


# GC 8500

## GAS CHROMATOGRAPH

### Specification Sheet

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## DIMENSIONS AND WEIGHTS

Size\*: Height: 57 cm (22.5 in.)  
 Width: 66 cm (26.0 in.)  
 Depth: 56 cm (22.0 in.)  
 Weight\*: 43 kg (95 lb)

\*Typical values

## ENVIRONMENTAL CONDITIONS

Operating temperatures: 10 °C to 40 °C.  
 Operating humidity (relative): 5 % to 95 %  
 Line voltage requirements: 120 V, 230 V (±10 % nominal)

## COLUMN OVEN

Dimensions: 28 cm (w) x 20 cm (d) x 28 cm (h)

### Temperature range:

- Ambient +4 °C to 450 °C
- Liquid N<sub>2</sub>: -100 °C to 450 °C
- Liquid CO<sub>2</sub>: -60 °C to 450 °C

Temperature program ramps/holds: 24/25  
 Maximum temperature ramp rate: 150°C/min for all voltages and 180°C/min with oven insert accessory  
 Cool down rate: 400 °C to 50 °C in 4.5 minutes  
 Temperature set-point resolution: 0.1°C  
 Ambient temperature reject <0.01°C change in oven for 1°C change in ambient temp  
 Retention Time Repeatability <0.008% or < 0.0008 min, based on Pentadecane under temperature program conditions  
 Area repeatability < 1% RSD

## GENERAL SPECIFICATIONS

Up to 9 EFC modules total, injector, detector and auxiliary  
 Optional backflush

### GC Control:

- External events (digital output):
  - 8 standard
  - 8 optional, total 16
- Max number of timed events: 16
- Heated zones:
  - Column, 3 injectors, 3 detectors and 2 valve or aux ovens standard (9)
  - Additional 4 zones are provided by heater extension board
- Two power outlets 24V (1A max. each)

Temperature Range (°C)	GC 8500 Rates (°C/min)	With Oven Insert
50 - 70	150	180
70 - 115	95	115
115 - 175	70	90
175 - 300	45	65
300 - 450	30	45

## METHODS

- Maximum stored internal methods: 50 (max. 30 alphanumeric characters)

### Logging:

- Run log file (stored with the chromatogram when using CompassCDS)
- Error log file

### Local Display:

- 10" High-resolution full-colour touchscreen

### Languages:

- EnglishGB, EnglishUS, German, French, Italian, Dutch, Polish, Russian, Spanish, Portuguese, ChineseSC, ChineseTC, Korean, Thai, Vietnamese, Japanese.

### Local automation:

- Method lines: 25
- Modes:
  - Infinite looping
  - Dual and duplicate injection

## COMMUNICATION

Ethernet: Protocol: TCP/IP  
 Data rate: 100 Mbps  
 Control: GC control and method parameters

### Analog output (optional):

- Number of channels: 3
- Time programmable steps: 30
- Output software selectable (set individual):
  - 0-1 V (default)
  - 0-10 V

### Synchronisation signals with other devices & data systems:

- Ready in and out
- Start in and out

### Data Handling and System Control:

- CompassCDS Chromatography Data System

## CERTIFICATIONS

- CE
- UKCA
- TÜV SÜD NRTL Mark (US/Canada)
- FCC Part 15 Subpart B
- CAN ICES-003(A) / NMB-003(A)

## INJECTOR OPTIONS

Maximum injectors: three, operating concurrently  
 Pneumatics: Electronic Flow Control (EFC), or manual

### Injector types:

- S/SL Split/Splitless injector\*
- PTV Programmable Temperature Vaporising\*
- COC Cold On-Column injector\*
- Flash injector
- PWOC Packed/ Wide bore On-Column injector

\*Including septum purge

### S/SL SPLIT/SPLITLESS INJECTOR

Pressure range: 0-150 psi

**Total flow:**

- 500 mL/min for N<sub>2</sub>/Ar
- 1500 mL/min for He/H<sub>2</sub>

Maximum temperature: 450 °C

Split range: 1-10,000 (column dependent)

**Suited for columns:**

Wide bore: (0.53 mm)

Narrow bore: (0.05 to 0.32 mm)

### COC COLD ON-COLUMN INJECTOR

Pressure range: 0-150 psi

Total Flow: 50 mL/min (Type 23 EFC)

**Temperature range:**

- Ambient + 10 °C to 450 °C using air cooling
- -60 °C to 450 °C using liquid CO<sub>2</sub> cooling
- -160 °C to 450 °C using liquid N<sub>2</sub> cooling

Maximum temperature: 450 °C

Maximum temperature ramp rate: 200 °C/min

Temperature ramps/holds: 24/25

**Suited for columns:**

- Wide bore (0.53 mm)
- Narrow bore (0.32 mm)

### PTV PROGRAMMABLE TEMPERATURE

Vaporising Injector

Pressure range: 0-150 psi

**Total flow:**

- 500 mL/min for N<sub>2</sub>/Ar
- 1500 ml/min for He/H<sub>2</sub>

### TEMPERATURE RANGE

- Ambient + 10 °C to 450 °C using air cooling
- -160 °C to 450 °C using liquid N<sub>2</sub> cooling
- -60 °C to 450 °C using liquid CO<sub>2</sub> cooling

Maximum temperature ramp rate: 200 °C/min

Temperature ramps/holds: 24/25

Split range: 1-10,000 (column dependent)

**Operational capabilities:**

- Large volume injection
- Temperature ramped splitless
- Cold on-column
- Split and splitless
- ChromatoProbe solid sample introduction optional

**Suited for columns:**

- Wide bore (0.53 mm)
- Narrow bore (0.05 to 0.32 mm)

Maximum injection volume: 250 µL (LVI mode)

### FLASH INJECTOR

Pressure range: 0-150 psi

**Total flow:**

- 50 mL/min (Type 23 EFC)

**Maximum temperature: 450 °C**

Suited for columns:

- Wide bore (0.53 mm)
- Packed (1/8" to 1/4")

### PWOC PACKED/WIDE-BORE ON-COLUMN INJECTOR

Pressure range: 0-150 psi

**Total flow:**

- 50 mL/min (Type 23 EFC)

Maximum temperature: 450 °C

**Suited for columns:**

- Wide bore (0.53 mm)
- Packed (1/8" to 1/4")

### ELECTRONIC FLOW CONTROL: INJECTORS (EFC)

Module types: 4 injector-specific modules

Pressure: 0.1 % Full Scale

Resolution pressure set points is 0.001psi

Flow sensor accuracy 2% of measured or 0.2% of full scale

Flow sensor repeatability 0.5%

### SAMPLE PRECONCENTRATION TRAP (SPT)

Trace level analysis of volatiles in gases

Fully integrated

**Temperature range:**

- -60 °C to 450 °C using liquid CO<sub>2</sub> cooling
- -185 °C to 450 °C using liquid N<sub>2</sub> cooling

**Temperature rate:**

- Ballistic heating for instant release of adsorbed volatiles. Typical heating rate 50°/sec.

**Available traps:**

- Two lengths - 8 and 30 cm
- A wide range of packing materials, including glass beads, Tenax and other specific adsorbents. Packing material may be customized

### QUICK-SWITCH VALVE OPTION

Instantly switch between injectors/columns and detectors

Configurations: automated or manual, factory or field installed

## DETECTOR OPTIONS

Maximum detectors: four, operating concurrently (one of which is MS or external Detector)

Pneumatics: Electronic Flow Control (DEFC) or manual

### Detector types:

- FID Flame Ionization Detector
- TCD Thermal Conductivity Detector
- ECD Electron Capture Detector
- NPD (TSD) Nitrogen-Phosphorus Detector
- PFPD Pulsed Flame Photometric Detector
- PDHID Pulsed Discharge Helium Ionization Detector
- MS Mass Spectrometry (see GC/MS brochure and datasheet)

Note: Data Acquisition Rate : 600Hz for all detectors, exception is the PFPD

## FID FLAME IONISATION DETECTOR

Maximum temperature: 450 °C

Detectivity: 1.2 pg C/sec

Linear dynamic range:  $10^7$

## FLAME TIP TYPE: CERAMIC (PATENTED)

### Operational quality:

- Flame-out detection
- Auto re-ignition

## TCD THERMAL CONDUCTIVITY DETECTOR

Maximum temperature: 450 °C

Detectivity: 300 pg/mL (Butane)

Linear dynamic range:  $10^6$

### Operational quality:

- Filament protection
- Automatic bridge balancing

## ECD ELECTRON CAPTURE DETECTOR

Maximum temperature: 450 °C

Detectivity: 7 fg/s Lindane

Linear dynamic range:  $10^4$

Radioactive source:  $^{63}\text{Ni}$  - 15 mCi (555 Mbq)

## NPD (TSD) NITROGEN-PHOSPHORUS DETECTOR

Maximum temperature: 450 °C

### Detectivity:

N: 100 fg N/sec (Azobenzene)

P: 100 fg P/sec (Malathion)

### Linear dynamic range:

- N:  $10^5$
- P:  $10^4$

Operational quality: self-aligning bead

## PFPD PULSED FLAME PHOTOMETRIC DETECTOR

### Photomultiplier tube:

- S/P
- S/P/N

Maximum temperature: 450 °C

### Detectivity:

- S: 1 pg S/sec (S/P tube)
- P: 100 fg P/sec (S/P tube)
- N: 20 pg N/sec (S/P/N tube)

### Linear dynamic range:

S:  $10^3$

P:  $10^4$

N:  $10^2$

Up to 23 elements can be detected

### PDHID Pulsed Discharge Helium Ionization Detector

Detectivity: 50 ppb (Methane)

Linear dynamic range:  $10^4$  (Methane)

### Operational quality:

- Gold plated connections
- Welded column connections

## DETECTORS (DEFC)

Module types: 6 detector-specific modules

Accuracy:  $\pm 7\%$  set point flow

Resolution: 0.1 or 1 mL/min

## Automation Options

### 8410 PRO AUTO INJECTOR

#### Sample capacity:

- 10 x 2 mL vials
  - 6 x 5 mL vials
  - 5 x 10 mL vials
- Large solvent wash vial: 2 x 120 mL\*
- Dual and duplicate mode
- Internal standard addition

#### Modes of operation:

- Liquid
- Ambient headspace\*
- SPME (Solid Phase MicroExtraction)\*
- Sample heating and cooling\*

#### Pre-programmed modes of injection Syringes:

- 1  $\mu$ L, 2  $\mu$ L, 5  $\mu$ L, 10  $\mu$ L, 100  $\mu$ L, 250  $\mu$ L for liquid injection
- SPME

### 8400 PRO AUTOSAMPLER

Sample capacity: 100 x 2 mL vials

Large solvent wash vial: 2 x 120 mL\*

Dual and duplicate mode

Internal standard addition

#### Modes of operation:

- Liquid
- Ambient headspace\*
- SPME\*
- Sample heating and cooling\*
- Pre-programmed modes of injection

### SYRINGES:

- 1  $\mu$ L, 2  $\mu$ L, 5  $\mu$ L, 10  $\mu$ L, 100  $\mu$ L, 250  $\mu$ L for liquid injection
- SPME

\* Optional

### PAL3 XYZ AUTOSAMPLER – LSI, RSI, RTC VERSIONS

#### Sample trays: two standard and expandable to four Tray types:

- 98 x 2 mL vials
- 200 x 1 mL vials
- 32 x 10 mL/20 mL vials
- 96-well plates

Dual and duplicate mode

Internal standard addition

#### Modes of operation:

- Liquid
- Heated headspace\*
- SPME\*
- ITEX\*

Sample heating and cooling

Additional optional modules: further sample trays, microwell plate holders, wash station, SPME fiber bake-out station, dilutor, barcode readers, and flowcell

\* Optional



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