

CEG499/699-13: INTELLIGENT SENSOR SYSTEMS LABORATORY III: SYSTEM INTEGRATION

In this laboratory you will assemble the flow injection system for the gas sensor array and develop the LabVIEW data collection interface. The instructor will give you the following items:

- One stainless-steel sensor chamber with mounting screws/nuts
- One pump (12VDC) with power connector
- Three solenoid valves (12VDC) with power connectors
- One check valve
- One four-inlet manifold
- One flowmeter kit
- One in-line disposable filter
- 1ft. PVDF tubing (1/4" OD)
- 1ft. Nalgene tubing (1/4" OD)
- Two plugs for the unused manifold inlets (10-32)
- One plug for the unused manifold outlet (1/8 NPT)
- Three compression fittings (10-32 to 1/4" OD)
- Three hose barb fittings (1/8 NPT to 1/4" OD)

SECTION 1: LABVIEW INTEFACE

Based on the programs that you developed on Lab II, you will now create a complete LabVIEW interface to automate the data collection process. A typical "sniffing" cycle should consist of three steps:

- A Wash cycle in which the sensors and the tubing are cleansed with the headspace of an diluted organic solvent (e.g., rubbing alcohol)
- A Reference cycle in which the sensors are allowed to reach a baseline resistance by circulating a reference gas through the system (e.g., filtered room air)
- A Sample cycle in which the sensors are finally exposed to the headspace of the odorous analyte to be analyzed (e.g., ground coffee, pipe tobacco, cedarwood chips and air)

The LabVIEW interface should have the following features

- Numeric control to select a global sampling rate (in samples per second).
- Numeric controls to set up the duration of each sniffing cycle¹ (in seconds)
- String control to select an output text filename².
- Graphical display of the data as it is collected.

SECTION 2: HARDWARE ASSEMBLY

To avoid clutter on your lab bench, do not assemble the system until after you have finished and tested the LabVIEW interface! Follow the schematic shown in Appendix I.

¹ Assign FET switches 1,2 and 3 for the wash, reference and sample solenoid valves, respectively, and FET switch 4 for the pump.

² The output format should be ASCII with one column per sensor, one row per sample. You can easily read the data into MATLAB using the 'load' command.

APPENDIX I. FLOW INJECTION SYSTEM

