

Technická specifikace

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Agilent 990 Micro





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1. Technická specifikace zadavatele

Konfigurace	Minimálně 2 analytické kolony pro separátní analýzu plynů – viz Kapitola 2
Řízení	Nezávislé ovládání každého analytického kanálu (kolony). viz Kapitola 2
	Nezávislé nastavení kolony, injektoru a detektoru pro každý analytický kanál. viz Kapitola 2
Vstřikovač	Objem vstřiku 1 až 10 µL, nastavitelná doba vstřiku. viz Kapitola 2
	Injektor je vyhříván do 100 °C nebo vyšší teploty. viz Kapitola 2
Pec pro ohřev kolony	Teplotní rozsah: od RT do 150 °C nebo vyšší teploty, izotermický ohřev. viz Kapitola 2
Detektor	Na bázi tepelné vodivosti (microTCD detektor). viz Kapitola 2
	Dvoukanálový (pro vzorek a referenční plyn). viz Kapitola 2
Detekční limity (LOD)	H2 – 2 ppm O2 – 2 ppm CO – 2 ppm CH4 – 2 ppm C2H4 – 2 ppm NH3 – 100 ppm H2S – 10 ppm Moznost analýzy ne jenom malých ale i vyšších koncentrací (bez nutnosti výměny kolony), až do 100%. Simultánní analýza všech plynů (O2, H2, CO, C2H4, CH4, H2S, NH3).

	viz Příložené dokumenty aplikace
Rychlost analýzy	Pro stanovení amoniaku do 1 minuty. Pro stanovení produktů transformaci CO2 do 2.5 minuty. Pro stanovení produktu štěpení vody do 2.5 minuty. viz Příložené dokumenty aplikace
Nosný plyn	He nebo Ar viz Kapitola 2
Maximální rozměry přístroje	35 cm (v) x 35 cm (š) x 35 cm (h). viz Kapitola 2
Hmotnost	Do 20 kg. viz Kapitola 2
Ovládací počítač kapacitně a výkonově nakonfigurovaný k dodané sestavě, vč. monitoru.	Ano. PC101HTBU HP PC i5-9500, 8GB RAM, 256GB SSD, monitor 1KS 24" IPS
Ovládací software (SW)	Funkce SW, jež plně integrovaná v dodaném SW, umožňující automatické zachování retenčních časů látek i při výměně kolony na principu přepočtu tlaku a průtok na inletu (bez nutnosti použití kalibračních směsí). Viz Kapitola 3
Aplikační podpora	Ano, včetně vývoje konkrétní metody pro potřeby měření. H400000 Aplikační podpora služba: Vývoj metody, aplikace (1 den)

Agilent 990 Micro GC

Introduction

The Agilent 990 Micro GC system is the next generation of Agilent Micro GCs, incorporating state-of-the-art technology also used in industry-leading bench GCs. The 990 takes flexibility, usability, and servicability to a next level.

The 990 makes a difference compared to its predecessors as well as its competition by:

Unmatched speed of analysis. Clever selection of short, narrow bore, and high-speed columns in combination with a backflush option provides the fastest cycle times in the market.

Enhanced flexibility. The 990 takes modularity to a next level. Changing GC channels has never been easier. You are up and running in less than 10 minutes. With 14 column chemistries to choose from, there is always a perfect match to any application.

Sensitivity in gas analysis. Whether you are interested in gas composition, odorants, air quality, mine safety, or mud logging, the 990 is your number one choice, providing lab-quality results with unmatched repeatability and sensitivity down to 0.5 ppm.

Sample handling accessories. A wide variety of sample handling accessories meets the needs of your in-lab or field analysis, including:

- A full range of Stream Selector Valves for easy switching between samples and calibration or verification gas
- Genie filters to ensure that no droplets nor particles enter the injector
- A touchscreen for quick status updates
- Optional sample pressure-reducing equipment

Table 1. Product dimensions and weight.

Instrument	Height		Width		Length		Weight*	
	in	cm	in	cm	in	cm	lb	kg
Micro GC	11.13	28.28	5.71	14.50	12.97	32.94	16.0	7.3
Micro GC with Channel Extension Cabinet Installed	11.13	28.28	11.83	30.04	12.97	32.94	34.5	15.6
Power Supply	1.8	4.6	3.3	8.5	8.3	21.0	2.4	1.1
Mobile Micro GC Quad Channel	10.6	26.9	16.0	40.6	21.2	53.8	82.67	37.5

* The weight may vary due to different analytical configurations.

Product features

Configuration

- One to four analytical GC columns

Control

- Independent control of each analytical channel
- Pneumatics, including proportional column pressure programming
- Independent column, injector, and detector settings

Injector

- Micro-machined injector with no moving parts
- Injection volume 1 to 10 μL , software selectable injection time
- Heated injector, up to 110 °C, including heated sample transfer line
- Optional backflush capability

Column oven

Temperature range: up to 180 °C, isothermal

Available column chemistries:

- CP-Sil 5 CB
- CP-Sil 5 CB for NGA
- CP-Sil 13 CB for TBM
- CP-Sil 19 CB
- CP-Sil 19 CB for THT
- CP-WAX 52 CB
- Molesieve 5A
- Aluminum oxide
- PoraPLOT Q
- PoraPLOT U
- Hayesep A
- COX
- SilicaPLOT
- Proprietary MeS in NGA

Detector

- Micro-machined thermal conductivity detector (TCD)
- Dual-channel (sample and reference flow)
- Internal volume 200 nL per channel
- Four filaments

Detection limits, TCD

Detection limits are typical for selected components, provided that the proper column length and chromatographic conditions are used.

- 0.5 ppm for WCOT capillary columns (CP-Sil 5 CB, CP-Sil 13 CB, CP-Sil 19 CB, and CP-WAX 52 CB) in 4 to 10 m length
- 2 ppm for PLOT columns (Molsieve 5A, PoraPLOT Q, PoraPLOT U, Aluminum oxide, SilicaPLOT, MeS)
- 10 ppm for Micropacked columns (Hayesep)
- 10 ppm for Micropacked columns (Carboxene)

Operating range, TCD

- Concentration: 0.5 ppm to 100 % level
- Linear dynamic range: 10^5 (0.5 ppm to 5%) for example, propane on a CP-Sil 5 CB channel
- For full range (low ppm to 100%), multilevel calibration is advised

Repeatability

<0.5 % RSD for propane at 1 mol % level for WCOT columns at constant temperature and pressure

Carrier gas

- He, H₂, N₂, or Ar, 550 $\pm$ 10 kPa (80 $\pm$ 1.5 psi) input
- Every channel can be operated with its own carrier gas.
- Inlet connection, 3.2 mm (1/8 in) stainless steel compression fitting

Sampling

- Sample inlet: 1.6 mm (1/16 in) stainless steel Valco fitting with replaceable 5 μm stainless steel filter
- Sample conditions: noncondensing gas of 0 to 110 °C
- Maximum sample inlet pressure: 100 kPa (14.5 psi)
- Software selectable sample pump or continuous flow
- Relay control for stream selection (extension boards required)
- Support of up to three multi position stream selection valves
- Optional manual sample inlet

Communications

See Table 2.

Data handling software

The 990 Micro GC is controlled by Agilent OpenLab CDS 2.x, Agilent OpenLab CDS EZChrom edition, and Agilent OpenLab CDS ChemStation edition.

- Natural gas physical properties calculations such as: calorific value, relative density, wobbe-index in accordance with ISO 6976, GPA 2172, and ASTM D3588
- OpenLab intelligent reporting provides custom reporting and calculations

Environmental conditions

- Ambient operating temperature: 0 to 50 °C
- Ambient operating humidity: 5 to 95% RH (noncondensing)
- Storage extremes: -40 to 70 °C
- Altitude: Up to 2,000 m above sea level

Port	Connection	Agilent 990 Micro GC	Agilent 990 Mobile Micro GC	Agilent 990-PRO Micro GC
LAN	Ethernet	Interface with PC	Interface with PC	Interface with PC
COM1	RS232	VICI Valve	VICI Valve	VICI Valve, Modbus ¹
COM2 and COM3	RS232 RS422 RS485 2-wire RS485 4-wire	Not available	Not available	Modbus ^{1,5}
Digital and Analog I/O		Digital I/O ² Ready in – ready out Start in – start out	Digital I/O ² Ready in – ready out Start in – start out	Digital Analog I/O ² Ready in – ready out Start in – start out Extension boards ^{1,3}
HDMI	HDMI	LCD ³	LCD ^{3,4}	LCD ³
USB	USB	VICI Valve ⁶ WIFI interface	VICI Valve ⁶ WIFI interface USB storage License dongle	VICI Valve ⁶ WIFI interface USB storage License dongle
CAN	CAN	Channel Extension Cabinet connection		Channel Extension Cabinet connection

1. Requires a PRO license.

2. Y cable is available (part number G3588-60825).

3. Optional accessory.

4. This port is hidden inside the case, only for internal connection.

5. The plastic cover on the side of top assembly must be removed.

6. Requires a USB-to-RS232 converter.

990 Micro GC power requirements

- Power source: 100 to 240 VAC, 50/60 Hz
- GC Input: 12 VDC, 150 W max
- Must only use the power supply provided with your Micro GC

Safety and regulatory certification

- Name: 990 Micro GC
- Regulatory Model Number: RMN3588A

Conforms to the following 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

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

- CISPR 11/EN 55011: Group 1, Class A
- IEC/EN 61326-1
- AS/NZS CISPR11
- 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.
- This product complies with the EU RoHS Directive 2011/65/EU, and conforms to EN 50581.

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3. Agilent Retention Time Locking

Popis funkce na oficiálních stránkách výrobce:

<https://www.agilent.com/en/product/gas-chromatography/retention-time-locking>

Funkce je integrovanou součástí SW OpenLab CDS Workstation

M8413AA	OpenLab CDS Workstation Software	1KS
M8413AA#002	GC Instrument Connection	1KS