Waters® 1500 Series HPLC Pumps

As your lab's productivity demands increase, so do expectations for the reliability, performance and flexibility of your solvent delivery system. Waters 1500 Series HPLC pumps have been designed to meet all of your flow range needs, from low flow to preparatory. Exceptional flow rate across all ranges provides you with precision and accuracy, delivering the chromatographic reproducibility that you need to fully automate all your processes. With exceptional solvent blending and pulse-free delivery, the Waters 1500 Series HPLC pumps can meet your most sensitive application challenges.

1515/1525 HPLC PUMPS
Operating Specifications

Control	Breeze™ Version 3.2, 3.3, MassLynx Version 3.5, 4.0, and Empower™ Software
Number of Eluents	1515: One; 1525: One or two
Programmable Flow Rate Range	0.00 - 10.00 mL/min in 0.01 mL increments
Flow Precision	≤ 0.1% RSD or 2 seconds SD, six replicates, based on retention time or volumetric measures, at 1 mL/min, 1000 - 2000 psi backpressure, PQ test (each pump individually)
Flow Accuracy	+/- 1.0 % of setting at 1.0 mL/min or 30 µL/min, whichever is greater, using degassed methanol, 1000 - 2000 psi backpressure (each pump individually)
Maximum Operating Pressure	6000 psi (41,370 kPa, 401 bar)
Operating Pressure Limits	Software programmable high and low pressure limits; User selectable in psi, kPa, bar
Delay Volume (1525)	< 200 µL (with one GM 150 mixer)
Gradient Compositional Accuracy (1525)	± 0.5% of setting at 1 mL/min and 1000 psi backpressure (Methanol: Methanol with propylparaben) with one GM 150 mixer
Gradient Compositional Precision (1525)	< 0.5% RSD of setting at 1 mL/min and 1000 psi back pressure (Methanol: Methanol with propylparaben) with one GM 150 mixer (based on 6 replicates of compositional accuracy)
Pressure Ripple (one pump)	≤ 2.0% at 1 mL/min, degassed methanol, at 1000 psi backpressure
Gradient Ripple	<1.5% normalized to full scale between 10 - 90%, 1.0 mL/min, and 1000 psi backpressure (methanol: methanol with propylparaben with one GM 150 mixer)

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1525µ Binary HPLC Pump Operating Specifications

Control	MassLynx™ 4.0 (SP1) and Breeze™ 3.3 software
Programmable Flow Rate	0.00 - 5.00 mL/min, in 0.01 mL/min increments
Flow Precision	2 secs SD, six replicates based on retention time or volumetric measures at 0.2 mL/min 1000 - 2000 psi back pressure, PQ test (each pump individually)
Flow Accuracy	2% of setting at 0.1mL/min using degassed methanol at 1000 - 2000 psi backpressure (each pump individually)
Maximum Operating Pressure	6000 psi (41,370 kPa, 401 bars)
Operating Pressure Limits	Software programmable high and low pressure limits; user selectable in psi, kPa, bar
Delay Volume	< 30 µL (without mixer) < 100 µL (with one 50 µL mixer)
Gradient Accuracy	< 1% of setting (typical) at 0.1 mL/min between 10 - 90%, and 1000 psi backpressure (methanol: methanol with propylparaben and one 50 µL mixer)
Gradient Precision	< 0.5% RSD (typical) between 10 - 90%, 0.1 mL/min, and 1000 psi backpressure (methanol: water with octanophenone and one 50 µL mixer)
Pressure Ripple (one pump)	< 2.0% at 0.5 mL/min, degassed methanol, at 1000 - 2000 psi backpressure
Gradient Ripple	<1.5% normalized to full scale between 10 - 90%, 0.1 mL/min, and 1000 psi backpressure (methanol: methanol with propylparaben) with one 50 µL mixer

1525EF Binary HPLC Pump Operating Specifications

Control	MassLynx™ 4.0 (SP1) and Breeze™ 3.3 software
Programmable Flow Rate	0.00-22.50 mL/min, in 0.01 mL/min increments
Flow Precision	≤ 0.1% RSD or 2 secs SD, six replicates, based on retention time or volumetric measures at 1 mL/min, 1000 - 2000 psi backpressure, PQ test (each pump individually)
Flow Accuracy	± 1.0% of setting at 1.0 mL/min, or 30 µL/min, whichever is larger, using degassed methanol at 1000 - 2000 psi backpressure (each pump individually)
Maximum Operating Pressure	5000 psi (34,474 kPa, 345 bars)
Operating Pressure Limits	Software programmable high and low pressure limits; user selectable in psi, kPa, bar
Delay Volume	< 100 µL (without mixer) < 600 µL (with one GM 150 mixer)

Gradient Accuracy	< ± 1% of setting at 1.0 mL/min and 1000 psi back pressure between 10 - 90%, (methanol: methanol with propylparaben and one GM 150 mixer)
Gradient Precision	< 0.5% RSD at 1 mL/min and 1000 psi backpressure (methanol: methanol with propylparaben and one GM 150 mixer)
Pressure Ripple (one pump)	< 3.0% at 22.5 mL/min, degassed methanol, at 1000 psi backpressure
Gradient Ripple	< 1.5% normalized to full scale between 10 - 90%, 1.0 mL/min, and 1000 psi backpressure (methanol: methanol with propylparaben with one GM 150 mixer)

Physical Specifications

Acoustic Noise	< 70 dB (A) at operator position
Operating Temperature Range	4° C - 40° C
Operating Humidity Range	20 - 80%, non-condensing
Physical Size (WxHxD)	12 inches x 17 inches x 24 inches
(without bottle holder)	30.5 cm x 43 cm x 61 cm
Weight	1515 pump: 45 lbs. or 20.4 kg
	1525 pumps: 60 lbs. or 27.2 kg

Power Requirements

Voltage Range	120/240 VAC
Frequency	50/60 Hz

Instrument Control and Communication

IEEE - 488 Address Select	Back of instrument
Event I/O	Back of instrument
	Detachable terminal strip

1500 SERIES MANUAL INJECTOR (applicable for 1515, 1525, 1525EF)

Rheodyne® 7725i Injector
Operating Specifications

Inject Switch	Contact closure, pre-wired
Mounting	Integral for 1500 Series HPLC pumps
Sample Holdup	Zero (0)
Flow During Switching	Continuous, make-before-break
Injection	Partial or full loop
Loop Size	20 µL (standard)
	Changeable, (5, 50 and 200 µL supplied)
Wetted Materials	316 ss, ceramic, inert polymers

1500 SERIES COLUMN HEATER

Operating Specifications

Set Point Temperature Range	20° C - 60° C; set ≤ 5° C above ambient temperature
Temperature Accuracy	± 0.8° C
Temperature Precision	± 0.25° C
Pre-column Heating of Mobile Phase	± 0.5° C of column temperature up to 5 mL/min.
Pre-heat Tube Volume	Approximately 35 µL
Column Capacity	Up to four 7.8 mm x 300 mm without guard columns Two columns with guard columns

Physical Specifications

Physical Size (WxHxD)	6 inches x 17 inches x 14 inches 15.2 cm x 43 cm x 35.6 cm
Weight	13 lbs. or 5.9 kg

Power Requirements

Input Voltage Range	120/240 VAC
Input Frequency Range	50/60 Hz

Instrument Control and Communication

IEEE - 488 Address Select	Back of instrument

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