DANIEL®

Model 2350A **Gas Chromatograph Controller**

EMERSON™
Process Management

For more than 75 years, **Daniel Measurement and Control** has brought acclaimed gas and liquid fiscal flow measurement products, services, and systems to the oil and gas industry. Around the world, the Daniel name is synonymous with quality, reliability, and a commitment to serving its customers.

Today, Daniel continues to innovate and build its product technology and organization to provide customers leading fiscal gas and flow measurement and control expertise. Daniel is stronger than ever. As a part of the Emerson Process Management group of companies and its parent company, Emerson Electric Co. (NYSE:EMR), Daniel has the financial strength, staying power, and proven history it takes to lead the industry.

Daniel began as a pioneer in oil and gas measurement, and although change and continuous improvement have meant success for Daniel customers, one thing remains constant: **We promise to continue to earn and keep your trust through superior products and services.**

Optimize the performance *of your gas chromatograph*

Daniel's reputation is built on equipment reliability and long-life-cycle performance. We invest significantly in our research and development programs to develop technologies that help our customers to upgrade and extend the performance and longevity of their existing Daniel® Danalyzer™ Model 500 or Model 1000 Gas Chromatographs.

Model 2350A Gas Chromatograph Controller

Daniel's Model 2350A Gas Chromatograph Controller, equipped with the MON2000 Windows®-based software, allows users to increase the processing power, operating efficiencies, and system performance of their existing, legacy-model Danalyzer Gas Chromatograph.

Maximize your processing power

- Choose from ISO6976-1995 or GPA 2172-1996 calculation methods with GPA 2145-03 physical constants
- Receive hourly, daily, weekly, monthly, or variable (0-167) averages
- Access up to 254 archived item averages and over three months of standard four-minute runs – or choose to expand archiving abilities even further
- Trend archived variables graphically on a PC or printer

Increase your operating efficiencies

- Utilize as many as eight field-configurable serial ports to support four unique user-selectable versions of Modbus to simplify communications between flow computers, PLCs, DCSs, and SCADA systems
- Access your gas chromatograph using industry-standard Modbus/TCP connectivity
- Simplify the work process by eliminating strip chart recorders, printers, portable service panels, and workstations
- Cut technician time and training time by as much as 50% with familiar, user-friendly, PC-based software
- Download MON2000 software enhancements directly from the Daniel website to your Ethernet-ready 2350A system, or use the connection to email chromatograms for peer review

Expand your system's potential

- Enhance resolution with advanced 16-bit analog-to-digital converters
- Employ a second gas chromatograph oven in parallel with four user-configurable auxiliary analog inputs, or monitor alarms and peripheral devices directly with five digital inputs/outputs
- Detect trace thermal conductivity detector (TCD) component analysis at lower detectable limits with a second gas chromatograph oven
- Utilize parallel chromatography for advanced applications

The **2350A Gas Chromatograph Controller** offers an explosion-proof design or rack-mount placement, with an optional keypad and display window.

2350A

Increase *your diagnostic capabilities*

*With the **2350A Gas Chromatograph Controller**, diagnostic capabilities are significantly expanded. By allowing users to access on-screen chromatograms directly from their PC or workstation, the 2350A eliminates the need for chart recorders. Through the easy-to-use MON2000 software, chromatogram functions are extended. By using the "Overlay" function to make a direct comparison of historical chromatograms, troubleshooting is simplified, and the "Zoom" function offers a better view of the baseline to improve peak integration for maximum analytical accuracy.*

Controller Electronics Options

- **Ethernet card** – connect to your gas chromatograph at 10 mbps via an RJ-45 port
- **High-speed internal modem** – direct-dial to your gas chromatograph and configure or interrogate it remotely with the MON2000 software
- **Analog outputs (4-20 mA)** – user-configurable, with two standard, and four or eight optional
- **Keypad and display** – full, 18-button keypad with liquid crystal display and LED backlighting
- **Additional memory** – includes 16 MB standard memory for historical data storage, and can be expanded to 32 MB

Simplified and convenient migration from older systems

Investing in gas chromatograph technologies is a capital expenditure, and Daniel is as serious as our customers when it comes to spending wisely on the latest technology. When it is time for customers to upgrade their systems to the 2350A, they can trust that Daniel has designed the process to be as smooth as possible. The gas chromatograph analyzer electronics, including the pre-amp board and the decoder board, interface to the controller exactly as the older 2251 controllers, so retrofitting units in the field is a simple and quick process. Furthermore, Daniel has engineered the cutouts for the optional panel-mount 2350A to match the 2251 and 2551 panel cutouts, so additional modifications are not required.

Full functionality, *specialized for ease of use*

The controller performs all signal processing, calculations, instrument control, communications, and data storage.

Optional explosion-proof housing allows for operation and diagnostics to be performed in a Class I, Division 1 hazardous area.

Three multi-colored LED status indicators are easy to see on the front panel to let the operator know the system's status — green for in operation, yellow for unacknowledged alarms, and red for alarms requiring operator action.

Controller-mounting options allow the controller to be located remotely or as an integrated component of the gas chromatograph in the field.

Keyboard and display options allow for control and diagnostics to be performed.

2350A boards are mounted in a passive card cage with ribbon cable connectors to enable STD (32- bit) bus communications.

The CPU has a PC 104 bus for easy addition of serial ports, models, or an Ethernet card.

MON2000

MON2000™

MON2000™ Gas Chromatograph software is used with Daniel® Danalyzer™ Gas Chromatographs and Gas Chromatograph Controllers. As a leading worldwide supplier of on line gas chromatographs, Daniel has designed the software used in Danalyzer Gas Chromatographs to have the flexibility, calculation power, and data security to handle the precise component identification as well as strict adherence to industry-standard calculations that fiscal and gas quality measurements demand.

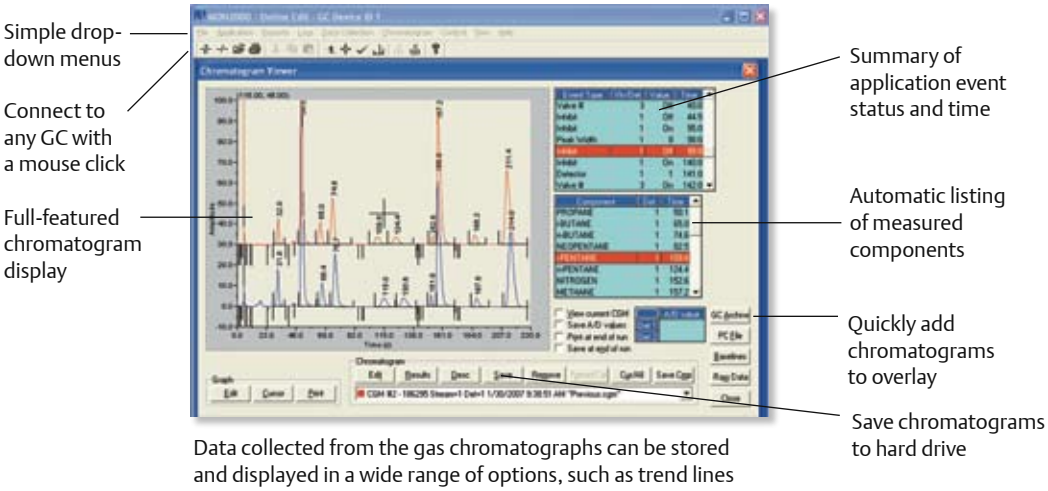
Our exclusive MON2000 Gas Chromatograph software enables field engineers and technicians to have complete control over their Daniel gas chromatograph. MON2000 is Windows-based, making analyzer configuration and maintenance and data collection easy. With intuitive drop-down menus and fill-in-the-blank tables, even new users can quickly navigate through the software.

MON2000 offers a wide range of capabilities:

- 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 third-party applications
- Overlay multiple chromatograms for troubleshooting and calibration
- Check original calibration against the last calibration

The MON2000 software has numerous built-in tools to help users manage their analyzers, including:

- 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 completed maintenance and testing



Data collected from the gas chromatographs can be stored and displayed in a wide range of options, such as trend lines on the screen and logs automatically documenting all changes made to the gas chromatograph.

Design Specifications

Electrical Power: 115 VAC +/- 15% at 0.55 A, 50/60 Hz; 230 VAC +/- 15% at 0.275 A, 50/60 Hz

Communications:
Four serial ports standard (user-selectable RS-232/484/422)

Optional:
- Com 4A board for additional serial ports (5, 6, 7, 8)
- Internal modem connected to dedicated serial port
- Ethernet network interface card

Analog Inputs:
- Detector 1- 4 each filtered with transient protection dedicated to the GC auto-ranging pre-amp. 16 bit A/D resolution.
- Detector 2 - 4 each filtered with transient protection for optional inputs from other devices or for use with a second auto-ranging pre-amp from a second GC detector. 16 bit A/D resolution.

Analog Outputs:
Two outputs standard
4-20 mA with software calibration
Optional: 4 or 8 additional outputs

Digital Inputs:
- One GC alarm, optically isolated with transient protection
- Five user alarms, optically isolated, with transient protection
- 12 V standard, maximum 24 V external

Digital Outputs: Five digital outputs can be used for alarms, optically isolated, with transient protection. 30 VAC 500 mA maximum.

Keypad Display: Optional 18 keys/8 lines x 41 characters. Uses Com 4 or Com 8, depending on serial port options.

Parallel Port: One parallel port available for printed reports.

Internal Modem: Optional 300 to 33.6 k baud field configurable.

Detector Inputs: TCD, FID, FPD, single or dual pre-amp inputs.

Transient Protection: CE tested and certified to the highest levels (3 & 4) of the European IEC 801 STD.

Physical Environment: Operating range at 0° to 130° F (-18° to 55° C), storage range at -40° to 185° F (-40° to 85° C), Humidity 0-95% RH non-condensing.

Mounting Options:
- Integral/field mount – X-proof – 60 lbs (27.21 Kg) NEMA 4X, IP 65 19
- Rack-mount – 25 lbs (11.34 Kg)
- Panel-mount retrofit – 22 lbs (9.98 Kg)

System Memory: 128MB storage for all historical data.

Chromatogram Storage: Last run for each stream and last cal for each method. Additional chromatogram storage in MON2000 software running on a computer.

Methods: Four timed event tables, four component tables freely assignable to each stream.

Safety Classification:

2350A Explosion Proof Controller

UL-listed for use in Class I, Division 1, Groups C and D hazardous locations in both the US and Canada. ATEX-certified to EEx d IIB T6 standards EN50014 and EN50018 for potentially explosive atmospheres Parts 1 and 5.

2350A Rack Mount

CSA-certified

Latest Measurement Standards

- The latest GPA 2145 physical properties (energy content and related calculations) are included as standard components
- ISO 6976-1995 applications for metric energy measurement with a full choice of calculation methods
- Manual entry of alternate physical constants is permitted (but tagged as “User” for GC audit purposes)
- Hydrocarbon dewpoint calculations are an option for the extended C9+ analysis (using PR or RKS equations of state and latest physical property data)

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