Danalyzer™ 700XA Gas Chromatograph

Extended Analysis for Natural Gas Applications

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Process Management

For more than 75 years, **Daniel Measurement & Control, Inc.** has served the oil and gas industries with natural gas and liquid flow measurement products, systems, and services. As a company recognized around the world for delivering advanced solutions, Daniel is synonymous with quality products, industry expertise, and reliable and innovative engineering.

We provide the power to perform

We help our customers meet their business objectives by providing excellent service and solutions that reduce maintenance costs, increase availability, and, ultimately, allow engineers and technicians to focus on areas other than their Daniel Measurement and Control products.

As part of Emerson Process Management, Daniel designs and builds its product solutions for a global market. Our financial strength enables us to continuously test the boundaries of current technology, but it is our commitment our customers' success that truly motivates us towards ongoing innovation.

Danalyzer™ 700XA
Gas Chromatograph

Danalyzer™ 700XA gas chromatographs *provide extended analysis for complex natural gas measurement. The 700XA gas chromatograph offers proven reliability, increased analytical capability, and maximum ease of use, combined with a wide range of analysis options in a field-mounted gas chromatograph (GC). These enhanced features make the 700XA ideal for natural gas custody transfer and applications requiring advanced analysis, such as C_9+, hydrocarbon dew point, and C_6+ and hydrogen sulfide (H_2S).*

With an environmentally hardened, single-cast enclosure, the 700XA gas chromatograph offers an efficient use of oven space to accommodate both micropacked and capillary columns, as many as four 6-port or 10-port valves, a rotary valve for liquid injections, and dual-detector configurations, such as TCD/TCD, TCD/FID, and TCD/FPD.

The analytical power inherent within the 700XA ensures the precise, fast measurement you need for the most complex C_9+, hydrocarbon dew point, or sulfur calculations, but its reliability and simplified design make it a good choice for standard C_6+ energy, relative density, and Wobbe index measurements.

Precise, reliable analysis

The 700XA measures the individual components in your product quickly — in as little time as a minute in select applications — and it communicates the data to your SCADA system or flow computers.

No-hassle installation

The 700XA uses 24 VDC power directly (120/240 VAC optional) and can be mounted practically anywhere — on a pipe, wall, or floor. With integrated controller electronics, the 700XA has a reduced footprint and fits well in tight locations.

The 700XA analytical oven has been redesigned for maximum serviceability and expandability. It features a new, cleaner architecture with fewer cables, making the 700XA easy to maintain.

Flexible communications

Whether the requirement is to communicate to an enterprise-wide network, or a single flow computer, the 700XA can be configured to communicate via discrete I/O, Modbus or OPC over Ethernet, Modbus over serial RS-232 or RS-485, and Foundation Fieldbus.

Rugged durability

Decades ago, Daniel set a new industry standard with its Danalyzer line of gas chromatographs in terms of durability and ruggedness. Even today, it is not uncommon to find a 20-year-old Danalyzer in a plant or on a pipeline. The evolutionary 700XA gas chromatograph is built with that same commitment to quality and longevity. In addition, the 700XA requires no shelter or separate cooling system in most climates — offering significant savings to our customers.

Superior measurement performance

With the highest stated repeatability– ±0.01% of heating value (±0.1 BTU/1000 BTU) for controlled-environment C_6+ analysis and ±0.015% (±0.15 BTU/1000 BTU) of heating value for uncontrolled-environment (-20° to 60° C / -4° to 140° F) C_6+ analysis — the 700XA gas chromatograph has superior measured performance. The system offers a wide dynamic range from percent to trace-level components, and reliable performance over a broad range of ambient temperatures (-40° C to 60° C and -40° F to 140° F).

Low cost of ownership

By not requiring a shelter, the 700XA reduces initial purchase costs significantly. In addition, low carrier and power consumption reduces lifecycle costs and minimizes the environmental impact. The system comes with the longest valve and column warranties available. Parts can be replaced or repaired individually, without expensive modules to replace. This reduces the cost of each service repair by thousands.

Environmental chamber testing

Every Danalyzer™ gas chromatograph that leaves our facility undergoes rigorous testing throughout assembly. The majority of our systems are put into a 24-hour environmental chamber test, where they must operate to specification in an environment where the temperatures cycle between 0° and 130° F (-18° and 54° C) for 24 hours. This is part of our commitment to providing gas chromatographs that can withstand the toughest conditions in your field environment.

Ease of maintenance

The 700XA gas chromatograph was designed for easy maintenance. It offers maximum access to communication terminations, solenoids, and connections. A significant reduction in cabling and number of interior components, as well as a pivot-top oven base, allow for maximum accessibility to the components. Plus, a single-cast design, large front and side access panels, and rugged, plug-and-play boards streamline the service process.

DANALYZER 700XA

Specializing in advanced analysis applications

Extended C_9+ energy measurement

The 700XA gas chromatograph offers C_9+ extended analysis for applications at rich-gas custody transfer points to enable a more accurate measurement than a standard C_6+ analysis. Rather than assuming fixed percentages of the C_6+ peak (as the C_6+ application does per GPA 2261), a C_9+ analysis separates and measures the component hydrocarbon groups of C_6, C_7, C_8, and C_9+.

The ultra-flexible 700XA can incorporate a dual-detector FID/TCD combination to allow measurement of very low concentrations (above 100 ppb) of C_9+ components.

Hydrocarbon dewpoint monitoring

The 700XA gas chromatograph offers accurate and reliable hydrocarbon dew point calculations from the extended C_9+ analysis by combining two detectors and a controller within a single housing – reducing complexity, minimizing maintenance, and spare parts requirements, simplifying the scope of analyzers at the pipeline, and reducing the overall cost of the analytical solution.

The 700XA integrates DewCalc hydrocarbon dew point software into the gas chromatograph to provide dew point temperatures for up to four user-entered pressures and the cricondentherm using the Peng-Robinson or the Redlich-Kwong-Suave equations of state. Real-time dew point results can be provided by using analog or Modbus inputs from another device for the calculation pressures.

The measured C_6/C_7/C_8 and C_9+ components allow for an accurate determination of the hydrocarbon dew point for pipeline-quality natural gas using reliable and low-maintenance thermal conductivity detectors (TCD), avoiding standalone dew point analyzers or flame ionization detectors (FID), which require additional utility gas requirements. For heavier gas applications where significant amounts of components above C_{10} are expected, an FID can be combined with a TCD to provide for further extended analysis.

Gas quality analysis

Natural gas contaminants, such as hydrogen sulfide and oxygen, reduce pipeline integrity over time. The redesigned electronics and analytical hardware of the 700XA allows for much lower detection levels, opening up the capability of using your custody transfer GC to analyze contaminants previously measured using a separate analyzer such as H_2S or helium. Most contaminants can be easily measured in the Danalyzer 700XA for online quality assurance. Contaminant monitoring can be combined with energy measurements for complete custody transfer analysis. To the extent possible, these combined applications utilize independent gas chromatograph valves, detectors, and columns for each primary measurement. This technique offers greater reliability, increased speed, and easier troubleshooting. This application approach also makes field upgrades and re-applications in the Danalyzer 700XA easy by minimizing internal piping changes.

Measurement Range of a C_6+ Danalyzer

The standard Danalyzer is designed to measure the following components over the measurement range shown:

Component	Mole %
Methane	65 to 100
Ethane	0 to 20
Propane	0 to 10
N-Butane	0 to 5
Iso-Butane	0 to 5
N-Pentane	0 to 1
Iso-Pentane	0 to 1
Neo-Pentane	0 to 1
Hexane+	0 to 0.7
Nitrogen	0 to 20
Carbon Dioxide	0 to 20

Measurement Range of a C_9+ Danalyzer

The ranges of measurement remain the same as the C_1 to C_6+ analyzer with the exception of:

Component	Mole %
Hexanes	0 to 1
Heptanes	0 to 1
Octanes	0 to 0.5
Nonane+	0 to 0.5

In addition to standard applications such as C_1 to C_6+ with N_2 and CO_2 with a three-minute-analysis cycle time and C_1 to C_9+ with N_2 and CO_2 with a five-minute-analysis cycle time, a number of other applications are available, including high CO_2 and natural gas liquids (NGL). See your local account representative for details.

The 700XA gas chromatograph has the capacity to support up to four 10-port or 6-port diaphragm/piston valves, which are guaranteed for the life of the system.

Standard natural gas applications

Our most popular energy and gas quality applications are standard measurements within the 700XA gas chromatographs. Applications may vary by components of interest, analysis time, reduced hardware, or improved precision. Choose the one that is right for you, or we'll create one that is customized for your specific application.

The Danalyzer 700XA offers applications for energy measurement from C_6+ hydrocarbon ranges to C_9+ hydrocarbon ranges. Calculations based on GPA 2145/2172 or ISO 6976 standards can be provided.

Custom applications

If the applications listed above do not fit your unique needs, the 700XA can be customized to meet many measurement requirements. Contact your sales representative for more information.

Intuitive *software tools*

MON 20/20

The Danalyzer 700XA gas chromatograph *is designed to operate unattended, and when occasional adjustments need to be made, our exclusive MON 20/20™ software can be loaded on to your Windows®-based desktop PC or laptop, giving you complete control of your gas chromatograph – both locally and remotely.*

Emerson's MON 20/20 software makes configuration, maintenance, monitoring, and control for your gas chromatograph easy. With intuitive, Windows-based drop-down menus and fill-in-the-blank tables, even new users can quickly navigate through the software.

MON 20/20™ software collects and organizes the analyzed data from the 700XA gas chromatograph. With the ability to communicate to the enterprise network or export to numerous file types, MON 20/20 is a powerful software tool that ensures operators, engineers, maintenance personnel, and management have access to critical data, such as current and archived chromatograms, alarm history, event logs, and maintenance logs.

MON 20/20 software enables you to:

- Open multiple screens simultaneously to review and modify analytical settings
- Download and display multiple chromatograms on the screen for comparison
- Download and trend any of the calculated or measured results
- Export data for use in other third-party applications

Engineering and Services

Service and support

Every Danalyzer 700XA gas chromatograph is backed by an array of service and support options that ensure your unit continues to perform to precise specifications. For every new system, we offer on-site training conducted by our GC experts, so your operators, engineers, and technicians have the skills and knowledge they need to keep your system operating at peak performance.

Daniel Measurement Services provides on-call field service and around-the-clock customer service for customers who need assistance with:

- Startup and commissioning
- Product upgrades
- Product repair
- Maintenance contracts
- Education services
- Remote diagnostics

Custom-engineered solutions

Although Danalyzer™ gas chromatographs are designed for easy installation and operation in hostile environments, customers may still require engineered solutions to meet their unique demands. We can engineer numerous levels of customization, including:

- Three-sided enclosures
- Custom-sized cabinets
- Hazardous-rated area shelters
- Complex sample system development
- Integration into existing and new data acquisition networks
- Custom software solutions

Design Specifications

Power:

- **Standard:** 24 VDC (21-30 VDC)
- **Optional:** 90-264 VAC, 47-63 Hz

Power Consumption at 22° C (72°F):
- **Startup:** 105 Watts DC (125 Watts AC)
- **Steady State:** 35 Watts DC (40 Watts AC)

Note: Add 15.5 Watts DC (18 Watts AC) for LOI

Environmental temperature:
-20° to 60° C (-4° to 140° F)

Environmental temperature without safety certification:
-40° to 60° C (-40° to 140° F)

Enclosure Protection Rating: IP66 and NEMA 4X

Dimensions (without sample system):

- **Wall-mount:**
  711.20 mm H x 444.5 mm W x 497.84 mm D
  (28" H x 17.5" W x 19.6" D)
- **Pipe-mount:**
  711.20 mm H x 444.5 mm W x 670.56 mm D
  (28" H x 17.5" W x 26.4" D)
- **Floor-mount:**
  1531.62 mm H x 444.5 mm W x 612.14 mm D (60.3" H x 17.5" W x 24.1" D)

Mounting: Free-standing (standard), wall- or pipe-mount (optional)

Approximate Weight (without sample system): 49.895 kg (110 lbs.)

Area Safety Certification Options:*

- **CSA:**
  - USA
    - Class I, Zone 1, A Ex d IIC, T6
    - Class I, Division 1, Groups B, C, D, T6, Enclosure Type 4
  - Canada
    - Class I, Zone 1, Ex d IIC, T6
    - Class I, Zone 1, Ex d IIC, T6
- **ATEX/IECEX**
  - Ex II 2G
  - Ex d IIC Gb T6

Oven: Airless heat sink, maximum 150° C (302° F)

Valves: 6-port and 10-port diaphragm chromatograph valves. Other types of valves, such as liquid injection or rotary valves, may be used depending on the application

Carrier Gas: Application-dependent. Typically zero-grade helium, nitrogen, or hydrogen

Sample Input Pressure Range (recommended): 15-20 psig

Carrier Gas Input Pressure Range (recommended): 90-100 psig

Detector: Thermal conductivity detector (TCD), flame ionization detector (FID), TCD/TCD or TCD/FID dual detector configurations possible; flame photometric detector (FPD) available (see FPD module data sheet)

Gating Options: Fixed-time, slope sensing gating of peaks

Streams: Up to 20 streams (including calibration stream), 8 streams standard

Chromatograms stored/archived internally: Stores up to 30 days of analysis report data and up to 2500 individual chromatograms.

Communications (Standard):
- Ethernet: Two available connections – one RJ-45 port & one 4-wire termination – with 10/100mbps
- Analog inputs: Two standard inputs filtered with transient protection, 4-20mA (user scalable and assignable)
- Analog outputs: Six isolated outputs, 4-20mA
- Digital inputs: Five inputs, user assignable, optically isolated, rated to 30VDC @ 0.5A
- Digital outputs: Five user-assignable outputs, Form C and electromechanically isolated, 24VDC
- Serial: Three termination blocks, configurable as RS-232, RS-422 or RS-485 and one D-sub (9-pin) port for PC connection

Communications (Options):
Two expansion slots available for additional communications. Each slot has the capacity to add one of the following:
- 4 analog inputs (isolated) card
- 4 analog outputs (isolated) card
- 8 digital inputs (isolated) card
- 5 digital outputs (isolated) card
- 1 RS-232, RS-422 or RS-485 serial connection card
- 1 modem card, 300-19.2k baud

Additionally, a FOUNDATION fieldbus module is available as an option.

Memory Capacity: 1 Gb of flash memory for data storage; 128Mb of SDRAM system memory with 2 Mb static RAM (battery-backed)

*Use of the optional LSIV will result in a temperature rating of T4.

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