

# Agilent 8860 Gas Chromatograph System

The Agilent 8860 gas chromatograph, inheriting legendary Agilent expertise and proven quality in GC, generates reliable results with minimized complexity for routine analyses, run after run, day after day.

The 8860 color touchscreen provides:

- Access to setpoint and status information with the ability to turn setpoints on/off
- Instrument configuration and flowpath
- A signal plot, helping confirm that analyses are progressing as intended

The browser interface is the most extensive interface to the 8860 GC. Optimized for a 10-inch tablet, you can use the browser interface on a tablet, PC, or even a phone.

Access to advanced intelligence functions include:

- Connectivity to check status or run diagnostics from anywhere within your network
- Built-in self-guided diagnostics and maintenance capabilities
- Method and sequence editing without the need for a data system
- Easy access to logs and complete user documentation

A browser interface optimized for mobile viewing on either iOS or Android phones provides status information including remaining run time and a static plot of the last 20 minutes of detector data.

Full electronic pneumatics control (EPC), available for all inlets and detectors, automates control of gas pressures/flows to predefined setpoints, and allows pressure and flow programming.

Electronic pneumatics regulation (EPR) is available for select inlets and detectors. EPR provides a digital measurement and display of gas pressure/flow, and allows the user to manually adjust these gas pressures/flows, electronically, using the Browser Interface, avoiding the use of mechanical regulators. This provides constant pressure operation for the Split/Splitless inlet, and constant flow operation for the Packed Column inlet and the detectors with EPR. If desired, EPR actual pressure and flow can be saved as additional signals with any OpenLAB CDS software to record its operation for each GC run.

The 8860 EPC and EPR are based on Agilent GC core 6th generation microchannel-based EPC architecture. Unique to Agilent, this design protects against gas contaminants such as particulates, water, and oils, and provides significant improvements in reliability and longevity over earlier generation GC designs from Agilent or other GC manufacturers. EPC and EPR are compensated for barometric pressure and ambient temperature changes, resulting in more stable retention times and detector baselines.

## Overall system performance\*

\* Using the 8860 GC with 8860 EPC (splitless), ALS, and Agilent Data System for analysis of tridecane (2 ng to the column). Results may vary with other samples and conditions.

- Retention time repeatability <0.06 %
- Peak area repeatability <2 %

## Power requirements

- Line voltage – 100/120/200/220/230/240 Volts ±10 % of nominal
- Frequency – 50/60 Hz ±5%
- 1,500 W at 100 V; 2,250 W at all other voltages

## Column oven

Dimensions	28.0 × 30.5 × 16.5 cm
Operating temperature	8 °C above ambient to 425 °C
Temperature setpoint resolution	0.1 °C
Maximum temperature ramp rate	75 °C/min (see Table 1)
Oven cool down	300 °C to 50 °C in 5.7 minutes (25 °C ambient)
Maximum run time	999.99 minutes
Temperature programming ramps	20 ramps (negative allowed) Ambient rejection <0.01 °C per 1 °C

Table 1. Typical 8860 oven ramp rates.

Temperature (°C)	220 V Oven rates (°C/min)
50 to 70	75
70 to 115	45
115 to 175	40
175 to 300	30
300 to 425	20

For 100 V oven, the maximum temperature is 350 °C with a maximum ramp rate of 30 °C/min

### EPC

Available on all inlets and detectors

### EPR

Available on S/SL and Packed Column inlets and FID, TCD, and ECD detectors. EPR allows the user to manually adjust pressure and total flow (for S/SL inlet) or flow only (for Packed Column inlet (PCI) and FID, TCD, and ECD detectors) to a desired value using the Browser Interface. Makeup flow will not compensate for changes to column flow during oven temperature ramping.

## Inlets

- Up to two inlets may be installed.
- EPC pressure setpoint and control precision to 0.01 psi or 0.069 kPa
- Display resolution for EPR for pressure is 0.01 psi or 0.069 kPa

### **Purged packed (EPC)**

- Electronic flow control
- Septum purge
- 400 °C maximum operating temperature
- Maximum flow 100 mL/min
- Adapters included for 1/8-inch packed columns
- Adapters for 0.530-mm capillary columns

### **Packed column (EPR)**

- Constant flow operation
- 400 °C maximum operating temperature
- Maximum flow 100 mL/min
- Adapters included for 1/8-inch packed columns

### **S/SL (EPC)**

- Electronic pressure/flow control
- Septum purge
- Turn top inlet sealing system
- Includes leak/restriction, pressure decay, and split vent restriction test diagnostics (cap off septum purge and split vent)
- Maximum operating temperature 400 °C
- Pressure setting range 0–100 psi or 0–689.47 kPa
- Maximum split ratio 12,500:1
- Flow setting range 0 to 500 mL/min N<sub>2</sub>, 0–1,250 mL/min H<sub>2</sub> or He

### **S/SL (EPR)**

- Constant pressure operation
- Septum purge
- Turn top inlet sealing system
- Maximum operating temperature 400 °C
- Pressure adjustable range 0 to 100 psi or 0 to 689.47 kPa
- Maximum split ratio 12,500:1
- Flow adjustable range 0–500 mL/min N<sub>2</sub>, 0–1,250 mL/min H<sub>2</sub> or He

### **PCOC (EPC)**

- Maximum operating temperature 400 °C. Temperature programming in three ramps or tracking
- Oven subambient control is not available
- Pressure setting range 0–100 psig or 0–689.47 KPa
- Electronic septum purge control
- Automatic liquid injection supported directly onto columns ≥0.250 mm id

## **Detectors**

- Up to three detectors may be installed.
- A 3rd detector as FPD+ or TCD can be located on top in the middle position, or a 3rd detector as TCD or ECD can be located on the side of the GC.
- EPC with electronic flow control is available for detector gases for all detectors.
- EPR with constant flow operation is available for detector gases for FID, TCD, and ECD.

### **Flame ionization detector (FID)**

- Maximum operating temperature 425 °C
- MDL <3 pg carbon/s as tridecane
- Linear dynamic range >10<sup>7</sup> with N<sub>2</sub> carrier and 0.29-mm id jet
- Maximum data acquisition rate 500 Hz
- Full range digital data path enables peaks to be quantified over the entire 10<sup>7</sup> concentration range in a single run

### **Thermal conductivity detector (TCD)**

- Maximum operating temperature 400 °C
- MDL <800 pg tridecane/mL using He carrier (MDL may be affected by laboratory environment)
- Linear dynamic range 10<sup>5</sup> (±10 %)
- Single-filament TCD can provide rapid baseline stabilization from turn on with low drift, and does not require a separate reference gas or manual potentiometer adjustment
- The TCD can be mounted as a third detector on the left side of the GC

### Electron capture detector (ECD\*)

- Maximum operating temperature 400 °C
- Makeup gas types argon/5 % methane or nitrogen
- Radioactive source <15 mCi <sup>63</sup>Ni
- MDL <9 fg/mL lindane
- Dynamic range >10<sup>4</sup> with lindane
- 500 Hz maximum data acquisition rate
- Equipped with hidden anode and high-velocity flows for contamination resistance
- The ECD can be mounted as a third detector on the left side of the GC

### Nitrogen phosphorous detector (NPD)

- MDL <0.3 pg N/s, <0.04 pg P/s with azobenzene/malathion mixture
- Selectivity 25,000 to 1 gN/gC, 75,000 to 1 gP/gC with azobenzene/malathion mixture
- Dynamic range >10<sup>4</sup> N, >10<sup>4</sup> P with azobenzene/malathion mixture
- Data acquisition rate up to 100 Hz
- Blois bead standard (white ceramic bead not supported)  
Maximum operating temperature 400 °C

### Flame photometric detector (FPD) +(Plus)

- Single wavelength
- MDL <4.5 pg S/s, <120 fg P/s with methylparathion
- Dynamic range >10<sup>3</sup> S, 10<sup>4</sup> P with methylparathion
- Selectivity 10<sup>6</sup> g S/g C, 10<sup>6</sup> g P/g C
- Data acquisition rate up to 500 Hz
- Maximum operating temperature 400 °C

### SCD (Model 8355)

- Highest sensitivity and selectivity for sulfur-containing compounds

### NCD (Model 8255)

- Highest selectivity for nitrogen-containing compounds
- Supports integrated and standalone SCD, and standalone NCD. See Agilent Sulfur Chemiluminescence Detector and Nitrogen Chemiluminescence Detector Specification Guide for more information.

### Mass spectrometer

- Agilent 5977B Series MSD (stainless-steel source only)

## Other EPC Devices

The 8860 has six total slots for EPC devices. If two inlets and two detectors are used, then two auxiliary slots are available. If two inlets and three detectors are used, then one auxiliary slot is available. Purged GC capillary flow devices are not supported.

### Auxiliary EPC module

- Three channels of pressure control
- Psig (gauge) pressure control
- Forward pressure regulated 0–100 psig
- Maximum of one auxiliary EPC module per GC

### Pneumatics control module (PCM)

- Two channels for operation
- PCM may be located in either/both inlet positions and in auxiliary position
- Maximum of three PCMs per GC
- First channel
  - Pressure or flow control (psig (gauge))
  - Forward pressure regulated 0–100 psig
  - Forward flow regulated 0–200 mL/min
- Second channel
  - Pressure control
  - Forward pressure or back pressure regulated
  - Psig (gauge) and psia (absolute) pressure control

## Data communications

- Two analog output channels (1 V and 10 V output available) as standard
- Remote start/stop
- LAN
- Binary code decimal input for a stream selection valve

### Environmental conditions

- Ambient operating temperature 15 to 35 °C
- Ambient operating humidity 5 to 90 % (noncondensing)
- Storage extremes –40 to 70 °C
- Operating altitude 4,600 m

## Safety and regulatory certifications

### 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

### Electromagnetic compatibility (EMC) and radio frequency interference (RFI) regulation conformity

- CISPR 11/EN 55011 Group 1, Class A
- IEC/EN 61326-1
- AS/NZS CISPR 11
- This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada. ISM 1-A.

Designed and manufactured under a quality system registered to ISO 9001. The Declaration of Conformity is available.

## Other specifications

- Height 49 cm
- Width 58 cm (68 cm with side mounted detector)
- Depth 54 cm
- Average weight 51 kg
- Four internal 24-volt connections (up to 150 mA)
- Two on/off contact closures (48 V, 250 mA max)
- Support for up to any combination of three valves total:
  - Up to three heated gas sample valves
  - Up to two liquid sampling valves
- Six independent heated zones, not including oven (two inlets, two detectors, and two auxiliary). Third detector can use any available auxiliary zones.
- 400 °C Maximum operating temperatures for auxiliary zone

## Optional automated sample injectors and samplers

Supports one 7693A autoinjector with capacity for 16 sample vials

or

Supports one 7693A autoinjector and automatic sampler tray with capacity for 150 sample vials

(Heater/mixer/bar code reader not supported)

or

Supports one 7650A autoinjector with capacity for 50 sample vials

or

Supports one PAL3 Autosampler

### Software

Agilent software choices are available designed to help you make the most of every run, and every workday, from:

- OpenLAB CDS Workstation\* and OpenLAB CDS Workstation Plus\*
- OpenLAB CDS VL Workstation\* and OpenLAB CDS VL Workstation Plus\*
- OpenLAB CDS ChemStation Edition\* or EZChrom Edition\*
- OpenLAB CDS ChemStation VL\* or EZChrom VL\*
  - \* Includes Agilent Retention Time Locking (RTL) support for 8860 GC with EPC
  - \* Optional RTL databases/libraries are not supported with 8860 GC
- OpenLAB CDS EZChrom Compact
- DA Express (Optional Data Analysis accessible from 8860 GC)

## For more information

For more information on our products and services, visit our Web site at [www.agilent.com/chem](http://www.agilent.com/chem)

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