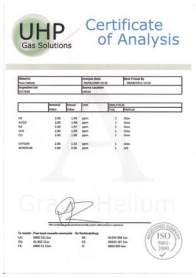
TrendVision Software

From AGC Instruments, TrendVision Gas Chromatography Software is the complete chromatography package specifically designed to address the needs of gas chromatograph users in various areas of Industry. Comprised of the TrendVision Interface and Software Program, it is the fourth generation offering built on the foundation of previous successful TrendVision products. With a large installation base worldwide, it is in continuous development with an intuitive and industry-proven operation. TrendVision has been fully redesigned to meet the needs of modern operating systems and is tailored for industrial use, offering complete functionality that is easy to navigate and use.

TrendVision provides a unified chromatography method whereby all settings are contained in a single method, including event tables, calibration tables and integration settings. In addition, this software enables AGC GC systems to run in a fully unattended mode. It can also take control of GC systems and automatically perform the required analysis using the pre-programmed methods. This is coupled with the ability to send results back to a DCS or control room using fieldbus protocols or traditional 4-20 mA signalling. Ethernet connectivity also provides for remote support where required. If On-Line operation is not required then the software runs equally well in its Stand-Alone mode with the same functionality and ease of use.



Aftersales Care

AGC Instruments are committed to providing and maintaining quality systems from customer liaison to technical knowledge through to System Design and Delivery. With each system manufactured under the auspices of ISO 9001:2015, guaranteed applications are achieved with the utmost quality. To coincide with this, we believe that our After Sales Support to the customer is one of the most important services we can offer. Each Distributor has been carefully selected and trained to ensure our customers receive the best possible service. Furthermore, online customer support and direct support are available to deliver a comprehensive support package.

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AGC INSTRUMENTS
Gas Chromatography since 1965

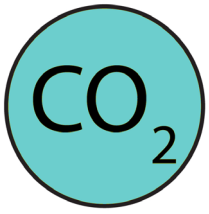
nqa. ISO 9001 QUALITY MANAGEMENT

AGC Instruments Customised CO_2 Analysis Solutions

V2.2
31/03/23

Gas Analysis at %, ppm and ppb levels

Carbon Dioxide (CO_2) is an invisible, colourless and odourless gas which is non-toxic, inert and non-flammable. It exists as a liquid, gas or solid, dependant on the temperature and pressure conditions. Typical CO_2 sources include: direct combustion of fossil fuel, stack / flue gas recovery, recovery from breweries, by-product from (bio)chemical processes (such as ethylene oxide production, ammonia synthesis, bio-ethanol production, hydro-cracking…etc.) and natural sources such as gas wells. AGC Instruments provides a range of modular analysis technologies covering all the required impurities in Carbon Dioxide (CO_2). The approved analytical measurements avoid database derivations and provide traceable calibration technologies.



Company Profile

AGC Instruments is a leading manufacturer of Gas Analysis Solutions to all users requiring a Quality Control or identification of their gas stream. We have over 50 years experience in providing our customers with their "Total Gas Analysis Solutions".

We work closely with all customers to ensure they obtain the analytical solution that meets their needs and a system that is easy to use and understand. All AGC distributors are extremely experienced and factory trained to the highest standards offering you a complete after sales support service.

The wide range of detectors available can be customised to measure unique gas streams and we place an emphasis on the continuous development of our analytical solutions. Our worldwide reach with strategic partners ensures that you have peace of mind and after sales care that are important to your operations.

Applications

- CO_2 Industrial Grade
- CO_2 Laser Gas
- CO_2 Electronic Grade
- CO_2 Capture Product Gas
- CO_2 Dry Ice
- CO_2 Food & Beverage Grade (EIGA/ISBT/CGA)
- CO_2 Medical Grade
- CO_2 Zero Grade

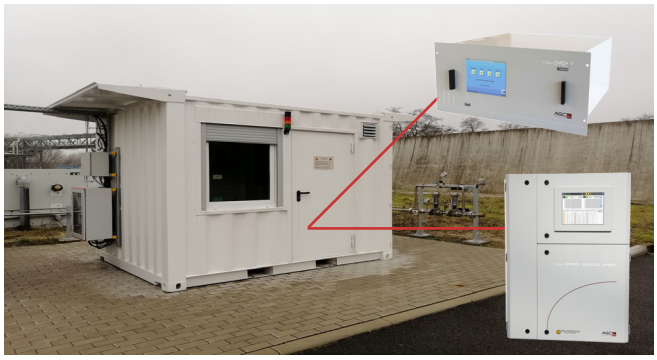
Analytical Solutions

- Individual Target Analysis
- Wide-Range Monitoring Analysis
- Turn-Key Integrations (Truck Filling / Monitoring, Process Control)
- Adapted Sample Handling Distribution Infrastructure

Product Ranges

- Total Hydrocarbon Analyser (THC-NMHC)
- Gas Chromatographs
  with versatile approved detector technology
  (HC specific as CH_4 , Alkanes, Alkenes, C_2H_2 , H_2S , COS , CS_2 , RSH , Total S , H_2 , O_2 , N_2 , CO , toxic VOC as BTEX, Aldehydes, Alcohols)
- Add-on Gas Monitors with individual technology
  (NO_x / NH_3 / H_2O).

Typical Analytical Shelter



AGC INSTRUMENTS
Gas Chromatography since 1965

www.agc-instruments.com

CO_2 Analyses Overview

NovaSTREAM 6000 Analyser

Permanent Gases / CH_4 / THC

- THC: Direct Response
- GC: Selective Response / Free of Interference
- Shortest Possible Reaction Time
- Multi-component analysis using one G.C. run

Model & Typical Range*	H_2	Ar	O_2	N_2	CH_4	CO	THC	NMHC
NovaSTREAM 6000-24 (ppm/high ppb)					✓		✓	By Calculation
NovaCHROM/PRO FID (ppm / ppb)					✓		✓	✓
NovaCHROM/PRO TCD (ppm)	✓	✓ Combined Reading		✓	✓	✓		
NovaCHROM ADD (ppm / high ppb)	✓		✓	✓	✓	✓		
NovaCHROM/PRO DID (low ppm / ppb)	✓	✓ Combined Reading		✓	✓	✓		

*Other Ranges available on demand

NovaCHROM Gas Chromatograph

Toxic VOC / BTEX / Hydrocarbons

- Selective Response / Free of Interference
- Shortest Possible Reaction Time
- Wide range of Hydrocarbons including new types of CO_2 sources
- Multi-component analysis using one G.C. run

Model & Typical Range*	Acetaldehyde	Methanol	Ethanol	DME	Acetone	C_2-C_6 Alkanes	C_2-C_6 Alkenes	C_2H_2
NovaCHROM/PRO FID (ppm/ ppb)	✓	✓	✓	✓	✓	✓	✓	✓

Model & Typical Range	Benzene	Toluene	Xylenes	Ethylbenzene
NovaCHROM/PRO FID (ppm / ppb)	✓	✓	✓	✓
NovaCHROM/PRO PID (ppm / ppb)	✓	✓	✓	✓

*Other Ranges available on demand

NovaPRO 9000 Process Gas Chromatograph

Total Sulphur / Specific Sulphur Species

- Selective Detection of Specific Impurities or Total Sulphur
- Typical Analysis Time: 3 - 5 Minutes
- No interference by Matrix Gas and Moisture

Model & Typical Range	Total Sulphur	SO_2	H_2S	COS
NovaCHROM/PRO FPD (low ppm & ppb)	✓	✓	✓	✓

Model & Typical Range	RSH	CS_2	R - S - R	R - S_2 - R
NovaCHROM/PRO FPD (low ppm & ppb)	✓	✓	✓	✓

NovaAIR Gas Chromatograph

H_2O / NOx / NH_3

- Direct Response by Stream Monitors
- H_2O: Several Detection Technologies Available
- NOx: Integrated Dilution System for CLD monitoring
- NH_3: Add-on Converter to CLD monitor

Model & Typical Range	H_2O	NO	NO_2	NOx	NH_3
H_2O Monitor (0.5 to 100ppm)	✓				
H_2O Monitor (0.1 to 10ppm)	✓				
NOx Monitor (low ppm / ppb)		✓ *	By Calculation	✓	
NOx / NH_3 Monitor (low ppm / ppb)		✓	✓ *	✓	✓

The individual brochures and data sheets for each of the products mentioned can be found on the AGC Instruments website.

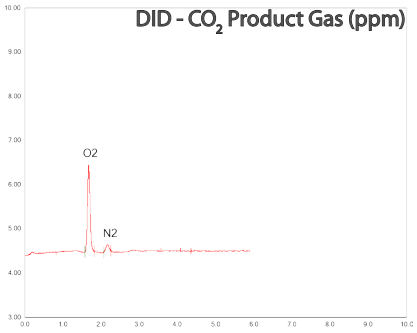
* As Option

Detectors

Discharge Ionisation Detector (DID)

Based on using a non-radioactive, universal and concentration-dependent design, the detector generates high energy photons through an electrical discharge in Helium. The metastable Helium then ionises all components except Helium.

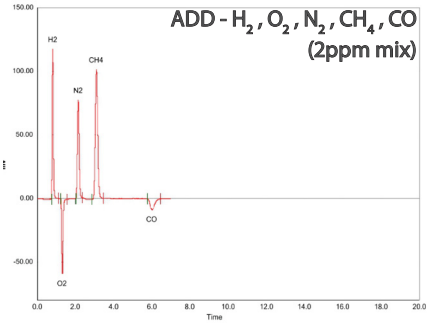
Carrier Gas: He N6.0
CO_2 Applications: ppm , ppb permanent gases
(by using multiple column ovens and backflush technique)



Argon Discharge Detector (ADD)

The Argon Discharge Detector uses high energy electromagnetic field, through which the carrier gas passes, produces an ionising effect. This process transforms the gas to a plasma state and a by-product of this is the emission of photons of light. As the sample component elutes from the column, the light intensity is altered and this light emission can be monitored by a sensitive, tuned photo-diode.

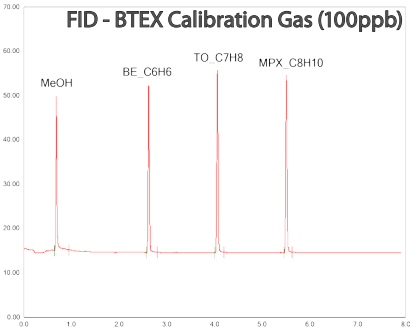
Carrier Gas: Ar N6.0
CO_2 Applications: ppm permanent gases
(by using multiple column ovens and backflush technique)



Flame Ionisation Detector (FID)

The presence of hydrocarbons is detectable by burning the sampled gas in an air-hydrogen flame. Burning just pure hydrogen with air produces only small amounts of ionisation and thus the presence of hydrocarbons causes increased levels of ionisation. A catalyst such as a Methaniser Module can be used for CO / CO_2 readings.

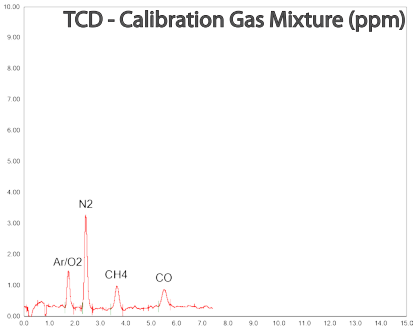
Typical Carrier Gas: N_2 , Ar (recommended) or He (if combined with a DID)
CO_2 Applications:
- THC & CH_4 ppm/ppb
- Toxic VOC ppb (e.g. Acetaldehyde, Methanol) by using focussing technique and multiple ovens
- Aromatic Hydrocarbons (e.g. BTEX)
- Alkanes / Alkenes C_1 - C_6



Thermal Conductivity Detector (TCD)

Four sensing elements are connected to form an electrical Wheatstone bridge circuit. An electrical current from a regulated power source heats the elements and changes in thermal conductivity of the sample gas result in an output voltage change.

Typical Carrier Gas: For high ppm range: H_2 or He N5.0
For low ppm range: H_2 or He N6.0
CO_2 Applications: ppm permanent gases using single or dual column oven techniques



Flame Photometric Detector (FPD)

The double Flame Photometric Detector (FPD) is designed to give a selective response to sulphur or phosphorous compounds. When an excitation energy is applied to the atoms of an element, a photometric emission spectrum is obtained whose wavelength is characteristic of the element. The intensity of the emitted light is proportional to the number of atoms excited. The double flame technology eliminates the well-known cross-interference caused by the matrix gas.

Typical Carrier Gas: Ar or N_2 N6.0 (Others available upon request)
CO_2 Applications: ppb H_2S / COS / SO_2 / Total Sulphur
(by using multiple oven techniques)

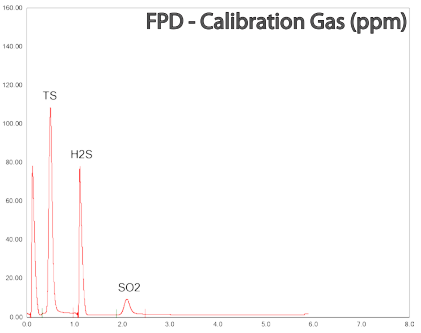


Photo Ionisation Detector (PID)

Based on the same principle as the DID, the PID can be used with a Nitrogen or Helium carrier gas. The PID uses a lamp energy specific to the detection of gases with a lower ionisation potential such as aromatic hydrocarbons required in the analysis of CO_2.

Typical Carrier Gas: N_2 or He N5.0
CO_2 Applications: ppb Aromatic Hydrocarbons (BTEX)
(by using multiple oven techniques)