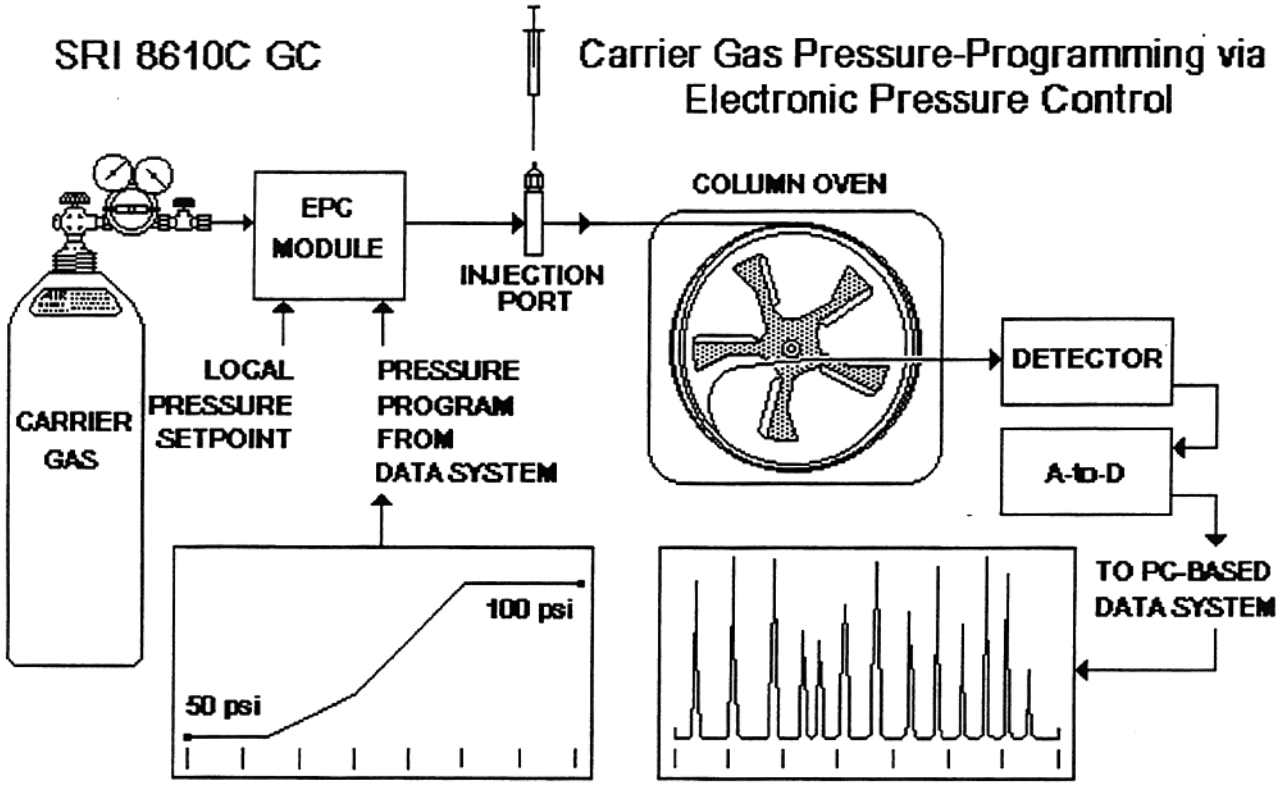
Chapter: INSTALLATION

Topic: Pressure-Programmed Carrier Gas Operation Using EPC System



FLOW CHART ILLUSTRATING CARRIER GAS PRESSURE PROGRAMMING ON THE 8610C GC

All SRI 8610C gas chromatographs are equipped with Electronic (or Pneumatic) Pressure Control (EPC) of all system gases. Each gas, from the carrier gas, to the specific detector gases, such as FID hydrogen and FID compressed air, in the case of an FID detector, are controlled by a dedicated solid-state EPC module that electronically monitors and instantaneously adjusts the pressure being supplied to the particular feature. This electronic control facilitates extreme precision of gas flows to the various functions. Each EPC module features a local, user-adjustable setpoint accessed by a trimpot (variable potentiometer) located just above the particular function on the "at-a-glance" panel display. The carrier gas is among these adjustable setpoints. The term "local" refers to the fact that the "local" setpoint is set manually at the trimpot on the GC chassis. As in the case of the column oven temperature setpoint, the carrier gas pressure setpoint may be set "locally" (manually on the GC chassis), or from the computer via a pressure program. Created in the same format as a PeakSimple temperature program, the program signal is sent to the data system interface and converted to a control voltage that can increase, maintain, or decrease the carrier gas pressure automatically at the user's command.

The PeakSimple serial data system interface offers two rampable voltage outputs - one to program the column oven, and the other to program carrier gas pressure. Outputting a 0 to 5VDC variable signal, the EPC module will permit an output pressure of from 0 to 100psi (the carrier pressure shown is actually the column head pressure). Please note that any local setpoint value will be summed to this signal, resulting in the "total" setpoint value on the panel display. The carrier gas pressure regulator at the gas cylinder should be set 10psi higher than the highest programmed carrier gas head pressure desired for proper control. Ramping permits the head pressure to be varied, to speed or slow the elution of peaks from the analytical column as needed by the application or user.

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Topic: Checking for Gas Leaks

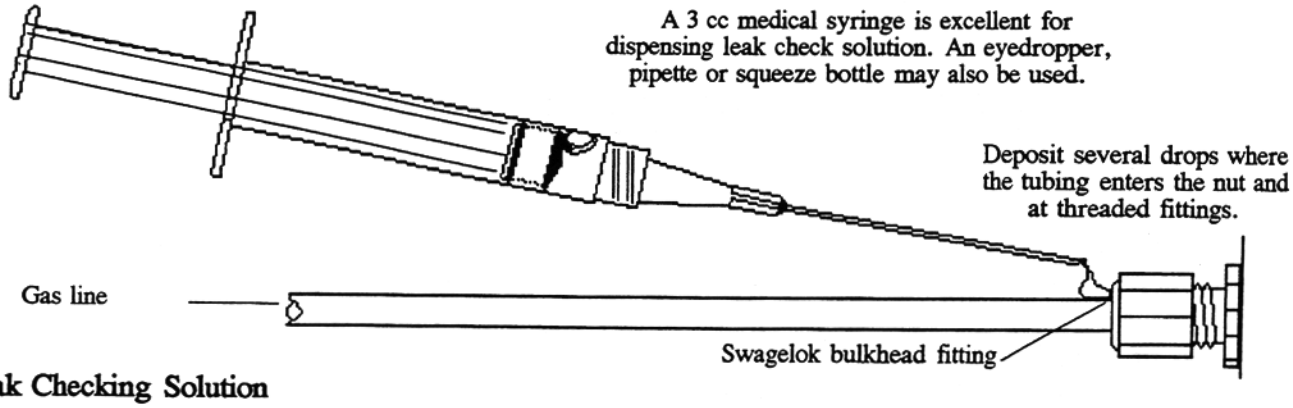
Once all of the appropriate gas supply sources and lines have been properly installed, along with all other GC columns and connections, the entire system should be systematically pressurized and checked for possible leaks. Begin by opening all of the compressed gas cylinder valves and setting exit pressures to the appropriate value for each cylinder regulator. Remember that cylinder exit pressures should never exceed the required GC pressure settings by more than 20 psi and 80 psi is the maximum pressure that the GC can safely handle.

First check for leaks in the lines and connections between the compressed gas cylinder and the GC flow control fluistors. With the system pressurized and the GC power turned off, close each of the compressed gas cylinder valves one at a time and closely watch the pressure indicator on the cylinder regulator to see if pressure decreases. If the system is leak free between these two points, the cylinder pessure indicator should not noticeably decrease for at least five minutes. If pressure does noticably decrease over this time period, then it indicates a significant leak somewhere between the cylinder output and the GC fluistor. Any leak, especially with flammable gases, must be immediately located and repaired. The best way to check specific connections for leaks is with a leak check solution (see section below on Using Leak Check Solution). If pressure test indicates that the system is leak free from the cylinder to the fluistor, then proceed to check the rest of the carrier gas system for leaks. If the system does have a leak, locate and repair prior to proceeding.

Next check for leaks between the fluistor and injection port. Begin by disconnecting the column from the back side of the injection port. Next insert some type of pressure blocking fitting on the injection port where the column was attached. A standard Swagelok nut with an injection septum in place of the ferrule will work quite well. Turn the GC power and gas supply back on. Use the control panel to see what the **actual** carrier pressure value is and write it down. Now turn off the carrier gas supply at the cylinder once again. Wait 5 minutes and then use the GC control panel to view the **actual** carrier pressure once again. If this value has decreased in the 5 minute time frame and the previous test results were negative, it indicates that there is a significant leak somewhere in the interal GC carrier gas lines between the fluistor and the injection port. Once again immediately locate and repair any leaks using a leak check solution as described below.

After all of the leaks upstream from the column have been eliminated and confirmed by the two pressure tests described above, properly attach your column to the injection port. Use leak check solution to check all of the fittings within the column oven for leaks and repair any that you find.

Following all the instructions above will assure the operator that the system is leak free. Any time fittings are changed or the GC is relocated, the system should be rechecked for leaks. Failure to properly repair leaks can cause safety risks as well as operational malfunctions.



Leak Checking Solution

SRI recommends that a solution of 50% water and 50% alcohol (methanol, ethanol, or propanol) be used as a leak check solution. The water-alcohol mixture leaves no residue which could leak through the fittings and cause system contamination. Furthermore, water, when used alone and due to its high surface tension, tends to bead rather than flow into spaces between the tubing and the connectors where leaks may occur. A leak will show up as a stream or froth of tiny bubbles. Inspect any leaking fitting for damaged threads and reversed, missing, or damaged ferrules.