

Science with Passion



Liquid Handler LH 8.1

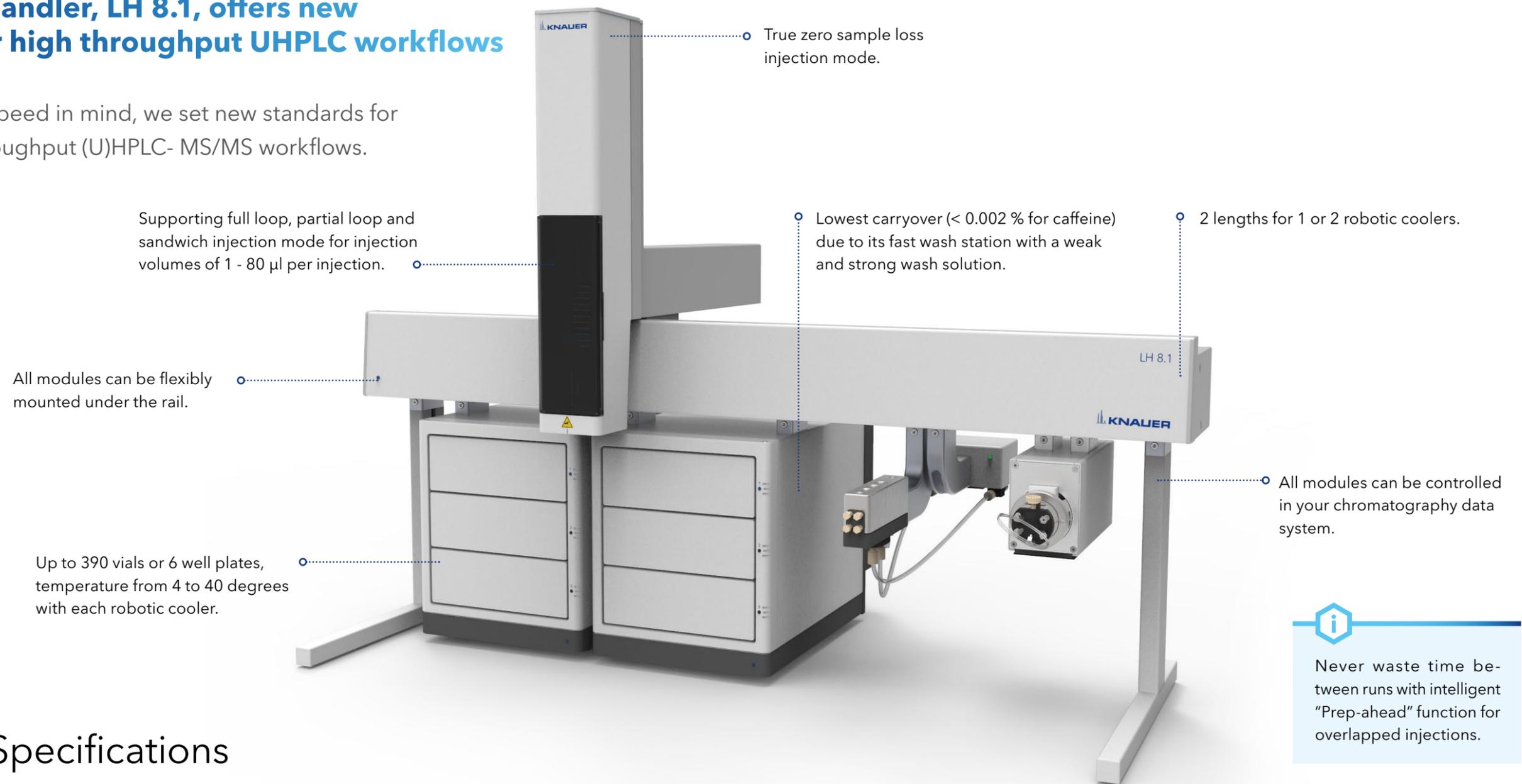


High-throughput Autosampler

think **LC.** think **KNAUER.**

Knauer liquid handler, LH 8.1, offers new possibilities for high throughput UHPLC workflows

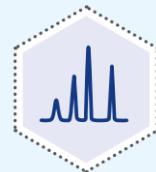
With simplicity and speed in mind, we set new standards for demanding high throughput (U)HPLC- MS/MS workflows.



Analytical Specifications



Injection volume:
1 - 80 µl (higher injection volumes possible on request)



Injection precision:
RSD (Relative Standard Deviation): full loop injection: ≤ 0.10 %;
sandwich injection at an injection volume > 5 µl: < 0.15 %



Injection cycle time:
min. 7 sec in sandwich injection mode



Sample carry over:
< 0.002 % (caffeine)
< 0.005 % (chlorhexidine) with fast wash station

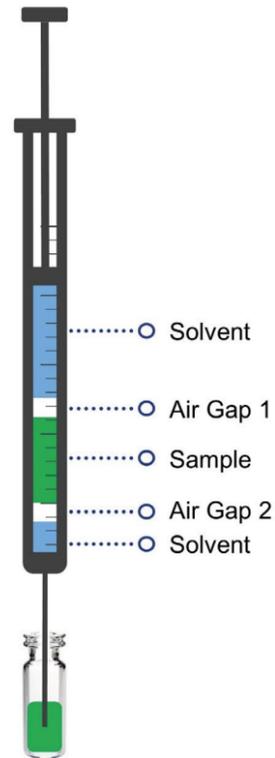
Injection Modes

Sandwich Injection Mode:

Zero sample loss with excellent repeatability

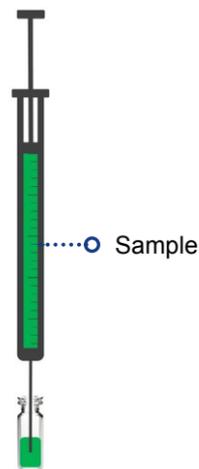
Are you tired of sacrificing high performance to avoid sample loss? This special injection mode enables both simultaneously.

- Only the amount of sample that is injected is aspirated by the syringe
- The sample plug is trapped between airgaps and transport solvent plugs
- Very high precision
- No sample loss



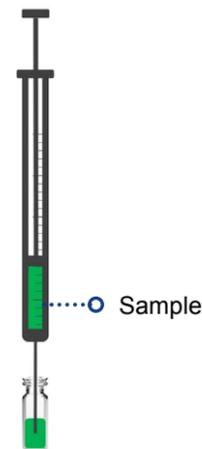
Full loop

- Sample loop is completely filled with sample
- Maximum reproducibility is achieved
- Injection volume equals the loop volume
- The sample loop will be overfilled to ensure a complete and reproducible filling



Partial loop

- Sample loop is partially filled with programmed amount of sample
- Injection mode is recommended for preparative tasks
- Maximum injection volume equals 50 % of the loop volume
- No sample loss



Injection Syringes

The place where sample take-up happens

Extensively tested injection syringes giving outstanding results in injection precision and carry over are directly implemented in the LH 8.1 software drivers. They can be used like a plug and

play item. Additionally, a series of widespread syringes with varying volumes can be fitted into the LH 8.1 tower.

Recommended Syringes	Order No.
25 µl syringe, 22s gauge, polished and coated for chemical inertness	A510542
50 µl syringe, 22s gauge, polished and coated for chemical inertness	A510543
100 µl syringe, 22 gauge, polished and coated for chemical inertness	A510544-1
100 µl syringe, gauge 22, starter model	A510548



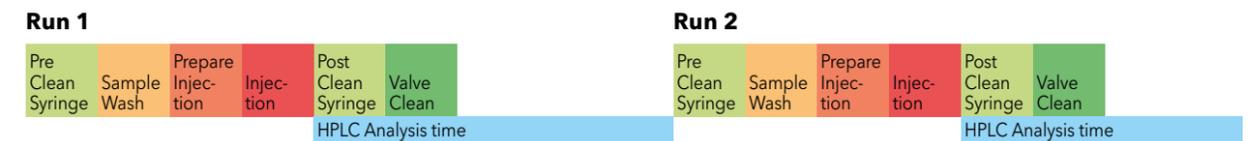
Fast cycle times - with overlapped injections.

The LH 8.1 is optimized to save time during injection and movement.

To further reduce analysis cycle time, the sampler can apply the "overlapped injections" function, where the sample is already prepared inside the

syringe. Then the sample can be injected directly after the end of the current run.

Without Overlapped Injections



With Overlapped Injections



Great variety of modules available

KNAUER offers a range of modules for easy customization of your LH 8.1.

The LH 8.1 is completely based on modular technology.

Want to have more samples and need a cooling option? Use the Robotic Cooler! Want a lower carry over? Install the Fast Wash Station with two different solvents for syringe and in- and outside needle cleaning.



Always a safe investment as the system can grow according to your needs.

Robotic Cooler

Sample storage and cooling

Store your samples at 4 - 40 °C. Insert up to 3 sample racks for 130 vials each for up to 390 sample vials per Robotic Cooler.

Depending on the rail length, up to 3 Robotic Coolers can be installed on a standard system. The resulting sample capacity is up to 1170 x 1.5 ml vials or 18 well plates for one LH 8.1 device.

The drawers can be opened just far enough to access the selected vial. This makes sure the contents are kept as cool as possible when a vial is sampled. The motorized trays also keep sampling



times extremely short, which also keeps heat and condensation out. The ability to open and close drawers without assistance makes this product unique in its field.

Fast Wash Station

- Most effective cleaning for minimized carry-over by washing the syringe and the in- and outside of its needle
- No worries about ageing washing solutions: Two different solvents are freshly pumped into the wash station when a cleaning step is executed
- Fast wash cycles without movement: The syringe can be filled and emptied in the same wash port



HPLC Injection Valve

- The LH 8.1 injection valve is a 6 port 2-position valve with a special optimized port
- Due to rapid switching, the flow path is only interrupted for a very short time and pressure peaks are reduced to a minimum
- No need to program valve parameters in the software. The "plug and play" valves are identified via RFID technology for easy and error-free valve exchange
- Never worry about the condition of the injection valve. Monitoring of GLP data simplifies maintenance by logging valve switches for a timely exchange of wear parts like the rotor seal



Other modules

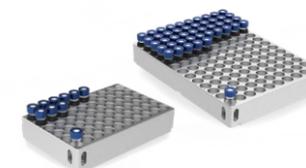
- Manual wash station with 2 reservoirs and waste line



- Manual wash station with 5 reservoirs and waste line



- Sample racks for 60 or 130 vials, for Robotic Cooler



- Manual wash station with 6 reservoirs and waste line



- Manual sample rack holder incl. manual wash station



Intuitive Control via CDS

Multiple CDS drivers are available for the integration of the LH 8.1 to your (U)HPLC MS/MS system

ClarityChrom® CDS is a user-friendly and powerful chromatography data system designed for workstation environments. Its modular architecture allows seamless integration of optional extensions, including GPC, KNAUER FRC (Fraction Collector) control, as well as advanced function-

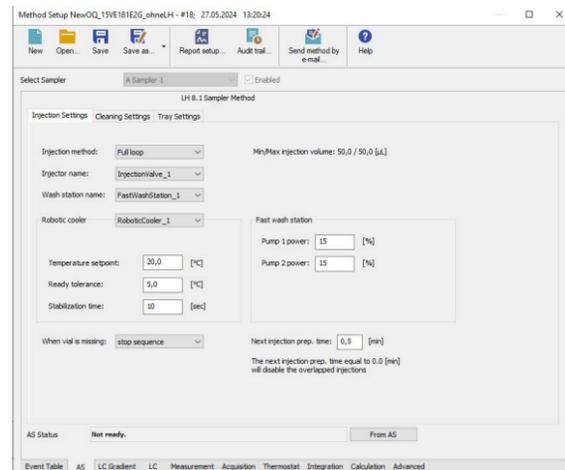
alities for PDA, SST, SEC/GPC, and MS applications. This flexibility makes ClarityChrom® the ideal solution for a wide range of chromatography workflows, delivering precision, efficiency, and reliability in every analysis.



Customer care

We offer support either remotely from the factory or on-site by one of the many representatives of the KNAUER service and support locations.

We offer service education programs for your OEM service team either at our location as well as on-site at your location.



Instrument Diagnostics

The LH 8.1 has been designed from the ground up with (remote) support as one of the most important design criteria. The system maintains an extensive logbook that records all system activities as well as all warning and error exceptions that have occurred. This is very helpful in understanding problems in the field, regardless of the cause. System health is monitored electronical-

ly and can be accessed by software. An automated performance check is also supported. This will indicate if the system (mechanically or electronically) is outside of factory specifications. The LH 8.1 system provides odometers for each axle to suggest service intervals. It also records the number of injections throughout the life of the system.

OEM Integration

The integration of a robotic autosampler in your product environment should be as smooth as possible without sacrificing functionality or quality.

Integration support directly from us to you

KNAUER offers several OEM packages, ranging from customization of exterior design to optimi-

zation, modification or adaption of hardware and software the customer's requirements.



SDK that fits in every environment

We offer an SDK (Software Development Kit) that is designed to support multiple environments.

- SDK supports Win10 interfacing using LAN or RS232 (C++, C# and Python supported and code samples provided). Free development support.
- SDK supports Linux interfacing on Intel PC using LAN or RS232 (C++ and Python supported and code samples provided). Free development support.
- SDK supports Embedded Linux interfacing on ARM CPUs using LAN or RS232 (C++ and Python supported and code samples provided). Free development support.

Simulator application for software development teams

Our software development team has come up with a unique tool to expedite software integration, even without a physical sampler available. With this tool, the full functionality of LH 8.1 is available.

This provides unique opportunities to explore different modules and combinations more easily and quickly. This feature is also ideal for software developers working remotely.



Superior integration support

- Custom software solutions
- Any mix of standard rail mounted options
- Development of custom rail-mounted options
- Various APIs (Windows and Linux) for easy integration of sample handling into your software

Ordering details

Device	
A5100	LH 8.1 Liquid Handler, 557 mm version with manual tray holder, including injection valve and fast wash station
A51001	LH 8.1 Liquid Handler, 557 mm version with Robotic Cooler, including injection valve and fast wash station
A5110	LH 8.1 Liquid Handler, 887 mm version with manual tray holder, including injection valve and fast wash station
A51101	LH 8.1 Liquid Handler, 887 mm version with Robotic Cooler, including injection valve and fast wash station
Accessories	
A5101	Fast wash station LH 8.1 complete incl. dual liquid pump
A5102	Manual wash station for LH 8.1, 2 x 60 ml + waste port
A51021	Manual wash station for LH 8.1, 6 x 10 ml
A51022	Manual wash station for LH 8.1, 5 x 10 ml, useable with A5103
A5103	Manual sample rack holder for LH 8.1, without racks
A5104	Robotic Cooler with 3 drawers and cooling function for LH 8.1, without sample racks
A51041	Sample rack 60 x 1.5 ml vials for LH 8.1 Robotic Cooler or manual rack holder
A51042	Sample rack 130 x 1.5 ml vials for LH 8.1 Robotic Cooler or manual rack holder
A5105	Injection valve drive for LH 8.1 without valve
A51051	Injection valve for LH 8.1 without valve drive, useable with A5105
A510511	Injection port, HPE, zero dead volume, for injection valve LH 8.1
Syringes	
A510542	25 µl syringe, polished and coated, PTFE Tip, fixed needle 22s gauge
A510543	50 µl syringe, polished and coated, PTFE Tip, fixed needle 22s gauge
A510544-1	100 µl syringe, polished and coated, PTFE Tip, fixed needle 22 gauge
A510548	100 µl syringe, starter model, PTFE Tip, fixed needle 22 gauge

Specifications

General	
System type	XYZ autosampler with syringe
Syringe sizes	25 - 100 µl (other volumes possible)
Dimensions	Length: 447 mm up to 887 mm in steps of 110 mm Standard models: 557 mm and 887 mm Depth: 520 mm Height: 655 - 681 mm (incl. rail mounted options and supports)

Weight	~ 15.5 kg (~ 27 kg with robotic cooler)
Leak sensor	No
Ambient conditions	10 - 35 °C, 30 - 80 % RH, non-condensing
Software API	Comprehensive support for C#, C++, C and Python on Windows and (embedded) Linux OS
Electrical Interfaces	Solid State Relay Outputs (Ready, Inject, Auxiliary), Wide voltage digital inputs (Ready, Auxiliary)
GLP	Yes, valve switches, syringe injections
Display	No
Sample injection	
Sample injection modes	Full loop, Sandwich loop, Partial loop
Maximum back pressure	1240 bar
Sample capacity	6 sample racks per robotic cooler. Up to 3 Robotic Coolers on a standard system. 2 racks for manual rack holder.
Vial/plate dimensions	Per rack 60 x 1.5 ml vials, 96 well plates or 384 well plates possible. 130 x 1.5 ml vial rack available (2 rack positions needed)
Sample loop	Possible from 2 µl to 200 µl (not included)
Injection valve	Injection valve included (special 6 port, 2 position)
Switching time inj. valve	< 100 ms
Piercing needle precision	± 0.1 mm
Sample tray cooling/heating	4 - 40 °C optional with Robotic Cooler
Temperature control	Yes
Vial detection	Yes
Needle wash	Programmable by method
Wash solvent	2 minimum up to 10
Wetted materials	PTFE, PEEK, Stainless steel, Borosilicate glass
Analytical performance	
Injection volumes	1 - 80 µl (higher injection volumes possible on request)
Injection precision RSD (Relative Standard Deviation):	full loop injection: = 0.10 %; sandwich injection at an injection volume > 5 µl: < 0.15 %
Sample carry over	< 0.002 % with caffeine and fast wash station < 0.005 % with chlorhexidin and fast wash station
Communication	
Interfaces	LAN, RS232 serial
Control	Ethernet LAN, RS232 serial
Inputs	Wide voltage digital inputs

(U)HPLC • Prep. LC • FPLC • SMB • LNP • Osmometry



Innovation

Own hardware and software development



Customized solutions

Pumps, detectors, valves and systems adapted to your needs

think **LC.** think **KNAUER.**

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