Global Analyser Solutions

Sample inlet options

- preserving sample integrity

- quantitative analysis for every situation
- stream-selection
- sampling from small volume or low pressure
- maintaining sample integrity

AN90WA1224B

GAS offers custom configured GC analysers for many application fields for over 45 years. GAS analysers are designed to meet many standardised methods from GPA, ASTM, UOP, ISO, EN and others. The efficient configurations are based on proven GC technology, resulting in robust instruments with an optimal return on investment.

GAS offers custom made inlet options for accurate transfer, conditioning and injection of gas and liquid samples.
Specific sample situations often require tailor made adaptations for keeping the sample in the original state and obtaining correct quantitative results.

Quantitative analysis

For accurate quantitative analysis it is essential to meet the gas laws, combined in equation PV=nRT, which dictates that pressure (P), volume (V) and temperature (T) of the sample have to be constant. V and T are normally addressed since a fixed volume sample loop is used and the injection valve is positioned in a heated oven (see figure 1). When the sample is not offered at a constant pressure, it is necessary to add a sample stop-flow valve or (back) pressure regulator (figure 10). Another way to compensate for pressure differences is using a pressure sensor and a custom calculation by Chromeleon data system.

Sample pump

When the sample is at ambient or sub-ambient pressure, a sample pump is provided to load the sample loop. Various types are available, offering different capacities and resistance to chemicals.

Sampling from low pressure or small volume

Sample loops are adequately flushed when sufficient sample volume is offered. Today experiments however often use small reactor cells or low pressures, so only a small volume is available for sampling, and it is a challenge to flush adequately and inject a representative sample amount. GAS provides a vacuum sampling option by vacuuming the sample loop down to 4 mbar, before sampling. As a result only a few ml of sample is adequate (figure 4). In a similar way analysis of collected samples in canisters or syringes can be performed (figure 6).

Stream selector valves

Stream selector valves are used to accommodate multiple process streams (figure 2). 4 to 16 inlets are offered by a single valve; extra valves can be added for a larger number of inlets. Different selector types are available for various experimental conditions. Figure 3 shows and explains the possibilities. The sample sequence is programmed in the sample table of Chromeleon data system, offering flexible and user friendly automated operation (figure 2).

Avoiding sample condensation / adsorption

A heated interface between sample point and GC analyser avoids condensation of high boiling components. Lengths from 10 cm to hundreds meters are available, heated up to 280 °C. Inert materials and coatings like Sulfinert™ and Dursan™ prevent adsorption of polar components. Please contact us for our coating program (SilcoTec™, SilcoNert™ and others, figure 5).

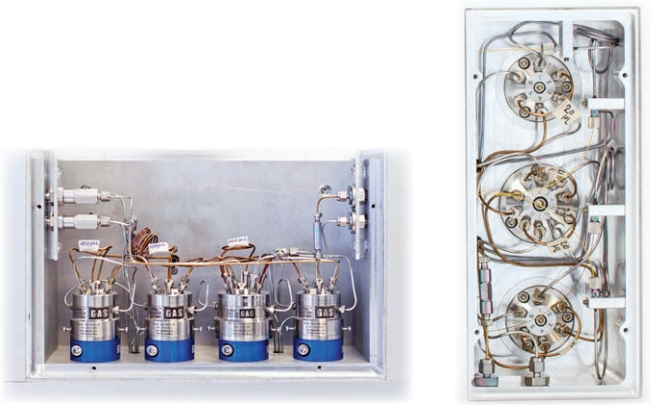
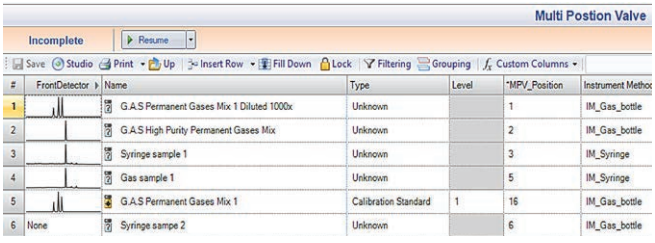
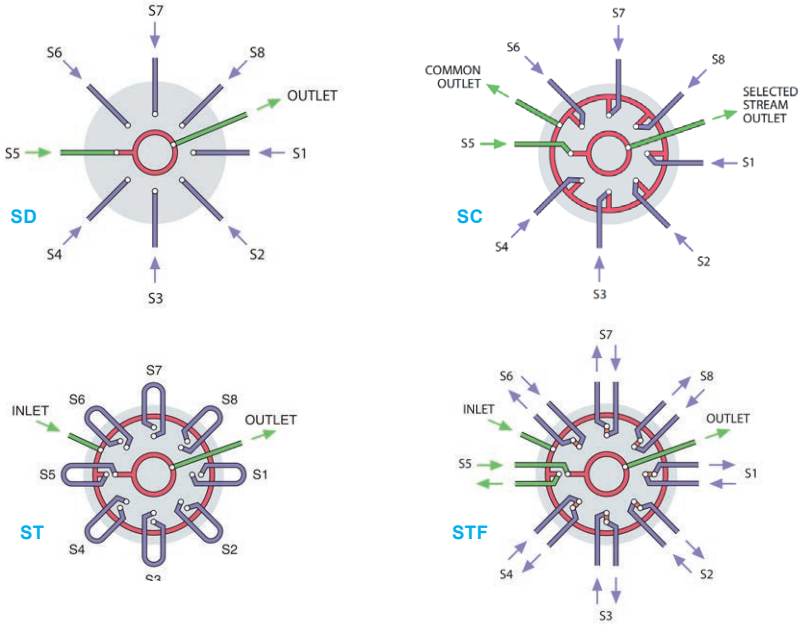


Figure 1. Heated valve oven with diaphragm valves (left: GC1600, right: CompactGC4.0)



#	FrontDetector	Name	Type	Level	*MPV_Position	Instrument Metho
1		G.A.S Permanent Gases Mix 1 Diluted 1000x	Unknown		1	IM_Gas_bottle
2		G.A.S High Purity Permanent Gases Mix	Unknown		2	IM_Gas_bottle
3		Syringe sample 1	Unknown		3	IM_Syringe
4		Gas sample 1	Unknown		5	IM_Syringe
5		G.A.S Permanent Gases Mix 1	Calibration Standard	1	16	IM_Gas_bottle
6	None	Syringe sampe 2	Unknown		6	IM_Gas_bottle

Figure 2. Sample stream selector controlled by Chromeleon data system. Column 'MPV Position' is used for flexible sequence programming.



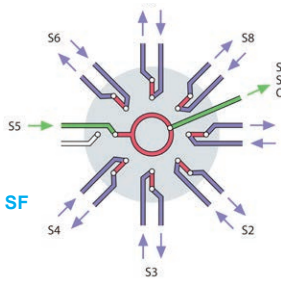


Figure 3. Selector valve flowpath configurations.

SD (dead ended): not-selected streams are blocked
SC (common outlet): not-selected streams to common outlet
SF (flow-through): not-selected streams to individual outlets
ST (trapping): for fast storing of sample in multi loops
STF (trapping flow-through): variation on ST, but not-selected streams to their own vents

Filters and moisture trap

Particle filters and frits in various pore sizes protect the analyser, and can be coated to avoid adsorption of analysed components. Permapure™ filters are available to remove excess of moisture, however components of interest can be lost as well. Since the robust design of GAS analysers can handle water, often wet samples are allowed to enter the system to preserve sample integrity.

Sample Securitiser and Vaporiser

GAS offer the Sample Securitiser for accurate liquid injection of LPG samples. The Vaporiser is available for evaporation of LPG samples before injection as a gas. See figure 8 & 9 and the specific application notes.

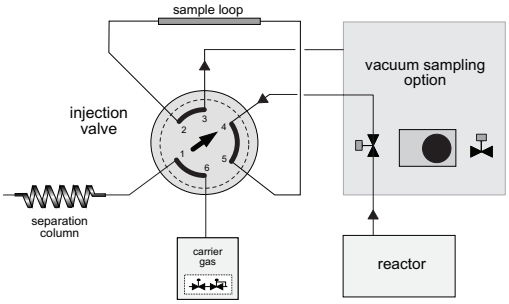


Figure 4. Vacuum sampling option for sampling from small volumes or low pressure.

Figure 5. Coated tubing and parts are mandatory for trace analysis of polar components

Figure 6.
Automatic sampling of samples collected in syringes

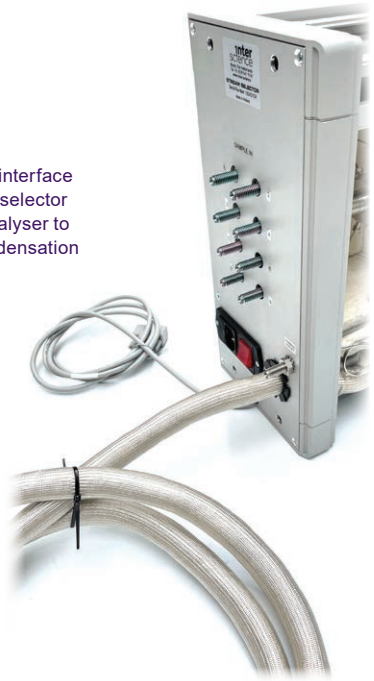


Figure 7. Heated interface between heated selector valve and GC analyser to avoid sample condensation

Specification

Application: Sample inlet systems for various GAS analysers, preserving sample integrity and enabling highly quantitative analysis

Options:

- Stop flow valve
- (Back) pressure regulator
- Heated sample interface
- Selector valves (optionally heated), 4-16 sample inlets per valve, sequence programmed by Chromeleon datasystem.
- Sample pump
- Partical filters
- Water traps
- Oil filters
- Coated parts and tubing (Silcosteel, Sulfinert, SilcoTec, SilcoNert, Dursan and others)
- Corrosion resistant parts (Hastelloy C, Teflon and others)
- Sample Securitiser
- Vaporiser

Figure 8. GAS Vaporiser for gas injection of liquefied gases

Figure 9. GAS Sample securitiser for liquid injection of liquefied gases

Figure 10. Dual channel sample conditioner with filters, backpressure regulators and rotameters