APPLICATIONS

The Model 1000A is designed for a variety of refining, petrochemical, power, and environmental applications where selected components in gaseous or liquid streams must be precisely monitored on a continuous basis. The result is maximum analyzer reliability and analytical flexibility in one package.

FEATURES

• Traditional air-bath oven design for maximum application flexibility
• Fully compatible with modern Ethernet networks and DCS communication
• Diaphragm-based 6-port chromatograph valves
• Oven capacity for up to six chromatograph valves and two detectors
• Choice of thermal conductivity, flame ionization, or flame photometric detectors
• Thermal conductivity detector (TCD) sensitive down to very low parts-per-million levels
• Last chromatogram for each sample and calibration stream stored in process gas chromatograph
• Archives up to 64 item averages and up to 35 days of standard runs and calculations

APPLICATIONS

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Refineries
– Catalytic reformer
– Isomerization unit
– Aromatics unit

Petrochemical
– Ethylene plants
– Polymer plants
– Acrylonitrile plants

Gas Processing
– NGL, GTL and LNG plants
– Cryogenic gas plants

Power Generation
– Power generation plants
– Gas turbine control

Environmental Monitoring
– Ambient air monitoring
– HR-VOCs in flares and cooling towers
Detectors
The Model 1000A Process Gas Chromatograph has the selection of detectors to handle the wide range of analytical demands found in typical process applications. Whether the components of interest are in the percent range or down to the parts-per-million range, precise and reliable measurement is possible.

The thermal conductivity detector (TCD) is the detector of choice for most applications due to its universal response to all compounds. The thermistor TCD from Emerson Process Management is also able to go well beyond the normal measuring ranges seen in other designs by being able to do many applications with low parts-per-million measurement requirements. This greatly simplifies the process gas chromatograph design when a simple and rugged TCD can be used.

For measurement of compounds in the low ppm or even ppb ranges, the flame ionization detector (FID) for most organic compounds and the flame photometric detector (FPD) for sulfur compounds are analytical options. Maintenance features such as auto-detection of flame loss are also standard.

For maximum application flexibility, the Model 1000A can have up to two detectors. Detector combinations like TCD-TCD, TCD-FID or TCD-FPD are well within the capability of the Model 1000A.

Columns
Since 1980, Emerson Process Management has been refining and improving its process for creating micro-packed columns. Our micro-packed columns offer a superior combination of the features found in both capillary and conventional packed columns.

Gas Chromatograph Valves
The chromatograph valves used in Emerson’s process gas chromatographs are unique to the online gas chromatograph market. Using a design originally developed by NASA, the valve offers greatly extended operating life. Emerson Process Management is currently the only online gas chromatograph supplier to offer a lifetime warranty on their chromatograph valves.

– Simple mechanical design
– Sample does not come in contact with internal moving parts
– More than 5 million operations per valve
– Lifetime warranty
– Rotary liquid injection valves also available for special applications

The reason for the exceptional durability of the valve is its unique double-diaphragm actuation. The double-diaphragm design eliminates the need for springs, o-rings, and lubrication. Flow paths in the valve are arranged so that internal moving parts never contact the sample flow. As a result, abrasive mechanical wear on machined valve surfaces is eliminated. The valves are rated for over 5 million operations before repair (approximately 3-5 years of usage). And then, repair is typically simply changing the diaphragms in the valve.

Most importantly, the Emerson Process Management valve offers excellent performance. Minimal internal movement of the components in the valve — roughly 1/1000th of an inch — contributes to rapid actuation of the valve, which can be important for applications using micro-packed and capillary columns.

The diaphragm valve used in the Model 1000A is so reliable, it comes with a lifetime warranty.

For many part-per-million applications, a simple, easy-to-maintain TCD detector can be used rather than a more complicated FID or FPD due to the superior sensitivity of the Emerson Process Management TCD design.
The result is improved chromatography with extended column life (several years in most applications without measurable degradation or bleed). Emerson’s micro-packed columns produce sharper peaks for improved component separation, short analysis time, and very low carrier-gas consumption.

Air Bath Oven
The air bath oven uses a conventional instrument air heater design for maximum analytical flexibility. The oven on the Model 1000A has capacity for up to six diaphragm chromatographs valves. There is also the capacity to install liquid injection sample valves for heavier samples. The oven can operate at temperatures up to 150°C (300°F) as the application dictates.

MON2000™ Gas Chromatograph Software
The Model 1000A Process Gas Chromatograph is designed to operate unattended. If, however, adjustments are needed, our exclusive MON2000™ software allows complete control of your gas chromatographs — either locally or remotely.

From within MON2000, a user can:
- Review and modify analytical settings
- Upload and display multiple chromatograms on the screen for comparison
- Upload and trend any of the measured results
- Export data for use in other third-party applications
- Overlay multiple chromatograms for troubleshooting and calibration
- Check original calibration against last calibration

The MON2000 Software is Windows®-based software designed to make 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.

The MON2000 software can display both current and multiple archived chromatograms on the screen, streamlining the time needed to perform routine analyzer maintenance.

MON2000 also has a number of tools built in that help users manage their analyzers such as:
- Automatic recording of alarms in a log file
- Event logs that provide a continuous record of all operator changes with time and user name stored
- Maintenance log scratch pad for keeping track of maintenance or testing done

Data collected from the process gas chromatographs can be stored and displayed with a wide range of options such as trend lines on the screen and logs automatically documenting all changes made to the process gas chromatograph. Data can also be exported in formats compatible with most third-party Windows® applications.

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**Touch Key Local Operator Interface (Optional)**

The Model 1000A local operator interface (LOI) allows for maintenance and operation of a Model 1000A 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. Features of the LOI include:

- Color LCD with QVGA (320 x 240 pixels) resolution
- ASCII text and graphics modes
- Auto-backlighting (adjustable)
- Eight infrared-activated touch keys and screen saver

In addition, the LOI:

- Eliminates external magnetic pen requirement
- Maintains the Model 1000A hazardous area classifications
- Operates in the same ambient temperatures as the base Model 1000A
- Indicates complete GC status, control, and diagnostics, including full chromatogram display

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**Analyzer Networking and Data Communication**

Emerson’s process gas chromatographs can be configured in a number of networking and data communication schemes to meet process communication requirements.

Options include Ethernet networks as well as multidrop RS-485 networks. It is even possible to set up automatic polling for data collection over phone lines if desired.

Data communication options to the plant control system include simple analog and discrete signals as well as Modbus serial links. To preserve the integrity of the analysis data, all Model 1000A Process Gas Chromatographs are capable of storing up to 35 days of analysis or calibration data in the event of loss of communication to the plant control system.

All Emerson Process Management process gas chromatographs are designed to operate unattended. Occasionally, adjustments to the analyzers’ analytical method or a review of alarms may be needed. Using our exclusive MON2000 software loaded on either a PC or laptop running Windows®, you’ll have complete control of your process gas chromatographs – either locally or remotely.
Networking Flexibility

Whether you want to network process gas chromatographs throughout the plant or simply link a single process gas chromatograph to the DCS system, the Model 1000A can be configured to handle most any scenario:

– Choice of Ethernet or RS-485 networks
– Can use the same network to connect Model 700, Model 500, and Model 1000A Process Gas Chromatographs
– Able to connect multiple PC workstations using MON2000
– Connectivity to plant control systems using industry standard protocols such as Modbus and OPC

Secure Modbus Connectivity

For process gas chromatographs, Modbus continues to be the preferred choice to connect a process gas chromatograph network to the plant control system. Modbus design avoids the use of central interface cards or computers that can act as a single-point of failure in the Modbus link. Instead, the plant DCS system can “talk” directly to each process gas chromatograph to gather the data needed. Furthermore, the register and coil addresses can be easily customized to meet the specific data structure of the DCS. There is also a program built into the MON2000 workstation to test the Modbus link to the DCS if troubleshooting is needed.

Custom-Engineered Sample Systems

Any process gas chromatograph is only as good as the quality of the sample it measures. So every sample system for Emerson's 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

Custom-Engineered Process Analytical Systems

A complete online analytical solution is more than just the analyzer. Sample conditioning systems to prepare the sample for analysis, communication links to the plant control computer, and packaging of the analytical equipment into a cabinet or shelter all play an important role.

Emerson Process Management has decades of experience providing complete turnkey solutions ranging from simple single-analyzer cabinets up to large integrated shelters with multiple types of analyzers.

The key to successful system integration begins at the proposal stage where Emerson Process Management develops a custom engineered solution. This is followed by experienced project management during the system fabrication and on to installation and training once the system is delivered to the field.
Environmental Chamber Testing
Every Emerson 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 a minimum of 24 hours.

Environmental chamber testing is offered to our customers free of charge for all Emerson gas chromatographs prior to shipment.

Our product testing procedures are much stricter than the industry standard for analytical measurement products. When you purchase an Emerson gas chromatograph, you can be assured that you’re purchasing the highest-quality process gas chromatograph or natural gas chromatograph available.

As a result of chamber testing, 100% of all gas chromatographs that we ship will operate to the performance specifications across the stated operating temperature range.

The Emerson Process Management Process Gas Chromatograph Difference
- Built tough to stand up against any environment
- Rigorously tested to ensure performance
- Field-mountable technology means solid performance at reduced cost
- High-sensitivity thermal conductivity detectors can often replace more complex detectors
- Micro-packed columns that are made to last
- Diaphragm valves with a lifetime warranty
- Broad application scope with single- or dual-detector capability
- Easy-to-use MON2000™ software for advanced diagnostics and simplified troubleshooting — it is simply the best in the industry

PUT EMERSON PROCESS MANAGEMENT’S EXPERIENCE TO WORK FOR YOU – As one of the largest instrumentation and control system suppliers in the world. Emerson Process Management has the expertise and resources to tackle nearly any analytical system integration project. Whether the project is a simple three-sided shelter or a large shelter with multiple types of analyzers, complete turnkey solutions are custom-engineered to exactly match the needs of the customer.
Request a Quotation

Every Model 1000A Process Gas Chromatograph is custom-built for your specific application. To request a free quotation, simply fill out the information below and send it to the address at the end of this data sheet.

Name: ________________________________  Your Reference #: __________________________
Title: ________________________________  Project Name: ____________________________
Company: ______________________________
Address: ______________________________  Process Unit: ____________________________
____________________________________  Stream Name(s): __________________________
____________________________________
Phone #: ______________________________  Hazardous Area Classification: ___________
Fax #: ________________________________
Email: ________________________________

<table>
<thead>
<tr>
<th>Stream Composition</th>
<th>Units</th>
<th>Stream 1</th>
<th>Stream 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Normal</td>
</tr>
<tr>
<td>(For more than two streams, make copies of this page)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stream Temperature: __________________________
Stream Pressure: ____________________________
Stream Phase (vapor / liquid) __________________________
Stream Contaminants: __________________________

Distance to GC from Sample Point: ____________
Mounting: Wall ( )  Stand ( )  Power: 115 VAC ( )  220 VAC ( )
Data Communication: Analog Output ( )  Modbus ( )  OPC ( )  Printer ( )  Modem ( )
Analyzer Network: Ethernet ( )  RS-485 Multi-Drop ( )
Other Options: Carrier Gas ( )  Calibration Gas ( )  Start-Up ( )  Training Class ( )

Special Instructions: __________________________
____________________________________________
____________________________________________
____________________________________________
____________________________________________
____________________________________________
____________________________________________
### Model 1000A SPECIFICATIONS

**Power:** 115 VAC ±15%, 220 VAC ±15%, 50/60 HZ
- 400 watts running, 1100 watts start-up

**Environment:**
- 0° to 55°C (32° to 130°F) for TCD and FID;
- 20°C ± 5°C (70°F ± 10°F) for FPD

**Dimensions (without sample system):**
- 198 cm H x 61 cm W x 61 cm D (78” H x 24” W x 24” D)

**Mounting:**
- Wall-mount (standard); free-standing (optional)

**Approximate Weight (without sample system):**
- Approximately 68 kg. (150 lbs.)

**Area Classification Options** (Hardware dependent): designed to meet Class 1, Div. I, Groups B, C, D with X-Purge; Class 1 Div. 2, Groups B, C, D with Z-Purge, ATEX certified EExpII T3 (optional)

**Instrument Air:**
- 4 SCFM at 40 psig of oil-free instrument air for purge and oven heat and 90 psig for valve actuation

**Oven:**
- Air bath oven, maximum 150°C (300°F)

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

**Carrier Gas:**
- Application-dependent. Typically zero-grade helium, nitrogen or hydrogen at 90 psig

**Columns:**
- Choice of packed, micro-packed or capillary columns; application-dependent

**Detector:**
- Thermal conductivity detector (TCD), flame ionization detector (FID) or flame photometric detector (FPD); TCD-TCD, TCD-FID or TCD-FPD dual detector combinations possible

**Gating Options:**
- Fixed-time automatic slope sense gating of peaks

**Streams:**
- Up to 12 streams

**Chromatograph Control Electronics:**
- Integrimally mounted

**Analog Inputs:**
- Four inputs filtered with transient protection (user scalable and assignable)

**Analog Outputs:**
- Four non-isolated analog outputs, 4 – 20 mA (standard); four additional isolated analog outputs or eight additional non-isolated analog outputs (optional)

**Serial Communication Ports:**
- Three serial ports standard with option for a total of seven. Depending on the port, choice of RS-232, RS-422, and RS-485 is available as well as the Modbus protocol

**Digital Inputs:**
- Five digital inputs; user assignable

**Digital Outputs:**
- One gas chromatograph alarm and four user-assignable outputs (2 form A, 3 solid-state optically isolated)

**Parallel Printer Port (optional):**
- One parallel port available for printed reports

**Internal Modem (optional):**
- Field-configurable; 300 to 19.2k baud

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