Data sheet

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Agilent 8850 gas chromatograph



The Agilent 8850 gas chromatograph is the most compact high-performance benchtop GC on the market, whose special features ensure maximum productivity, efficiency and uptime:

– Compact size. The 8850 GC requires only half as much space as conventional benchtop devices.

– High performance. The 8850 GC has the same electronic pneumatic control (EPC) and the same inlets and detectors as the Agilent 8890 GC, and therefore the same industry-leading reproducibility, precision and sensitivity.

– Fast GC. A small air bath oven enables a rapid temperature rise and short cooling times.

Energy efficiency. The 8850 consumes less electricity than other gas chromatographs and thus helps to reduce energy costs and achieve sustainability goals in the laboratory.

– Powerful intelligent functions. Thanks to diagnostic functions and remote access, the system status of the 8850 can be monitored independently of location, maintenance measures can be planned, troubleshooting can be carried out and method development can be managed. The guided maintenance helps even inexperienced operators to carry out the maintenance steps correctly the first time.

Agilent GC systems are known for their reliability, robustness and long service life. Agilent's 10-year warranty of use provides security throughout the entire life of the device.

Chromatographic performance*

- Retention time reproducibility: < 0.008 % or < 0.0008 minutes

Area reproducibility: < 0.5% RSD

The 8850 GC is a state-of-the-art gas chromatograph with advanced sixth-generation Agilent EPC modules and high-performance GC furnace temperature control.

The combination of precise pneumatic control and temperature control ensures optimal chromatography results with peak symmetry, retention time reproducibility and accuracy of the retention index.

* When using the 8850 with EPC (splitless), an automatic liquid sampler (ALS) and Agilent OpenLab CDS for analysis of tetradecane (2 ng on the column). Results may vary depending on the sample and conditions.

System functions

– Supports simultaneously:

– an intake

- a detector

Up to eight detector/diagnostic signals

Thanks to state-of-the-art detector electronics and a fully digital data path, peaks can be quantified across the entire detector concentration range (107 for the FID) in a single run.

– Full electronic pneumatic control (EPC) is available for all intakes and detectors. Control range and resolution are optimized for the respective inlet or detector module.

Up to three EPC modules can be installed.

The pressure setpoint accuracy and control precision to 0.001 psi provide better retention time locking precision for low pressure applications.

Electronic pneumatic control with capillary columns offers four control modes for column flow: constant pressure, rising pressure (three ramps), constant flow or rising flow (three ramps). The average linear speed through the column is calculated.

– The compensation of atmospheric pressure and temperature is standard. Therefore, the results do not vary with changing laboratory environments.

Serial port interface.

– With just one click, access to maintenance and service modes via the touchscreen or browser user interface.

– Pre-programmed leakage tests.

The automatic liquid sampler and headspace sample application technology with the Agilent 8697 are fully integrated into the mainframe control.

– The setpoint value and automation control can take place from the touchscreen or via a networked data system. Time programming can be done via the front control panel to start events (on/off, method start, etc.) at a future date and time.

– For each analysis, a deviation protocol is created during the run to ensure that all method parameters are met and adhered to.

– 550 timed events.

All GC, ALS and 8697 HSS nominal values are displayed directly on the GC or in the data system.

Context-sensitive online help.

– The programmable environmentally friendly rest mode

Enables the reduction of electricity and gas consumption during inactive periods; in active mode, the system is prepared for high-throughput operation.

The 8850 GC has advanced built-in capabilities for monitoring system resources, such as meters, electronic protocols, and diagnostics. The integrated preventive maintenance reporting system tracks either the number of injections or the useful life, thus enabling maintenance planning to avoid unnecessary downtime.

Column furnace

– Dimensions: 21 × 20 × 10 cm.
Provides space for a capillary column of up to 105 m in length and one
Inner diameter of up to
0.530 mm or for a 20 foot long
Packed stainless steel column (1/8 inches)
Outer diameter.

– The operating temperature range is suitable for all columns and chromatographic separations. Ambient temperature +4 °C to 350 °C.

– nominal temperature resolution: 0,1 °C.

Supports 32 furnace temperature ramps with 33 plateaus. Negative ramps are allowed.

– Maximum achievable temperature rise rate: 300 °C/min (standard 120 V furnace systems are limited to 120 °C/min, see Table 1).

– Maximum analysis time: 999.99 min (16.7 hours).

– Kiln cooling (22 °C ambient temperature) 350 to 50 °C in < 2.5 minutes.

– Ambient temperature compensation: < 0,01 °C per 1 °C.

Table 1. Typical rise rates for Agilent 8850 GC furnaces.

Temperature range (°C)	120 V standard (°C/min)	120 V Fast (°C/min)	200 to 240 V Fast (°C/min)
50 to 75	120	240	300
75 to 115	95	190	300
115 to 175	65	130	300
175 to 300	45	90	200
300 to 350	35	70	100
350 to 50	< 2,5 min	< 2,5 min	< 2,5 min

Electronic Pneumatic Control (EPC)

Compensation for variations in air pressure and ambient temperature is standard.

– The pressure is typically over the range from 0 to 150 psi with a Accuracy of ± 0,001 psi regulated. The desired pressure values can be in the range of 0.000 to 99.999 psi in increments of 0.001 and in the range of 100.00 to 150.00 psi in increments of 0.01 can be set.

– The user can choose between the printing units psi, kPa and bar.

Pressure or River ramps: maximum three.

– Settings of the carrier and makeup gas are selectable for He, H2, N2 and argon/methane.

Constant flow mode is available when capillary column dimensions are entered into the 8850 GC system.

– The split/splitless inlet has flow sensors to control the split ratio.

Inlet modules

– Pressure sensors: Accuracy: < ± 2 % above Total range of reproducibility: < ± 0,05 psi temperature coefficient: < ± 0,01 psi/°C Drift: < ± 0,1 psi/6 months

– Flow sensors: Accuracy: < ± 5 % depending on Carrier gas Reproducibility: < ± 0,35 % of nominal value temperature coefficient: < ± 0,20 ml/min (NTP)* per °C for He or H ; < ± 0,05 ml/min NTP per °C for N_2or Ar/CH_4.

* NTP = 25 °C and 1 atm

Detector modules: Accuracy: < ± 3 ml/min NTP or 7 % of nominal value Reproducibility: < ± 0,35 % of nominal value

Entries

– Maximum one installed intake.

– Variations in atmospheric pressure and temperature are compensated by the EPC.

– Available admissions:

Flushed/Packed Intake (PPI)

- Standard, high pressure and inert flow path split/splitless capillary inlets (S/SL)

Temperature-programmable Cool-on-Column injection (PCOC)

S/SL

– Suitable for all capillary columns (50 µm to 530 µm internal diameter).

– Split ratio up to 12 500:1 to avoid column overload.

– Splitlos mode for trace analysis. The pressure-pulsed splitlos mode is easily accessible for optimal performance.

– Maximum temperature: 375 °C.

– EPC available in two pressure ranges: 0 to 100 psig (0 to 680 kPa) for Optimal control of pillars ≥ 0,200 mm in diameter, 0 to 150 psig for columns < 0,200 mm in Diameter.

– Gas-saving mode to reduce gas consumption without affecting performance.

– Electronic control of the flow of the septum flush to eliminate “ghost peaks”.

– Adjustable total flow area: 0 to 500 ml/min N 0 to 1250 ml/min H or He 0 to 200 ml/min argon/methane

For every 8850 S/SL intake, the turn-top intake sealing system is an integrated standard for quick and easy replacement of the injector liner.

The optional inert S/SL inlet includes a chemical deactivation process for unit and unit deployment.

PCOC

Direct injection in cold capillary columns ensures quantitative transfer of samples without thermal degradation.

– Automatic liquid injection directly onto the column is supported for columns ≥ 0.250 mm internal diameter.

– Maximum temperature: 375 °C. Temperature programming with three ramps or kiln monitoring.

– Area of electronic pressure control: 0 to 100 psig.

– Electronic control of the flow of septum flushing.

PPI

Direct injection into packed and wide bore capillary columns.

– Electronic flow/pressure control: 0 to 100 psig pressure range, 0.0 to 200.0 ml/min flow range. Ranges are designed for optimum performance over the normal setpoint ranges for packed columns.

– Electronic control of the flow of septum flushing.

– Maximum operating temperature of 375 °C.

– Includes adapters for packed 1/8" columns and for 0.530 mm capillary columns.

Detectors

– Maximum one installed detector.

Electronic pneumatic control (EPC) and electronic input/output Switching off all detector gases.

– Variations in atmospheric pressure and temperature are compensated by the EPC.

– Available detectors:

FID:

Flame ionization detector (FID) that responds to most organic substances.

– Minimum detectable value (for tridecane): < 1,2 pg C/s.

Linear dynamic range: > 107 (± 10 %). Through the fully digital data path, peaks over the entire concentration range of 107 can be quantified in a single run.

Data rates of up to 1000 Hz for very narrow peaks up to a half-width of 5 ms.

– Electronic pneumatic control as standard for three gases:
Air: 0 to 800 ml/min
H : 0 to 100 mk/min
Makeup gas (N) $_2$or He: 0 to 100 ml/min

– Optimized for capillary columns. For packed 1/8-inch pillars, an adapter is available.

– Detection of flame rupture and automatic re-ignition.

– Maximum operating temperature of 375 °C.

Thermal conductivity detector (TCD):

TCD, a universal detector that responds to all compounds except the carrier gas.

– Minimum detectable value: 400 pg tridecane/ml with He as carrier gas. (This value can be influenced by the laboratory environment)

Linear dynamic range: > 105 ± 5 %.

The unique design of the fluidic circuit allows for rapid stabilization after on and low drift.

Signal polarity can be programmed for components with higher thermal conductivity than the carrier gas.

– Maximum temperature: 375 °C.

– Standard EPC for two gases (He, H2, N2 or argon/methane matching the carrier gas).

– Makeup gas: 0 to 12 ml/min.

– Reference gas: 0 to 100 ml/min.

Additional EPC units

The 8850 GC has a position for an additional EPC unit, which can be either an additional EPC, a pneumatic control module (PCM) or a pneumatic switching unit (PSD).

Additional EPC module

– Three channels for pressure control.

– Variations in atmospheric pressure and temperature are compensated by the EPC when it is connected to a custom capillary column.

– Pressure control in psig (meter) and psia (absolute).

– Regulation of the form.

PCM

Two operational channels.

– Variations in atmospheric pressure and temperature are compensated by the EPC when it is connected to a custom capillary column.

First channel:

– Pressure or flow control.

– PSIG (manometer) pressure control.

– Regulation of the form.

The second channel:

Pressure control.

– Pressure control in psig (meter) and psia (absolute).

– Regulation of the forward or back pressure.

PSD

– Variations in atmospheric pressure and temperature are compensated by the EPC when it is connected to a custom capillary column.

– Regulation of the form.

Integrated flushing for rapid adjustments for pressure regulation.

Automatic sample injectors and samplers

An Agilent ALS interface on the 8850 GC system powers an automatic injector tower of the Agilent Series 7693A or the Agilent Series 7650 and establishes communication with it. The injector is easy to install without the need for alignment.

The 8850 also supports sample delivery with the Agilent 7697A and 8697 headspace samplers.

Data communications

- LAN.

Two analogue output channels (1–V and 10–V output signals available)

– Remote control start/stop

Touch screen control of the ALS or the 8697 headspace sampler

Binary coded input signal for a gas flow selection valve

Serial port interface

Maintenance and customer service

The integrated maintenance early warning system enables planning of maintenance work and helps to avoid unnecessary downtime.

– Device events and downtime are displayed on the touchscreen or data system.

– Remote diagnosis in real time.

Performance Verification Services.

– Easy spare parts identification and software to find order numbers (stand-alone software, Agilent chromatography data system is not required).

Touchscreen and browser user interface

The capacitive 7-inch touchscreen interface of the 8850 GC system provides real-time access to device status, configuration and flow path data. The planned analysis progress can be checked with the signal progress. Additional tabs allow quick access to key functions, such as ads for editing method parameters, diagnostics, maintenance, protocols and help.

– Using the browser user interface, you can access configuration data and troubleshooting, initiate diagnostic and performance tests, stop and start trial runs, and manage method development.

– The browser interface has been optimized for viewing on iOS and Android smartphones and provides an overview of status information, especially the remaining runtime and a static graph of the detector data from the last 20 minutes.

Environmental conditions

– Acceptable ambient temperature when operating: 15 °C to 35 °C

– Permitted ambient humidity in service: 5 % to 90 % (non-condensing)

– Temperatures for storage: -40 °C to 70 °C

Requirements for power supply

– Mains voltage: 100/120/200/220/230/240 V ± 10 % of rated value

Frequency: 50/60 Hz

Safety certifications and authorisations

Meets the following safety standards:

Canadian Standards Association (CSA) C22.2 No 61010-1

Nationally Recognized Test Laboratory (NRTL): ANSI/UL 61010-1

- International Electrotechnical Commission (IEC): 61010-1, 61010-2-010, 61010-2-081
- EuroNorm (EN): 61010-1

Conforms to the following guidelines on electromagnetic compatibility (EMC) and radiofrequency interference:

– CISPR 11/EN 55011: Group 1, Class A

IEC/EN 61326-1

OFF/NC CISPR 11

– This ISM device complies with the Canadian standard ICES-001. This ISM device complies with the Canadian standard NMB-001.

Designed and manufactured under an ISO 9001 registered quality system, Declaration of Conformity is available.

– This product complies with the EU RoHS Directive 2011/65/EU and the standard EN 50851.

Other specifications

– Height: 49.2 cm (19.4 inches).

– Width: 28.3 cm (11.1 inches).

– Depth: 58.5 cm (23.0 inches).

Typical weight: 27.3 kg (60.2 lb).

Four internal 24-volt connections (up to 150 mA).

Two external 24-volt connectors (up to 150 mA).

– Two on/off closing contacts (max. 48 V, 250 mA).

– 550 events timed by the data system. Fifty timed events via the touchscreen of the GC system.

Support for a gas sample valve or a liquid sample valve in a heated compartment.

– Four independently heated areas in addition to the stove (one inlet, one detector and two more).

– Maximum operating temperature for additional range: 375 °C.

References

1. A Guide to Interpreting Detector Specifications for Gas Chromatography. Technical *Note from Agilent Technologies,* Publication no. 5989-3423EN, **2005**.

2. The Importance of Area and Retention Time Precision in Gas Chromatography. Technical *Note from Agilent Technologies,* Publication no. 5989-3425EN, **2005**.

Further information

Further information about our products and services can be found on our website www.agilent.com.

www.agilent.com/gc/8850

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