

Valmet MAXUM II

Precision meets unsurpassed performance







Why choose gas chromatography?

Only if measurements are highly precise and results completely reliable can the proven “measure, analyze, and optimize” approach used in the process industry unlock sustainable process improvements and increase production efficiency. Companies in the process industry are faced with the challenge of ever increasing stringent plant requirements, production cost pressure, and a growing dependence on outside experts to keep plant equipment maintained. Gas chromatography offers unique measurement properties to meet these challenges.

Highly dependable analyzer precision

Though often similar, no two processes are identical. Therefore, precise measurements and reliable analytics are vital to the success of your business. As a result, process engineers need to be able to rely on analyzer measurements. Online gas chromatographs contribute significantly to improving plant efficiency and securing product quality. Proven in the field for over 20 years, the MAXUM II process gas chromatograph has an excellent reputation for quality, reliability, and measurement precision. Due to its design versatility, a broad range of process applications and flexible data communication concepts are available.

Maximum uptime thanks to digitalization

As advances in digitalization continue to be made, predictive maintenance, remote monitoring and control as well as customized data access can further reduce costs while enhancing uptime. An example of this are the smart sensors embedded sample system components (SSSI) to improve the reliability of the analyzers sample conditioning system. Based on our extensive experience in process gas chromatography, we can offer advanced solutions that take advantage of the benefits of digitalization across your gas chromatography platform.

Simplified operation through application technology

Our solutions include the modular oven version of the MAXUM II that uses analytical modules that can be quickly and easily replaced in the event maintenance is required. The modules are also compatible with Simple Consistent Application Technology (SiCAT) that eliminates the need for chromatography expertise to perform analytical maintenance.

Always the right process gas chromatograph configuration

Our highly adaptable MAXUM II process gas chromatographs are the perfect match for a wide variety of process analytics applications, even with varying user requirements for each analyzer.

Outstanding versatility

The highly versatile MAXUM II combines various analytical oven designs into one system. This broad basis allows the MAXUM II to be used for many different analyzer tasks. This significantly reduces costs for capital investment, training, and spare parts.

Compatibility with a variety of detector types such as FID, TCD, FPD, and PDD means multi-detector configurations are possible, making MAXUM II units among the most versatile chromatographs in the world. Also available with dual ovens, this flexible concept features energy-saving airless ovens and roomy airbath ovens including a temperature-programmable version. Where two separate gas chromatographs are normally required, a dual-oven configuration with one complex application or two simple applications can be implemented using only one analyzer.

The optional modular oven design sets industry standards for rapid and easy maintenance which also increases system uptime. Using a parallel chromatography system allows complex applications to be

divided into several simpler applets for simultaneous analysis. This reduces analysis times and makes maintenance work easier.

The modular oven design is also available with the innovative SiCAT modules that allow the analyzer to be back online in minutes when maintenance is required.

Standardized measurement solutions

To provide consistent and optimized measurement solutions, Valmet has developed a series of standardized chromatography solutions for many of the most common component measurements found in the industry. These Simplified Consistent Application Technology (SiCAT) cover a wide range of common applications found in the process industry. Whether the application is a simple light hydrocarbon measurement or the analytical requirements of an LNG plant, these standardized applications provide consistent solutions across the industry. This results in faster delivery and easier maintenance of the MAXUM II GC.

Integrated dual channel Ethernet-based communication

State-of-the-art TCP/IP communication and Ethernet standard hardware ensure compatibility with a wide range of different networks. This simplifies communication between the chromatograph, control system, and users. Operation is also made easier for on-site and remote operators. The highly intuitive HMI color touchscreen cuts training expenditures and speeds up device operation. Remote monitoring of all parameters could not be easier thanks to flexible PC operation using Windowsbased software and Ethernet communication, as well as the performance of the Analyzer System Management software.

First-in-class: The MAXUM II process gas chromatograph

MAXUM II's combination of versatile hardware and software enables the extensive use of unique chromatograph techniques. These techniques bring benefits that cannot be matched by any other process chromatograph.

"State-of-the-art" application development

"Application" is the term used for customer-specific measurement solution to optimally perform the measuring task. This is where the strengths of the MAXUM II really stand out. Our applications specialists are involved in the process right from the start, applying years of experience in working with hundreds of applications performed by our gas chromatographs. They configure the device to meet detailed customer specifications, including the oven, detectors, valves, and separation columns. The solution is then developed in close collaboration with the customer and put into place during the factory acceptance test.

Multiple detector configuration

The detector modules can be used in various combinations with each other in a single MAXUM II:

- Up to three detector modules
- Choice of a Thermal Conductivity Detector (TCD), Flame Ionization Detector (FID), or Flame Photometric Detector (FPD)

Those capabilities are the key to achieving numerous cost-saving benefits:

- Duplicate detector modules can be run in parallel at staggered times to provide even more frequent measurement updates.
- Parallel detector modules can be used for each stream rather than switching the stream to a single module to reduce total cycle time in multi-stream installations.
- Running two identical detector modules in parallel on the same stream provides redundant measurements, which can be compared to reduce the need for calibration.

These capabilities give MAXUM II the ability to do what no other chromatograph can do – parallel chromatography.

Serial to parallel chromatography

MAXUM II enables a completely new approach to gas chromatography: parallel chromatography. This allows simpler and more logical analyzers that are easier and faster to maintain and have higher reliability. For a long period of time, process gas chromatographs utilized and still use a single detector only with multiple separation columns and switching valves and a higher complexity due to the fact that all target components eluting from different columns have to arrive at the single common detector at different times.

With parallel chromatography, the MAXUM II hardware and software allows users to break a complex single-train chromatograph analysis into multiple simple trains which are then run at the same time, in parallel. This not only simplifies the overall analysis, but also allows it to be performed faster and more reliably.

This makes training easier, reduces spare parts requirements, and significantly reduces cycle time, but also makes it possible to use standard configurations for common applications.



Simplified maintenance

MAXUM II has unique features to simplify maintenance and long-term reliability! Using electronic pressure control (EPC) modules in a process gas chromatograph allows the carrier and fuel gas supply to be controlled to eliminate drift and variations due to unstable mechanical regulation. But the main benefit is to automatically control and adjust the column switching flow without the need for needle valves, substantially reducing the need for maintenance.

Column replacement or slow degradation requires resetting the correct valve timing in order to ensure proper component detection. This also requires a trial-and-error approach (e.g., an 8-minute cycle time to recognize the effect of the adjustment).

Inter Column Detector (ITC) makes it possible to have real-time status at strategic locations in a separation path (between separation column and switching valve), streamline setup of switching time with one analysis (versus trial and error) and, finally, allows continuous monitoring of column performance (preventive maintenance).

Gas Chromatograph Portal software

The Gas Chromatograph Portal software runs on a PC workstation and shows users the real-time status for all MAXUM II gas chromatographs in a network. In the event of an alarm, interrogating the analyzers is as easy as clicking on the icon for that analyzer. This automatically displays easy-to-understand screens displaying all the analyzer's key performance parameters. The software continually updates every gas chromatograph on the network to show the current analysis and operating status. Analysis results, chromatograms, and alarm logs are all just a click away. In addition, automatic data logging and reporting functions are fully supported in the Gas Chromatograph Portal.

MAXUM II's StatMon feature helps pinpoint errors

The StatMon feature – an analyzer database configured to store key operating values such as validation components, power, temperature,

analog inputs, alarms, and response factors – is included in every MAXUM II GC. StatMon allows trends or charts to be viewed and full statistical tracking and display of average, maximum, minimum, and mean values, as well as limit monitoring. As data points accumulate for each value selected, the root cause of deviations and errors can be identified using StatMon.

OPEX

Over the lifetime of a process analyzer, operational costs often exceed the initial capital investment costs. OPEX represented typically 30% of the total lifecycle investment including the initial CAPEX. Thanks to its ease of servicing, the Valmet MAXUM II helps reduce operating costs while also lowering air and power consumption. It has been estimated that annual savings of up to \$2,000 can be achieved with a MAXUM II airless oven compared with traditional airbath oven GCs.

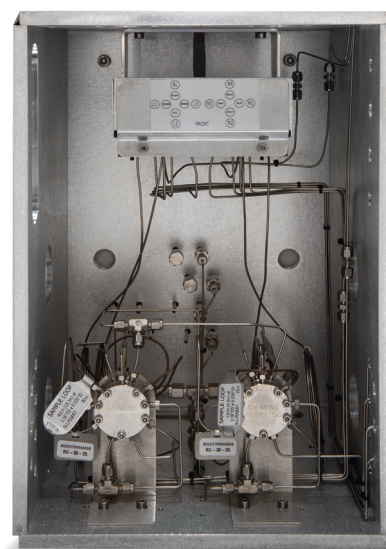
Innovative thermal conductivity detector design for the MAXUM II Airbath/Airless

Ever since the MAXUM II Gas Chromatograph was introduced 20 years ago, it has continued to be a global leader in innovative measurement solutions for our customers. The underlying design philosophy of the MAXUM II GC makes the addition of new technical enhancements possible while ensuring backwards compatibility for older MAXUM II analyzers.

The most recent innovation introduced with the MAXUM II GC is a new design for the thermal conductivity detector (TCD) in the MAXUM II Airless/Airbath (MAA) GC. This is a key evolutionary step toward making the MAXUM II more powerful. In addition, Valmet is responding to customer requirements for further reductions in costs of ownership. A key new benefit is the true intrinsically safe (IS) design. This means the power in the wires leading to the detector is controlled in a manner that cannot create sparks. Instead of a heavy and costly explosion-proof housing to ensure safe operation, an easy-to-service enclosure is used for the 8-cell detector.

Lower TCD detection limits

The new aluminum detector body also delivers improved thermal conductivity performance. Combined with enhanced detector geometry, this improves sensitivity and reduces signal noise and “cross-talk” between detector cells and enables further reductions in the detection limit. For many applications, this means where an FID or FPD would normally have been required, the application can be performed using the MAXUM II and its TCD.

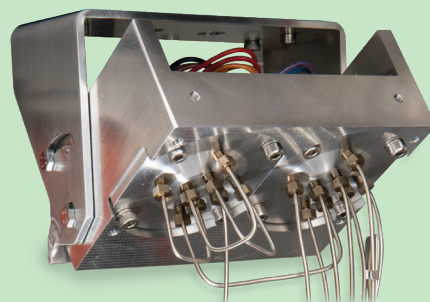
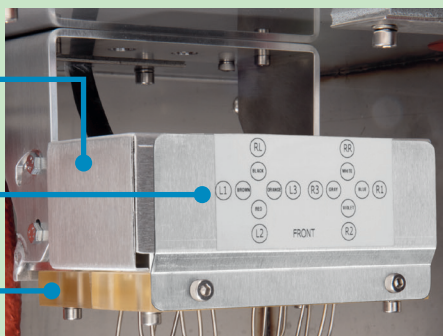


The design's direct connection of the columns to the TCD for improved chromatography. The TCD body tilts for easy access to column connections.

Cover for the TCD beads

Metal shield to reduce thermal influence by the oven air

Plastic thermal barrier to reduce oven thermal influence



MAXUM II solving measurement challenges for emerging sustainable energy technologies

In addition to the traditional process industries such as refining, petrochemicals and gas processing, the MAXUM II is playing a key role in meeting the novel analytical measurement requirements for sustainable aviation fuels, renewable natural gas as well as biofuels.



Blue and green hydrogen

Hydrogen plays an important role in many industries, such as steel and chemical production processes. As such, several companies are investigating how to generate hydrogen in an eco-friendly manner. Valmet is working with many of these companies to address the analytical challenges for these processes. For example, Valmet has developed reliable measurement solutions for the parts-per-billion measurement of nitrogen and carbon monoxide impurities in the hydrogen.



Renewable Natural Gas (RNG)

The use of anaerobic digesters to convert organic wastes, such as animal manure, into a usable biogas is an important area of renewable energy research. As the organic waste is converted into a “methane rich” biogas, it can be used to generate electricity with a gas turbine or sold as a form of natural gas. But before the biogas or bio-LNG can be used, it has several impurities that need to be removed such as carbon dioxide (CO₂) and hydrogen sulfide (H₂S). Valmet has provided analytical solutions to confirm the biogas purification processes are operating efficiently to maximize methane yield while operating the plant safely.

Our services at a glance

Valmet is firmly committed to quality maintenance support throughout the lifecycle of your measurement systems equipment. Whatever your maintenance philosophy, availability requirements or in-house maintenance resources, Valmet provides service designed to meet your needs.

Our portfolio of services

From on-demand and scheduled site support by dedicated analyzer technicians to field installation, start-up and commissioning, our specialized support staff are ready to serve you. Our portfolio of services also includes remote maintenance, preliminary and detailed engineering documentation, and support during approval phases. This is rounded off by service and support with spare parts, factory repair of analyzers and parts, and reapplication and optimization of measurement systems.

Training

To optimize system availability, we offer you a comprehensive process analytics training program for planning, operating, and maintenance personnel. Training can take place at Valmet's training centers (in Karlsruhe, Houston, and Shanghai) or at your site and can be carried out with a focus on specific systems or applications.

After completion of training, your personnel will be able to carry out servicing work and even certain types of repair work.

As your trusted partner, we can provide a complete portfolio of reliable service and support. Our range of services includes activities such as planning and professional specialist support, connecting your device to the control system, all the way to performing comprehensive customer support. You can count on our competent specialists for a high level of service no matter what.

Service contracts

Reduced downtimes and the ability to improve planning of your maintenance costs are just two of the many benefits of having a Valmet's GCI service agreement in place. Service packages also include preventive maintenance, fault elimination and on-call services. Customized service packages are available upon request.

Worldwide service

Your plants need to run reliably around the clock. Efficient process analytics are essential for achieving this requirement. In order to do this, you need to be able to rely on getting quick and professional service from your suppliers and providers. Whether you need advice, fast delivery or new devices installed, we offer a network of experts available all across the globe. By combining process analytics with the latest communication technologies, we are also able to provide effective remote servicing for our gas chromatographs.



Optimal system availability can only be achieved if maintenance is carried out professionally.



Around the world, Valmet's professionals work close to our customers and are committed to moving our customers' performance forward – every day.

For more information, contact your local Valmet office. valmet.com/maxum

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