



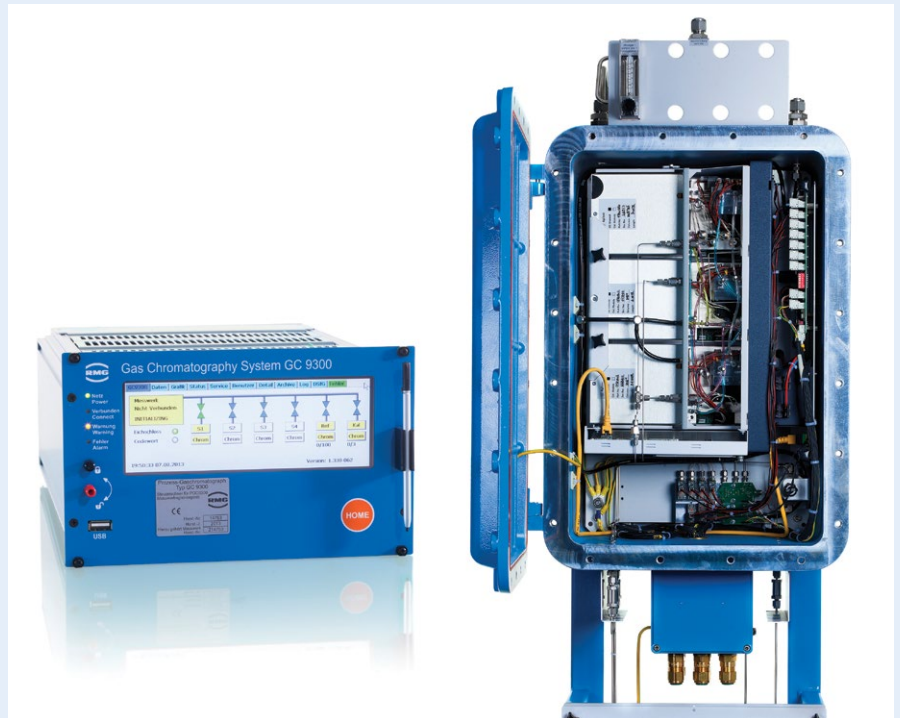
PROCESS GAS CHROMATOGRAPH PGC 9303

Gas quality matters. In order to be prepared for the changes in the natural gas grid, RMG has developed the PGC 9303 –the first process gas chromatograph to measure natural gas quality plus hydrogen and oxygen within the same device. The PGC 9303 uses helium as carrier gas and measures pentanes and hexanes. Hydrogen can be measured up to 5 percent. As such, it is suited for demanding renewable energy, biogas and power-to-gas applications under metrological conditions.

Proven Performance. Robust Functionality.

Rely on RMG

- Over 150 years of combined experience in the natural gas industry
- Worldwide solution leader in control, measurement and analysis technology
- Products and solutions for natural gas transportation, storage, distribution and consumption
- Local support with global expertise
- Single source provider with a wide portfolio



Due to increased availability of renewable energy sources, there are changes in gas quality in the natural gas grid requiring additional measurement of hydrogen and oxygen components. Users need a solution to precisely determine gas composition.

ACCURACY MATTERS

The RMG Process Gas Chromatograph PGC 9303 meets the challenges of today's fast growing natural gas industry. Approved for fiscal and custody transfer metering by the National Metrology Institute PTB in Germany, the PGC 9303 helps users accurately identify the calorific value of natural gas, and in doing so, lower costs, also due to reduced carrier gas consumption.

Employing Micro Electro Mechanical System (MEMS) technology to ensure stable, reliable operation, it is the world's first process gas chromatograph able to measure natural gas, hydrogen and oxygen in a one integrated device according to custody transfer approvals.

Inherently Precise

The PGC 9303 provides ± 0.10 percent accuracy (superior calorific value and standard density) and can measure hydrogen up to 5% with only helium used as a carrier gas. As such, it is suited for demanding renewable energy, biogas and power-to-gas applications under metrological conditions. This precision gas chromatograph reduces operational costs, and improves accuracy and reliability when determining energy usage.

Proven Technology

The PGC 9303 measures the percentage of twelve different primary natural gas components for the calculation of gas compressibility based on the compressibility factor according to AGA 8. These data are the basis for calculating superior and inferior calorific value, standard density, relative density and Wobbe Index using the characteristics of the components per the ISO 6976 or GPA 2172-09 standards.

The device's proven measurement technique enables the energy content of measured gas to be determined for billing purposes.

Fully Integrated

The PGC 9300 series process gas chromatographs are currently offered in three different configurations – PGC 9301, PGC 9302 and PGC 9303. The devices consist of five key components: the measuring element, analytical computer, sampling probe, pressure reducer and gas supply unit. They have a modular setup and can be equipped with two or three column modules, depending on the gas components to be measured.

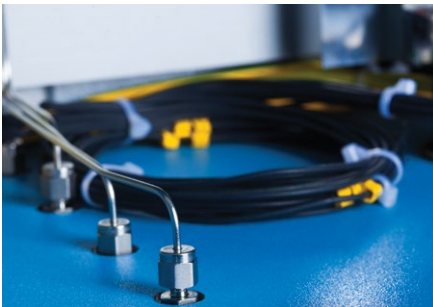


Typical applications include:

- Custody Transfer
- Fiscal Measurement
- K Coefficient Measurement
- Gas Mixing Control
- Power-to-Gas
- Remote Stations
- City/Regional Gas Supplier
- Border Stations

The PGC 9303 calculates superior and inferior calorific value, standard and relative density, Wobbe Index and optionally methane number.

MEETING THE DEMANDS



Robust Functionality

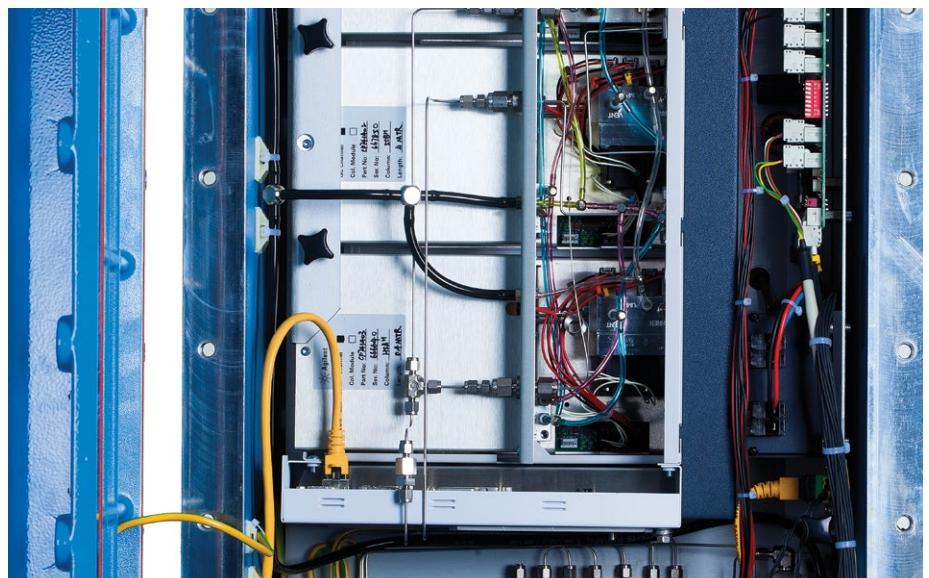
RMG has optimized the technique for analyzing natural gas and biogas composition. With the PGC 9303, individual gas components are separated in special capillaries, i.e., columns. The gas components flow successively through a thermal conductivity detector, which measures their respective percentages. Carrier gas flows through the miniaturized column and detector unit on a continuous basis, and is injected with a defined amount of measuring gas for analysis.

In order to maintain constant accuracy, the gas chromatograph is automatically calibrated at regular intervals. A gas mixture of which the composition is known is analyzed for this purpose.

Versatile Performance

Aside from calculation of superior calorific value and standard density for fiscal metering, the PGC 9303 calculates relative density, inferior calorific value, Wobbe Index and optionally methane number.

The instrument's analytical computer has inputs for additional measured values such as room temperature and dew point from external transmitters. Inputs are also available in the pressure reducer and gas supply unit for the messages of contact pressure gauges and thermometers, with generation of a collective fault message. In addition, the PGC 9303 allows management of multiple DSfG addresses. Special bus couplers are not necessary as long as the analytical computer is connected to a maximum of two DSfG bus systems.



The unit's touchscreen allows a quick overview of the current status and measurement results, and simplifies operation via graphic displays.

EASY TO OPERATE



Easy Operation

The PGC 9303's Human-Machine Interface (HMI) features a touchscreen graphic display providing intuitive operation. Individual parameters are described by help text, and the programmable display enables quick access to the 20 most important parameters or values.

Flexible Communication

The chromatograph's analytical computer has two TCP/IP interfaces: one for communication with the measuring element, and the other for the operator and the RMGViewGC operating software. The analytical computer also supports a display for remote operation through an Ethernet connection to reduce on-site maintenance and trips to the field.

Industry Approved

By approval of RMG, the PGC 9303 is approved by PTB for custody transfer measurement of the superior calorific value and the standard density of gas, as well as percentages of the components.

The PGC 9303 is globally applicable with the exception of North America. General approvals such as ATEX and IECX are available; local metrological approvals may apply.



The PGC 9303 measures the percentage of twelve different primary natural gas components for the calculation of gas compressibility based on the AGA 8 compressibility factor.

STATE-OF-THE-ART DESIGN



The Process Gas Chromatograph PGC 9303 was designed from the ground-up to utilize advanced MEMS technology, enabling significant reductions in carrier gas consumption. This state-of-the-art gas chromatograph provides 2-3 years of uninterrupted operation, which require users to deploy less field personnel to change carrier gas bottles.

In addition, the PGC 9303 measures the traditional components of natural gas (e.g., nitrogen, carbon dioxide, and methane up to hexanes), hydrogen and oxygen with only one carrier gas—helium—required for operation.

Measuring Element

The chromatograph's measuring element contains the column modules, which are the source of the measured values transmitted via a network connection to the analytical computer. In the standard version, the measuring element is equipped for analysis of the measuring gas from one sampling point. With the multi-stream version, measuring gases from up to four sampling points can be analyzed. For each gas stream, there is a bypass parallel to the measuring element. Because of the low flow through the miniaturized measuring element, it is necessary to increase the flow through the supply pipes so the actual gas is measured.

Analytical Computer

The PGC 9303's analytical computer provides control of gas analysis and evaluation of the measured values and, at the same time, serves as the operating panel of the chromatograph. The unit's touchscreen allows a quick overview of the current status and measurement results, and simplifies operation via graphic displays. The supplied operating software provides additional valuable functionality, such as displaying the HMI on a remote PC. This permits the analytical computer to be operated from a distance in the same way as directly at the device. The PGC 9303 is also delivered with all necessary peripheral equipment:

Sampling Probe:

Used to take samples of the measuring gas to be analyzed from the gas pipe. Configurations available for fixed installation or pipes that are pigged.

Pressure Reducer:

Reduces and stabilizes the pressure of the measuring gas. Pipe from the sampling probe to the pressure reducer can be heated. This is required if the gas is humid and condensate formation is likely to occur.

Gas Supply Unit:

Includes a rack for positioning the carrier gas and calibration gas cylinders. Designed with a reserve cylinder and switching device for the carrier gas, as well as temperature monitoring for the calibration gases.

PGC 9303 TECHNICAL SPECIFICATION

Measuring element		Components and ranges	
Ambient temperature	-10°C to +55°C, no air conditioning required	Methane	>65%
Degree of protection	IP 54	Nitrogen	<20%
Ex device protection type	II 2 G Ex de IIB T5/T4	Ethane	<15%
Carrier gas	Helium 5.0	Carbon dioxide	<10%
Analysis time	3 - 4 minutes	Propane	<9%
Measuring uncertainty - superior calorific value - standard density	< ±0.10% < ±0.10%	i-Butane	<4
		n-Butane	<4%
Dimensions	W x H x D = 455 mm x 1830 mm x 335 mm	neo-Pentane	including n-Butane
Weight	75 kg	i-Pentane	0.12%
Power supply	24 V DC	n-Pentane	0.12%
Power requirement	190 W ¹⁾	C6+	0.3%
Process connections - carrier, measuring and calibration gas - exhaust gas	compression connection 1/8" 12 mm	Hydrogen	<5%
		Oxygen	<5%
Gas consumption - carrier gas - calibration gas	1.0 - 1.2 NI/h 1.2 - 1.6 NI/d		
¹⁾ Switch-on current: 25 A for approx. 10 ms, 10 A in the first 3 minutes.			
Analytical computer			
Dimensions	W x H x D = 213 x 128.4 x 310 mm		
Power supply	24 V DC		
Power requirement	25 W		
Inputs	20 digital	8 analog	
Outputs	12 digital 4 analog		
Interfaces	2 x LAN ²⁾ 2 x USB ³⁾ 7 x serial (RS 232/485)		
²⁾ LAN1 reserved for measuring element. ³⁾ closed for custody transfer metering.			
Gas supply unit			
Dimensions	W x H x D = 1300 x 1450 x 370 mm		
Power supply	230 V AC		
Power requirement	100 W per heated cylinder		

Key features

- Modular system for measuring the composition of natural gases and biogas, including gases with a mixture of hydrogen, air or hydrocarbons
- PTB approval for determining the molar portions of gas components, as well as superior calorific value and standard density
- Measurement of natural gas and biogas using helium as a carrier gas
- Single- and multi-stream design for gas from up to four sampling points
- Analytical computer with touch screen for easy operation
- Detailed archives and logbooks, with storage of chromatograms for one week
- Digital communication via network, DSfG and Modbus
- Additional analog and digital inputs and outputs with an external module, connected to a serial interface
- Low-maintenance system (only logging of operating parameters)
- Measuring element in Ex-d case for installation in Ex-zone 1
- RMGViewGC operating software (MS Windows) for display, change and export of parameters to spreadsheets (MS Excel), data book production, display/storage of chromatograms and remote control

Technical data is subject to change without notice.



ONE STEP AHEAD

RMG Messtechnik GmbH

Otto-Hahn-Straße 5
35510 Butzbach
Germany

Tel. +49 (0) 6033 897-0
Fax: +49 (0)6033 897-130
Mail info@rmg.com

www.rmg.com

For More Information

To learn more about products and solutions from RMG, visit www.rmg.com or contact your account manager.