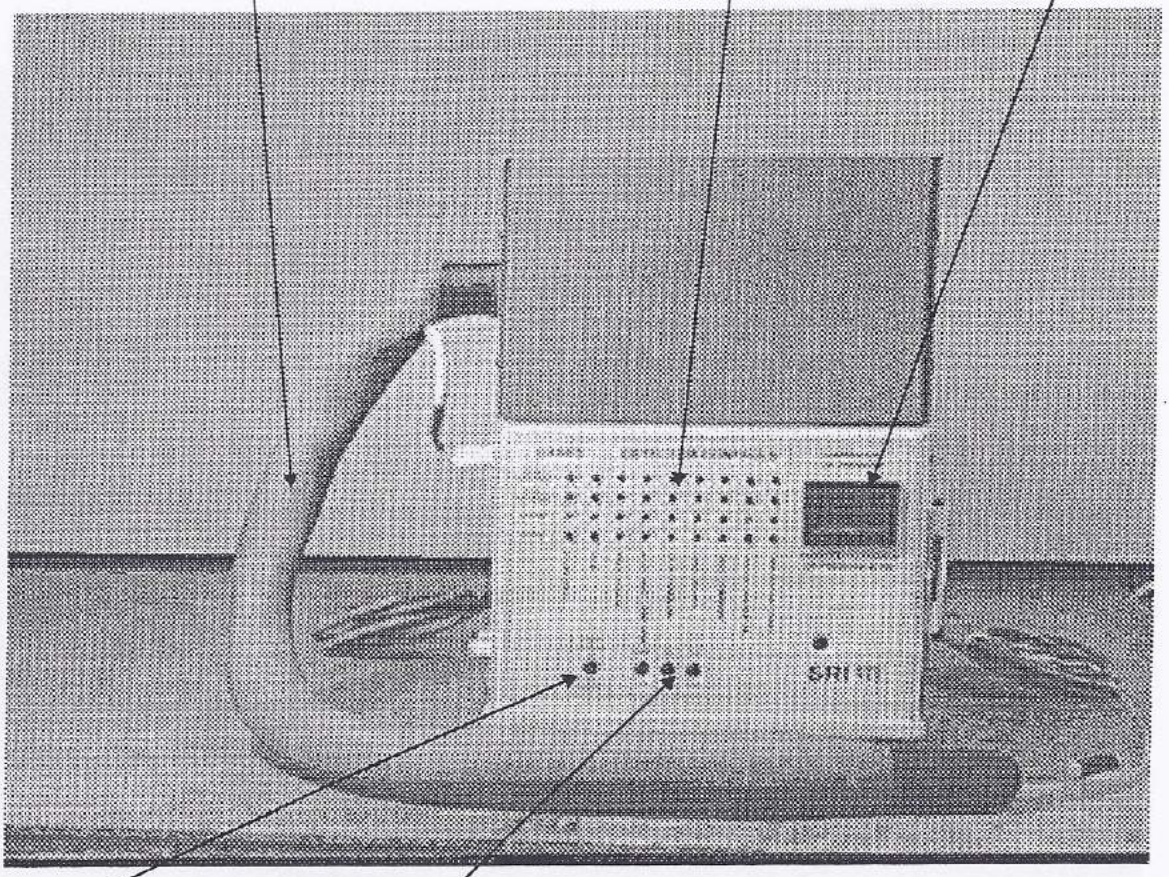
Chapter: MODEL 110 GC CHASSIS

Topic: FRONT PANEL ORIENTATION

Heated transfer line runs about 200 degrees C and has a thick layer of insulation covered by red colored woven tubing. A length of .53mm I.D. silco-steel tubing carries the carrier gas from the host GC to the detector mounted in the 110 chassis.

"At a glance" LED display shows status of all detector parameters

Digital panel meter reads out detector temperatures, voltages, etc. when a specific button on the front panel is depressed.



On/off switch for optional built-in air compressor

Detector parameter on/off switches for FID ignitor, NPD bead voltage, PID lamp current, etc.

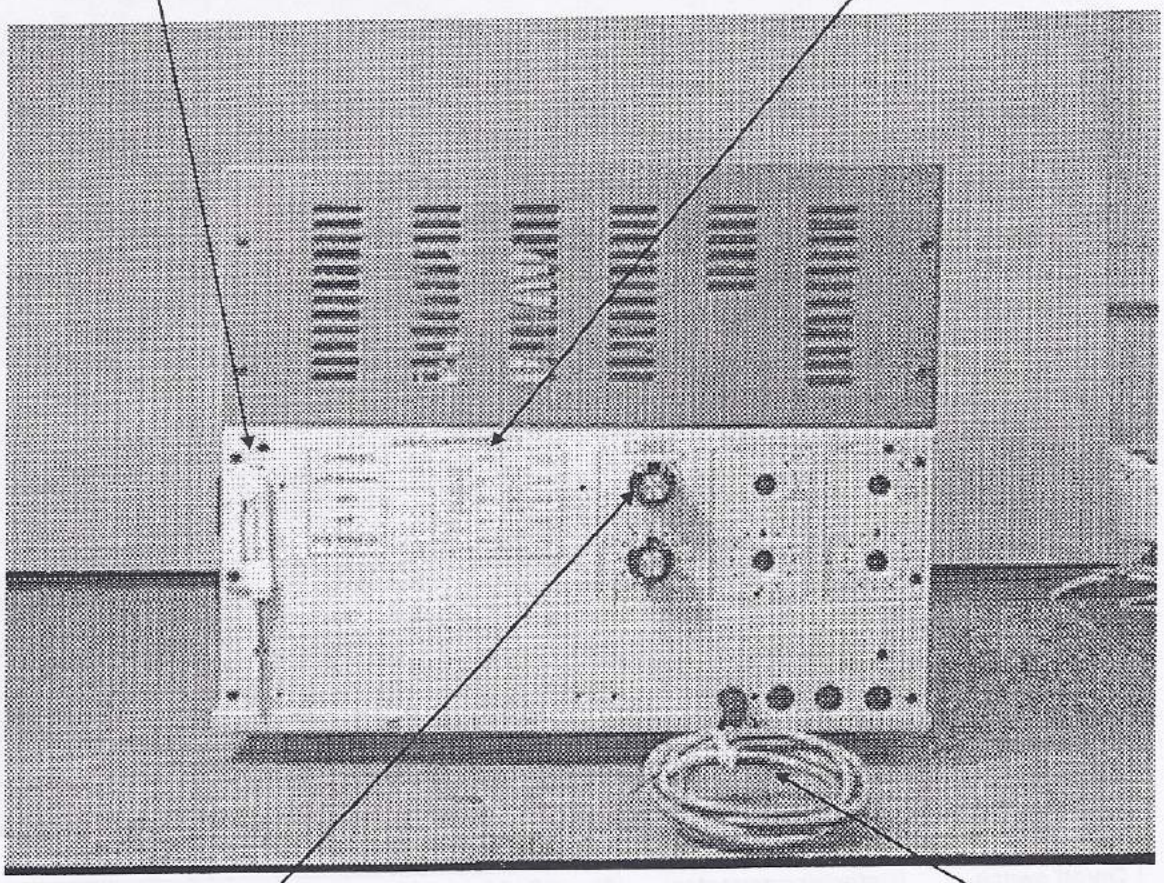
The SRI Model 110 chassis is used primarily as a mounting platform for stand-alone GC detectors. The heated transfer line makes it easy to connect the detector to the host GC since only a small opening into the host GC's column oven is required. User's should note that because the heated transfer line operates at 200 C, some high boiling point analytes may condense before reaching the detector. Where high temperature analyses are envisioned, it makes sense to mount the detector on the GC itself instead of on the stand-alone chassis.

Chapter: MODEL 110 GC CHASSIS

Topic: RIGHT SIDE PANEL ORIENTATION

Screwdriver mounted in handy "holster" for adjusting detector parameters or temperature setpoints

Gas flow rate table is used to record the flow rates and pressures used for detector support gases. Factory technicians record typical flow rates and pressures used to test detectors before shipment during final test at the manufacturing facility.



Zero and attenuator controls for detector output signals. The zero control is a ten turn potentiometer which allows the output from the detector to be offset to 0.00. The attenuator divides the signal by selectable powers of 2 (1,2,4,8 etc.) so that the peak remains on scale when using a strip chart recorder with a fixed span (i.e. 10millivolts full scale). When used with a computer data system or integreator the attenuator control is normally set and left on maximum sensitivity (att=1).

Detector signal cable output wire. This cable containing two wires is hooked up to your strip chart recorder or data system.

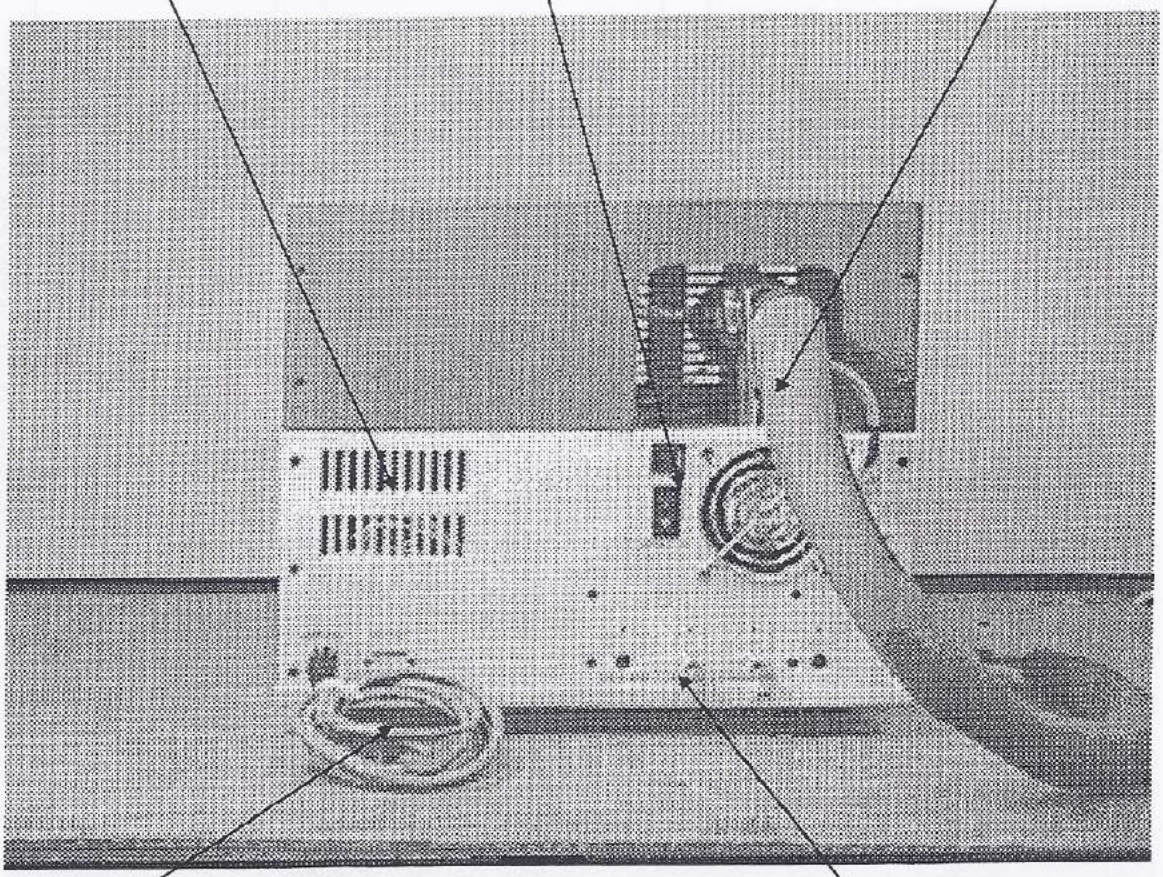
Chapter: MODEL 110 GC CHASSIS

Topic: LEFT SIDE PANEL ORIENTATION

Chassis cooling air exit slots. Air expelled from the chassis by the cooling fan exits through these slots. Do not obstruct the slot openings.

Main power switch, circuit breakers, and chassis cooling fan. This fan cycles on and off to maintain the selected interior chassis temperature.

Heated transfer line for connecting column outlet from host GC to stand-alone detector on Model 110 chassis. Transfer line operates at 200 degrees C. Take care to route transfer line away from heat sensitive surfaces.



Power cord. On 220 volt models it may be necessary to replace the plug on the end of this cord to match the plug type for the country or region.

Gas inlet bulkheads for connection of detector support gases (typically hydrogen and air). Use 1/8th inch O.D. copper tubing to connect gas cylinder to stainless steel bulkhead, not teflon or other plastic tubing types. Use brass ferrules for good sealing.

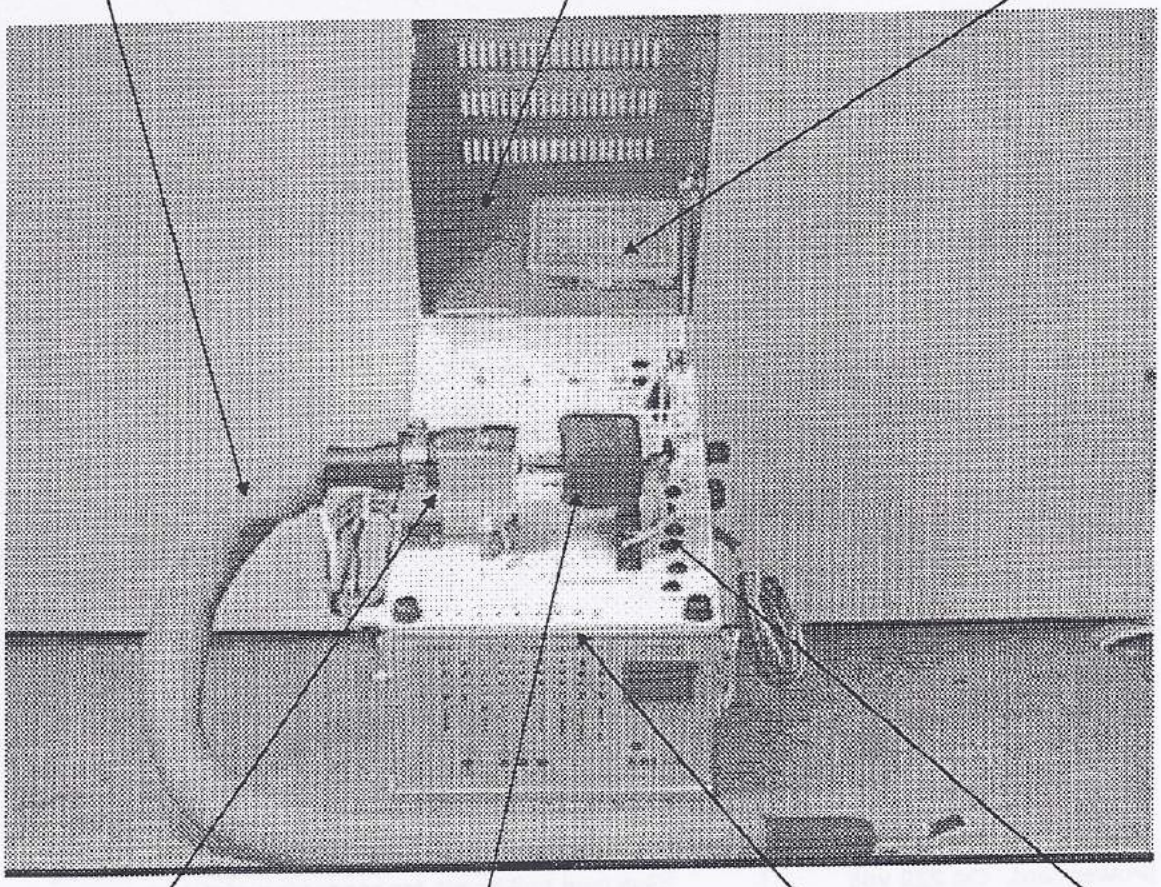
Chapter: MODEL 110 GC CHASSIS

Topic: TOP PANEL ORIENTATION

Heated transfer line connects from host GC to detector mounted on Model 110 chassis. .53mm I.D. silco-steel tubing runs inside heated transfer line so sample only contacts inert fused silica surfaces for most of the length.

Red lid hinges up to allow access to detectors

Spare parts storage container is convenient for keeping extra nuts, ferrules, etc.



Detector heated block and cover terminate transfer line in a hot location to avoid sample condensation

Detector shown above is the SRI DELCD detector, but any of 13 detector types or combinations of detectors may be mounted.

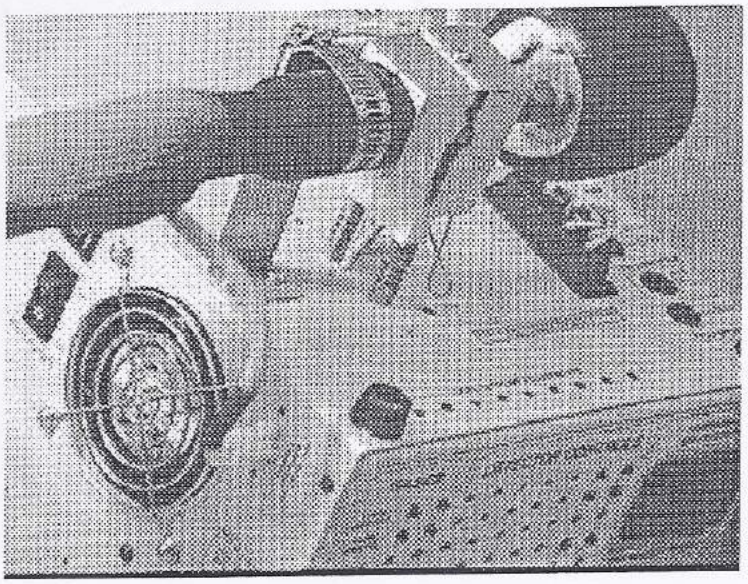
Detector parameter and temperature adjustments are done by using the provided screwdriver to adjust the setpoints through the holes in the forward edge of the chassis

Detector gain controls are located here in the exact same layout as the 310 and 8610C GCs.

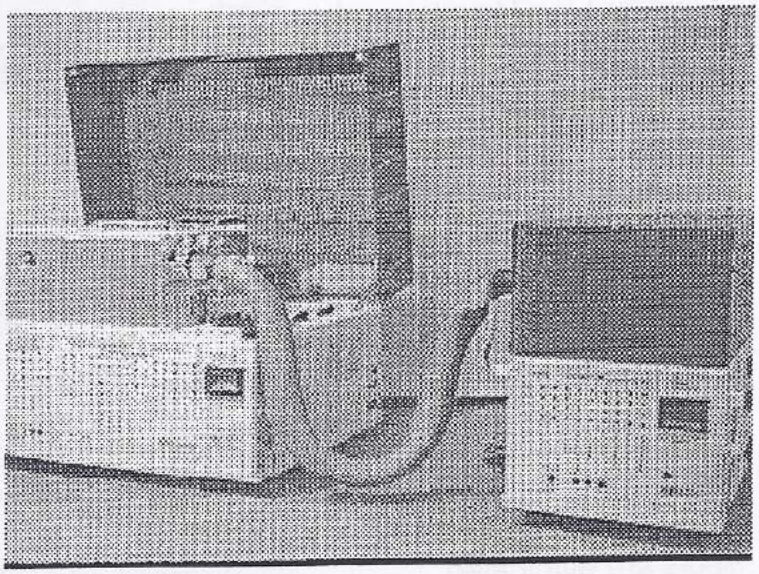
Chapter: MODEL 110 GC CHASSIS

Topic: HEATED TRANSFER LINE

This photo shows the detector end of the heated transfer line as it attaches to the heater block and enclosure. When removing and reattaching the heated transfer line be careful to eliminate any cold spots which could cause sample condensation.



This photo shows the typical installation of the Model 110 to the right of the GC with the heated transfer line connecting the two units. Be careful to route the transfer line so it does not rest on heat sensitive surfaces. In some cases, the lid of the GC may need to have a small notch cut-out of the right side panel to allow the transfer line to exit cleanly from the GC when the red lid is lowered.

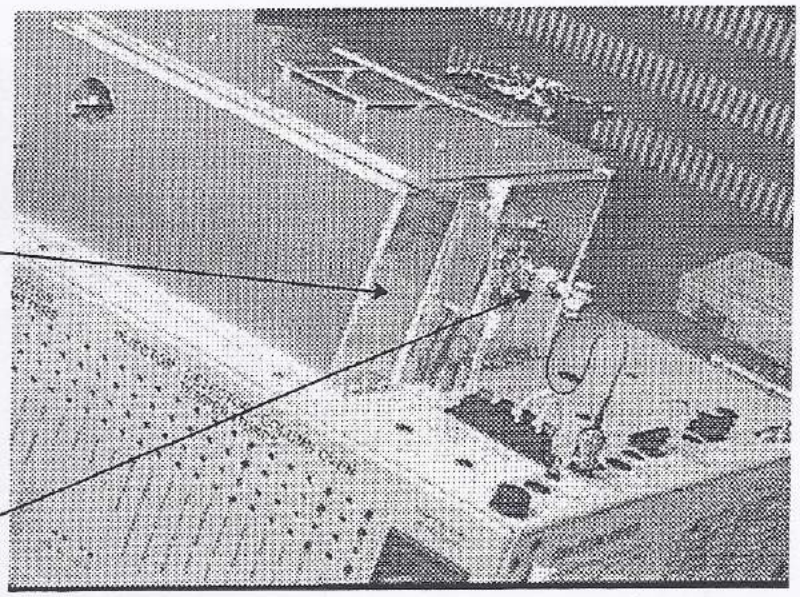


Chapter: MODEL 110 GC CHASSIS

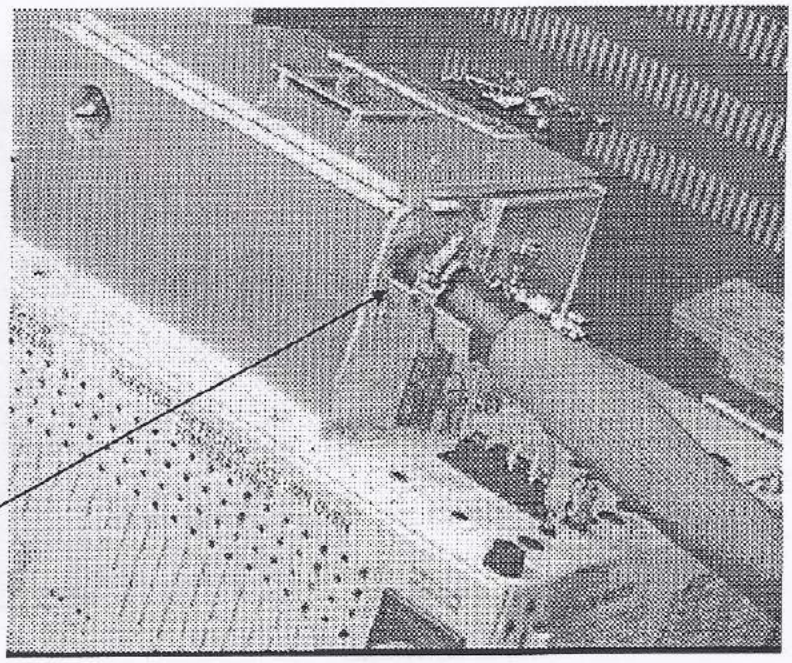
Topic: CONNECTING TRANSFER LINE TO GC

If you are connecting the Model 110 detector to a SRI Model 8610C or 310 GC the right hand side of the GC's column oven has 4 identical detector mounting locations. Locations where no detector is installed are supplied with blank cover plates.

FID detector installed



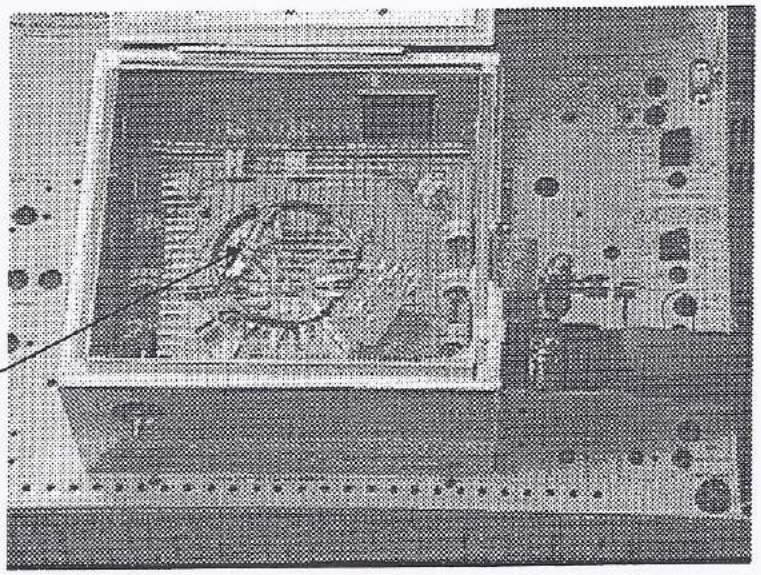
Replace one of the blank cover plates with the Transfer Line Mounting Plate (SRI part# 8670-9836) by removing the two screws at the base of the plate. The nuts on the underside of the chassis must be accessed by removing the bottom plate of the GC. The heated transfer line is then lightly secured to the plate with the hose clamp so that the heated portion of the line penetrates into the column oven so that cold spots are eliminated



Chapter: MODEL 110 GC CHASSIS

Topic: COLUMN/TRANSFER LINE CONNECTION

The .53mm I.D. silco-steel tubing which runs down the center of the transfer line is connected to the end of the analytical column inside the GC's column oven. A special 1/8th inch stainless steel bulkhead union and insert are provided to ensure a low dead volume butt type connection. The union may be mounted on a flange or bracket, or just left hanging in the oven.



The separate parts of the union and column to transfer line connection hardware consist of:
GC column

Nut with graphite ferrule (2)

Stainless Steel bulkhead

Internal alignment guide which holds the transfer line and column butt to butt inside the bulkhead union