

# Agilent 1290 Infinity II LC



System Manual and  
Quick Reference



**Agilent Technologies**

# Notices

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# In This Book

This book describes the Agilent 1290 Infinity II LC.

## **1 Introduction**

This chapter gives an introduction to the Agilent 1290 Infinity II LC, the underlying concepts and the features of the Agilent 1290 Infinity II LC.

## **2 Specifications**

This chapter provides information about specifications for the LC system.

## **3 Best Practices**

This chapter summarizes the best practices for the Infinity II LC.

## **4 Quick Start Guide**

This chapter provides information on data acquisition and data analysis with the Agilent 1290 Infinity II LC.

## **5 Appendix**

This chapter provides addition information on safety, legal, and web.

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# 1 Introduction

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This chapter gives an introduction to the Agilent 1290 Infinity II LC, the underlying concepts and the features of the Agilent 1290 Infinity II LC.



## Product Description

The new Agilent 1290 Infinity II LC system has a high reliability and robustness, and improves analytical, instrument, and laboratory efficiency.

Its separation and detection performance delivers analysis data of high quality.

Highest throughput for any application is achieved through high sample capacity and fast injection cycles, combined with new levels of usability.

Additionally, seamless integration in existing infrastructure and smooth method transfer from legacy equipment enable non-disruptive transition to highest productivity and lowest cost of ownership.

## Features of the Agilent 1290 Infinity II LC

- More chromatographic resolution: specially designed components in the sample flow path achieve low system dispersion.
- Higher peak capacity for challenging separations: switch easily between single dimension UHPLC and 2D-LC.
- Lower carryover for uncompromised data quality: multiwash capabilities of the 1290 Infinity II Multisampler reduce carryover to less than 10 ppm even for challenging compounds such as chlorohexidine.
- Unique detection capabilities: combine low detection limits with an ultra-wide dynamic range by using the new 1290 Infinity II HDR- DAD or 1290 Infinity II ELSD.
- Faster injection cycles (< 5 seconds) with dual needle injection for higher sample throughput.
- Higher sample capacity per bench space: up to 6144 samples within the footprint of a standard Agilent stack.
- Significantly better usability: dead-volume-free UHPLC fluidic connections can be easily achieved with the new A-line quick-connect fittings.
- Flexibility for all applications: due to the wide power, temperature and automatically scalable injection range, gradient options and intelligent system emulation technology.
- Seamless transfer of methods between LCs, regardless of the brand – facilitated by Intelligent System Emulation Technology (ISET) delivering unchanged retention time and peak resolution.
- Seamless integration in your chromatography data system: Agilent's Instrument Control Framework (ICF) enables smooth control of Agilent LC instrumentation through third-party chromatography data systems.

## System Components

The Infinity II LC System can be set up with two different types of pumps: with the Flexible Pump, combining the performance of a high-pressure mixing UHPLC pump with the flexibility of a low-pressure mixing UHPLC pump, or with the High Speed Pump, allowing you to run fast gradients for high laboratory efficiency.

The Infinity II LC System consists of the following components:

- High Speed Pump or Flexible Pump
- Multisampler
- Multicolumn Thermostat
- Diode Array Detector or Variable Wavelength Detector
- Solvent Cabinet

The Agilent 1290 Infinity II LC is described in more detail in the following sections. All modules are stackable, see [“One Stack Configuration”](#) on page 17 and [“Two Stack Configuration”](#) on page 19.



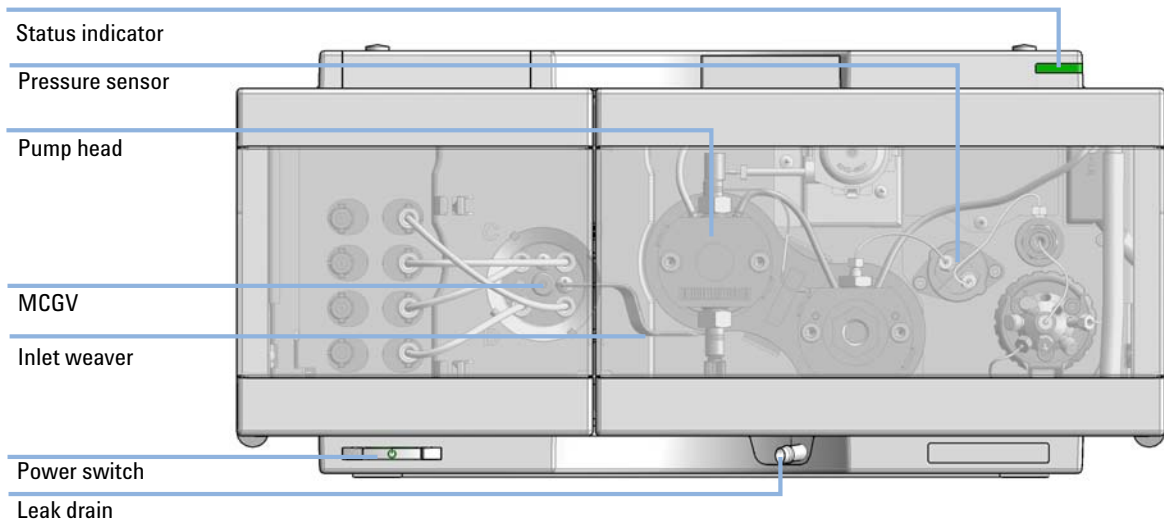
## Flexible Pump

The Agilent 1290 Infinity II Flexible Pump improves your efficiency by combining the performance of a high-pressure mixing UHPLC pump with the flexibility of a low-pressure mixing UHPLC pump.

The new 1290 Infinity II LC power range has a high instrument efficiency, allowing you to run any HPLC and UHPLC method. ISET enables you to transfer existing methods from different instrument modules - current Agilent systems as well as instruments from other manufacturers.

The Agilent Inlet Weaver mixer, active damping or the optional Agilent V380 Jet Weaver mixer for additional mixing capacity achieve high analytical efficiency.

The established multipurpose valve enhances laboratory efficiency by adding useful functionalities, for example, mixer in/out switch, filter backflush or automatic purge, and BlendAssist software simplifies your workflow with accurate buffer/additive blending.



**Figure 1** Overview of the Flexible Pump

## High Speed Pump

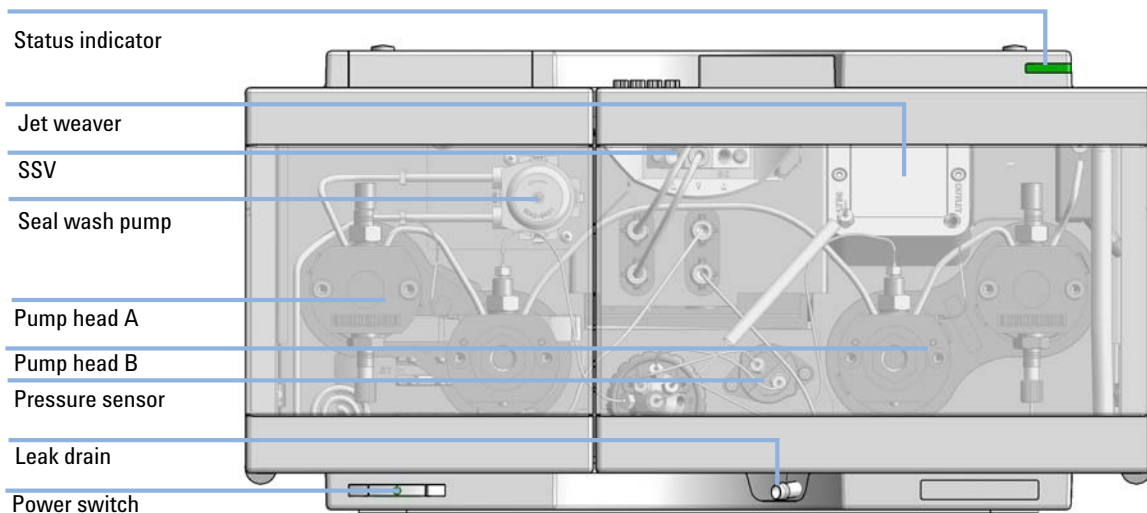
The Agilent 1290 Infinity II High Speed Pump can enhance your efficiency through high speed and chromatographic performance.

A low-delay-volume mixer allows you to run fast gradients for narrow-bore applications for high laboratory efficiency.

The new 1290 Infinity II LC power range has a high instrument efficiency, allowing you to run any HPLC and UHPLC method.

The full ISET range enables you to transfer existing methods from different instruments, including current Agilent systems as well as instruments from other manufacturers.

Active damping, automatic purge valve, new ultralow dispersion kits or low delay-volume capability, combine to achieve high instrument and analytical efficiency.



**Figure 2** Overview of the High Speed Pump

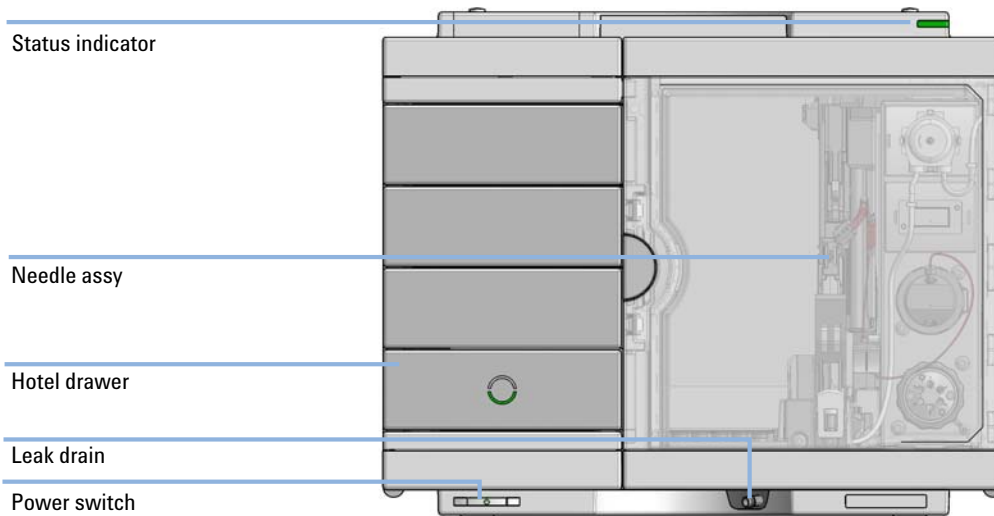
## Multisampler

The Agilent 1290 Infinity II Multisampler can handle both vials and microtiter plates with ease and efficiency up to 1300 bar system pressure, optimized on chromatographic performance.

In fact, this compact module has the capacity to house up to 6144 samples, all inside the Agilent stack footprint and the robotics to smoothly inject each into the chromatograph in turn.

With Agilent's unique dual-needle design, cycle time is just 5 seconds.

With the multi-wash capability, you can reduce carryover to less than 9 parts per million.



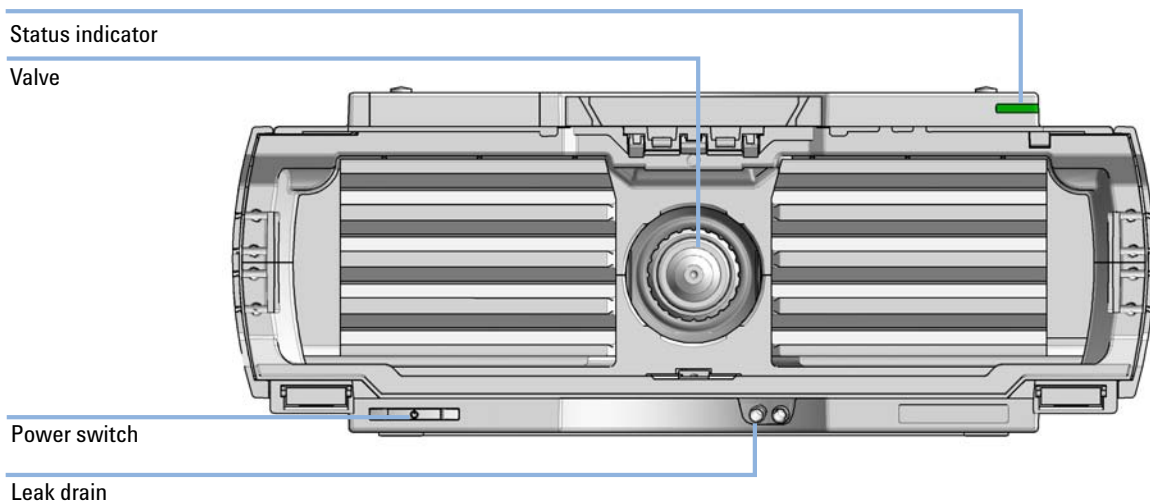
**Figure 3** Overview of the Multisampler

## Multicolumn Thermostat

The Agilent 1290 Infinity II Multicolumn Thermostat (MCT) allows precise column thermostating over a broad temperature range: from cooling down to 20 degrees below ambient temperature up to 110 °C, providing high flexibility for optimized speed and selectivity of LC separation.

Ultrahigh pressure valves enable a wide range of applications such as column selection from 8 columns in a single MCT, sample preparation for analyte enrichment or matrix removal, alternating column regeneration, etc.

The MCT fits with all 1290 Infinity II modules and can also be combined with modules of the Agilent 1260 and 1290 Infinity Series.



**Figure 4** Overview of the Multicolumn Thermostat

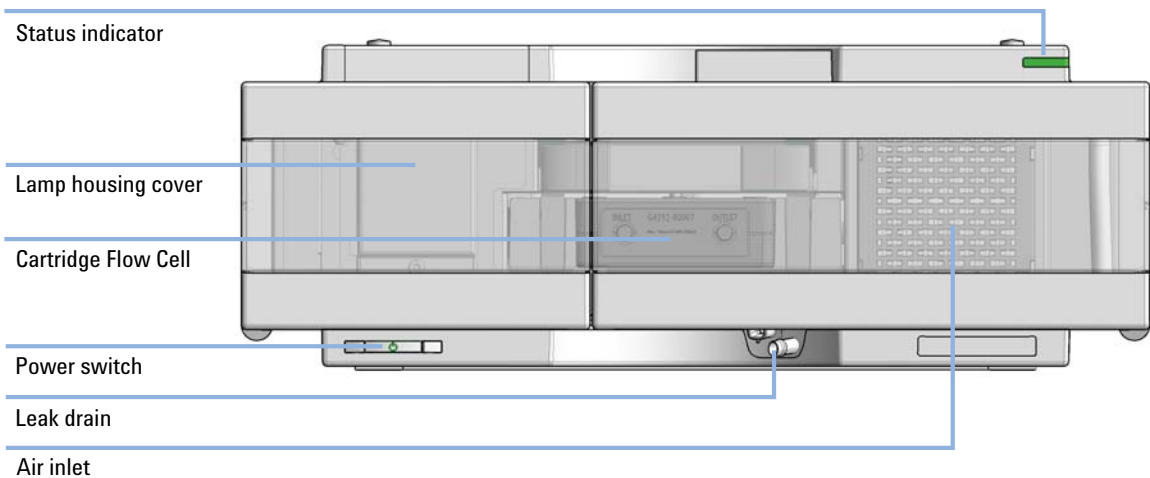
## Diode Array Detector (DAD)

The Agilent 1290 Infinity II Diode Array Detector (DAD) is based on the Agilent Max-Light cartridge cell with optofluidic waveguides that improve light transmission to near 100% efficiency without sacrificing resolution caused by cell dispersions effects.

With typical detector noise levels of  $< \pm 0.6 \mu\text{AU}/\text{cm}$  the 60 mm flow cell gives up to 10 times higher sensitivity than detectors with conventional flow cells.

Any compromising refractive index and thermal effects are almost completely eliminated, resulting in significantly less baseline drift for more reliable and precise peak integration.

For fast separations, this detector has multiple wavelength and full spectral detection at sampling rates up to 240 Hz.



**Figure 5** Overview of the Diode Array Detector

## Variable Wavelength Detector (VWD)

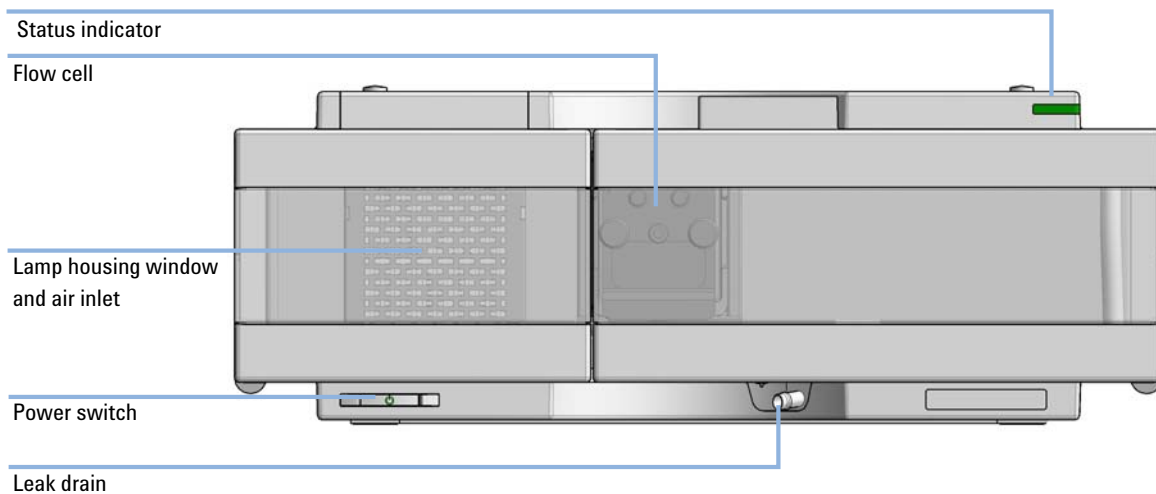
The Agilent 1290 Infinity II Variable Wavelength Detector (VWD) is the most sensitive and fastest detector in its class.

Time-programmable wavelength switching provides sensitivity and selectivity for your applications.

More sample information can be acquired in the dual wavelength mode.

Low detector noise ( $< \pm 1.5 \mu\text{AU}$ ) and baseline drift ( $< 1 \times 10^{-4} \text{ AU/h}$ ) facilitates precise quantification of trace level components.

High productivity can be achieved with fast analysis at up to 240 Hz data rates.



**Figure 6** Overview of the Variable Wavelength Detector

# Solutions

## 2D-LC Solution

The Agilent 1290 Infinity II 2D-LC Solution matches separation performance with sample complexity. The solution offers intuitive software, completely pre-configured systems, and an easy starter kit.

Furthermore an easy switch between 1D-UHPLC and 2D-LC guarantees you highest usage of a single system.

The software is designed for fastest method setup in all available modes, whether it is heart-cutting 2D-LC, multiple heart-cutting 2D-LC or comprehensive 2D-LC.

Application areas are numerous and include pharmaceutical and biopharmaceutical (impurity) profiling, all -omics areas, analysis of food matrices, herbal medicine, polymer analysis, flavor analysis and many more.

## High Dynamic Range DAD Solution

The Agilent 1290 Infinity II High Dynamic Range DAD Solution combines the signals from two diode array detectors (DAD). The DADs are assembled with different path length Max-Light flow cells. This combination offers a 30x wider linear UV-range.

The increased linear UV-range allows detection and quantification of all sample components in a single run, thus making it ideal for analysis of mixtures with widely different concentration levels.

## Method Transfer Solution

The 1290 Infinity II Method Transfer Solution allows you to execute any legacy HPLC or latest UHPLC methods while achieving the same chromatographic results. It provides a seamless method transfer between LCs, regardless of brand.

The Intelligent System Emulation Technology (ISET) emulates the LC system on which the original method was developed, thus achieving the same retention times and peak resolution. Speed up your method development with UHPLC performance and then fine-tune your method by emulating the target system. Run your legacy methods with ISET while taking full advantage of the UHPLC speed, resolution, and sensitivity of the 1290 Infinity II LC.



## Optimizing the Stack Configuration

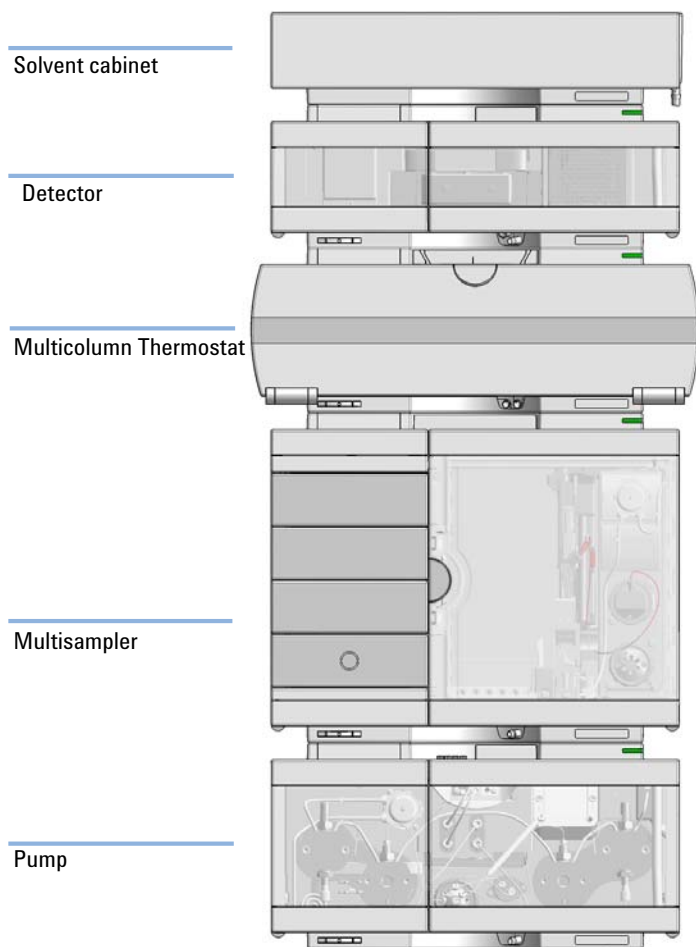
You can ensure optimum performance by installing the system in one of the following configurations. These configurations optimize the system flow path, ensuring minimum delay volume.

### One Stack Configuration

Ensure optimum performance by installing the modules of the Agilent 1290 Infinity II LC System in the following configuration (see [Figure 7](#) on page 18). This configuration optimizes the flow path for minimum delay volume and minimizes the bench space required.

## 1 Introduction

### Optimizing the Stack Configuration

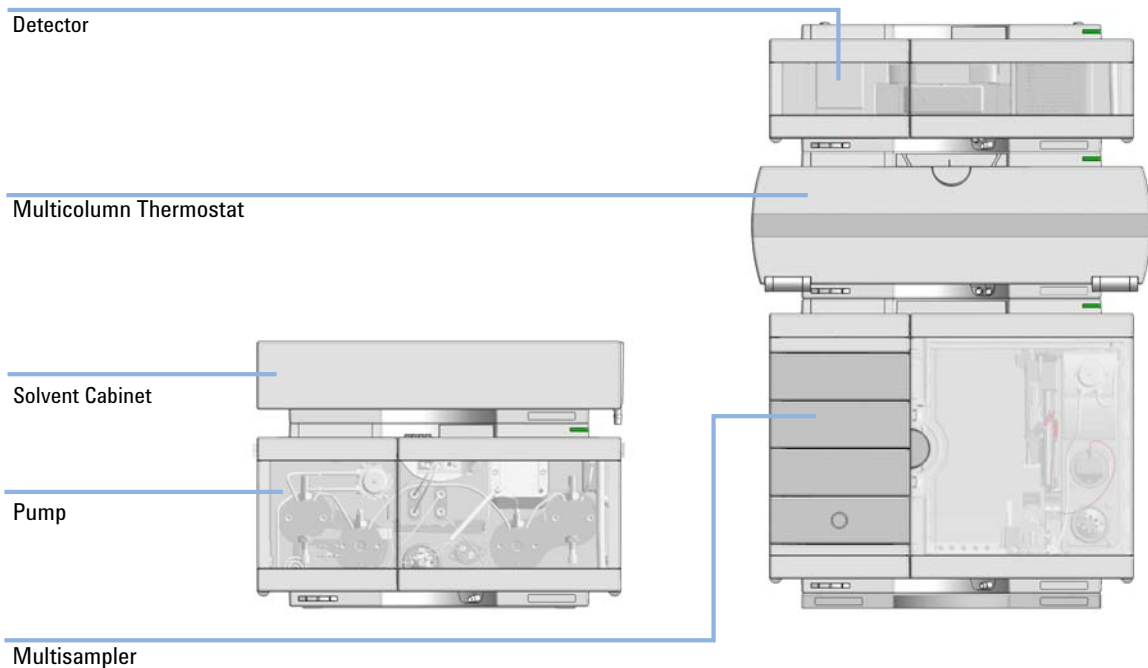


**Figure 7** Recommended Stack Configuration for 1290 Infinity II

The figure shows an exemplary stack with a High Speed Pump and a DAD. The stack can also be setup with a Flexible Pump and/or a VWD.

## Two Stack Configuration

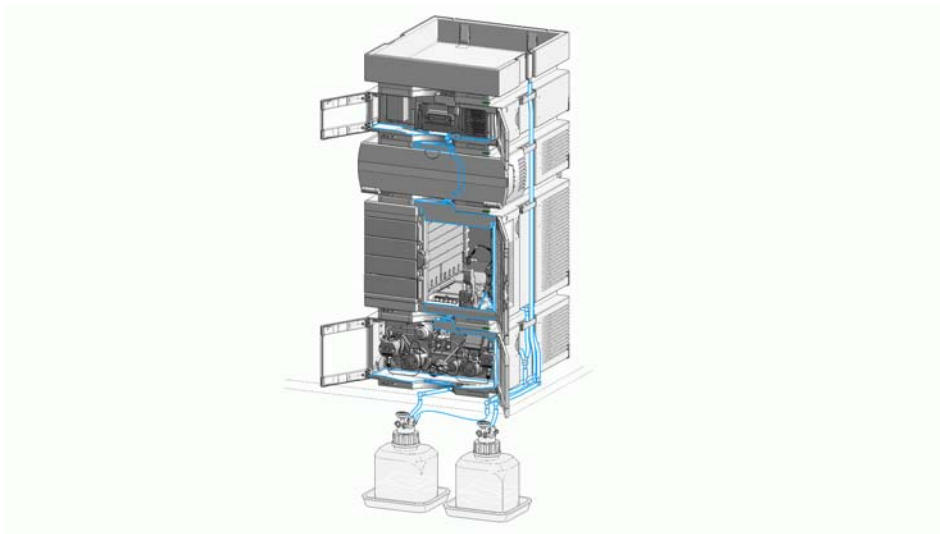
To avoid excessive height of the stack (for example when using the system in combination with an MS detector) it is recommended to form two stacks. A slightly longer capillary is required between the pump and the Multisampler. (See [Figure 8](#) on page 19).



**Figure 8** Recommended Two-Stack Configuration for 1290 Infinity II

## Leak and Waste Handling

The 1290 Infinity II Series has been designed for safe leak and waste handling. It is important that all security concepts are understood and instructions are carefully followed.



**Figure 9** Leak and waste handling concept (overview - typical stack configuration as an example)

The solvent cabinet is designed to store a maximum volume of 6 L solvent. The maximum volume for an individual bottle stored in the solvent cabinet should not exceed 4 L. For details, see the usage guideline for the Agilent 1200 Infinity Series Solvent Cabinets (a printed copy of the guideline has been shipped with the solvent cabinet, electronic copies are available on the Internet).

All leak plane outlets are situated in a consistent position so that all Infinity and Infinity II modules can be stacked on top of each other. Waste tubes are guided through a channel on the right hand side of the instrument, keeping the front access clear from tubes.

The leak plane provides leak management by catching all internal liquid leaks, guiding them to the leak sensor for leak detection, and passing them on to the next module below, if the leak sensor fails. The leak sensor in the leak plane stops the running system as soon as the leak detection level is reached.

Solvent and condensate is guided through the waste channel into the waste container:

- from the detector's flow cell outlet
- from the Multisampler needle wash port
- from the Sample Cooler (condensate)
- from the Seal Wash Sensor
- from the pump's Purge Valve or Multipurpose Valve

The waste tube connected to the leak pan outlet on each of the bottom instruments guides the solvent to a suitable waste container.

## Waste Concept

- 1** Agilent recommends using the 6 L waste can with 1 Stay Safe cap GL45 with 4 ports (5043-1221) for optimal and safe waste disposal. If you decide to use your own waste solution, make sure that the tubes don't immerse in the liquid.



**1 Introduction**  
**Leak and Waste Handling**



## 2 Specifications

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This chapter provides information about specifications for the LC system.



## Physical Specifications

### Physical Specifications G7104A

**Table 1** Physical Specifications

Type	Specification	Comments
Weight	16.1 kg (35.5 lbs)	
Dimensions (height × width × depth)	180 x 396 x 436 mm (7.1 x 15.6 x 17.2 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	120 VA / 110 W	
Ambient operating temperature	4 – 55 °C (39 – 131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Non-operating altitude	Up to 4600 m (15092 ft)	For storing the module
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.



## Physical Specifications G7120A

**Table 2** Physical Specifications

Type	Specification	Comments
Weight	21.0 kg (46.3 lbs)	
Dimensions (height × width × depth)	200 × 396 × 436 mm (7.9 × 15.6 × 17.2 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	210 VA / 180 W	
Ambient operating temperature	4 – 55 °C (39 – 131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Non-operating altitude	Up to 4600 m (15092 ft)	For storing the module
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.

## Physical Specifications G7167B

**Table 3** Physical Specifications

Type	Specification	Comments
Weight	22 kg (48.5 lbs)	w/o sample cooler
Dimensions (height × width × depth)	320 x 396 x 468 mm (12.6 x 15.6 x 18.4 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	180 VA, 180 W	
Ambient operating temperature	4 - 40 °C (39 - 104 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Non-operating altitude	Up to 4600 m (15092 ft)	For storing the module
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.

## Physical Specifications G7116B

**Table 4** Physical Specifications

Type	Specification	Comments
Weight	12.5 kg (27.6 lbs)	
Dimensions (height × width × depth)	160 × 435 (472) × 436 mm (6.3 × 17.1 (18.6) × 17.2 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	150 VA, 150 W	
Ambient operating temperature	4 – 55 °C (39 – 131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 2000 m (6562 ft)	
Non-operating altitude	Up to 4600 m (15092 ft)	For storing the module
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.

## Physical Specifications G7117B

**Table 5** Physical Specifications

Type	Specification	Comments
Weight	11.5 kg (25.4 lbs)	
Dimensions (height × width × depth)	140 x 396 x 436 mm (5.5 x 15.6 x 17.2 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	110 VA, 100 W	
Ambient operating temperature	4 – 40 °C (39 – 104 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 2000 m (6562 ft)	
Non-operating altitude	Up to 4600 m (15092 ft)	For storing the module
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.

## Physical Specifications G7114B

**Table 6** Physical Specifications

Type	Specification	Comments
Weight	11 kg (24.3 lbs)	
Dimensions (height × width × depth)	140 x 396 x 436 mm (5.5 x 15.6 x 17.2 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	80 VA, 70 W	
Ambient operating temperature	4 - 55 °C (39 - 131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 2000 m (6562 ft)	
Non-operating altitude	Up to 4600 m (15092 ft)	For storing the module
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.

## Performance Specifications

### Performance Specifications

**Table 7** Agilent 1290 Infinity II Flexible Pump (G7104A) Performance Specifications

Feature	Specification
Hydraulic system	Dual pistons in series pump with proprietary servo-controlled variable stroke design and smooth motion control for active damping.
Pump resolution step size	300 pL step size
Settable flow range	0.001 – 5 mL/min, in 0.001 mL/min increments (executed in 300 pL/step increments).
Flow precision	≤0.07 % RSD or 0.01 min SD, whatever is greater
Flow accuracy	±1 % or ±10 µL/min, whatever is greater
Pressure range	up to 130 MPa (1300 bar) at 0 – 2 mL/min ramping down to 80 MPa (800 bar) at 5 mL/min
Pressure pulsation	<1 % amplitude or <0.5 MPa (5 bar), whatever is greater
Compressibility compensation	Automatic
Gradient formation	Low pressure quaternary mixing
Delay volume	As low as 350 µL
Composition range	Settable range: 0 – 100 % Recommended range: 1 – 99 % or 5 µL/min
Composition precision	<0.15 % RSD or 0.02 min SD, whatever is greater
Composition accuracy	±0.4 % absolute (1 – 99 % B)
Number of solvent	4 out of maximum 26 solvents

**Table 7** Agilent 1290 Infinity II Flexible Pump (G7104A) Performance Specifications

Feature	Specification
Solvent selection valve	Internal 4-solvent gradient formation valve included. External 2x 12 solvent valve as option, fully integrated in the pump control interface.
Degassing unit	Integrated. Number of channels: 4, Internal volume per channel: 1.5 mL
Materials in contact with solvent	TFE/PDD copolymer, FEP, PEEK, PPS, stainless steel, polyimide
Automatic Purge Valve	Included, allows automatic inline-filter back-flush and automatic mixer change, e.g. for optional TFA-mixer
Active Seal wash	Included
Intelligent System Emulation Technology (ISET)	Included
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 included Agilent LabAdvisor, 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 seal wear 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 are recyclable.

## Performance Specifications

**Table 8** Agilent 1290 Infinity II High Speed Pump (G7120A) Performance Specifications

Feature	Specification
Hydraulic system	Two dual pistons in series, pumps with proprietary servo-controlled variable stroke design and smooth motion control.
Pump resolution step size	300 pL step size
Settable flow range	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
Flow accuracy	±1 % or 10 µL/min, whatever is greater
Pressure range	up to 130 MPa (1300 bar) at 0 – 2 mL/min ramping down to 80 MPa (800 bar) at 5 mL/min
Pressure pulsation	<1 % amplitude or <0.5 MPa (5 bar), whatever is greater
Compressibility compensation	Automatic
Recommended pH-range	1.0 – 12.5, solvents with pH <2.3 should not contain acid which attack stainless steel.
Gradient formation	High pressure binary mixing
Delay volume	As low as 45 µL (10 µL without mixer)
Composition precision	<0.15 % RSD or 0.01 min SD, whatever is greater
Composition accuracy	±0.35 % absolute
Number of solvent	2 out of maximum 26 solvents
Solvent selection valve	Internal 4-solvent selection valve included. External 2x 12 solvent valve as option, fully integrated in the pump control interface.
Integrated degassing unit	Included Number of channels: 2 Internal volume per channel: 1.5 mL Materials in contact with solvent: TFE/PDD Copolymer, FEP, PEEK, PPS.



**Table 8** Agilent 1290 Infinity II High Speed Pump (G7120A) Performance Specifications

Feature	Specification
Automatic Purge Valve	Included
Active Seal wash	Included
Intelligent System Emulation Technology (ISET)	Included
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 included Agilent LabAdvisor, leak detection, safe leak handling, leak output signal for shutdown of the pumping system. Low voltage in major maintenance areas.
GLP feature	Early maintenance feedback (EMF) for continuous tracking of instrument usage in terms of seal wear 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 are recyclable.

## Performance Specifications

**Table 9** Agilent 1290 Infinity II Multisampler (G7167B) Performance Specifications

Feature	Specification
Hydraulic System	Flow through needle design for minimized sample carry-over and sample discrimination. Unique dual needle feature <sup>1</sup> with two independent injection needles and loops optionally available. Different loop sizes for optimized injection range and lowest delay-volume available, user-exchangeable. Optional multi-wash feature for ultra-low carry-over.
Pressure range	up to 130 MPa (1300 bar)
Injection range (Single Needle)	0 – 20 µL or 0 – 100 µL single stroke injection at max. pressure Up to 0.1 – 1500 µL with optional kits
Injection range (Dual Needle <sup>1</sup> )	Mix of 20 µL, 40 µL, 100 µL, or 500 µL loops and analytical heads and multi-load Either two identical set-ups for maximum injection speed or two different set-ups for maximum application flexibility are possible.
Precision	<0.15 % RSD or SD<10 nL
Accuracy	0.7 % (10 µL, n=10)
Sample viscosity	0.2 – 5 cp
Sample capacity	Up to 6144 with 16384 shallow well micro titer plates Up to 4322 mL vials Up to 8 single height drawers for 2 micro-titer plate footprint sample containers, each. Free configuration of single height (e.g. for shallow well micro titer plates), double height (e.g. for 2 mL vials or deep-well micro-titer plates) or triple height drawers (e.g. for 6 mL vials) possible.
Injection cycle time	As low as 10 s with Single-needle setup, virtually zero with Dual-needle set-up
Carry Over	<0.0009 % (9 ppm) with Multi-wash <0.003 % (30 ppm) without Multi-wash
Multiwash	Outer needle wash and seat backflush for carryover reduction with up to 3 different solvents
Communications	Controller-area network (CAN), Local Area Network (LAN) ERI: ready, start, stop and shut-down signals

**Table 9** Agilent 1290 Infinity II Multisampler (G7167B) Performance Specifications

Feature	Specification
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.
Injector programming	Pretreatment functionality such as multi-draw, mixing, stacked injection and dilution
<b>Performance Specifications Agilent 1290 Infinity II Sample Cooler</b>	
Operating principle	High performance, low-energy consumption micro-compressor based cooler with ozone-friendly R134A coolant (42 g), user-upgradable.
Temperature range	Settable from 4 – 40 °C in 1 °C increments (with a max. temperature of 5 °C below ambient)
Temperature accuracy	±2 °C at set-point of 4 °C

<sup>1</sup> Availability planned early 2015

## Performance Specifications

**Table 10** Agilent 1290 Infinity II Multicolumn Thermostat (G7116B) Performance Specifications

Feature	Specification
Operating principle	Dual, independent Peltier-element thermostatted column compartment. Solvent pre-heating and still-air operation for reduction of chromatographic band-broadening under UHPLC-conditions. Up to three devices can be clustered and controlled by a single user interface for additional flexibility <sup>1</sup> .
Temperature range	4 °C to 110 °C, (minimum 20 °C below ambient)
Temperature stability	±0.05 °C
Temperature accuracy	±0.5 °C (with calibration)

## 2 Specifications

### Performance Specifications

**Table 10** Agilent 1290 Infinity II Multicolumn Thermostat (G7116B) Performance Specifications

Feature	Specification
Independent Temperature zones	2 (in single device) up to 6 in clustered configuration <sup>1</sup>
Column capacity	8 columns of 100 mm length plus Quick-Connect fittings or pre-columns 4 columns of 300 mm length plus Quick-Connect fittings or pre-columns Selection of columns by single optional integrated 8-column selection valve (1300 bar) Maximum of 24 columns of 100 mm length plus Quick-Connect fittings or pre-columns 12 columns of 300 mm length plus Quick-Connect fittings or pre-columns with clustering <sup>1</sup> of three devices.
Heat-up/cool-down time	5 min from ambient to 40 °C 10 min from 40 °C to 20 °C
Solvent heat exchangers	Individually quick-installable for every column. Available at 1.0 µL (ultra-low dispersion), 1.6 µL (standard) and 3 µL (high-flow) volume.
Valve options	1x integrated valve drive as option 2x external valve drives as option to host user-exchangeable Quick-Change valve heads of different formats, materials and pressure ratings (up to 1300 bar): 2-position/6-port, 2-position/10-port, 6-column selection (6-pos/14-port), 8-column selection (8-pos/18-port). Equipped with tags, valve heads are automatically identified by SW
Communications	Controller-area network (CAN).
Safety and maintenance	Extensive diagnostics, error detection and display (through Instant Pilot control module and Agilent LabAdvisor), leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in main maintenance areas. Door-open sensor.
GLP	Valve heads carrying tags with serial number, pressure rating, number of switches and valve type.

<sup>1</sup> Availability planned early 2015

## Performance Specifications G7117B

**Table 11** Agilent 1290 Infinity II Diode Array Detector (G7117B) Performance Specifications

Feature	Specification
Detector type	1024-element diode array
Light source	Deuterium
Number of signals	8
Maximum sampling rate	240 Hz (both spectra and signals)
Short-term noise	with 10 mm Max-Light cartridge cell: $<\pm 3 \cdot 10^{-6}$ AU at 230/4 nm, slit width 4 nm, TC 2 s, ASTM with 60 mm Max-Light cartridge cell: $<\pm 0.6 \cdot 10^{-6}$ AU/cm at 230/4 nm, slit width 4 nm, TC 2 s, ASTM
Drift	$<0.5 \cdot 10^{-3}$ AU/h at 230 nm
Linearity	$>2.0$ AU (5 %) at 265 nm Typically 2.5 AU (5 %)
Wavelength range	190 – 640 nm
Wavelength accuracy	$\pm 1$ nm, self-calibration with deuterium lines
Wavelength precision	$<\pm 0.1$ nm
Slit width	Programmable: 1, 2, 4, 8 nm
Diode width	$\sim 0.5$ nm
Wavelength bunching	Programmable, 2 – 400 nm, in steps of 1 nm
Spectral tools	Data analysis software for spectra evaluation, including spectral libraries and peak purity functions

## 2 Specifications

### Performance Specifications

**Table 11** Agilent 1290 Infinity II Diode Array Detector (G7117B) Performance Specifications

Feature	Specification
Flow cells	User-exchangeable, self-aligning cartridge cells with RFID tags. Max-Light Cartridge Cell (Standard): 10 mm, $\sigma V = 1.0 \mu\text{L}$ Max-Light Cartridge Cell (High Sensitivity): 60 mm, $\sigma V = 4 \mu\text{L}$ Max-Light Cartridge Ultra Low Dispersion (ULD) Cell: 10 mm, $\sigma V = 0.6 \mu\text{L}$ Max-Light Cartridge High Dynamic Range (HDR) Cell: 3.7 mm, $\sigma V = 0.8 \mu\text{L}$ Maximum Operating Pressure (MOP) <sup>1</sup> : 70 bar Maximum Incidental Pressure (MIP) <sup>2</sup> : 150 bar
Analog output	Recorder/integrator: 100 mV or 1 V, output range 0.001 – 2 AU, one output
Communications	LAN, controller-area network (CAN), ERI: ready, start, stop and shut-down signals
GLP features	Data recovery card to prevent data losses. RFID for electronics records of flow cell and UV lamp conditions (path length, volume, product number, serial number, test passed, usage) 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 deuterium lines.
Safety and maintenance	Extensive diagnostics, error detection and display through Agilent Instant Pilot and Agilent Lab Advisor software. Leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in major maintenance areas.
Others	Second generation of Electronic temperature control (ETC) for the complete optical unit

<sup>1</sup> Maximum operating pressure (MOP): Maximum pressure at which a system can operate continuously under normal conditions.

<sup>2</sup> Maximum incidental pressure (MIP): The maximum pressure which the system can experience during a short time.

## Performance Specifications

**Table 12** Agilent 1290 Infinity II Variable Wavelength Detector (G7114B) Performance Specifications

Feature	Specification
Detection type	Double-beam photometer
Light source	Deuterium lamp
Number of signals	Single and dual wavelength detection
Maximum data rate	240 Hz (single wavelength detection) 2.5 Hz (dual wavelength detection)
Noise	<±0.15·10 <sup>-5</sup> AU, at 230 nm (single wavelength detection) <±1.00·10 <sup>-5</sup> AU, at 230 nm and 254 nm (dual wavelength detection)
Drift	<1·10 <sup>-4</sup> AU/h, at 230 nm
Linearity	>2.5 AU upper limit
Wavelength range	190 – 600 nm
Wavelength accuracy	±1 nm, self-calibration with deuterium lines, verification with holmium oxide filter
Wavelength precision	<±0.1 nm
Slit width	6.5 nm typical over whole wavelength range
Time programmable	Wavelength, polarity, peak width, lamp on/off
Flow cells	<i>Standard:</i> 14 µL volume, 10 mm cell path length and 40 bar (588 psi) pressure maximum <i>Micro:</i> 2 µL volume, 3 mm cell path length and 120 bar (1760 psi) pressure maximum <i>Semi-micro:</i> 5 µL volume, 6 mm cell path length and 40 bar (588 psi) pressure maximum <i>Preparative:</i> 4 µL volume, 3 mm cell path length and 120 bar (1760 psi) pressure maximum <i>Preparative:</i> 0.3 mm cell path length and 50 bar (725 psi) pressure maximum <i>Preparative:</i> 0.06 mm cell path length and 50 bar (725 psi) pressure maximum
Spectral tools	Stop-flow wavelength scan

## 2 Specifications

### Performance Specifications

**Table 12** Agilent 1290 Infinity II Variable Wavelength Detector (G7114B) Performance Specifications

Feature	Specification
Analog output	Recorder/Integrator 100 mV or 1 V, 1 output
Communication	LAN, Controller-area network (CAN), ERI: ready, start, stop and shut-down signals
GLP	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. RFID for electronics records of flow cell and UV lamp conditions (path length, volume, product number, serial number, test passed, and usage). Verification of wavelength accuracy with built-in holmium oxide filter.
Safety and maintenance	Extensive diagnostics, error detection and display through Agilent Instant Pilot and Agilent Lab Advisor software. Leak detection, safe leak handling, leak output signal for shutdown of pumping system. Low voltages in major maintenance areas. Tracking of flow cells and lamps with RFID (radio frequency identification) tags





## 3 Best Practices

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Prepare the pump	44
How to deal with solvents	45
Select channels for Multi-Channel Gradient Valve (MCGV)	46

This chapter summarizes the best practices for the Infinity II LC.



## Daily / Weekly tasks

### Daily tasks

- Replace mobile phase based on water/buffer.
- Replace organic mobile phase latest every 2nd day.
- Check seal wash solvent.
- Run conditioning with composition of your application.

### Weekly tasks

- Change seal wash solvent (10 % / 90 % isopropanol/water) and bottle.
- Flush all channels with water to remove salt deposits.
- Visually inspect solvent filters. Clean or exchange if necessary.

## Power up / Shut-down the pump

### Power up the pump

- Use new or different mobile phase (as required).
- Purge pump heads with 2.5 – 3 mL/min for 5 min.
- Condition pump heads for 10 – 20 min.

### Long-term shut-down of the pump

- Flush system with water to remove buffer.
- Use recommended solvents to store the system.
- Power off the pump or system.

## Prepare the pump

### Purge

Use the Purge function to:

- fill the pump,
- exchange a solvent,
- remove air bubbles in tubes and pump heads.

### Condition

Use the Conditioning function:

- daily when starting the pump,
- to minimize pressure ripple by dissolving air bubbles in pump heads.

#### NOTE

Condition your complete system with solvents and composition of your application (for example 50 %/50 % A/B at 0.5 mL/min).

---

### Seal wash

The seal wash function runs continuously and is controlled by the seal wash sensor. This guarantees a maximum seal life time.

#### CAUTION

Contaminated seal wash solvent

- Do not recycle seal wash solvent to avoid contamination.
  - Weekly exchange seal wash solvent.
-

## How to deal with solvents

- Use clean bottles only.
- Exchange water-based solvents daily.
- Select solvent volume to be used up within 1 – 2 days.
- Use only HPLC-grade solvents and water filtered through 0.2 µm filters.
- Label bottles correctly with bottle content, and filling date / expiry date.
- Use solvent inlet filters.
- Reduce risk of algae growth: use brown bottles for aqueous solvents, avoid direct sunlight.

### **3 Best Practices**

#### Select channels for Multi-Channel Gradient Valve (MCGV)

## **Select channels for Multi-Channel Gradient Valve (MCGV)**

- Use lower channels (A and/or D) for buffer solutions.
- Regularly flush all MCGV channels with water to remove possible salt deposits.
- Check compatibility of buffers and organic solvents to avoid precipitation.



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This chapter provides information on data acquisition and data analysis with the Agilent 1290 Infinity II LC.



## Check Out the System

### Checkout Method

This is the checkout method for the Infinity II LC.

Exemplary configuration:

- High Speed Pump G7120A
- Multisampler G7167B
- Multicolumn Thermostat G7116B
- Diode Array Detector G7117B

The RRLC checkout sample (5188-6529) contains 100 ng/ $\mu$ L each of nine components dissolved in water / acetonitrile (65/35). The nine components are:

- Acetanilide
- Acetophenone
- Propiophenone
- Butyrophenone
- Benzophenone
- Valerophenone
- Hexanophenone
- Heptanophenone
- Octanophenone

The checkout sample is run on the checkout column: RRHD Eclipse Plus C18, 2.1 x 50 mm, 1.8  $\mu$ m (959757-902).

The following sections list the method settings for the modules.



## Setup the Checkout Method

- 1 Load the the default method DEF\_LC.M
- 2 Change the method settings for the pump (G7120A)

The screenshot displays the method settings for the G7120A pump. The interface is organized into several panels:

- Flow:** Set to 1.500 mL/min.
- Solvents:**
  - Channel A:** 70.00% solvent 1 (100.0% Water V.03, water) and 30.00% solvent 2 (100.0% Water V.03).
  - Channel B:** 30.00% solvent 1 (100.0% Acetonitrile V.03, ACN) and 70.00% solvent 2 (100.0% Acetonitrile V.03).
- Pressure Limits:** Min: 0.00 bar, Max: 1,200.00 bar.
- Stoptime:** 4.00 min.
- Posttime:** 1.00 min.
- Advanced:**
  - Minimum Stroke:** Channel A: Automatic (20.00 µL), Channel B: Automatic (20.00 µL). Synchronized is checked.
  - Compressibility:** Use Solvent Types is checked.
  - Maximum Flow Gradient:** Flow ramp up: 100.000 mL/min<sup>2</sup>, Flow ramp down: 100.000 mL/min<sup>2</sup>.
  - Required Mixer:** No check.
  - Timetable:** 2/100 events.

Figure 10 Method settings (G7120A)

## 4 Quick Start Guide

### Check Out the System

### 3 Change the method settings for the Multisampler (G7167B)

**Injection**

Injection volume: 2.00 µL

**Needle Wash**

Standard Wash

**Stoptime**

As Pump/No Limit  
 1.00 min

**Posttime**

Off  
 1.00 min

**Advanced**

**Sampling Speed**

Draw Speed: 100.0 µL/min  
Eject Speed: 200.0 µL/min  
Wait Time After Draw: 2.0 s

**Needle Height Position**

Offset: 0.0 mm  
 Use Vial/Well Bottom Sensing

**High Throughput**

Sample Flush-Out Factor: 5.0

Injection Valve to Bypass for Delay Volume Reduction  
 Enable Overlapped Injection

When Sample is Flushed Out  
 After Period of Time: 0.00 min

**Injection Path Cleaning**

**Figure 11** Method setting (G7167B)

Injection  
Injection volume: 2.00  $\mu$ L

Needle Wash  
Standard Wash

Stoptime  
 As Pump/No Limit  
 1.00 min

Posttime  
 Off  
 1.00 min

Advanced  
 Injection Path Cleaning  
 Standard Wash  
 Mode: Flush Port  
 Time: 5 s  
 Location:  
 Repeat: 3

Multi-wash

Step	Solvent	Time [s]	Seat Back Flush	Needle Wash	Comment
1	Off		<input type="checkbox"/>	<input type="checkbox"/>	
2	Off		<input type="checkbox"/>	<input type="checkbox"/>	
3	Off		<input type="checkbox"/>	<input type="checkbox"/>	
Start Cond.	S1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Figure 12 Method setting (G7167B) - Injection Path Cleaning

## 4 Quick Start Guide

### Check Out the System

#### 4 Change the method settings for the Multicolumn Thermostat (G7116B)

**Temperature**

Left:  Not Controlled  40.0 °C  As Detector Cell

Right:  Not Controlled  20.0 °C  As Detector Cell  Combined

**Valve Position/Column**

Use Current Column / Position

Use Selected Column / Position

Position 1

Enforce column for run

**Stoptime**  As Pump/Injector  1.00 min

**Posttime**  Off  1.00 min

**Advanced**

Enable Analysis

when front door open

Left:  With any temperature  When temperature is within ± 0.8 °C

Right:  With any temperature  When temperature is within ± 0.8 °C

**Timetable (empty)**

**Figure 13** Method settings (G7116B)

5 Change the method settings for the detector (G7117B)

The screenshot shows the following settings:

Signal	Use Signal	Wave length	Band width	Reference Wavelength	Reference Bandwidth	Unit
Signal A	<input checked="" type="checkbox"/>	254.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm
Signal B	<input type="checkbox"/>	210.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm
Signal C	<input type="checkbox"/>	214.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm
Signal D	<input type="checkbox"/>	230.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm
Signal E	<input type="checkbox"/>	260.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm
Signal F	<input type="checkbox"/>	273.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm
Signal G	<input type="checkbox"/>	280.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm
Signal H	<input type="checkbox"/>	250.0	4.0	<input checked="" type="checkbox"/>	360.0	100.0 nm

**Advanced Settings:**

- Spectrum:** Store: All; Range from: 190.0 to 400.0 nm; Step: 2.0 nm
- Analog Output:** Output 1: Zero Offset: 5%; Attenuation: 1000 mAU
- Margin for negative Absorbance:** 100 mAU
- Slit:** 4 nm
- Autobalance:**  Prerun;  Postrun
- Lamps on required for acquisition:**  UV Lamp
- Timetable (empty):** (Empty)

**Other Settings:**

- Peakwidth:** > 0.0063 min (0.13 s response time) (40 Hz)
- Stoptime:**  As Pump/Injector; 1.00 min
- Posttime:**  Off; 1.00 min

Figure 14 Method settings (G7117B)

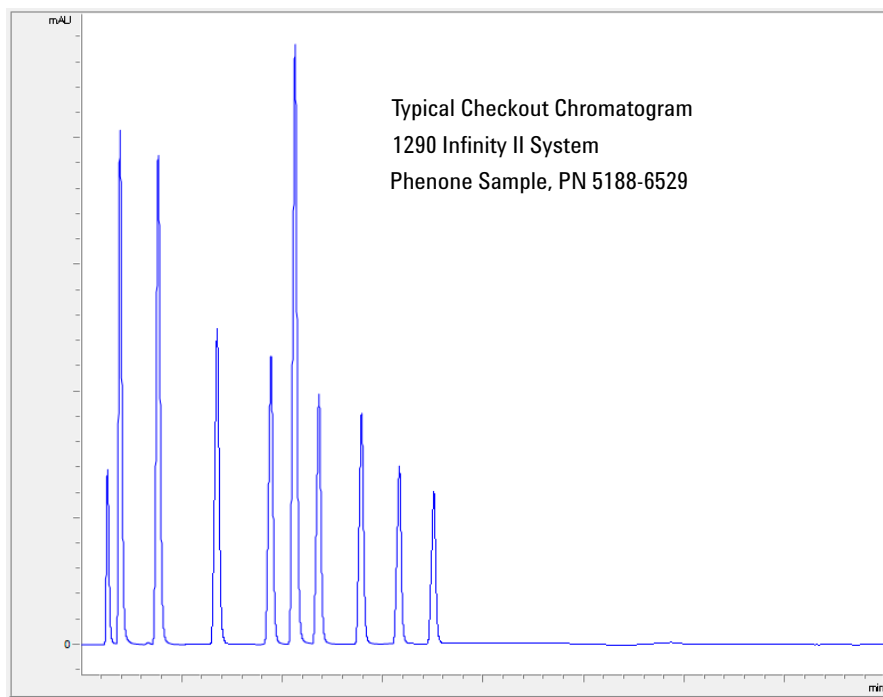
6 Save the method as GRAD-1.M

7 Equilibrate the system for 10 min under checkout conditions

## 4 Quick Start Guide

### Check Out the System

#### 8 Run and evaluate the checkout method





## 5 Appendix

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This chapter provides addition information on safety, legal, and web.



## Safety

### Safety Symbols

Table 13 Safety Symbols

Symbol	Description
	The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect risk of harm to the operator and to protect the apparatus against damage.
	Indicates dangerous voltages.
	Indicates a protected ground terminal.
	Indicates eye damage may result from directly viewing the light produced by the deuterium lamp used in this product.
	The apparatus is marked with this symbol when hot surfaces are available and the user should not touch it when heated up.

#### WARNING

##### A WARNING

alerts you to situations that could cause physical injury or death.

- Do not proceed beyond a warning until you have fully understood and met the indicated conditions.

#### CAUTION

##### A CAUTION

alerts you to situations that could cause loss of data, or damage of equipment.

- Do not proceed beyond a caution until you have fully understood and met the indicated conditions.



## General Safety Information

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

**WARNING**

**Ensure the proper usage of the equipment.**

**The protection provided by the equipment may be impaired.**

→ The operator of this instrument is advised to use the equipment in a manner as specified in this manual.

---

## Safety Standards

This is a Safety Class I instrument (provided with terminal for protective earthing) and has been manufactured and tested according to international safety standards.

## Operation

Before applying power, comply with the installation section. Additionally the following must be observed.

Do not remove instrument covers when operating. Before the instrument is switched on, all protective earth terminals, extension cords, auto-transformers, and devices connected to it must be connected to a protective earth via a ground socket. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in serious personal injury. Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any intended operation.

Make sure that only fuses with the required rated current and of the specified type (normal blow, time delay, and so on) are used for

replacement. The use of repaired fuses and the short-circuiting of fuse holders must be avoided.

Some adjustments described in the manual, are made with power supplied to the instrument, and protective covers removed. Energy available at many points may, if contacted, result in personal injury.

Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided whenever possible. When inevitable, this has to be carried out by a skilled person who is aware of the hazard involved. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present. Do not replace components with power cable connected.

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Do not install substitute parts or make any unauthorized modification to the instrument.

Capacitors inside the instrument may still be charged, even though the instrument has been disconnected from its source of supply. Dangerous voltages, capable of causing serious personal injury, are present in this instrument. Use extreme caution when handling, testing and adjusting.

When working with solvents, observe appropriate safety procedures (for example, goggles, safety gloves and protective clothing) as described in the material handling and safety data sheet by the solvent vendor, especially when toxic or hazardous solvents are used.

## Waste Electrical and Electronic Equipment Directive

### Abstract

The Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC), adopted by EU Commission on 13 February 2003, is introducing producer responsibility on all electric and electronic appliances starting with 13 August 2005.

#### NOTE

This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category:

With reference to the equipment types in the WEEE Directive Annex I, this product is classed as a Monitoring and Control Instrumentation product.

---



#### NOTE

Do not dispose of in domestic household waste

To return unwanted products, contact your local Agilent office, or see [www.agilent.com](http://www.agilent.com) for more information.

---

## Lithium Batteries Information

### WARNING

Lithium batteries may not be disposed-off into the domestic waste. Transportation of discharged Lithium batteries through carriers regulated by IATA/ICAO, ADR, RID, IMDG is not allowed.

**Danger of explosion if battery is incorrectly replaced.**

- Discharged Lithium batteries shall be disposed off locally according to national waste disposal regulations for batteries.
  - Replace only with the same or equivalent type recommended by the equipment manufacturer.
- 



### WARNING

**Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.**

**Udskiftning må kun ske med batteri af samme fabrikat og type.**

- Lever det brugte batteri tilbage til leverandøren.
- 

### WARNING

**Lithiumbatteri - Eksplosionsfare.**

**Ved udskiftning benyttes kun batteri som anbefalt av apparatfabrikanten.**

- Brukt batteri returneres apparatleverandøren.
- 

### NOTE

Bij dit apparaat zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.

---

## Radio Interference

Cables supplied by Agilent Technologies are screened to provide optimized protection against radio interference. All cables are in compliance with safety or EMC regulations.

### Test and Measurement

If test and measurement equipment is operated with unscreened cables, or used for measurements on open set-ups, the user has to assure that under operating conditions the radio interference limits are still met within the premises.

## Sound Emission

### Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive of 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB.

- Sound Pressure  $L_p < 70$  dB (A)
- At Operator Position
- Normal Operation
- According to ISO 7779:1988/EN 27779/1991 (Type Test)

## Solvent Information

### Flow Cell

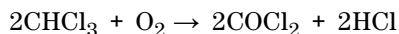
To protect optimal functionality of your flow-cell:

- Avoid the use of alkaline solutions (pH > 9.5) which can attack quartz and thus impair the optical properties of the flow cell.

### Use of Solvents

Observe the following recommendations on the use of solvents.

- Brown glass ware can avoid growth of algae.
- Avoid the use of the following steel-corrosive solvents:
  - Solutions of alkali halides and their respective acids (for example, lithium iodide, potassium chloride, and so on),
  - High concentrations of inorganic acids like sulfuric acid and nitric acid, especially at higher temperatures (if your chromatography method allows, replace by phosphoric acid or phosphate buffer which are less corrosive against stainless steel),
  - Halogenated solvents or mixtures which form radicals and/or acids, for example:



This reaction, in which stainless steel probably acts as a catalyst, occurs quickly with dried chloroform if the drying process removes the stabilizing alcohol,

- Chromatographic grade ethers, which can contain peroxides (for example, THF, dioxane, di-isopropyl ether) such ethers should be filtered through dry aluminium oxide which adsorbs the peroxides,
- Solvents containing strong complexing agents (e.g. EDTA),
- Mixtures of carbon tetrachloride with 2-propanol or THF.

## UV Radiation

Emissions of ultraviolet radiation (200 – 315 nm) from this product is limited such that radiant exposure incident upon the unprotected skin or eye of operator or service personnel is limited to the following TLVs (Threshold Limit Values) according to the American Conference of Governmental Industrial Hygienists:

**Table 14** UV radiation limits





Exposure/day	Effective irradiance
8 h	0.1 $\mu\text{W}/\text{cm}^2$
10 min	5.0 $\mu\text{W}/\text{cm}^2$

Typically the radiation values are much smaller than these limits:

**Table 15** UV radiation typical values

Position	Effective irradiance
Lamp installed, 50 cm distance	average 0.016 $\mu\text{W}/\text{cm}^2$
Lamp installed, 50 cm distance	maximum 0.14 $\mu\text{W}/\text{cm}^2$

## Declaration of Conformity for HOX2 Filter

<b>Declaration of Conformity</b>																											
<p>We herewith inform you that the</p> <p style="text-align: center;"><b>Holmium Oxide Glass Filter</b></p> <p>used in Agilent's absorbance detectors listed in the table below meets the requirements of National Institute of Standards and Technology (NIST) to be applied as certified wavelength standard.</p> <p>According to the publication of NIST in J. Res. Natl. Inst. Stand. Technol. 112, 303-306 (2007) the holmium oxide glass filters are inherently stable with respect to the wavelength scale and need no recertification. The expanded uncertainty of the certified wavelength values is 0.2 nm.</p> <p>Agilent Technologies guarantees, as required by NIST, that the material of the filters is holmium oxide glass representing the inherently existent holmium oxide absorption bands.</p> <p>Test wavelengths:</p> <p>Where "x" can be any alphanumeric character</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 25%;">Product Number</th> <th style="width: 25%;">Series</th> <th style="width: 15%;">Measured Wavelength *</th> <th style="width: 15%;">Wavelength Accuracy</th> <th style="width: 20%;">Optical Bandwidth</th> </tr> </thead> <tbody> <tr> <td>G1315x, G1365x</td> <td>1100, 1200, 1260</td> <td rowspan="3">361.0 nm 418.9 nm 453.7 nm 536.7 nm</td> <td rowspan="3">+/- 1 nm</td> <td rowspan="3">2 nm</td> </tr> <tr> <td>G7115x, G7165x</td> <td>1260</td> </tr> <tr> <td>G1600x, G7100x</td> <td>CE</td> </tr> <tr> <td>G1314x</td> <td>1100, 1200, 1260, 1290</td> <td rowspan="3">360.8nm 418.5nm 536.4nm</td> <td rowspan="3">+/- 1 nm</td> <td rowspan="3">6 nm</td> </tr> <tr> <td>G7114x</td> <td>1260, 1290</td> </tr> <tr> <td>G4286x....., 94x</td> <td>1120, 1220</td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 10px;">*) The variation in Measured Wavelength depends on the different Optical Bandwidth.</p>					Product Number	Series	Measured Wavelength *	Wavelength Accuracy	Optical Bandwidth	G1315x, G1365x	1100, 1200, 1260	361.0 nm 418.9 nm 453.7 nm 536.7 nm	+/- 1 nm	2 nm	G7115x, G7165x	1260	G1600x, G7100x	CE	G1314x	1100, 1200, 1260, 1290	360.8nm 418.5nm 536.4nm	+/- 1 nm	6 nm	G7114x	1260, 1290	G4286x....., 94x	1120, 1220
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<p>28-Oct-2014</p> <p>(Date)</p> <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 20px;"> <div style="text-align: center;">               _____              (R&amp;D Manager)         </div> <div style="text-align: center;">               _____              (Quality Manager)         </div> </div>																											
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## In This Book

This manual contains technical reference information about the Agilent 1290 Infinity II LC.

The manual describes the following:

- introduction,
- product description,
- best practices,
- system optimization,
- quick start guide.

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