

● 450-GC

Specification Sheet

Dimensions and Weights

Size*: Height: 53 cm (20.9 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: 101 V, 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
- With liquid N₂: -100 °C to 450 °C
- With liquid CO₂: -60 °C to 450 °C

Temperature program ramps/holds: 24/25

Maximum temperature ramp rate: 120 °C/min for all voltages

Cool down rate: 400 °C to 50 °C in 4.5 minutes

Temperature set-point resolution: 1 °C

General Specifications

GC Control:

- External events (digital output):
 - 7 standard
 - 8 optional
- Max number of timed events: 15 x 99
- Heated zones: 7 (including column oven)

Methods:

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

Logging:

- Run log file (stored with the chromatogram when using Galaxie™ or MS Workstation)
- Error log file

Local Display:

- TFT full color screen
- VGA resolution (640 x 480)
- Size 8.4" (20 cm)



- Local Control:
 - Touch screen
 - Hard keys
- Languages: English, German, French, Spanish, Italian, Portuguese, Cyrillic, Kanji, Chinese, Thai and Korean (Other languages on request)

Local automation:

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

System operational qualities:

- High Inertness: sample path UltiMetal treated, optional
- Low level detection assurance: purged valves, optional

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: 25
- Output (set individual):
 - 0-1 V (default)
 - 0-10 V

Synchronization signals with other devices and data systems:

- Ready in
- Start out

Data Handling and System control:

- GC: Galaxie™ Chromatography Data System (CDS)
- GC/MS: MSWS (see the GC/MS brochure and datasheet for more information)

Certifications

- CSA:
 - C22.2 61010-1
 - UL 61010-1
- IEC: 61010-1
- EMC:
 - 47 CFR part 15
 - ANSI C63.4
 - EN 61326

Injector Options

Maximum injectors: three, operating concurrently

Pneumatics: Electronic Flow Control (EFC), or manual

Injector types:

- 1177 S/SL Split/Splitless injector
- 1079 PTV Programmable Temperature Vaporizing
- 1093 COC Cold On-Column injector
- 1061 Flash injector
- 1041 PWOC Packed/Wide bore On-Column injector

1177 S/SL Split/Splitless Injector

Pressure range: 0-150 psi
 Total flow: 500 mL/min at 10 psi
 1500 mL/min at 10 psi (He)
 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)

1093 COC Cold On-Column Injector

Pressure range: 0-150 psi
 Total Flow: 50 mL/min (Type 23 EFC)
 500 mL/min (Type 24 EFC)

Temperature range:

- Ambient +10 °C to 450 °C using air cooling
- -60 °C to 450 °C using liquid CO₂ cooling
- -160 °C to 450 °C using liquid N₂ 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)

Sample Preconcentration Trap (SPT)

Trace level analysis of volatiles in gases
 Fully integrated

Temperature range:

- -60 °C to 450 °C using liquid CO₂ cooling
- -185 °C to 450 °C using liquid N₂ cooling

Temperature rate:

- Ballistic for instant release of adsorbed volatiles

Available traps:

- Two lengths
- A wide range of standard packings and custom packings

Quick-Switch Valve Option

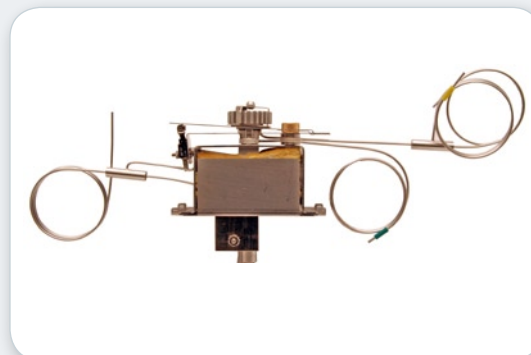
Instantly switch between injectors/columns and detectors
 Configurations: automated or manual, factory or field installed

1079 PTV Programmable Temperature

Vaporizing Injector
 Pressure range: 0-150 psi
 Total flow: 500 mL/min at 10 psi

Temperature range:

- Ambient + 10 °C to 450 °C using air cooling
- -160 °C to 450 °C using liquid N₂ cooling
- -60 °C to 450 °C using liquid CO₂ cooling



1177 S/SL Injector

Maximum temperature ramp rate: 200 °C/min
 Temperature ramps/holds: 24/25
 Split range: 1-10,000 (column dependent)

Operational modes:

- 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)



PFPD Detector

1061 Flash Injector

Pressure range: 0-150 psi

Total flow:

- 50 mL/min (Type 23 EFC)
- 500 mL/min (Type 24 EFC)

Maximum temperature: 450 °C

Suited for columns:

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

1041 PWOC Packed/Wide-bore On-Column Injector

Pressure range: 0-150 psi

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

500 mL/min (Type 24 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

Flow: 0.5 % Full Scale and 3% Measured Value

Resolution: 0.1 psi or 0.1 mL/min

Detector Options

Maximum detectors: three: operating concurrently

Pneumatics: Electronic Flow Control (DEFC) or manual

Detector types:

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

FID Flame Ionization Detector

Maximum temperature: 450 °C

Detectivity: 2 pg °C/sec

Linear dynamic range: 10⁷

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: 10⁶

Operational quality:

- Filament protection
- Automatic bridge balancing

ECD Electron Capture Detector

Maximum temperature: 450 °C

Detectivity: 7 fg/s Lindane

Linear dynamic range: 10⁴

Radioactive source: 63Ni - 15 mCi (555 Mbq)

TSD Thermionic Specific Detector

Maximum temperature: 450 °C

Detectivity:

- N: 100 fg N/sec (Azobenzene)
- P: 100 fg P/sec (Malathion)

Linear dynamic range:

- N: 10⁵
- P: 10⁴

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: 10³
- P: 10⁴
- N: 10²

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

CP-8410 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 μ L, 2 μ L, 5 μ L, 10 μ L, 100 μ L, 250 μ L
 for liquid injection
- SPME

CP-8400 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 μ L, 2 μ L, 5 μ L, 10 μ L, 100 μ L, 250 μ L
 for liquid injection
- SPME

* Optional



Combi PAL AutoSampler

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*

Sample heating and cooling

Optional modules: additional sample trays, micro-well plate holders, wash station, SPME fiber bake-out station, dilutor, barcode readers, and flowcell

* Optional

For research use only. Not for use in diagnostic procedures.



For laboratories requiring even greater sample throughput or more extensive sample preparation automation options, Bruker offers the CombiPAL system.



The CP-8400. Automatic access to two injection ports allows you to double your throughput. These can be installed in addition to gas or liquid Sample injection valves for optimum flexibility.

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