

# NOVA PRO

## Process Gas Chromatograph



# About the new AGC NovaPRO Process GC

Introducing the most up-to-date On-Line Gas Chromatograph for the Process market from AGC Instruments. This intelligent platform is the most current PGC in the market today.

The NovaPRO Process Gas Chromatograph utilises the most up-to-date technology and systems available. It is a rugged and robust solution to the numerous applications required in the many markets into which it is operational. The NovaPRO PGC provides custom solutions to your requirements and offers 24 hour monitoring and reporting as needed. Accurate readings are achieved using our proven detectors.

AGC Instruments provides our customers with exacting solutions to their many needs. We pride ourselves as being the only independent supplier of Process Gas Chromatographs. The industry-proven Detectors available are chosen from the wide selection available from AGC Instruments. For years, we have been the industry leaders in the supply of such items to various manufacturers world-wide. The majority of detectors used are either Thermal Conductivity Detector (TCD) or Flame Ionisation Detector (FID), and with our experience we are able to design a customised solution for your specific applications.

This explosion proof PGC utilising a Purge method of conformity, is housed in a mild steel enclosure that is purged for use in the hazardous areas of Zone 1 and Zone 2 classification.

A non-purged version for use in safe zones is also available in wall mount or free standing floor mount.

# Principle Of Operation

The NovaPRO Process GC is a custom built solution to your exact specifications and ensures a continuous high resolution analysis of the Sample Streams being monitored. This is achieved by recreating an exact environment within the specially designed enclosure to enable the real-time analysis in the hazardous area with reliable and consistent results.

With the NovaPRO Process GC, a vast range of analytical possibilities are found using the extensive experience of the AGC Instruments team of engineers.

With our eight independent temperature controlled column ovens, which are unique to the market, we are able to provide an accurate and stable temperature environment for the selected columns for a variety of temperature zones. This multi-oven technology reduces the typical analysis time and in doing so, the NovaPRO PGC provides an excellent performance. Micro-packed columns are also used for efficient and rapid separations whilst parallel simultaneous chromatography allows for more in-depth data reporting in busy process centres.

The explosion-proof, EExP (purged) design is ideal for continuous analysis in the harshest of environments. Our strategic affiliation with top component manufacturers such as Vici Valco® has enabled us to devise a comprehensive solution for the Process Gas Chromatograph market with quality and performance in mind. Complete testing is carried out on all of our PGC's prior to dispatch and full documentation will ensure a smooth transition; delivering a plug and play solution.

The system that runs and interfaces with the NovaPRO is a highly intelligent platform that has been carefully designed through interaction with our customers. Based on the professional embedded operating system and run on a rugged industrial embedded computer solution, the TrendVision PRO chromatography software controls all aspects of the analytical and reporting requirements. In addition, external solenoids and valves are also controlled by the AGC software to give a full control solution. Using this cost effective solution removes the need for any other software as full reporting of results to the control room or the DCS is easily done.



## Features

- Explosion Proof for use in Zone 1 and Zone 2
- Cabinet fitted with Purge Controller to EExP standards
- Exp-system controllers which are proved according to EN 60079 (BVS 06 ATEX E 088)
- Available in a non - ATEX Safe Zone Version
- Large Capacitive Colour Touch Screen Display for ease of use
- Electronic Pressure and Flow Controls
- Mild Steel Enclosure with front secured door - IP54
- Free Standing Floor Mount or Wall Mounted options
- Modern Embedded Industrial Computer Control with embedded operating system: TrendVision PRO
- Auto Validation of the PGC Values displayed as DPM/Trend-Lines/Chromatogram
- 4-20mA outputs, Profibus, Modbus, Modbus over TCPIP communications available - RS232, RS485 and Ethernet
- Results Displayed as Chromatograms, Trendline of Digital Panel Meters (DPM)
- Segregated Power, Signal alarms, Communication cables and Junction Boxes
- 8 Independent Temperature Controlled Column Ovens with Temperature Ramp Chromatography
- Regeneration of Columns in-situ
- Gas Lines fitted with flow check alarms
- Vici Valco® Rotary Valves for extended life usage
- Swagelok® or VCR Fittings
- Sample Stream Selection
- Single Channel or Dual Channel Configurations
- Analysis from % to ppm to ppb available
- Easy to Service and economical to operate
- Low Cost of Ownership
- Internal Cooling of enclosure available
- Corrosion Resistant Material Options
- Seamless Integration onto a Distributed Control System (DCS)
- Small Foot Print
- Retro Fits with other Manufacturers' Units
- Power: 110VAC - 230VAC



## Industries

- Hydrocarbons Processing
- Petrochemicals
- Hydrogen Production
- Hy/CO Plants
- Critical processing facilities
- Oil Refineries
- Chemical Plants
- Metal Refining
- Power Plants
- Inorganic Chemical Industries
- Environmental Monitoring
- Natural Gas / LNG Processing
- Other related industries

## Sample Conditioning

The quality of the sample entering a Process Gas Chromatograph affects the reliability of the measured values. Sample conditioning is therefore an integral part of a dependable analytical solution and good quality samples also minimise maintenance costs and analyser-related downtimes.

AGC Instruments recommend sample conditioning systems customised to the process gas chromatograph in order to maintain precision high sensitivity analysis. In keeping with our turnkey integrated systems approach, AGC Instruments can provide sample conditioning systems to operate in tandem with the NovaPRO PGC. Working closely with our collaborative partners, we can design, manufacture and implement a system suited to your specific requirements.

# Applications

The NovaPRO is designed for use in applications within processing facilities and hydrocarbon processing industries such as a variety of refining, petrochemical, power, fine chemicals and environmental applications where selected components in gaseous or liquid streams must be precisely monitored on a continuous basis. It performs the analysis of gases that are present in these production processes.

The flexibility of the NovaPRO allows it to analyze samples of feedstock, partially processed streams, final products and process by-products including wastes which may be hazardous to the environment.

## Petrochemicals

- Acrylonitrile Plants
- Ethylene Plants
- Polymer Plants

## Refining

- Aromatics Unit
- Catalytic Reformer
- Flares
- Fuel Gas Lines
- Isomerisation Unit
- Light Hydrocarbons
- Process Monitoring of Alkylation and Reforming

## Natural gas (Preparation)

- Cryogenic Gas Plants
- LNG Plants
- Light Hydrocarbons
- Calorific Value
- BTU
- Wobbe Index
- Specific Gravity

## Chemistry

- Fine Chemicals
- Polysilicon Manufacturing Products
- Cl<sub>2</sub>, HCL, NH<sub>3</sub> Gas
- Chlorinated Hydrocarbons

## Industrial gases

- N<sub>2</sub>, Ar, O<sub>2</sub>, He
- CO<sub>2</sub>, H<sub>2</sub>
- Corrosive Gases
- Electronic Gases
- Air Separation Units (ASU)
- Organic Gas Analysis
- Inorganic Gas Analysis

## Electric power/gas

- Fuel Gas
- Exhaust Gases
- Blanket Gases
- Coal Gasification/Liquefaction
- Gas Turbine Control

## Iron & steel

- Blast Furnace
- Coke Oven
- Shielding Gas



# Petrochemical & Refinery Applications

## Petrochemical Applications

AGC Instruments recognises that the Petrochemicals Industry is in a constant drive to improve on efficiency and performance onsite in order to deliver top quality end products to their customers. To do this, they need to ensure that all aspects are adhering and meeting their quality requirements. The need to guarantee the quality of gases used on site, whether it is in the Utility Plant delivering N<sub>2</sub> or O<sub>2</sub> to various parts or monitoring efficiency of the scrubbers and catalysts. AGC Instruments consistently delivers these Gas Analysis Solutions to assist in these processes.

*Some Typical applications include:*

- Measurement of H<sub>2</sub> in Synthesis Gas
- Measurement of CO & CO<sub>2</sub> in various gases
- Monitoring of Nitrogen (N<sub>2</sub>) and Oxygen (O<sub>2</sub>) quality
- Methane/Non Methane Hydrocarbon gas Analysis

In general, there are many applications surrounding the Petrochemical Industries. Customers need to analyse various streams of Ethane, Propane, Ethylene, LLDPE, HDDPE, (Polyethylene), Ethylene Oxide, Chloride, Carbon Monoxide etc. All these applications are accommodated by the AGC Instruments NovaPRO Process Gas Chromatograph with optimal efficiency and performance.

## Refinery Applications

Refinery based applications are always evolving and new processes are being developed to increase the performance and production capabilities on many Refinery type platforms. The NovaPRO PGC can easily be integrated into a multitude of analytical processes within refineries.

*Some Typical applications include:*

- Analysis of CO in Propylene (C<sub>3</sub>H<sub>6</sub>) or in Ethylene (C<sub>2</sub>H<sub>4</sub>)
- Measurement of Hydrogen (H<sub>2</sub>) in Synthesis Gas
- Hydrocarbons Processing Monitoring

# Range of Detectors

- Discharge Ionisation Detector DID 1000
- Flame Ionisation Detector FID 3000
- Thermal Conductivity Detector TCD 4000
- Flame Photometric Detector FPD 5000
- Photo Ionisation Detector PID 6000

## Thermal Conductivity Detector-TCD-4000

Four sensing elements are connected to form an electrical Wheatstone bridge circuit. These elements are typically miniature rhenium-tungsten filaments, which are mounted in a metallic cell block. A flow through type thermal conductivity cell is normally used in this analyser. This cell contains a sample and reference gas flow geometry. Two elements are installed in each flow system. An electrical current from a regulated power source heats the elements. Changes in thermal conductivity of the sample gas result in an output voltage change.

Linearity	>10 <sup>4</sup>
Sensitivity	<5ppm
Response time	<1 second

### Gases Required:

Carrier Gas	He, Ar, N <sub>2</sub> or H <sub>2</sub> ; 70ml/min
Actuator Gas	Clean Dry Air @ 3 bar

## Discharge Ionisation Detector-DID-1000

The AGC Discharge Ionisation Detector (DID) has outstanding stability and performance giving low ppb measurements. 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.

Linearity	>10 <sup>6</sup>
Sensitivity	<1 ppb of CH <sub>4</sub> (APPLICATION DEPENDENT)
Response time	<0.5 seconds

### Gases Required:

Carrier Gas	Ultra Pure He N6.0 ; 40ml/min
Discharge Gas	Ultra Pure He N6.0 ; 20ml/min
Actuator Gas	Clean Dry Air @ 3 bar
Purge Gas	Ultra Pure He N6.0 ; 10ml/min

## Flame Ionisation Detector-FID-3000

The AGC Flame Ionisation Detector (FID) is used to measure concentrations of hydrocarbons within a sampled gas. 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. The presence of hydrocarbons in the sampled gas, when burnt with an air-hydrogen mix causes increased levels of ionisation.

The ionisation occurs a result of the carbon atoms present in the sampled gas. The level of ionisation is proportional to the number of carbon atoms within the sample.

Linearity	>10 <sup>6</sup>
Sensitivity	<20ppb of CH <sub>4</sub>
Response time	<0.5 seconds

### Gases Required:

Carrier Gas	N <sub>2</sub> , He, Ar ; 20-40ml/min
Air	240ml/min
Fuel	20ml/min
Actuator Gas	Clean Dry Air @ 3 bar

## Flame Photometric Detector-FPD-5000

The FPD is designed to give a 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.

Within the flame photometric detector, the excitation energy is derived from the combustion of the sample in a hydrogen-rich flame. Variations in intensity of the emitted light are detected by a photomultiplier, which converts the photons to an electrical signal, which is measured on an electrometer.

Linearity	10 <sup>3</sup> (Sulphur Mode) 10 <sup>4</sup> (Phosphorous Mode)
Sensitivity	20pg S/sec for Thiophene (Sulphur Mode) 0.9pg P/sec for DDVP (Phosphorous Mode)

### Gases Required:

Carrier Gas	N <sub>2</sub> , He, Ar ; 20-40ml/min
Air	240ml/min
Fuel	100ml/min
Actuator Gas	Clean Dry Air @ 3 bar

## Photo Ionisation Detector-PID-6000

This detector functions in exactly the same as that of the traditional discharge ionisation detector but without the addition of Helium to increase the ionisation potential. The sensor consists of a UV lamp emitting 10.2 electric volts and an ionisation chamber where ionisation occurs.

Sensitivity	1ppb
Carrier Gas	Dependent on Application
Selective for	Components with Lower 'Ionisation Potential'

\* Repeatability and Accuracy dependent on application. Contact us for more information.

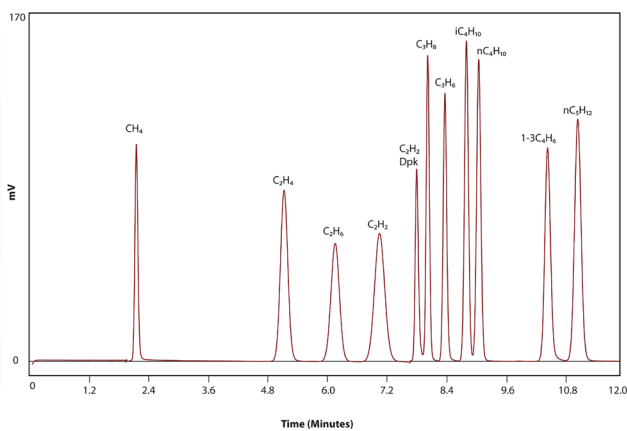


# TrendVision PRO

TrendVision PRO is the complete embedded chromatography software package specifically designed to address the needs of the NovaPRO Process Gas Chromatograph users in various areas of Industry. TrendVision PRO is built on the foundation of the successful TrendVision product which is used worldwide in our industry-proven gas chromatographs. The Software is in constant development to provide an intuitive, industry proven operation. Rugged industrial level modular and scalable hardware is used with Embedded Windows Operating System. TrendVision PRO provides a unified chromatography method whereby all settings are contained in a single method, including event table, calibration table and integration settings for a continuous and unattended operation.

Calibration can be linear or non-linear and can be based on a single calibration point or on multiple calibration points. Validation is supported to suppress unnecessary triggering of calibration events. Measurement units can be conveniently selected as %, ppm or ppb. Furthermore, sequence alarm contacts are supported to alert the control room to an out of bound condition.

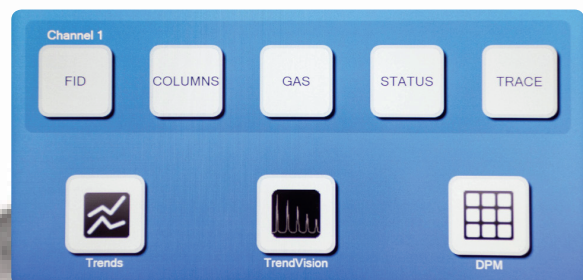
There is flexibility in the presentation and each result can be displayed in a numeric panel (Digital Panel Meter format). Trend Lines retain a link to the source chromatogram and by clicking on a trend point this will directly open the source chromatogram. Individual trend lines can be exported in CSV format. All panels can carry high alarms, low alarms or both and these alarms can be set to "auto-acknowledge" which will reset if subsequent measurements return to an acceptable level. Custom report certificates, custom calculations, macros, etc. can be created and stored or printed for further use.



Sample FID Chromatogram: 10ppm C1-C5 in O<sub>2</sub>

## Features

- Process driven Chromatography Software
- Full Chromatography Interaction
- Robust, Intuitive Operation, Easy to Use, designed for Process applications
- Single Integrated Method
- Easy to use Multi-level Calibration
- Real-Time Chromatogram of Analysis performed
- Continuous Trend of all components analysed by the PGC
- Digital Panel Meter View of the Components on Interest
- Automatic Performance Validation of the System
- Hi-Lo Alarms
- Visual Display of Alarm Status
- Up to 16 Independent Peak Alarms using voltage free relay contacts
- 4-20 mA outputs, Profibus, Modbus, RS232, RS485
- Programmable relays for event control
- Sophisticated Multi-sample Method Programme
- Controls of Sample Valves & Solenoid Switching/Sequencing for Sample and Calibration Lines
- Complete digital control of all temperature and gas flows of the PGC
- Convenient graphic features e.g. zoom, chromatogram comparisons, fixed axes, etc.
- Chromatogram preview before load
- Programmable Integration (negative peaks, etc.)
- Batch Reprocessing
- Convenient file management e.g. automatic folder creation, preview before load, etc.
- On-Line Customer Support module included
- Direct support over Internet



## Specification

Measuring Range	<ul style="list-style-type: none"> <li>• ppb, ppm, %</li> </ul>
Operating Temperatures	<ul style="list-style-type: none"> <li>• -10 to +50 degrees Celsius</li> </ul>
Enclosure	<ul style="list-style-type: none"> <li>• Explosion Proof (EExP type)</li> <li>• Mild Steel Painted with front secured door</li> <li>• DuPont® Polyester Powder Colour conforming to the requirements for BS6496 and BS6497 for the highest levels of durability</li> <li>• Segregated Power, Gas Flow Alarms, Auto Switch-Off of Gas Lines</li> <li>• Large Capacitive Industrial Grade 10" Touch Screen Display</li> </ul>
Mounting	<ul style="list-style-type: none"> <li>• Wall or Floor Standing</li> </ul>
Dimensions	<ul style="list-style-type: none"> <li>• H = 900mm, W = 600mm, D = 400mm</li> </ul>
Power Supply	<ul style="list-style-type: none"> <li>• Voltage 110V/220V, 50/60Hz</li> </ul>
Gas Lines	<ul style="list-style-type: none"> <li>• 1/8" Stainless Steel with Swagelok® or VCR Compression Fittings</li> <li>• Corrosion Resistant Materials also available</li> </ul>
Valves	<ul style="list-style-type: none"> <li>• Stainless Steel / Hastelloy Rotary Valves - Vici Valco®</li> <li>• 10 Port / 8 Port / 6 Port / 4 Port available depending on the configuration with Air Actuation</li> </ul>
Alarms	<ul style="list-style-type: none"> <li>• High and Low Alarm Output available for each impurity</li> <li>• Common Fault Alarm available</li> <li>• Sample &amp; Carrier Gas Flow alarms</li> <li>• Temperature Zone Alarms</li> <li>• Utility Gas Alarms</li> <li>• Maintenance Mode Status Alarm</li> </ul>
Columns	<ul style="list-style-type: none"> <li>• Packed Columns, Micropacked Columns, Capillary Columns</li> <li>• Independent Temperature Controlled Column Ovens</li> <li>• Regeneration of Columns In-Situ</li> </ul>
EExp Purge Controller	<ul style="list-style-type: none"> <li>• The Purge Controller Units are proved according to: EN 60079 (BVS 06 ATEX E 088)</li> <li>• The controller is an industry standard and well proven in its field of use</li> <li>• Compact system with visualisation of status, pressure, remaining purge time and failure report via integrated display</li> <li>• Solenoid valve fuses are easy exchangeable inside of the units</li> </ul>
Computer Software/Hardware	<ul style="list-style-type: none"> <li>• Embedded Industrial Computer - 24 bit ADC and associated hardware (dependent on the application)</li> <li>• Embedded Windows Operating System</li> <li>• Relay to Control Room: Maintenance Mode</li> <li>• AGC TrendVision PRO Chromatography Software</li> </ul>
Detectors Available	<ul style="list-style-type: none"> <li>• Thermal Conductivity Detector (TCD)</li> <li>• Flame Ionisation Detector (FID)</li> <li>• Flame Photometric Detector (FPD)</li> <li>• Discharge Ionisation Detector (DID)</li> <li>• Photo Ionisation Detector (PID)</li> </ul>
Testing	<ul style="list-style-type: none"> <li>• Burn-In Test on Electronic Parts &amp; Assemblies under Simulated Conditions</li> <li>• System Performance monitored before, during and after the test</li> <li>• Insulation Test / Voltage Proof Test</li> <li>• Voltage Variation Test</li> </ul>
Certifications	<ul style="list-style-type: none"> <li>• CE Certified</li> <li>• ATEX Certified</li> </ul>

# Company Profile

## AGC Instruments

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 48 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.



Proven Technology

Precision

Guaranteed Applications

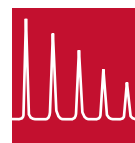
Flexible & Versatile Solutions

High Sensitivity Analysis

## Aftersales Care

AGC Instruments are committed to providing and maintaining quality systems from customer liaison to technical knowledge through to System Design and Delivery. 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.

For further information please contact:



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