ABB MEASUREMENT & ANALYTICS | DATA SHEET

Portable NGC

Natural gas chromatograph

Measurement made easy

The NGC combines simplicity with low installation costs and unmatched performance, making it the ideal solution for natural gas custody transfer. The Portable NGC is a natural gas chromatograph designed for installation in a vehicle, allowing it to be used for real-time analysis on any site that can be accessed by vehicle.

The NGC is easily powered, either from the vehicle's 12 V DC system or from a 110 V AC inverter. Its low power operation means you can maintain continuous power on the unit, thus keeping it at operating temperature and assuring it is ready for immediate use on site.

From the spot analysis the following are calculated:

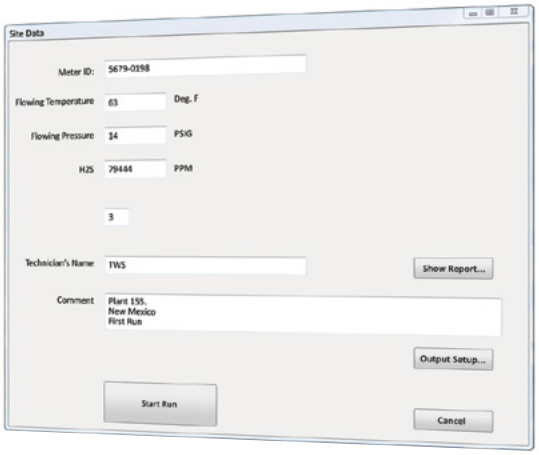
- Relative density
- Heating value
- VOS (velocity of sound)
- GPM (gallons of liquid per thousand cubic feet)
- Wobbe index

Introduction

This data can be used for flow computers, RTU's, gas accounting systems, and SCADA systems for the energy, AGA3, 7, 8, and 10 calculations at the meter site. This data output can be a CSV file format so that analysis data systems can easily incorporate the information. The number of runs and the number of averages can be selected.

The averaged output can be formatted to be accepted by a 3rd party gas accounting software system, allowing automatic downloads of the analysis data. Analysis done on site is valuable because:

- Transportation of DOT regulated gas cylinders is avoided
- Time and cost of subsequent laboratory analysis
- Problems with sample handling
- Economic solution for gas quality measurement when the gas volumes are too low to justify on-line chromatography



Description

The truck is moved as close to the sample point as is practical. A flexible sample line is then uncoiled and attached to the probe in the flowing natural gas pipeline. If the dew point of the gas or the weather demands it, this flexible tubing must be heated. A sample of the gas is extracted from the probe in the line, purged through the flexible line and then transported to the analyzer. There it is processed for particle removal and phase integrity, injected onto the chromatographic columns where component separation occurs. These components are then quantified by peak integration and concentration is calculated. The other data of interest is then calculated from these concentrations.

The Portable NGC analyzes each sample utilizing established chromatographic techniques. The resulting information consists of mole percent values for the following:

- "Air" (Contains N2, Ar, CO and O2 but not CO2)
- C1 CO2 C2 C3 IC4 NC4
- NeoC5 IC5 NC5 C6+
- As an option, H2S, up to 1200ppm, (With an MDQ of 300ppm) may be added to this analysis

The NGC8206 measures a C6+ (back flushed) peak. Users may input the results of a comprehensive lab analysis that reflects the split or ratio of C6 through C10 components. This ratio can be used in subsequent analyses and energy calculations.

The NGC8209 measures a C9+ (back flushed) peak. Users may input the results of a comprehensive lab analysis that reflects the split or ratio of C9 through C12 components. This ratio can be used in subsequent analyses and energy calculations.

Calculated values include

- Relative density (specific gravity)
- Btu/CV (heating) value
- GPM (gallons of liquid per thousand cubic feet)
- Wobbe index

Standard features

Modular design includes

- Portable GC interface allows user analysis customization
- Modular software – application based plug in software modules
- Manifold module (internal tubing now replaced by manifold)
- Analysis sections contain stream selection solenoids, temperature and pressure regulation, 32 bit digital detector electronics, replaceable column / valve modules and a low power 32 bit digital controller, using Windows CE® (internal to GC unit)
- Microsoft® Windows® based man-machine interface software (PCCU)
- USB MMI port connectivity
- Ethernet connectivity
- Lithium battery-backed RAM
- Two remote serial digital communications ports; one local port
- Comprehensive diagnostics and wizards available to users
- Audit-quality historical data; date and time stamped
- Operational fault/warn alarms available
- Detectors - constant temperature, glass encapsulated thermister beads for rugged service and long life; will not burn out on loss of carrier
- 10 port valves have no moving metal parts in each analysis unit
- Low utility usage - low-power, low-carrier, no instrument air required
- On demand or scheduled automatic calibration and diagnostics

Portable NGC8206

Portable NGC8209

Equipment

The equipment used for this analysis consists of the standard NGC8206 mounted in a powder-coated box. The equipment used for this analysis consists of the standard NGC8209 mounted in a black case. It is recommended that the unit be left in an operational mode while transporting.

All the valves, gauges, inlet ports, and PCCU32 (the laptop driven man-machine interface) connectors are bulkhead mounted on panel to provide the technician with ready access.

Historical data

The Portable NGC is designed to retain historical data. This data can be used for custody transfer needs, verify transmitter operation over time, and provide a limited data backup for communication link reliability.

In addition, various CSV file outputs are available to download the analysis data into spreadsheet based company specific data sheets, and outputs to 3rd party gas accounting packages.

The default[1] memory configuration provides the most recent 480 analysis cycles containing:
- Normalized components
- Un-normalized components
- Ideal Btu/CV
- Real Btu (wet and dry) / CV (superior and inferior)
- Relative density (specific gravity)
- Density
- GPM
- Wobbe index
- Alarms

Stream averages for the (default[1]) 840 last hours, 35 last days and the most recent last month analyses. Operational Parameters for the (default[1]) last 480 cycles (Diagnostics Report):
- Selected peak times
- Selected peak areas
- Ideal Btu/CV
- Carrier regulator pressure
- Oven temperature
- Ambient temperature
- Sample pressure
- Detector noise values
- Detector balance values

Audit logs (default[1])
- Last 480 alarms
- Last 480 events

Data retained by the Portable NGC can be collected via a remote communication link or by the laptop PC local operator interface PCCU 32.

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default[1]
The default memory configuration will provide for the data storage above. Users may reallocate the memory that is available.

Available options

- Sample and GC Rotometers
- 120/240 V AC / 24 V DC to 12 V DC power supply
- Modular Sample System for Non-pipeline quality natural gas and Sample transport lag-time needs: Type 4 w/ liquid shut-off
- Temperature Compensation Probes:
- Fixed
- Retractable
- Regulators, carrier and calibration blend
- Start up/calibration/validation gas sample (+2% Cal Blend)
- Export crating
- Tool kit
- Various maintenance kits
- On board digital ¼ VGA display with multiple screen access
- USB (Host and Client) and Ethernet ports
- SD memory cards
- Feed-Through heater
- Heat trace internal and external tubing

Specifications

Portable NGC Specifications	Portable NGC8206	Portable NGC8209
Dimensions	9.5" high x 14.3" wide x 16" deep 24.13 cm x 36.32 cm x 40.64 cm	7.5" high x 20.5" wide x 15.5" deep 19.05 cm x 52.07 cm x 39.37 cm
Weight	Approximately 38 lb. / 17 Kg	Approximately 34 lb. / 15 Kg
Weatherproof construction	No classification	No classification
Carrier gas	Helium (consumption rate < 20 cc/minute during analysis cycle	Helium (consumption rate < 20 cc/minute during analysis cycle
Analysis time	Approximately five (5) minutes (cycles may be scheduled by user)	Approximately six (6) minutes (cycles may be scheduled by user)
Repeatability	± 0.125 Btu @ 1,000 Btu; (± 0.0125%) @ ambient; ± 0.25 Btu @ 1,000 Btu (± 0.025%) over temperature range	± 0.25 Btu @ 1,000 Btu (± 0.025%) @ ambient ± 0.50 Btu @ 1,000 Btu (± 0.05%) over temperature range
Temperature range (storage)	-22°F to +140°F (-30°C to 60°C)	-22°F to +140°F (-30°C to 60°C)
Temperature range (normal)	0°F to 130°F (-18°C to 55°C)	0°F to 130°F (-18°C to 55°C)
Moisture	95% relative humidity non-condensing	95% relative humidity non-condensing
Supply voltage	110 V AC, 60 Hz or 250 V AC, 50 Hz, 24 V DC (16-28 V DC) or 12 V DC (10.5 - 15 V DC)	110 V AC, 60 Hz or 250 V AC, 50 Hz, 24 V DC (16-28 V DC)
Power consumption	@ 0°F (-18°C) Nominal: 7 Watts @ 15 V DC; 650 mA Start up: 45 Watts @ 15 V DC; less than 3 A	@ 0°F (-18°C) Nominal: 14 Watts @ 15 V DC; 1300 mA Start up: 90 Watts @ 15 V DC; less than 6 A
Certifications	General purpose	General purpose
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.	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.
Protocols supported	Totalflow Remote / Local MMI Totalflow / TCP Modbus / TCP Server Modbus / TCP Client Modbus ASCII or RTU (Modicon, WordSwap, or Danalyzer); DSFG	Totalflow Remote / Local MMI Totalflow / TCP Modbus / TCP Server Modbus / TCP Client Modbus ASCII or RTU (Modicon, WordSwap, or Danalyzer)
Other specifications	• Designed for pipeline-quality natural gas, 800 to 1500 Btu per standard cubic foot (29.8 to 55.9 megajoules/meter3)1 with less than 100 PPM H2S • Meet or exceeds GPA 2261-99 for linearity • Single auto calibration stream and 3 sample streams, or 2 auto calibration streams and 2 sample streams. • Calculations per: GPA 2172-96 (Z by AGA 8 or single viral summation) and 2145-03, ISO 6976-95; meets ISO 12213-2 by AGA 8 detail: (in the future - ASTM D 3588, GOST and ISO mass) • Four stream capability. Manual calibration required with 4 sample streams.	• Designed for pipeline-quality natural gas, 800 to 1500 Btu per standard cubic foot (29.8 to 55.9 megajoules/meter3)1 with less than 100 PPM H2S • Meet or exceeds GPA 2261-99 for linearity • Single auto calibration stream and 1 sample stream. • Heating value calculations supported: GPA 2172, ISO 6976, ASTM 3588 • Calculations per compressibility calculation: AGA 8, ISO 12213, NX-19 • Analysis standards compliant with: GPA 2261, ISO 6974, ASTM 1945

Sales Service Software

Note on linearity of C6 through C9+

Extensive linearity testing is usually done to prove the design of a GC. This has been done for the NGC8206 and the results can be obtained in another datasheet. It is, however, doubtful that the same data could be obtained for the “extended analysis" fraction, that is, the components beyond C6 and up to C9+.

The reasons for this are as follows:

- The wide concentration ranges needed to produce the linearity data will themselves prevent building stable calibration blends. When blends with more that 1000 ppm (0.1 Mol %) of any of the C6, C7, C8, and C9+ components are added to a blend, the Hydrocarbon Dew Point (HDP) of that blend will tend to make it become a liquid unless kept and sampled at a high temperature. Greater than 1000 ppm of C6, C7, C8, or C9 increases the HDP to such a point the mixture would have to be heated beyond 120F-140F to keep the mixture a gas. This increases the difficulty of keeping or sampling from the needed blends.
- The accuracy of a gravimetric calibration blend at these very low mol % levels drops off significantly due to the very small weights of the gases added. This leads to a much greater error in the resulting mol % of each component and therefore in the accuracy of the blend. This inaccuracy tends to make the generation of the detector response curve meaningless. However, the usable linear range of the detectors is quite wide at the reasonable operating concentrations found in these heavier fractions in comparison to the possible variations in blend concentrations. So the NGC linearity will likely exceed the real world requirements.

ABB Inc.
Measurement & Analytics
Quotes: totalflow.inquiry@us.abb.com
Orders: totalflow.order@us.abb.com
Training: totalflow.training@us.abb.com
Support: totalflowsupport@us.abb.com
+1 800 442 3097 (opt. 2)

Main Office
7051 Industrial Boulevard
Bartlesville, OK 74006
Ph: +1 918 338 4888

www.abb.com/upstream

California Office
4300 Stine Road
Suite 405-407
Bakersfield, CA 93313
Ph: +1 661 833 2030

Kansas Office
2705 Centennial Boulevard
Liberal, KS 67901
Ph: +1 620 626 4350

Texas Office – Odessa
8007 East Business 20
Odessa, TX 79765
Ph: +1 432 272 1173

Texas Office – Houston
3700 West Sam Houston
Parkway South, Suite 600
Houston, TX 77042
Ph: +1 713 587 8000

Texas Office – Pleasanton
150 Eagle Ford Road
Pleasanton, TX 78064
Ph: +1 830 569 8062

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