Prep and Load Platform

DLW Option

DLW – Fast and Clean LC/MS Loading

High Throughput Screening
Environmental, Food Safety, Forensics
Preclinical Research, Metabolomics
Drug Metabolism, Pharmacokinetics
Protein Biomarker Discovery

CTC Analytics

Where design meets performance

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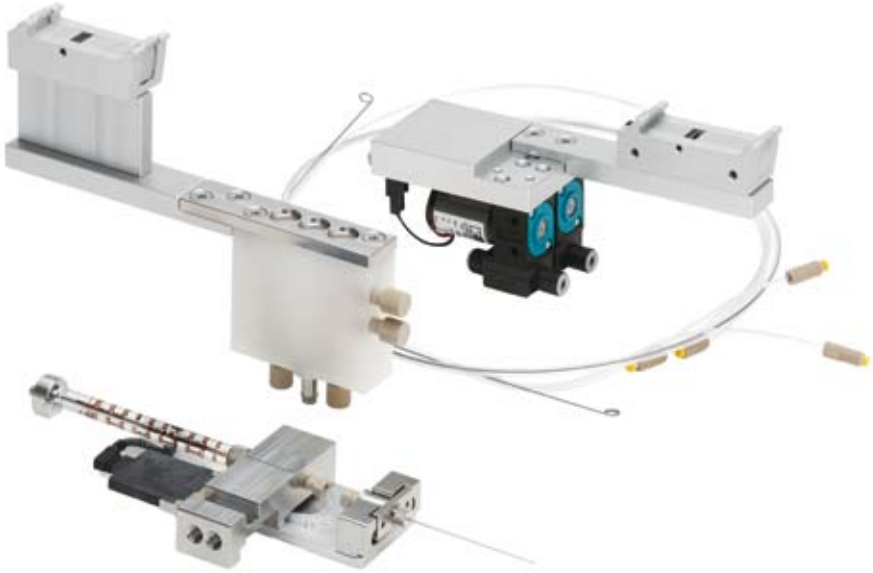
Part No. PAL Broch-ITEX-2-10

DLW wash station



DLW Upgrade kit
including Syringe set,
Pump and Wash Station

Specifications DLW Option

Wetted parts material:	Stainless steel, PEEK
Syringe Size:	100µl
Reproducibility (partial loop):	better than 1 % RSD (under specific conditions)
Carry over:	Typically less than 0.003% (30ppm)
Typical Clean Cycle Time:	less than 1 Minute (Fast Cycle)

Near Zero Carryover – Fast Cycles and exceptional reproducibility

Today's Mass Spectrometers are so sensitive that carryover becomes an issue again. To meet today's requirements for fast, clean and reproducible LC/MS injection; CTC developed the DLW Option for the PAL system (Dynamic Load and Wash).

Now the sample is no longer in contact with the syringe but it is aspirated into a holding loop. The syringe only acts as an aspirator and dispenser device in order to exactly measure the amount of sample which needs to be injected. This yields to excellent reproducibility. After injection, the whole sample path including the valve and the needle is washed from the rear with up to 2 different solvents. Active micro pumps deliver the required quantity of solvent fast and reliable. An active solenoid valve precisely stops solvent delivery or switches between solvents. At the end of the injection cycle all parts which have been in contact with the sample are completely clean. As a result, near-zero carryover is achieved for most components.

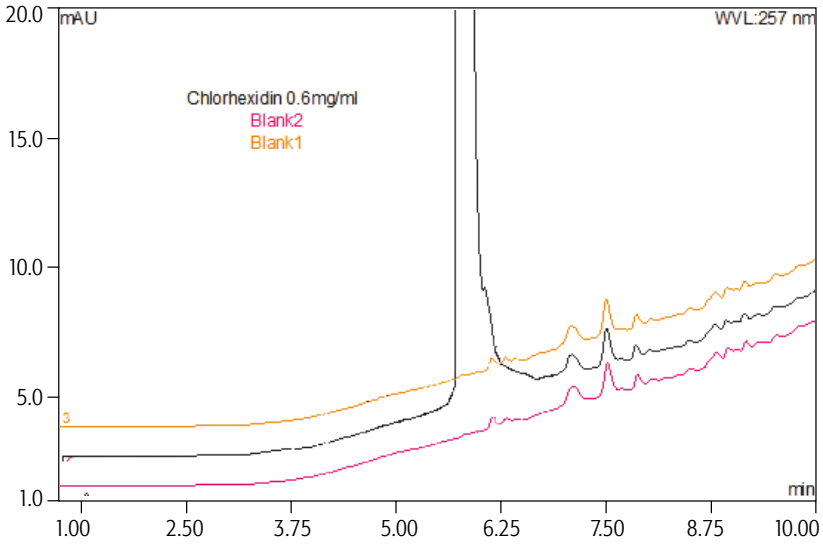
Carryover Results UV and MS

These tests show the excellent performance of the DLW in both UV and MS mode.

Carryover Test UV: Less than 30ppm carryover (Chlorhexidine)

Conditions for UV carryover test

Column:	Halo C18 2.1x50mm, 2.8 µm
Flow:	0.5ml/min
Injection:	Full Loop 2µl (PEEK)
Eluent:	A: H2O + 0.1% TFA / B: Acetonitrile + 0.1% TFA
Gradient:	10%B (0.5 min) – 10% to 90% B (7.5 min) – 90% B (1 min)
Wash1:	H2O + 0.1% TFA
Wash2:	Acetonitrile + 0.1% TFA
Detection:	UV, 257nm

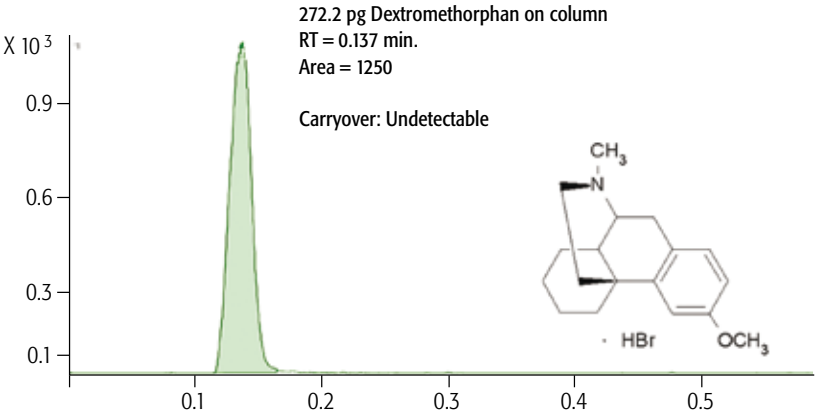


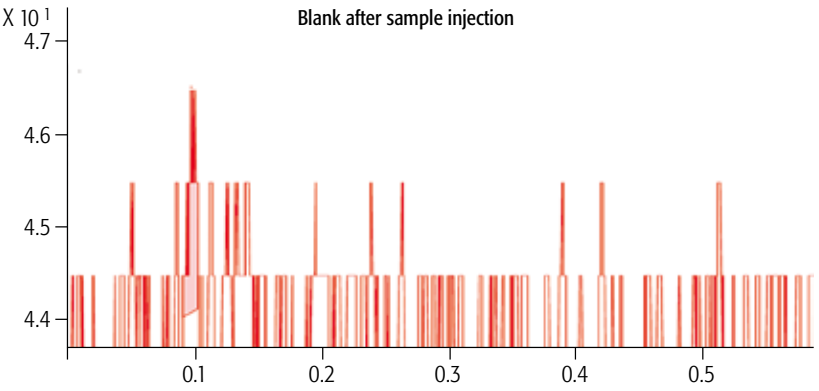
Injection of 1200 ng Chlorhexidine on column; followed by 2 blank injections using the new DLW option. Less than 0.003% (30ppm) of carryover could be detected.

Carryover Test MS: No Carryover detected (Dextromethorphan)

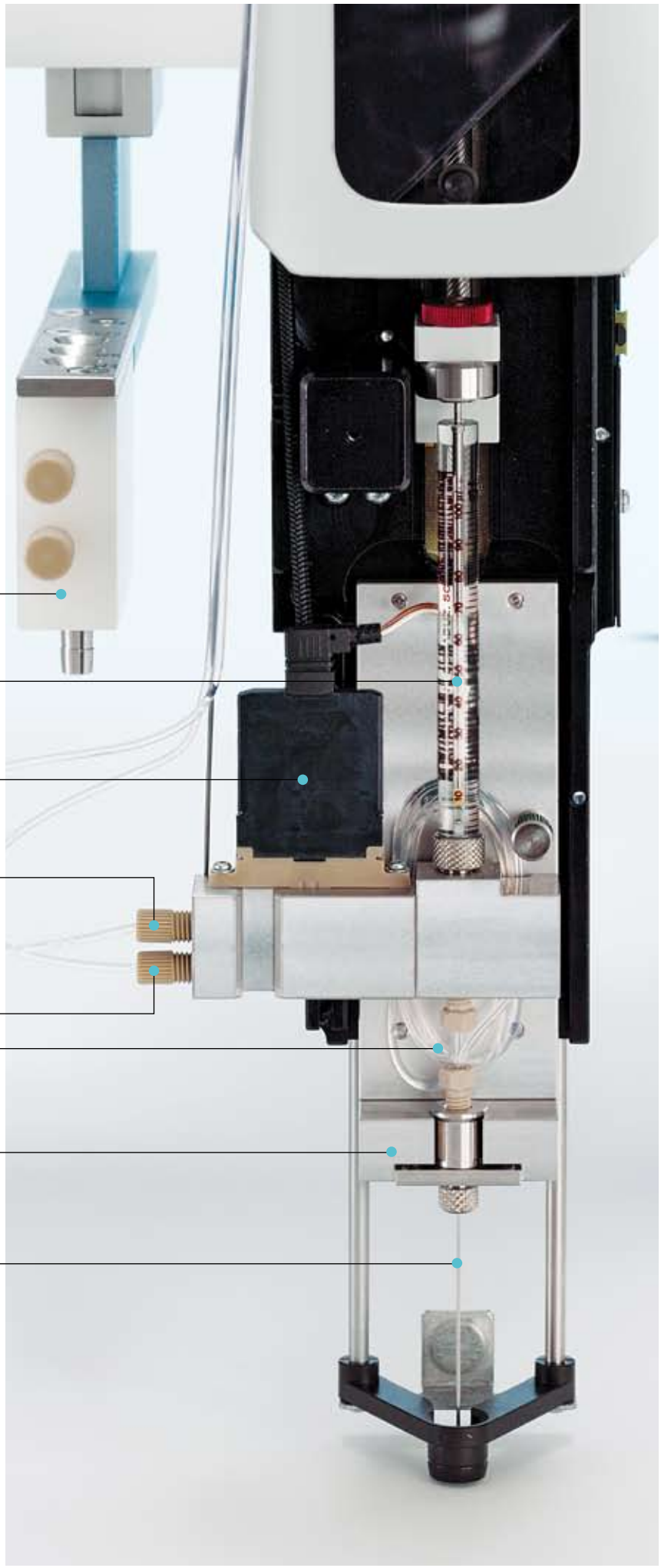
Conditions for MS carryover test

Flow:	0.8 ml/min
Injection:	Full Loop 2µl
Eluent	Isocratic: 40% A (H2O+0.1% TFA) & 60% B (Acetonitrile+0.1% TFA)
Wash1:	H2O + 0.1% TFA
Wash2:	Acetonitrile + 0.1% TFA
Detection:	MS (Agilent 6460 QQQ LC-MS/MS) +MRM: m/z 272.2 à m/z 215.2)
Dwell Time:	20ms
Interchannel delay:	3.5 ms
Cycle time =	50 ms

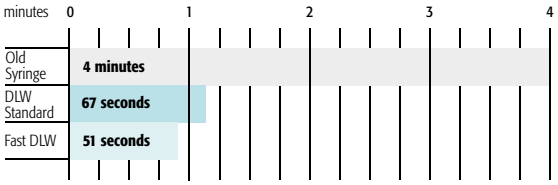




Injection of 272 .2 pg Dextromethorphan on column; followed by blank injection
No carryover could be detected.
MS Data provided by Agilent Technologies.


Wash Station
Syringe
Solenoid / Actuator Valve
Pump &
Solvent 1
Pump &
Solvent 2
Holding Loop
Spring loaded needle guide
Replaceable needle

Dynamic load and Wash Cycle principle



DLW Standard Cycle

cycle start

1. aspirate rear air segment
2. get sample aspirate rear, inject and front volume.
3. aspirate front air segment
4. passive needle clean outside in wash position 1
5. dispense front air segment and front sample volume to waste
6. valve to load postion and load inject volume
7. valve to inject position and start chromatography
8. dispense rear sample and air segment to waste
9. valve clean with wash liquid 2
10. active needle wash with wash liquid 2
11. valve clean with wash liquid 1
12. active needle wash with wash liquid 1

cycle end

DLW Fast Cycle

cycle start

1. aspirate rear air segment
2. get sample aspirate rear, inject and front volume.
3. aspirate front air segment
4. dispense front air segment and front sample volume to waste
5. valve to load postion and load inject volume
6. valve to inject position and start chromatography
7. dispense rear sample and air segment to waste
8. valve clean with wash liquid 2
9. valve clean with wash liquid 1
10. active needle wash with wash liquid 1

cycle end

Download pdf
Standard Cycle
Fast Cycle
Stator Wash Cycle
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PAL SYSTEM

LC/LC-MS General Specifications

System Type
XYZ robot with injection unit

Local User Interface
Control panel with 4 function keys, graphical LCD display, unique scroll knob for teach functions

Remote Control
Cycle Composer control software Windows 2000 / XP
Third party instrument drivers for major LC/LC-MS Systems

Maintenance
Accessibility to all maintenance parts from front
Preventative maintenance kits available

Electrical Control
1x RS232 / 1 x LAN (with optional PAL-*xt* Electronics)
3x TTL Input
2x Opto Coupler Input
2x Relay Output

Power Requirements
100-240V, 120W, 50/60Hz

Environment
4°C - 40°C constant temperature, < 80% humidity (non condensing)

Weight
~ 10kg (without accessories)

Electrical Safety Standards
CAN/CSA C22.2 No. 61010-1 / ANSI/UL 61010-1 / EN 61010-1

Sample Capacity*

up to	1400	1ml micro vials
	1296	2ml vials
	224	10 ml or 20 ml vials
	24	deepwell microplates (96/384 wells)
	24	standard microplates (96/384 wells)
		(* depends on PAL model)

Instrument Options
PAL MALDI Spotter / Fraction Collection
PAL Dilutor
PAL Multi Valve Drives
PAL Sample StackCooler / TrayCooler
4- 6- 10 port Injection and Switching Valves
UPLC Injection Valves up to 1000 bar / 15'000psi
PAL Column Selector Valve
PAL Barcode Reader

Specifications are subject to change without notice

Ordering details

PAL DLW-HTS-*xt*

	DLW Option including HTS-*xt* Upgrade Kit
1 pc	DLW Injection Adapter with sample holding loop and syringe 100µl
1 pc	Wash Station
1 pc	Wash Solvent Pump Station with 2 active micro pumps
2 pcs	1 Liter Wash Solvent bottles
2 pcs	Solvent bottle transfer line including PEEK solvent filter 10µm
1 pc	System CD ROM DLW including Cycles
1 pc	Manual DLW Option
1 pc	Kit HTS-*xt* (Control Board-xt for PAL System - Firmware 4.0.X)

Choose this kit if you want to upgrade an existing HTS PAL to the DLW Option

PAL DLW-HTC-*xt*

	DLW Option including HTC-*xt* Upgrade Kit
1pc	DLW Injection Adapter with sample holding loop and syringe 100µl
1 pc	Wash Station
1 pc	Wash Solvent Pump Station with 2 active micro pumps
2 pcs	1 Liter Wash Solvent bottles
2 pcs	Solvent bottle transfer line including PEEK solvent filter 10µm
1 pc	System CD ROM DLW including Cycles
1 pc	Manual DLW Option
1 pc	Kit HTC-*xt* (Control Board-xt for PAL System - Firmware 4.0.X)

Choose this kit if you want to upgrade an existing HTC PAL to the DLW Option

PAL DLW Option*

	DLW Option for fast and clean LC Cycles
1pc	DLW Injection Adapter with sample holding loop and syringe 100µl
1 pc	Wash Station
1 pc	Wash Solvent Pump Station with 2 active micro pumps
2 pcs	1 Liter Wash Solvent bottles
2 pcs	Solvent bottle transfer line including PEEK solvent filter 10µm
1 pc	System CD ROM DLW including Cycles
1 pc	Manual DLW Option
	requires but does not include xt-Upgrade for PAL and Firmware 4.0.X

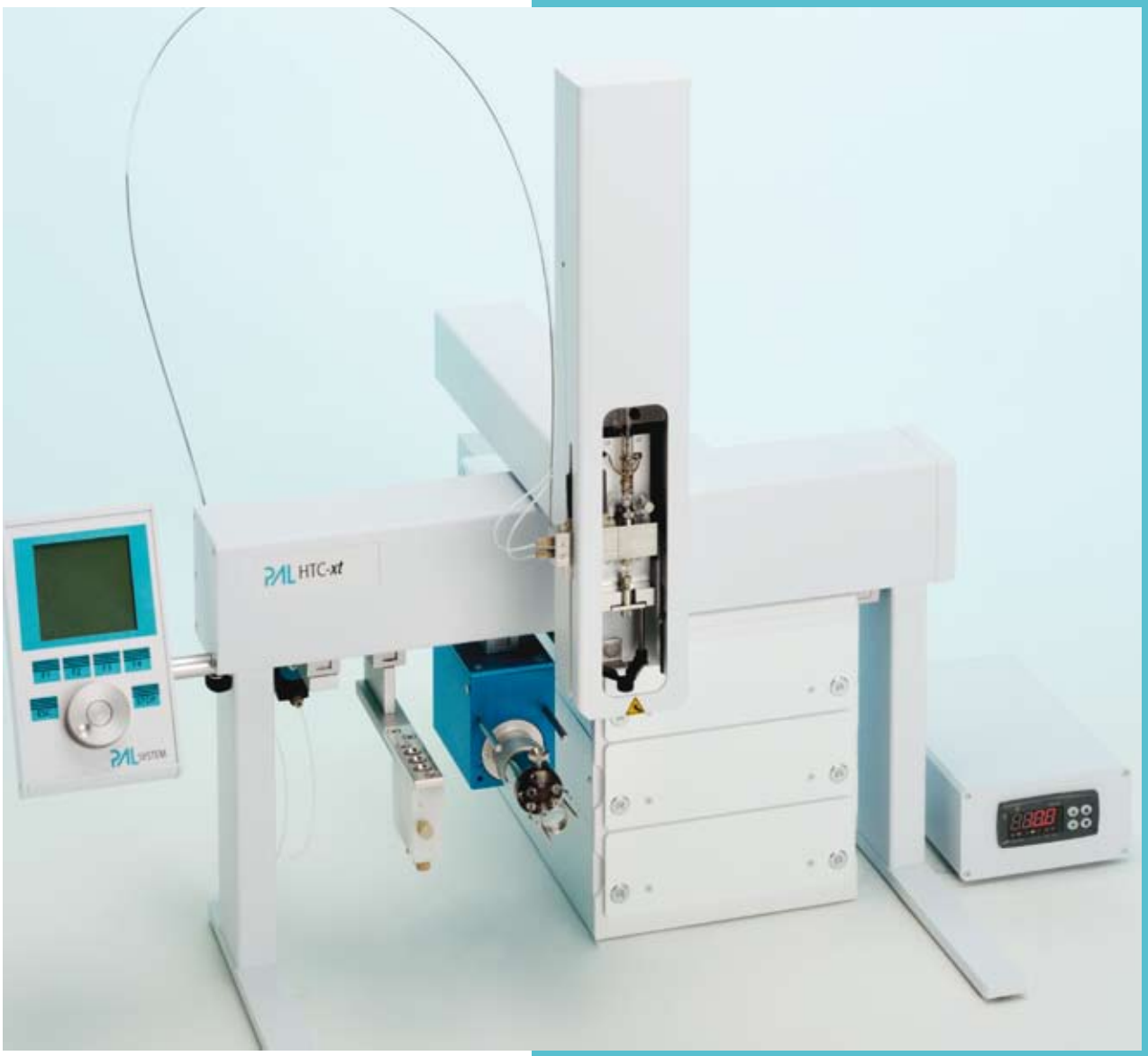
Choose this kit if your PAL is already equipped with the *xt*-Upgrade

* only if HTS/HTC is equipped with *xt* Upgrade

To learn more about the unique PAL Series of LC/LC-MS sample handling systems or any of our GC/GC-MS sample injection systems contact your CTC Analytics distributor.

Distributed by:

- Clean and efficient removal of carryover in the entire flow path
- Holding loop for effective rinsing of the complete sample path
- Integrated pumps for active wash solvent delivery selectable wash time for organic and aqueous solvents
- Spring loaded syringe needle positioning in needle guide – no dead volume
- Existing PAL Systems can be upgraded
- X-Type Syringe based



PAL SYSTEM

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