

QL-UltraTrace

QUAKELOGIC

ULTRA-HIGH PERFORMANCE
LIQUID CHROMATOGRAPHY
SYSTEM



QL-UltraTrace

Ultra-High Performance Liquid Chromatography System



HIGH-SENSITIVITY UHPLC FOR TRACE ANALYSIS

The QL-UltraTrace is a fully integrated ultra-high-performance liquid chromatography system built for high-sensitivity trace and ultra-trace contaminant analysis across complex matrices – PFAS, pesticides, antibiotics, AMR research, and fatty acids. It combines a quaternary ultra-high-pressure pump, refrigerated autosampler, temperature-controlled column oven, and DAD/PDA detector on a PFAS-compatible inert flow path, delivering pressures to 130 MPa with documented MS/MS integration readiness for laboratories requiring rigorous quantitative results.

- PFAS-compatible biocompatible flow path avoids metallic sample contact, protecting sensitive trace analyses from contamination and background interference.
- Operating pressures up to 130 MPa (1,300 bar) support fast, high-resolution separations across a wide range of column chemistries.
- Ultra-low carryover below 0.002% and total system dispersion under 12 μ L ensure reliable, repeatable quantitative results.
- Documented hardware and software MS/MS compatibility protects the investment by enabling future LC-MS/MS workflow expansion.

STANDARD FEATURES »

- Quaternary UHP Pump
- Integrated Solvent Degassing
- Refrigerated Autosampler
- Peltier Column Oven
- DAD/PDA Detector
- Chromatography Workstation
- Computer and Monitor
- C18 Reversed-Phase Column
- Four Solvent Bottles
- Tubing and Fittings
- Sample Loops to 1 mL
- Maintenance Toolkit
- Starter Vials and Caps
- Dual Leak Sensors
- Over-Temperature Protection
- Fault Diagnostics

Key Features

- Four-channel quaternary gradient pump with integrated degassing and compressibility compensation delivers precise, stable gradients from 0.0001 mL/min.
- Refrigerated autosampler holds up to 120 vials or dual 96-well plates with sub-0.002% carryover for demanding sample throughput.
- Peltier column oven manages up to six columns from 4–85 °C with automated switching for method flexibility and walk-away operation.
- DAD/PDA detector spans 190–800 nm with 1.2/0.6 nm resolution, giving sensitive, spectrally rich detection down to $\leq 7.0 \times 10^{-9}$ g/mL.
- PFAS-compatible inert flow path keeps metallic contact off the sample, essential for credible ultra-trace environmental and residue results.
- Total system band spread ≤ 12 μ L preserves peak sharpness and separation efficiency for high-resolution trace quantitation.
- Complete chromatography workstation provides method, sequence, quantification, and reporting tools with audit trail and electronic signatures.
- Software supports 21 CFR Part 11, GMP, cGMP, and ICH data-integrity requirements for regulated analytical environments.
- Documented MS/MS compatibility enables scheduled MRM, positive/negative ionization, and isotope-labelled internal standard workflows on future integration.

PRODUCT FEATURES

Pump System

Four-channel quaternary gradient with integrated degassing · Flow range 0.0001–5.0000 mL/min, 0.0001 mL/min increment · Maximum pressure 130 MPa (1,300 bar / ~18,850 psi)

Flow Path

Low-dead-volume PFAS-compatible biocompatible/inert path · Avoids metallic sample contact where required · Compatible with aqueous and organic UHPLC-MS/MS phases

Autosampler

Injection range 0–100 μ L, extendable to 1,000 μ L · Refrigerated 4–40 °C; up to 120 vials or dual 96-well plates · Programmable washing, dilution, and derivatization

Column Oven

Peltier heating/cooling 4–85 °C, precision ≤ 0.1 °C · Capacity up to six columns with automated switching · Preheating, leak detection, over-temperature protection

DAD/PDA Detector

Wavelength range 190–800 nm; 512/1024 diode elements · Spectral resolution 1.2 nm / 0.6 nm; sampling 2–20 Hz · Automatic wavelength calibration, dual leak sensors

Data & Compliance

Full instrument control, quantification, and reporting · Audit trail, electronic signatures, multi-level access · Supports 21 CFR Part 11, GMP, cGMP, ICH

For more information about the features, specifications, and available configurations of the QL-UltraTrace, please contact QuakeLogic.

SYSTEM CONFIGURATION

COMPONENT	CONFIGURATION
Pump	Four-channel quaternary gradient, 130 MPa, integrated degassing
Autosampler	Refrigerated 4–40 °C, up to 120 vials or dual 96-well plates
Column Oven	Peltier 4–85 °C, up to six columns, automated switching
Detector	DAD/PDA, 190–800 nm, 512/1024 diode elements
Flow Path	Low-dead-volume PFAS-compatible biocompatible/inert
Software	Chromatography data workstation with 21 CFR Part 11 support
Computer	Complete PC system with monitor and system cables
Column	C18 reversed-phase UHPLC column (included)

EXTENDED INJECTION RANGE

Additional autosampler configurations extend injection volume capability up to 1,000 µL for large-volume sample workflows.

AUTOMATED COLUMN SWITCHING

Adds automated switching across the multi-column oven for unattended method changes and higher sample throughput.

SELECTABLE FLOW CELLS

Multiple DAD/PDA flow-cell configurations optimize path length and sensitivity for varied detection requirements.

MS/MS INTEGRATION

Documented hardware and software compatibility enables future integration with tandem quadrupole mass spectrometry for LC-MS/MS workflows.

TECHNICAL SPECIFICATIONS

SPECIFICATION	DESCRIPTION
System Type	Integrated UHPLC/DAD analytical platform
Pump Configuration	Four-channel quaternary gradient, integrated degassing
Flow Range	0.0001–5.0000 mL/min
Flow Increment	0.0001 mL/min
Flow Accuracy	≤±0.2% at 1.0000 mL/min
Flow Precision	≤0.06% at 1.0000 mL/min
Maximum Pressure	130 MPa / 1,300 bar / ~18,850 psi up to 2.0000 mL/min
Compressibility Comp.	Automatic continuous
System Dispersion	Total band spread ≤12 µL
Injection Range	0–100 µL, extendable to 1,000 µL
Injection Accuracy	<0.5%
Injection Repeatability	<0.2%
Injection Linearity	R ² >0.999
Carryover	<0.002%
Autosampler Cooling	4–40 °C refrigerated
Autosampler Capacity	120 × 2 mL vials or dual 96-well plates
Fastest Injection	As low as 1 second

SPECIFICATION	DESCRIPTION
Column Oven Range	4–85 °C, Peltier heating/cooling
Oven Precision	≤0.1 °C
Column Capacity	Up to 6 columns
Detector Wavelength	190–800 nm
Diode Elements	512 / 1024
Spectral Resolution	1.2 nm / 0.6 nm
Wavelength Accuracy	±1 nm
Wavelength Precision	≤0.1 nm
Sampling Frequency	2–20 Hz
Min. Detectable Conc.	≤7.0 × 10 ⁻⁹ g/mL
Flow Path	PFAS-compatible biocompatible/inert, low dead volume
Electrical	110–220 VAC, 50–60 Hz
Operating Temperature	4–40 °C
Relative Humidity	20–85%
Compliance	21 CFR Part 11, GMP, cGMP, ICH
Warranty	Two years, with installation and training

QL CHROMATOGRAPHY DATA WORKSTATION

The bundled chromatography data workstation covers the full analytical workflow — instrument control, method and sequence management, data acquisition, integration, quantification, and reporting — with built-in system-suitability evaluation, fault diagnostics, and real-time monitoring. Multi-level user access, audit trail, electronic signatures, and database storage support regulated environments including 21 CFR Part 11, GMP, cGMP, and ICH.

INSTRUMENT CONTROL

Provides unified control of the quaternary pump, autosampler, column oven, and DAD/PDA detector, with real-time status monitoring, pressure and temperature alarms, leak detection, and integrated fault diagnostics across the complete UHPLC flow path.

DATA & QUANTIFICATION

Handles data acquisition, integration, calibration, and quantitative analysis with customizable reports and system-suitability evaluation. Database storage and network operation centralize results, supporting reliable retention-time stability review and repeatable trace-level quantitation.

COMPLIANCE & INTEGRITY

Enforces data-integrity requirements through audit trail, electronic signatures, and multi-level user access, meeting 21 CFR Part 11, GMP, cGMP, and ICH. Documented compatibility allows subsequent integration with compatible MS software for LC-MS/MS.

Corporate Headquarters:**QUAKELOGIC INC.**

2008 Opportunity Dr., Suite 130
Roseville, CA 95678, USA

Monday – Friday

9:00 AM – 5:00 PM (PST/PDT)

Contact Us:

Phone: +1 (916) 899-0391

Email: sales@quakelogic.net

Web: products.quakelogic.net

About QuakeLogic:

QuakeLogic Inc. is a California-based engineering and technology company providing innovative, reliable, high-quality solutions to customers worldwide.

Our Commitment

We are committed to quality, innovation, and customer satisfaction – building lasting partnerships through reliable solutions and dependable support.

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