

PGC1000

H₂ in Natural Gas



The PGC1000 is a field proven, state of the art, process gas chromatograph. The flexible architecture allows it to be used in a variety of custody transfer applications. One of these applications is H₂ in natural gas.

Measurement made easy

Introduction

The decarbonization of energy systems has become a top priority for governments and policymakers as they try to balance climate targets with increasing global demand. Hydrogen is being considered as a sustainable energy carrier for a wide range of energy sectors, including natural gas. The addition of hydrogen to natural gas can significantly reduce greenhouse gas emissions if the hydrogen is produced from low carbon energy sources. Hydrogen levels in natural gas can differ depending upon specific design conditions and individual country authority regulations. Moreover, the concentration is also susceptible to the selected hydrogen source.

A concentration up to 10% of hydrogen added to the grid does not imply a major upgrade of the existing infrastructure and does not compromise network safety and integrity. The main impact is a proportionally lower energy content of the natural gas stream. Consequently, the presence of hydrogen will negatively influence the accuracy of existing gas meters. For custody transfer applications, analyzers will have to be able to measure all relevant components of the natural gas, including its hydrogen content, to properly calculate properties and parameters as to comply with gas sales requirements.

On-line Process Gas Chromatographs are generally accepted as the most accurate device for custody transfer measurement of natural gas. Their ability to provide a full compositional analysis of natural gas is the key to providing the most accurate custody transfer measurement.

The PGC1000 is capable of measuring hydrogen as well as other key constituents in natural gas.

The solution

ABB has developed a new application for the PGC1000, one that yields a full compositional analysis of natural gas, including hydrogen. The analyzer can accurately measure up to 10% hydrogen along with a traditional C6+ natural gas analysis, without the need of a second carrier or additional analytical modules. Carrier gas and power consumptions are consistent with the standard PGC1000. In fact, current PGC1000 units can easily be upgraded to include the hydrogen measurement. Higher hydrogen measuring ranges can easily be covered with a dual carrier, dual head configuration of the PGC1000.

Analysis specifications

Train BBC

Stream Components					
Component Number	Component	Range Bottom	Range Top	Repeat	MDL
1	Propane Plus	0.05	2	1	0.01
2	Hydrogen	0.1	10	1	0.05
3	Nitrogen	0.05	100	1	0.01
4	Methane	0.05	100	1	0.01
5	Carbon Dioxide	0.1	100	1	0.02
6	Ethylene	0.1	100	1	0.02
7	Ethane	0.1	100	1	0.02
8	Acetylene	0.2	100	2	0.03

Train BBK

Stream Components					
Component Number	Component	Range Bottom	Range Top	% RSD	MDL
1	Hex Plus	0.005	5	1	0.001
2	Propane	0.005	100	1	0.001
3	Isobutane	0.005	15	1	0.001
4	Normal Butane	0.005	15	1	0.001
5	Neopentane	0.005	10	1	0.001
6	Isopentane	0.005	10	1	0.001
7	Normal Pentane	0.005	10	1	0.001

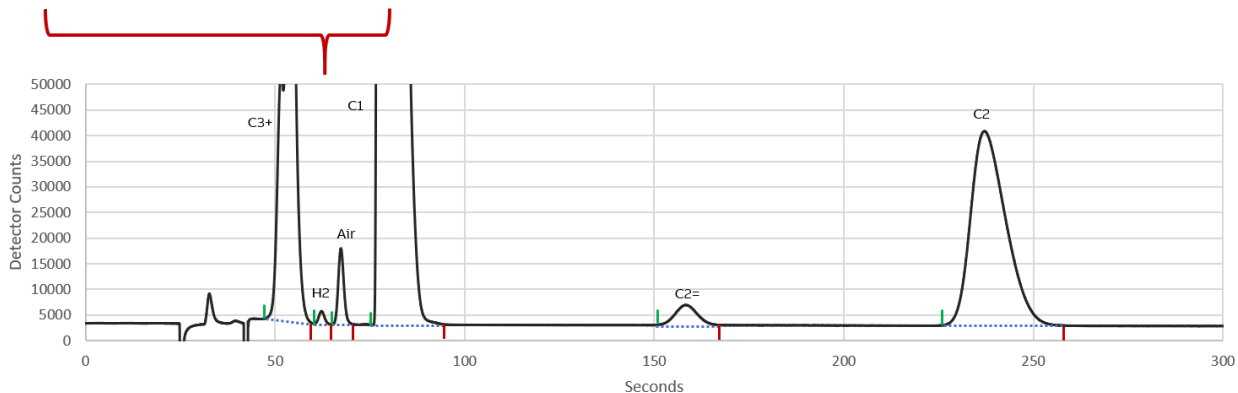
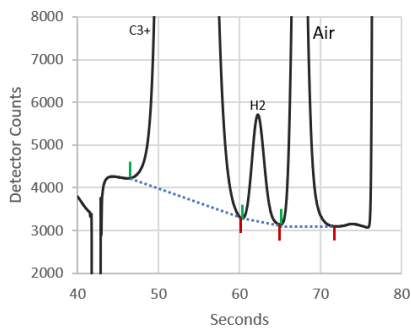
Carrier Gas - Helium

Cycle Time— 330 seconds

Btu Repeatability +/-0.125 Btu/Ft3

Calculated Properties Include:

- Gas compressibility per AGA 8
- Real Relative Density (Specific Gravity)
- Btu/CV Value
- GPM (gallons of liquid per thousand cubic feet)
- Wobbe Index
- Methane Number
- Optional calculations can include: AGA 10 speed of sound
- Hydrocarbon Dew Point



Analyzer specifications

NGC/PGC1000 specifications	
Dimensions	6.75" diameter x 16" long x 9.00" tall 17.1 cm x 40.6 cm x 22.9 cm
Weight	Approximately 28 lb. / 12.7 Kg
Shipping weight	Approximately 47 lb. / 21.3 Kg
Weatherproof construction	CSA Type 4X, IECEx IP56, ATEX Type 4X (IP66 Equivalent), aluminum alloy with white polyester powder coating.
Carrier gas	Helium (1 large helium bottle should last between 9 months and 1 year)
Analysis time	Approximately five (5) minutes; cycles may be scheduled by user
Temperature range (storage)	-22°F to +140°F (-30°C to 60°C)
Temperature range (normal)	0°F to 130°F (-18°C to 55°C)
Temperature range (cold weather enclosure)	-40°F to +130°F (-40°C to 55°C)
Moisture	95% relative humidity non-condensing
Supply voltage	10.5 to 16 V DC (Optional: 21 to 28 V DC) @ 0°F (-18°C)
Power consumption	Nominal: 7 Watts @ 15 V DC; 650 mA Start up: 45 Watts @ 15 V DC; less than 3 A NEC & CEC Class I, Div. 1, Groups B, C and D, T6: CFR 47, Part 15 CE ATEX II 2G : Ex d, IIB+H2 T6; Class I, Zone 1 EMC - EMI/RFI: EN 55022, EN 61000-6-1, EN 61000-4-2, 4-3, 4-4, 4-6, 4-8, CISPR 22-2004 IECEx Exd IIB + H2 T6; Class I, Zone 1
Certifications	INMETRO Exd 11B + H2 T6; Class 1 Zone 1
Communications supported	Two serial digital ports, software selectable for RS-232, RS-485, or RS-422. One USB MMI (RS-232 or USB). Optional USB hub (host and client) and Ethernet ports. Totalflow Remote / Local MMI Totalflow / TCP Modbus / TCP Server Modbus / TCP Client
Protocols supported	Modbus ASCII or RTU (Modicon, WordSwap, or Danalyzer) Up to a total 2.052 GB of RAM. CPU RAM Memory 20 MB. Nand Flash 32 MB.
Memory	Data storage 128 MB to 2 GB





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