

**Achieve accurate, repeatable, and
reliable gas measurement analysis**



Rosemount™ Gas Chromatograph Solutions
For natural gas transmission applications



Struggling to reduce costs while meeting tighter energy measurement demands?

What if you could...

Reduce the cost of new installations and control the expense of maintaining existing ones?

Emerson's Rosemount XA Series of gas chromatographs share a common electronics platform that reduces complexity and training needs, while providing a range of measurement options to suit the individual application. Critical, high-value locations benefit from the high accuracy Rosemount 770XA, and the Rosemount 370XA provides a lower up-front cost for less critical locations.

Both the Rosemount 770XA and Rosemount 370XA gas chromatographs can be easily maintained at the analytical component level, which results in very low maintenance costs over the life of the system. In addition, the Rosemount 370XA adds to this lower-cost-of-ownership benefit by including a unique *Maintainable Module™* technology that enables less skilled operators to easily replace an analytical module in the field and quickly get it up and running again. In most cases, the damaged module can be refurbished and sent back to you for future use.

Increase your profitability by reducing lost and unaccounted for gas in your system?

The difference between the total energy entering the transmission network and the total energy leaving the network is lost energy that directly affects the profitability of your company. Inaccurate measurement will contribute to the lost energy calculated when the errors in measurement do not account for all the actual energy flowing through the system. Older gas chromatograph hardware, the use of sampling to model energy content, and inconsistent measurement technologies contribute to the differences in energy measured on the inlets and outlets of the network.

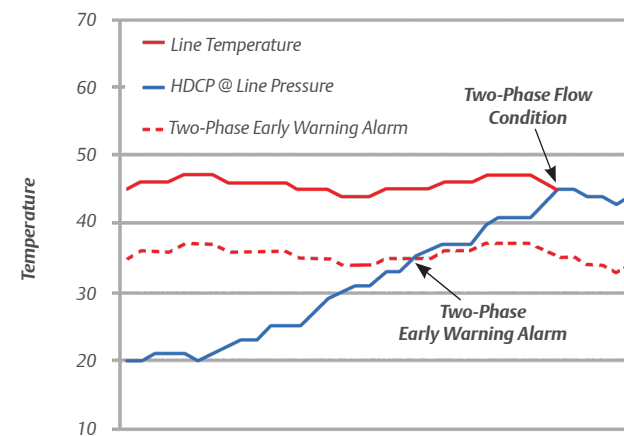
The Rosemount 370XA's small footprint and low power usage requirements make it an ideal selection to upgrade the energy measurement where older technology or lack of online energy determination (where sampling or pipeline modeling is used) may currently be contributing to inaccurate measurements.

Avoid two-phase flow measurement error?

A significant cause of inaccurate measurement where rich gases are most likely to be found is the error caused by two-phase flow through the meter run. All gas flow meter used in custody transfer are designed for single-phase gas flow, and will generate significant errors when liquid hydrocarbons occur in the flowing stream (up to 5% with ultrasonic meters¹). Additionally, gas sampling systems are designed to reject liquids prior to analysis in gas chromatographs, so the total energy content will be under-reported if some of the heavy hydrocarbons have dropped out into the liquid phase.

The Rosemount 770XA C9+ gas chromatograph with the Hydrocarbon Dew Point (HCDP) application installed can help avoid this source of error by calculating the HCDP at the flowing pressure. If the HCDP is below the temperature of the flowing stream, the stream will be single-phase only as all the hydrocarbons will be in the gas phase. However, if the HCDP reaches the flowing temperature, the heavy components will begin to drop out into the liquid phase and the flowing stream will become two-phase, thereby resulting in inaccurate flow measurement and gas sampling.

The Rosemount 770XA C9+ can calculate the HCDP at the flowing pressure, which can then be compared to the stream temperature. If the HCDP gets close to the stream temperature, an alarm will be generated in the supervisory system to warn the operator of an impending two-phase flow condition so that mitigating actions can be taken before it causes flow measurement errors.



(1) Zanker and Brown, in *The Performance of a Multi-Path Ultrasonic Meter with Wet Gas* (2000), report between 1% and 5% flow error with 1% liquid volume fraction in the flowing stream.

Recommended Solution

Natural gas is bought and sold based on the level of its energy content. Gas transmission plays a critical role in ensuring these natural gas resources are safely transported, measured, and recorded before reaching their final destination point. The recent influx of natural gas deposits discovered around the world has caused such an increase in supply that market demand cannot keep up and prices have dropped to an all-time low. These lower prices have caused a domino effect across the industry, and businesses are looking for ways to improve their processes to reduce their overall operating costs, including the installation and maintenance of energy measurement systems and instruments used for custody transfer applications.

Gas chromatographs are used to analyze the energy quality of the gas passing through the pipeline and are installed at each of the measurement points of the transmission process. Historically, gas chromatographs were known to be among the most complex analyzers to operate, often requiring specialized technicians to service and maintain them, a luxury that most companies today can no longer afford or are unwilling to pay for.

Calculating the Impact of Inaccurate Energy Flow Measurement

Whether the measurement errors are from the analysis of the gas or from two-phase flow through the metering systems, the impact of inaccurate energy flow measurement can be significant. Use the formula below to calculate the potential impact of flow error in your system.

Error Calculation	Example
Average Flow-rate Per Day	100 MMSCF (-60,000 m ³)
x Average Energy Content	x 1,000 BTU/SCF
= Total Energy Per Day	= 100,000 MMBTU
x Price Per Energy Unit	x \$ 4.00/MMBTU
= Total Revenue	= \$ 400,000
x Measurement Error	x 1%
= Lost revenue Per Day	= \$ 4,000
x 365 Days Per Year	x 365
= Lost Revenue Per Year	= \$ 1,460,000

About Rosemount Gas Chromatographs

Rosemount gas chromatographs set the standard for accurate online analysis of your natural gas applications and offer the lowest total cost of ownership. With nearly 40 years experience and over 12,000 gas chromatograph (GC) installations worldwide, the XA series of gas chromatographs provide the most accurate, repeatable, and reliable gas measurement analysis in the industry.

Engineered to be rugged and robust, the Rosemount XA series gas chromatographs are designed and tested for maximum up-time dependability and ease of use in even the most extreme weather conditions (-20 to 60 °C/-4 to 140 °F), often without the added cost of an enclosed shelter. Various GC configurations and mounting options are available, often requiring minimal time and effort for startup, commissioning, and ongoing maintenance services.

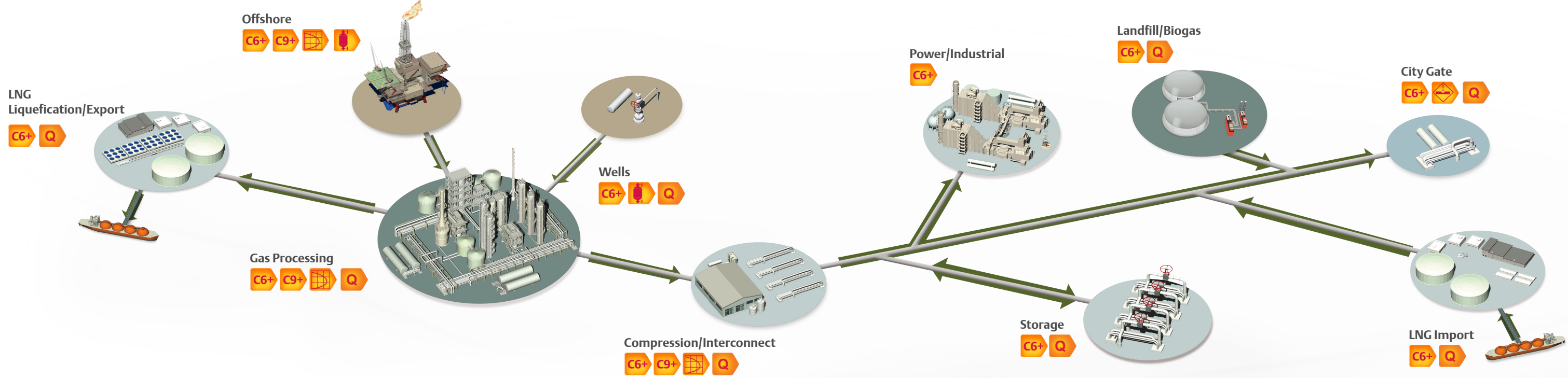
Field services, training, and on-going operational maintenance and support programs are available through our optional Lifecycle Services program. Our experienced and certified technicians can assist you to ensure your GC is operating at the desired performance levels throughout its lifecycle.

Standard Applications

For the most common C6+ and C9+ analysis and gas quality applications, the Rosemount XA series gas chromatographs offers low cost, standardized solutions to quickly meet your needs without sacrificing measurement accuracy. For more complex applications, we offer customized systems and solutions. Applications include:

- Standard Natural Gas Applications
- Energy Measurement Ranges (C6+ to C9+ Analysis)
- Fiscal Metering and Custody Transfer
- Refineries
- Petrochemical
- Lost and Unaccounted For Gas Measurement Prevention
- Gas Quality Analysis
- Trace Contaminate Monitoring
- Landfill and Biogas
- Hydrocarbon Dew Point Monitoring
- Avoiding Two-Phase Flow Errors
- Fuel Gas Control
- Environmental Monitoring
- Gas Processing
 - NGT, GTL, and LNG Plants
 - Cryogenic Gas Plants
- Custom Applications

Natural Gas Transmission Chain of Custody Applications



● Production/Gathering Network ● Gas Processing ● Midstream

Standard Measurement Ranges

		C6+	C9+
Methane	65 to 100 mole %		
Ethane	0 to 20 mole %		
Propane	0 to 10 mole %		
N-Butane	0 to 5 mole %		
Iso-Butane	0 to 5 mole %		
N-Pentane	0 to 1 mole %		
Iso-Pentane	0 to 1 mole %		
Neo-Pentane	0 to 1 mole %		
Hexane (**)	0 to 0.7 mole %		
Nitrogen	0 to 20 mole %		
Carbon Dioxide	0 to 20 mole %		
C6+ (*)	0 to 1 mole %		
Heptanes (**)	0 to 1 mole %		
Octanes (**)	0 to 0.5 mole %		
Nonane(**)	0 to 0.5 mole %		

(*) Not included in C9+ analysis
(**) C9+ analysis only

C6+ C6+ – The traditional GC “natural gas custody transfer” measurement. Individual hydrocarbons up to normal-pentane, nitrogen, and CO₂ are analyzed individually, and heavier hydrocarbons are combined to form “C6+” concentration, hence the descriptor. The Rosemount 370XA C6+ performs this measurement with a unique *Maintainable Module™* and a user interface designed with untrained operators in mind.

C9+ C9+ – On critical, high-value locations where there is a risk of two-phase flow, the Rosemount 770XA C9+ gas chromatograph extends the standard measurement to include the hexanes, heptanes, and octanes groups with heavier components back-flushed as C9+ to provide a more detailed analysis and enable physical calculations such as the hydrocarbon dew point.

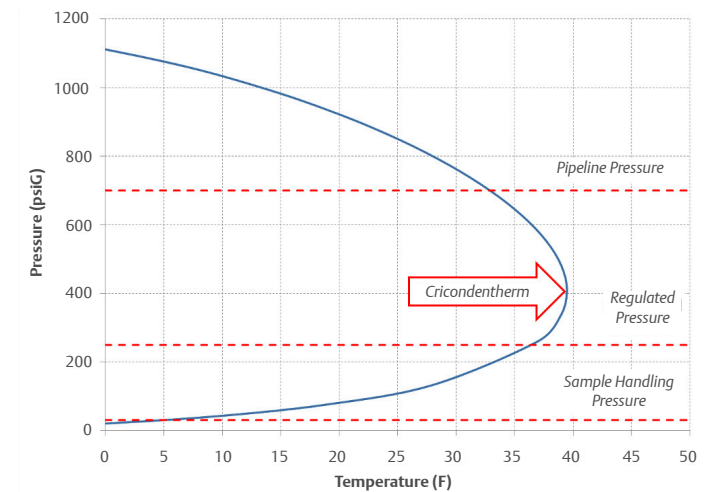
Q Gas Quality – In addition to the standard energy measurement, you may be required by contractual or health and safety requirements to provide additional measurements. These measurements will include the sulphur components of the process gas. The sulphur components of interest are typically defined as H₂S, COS (often reported

together as H₂S) and the total of all sulphur components individually measured or collectively as total sulphur. Emerson can provide all these measurements on the Rosemount XA platform, reducing the complexity of a gas quality measurement system.

Composite Sampler – A cylinder is continuously filled with small samples of the flowing gas. At regular intervals, an operator will collect the sample cylinders and send them to a laboratory for analysis. Some issues with composite samplers you should consider are; the manual collection process is prone to human error; the transportation of gas samples; and that the sample gathered does not reflect real-time analysis.

Lost and Unaccounted For – Ideally, the amount of gas (measured in energy) that leaves the network at the delivery point(s) will equal the amount of gas that enters the network at the receipt point(s). However, some energy will be lost through leakage or use (for valve actuation or compressor fuel). Additionally, the uncertainty of the measurement at the inlets and outlets can cause an imbalance. The total loss and the imbalance combined is often referred to as the Lost and Unaccounted For (LAUF) and is a critical performance indicator for the operation of the pipeline.

Hydrocarbon Dew Point – The hydrocarbon dew point changes with pressure, so the Rosemount 770XA C9+ can calculate HCDP at four different pressures, as well as the cricondetherm. The pressures can be fixed, or may be sourced from the modbus link or an analog input to enable the live calculation of HCDP at pipeline pressure.



A typical phase curve showing the cricondetherm and the hydrocarbon dew point calculated at three pressures for practical operational use.

Selecting the Best GC for Your Application

At locations where you currently use composite or older generation gas chromatographs, the Rosemount 370XA GC is ideal because it is simple to operate and includes a *Maintainable Module*, a truly cost effective solution for C6+ applications. For more critical applications or where there is risk of the hydrocarbon liquids, the Rosemount 770XA C9+ can provide the industry's best performance. Additionally, the Rosemount 770XA can be customized to meet unique measurement challenges.

Rosemount 370XA Gas Chromatograph



C6+

Applications

- Ideal for C6+ applications, including:
- Natural Gas Custody Transfer
 - Production Gas Measurement
 - Power Generation
 - Fuel Gas Control

The Rosemount 370XA provides a four-minute C6+ analysis using a unique *Maintainable Module* technology that gives the low downtime benefits of module replacement in the field with the cost-effective benefits of component-level repair. The module can be easily replaced in the field in under two hours using the module replacement wizard on the full-color local operator interface.

Rosemount 770XA Gas Chromatograph



C6+ C9+ Q

Applications

- Ideal for C9+ and customized applications, including:
- Refineries
 - Petrochemical
 - Fuel Gas Control
 - Gas Processing
 - Power Generation
 - Environmental Monitoring

The Rosemount 770XA is a full-featured airless oven gas chromatograph that allows you to use extended analysis applications in a rugged field-mountable enclosure. The Rosemount 770XA C9+ application includes HCDP calculations that can calculate the HCDP at four different pressures and the cricondentherm, the highest HCDP at any pressure.

Table 1 - Specifications Comparison

Quick Facts*	370XA	770XA
C6+ Applications	●	●
C6+ H ₂ S (3 ppm to 30 ppm)		●
C9+ Applications		●
Customized Applications		●
AGA 8	●	●
GPA 2172/2145	●	●
ISO 6976	●	●
Hydrocarbon Dew Point		●
CSA	●	●
IECEX	●	●
ATEX	●	●
MON2020™ Software	●	●
TCD	●	●
FID		●
FPD		●
Pole Mount (standard)	●	●
Wall Mount (optional)	●	●
Floor Mount (optional)	●	●
24 VDC	●	●
80–240 VAC		●
Streams	Up to 3 + Cal	Up to 7 + Cal
Historical Results Storage	Up to 85 days	Over 34 days
Chromatogram Storage	Up to 2500	2400
Serial Ports	2	Up to 5 (3 std.)
Ethernet Connections	2	2
Analog Output	2	Up to 6
Analog Input	1	Up to 6 (2 std.)
Digital Output	1	Up to 5
Digital Input	1	Up to 8

* For detailed specifications, product features, and other important information, visit the specific GC Product Data Sheet available online at Emerson.com/RosemountGasAnalysis

Fully Integrated GC Management Tool

MON2020™ Software

The Rosemount XA series gas chromatograph are designed to operate unattended. If adjustments are needed, our proprietary gas chromatograph software, called MON2020, allows complete control of the GC either locally or remotely.

With its abilities to communicate with your enterprise network and export to numerous file types, MON2020 is a powerful 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.

From within MON2020, you can:

- Start or stop analysis, calibration, or validation cycles
- Generate and save current and historical analysis and calibration reports
- Review and modify analytical settings
- Upload and display multiple chromatograms for comparison
- Upload and trend any of the measured results
- Export data to text, HTML, or Excel for use in third party applications
- Check on original calibration against the last calibration
- Perform GC operation checks and modifications simultaneously
- Upload and view manuals and drawings stored in the gas chromatograph

MON2020's chromatogram viewer allows you to view and compare both live and archived chromatograms simultaneously. Despite its small size (less than 100 KB), the chromatogram file (.xcm) includes analysis and calculation results, integration and valve timing settings, retention time settings, and raw peak data. The chromatogram's small file size also make it very convenient to share via email.

MON2020's trend viewer makes it easy to trend multiple variables on a single chart. To help diagnose process or analysis issues, you can select single or multiple points on the trend viewer; the chromatograms associated with these points will open in the chromatogram viewer. The trends can be saved as trend files or exported as text, CSV, or Microsoft® Excel™ files.

MON2020 is a Windows®-based software that makes analyzer configuration, maintenance, and data collection easy. With intuitive drop-down menus, and fill-in-the-blank tables, even new users can quickly navigate through the software. Users of MON2000 will be familiar with the layout and functionality of MON2020 and should be impressed with the additional features that make MON2020 even easier to use.

MON2020 can connect to the GC via Ethernet directly or over your local or wide area network. MON2020 is equipped with multi-level username and password security settings to limit and control access to the GC and provide five levels of authority, ranging from read-only access to full control of the GC and its data.

MON2020 Interface

The screenshot displays the MON2020 software interface with several key features highlighted:

- Simple Drop-down Menus:** Located at the top left of the interface.
- Connect to any GC with a Mouse Click:** A button or menu option for connecting to different gas chromatographs.
- Full Featured Chromatogram Display:** The main area showing a chromatogram plot with peaks and a data table below it.
- Response Factor Fidelity Chart:** A chart on the right side showing the relationship between response factor and fidelity.
- Fully Detailed Timed Event Table:** A table on the right side providing detailed information about timed events.
- Quickly Add Chromatograms to Overlay:** A feature for adding multiple chromatograms to the main display for comparison.
- Automatic Listing of Measured Components:** A feature for automatically listing the components measured in the analysis.
- Save Chromatograms to Hard Drive:** A button or menu option for saving chromatogram data to the local hard drive.

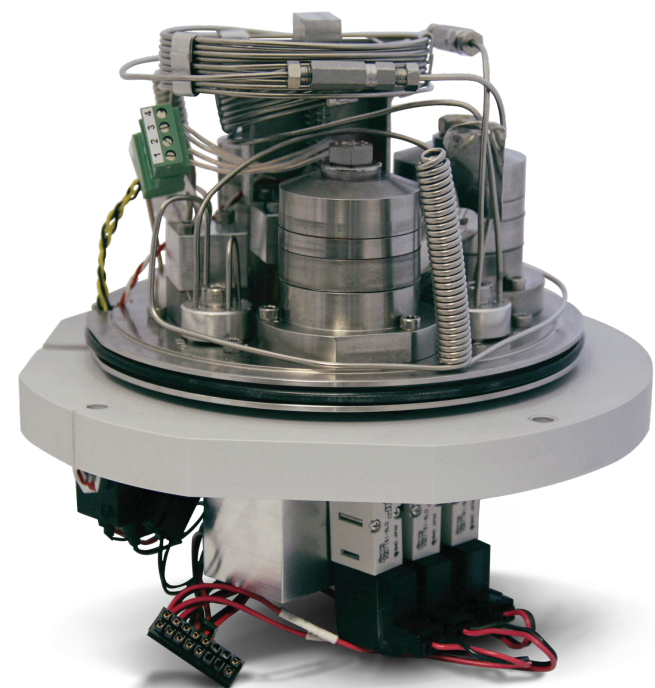
Rosemount 370XA Natural Gas Chromatograph

The Rosemount 370XA natural gas chromatograph from Emerson is designed to provide greater ease of use and increased measurement performance for your C6+ BTU/CV analysis.

Incorporating an operating method similar to previous Rosemount gas chromatographs, the Rosemount 370XA gives you the option of using hydrogen carrier gas or air/nitrogen actuation gas instead of helium.

A unique advantage of the Rosemount 370XA is the compact *Maintainable Module*, which contains the columns, thermal conductivity detectors (TCDs), analytical valves, and solenoids, all within a single enclosure, giving the operator easy access to these key components in case of routine maintenance or service checks.

If the *Maintainable Module* ever needs repair, it can be easily removed and replaced in the field without causing major interruptions or delays. Once the replacement module is back online, the Rosemount 370XA will self-validate and calibrate before automatically switching to Analysis mode.



Rosemount 370XA Maintainable Module

Features

Designed for Custody Metering of Natural Gas

- Four-minute C6+ BTU/CV analysis
- ± 0.0125% repeatability of heating value (± 0.125 BTU/1000 BTU) in controlled environments
- ± 0.025% repeatability of heating value (± 0.25 BTU/1000 BTU) over extended temperature range of -20 °C to 60 °C (-4 °F to 140 °F)
- Latest GPA 2145, GPA 2172, and AGA 8 calculations
- Latest ISO 6976 calculations
- Analysis results storage in excess of the latest API 21.1 requirements

Simplified Functionality and Ease of Use

Full color Local Operator Interface (LOI), with built-in wizards (software assistants) to guide the operator through common tasks, such as:

- Module replacement
- Change calibration gas
- Auto-valve timing

Reduced Installation Costs

- 24 VDC power with less than 55 Watts startup and < 25 Watts (steady state) nominal power
- Pole (standard) and wall mount options
- No shelter required for most environments

Lower Operational Costs

- Reduced carrier gas usage
- Automatic validation routine reduces calibration gas usage
- Maintainable Module* replacement is quick and easy
- Optional utility gases: H₂, He, N₂

The local operator interface (LOI), a standard feature in the Rosemount 370XA, is a full color VGA display with an alpha-numeric keypad that allows operators to perform common tasks without having to connect to a computer. The LOI has built-in tutorials to guide even the most inexperienced operator through step-by-step instructions on how to safely operate and maintain the GC, therefore reducing the need for specialized technicians.

Specifications

Please consult Emerson if your requirements are outside the specifications listed below. Improved performance, other products and material offerings may be available depending on the application.

Construction

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

Enclosure Protection Rating: IP65 and Type 4X

Dimensions (without sample system or mounts):
460 mm H x 305 mm W x 280 mm D
(18" H x 12" W x 11" D)

Mounting: Pole (standard) or wall mount

Approximate Weight (without sample system):
22 kg (50 lbs.)

Area Safety Certification Options:

- CSA:**
 - USA/Canada
 - Class I, Zone 1, AEx/AEx d IIB + H₂, T6, IP65
 - Class I, Division 1, Groups B, C, D, T6, Enclosure Type 4X
- ATEX/IECEX**
 - Ex d IIB + H₂, T6, Gb
 - T_a = -20 °C to 60 °C

Electronics

Power:

- 24 VDC at the unit (21–30 VDC)
- 55 Watts (Startup)
- < 25 Watts (Steady State)

Performance Capabilities

Application: Four-minute C6+ analysis

Repeatability:

- Controlled Environment:**
 - ± 0.0125 % Calorific Value (± 0.125 BTU/scf per 1000 BTU/scf)
- 20 to 60 °C (-4 to 140 °F):**
 - ± 0.025 % Calorific Value (± 0.25 BTU/scf per 1000 BTU/scf)

Calculations: ISO 6976, AGA 8, GPA 2172 (using the GPA 2145 physical properties table)

Carrier Gas: Zero-grade helium. Zero-grade hydrogen available as an option. 6.2 BarG (90 PSIG)

Actuation Gas: Helium, Nitrogen, or clean dry air. (90 PSIG)

Sample Input Pressure Range: 0.7 to 1.7 BarG (10 to 25 PSIG)

Valves: Three six-port diaphragm chromatograph valves

Oven: Airless iso-thermal

Detector: Thermal Conductivity Detector (TCD)

Streams: Three-stream plus calibration stream

Chromatograms stored/archived internally: Stores up to 85 days of analysis report data and up to 2,500 individual chromatograms

Communications (Standard)

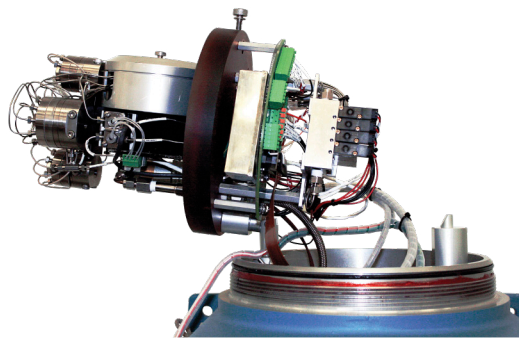
- Ethernet: Two available connections – one RJ-45 port & one four-wire terminal with 10/100 Mbps
- Analog inputs: One standard input filtered with transient protection, 4–20 mA (user scalable and assignable)
- Analog outputs: Two isolated outputs, 4–20 mA
- Digital inputs: One input, user assignable, optically isolated, rated to 30 VDC @ 0.5 A
- Digital outputs: One user-assignable output, Form C and electro-mechanically isolated, 24 VDC
- Serial: Two terminal blocks, configurable as RS-232 or RS-485

Rosemount 770XA Natural Gas Chromatograph

The Rosemount 770XA gas chromatograph offers accurate and reliable hydrocarbon dew point calculations from the extended C9+ 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 Rosemount 770XA integrates hydrocarbon dew point software into the gas chromatograph to provide dew point temperatures for up to four user-defined pressures and the cricondentherm using the Peng-Robinson or the Redlich-Kwong-Soave 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 C6/C7/C8 and C9+ components allow for an accurate determination of the hydrocarbon dew point for pipeline-quality natural gas using reliable and low-maintenance thermal conductivity detectors (TCDs), avoiding standalone dew point analyzers or flame ionization detectors (FIDs), that require additional utility gas requirements. For heavier gas applications where significant amounts of components above C10 are expected, an FID can be combined with a TCD to provide for further extended analysis.



Unique analytical assembly design pivots to allow instant access to all components.

Features

Unmatched measurement performance

- Best C6+ heating value/BTU repeatability available $\pm 0.01\%$ (± 0.1 BTU/1000 BTU) in temperature controlled environment
- $\pm 0.015\%$ (± 0.15 BTU/1000 BTU) in uncontrolled environment (-20° to 60 °C/-4° to 140 °F) with a three minute cycle time
- Best-in-industry C9+ repeatability available $\pm 0.0125\%$ of heating value (± 0.125 BTU/1000 BTU) for controlled environment
- $\pm 0.025\%$ (± 0.25 BTU/1000 BTU) of heating value for uncontrolled environment (-20° to 60 °C/-4° to 140 °F) with a five minute cycle time
- Wide dynamic range from percent to trace level components down to 2 ppm
- Reliable performance over broad ambient temperatures -40 °C to 60 °C/-40 °F to 140 °F

Easy to use

- Single bolt analytical valve design for easy overhaul in the field
- Large column canister for both micro-packed and capillary columns of long lengths
- Internal stream selection and valve actuation solenoids that can be replaced easily in under five minutes
- Easy to use MON2020 software for diagnostics
- Two portholes in the electronics housing for easy wiring access
- One package for fiscal metering or gas quality
- Custody transfer analysis from C6+ to C9+
- Contaminant monitoring – trace hydrogen sulfide, carbon dioxide, oxygen, etc.
- Combine measurements and reduce analysis cost
 - C9+ with hydrocarbon dew point
 - C6+ with H₂S (3 to 30 ppm H₂S)
 - C6+ with oxygen
 - C6+ with helium and hydrogen
 - C9+ with methanol and water

Reduced installation costs

- Standard 24 VDC power or optional 120/240 VAC power
- Integrated controller electronics
- Pipe-mount, wall-mount, or floor-mount

Lower operation and maintenance costs

- No shelter or instrument air required
- Low carrier and power consumption
- Longest gas chromatograph valve and column warranties available in the market today

Specifications

Please consult Emerson if your requirements are outside the specifications listed below. Improved performance, other products and material offerings may be available depending on the application.

Construction

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

Environmental temperature without safety certification: 40° to 60 °C (-4 ° to 140 °F)

Enclosure Protection Rating: IP66

Dimensions (without sample system):

- Wall-mount:** 711 mm H x 445 mm W x 498 mm D (28" H x 17.5" W x 19.6" D)
- Pipe-mount:** 711 mm H x 445 mm W x 671 mm D (28" H x 17.5" W x 26.4" D)
- Floor-mount:** 1532 mm H x 445 mm W x 612 mm D (60.3" H x 17.5" W x 24.1" D)

Corrosion Protection:

- GC Enclosure Material:** Copper-free aluminum coated with industrial-grade powder coat suitable for high humidity and salt-laden environments
- Process Wetted Materials:** Stainless steel; where the function of an item excludes the use of stainless steel (e.g. glass rotameter tubes), materials that are resistant to corrosion are used
- Electronics:** All electronic circuit boards are tropicalized with a clear conformal coating

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

Approximate Weight (without sample system): 50 kg (110 lbs.)

Area Safety Certification Options:*

- CSA:**
 - USA and Canada
 - Class I, Division 1, Groups B, C, and D
- ATEX/IECEx**
 - Ex II 2G
 - Ex d IIC Gb T6 (Ta = -20 °C to 60 °C)

*Stated T-ratings can vary based on applications.

Performance Capabilities

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

Valves: Six-port and ten-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 & Calibration Gas Input Pressure Range: 0.2068–2.0684 bar: 1.0342 bar (recommended) or 15 PSIG

Carrier Gas Input Pressure Range (recommended): 6.2052–6.8947 bar (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

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

Streams: Up to 20 externally controlled streams or up to eight internal (includes calibration stream)

Chromatograms stored/archived internally: Stores over 80 days of analysis report data and up to 2,500 individual chromatograms

Electronics

Power:

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

Typical Power Consumption at 22 °C (72 °F):

- Startup:** 105 Watts DC (125 W AC)
- Steady State:** 35 Watts DC (40 W AC)

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

Communications (Standard)

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

Communications (Optional)

Two expansion slots available for additional communications. Each slot has the capacity to add one of the following:

- Four analog inputs (isolated) card
- Four analog outputs (isolated) card
- Eight digital inputs (isolated) card
- Five digital outputs (isolated) card
- One RS-232, RS-422 or RS-485 serial connection card
- One modem card, 300-19.2k baud

Additionally, a FOUNDATION™ Fieldbus module is available.

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

Touch-key Local Operator Interface (Optional)

The Rosemount 770XA local operator interface (LOI) allows for maintenance and operation of a Rosemount 770XA without a laptop or PC. The LOI is a state-of-the-art high-resolution color display that is touch-key infrared activated and supports all core GC operations.

The Rosemount GC Difference

Gas Chromatograph Valves

Rosemount gas chromatographs offer six-port or ten-port diaphragm/piston valves. These pneumatic valves are guaranteed for the life of the gas chromatograph and specified to operate over five million times between service. By minimizing internal movement (1/1000 inch) of the pistons, which never come in contact with the sample, abrasive mechanical wear is virtually eliminated. This unique double-diaphragm design removes the need for all springs, o-rings, or lubrication. Valve service is performed by replacing a cost-effective diaphragm set, normally completed in less than ten minutes.



The diaphragm valves used in Rosemount gas chromatographs have a lifetime warranty.

Airless (Heat Sink) Oven

The heat sink oven integrates the detector, columns, and analytical valves in a single, temperature-controlled assembly. This unique design enables the analyzer to be mounted in the field without the need for elaborate weather protection or instrument air. To ensure performance to specifications, our gas chromatographs are tested for repeatability in an environmental chamber prior to shipment, where they are cycled from 0–130 °F for 18 hours. Customers are welcome to request testing in our environmental chamber free of charge for every gas chromatograph that is purchased.

Lower Installation and Maintenance Cost

Rosemount gas chromatographs offer the lowest cost of ownership in the industry. Most process measurements can be made at or near the sample point, greatly reducing the overall lifetime cost of the measurement. Expenses such as shelters, air conditioning, heating, and long/heated sample lines can be minimized or completely eliminated in most applications. Furthermore, Rosemount natural gas chromatographs are designed to operate unattended for long periods of time. When adjustments are required, all components are easily accessible and the adjustments be performed in the field in minutes with standard tools.

Thermal Conductivity Detectors

The thermal conductivity detector is the detector of choice for most applications due to its universal response to all components of interest in natural gas and light refinery and hydrocarbon processing gas analysis. The TCD is able to measure well beyond the normal ranges seen in other designs and is sensitive enough to perform many applications with low parts-per-million measurement requirements. This greatly simplifies the gas chromatograph design and lowers the cost to the end user when a simple and rugged TCD can be used.

Micro Flame Ionization Detector (μFID)

The micro-flame ionization detector, coupled with a new detector pre-amplifier/electrometer board, permits measurement of trace hydrocarbons in a variety of samples at parts-per-billion (ppb) concentrations. The μFID is unique in the industry because of its small size (less than three inches high) that fits inside the explosion-proof housing. Typical applications include measuring trace impurities in gases and light hydrocarbons, as well as ambient air monitoring.

Micro-packed Columns

Rosemount gas chromatographs offer micro-packed columns with a superior combination of features found in both capillary and conventional packed columns — speed, sharp peak resolution, and low carrier gas consumption. In addition, the unique design provides for greatly extended column life and the longest warranty available on the market (five years on the standard C6+ natural gas set). Standard capillary columns may also be used.

Six and ten-port valves with reduced dead volume and a single retention bolt to simplify maintenance.



Environmental Chamber Testing

Rosemount gas chromatographs undergo rigorous performance testing and has to pass a series of inspections before leaving the factory, including an 18-hour environmental chamber test in which the temperature changes rapidly from 0 to 130 °F while the analyzer is kept running.

Our product testing procedures are much stricter than the industry standard for analytical measurement products. When you purchase a Rosemount gas chromatograph, you can be assured that you are investing in the highest-quality online gas chromatograph available. As a result of chamber testing, we can guarantee all gas chromatographs that we ship will operate to the performance specifications across the stated operating temperature range.



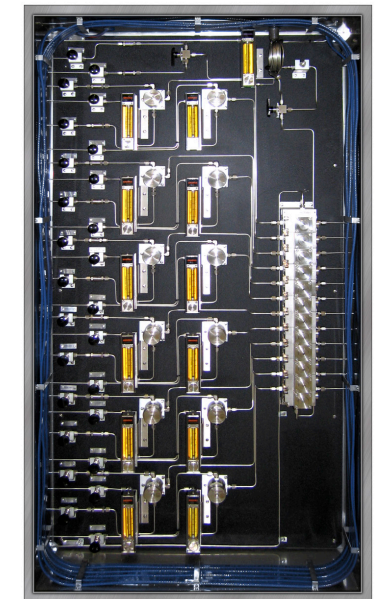
Rosemount 770XA gas chromatograph shown inside the environmental testing chamber.

Engineered Sample Handling Systems

Any process gas chromatograph is only as good as the quality of the sample it measures. So every sample system for Rosemount process gas chromatographs is custom-engineered for the specific requirements of the application.

Common features include:

- Heated and open-panel designs
- All components rated for the area classification
- Automatic calibration/validation available as an option
- Variety of sample probes to extract a reliable and stable sample from the process



Multi-stream heated sample conditioning system

Optional GC Parts and Accessories

We offer standard and custom gas chromatograph accessories to meet your installation and application requirements.

Touch-key Local Operator Interface (Optional)

Features of the LOI include:

- Color LCD display with QVGA (320 x 240 pixels) resolution
- ASCII text and graphics modes
- Auto-backlighting (adjustable)
- Eight infrared-activated touch keys and screen saver
- Eliminates external magnetic pen requirement
- Maintains the Rosemount 770XA hazardous area classifications
- Complete GC status, control, and diagnostics, including full chromatogram display



Rosemount 770XA optional touch-key LCD display LOI

Gas Chromatograph Systems Enclosures

- Complete range of gas chromatograph enclosure solutions ranging from simple sun-shields and cabinets to skid systems and shelters
- API 14.1 compliant solutions with heating of sample lines and calibration gas

Standard Auxiliary Equipment

- Sample probes/pressure regulators/tilters for a wide range of sample handling requirements
- Carrier gas systems with dual manifold regulators uninterrupted operation
- Calibration gases and heating blankets

Gas Chromatograph Accessories

- "Condulet" Junction Box for quick laptop PC (db9 connector) access



GC system cabinet



Three-sided shelter



Lifecycle Services and Support

Our team of trained and certified field experts know and understand the requirements needed to develop a customized service program to suit your application. We provide complete turn-key services and problem solving to assist you every step of the way. From pre-installation services to on-going maintenance and support long after commissioning, we have the expertise to ensure your Rosemount gas chromatograph runs at ideal operating conditions during its lifecycle.

Field services include, but are not limited to the following:

- Startup and commissioning
- Scheduled maintenance
- On-site support
- Field retrofits
- Training



Training Services

Whether your goal is to reduce maintenance costs, maximize up-time, or reduce lost and unaccounted for gas running through the pipeline, Rosemount offers a complete list of training courses and continuous support programs to ensure your technicians know how to properly operate and maintain the GC during its lifecycle.

Our certified instructors offer two types of training courses:

Standard Training programs are scheduled periodically throughout the year at one of our four training facilities in North America. Each course varies in length, typically lasting between four to eight hours a day for a period of four days, depending on the course level and student knowledge and experience. These classes are designed to expand a student's knowledge, covering such topics as how to properly configure the instruments to meet the plant's monitoring and control needs, how to properly calibrate and care for them, and how to use diagnostic variables to troubleshoot problems and schedule routine maintenance or sensor replacement.

Private Training classes can also be arranged at an off-site location depending on availability and training location requested. Training is conducted in both a formal classroom setting and a hands-on instructional approach to give customers a complete training program customized to their specific needs and interests.

All standard and private training courses are taught by Rosemount certified instructors who work with each student to provide the necessary hands-on training, theory, and conceptual knowledge needed to perform on-the-job functions safely and accurately.

The instructor will prepare a course curriculum designed around the student's skill level and expertise, often covering everything from installation and startup, all the way through commissioning and long-term maintenance within the same class. For the more experienced student, advanced training courses are available. Typical students who attend our training program include plant personnel, analytical technicians, and field service engineers.

Ensure reliable gas composition analysis and quality monitoring.



Rosemount 370XA Gas Chromatograph



Rosemount 770XA Gas Chromatograph

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