

## Physical Specifications

**Table 2** Physical Specifications (1100 Series modules)

Type	Specification	Comments
Weight	11.0 kg (25.0 lbs) 11.0 kg (25.0 lbs) 10.2 kg (22.5 lbs) 17.0 kg (38.0 lbs)	G1310A ISO Pump G1314A VWD G1316A TCC G1362A RID
Dimensions (width × depth × height)	345 × 435 × 140 mm (13.5 × 17 × 5.5 inches) 345 × 435 × 180 mm (13.5 × 17 × 7.0 inches) 410 × 435 × 140 mm (16.1 × 17 × 5.5 inches)	G1310A, G1314A, G1321A  G1362A  G1316A
Line Voltage	100 – 120 or 220 – 240 VAC, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	320 VA maximum 160 VA maximum	G1362A
Ambient operating temperature	0 – 55 °C (32 – 131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-4 – 158 °F)	
Humidity	<95 %, at 25 – 40 °C (77 – 104 °F)	Non-condensing
Operating altitude	Up to 2000 m (6500 ft.)	
Non-operating altitude	Up to 4600 m (14950 ft.)	For storing the instrument
Safety standards: IEC, CSA, UL, EN	Installation Category II, Pollution Degree 2	

For your PC specifications refer to its documentation.

Installing the Pump  
**Site Requirements**

**Table 1**                      **Physical Specifications**

<b>Type</b>	<b>Specification</b>	<b>Comments</b>
Weight	11 kg (25 lbs)	
Dimensions (height × weight × depth)	140 × 345 × 435 mm (5.5 × 13.5 × 17 inches)	
Line voltage	100–120 or 220–240 VAC, ± 10%	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5%	
Power consumption	220 VA	Maximum
Ambient operating temperature	4–55 °C (41–131 °F)	
Ambient non-operating temperature	-40–70 °C (-4–158 °F)	
Humidity	< 95%, at 25–40 °C (77–104 °F)	Non-condensing
Operating Altitude	Up to 2000 m (6500 ft)	
Non-operating altitude	Up to 4600 m (14950 ft)	For storing the quaternary pump
Safety standards: IEC, CSA, UL	Installation Category II, Pollution Degree 2	

**Setting the 8-bit Configuration Switch**

In the non-volatile memory the parameters are kept, regardless of whether you turn the instrument off and on again. They will be kept until the same set of parameters is subsequently changed and power is reset. All other previously stored configuration settings will still remain in the non-volatile memory.

In this way you can store more than one set of parameters using the same 8-bit configuration switch twice, for example, for both GPIB and RS-232C.

**GPIB Default Addresses**

If you just want to change the GPIB address and need a detailed procedure, refer to the *Installing Your ChemStation System* handbook. Default GPIB address is set to the following addresses::

**Table 36****Default Addresses for Agilent Series 1100 Modules**

<b>Module</b>	<b>Address</b>	<b>Binary Address</b>
Pump	22	00010110
FLD	23	00010111
VWD	24	00011000
Agilent 8453A	25	00011101
DAD/MWD	26	00011010
Column compartment	27	00011011
Autosampler	28	00011100
RID	29	00011101

where 0 means that the switch is down and 1 means that the switch is up.

**Communication Settings for RS-232C Communication**

The communication protocol used in the instrument supports only hardware handshake (CTS/RTR).

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## Performance Specifications

Table 44

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**Performance Specification Agilent 1100 Series Quaternary Pump**


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Type	Specification
Hydraulic system	Dual plunger in series pump with proprietary servo-controlled variable stroke drive, floating plungers and active inlet valve
Setable flow range	0.001 – 10 ml/min, in 0.001 ml/min increments
Flow range	0.2 – 10.0 ml/min
Flow precision	< 0.3 % RSD (typically 0.15 %), based on retention time, at 1 ml/min
Pressure	Operating range 0 – 40 MPa (0 – 400 bar, 0 – 5880 psi) up to 5 ml/min Operating range 0 – 20 MPa (0 – 200 bar, 0 – 2950 psi) up to 10 ml/min
Pressure pulsation	< 2 % amplitude (typically < 1 %), at 1 ml/min isopropanol, at all pressures > 1 MPa (10bar)
Compressibility compensation	User-selectable, based on mobile phase compressibility
Recommended pH range	1.0 – 12.5, solvents with pH > 2.3 should not contain acids which attack stainless steel
Gradient formation	Low pressure quaternary mixing/gradient capability using proprietary high-speed proportioning valve Delay volume 800 – 1100 µl, dependent on back pressure
Composition Range	0 – 95 % or 5 – 100 %, user selectable
Composition Precision	< 0.2 % SD, at 0.2 and 1 ml/min
Control and data evaluation	Agilent ChemStation for LC

Specifications

**Performance Specifications**

**Table 44**

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**Performance Specification Agilent 1100 Series Quaternary Pump**

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Analog output	For pressure monitoring, 2 mV/bar, one output
Communications	Controller-area network (CAN), GPIB, RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN optional
Safety and maintenance	Extensive diagnostics, error detection and display (through control module and Agilent ChemStation), 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 in terms of seal wear and volume of pumped mobile phase with user-settable limits and feedback messages. Electronic records of maintenance and errors.
Housing	All materials recyclable.

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## Environment

Your autosampler will work within specifications at ambient temperatures and relative humidity as described in Table 1.

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### CAUTION

Do not store, ship or use your autosampler under conditions where temperature fluctuations may cause condensation within the autosampler. Condensation will damage the system electronics. If your autosampler was shipped in cold weather, leave it in its box, and allow it to warm up slowly to room temperature to avoid condensation.

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**Table 1 Physical Specifications - Autosampler (G1313A / G1329A / G1389A / G2260A)**

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Type	Specification	Comments
Weight	14.2 kg (31.3 lbs)	
Dimensions (height × width × depth)	200 × 345 × 435 mm (8 × 13.5 × 17 inches)	
Line voltage	100 – 120 or 220 – 240 VAC, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption (apparent power)	300 VA	Maximum
Power consumption (active power)	200 W	Maximum
Ambient operating temperature	4 – 55 °C (41 – 131 °F)	see WARNING on page 16
Ambient non-operating temperature	-40 to 70 °C (-4 to 158 °F)	
Humidity	< 95 %, at 25 – 40 °C (77 – 104 °F)	Non-condensing
Operating Altitude	Up to 2000 m (6500 ft)	
Non-operating altitude	Up to 4600 m (14950 ft)	For storing the autosampler
Safety standards: IEC, CSA, UL	Installation Category II, Pollution Degree 2	

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### WARNING

**Using the autosampler at environmental temperatures higher than 50 °C (122 °F) may cause the rear panel to become hot.**

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## Performance Specifications

**Table 62**

**Performance Specifications Agilent 1100 Series Autosampler (G1313A) and Thermostatted Autosampler (G1329A). Valid when standard 100 µl metering head installed.**

Type	Specification
GLP features	Early maintenance feedback (EMF), electronic records of maintenance and errors
Communications	Controller-area network (CAN). GPIB (IEEE-448), RS232C, APG-remote standard, optional four external contact closures and BCD vial number output
Safety features	Leak detection and safe leak handling, low voltages in maintenance areas, error detection and display
Injection range	0.1 – 100 µl in 0.1 µl increments Up to 1500 µl with multiple draw (hardware modification required)
Replicate injections	1 – 99 from one vial
Precision	Typically < 0.5 % RSD of peak areas from 5 – 100 µl, Typically < 1 % RSD of peak areas from 1 – 5 µl
Minimum sample volume	1 µl from 5 µl sample in 100 µl microvial, or 1 µl from 10 µl sample in 300 µl microvial
Carryover	Typically < 0.1 %, < 0.05 % with external needle cleaning
Sample viscosity range	0.2 – 50 cp
Replicate injections per vial	1 – 99
Sample capacity	100 × 2-ml vials in 1 tray 40 × 2-ml vials in ½ tray 15 × 6-ml vials in ½ tray (Agilent vials only)
Injection cycle time	Typically 50 s depending on draw speed and injection volume

**Table 63**

**Performance Specifications Agilent 1100 Series Autosampler (G1313A) and  
Thermostatted Autosampler (G1329A).  
Valid when standard 900 µl metering head installed.**

<b>Type</b>	<b>Specification</b>
Pressure	Operating range 0-20 MPa (0-200 bar, 0-2950 psi)
GLP features	Early maintenance feedback (EMF), electronic records of maintenance and errors
Communications	Controller-area network (CAN). GPIB (IEEE-448), RS232C, APG-remote standard, optional four external contact closures and BCD vial number output
Safety features	Leak detection and safe leak handling, low voltages in maintenance areas, error detection and display
Injection range	0.1 – 900 µl in 0.1 µl increments (recommended 1 µl increments) Up to 1800 µl with multiple draw (hardware modification required)
Replicate injections	1 – 99 from one vial
Precision	Typically < 0.5 % RSD of peak areas from 5 – 2000 µl, Typically < 1 % RSD of peak areas from 2000 – 5000 µl, Typically < 3 % RSD of peak areas from 1 – 5 µl
Minimum sample volume	1 µl from 5 µl sample in 100 µl microvial, or 1 µl from 10 µl sample in 300 µl microvial
Carryover	Typically < 0.1 %, < 0.05 % with external needle cleaning
Sample viscosity range	0.2 – 50 cp
Sample capacity	100 × 2-ml vials in 1 tray 40 × 2-ml vials in ½ tray 15 × 6-ml vials in ½ tray (Agilent vials only)
Injection cycle time	Typically 50 s, depending on draw speed and injection volume

**Table 64**

**Performance Specifications Agilent 1100 Series Thermostatted Micro Autosampler (G1389A)**

<b>Type</b>	<b>Specification</b>
Sample capacity	100 x 2 ml vials in 1 tray. Microvials (100 or 300 µl) with sleeves (reduced cooling performance with microvials)
Settable injection volume	0.01 to 8 µl with small loop capillary 0.01 to 40 µl with extended loop capillary
Precision	Typically < 0.5 % RSD from 5 to 40 µl Typically < 1 % RSD from 1 to 5 µl Typically < 3 % RSD from 0.2 to 1 µl
Minimum sample volume	1 µl from 5 µl sample in 100 µl microvial, or 1 µl from 10 µl sample in 300 µl microvials
Carryover	Typically < 0.1 % without automated needle wash Typically < 0.05 % with external needle cleaning and 1 µl injection volume
Sample viscosity range	0.2 - 5 cp
Recommended pH-range	1.0 - 8.5 solvent with pH < 2.3 should not contain acids which attack stainless steel. Upper pH range is limited by fused silica capillaries
Material in contact with solvent	Stainless steel, sapphire, PTFE, PEEK, fused silica, Vespel
GLP features	Early maintenance feedback (EMF), electronic records of maintenance and errors
Communications	Controller-area network (CAN). GPIB (IEEE-448), RS232C, APG-remote standard, optional four external contact closures and BCD vial number output
Safety features	Leak detection and safe leak handling, low voltages in maintenance areas, error detection and display
Housing	All material recyclable

## Specifications

### Performance Specifications

**Table 65**

#### **Performance Specifications Agilent 1100 Series Preparative Autosampler (G2260A)**

<b>Type</b>	<b>Specification</b>
Pressure	Operating range 0-40 MPa (0-400 bar, 0-5800psi)
GLP features	Early maintenance feedback (EMF), electronic records of maintenance and errors
Communications	Controller-area network (CAN). GPIB (IEEE-448), RS232C, APG-remote standard, optional four external contact closures and BCD vial number output
Safety features	Leak detection and safe leak handling, low voltages in maintenance areas, error detection and display
Injection range	0.1 – 900 µl in 0.1 µl increments (recommended 1 µl increments)  Up to 1800 µl with multiple draw (hardware modification required)  Up to 5000 µl with multiple draw (hardware modification required)
Replicate injections	1 – 99 from one vial
Precision	Typically < 0.5 % RSD of peak areas from 5 – 2000 µl, Typically < 1 % RSD of peak areas from 2000 – 5000 µl, Typically < 3 % RSD of peak areas from 1 – 5 µl
Minimum sample volume	1 µl from 5 µl sample in 100 µl microvial, or 1 µl from 10 µl sample in 300 µl microvial
Sample viscosity range	0.2 – 50 cp
Sample capacity	100 × 2-ml vials in 1 tray  15 × 6-ml vials in ½ tray (Agilent vials only)
Injection cycle time	Typically 50 s, depending on draw speed and injection volume

## Performance Specifications Agilent 1100 Series DAD

Reference conditions for data of [Table 92](#):

- cell path length 10 mm, response time 2 s,
- flow 1 ml/min LC-grade Methanol,
- slit width 4 nm.

Linearity measured with caffeine at 265 nm.

**Table 92** Performance Specifications Agilent 1100 Series Diode Array Detector

Type	Specification	Comments
Detection type	1024-element photodiode array	
Light source	Deuterium and tungsten lamps	
Wavelength range	190 – 950 nm	
Short term noise (ASTM)* Single and Multi-Wavelength	Typically $\pm 3 \times 10^{-5}$ AU at 254 nm at flow rates <100 $\mu$ l/min	For the 500 nl flow cell the noise is 2-3 times higher than with standard flow cell
Drift	$2 \times 10^{-3}$ AU/hr at 254 nm	
Linear absorbance range	> 2 AU (upper limit)	
Wavelength accuracy	$\pm 1$ nm	Self-calibration with deuterium lines, verification with holmium oxide filter
Wavelength bunching	1 – 400 nm	Programmable in steps of 1 nm
Slit width	1, 2, 4, 8, 16 nm	Programmable slit
Diode width	< 1 nm	
Flow cell	500 nanoliter: 0.5 $\mu$ l volume, 10 mm cell path length and 50 bar (725 psi) pressure maximum	

**Table 92** Performance Specifications Agilent 1100 Series Diode Array Detector

Type	Specification	Comments
Maximum pressure	50 bar	
Control and data evaluation	Agilent ChemStation for LC	
Analog outputs	Recorder/integrator: 100 mV or 1 V, output range 0.001 – 2 AU, two outputs	
Communications	Controller-area network (CAN), GPIB, RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN optional	
Safety and maintenance	Extensive diagnostics, error detection and display (through control module and ChemStation), 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 in terms of lamp burn time with user-settable limits and feedback messages. Electronic records of maintenance and errors. Verification of wavelength accuracy with built-in holmium oxide filter.	
Housing	All materials recyclable.	

\* ASTM: "Standard Practice for Variable Wavelength Photometric Detectors Used in Liquid Chromatography".

For specification on the 500 nl flow cell refer to [Table 85](#) on page 153.

## Performance Specifications Agilent 1100 Thermostatted Column Compartment.

All specifications in [Table 91](#) 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.

For flow rates below 100 µl/min the column bracket must be installed

**Table 91** Performance Specifications Agilent 1100 Series Thermostatted Column Compartment

Type	Specification
Temperature range	10 degrees below ambient to 80 °C
Temperature stability	± 0.15 °C
Column capacity	Three 25 cm - NOTE: With fused silica capillaries connected, length limited by bend radii of capillary
Warm-up/cool-down time	5 minutes from ambient to 40 °C 10 minutes from 40 – 20 °C
Internal volume	3 µl left heat exchanger 6 µl right heat exchanger
Communications	Controller-area network (CAN), GPIB, RS-232C, APG Remote: ready, start, stop and shut-down signals, LAN optional
Safety and maintenance	Extensive diagnostics, error detection and display (through control module and Agilent ChemStation), leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in major maintenance areas.
GLP features	Column-identification module for GLP documentation of column type, see "Column-Identification System"
Housing	All materials recyclable.

## Performance Specifications Agilent 1100 Series Micro Vacuum Degasser

**Table 88** Performance Specifications Agilent 1100 Micro Vacuum Degasser

Type	Specification
Flow rate	0 – 5 ml/min per channel (5 – 10 ml/min at reduced degassing performance)
Number of channels	4
Internal volume per channel	Typically 1 ml per channel
Materials in contact with solvent	PTFE – FEP – PEEK
pH range	1 – 14
Analog output (AUX)	For pressure monitoring, range 0 – 3 V
Evaporation of solvents into the atmosphere	< 200 µg/m <sup>3</sup> Acetonitrile and Methanol certification by IAS.