



# Agilent 7890B Gas Chromatograph Data Sheet



## Chromatographic Performance\*

- Retention time repeatability < 0.008% or < 0.0008 min
- Area repeatability < 1%RSD

The Agilent 7890B is a state-of-the-art gas chromatograph that provides superior performance for all applications. Key to its performance is the use of advanced electronic pneumatic control (EPC) modules and high performance GC oven temperature control. Each EPC unit is optimized for its intended use with a specific inlet and detector option.

GC oven temperature control of the 7890B oven allows for fast and precise temperature ramping. Overall thermal performance provides optimal chromatography including peak symmetry, retention time repeatability, and retention index accuracy.

The combination of precise pneumatic and temperature control leads to extremely precise retention time reproducibility, which is the basis for all chromatographic measurement.

Agilent's proprietary Capillary Flow Technology provides a new dimension in chromatography with reliable, leak-free, in-oven capillary connections that stand up to repeated GC oven cycling over time. The 7890B GC has enhanced firmware to extend Capillary Flow capabilities and enhanced datasystem software to simplify set-up and operation of backflush. Programmable Eco-friendly Sleep Mode reduces power and gas consumption during periods of inactivity, while Wake Mode readies the system for high-throughput operation.

Other new tools and popular calculators such as Method Translator, Vapor Volume Calculator, Pressure Flow Calculator, and Solvent Vent Calculator

make it easier to analyze complex matrices and unknowns, and provide gains in productivity and data integrity for routine analyses via 2-dimensional heart cutting, detector splitting, and column backflushing. These tools are integrated within the Agilent Data Systems and calculated values are automatically transferred to the method editor.

The 7890B GC has advanced built-in capabilities to monitor system resources (counters, electronic logs and diagnostics). Now with integrated early maintenance feedback which track either number of injections or time of use allow for planned maintenance to eliminate unnecessary downtime. Agilent GC systems are known for their reliability, ruggedness, and long life. The Agilent 10-year use guarantee provides greater assurance for a low-cost of ownership throughout the GC's life.

\*Using 7890B with EPC (splitless), ALS and Agilent Data System for analysis of tetradecane (2 ng to the column). Results may vary with other samples and conditions.



**Agilent Technologies**

## System Capabilities

- Supports simultaneously:
  - Two inlets
  - Three detectors (third detector as TCD or ECD)
  - Four detector signals
- State-of-the-art detector electronics and the full-range digital data path enable peaks to be quantified over the entire concentration range of the detector ( $10^7$  for the FID) in a single run.
- Full EPC is available for all inlets and detectors. Control range and resolution are optimized for the specific inlet or detector module.
- Up to six EPC modules can be installed, providing control of up to 16 channels of EPC.
- Pressure setpoint and control precision to 0.001 psi provides more retention time locking precision for low-pressure applications.
- EPC with capillary columns provides four column flow control modes: constant pressure, ramped pressure (3 ramps), constant flow, or ramped flow (3 ramps). Column average linear velocity is calculated.
- Atmospheric pressure and temperature compensation is standard, so results do not change, even when the laboratory environment does.
- Low Thermal Mass (LTM) Series II system can be added to achieve fastest cycle times via rapid LTM capillary column module heating and cooling.

- Serial port interface for Remote Advisor or Optional Bar Code Reader.
- One-button access to maintenance and service modes from the keyboard
- Preprogrammed leak tests
- Automatic Liquid Sampling is fully integrated into mainframe control.
- Setpoint and automation control can be done from the local keyboard or via a networked data system. Clock-time programming can be initiated from the front panel to initiate events (on/off, method start, etc.) at a future date and time.
- A run time deviation log is created for each analysis to ensure that all method parameters were achieved and maintained.
- A full array of traditional gas sampling and column switching valves are available
- 550 timed events
- Display of all GC and ALS setpoints at the GC or data system.
- Context-sensitive online help

## Column Oven

- Dimensions: 28 × 31 × 16 cm. Accommodates up to two 105 m × 0.530 mm id capillary columns or two 10-ft glass packed columns (9 in. coil diameter, 1/4 in. od), or two 20-ft stainless steel packed columns (1/8 in. od).
- Operating temperature range suitable for all columns and chromatographic separations. Ambient

temperature +4 °C to 450 °C.

- With LN<sub>2</sub> cryogenic cooling: -80 to 450 °C.
- With CO<sub>2</sub> cryogenic cooling: -40 to 450 °C.
- Temperature setpoint resolution: 0.1 °C.
- Supports 20 oven ramps with 21 plateaus. Negative ramps are allowed.
- Maximum achievable temperature ramp rate: 120 °C/min (120 V units are limited to 75 °C/min, see Table 1).
- Maximum run time: 999.99 min (16.7 h).
- Oven cool down (22 °C ambient) 450 to 50 °C in 4.0 min (3.5 min with oven insert accessory).
- Ambient rejection: < 0.01 °C per 1 °C.

## Electronic Pneumatics Control (EPC)

- Compensation for barometric pressure and ambient temperature changes is standard.
- Pressure has typical control of ±0.001 psi for the range of 0 to 150 psi. Pressure setpoints may be adjusted in increments of 0.001 for the range 0.000 to 99.999 psi; 0.01 psi for the range 100.00 to 150.00 psi.
- User may select pressure units as psi, kPa, or bar.
- Pressure/flow ramps: Three maximum.
- Carrier and makeup gas settings selectable for He, H<sub>2</sub>, N<sub>2</sub>, and argon/methane.
- Flow or pressure setpoints for each inlet or detector parameter with both Agilent 7890B and Agilent ChemStations.

**Table 1. Typical 7890B GC Oven Ramp Rates**

Temperature range (°C)	120 V Oven* rates (°C/min)	Fast ramp rates** (°C/min)	
		Dual-Channel	Single-Channel***
50 to 70	75	120	120
70 to 115	45	95	120
115 to 175	40	65	110
175 to 300	30	45	80
300 to 450	20	35	65

\* Results obtained with line voltage maintained at 120V

\*\* Fast ramp rates require power > 200 volts at > 15 Amps.

\*\*\*Requires G2646-60500 oven insert accessory.

- Constant flow mode is available when capillary column dimensions are entered into the 7890B.
- Split/splitless, Multimode, and PTV inlets have flow sensors for the control of split ratio.
- Inlet modules  
Pressure sensors: Accuracy:  $< \pm 2\%$  full scale, Repeatability:  $< \pm 0.05$  psi, Temperature coefficient:  $< \pm 0.01$  psi/°C, Drift:  $< \pm 0.1$  psi/6 months.
- Flow sensors: Accuracy:  $< \pm 5\%$  depending on carrier gas, Repeatability:  $< \pm 0.35\%$  of setpoint, Temperature Coefficient  $< \pm 0.20$  mL/min (NTP)\* per °C for He or H<sub>2</sub>;  $< \pm 0.05$  mL/min NTP per °C for N<sub>2</sub> or Ar/CH<sub>4</sub>.
- Detector modules:  
Accuracy:  $< \pm 3$  mL/min NTP or 7% of setpoint, Repeatability:  $< \pm 0.35\%$  of setpoint

\*NTP = 25 °C and 1 atmosphere

## Inlets

- Maximum of two inlets installed
- EPC compensated for atmospheric pressure and temperature variation
- Inlets available:
  - Packed purged injection port (PIPI)
  - Standard and Inert Flow Path Split/Splitless capillary inlets (S/SL)
  - Multimode inlet (MMI)
  - Temperature-programmable cool on-column (PCOC)
  - Programmable temperature vaporizer (PTV)
  - Volatiles inlet (VI)

## S/SL

- Suitable for all capillary columns (50  $\mu$ m to 530  $\mu$ m id).
- Split ratios up to 7,500:1 to avoid column overload. Setting split ratios (particularly low split ratios) is limited by column parameters and control of system flows (particularly low system flows).
- Splitless mode for trace analysis. Pressure-pulsed splitless is easily accessible for best performance.
- Maximum temperature: 400 °C.
- EPC available in two pressure ranges: 0 to 100 psig (0 to 680 kPa) for best control for columns  $\geq 0.200$  mm diameter; 0 to 150 psig for columns  $< 0.200$  mm diameter.
- Gas saver mode to reduce gas consumption without compromising performance.
- Electronic septum purge flow control to eliminate "ghost" peaks.
- Total flow setting range:  
0 to 200 mL/min N<sub>2</sub>  
0 to 1,250 mL/min H<sub>2</sub> or He
- Turn top inlet sealing system is built in standard with each 7890B S/SL inlet for quick, easy, injector liner changes.
- Optional inert S/SL inlet includes chemical deactivation process for weldment and weldment insert

## MMI

- Provides the flexibility of a standard Agilent split/splitless inlet, combined with temperature programmable capabilities which allow for large volume injection. Also supports cool injections for improved signal response.

- Temperature control: LN<sub>2</sub> (to -160 °C), LCO<sub>2</sub> (to -70 °C), air cooling (to ambient +10 °C with oven temperature  $< 50$  °C) (due to high consumption, air cooling with cylinders is not advised). Temperature programming of up to 10 ramps at up to 900 °C/min. Maximum temperature: 450 °C.
- Injection modes:
  - Hot or cold split/splitless
  - Pulsed split/splitless
  - Solvent vent
  - Direct
- Suitable for all capillary columns (50  $\mu$ m to 530  $\mu$ m)
- EPC pressure range (psig): 0 to 100 psig
- Split ratio: up to 7500 to 1 to avoid column overload. Setting split ratios (particularly low split ratios) is limited by column parameters and control of system flows (particularly low system flows).
- Splitless mode for trace analysis. Pressure pulsed splitless is easily accessible for improved performance.
- Electronic septum purge flow control
- Compatible with Merlin Microseal septum
- Setup of parameters facilitated with Agilent Solvent Elimination Calculator
- Total flow setting range:
  - 0 to 200 mL / min N<sub>2</sub>
  - 0 to 1,250 ml/min H<sub>2</sub> or He
- Turn-top inlet sealing system is built in standard with each 7890B Multimode inlet for quick, easy injector liner changes

### PCOC

- Direct injection onto cool capillary column ensures quantitative sample transfer with no thermal degradation.
- Automatic liquid injection supported directly onto columns  $\geq 0.250$  mm id.
- Maximum temperature: 450 °C. Temperature programming in 3 ramps or tracking oven. Subambient control to -40 °C is optional.
- Electronic pressure control range: 0 to 100 psig.
- Electronic septum purge flow control.
- Optional solvent vapor exit for large-volume injections.
  - Electronically controlled, inert, three-way valve allows solvent venting.
  - Includes software for method optimization.
  - Preassembled retention gaps/vent line/analytical column for easy installation.

### PPIP

- Direct injection onto 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 chosen to provide optimum performance over normal packed column setpoint ranges.
- Electronic septum purge flow control.
- 400 °C maximum operating temperature.
- Adapters included for 1/4-in. and 1/8-in. packed columns, and 0.530-mm capillary columns.

### PTV

- Supports hot/cold split and splitless modes as well as large volume injections.
- Temperature control: either LN<sub>2</sub> (to -160 °C) or LCO<sub>2</sub> (to -65 °C) cooling. Temperature programming of up to 3 ramps at up to 720 °C/min. Maximum temperature: 450 °C.
- EPC pressure range 0 to 100 psig.
- Split ratio up to 7,500:1. Setting split ratios (particularly low split ratios) is limited by column parameters and control of system flows (particularly low system flows).
- Electronic septum purge flow control.
- Choice of Gerstel septumless head or Merlin Microseal<sup>®</sup> septum head.
- 450 °C maximum operating temperature.
- Total flow setting range:
  - 0 to 200 mL/min N<sub>2</sub>
  - 0 to 1,250 mL/min H<sub>2</sub> or He

### VI

- Very low volume (32  $\mu$ L) interface suitable for gas or prevaporized samples. Recommended for use with headspace, purge and trap, or thermal desorption samplers.
- Three modes for optimized sample introduction: split (up to 100:1 split ratio), splitless, and direct.
- Optimized EPC (H<sub>2</sub> or He carrier, 0.00 to 100 psig pressure control, 0.0 to 100 mL/min flow control).
- Electronic septum purge flow control.
- Treated flow path provides inert surface for minimum component adsorption.
- Maximum temperature: 400 °C.

### Detectors

- Electronic pneumatics control and electronic on/off for all detector gases.
- EPC compensated for atmospheric pressure and temperature variation.

#### Detectors available:

#### FID

- Flame ionization detector (FID) that responds to most organic compounds.
- Minimum detectable level (for tridecane): < 1.4 pg C/s
- Linear dynamic range: >10<sup>7</sup> ( $\pm 10\%$ ). Full-range digital data path enables peaks to be quantified over the entire 10<sup>7</sup> concentration range in a single run.
- Data rates up to 500 Hz accommodate peaks as narrow as 10 msec at half height.
- Standard electronic pneumatic control for three gases:
  - Air: 0 to 800 mL/min
  - H<sub>2</sub>: 0 to 100 mL/min
  - Makeup gas (N<sub>2</sub> or He): 0 to 100 mL/min
- Available in two versions: capillary column optimized or adaptable for either packed or capillary columns.
- Flameout detection and automatic reignition
- 450 °C maximum operating temperature

### TCD

- Thermal conductivity detector (TCD), a universal detector that responds to all compounds, excluding the carrier gas.
- Minimum detectable level: 400 pg tridecane/mL with He carrier. (This value may be affected by laboratory environment).
- Linear dynamic range:  $> 10^5 \pm 5\%$
- Unique fluidic switching design provides rapid stabilization from turn-on, low-drift performance.
- Signal polarity can be run-programmed for components having higher thermal conductivity than the carrier gas.
- Maximum temperature: 400 °C
- Standard EPC for 2 gases (He, H<sub>2</sub>, or N<sub>2</sub> matched to carrier gas type)
- Make-up gas: 0 to 12 mL/min
- Reference gas: 0 to 100 mL/min
- The 7890B GC can accommodate a third detector as TCD located on the left-hand side of the GC.

### Micro-ECD

- Micro-electron capture detector (micro-ECD), a very sensitive detector for electrophilic compounds such as halogenated organic compounds.
- Minimum detectable level:  $< 4.4$  fg/mL lindane  
At standard checkout conditions, with a detector temperature of 300 °C and flow to the detector (makeup plus column) of 30 mL/min, this is equivalent to 4.5 fg/sec.
- Proprietary signal linearization. Linear dynamic range:  $> 5 \times 10^4$  with lindane
- Data acquisition rate: up to 50 Hz

- Uses  $\beta$  emission of  $< 15$  mCi <sup>63</sup>Ni as the electron source.
- Unique micro-cell design minimizes contamination and optimizes sensitivity.
- 400 °C maximum operating temperature
- Standard EPC makeup gas types: argon/5% methane or nitrogen; 0 to 150 mL/min
- The 7890B GC can accommodate a third detector as micro-ECD located on the left side of the GC.

### NPD

- Nitrogen-phosphorus detector (NPD), a detector specific to nitrogen or phosphorus-containing compounds.
- NPD available with one of two beads, Blos (glass) bead or white ceramic bead (legacy offering)  
Compared to the legacy white ceramic bead, the Blos bead offers:
  - Longer lifetime
  - More stable operation during the bead's lifetime
- MDL:  $< 0.08$  pg N/s,  $< 0.01$  pg P/s with azobenzene/malathion/octadecane mixture with Blos bead
- MDL:  $< 0.3$  pg N/s,  $< 0.1$  pg P/s with azobenzene/malathion/octadecane mixture with white ceramic bead
- Dynamic range:  $> 10^5$  N,  $> 10^5$  P with azobenzene/malathion mixture with Blos or white ceramic bead
- Selectivity: 25,000 to 1 g N/g C, 200,000 to 1 g P/g C with azobenzene/malathion/octadecane mixture with Blos bead
- Selectivity: 25,000 to 1 g N/g C, 75,000 to 1 g P/g C with azobenzene/malathion/octadecane mixture with white ceramic bead

- Data acquisition rate: up to 200 Hz
- Standard EPC for three gases:
  - Air: 0 to 200 mL/min
  - H<sub>2</sub>: 0 to 30 mL/min
  - Makeup gas: 0 to 100 mL/min
- Available for packed/capillary columns or optimized for capillary columns
- 400 °C maximum operating temperature

### FPD + (Plus)

- Newly designed single-wavelength flame photometric detector (FPD), or dual-wavelength flame photometric detector (DFPD) – a sensitive, specific detector to sulfur- or phosphorus-containing compounds.
- MDL:  $< 45$  fg P/s,  $< 2.5$  pg S/s with methylparathion
- Dynamic range:  $> 10^3$  S,  $10^4$  P with methylparathion
- Selectivity:  $10^6$  g S/g C,  $10^6$  g P/g C
- Data acquisition rate: up to 200 Hz
- Standard EPC for three gases:
  - Air: 0 to 200 mL/min
  - H<sub>2</sub>: 0 to 250 mL/min
  - Makeup gas: 0 to 130 mL/min
- Available in single- or dual-wavelength versions.
- 400 °C maximum operating temperature
- Agilent 7890B GC's ability to handle 4 signals allows simultaneous use of DFPD, top-mounted GC detector, and TCD.

### SCD (Model 355)

- Highest sensitivity and selectivity for sulfur-containing compounds.
- MDL: Typical < 0.5 pg/s, dimethyl sulfide in toluene
- Linear dynamic range: > 10<sup>4</sup>
- Selectivity: > 2 x 10<sup>7</sup> g S/g C

### NCD (Model 255)

- High selectivity for nitrogen-containing compounds.
- MDL: < 3 pg N/s, in both N and nitrosamine modes, 25 ppm N as nitrobenzene in toluene
- Linear dynamic range: > 10<sup>4</sup>
- Selectivity: > 2 x 10<sup>7</sup> g N/g C (selectivity in nitrosamine mode is matrix dependent)

See Agilent Sulfur Chemiluminescence Detector and Nitrogen Chemiluminescence Detector Specification Guide for additional information regarding performance and physical and environmental specifications.

### Mass Spectrometers

See 5977 Series MSD specifications. See 7000 Triple Quadrupole GC/MS specifications. See 7200 Q-TOF Specifications. See 240 Ion Trap MS specifications.

### Other Detectors

Specialized detectors are available through Agilent Channel Partners including: atomic emission, Pulsed Flame Photometric (PFPD), Photoionization (PID), Electrolytic Conductivity (ELCD), Halogen Specific (XSD), Oxygenate Flame Ionization (O-FID), and Pulsed Discharge Helium Ionization (PDHID)

## Auxiliary EPC Devices

The 7890B GC has two positions for auxiliary EPC devices located on the back of the GC. Each position can be any combination of auxiliary EPC or pneumatics control module.

Note: The communication for a third detector such as TCD or ECD EPC module (located on the left side of the GC) interfaces via one of these auxiliary EPC module positions. If a third detector (TCD or ECD) is installed, one of these auxiliary positions is thus taken.

### Auxiliary EPC Module

- Three channels of pressure control
- EPC compensated for atmospheric pressure and temperature variation when connected to a user-defined capillary column
- Psig (gauge) and psia (absolute) pressure control
- Forward pressure regulated
- Maximum of 2 auxiliary EPC modules per GC

### Pneumatics Control Module (PCM)

- 2 channels for operation
- EPC compensated for atmospheric pressure and temperature variation when connected to a user-defined capillary column
- First channel:
  - Pressure or flow control
  - Psig (gauge) and psia (absolute) pressure control
  - Forward pressure regulated
- Second channel:
  - Pressure control
  - Psig (gauge) and psia (absolute) pressure control

- Forward pressure or back pressure regulated

- PCM can be located in either/both inlet EPC positions, and in either/both auxiliary positions on the back of the 7890B GC
- Maximum of 3 PCMs per GC

## Capillary Flow Technology

Agilent's proprietary Capillary Flow Technology provides devices with reliable, leak-free, in-oven capillary connections to help analyze complex samples and provide gains in productivity. Devices feature:

- Photolithographic chemical milling for low dead volume flow pathways
- Diffusion bonding to form a single flow plate
- "Credit card" profile for fast thermal response
- Projection welded connections for leak-tight fittings
- Deactivation of all internal surfaces in the sample path for inertness

All of the following purged Capillary Flow devices require one channel from an auxiliary EPC or PCM module.

Purged capillary flow devices, such as the Deans switch, purged effluent splitters, and purged ultimate unions, introduce an additional flow in the sample stream. For detectors that operate at low flow rates, like the MSD and TCD, some decrease in sensitivity will occur.



### Deans Switch

Deans switching provides additional selectivity using 2-dimensional GC analysis. Peaks of interest that may be coeluting on one column are diverted to a separate column of different stationary phase. This technique can also reduce maintenance costs by having troublesome solvents or other components bypass detectors or columns.

- Dimensions:  
65 mm x 31 mm x 1 mm  
(65 mm x 31 mm x 11 mm, including weldment connectors with tubing to reach through top of oven.)
- Weight: 30 grams, not including connector tubing.

### Purged Effluent Splitters

A 3-way purged effluent splitter sends column effluent to three detectors, even an MSD. More information can be obtained in a single run to help locate target peaks in unknowns. A 2-way purged effluent splitter version is also available.

- Dimensions:  
65 mm x 31 mm x 1 mm  
(65 mm x 31 mm x 11 mm, including weldment connectors with tubing to reach through top of oven.)
- Weight: 26 grams, not including connector tubing.

### Backflush

An Agilent Purged Ultimate Union or any of the above purged Capillary Flow devices *also* provides the ability to backflush. By reversing column flow immediately after the last compound of interest has eluted, you can eliminate long bake-out times for highly retained (or high-boiling) contaminants, thereby shortening cycle times and protecting

the column and detector. As backflush occurs after peaks of interest have eluted, the chromatographic method for peaks of interest does not need to change. Backflush is available when the column is attached to a split/splitless, volatiles interface, Multimode, or PTV inlet.

The 7890B GC firmware has been optimized for backflush operation:

- Displays positive and negative flows
- Inlet/outlet pressures settable to the limits of the controlling EPC devices.
- EPC can be introduced at any column or restrictor connection
- Capillary Flow configuration of up to six columns/restrictors

Backflush Wizard software works with Agilent CDS to provide a step-by-step procedure for configuring the backflush hardware and column plumbing. The chromatogram must have 3 well separated peaks. See Backflush brochure for additional system requirements.

### Automated Sample Injectors and Samplers

- 7693A ALS Interface on 7890B provides power and communications for up to two 7693A automatic injectors, one automatic sampler tray, and one heater/mixer/bar code reader. Injectors and tray install easily without the need for alignment.
- Agilent Pal Injector on 7890B. Specialized software controls available on OpenLab CDS ChemStation and EzChrom editions, MassHunter, and MSD Productivity ChemStation.

- 7650A ALS Interface on 7890B provides power and communications for one 7650 automatic injector. Compatible with one additional 7693A mounted on back inlet. Injector installs easily without the need for alignment.

### Data Communications

- LAN
- Two analog output channels (1-mV, 1-V, and 10-V output available) as standard
- Remote start/stop
- Keyboard control of the Agilent Automatic Liquid Sampler (ALS)
- Storage of 10 methods
- Storage of five ALS sequences
- Binary-coded decimal input for a stream selection valve
- Serial port interface for Remote Advisor or optional Bar Code Reader. BCR allows entering bar code of columns, liners, and other consumables directly into the GC method. USB Bar Code Reader also available for entering consumable information through the CDS computer.

### Maintenance and Support Services

- Integrated early maintenance counters allows planned maintenance and helps eliminate unnecessary downtime.
- Instrument events or shutdowns displayed on keyboard display or Data System.
- Remote diagnostics
- Performance verification services
- Easy parts identification and part number finder software (standalone software, does not require Agilent CDS)

## Environmental Conditions

- Ambient operating temperature: 15 °C to 35 °C
- Ambient operating humidity: 5% to 95% (noncondensing)
- Storage extremes: -40 °C to 70 °C
- Power requirements
  - Line voltage: 120/200/220/230/240 Volts ±10% of nominal
  - Frequency: 50/60 Hz

## Safety and Regulatory Certification

Conforms to the following safety standards:

- Canadian Standards Association (CSA) C22.2 No. 60101-1
- Nationally Recognized Test Laboratory (NRTL): ANSI/UL 61010-1
- International Electrotechnical Commission (IEC): 61010-1, 60101-2-010, 60101-2-081
- EuroNorm (EN): 61010-1

Conforms to the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI):

- CISPR 11/EN 55011: Group 1 Class A
- IEC/EN 61326
- AUS/NZ N10149
- This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada.
- Designed and manufactured under a quality system registered to ISO 9001, Declaration of Conformity available.

## Other Specifications

- Height: 49 cm (19.2 in.)
- Width: 58 cm (22.9 in.) with EPC inlet and detectors; 68 cm (26.8 in.) with third detector as TCD or with certain valving options mounted on left-hand side of GC
- Depth: 51 cm (20.2 in.)  
Typical weight: 49 kg (108 lb)
- Four internal 24-volt connections (up to 150 mA)
- Two external 24-volt connections (up to 150 mA)
- Two on/off contact closures (48 V, 250 mA max)
- 550 timed events via data system.  
50 timed events via GC keyboard.
- Support for up to 8 valves.
  - Valves 1 to 4, 12V DC 13 watt in a heated valve box
  - Valves 5 to 6, 24 V DC 100 mA unheated, for low power valve applications
  - Valves 7 to 8, externally powered as a remote event from separate contact closure
- Independent heated zones, not including oven: six (two inlets, two detectors, and two auxiliary). Third detector as TCD can utilize any available zone from inlet or auxiliary zones.
- Maximum operating temperatures for auxiliary zones: 400 °C

## References

1. A Guide to Interpreting Detector Specifications for Gas Chromatography. Agilent Technologies, publication 5989-3423EN
2. The Importance of Area and Retention Time Precision in Gas Chromatography. Agilent Technologies, publication 5989-3425EN

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© Agilent Technologies, Inc., 2013  
Printed in the USA  
January 25, 2013  
5991-1436EN



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