

Specifications

Table 2 Performance specifications

Type	Specification	Comments
Hydraulic system	Two dual pistons in series pumps with proprietary servo-controlled variable stroke design, power transmission by ball screws, smooth motion control of pistons for active damping.	
Settable flow range	Setpoints 0.001—5 ml/min, in 0.001 ml/min increments.	Executed in 300 pl/step increments
Flow precision	≤0.07 % RSD or 0.005 min SD, whatever is greater (0.2—5.0 ml/min).	Based on retention time at constant room temperature.
Flow accuracy	±1 % or 10 µl/min, whatever is greater.	Pumping degassed H ₂ O at 10 MPa (100 bar)
Pressure operating range	Operating range up to 120 MPa (1200 bar), up to 2 ml/min, 80 MPa (800 bar) at 5 ml/min.	
Pressure pulsation	<1 % amplitude or < 0.5 MPa (5 bar), whatever is greater.	At 1 ml/min water
Compressibility compensation	Automatic, pre-defined, based on mobile phase selection.	
Gradient formation	High pressure binary mixing.	
Delay volume	Jet Weaver V35: <45 µl Jet Weaver V100: <75 µl	JetWeaver generally recommended. For applications requiring lowest delay volumes, JetWeaver can be removed out of the flow path. Delay volume is then solely determined by the volume of the connection capillary.
Composition range	Settable range: 0 – 100 %	Recommended range: 1 – 99 % or 5 µl/min per channel, whatever is greater.

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Composition precision	<0.15 % RSD, or 0.01 min SD, whatever is greater.	0.2 —5.0 ml/min; based on retention time at constant room temperature
Composition accuracy	±0.35 % absolute (5 – 95 %, 0.2 – 5.0 ml/min)	Water/caffeine tracer
Solvent selection valve	Default	Standard part of the pump
Integrated degassing unit	Number of channels: 2 Internal volume per channel: 1.5 mL	
Control	Agilent ChemStation for LC (B.04.02 or above) EZChrom Elite (3.3.2 SP1 or above) OpenLAB (3.3.2 SP3) Masshunter (B.02.01 SP1 or above)	
Local control	Agilent Instant Pilot (G4208A) (B.02.08 or above)	
Communications	Controller-area network (CAN), RS232C, APG remote: ready, start, stop and shutdown signals, LAN	
Safety and maintenance	Extensive diagnostics, error detection and display (through Agilent Lab Advisor), leak detection, safe leak handling, leak output signal for shutdown of the pumping system. Low voltage in major maintenance areas.	
GLP features	Early maintenance feedback (EMF) for continuous tracking of instrument usage in terms of purge valve switches and volume of pumped mobile phase with pre-defined and user settable limits and feedback messages. Electronic records of maintenance and errors.	
Housing	All materials recyclable.	

Performance Specifications

Table 2 Performance specifications G4226A

Type	Specification	Comment
Injection range	0.1 – 20 µL in 0.1 µL increments 0.1 – 40 µL in 0.1 µL increments if 40 µL loop is installed 0.1 – 120 µL in 0.1 µL increments with 1290 Infinity large volume injection kit (hardware modification required) pressure range up to 1200 bar 0.1 – 100 µL in 0.1 µL increments with 100 µL upgrade kit (G4214A) (hardware modification required) up to 600 bar	
Precision	Typically <0.25 % RSD from 5 – 20 µL, Typically <0.5 % RSD from 2 – 5 µL volume, Typically <0.7 % RSD from 1 – 2 µL volume.	Measured with injections of benzylalcohol.
Pressure range	Up to 1200 bar Up to 600 bar	with 1290 Infinity large volume injection kit installed with 100 µL upgrade kit (G4214A) installed
Sample viscosity range	0.2 – 5 cp	
Sample capacity	Capacity 2 x well plates (MTP) + 10 x 2 mL vials, 108 x 2 mL vials in 2 x 54 vial plate plus 10 additional 2 mL vials, 30 x 6 mL vials in 2 x 15 vial plate, 100 Micro vial tray, plus 10 additional 2 mL vials, 54 Eppendorf tubes (0.5/1.5/2 mL) in 2 x 27 Eppendorf tube plate.	Also compatible with the Agilent 1200 Series sample capacity extension for further expansion of the sample capacity.

Table 2 Performance specifications G4226A

Type	Specification	Comment
Injection cycle time	Typically <21 s using following standard conditions: Default draw speed: 100 µL/min Default eject speed: 100 µL/min Injection volume: 5 µL	
Carry Over	Typically <0.004 %	Using the following conditions: <ul style="list-style-type: none"> • Column: Agilent ZORBAX SB-C18, 2.1 x 50 mm 1.8 µm (827700-902) • Mobile Phase: <ul style="list-style-type: none"> • A: 0.1 % TFA in water • B: 0.1 % TFA in Acetonitrile • Isocratic : % B=35 % • Flow rate: 0.5 mL/min • Temperature: 25 °C • Wavelength: 257 nm • Sample: 1200 ng/µL Chlorhexidine for UV, 240 ng/µL Chlorhexidine for MS (dissolved with mobile phase A), 1 µL injected and measured both on Agilent 6410 QQQ and G4212A DAD • Wash solution: H₂O with 0.1 % TFA (5 s)
Control and data evaluation	Agilent ChemStation for LC EZChrom Elite Mass hunter Lab Advisor	B.04.02 or above 3.3.3 or above B.02.01 sp1 or above B.01.03 or above
Local Control	Agilent Instant Pilot (G4208A)	B.02.08 or above
Communications	Controller-area network (CAN), RS-232C, APG Remote: ready, start, stop and shut-down signals, optional four external contact closures and BCD vial number output.	

2 Site Requirements and Specifications

Performance Specifications

Table 2 Performance specifications G4226A

Type	Specification	Comment
Safety and maintenance	Extensive diagnostics can be done with the help of the Control Module and Agilent LabAdvisor Diagnostic Software, error detection and display (through Instant Pilot and Diagnostic Software), leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in major maintenance areas.	
GLP features	Early maintenance feedback (EMF) for continuous tracking of instrument usage with user-settable limits and feedback messages. Electronic records of maintenance and errors.	
Housing	All materials recyclable.	
Metering device	Metering pump in high pressure flow path	

Performance Specifications

Table 2 Performance specifications Agilent 1290 Infinity Thermostat

Type	Specification
Temperature range	Settable from 4 °C to 40 °C in 1 ° increments
Temperature accuracy at ambient temperatures < 25 °C and humidity < 50 %	3 °C to 8 °C at a setpoint of 4 °C*
Temperature accuracy at ambient temperatures <30 °C and humidity <60 %	3 °C to 9 °C at a setpoint of 4 °C*

* Measurement conditions:

G1329B:

with 100-Vial Tray in vial location 2,10,92 and 100 vials filled with water

G1367A/G1367B/G1367C/G1377A/G1367E/G5667A/G2258A/G4226A:

For vials: Using the Thermostatable Tray (G1329-60011) or 100 Micro-Vial (G4226-60021), both loaded with 100 vials. Temperature is measured in vial locations 1,10,23,25,45,75,91 and 100 (filled with 1 mL of water)

For well plates: Standard Tray (G2258-60011) for two Well Plates loaded with two Agilent 96 Well Plate (5042-1386)

Performance Specifications

Table 4 Performance Specifications Thermostatted Column Compartment

Type	Specification	Comments
Temperature range	10 degrees below ambient to 100 °C up to 80 °C: flow rates up to 5 ml/min up to 100 °C: flow rates up to 2.5 ml/min	
Temperature stability	± 0.05 °C	
Temperature accuracy	± 0.8 °C ± 0.5 °C	With calibration
Column capacity	Three 30 cm	
Warm-up/cool-down time	5 min from ambient to 40 °C 10 min from 40 – 20 °C	
Dead volume	1.6 µl low dispersion heat exchanger 3 µl left heat exchanger 6 µl right heat exchanger	i.d. 0.12 mm (capillary kit available) i.d. 0.17 mm (standard)
Communications	Controller-area network (CAN), RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN via other modules	
Safety and maintenance	Extensive support for troubleshooting and maintenance is provided by the Instant Pilot, Agilent Lab Advisor, and the Chromatography Data System. Safety-related features are leak detection, safe leak handling, leak output signal for shutdown of pumping system, and low voltages in major maintenance areas.	
GLP features	Column-identification module for GLP documentation of column type	
Housing	All materials recyclable.	

NOTE

All specifications are valid for distilled water at ambient temperature (25 °C), set point at 40 °C and a flow range from 0.2–5 ml/min.

Performance Specifications

Specifications

Performance Specifications G4212A

Table 3 Performance Specifications G4212A

Type	Specification	Comments
Detection type	1024-element photodiode array	
Light source	Deuterium lamp	Equipped with RFID tag that holds lamp typical information.
Wavelength range	190 – 640 nm	
Short term noise (ASTM) Single and Multi-Wavelength	< $\pm 3 \times 10^{-6}$ AU at 230 nm/4 nm, with 10 mm Max-Light cartridge cell Typically < $\pm 0.6 \times 10^{-6}$ AU/cm at 230 nm/4 nm, with 60 mm Max-Light cartridge cell	see " <i>Specification Conditions</i> " below
Drift	< 0.5×10^{-3} AU/hr at 230 nm	see " <i>Specification Conditions</i> " below
Linear absorbance range	> 2.0 AU (5 %) at 265 nm	see " <i>Specification Conditions</i> " below
Wavelength accuracy	± 1 nm	After recalibration with deuterium lines
Wavelength bunching	2 – 400 nm	Programmable in steps of 1 nm
Slit width	1, 2, 4, 8 nm	Programmable slit
Diode width	~ 0.5 nm	
Signal data rate	up to 160 Hz	
Spectra Data rate	up to 160 Hz	

Table 3 Performance Specifications G4212A

Type	Specification	Comments
Flow cells	Max-Light Cartridge Cell (10 mm, V(σ) 1.0 μ L) (G4212-60008), Max-Light Cartridge Cell (60 mm, V(σ) 4.0 μ L) (G4212-60007), HDR Max-Light Cartridge Cell (3.7 mm, V(σ) 0.4 μ L) (G4212-60032) ULD Max-Light Cartridge Cell (10 mm, V(σ) 0.6 μ L) (G4212-60038) Max-Light Cartridge Cell Bio-inert (10 mm, V(σ) 1.0 μ L) (G5615-60018) Max-Light Cartridge Cell Bio-inert (60 mm, V(σ) 4.0 μ L) (G5615-60017) Max-Light Cartridge Test Cell (G4212-60011)	70 bar (1015 psi) Maximum Operating Pressure (MOP) ¹ 150 bar (2175 psi) Maximum Incidental Pressure (MIP) ² pH range 1.0—12.5 (solvent dependent) available as standard and bio-inert versions. Cartridge type, equipped with RFID tags that holds cell typical information.
Local Control	Agilent Instant Pilot (G4208A)	B.02.11 or above
Test and troubleshooting software	Agilent LabAdvisor	B.01.03 SP4 or above
Analog outputs	Recorder/integrator: 100 mV or 1 V, output range 0.001 – 2 AU, one output	
Communications	Controller-area network (CAN), RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN	
Safety and maintenance	Extensive support for troubleshooting and maintenance is provided by the Instant Pilot, Agilent Lab Advisor, and the Chromatography Data System. Safety-related features are leak detection, safe leak handling, leak output signal for shutdown of pumping system, and low voltages in major maintenance areas.	
GLP features	Early maintenance feedback (EMF) for continuous tracking of instrument usage in terms of lamp burn time with user-settable limits and feedback messages. Electronic records of maintenance and errors. Verification of wavelength accuracy with the emission lines of the deuterium lamp.	
Housing	All materials recyclable.	

¹ Maximum Operating Pressure (MOP): The maximum pressure at which the system can operate continuously under normal conditions.

² Maximum Incidental Pressure (MIP): The maximum pressure which the system can experience during a short time.