Agilent 6890N Network Gas Chromatograph

Specifications

Dimensions and Average Weight

- Height: 50 cm (19.7 in.)
- Width: 58 cm (22.8 in.) with EPC inlet and detectors; 68 cm (26.8 in.) with manual inlets or detectors or with optional gauges
- Depth: 54 cm (21.6 in.)
- Average weight: 49 kg (108 lb)

Environmental Conditions

- Ambient operating temperature: 15 °C to 35 °C
- Ambient operating humidity: 5 to 95 percent
- Storage extremes: -40 °C to 65 °C
- Line voltage requirements: ±5% of nominal

Safety and Regulatory Certifications

- Conforms to the following safety standards:
  - Canadian Standards Association (CSA): C22.2 No. 1010
  - CSA/Nationally Recognized Test Laboratory (NRTL): UL 3101
  - International Electrotechnical Commission (IEC): 61010-1
  - 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
- Designed and manufactured under a quality system registered to ISO 9001
- Declaration of Conformity available

Column Oven

- Dimensions: 28 × 31 × 16 cm
- Operating temperature: 4 °C above ambient to 450 °C
  - With LN_2 cryo: -80 °C to 450 °C
  - With CO_2 cryo: -55 °C to 450 °C
- Temperature setpoint resolution: 1 °C
- Maximum temperature ramp rate: 120 °C/min (see Table 1)
- Maximum run time: 999.99 min
- Temperature programming ramps/plateaus: 6/7
- Ambient rejection: <0.01 °C per 1 °C

Table 1. Typical 6890 GC Oven Ramp Rates

Temperature Range (°C)	120 Volt Oven Rates (°C/min)	Fast Ramp Rates* (°C/min) Dual-Channel	Fast Ramp Rates* (°C/min) 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

* Fast ramp rates require power >200 volts at >15 Amps.
** Requires G2646A oven insert accessory.

Agilent Technologies

- Column bleed compensation standard for two channels
- Typical oven cool-down is shown in Figure 1.

Heated Zones

- Independent heated zones, not including oven: six (two inlets, two detectors, and two auxiliary)
- Maximum operating temperatures for auxiliary zones: 400 °C

Inlets

- Maximum inlets installed: two
- Inlets available:
  - Packed purged injection port (PPIP)
  - Split/splitless capillary inlet (S/SL)
  - Temperature-programmable cool on-column (PCOC)
  - Programmable temperature vaporizer (PTV)
  - Volatiles inlet (VI)
- Accessory for solvent vapor exit (SVE) with PCOC

PPIP

- Electronic or manual pressure/flow control
- 400 °C maximum operating temperature
- Pressure setting range: 0-100 psi
- Total flow setting range: 0 to 100 mL/min
- Adapters included for 1/4-inch and 1/8-inch packed columns, and 0.530 mm capillary columns

S/SL

- Electronic or manual pressure/flow control
- 400 °C maximum operating temperature
- Pressure setting range: 0-100 psi (0-150 psi optional)

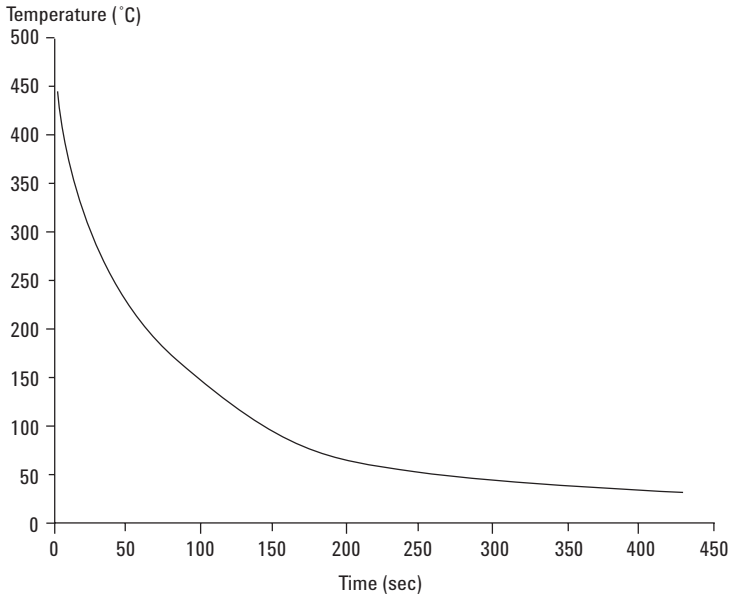

Figure 1. Typical oven cool-down rate, 6890N GC.

- Total flow setting range: 0 to 200 mL/min N_2 0 to 1,000 mL/min H_2 or He

PCOC

- Electronic pressure/flow control
- 450 °C maximum operating temperature
- Three temperature program rates or oven track mode
- Pressure setting range: 0-100 psi
- Total flow setting range: 0 to 100 mL/min

PTV

- Electronic pressure/flow control
- 450 °C maximum operating temperature
- Three temperature program ramps
- Temperature ramp rates 0.1 to 720 °C/min
- Pressure setting range: 0-100 psi
- Total flow setting range: 0 to 200 mL/min N_2 0 to 1,000 mL/min H_2 or He
- Cryogenic cooling fluid: LN_2 (down to -160 °C) or LCO_2 (down to -65 °C)
- Available with Gerstel septumless head or Merlin MicroSeal septum head

VI

- Electronic pressure/flow control
- 400 °C maximum operating temperature
- Pressure setting range: 0-100 psi
- Total flow setting range: 0 to 100 mL/min
- He or H_2 carrier gas
- Very low volume for pre-volatilized sample connection to capillary columns
- SilcoSteel® coating for high surface inertness

SVE

- Attaches to PCOC to permit large-volume injections
- Electronically controlled, inert, three-way valve allows solvent venting
- Includes software for method optimization
- Pre-assembled retention gaps/vent line/analytical column for easy installation

- Retention gap = 5 m, 530 µm
- Precolumn = 2 m, 250 µm
- Analytical column = HP-5 MS, 30 m, 250 µm

Detectors

All detectors include electronic pneumatics control and electronic on/off for all detector gases.

Detectors available:

- Flame ionization detector (FID)
- Thermal conductivity detector (TCD)
- Micro-electron capture detector (micro-ECD)
- Nitrogen-phosphorus detector (NPD)
- Single- or dual-wavelength flame photometric detectors (FPD)
- Atomic emission detector (AED)
- Mass selective detector (MSD)

FID

- Electronic pressure/flow control
- Available for packed/capillary columns or optimized for capillary columns
- 450 °C maximum operating temperature
- Flame-out detection
- MDL: <5 pg carbon/sec as propane using N_2 carrier and 0.29-mm id jet
- Linear dynamic range: <±10%, 10^7 with N_2 carrier and 0.29-mm id jet
- Data acquisition rate: up to 200 Hz

TCD

- Electronic pressure/flow control
- 400 °C maximum operating temperature
- MDL: <400 pg propane/mL He carrier (MDL may be affected by laboratory environment.)
- Linear dynamic range: 10^5 (±5%)

Micro-ECD

- Electronic pressure/flow control
- Equipped with hidden anode and high velocity flows for contamination resistance
- 400 °C maximum operating temperature
- Makeup gas types: argon/5% methane or nitrogen
- Radioactive source: <15 mCi ^{63}Ni
- MDL: <0.008 pg/sec lindane
- Dynamic range: $>5 \times 10^5$ with lindane
- Linear dynamic range: $>5 \times 10^4$ with lindane
- Data acquisition rate: up to 50 Hz

NPD

- Electronic pressure/flow control
- Available for packed/capillary columns or optimized for capillary columns
- 400 °C maximum operating temperature
- MDL: <0.4 pg N/sec, <0.2 pg P/sec with azobenzene/malathion mixture
- Selectivity: 25,000 to 1 gN/gC, 75,000 to 1 gP/gC with azobenzene/malathion mixture
- Dynamic range: $>10^5$ N, $>10^5$ P with azobenzene/malathion mixture
- Data acquisition rate: up to 200 Hz

FPD

- Electronic pressure/flow control
- Available in single- or dual-wavelength versions
- 250 °C maximum operating temperature
- MDL: <20 pg S/sec, <0.9 pg P/sec with dodecanethiol/tributyl-phosphate mixture
- Selectivity: 10^5 gS/gC, 10^6 gP/gC
- Dynamic range: $>10^3$ S, 10^4 P with dodecanethiol/tributyl-phosphate mixture

MSD

See MSD Specifications, "Agilent 5973 Mass Selective Detector," Publication (23) 5965-1366E.

Electronic Pneumatics Control (EPC)

- Up to 13 EPC channels for inlets, detectors, or auxiliary gases
- Pressure may be adjusted by increments of 0.01 psi
- Atmospheric pressure sensor to compensate for altitude and ambient temperature variation
- Pressure/flow programming ramps: up to three
- Detectors provided with EPC on all gas flows (carrier, makeup, and support gases)
- Inlets are available with EPC on all gas flows (carrier and split vent gases)
- Carrier and makeup gas settings selectable for He, H_2 , N_2 , and argon/methane
- Flow or pressure setpoints on each inlet or detector parameter screen
- EPC settings included in Agilent 6890 and Agilent ChemStation
- Automated carrier has constant flow, or linear velocity, when capillary column dimensions are entered into the 6890
- Split/splitless and PTV inlet; flow sensor for control and storage of split ratio

Inlet Modules

- Pressure sensors:
  - Accuracy: ±2% full scale
  - Repeatability: ±0.05 psi
  - Temperature coefficient : ±0.01 psi/°C
  - Drift: ±0.1 psi/6 months
- Flow sensors:
  - Accuracy: <±5% depending on carrier gas
  - Repeatability: ±0.35% of setpoint
  - Temperature coefficient : ±0.20 mL/min normalized temperature and pressure (NTP)* per °C for He or H_2 ; ±0.05 mL/min NTP per °C for N_2 or Ar/CH_4

* NTP = 25 °C and 1 atmosphere

Detector Modules

- Flow setpoint range (mL/min NTP):
  - FID/NPD makeup 0 to 100
  - FID air 0 to 800
  - FID hydrogen 0 to 100
  - NPD air 0 to 200
  - NPD hydrogen 0 to 30
  - TCD makeup 0 to 12
  - TCD reference 0 to 100
  - Micro-ECD makeup 0 to 150
  - FPD makeup 0 to 130
  - FPD air 0 to 250
  - FPD hydrogen 0 to 300
  - Accuracy: ±3 mL/min NTP or 7% of setpoint
  - Repeatability: ±0.35% of setpoint
  - Temperature coefficient: ±0.20 mL/min NTP per °C

ALS Interface Module

- 7683 ALS Interface standard. Provides power and communications for up to two 7683 automatic injectors, one automatic sampler tray, and one barcode reader.

Data Communications

- LAN
- RS-232-C (57,600 baud maximum is settable from keyboard)
- Two analog output channels (1-mV, 1-V, and 10-V output available) as standard
- Remote start/stop

Other Specifications

- Clock time programming
- Run deviation log (notes any changes to setpoints or expected values during a run, saved with run file in ChemStations)
- Control of eight external events (valves, on/off, or low-level contact)
  - Four internal 24-volt connections (up to 150 mA)
  - Two external 24-volt connections (up to 75 mA)
  - Two on/off contact closures (48 V, 250 mA max)
- Keyboard control of the Agilent automatic liquid sampler (ALS)
- Storage of nine methods
- Storage of five ALS sequences
- Binary-coded decimal input for a stream selection valve
- Context-sensitive online help

Maintenance and Support Services

- Service method sets temperature and flows for routine maintenance (such as septum or liner changes)
- Online service manual and parts diagrams
- Remote diagnostics
- Performance verification services
- Early Maintenance Feedback (EMF) for syringe, septa, inlet liner, and column maintenance

For More Information

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