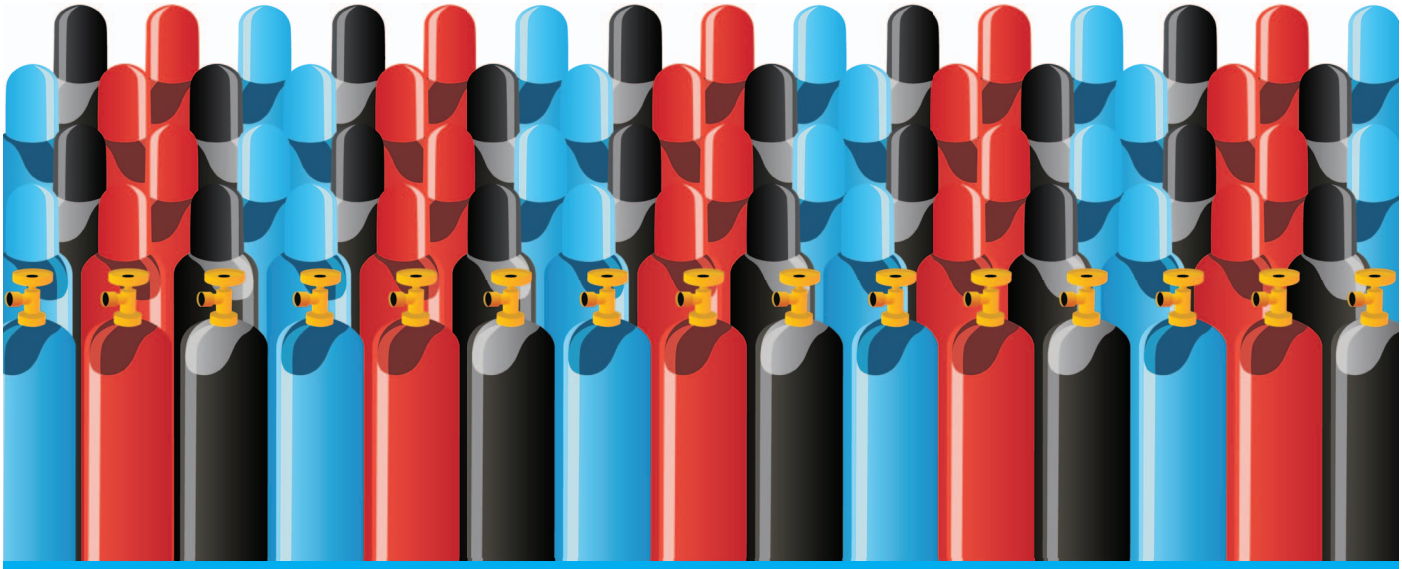
GLOBAL™ ANALYSER SOLUTIONS G·A·S



Permanent Gas Analyser

- Robust analyser with high uptime
- Reliable diaphragm valves
- Modular detectors
- ASTM D1946, D2504, D2505

AN 203WA0914C

GAS offers custom configured GC analysers for many application fields since 40 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.

The Permanent Gas Analyser (PGA) is the customised solution for analysing permanent gases, hydrocarbons and sulphur components in several gas matrices. The analyser complies with ASTM D1946, D2504 and D2505.
Various options are offered for extending the application range.

Analysed Components

Diagram 1 shows the principle of the PGA: H_2, O_2, N_2, CH_4 and CO are analysed on Molsieve column, while CO_2, Ethylene, Ethane, Acetylene and H_2S are analysed on column Hayesep 2. COS can be measured as well. Column Hayesep 1 is used to backflush C_3 and higher boiling components to vent. The used detector is Thermal Conductivity Detector (TCD).

Robust diaphragm valves

The PGA uses robust diaphragm valves with internal purge, mounted in an independently heated valve oven. These valves offer 5 times longer lifetime compared to rotary valves, with reduced maintenance costs as a result.

Benchtop GC or Micro GC

The GAS Permanent Gas Analyser is available on Thermo Trace 1300/1310 benchtop GC, which offers unique InstantConnect injector and detector modules that can be exchanged by the user in minutes. The PGA is also offered on GAS CompactGC$^{4.0}$, the 19" micro GC with fast analysis times.

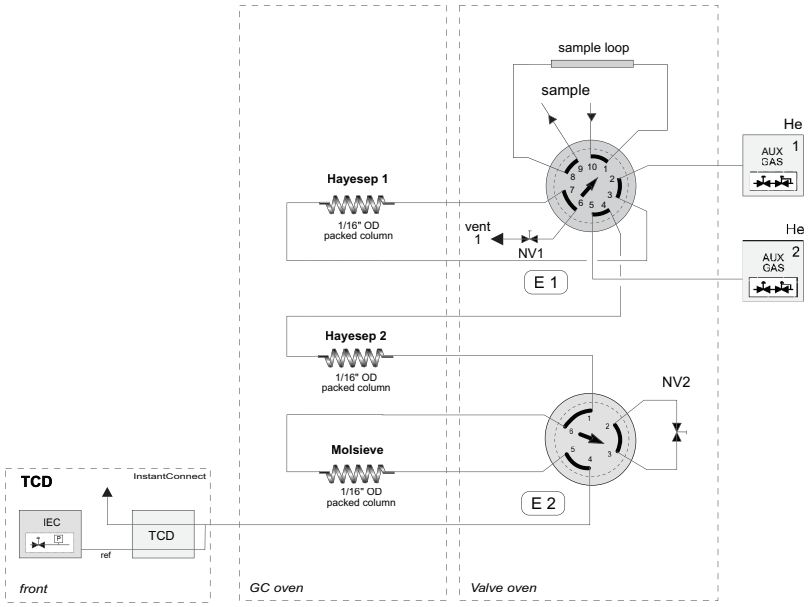


Figure 1. Diagram Permanent Gas Analyser

Figure 2. Diaphragm valve for extended lifetime

Results

Figure 3 shows a typical chromatogram; figure 4 shows excellent repeatability.

Chromatography Data Systems

Powerful, easy to use data systems offer a high level of automation and reporting. The PGA is available with Chromeleon or OpenLab.

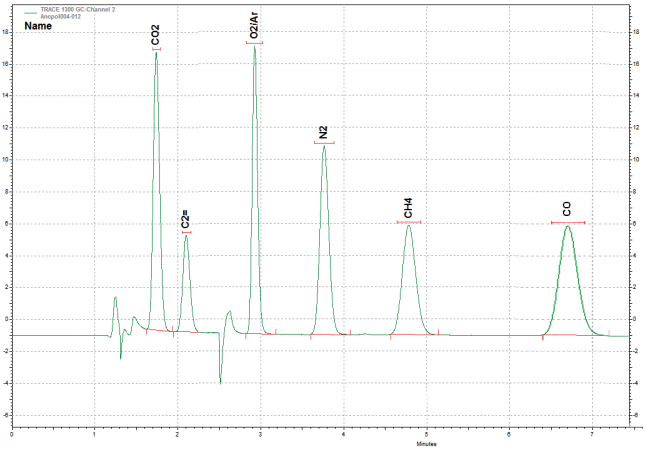


Figure 3. Chromatogram PGA, TCD detection, 1 % concentration level.

Options:

- H_2 analysis

The PGA uses Helium for carrier gas; Hydrogen is therefore detected with reduced sensitivity and linearity. An optional second channel is available with N_2 or Ar carrier gas for optimal H_2 analysis.

- Hydrocarbon analysis

An optional channel with FID detection is available for extended hydrocarbon analysis up to C_8 or C_{20}, depending on required separation. In that case the columns for permanent gas analysis are mounted in the valve oven, allowing an optimal temperature program for hydrocarbon separation using the GC column oven.

- Low sulphur analysis

The standard PGA configuration offers H_2S detection with TCD detection level (COS can be included). An additional channel with FPD or PFPD is available for low ppm/ppb sulphur analysis. Contact us for more information.

- Low ppm CO / CO_2 analyser - UOP 603

GAS also offers low ppm/ppb CO and CO2 analysis based on Methaniser/FID detection as a separate analyser (application note available), which can be combined with the PGA on the same GC instrument.

- Multistream analyser / stop flow sampling

For analysing multiple streams (up to 16), a multi-stream selector valve is offered, allowing unattended sampling. Other options are stop flow sampling for highly quantitative results or vacuum sampling in case of low sample pressure or low sample volume.

- PGA on CompactGC4.0

For fast analysis of permanent gases in only 60 seconds, CompactGC4.0 is offered. Robust diaphragm valves are used in a compact 19" industrial standard enclosure.

	CO2 Area	O2/Ar Area	N2 Area	CH4 Area
	940359	828079	884555	779277
	939330	828601	885834	775493
	935071	827641	881940	772190
	941345	831751	886659	778352
	936345	829598	882438	776315
	933830	827408	884447	772634
Min:	933830	827408	881940	772190
Max:	941345	831751	886659	779277
Mean:	937713	828846	884312	775710
Std Dev:	3057	1623	1846	2897
%RSD:	0.33	0.20	0.21	0.37

Figure 4. Excellent repeatability. 1 % Concentration level.

Figure 5. Permanent Gas Analyser based on GC 1300 with valve oven

Specifications:

Standardised method:	ASTM D1946, D2504, D2505
Configuration:	1 channel instrument with gas injection and TCD detection
GC instrument:	Thermo GC Trace 1300/1310 or CompactGC$^{4.0}$
Optional:	- FID detector for improved sensitivity for hydrocarbons - Methaniser-FID option for low ppm/ppb CO-CO_2 detection - Addtional channel for H_2 using second TCD and Ar or N_2 for carrier gas - Additional channel for hydrocarbons up to C_8, C_{12} or C_{20}, depending on used capillary column; FID detection - Additional channel for low ppm / ppb sulphur detection using (P)FPD - Sample stop flow valve for accurate results - Selector valve for multiple stream analysis
Sample tubing:	Sulfinert® tubing for inert sample path (H_2S analysis)
Application:	Custom configured analyser for the analysis of gaseous samples containing permanent gases. The instrument is factory tuned for the specific application intended
Sample requirements:	See our pre-installation guide for additional requirements
Analysis Time:	< 10 minutes
Minimum detectability:	10 ppm depending on sample loop volume and separation
Dynamic Range:	Four decades for all components
Accuracy:	Better than 1 % RSD
Repeatability:	Better than 1 % RSD (depending on application and configuration)

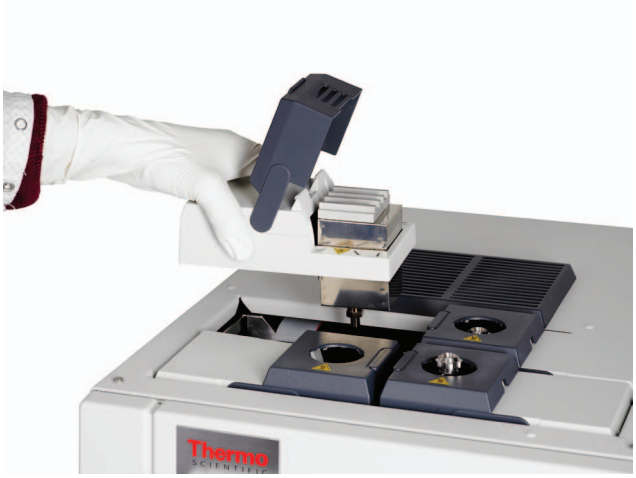


Figure 6. iConnect injectors and detectors: flexible; low maintenance costs

Figure 7. CompactGC$^{4.0}$ Permanent Gas Analyser

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MADE IN HOLLAND

GAS is an Interscience company