

Re-building customer GC's:

Introduction:

Numerous customers have older, legacy GC's. In these financially squeezed times, these customers want to maximize what resources they currently have. We understand that principle, even live by it ourselves. When it comes to GC's, we can do that. A customer asked us to take an older instrument that had been idle, test it, and automate it for fixed gas analysis. The instrument had never been fully implemented, in part due to the extensive manual operations needed to analyze samples.

Configuration:

The GC system came to us with two columns and two manual switching valves. One of the columns is a Hayesep Q for CO₂ analysis and the second column was a mol-sieve column for gases such as hydrogen, oxygen and nitrogen. The first valve serves as an injector valve and the second valve serves as the column selection valve. We took the GC and removed the manual valve actuators. We then modified each of the purged head stand-off's and installed air actuators along with the requisite pilot valves. In order to communicate with the customers current data system, we also installed a TTL valve driver board so that the current data system could actuate the automated valves. We also plumbed in a gas sampling valve that allows the sample to be equilibrated to atmospheric pressure. Finally, we installed a larger sample loop based on the necessary detection loops. Figure 1 below is a picture of the automated valve installation in the instrument side cabinet.

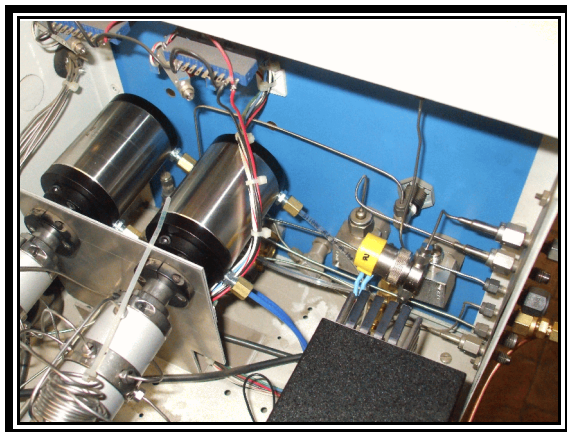


Figure 1: Automated valves installed inside GC cabinet.

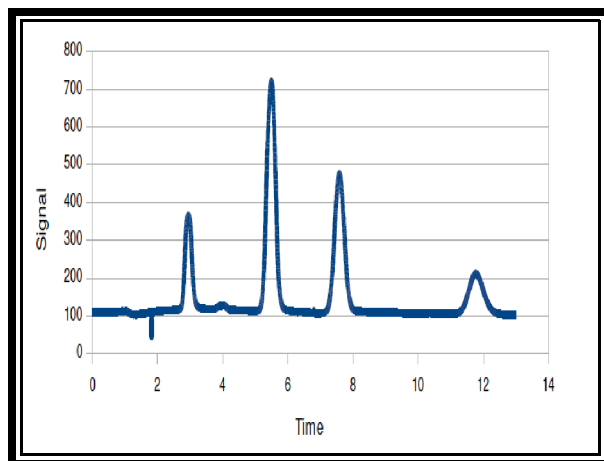


Figure 2: Chromatogram of 10 p.p.m. fixed gases in balance helium.

Results:

Figure 2 above is a chromatogram from a 10 p.p.m. standard of hydrogen, oxygen, nitrogen and methane in a balance of helium run on the mol-sieve column installed in the instrument. In this configuration, CO (not in this mix) comes off in about 16 minutes under isothermal conditions. Methods were built for both the mol-sieve column and for the Hayesep Q column and column switching occurs under the control of the GC data system.

Conclusion:

We were able to take a manually operated customer GC and software and automate the system so that the customer