Data Sheet

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Agilent 990-PRO Micro GC for Process Monitoring

Introduction

Informed decision making requires continuous, fast, and reliable analytical results. The Agilent 990-PRO Micro GC gives you a fast, accurate answer to control your processes. The 990-PRO serves many different industrial gas analysis applications ranging from natural gas calorific value, composition, odorants, refinery gas composition, and trace contaminants down to low ppm levels in industrial gases. Configurations are available with up to four independently controlled GC channels. the 990-PRO meets the most demanding and complex samples in record speed.

The Agilent 990-PRO Micro GC features:

- **Repeatable, fast, and accurate monitoring.** With cycle times measured in seconds to minutes, you get high speed continuous monitoring, laboratory instrument quality results.
- **On-board data handling.** No local operator is needed as the 990-PRO monitors your process 24/7, and communicates the analysis results directly to your process control, ensuring optimal conditions or follow up actions.
- **On-board intelligence.** Ensures the complete operation from GC control, data collection, data integration, and results transfer through industrial communication protocols such as 4-20mA, Modbus, FTP server, and so forth.
- **Autonomous operation.** During operation, no external computer is needed to control the 990-PRO Micro GC.
- **Ensure safety.** Requiring only a small amount of sample gas, and operation without flammable gases enhances the operational safety often required in online or process analysis.

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
- Aluminumoxide
- 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 limit:*

- 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)

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

Operating range, TCD

- Concentration: 0.5 ppm to 100% level
- Linear dynamic range: 10^5 (0.5 ppm to 5% for 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, H_2, N_2, or Ar, 550 ±10 kPa (80 ±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 multiposition stream selection valves
- Optional manual sample inlet

Communication

See Table 2.

Data communication includes

- LAN (TCP/IP)
- RS-232 and RS-485
- Control of external devices
  - Up to 38 external relays
  - Up to 25 analog out (4 to 20 mA)
- Input from external devices
  - Up to 16 digital inputs
  - Up to six analog inputs (0 to 10 V)

Protocols

- Modbus serial and Modbus
- TCP/IP, configured as slave FTP for transferring results to an FTP server
- Webserver for monitoring sample results on a standard Internet browser PROstation

Table 2. Communications.

Port	Connection	Agilent 990 Micro GC	Agilent 990 Moile 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&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 the top assembly must be removed. 6. Requires a USB-to-RS232 converter.

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 denstity, 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

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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Printed in the USA, October 17, 2019
5994-1271EN

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