

Online SPE-UHPLC-MS CHRONECT® Symbiosis



Flexible autosampler for sample preparation

Powerful SPE solutions for solid phase extraction

Superior UHPLC system for analysis

CHRONOS for Control & System Integration







CHRONECT Symbiosis Workstations are designed as user-friendly complete solutions for online solid phase extractions in front of LC or LCMS analysis. They consist of a flexible and reliable autosampler for sample preparation and injection, the powerful SPE technology from Spark Holland for solid phase extraction and a superior UHPLC system for analysis controlled by the sophisticated software platform CHRONOS by Axel Semrau[®].

Part 1 of CHRONECT Symbiosis Solutions Flexible Autosampler for Sample Preparation and Injection

First part of all CHRONECT Symbiosis solutions is a clean and reliable sample preparation based on PAL3 Sampler from CTC Analytics. The PAL system is one of the most widely used and successful sample preparation and handling platform. More than 40,000 systems worldwide are proof of its reliability and flexibility. The PAL's mechanical precision and robustness form the basis for precise and accurate handling of samples. Perfect control with the software platform CHRONOS will give you all possibilities to handle the system easily and to connect it to most mass spectrometers on the market.



Concept of PAL Systems

The PAL is a XYZ robot which is installed onto or next to the chromatographic system. The injection unit carrying the syringe can be moved along the entire transverse rail (available up to 2 m length). Below the transverse, all other tools are mounted such as sample trays and PAL options like Peltier Racks, Vortexer, Agitator, different Wash Modules or, if required, centrifuges, scales and microwaves. The injection syringe may be moved flexibly in X, Y or Z direction. The set-up of the component parts below the transverse can be configured individually for every system, depending on the requirements of the application.





Injection

Liquid injection by the PAL is characterized by a combination of precision, reproducibility and flexibility. The syringe is additionally capable of aspiring and injecting air cushions, solvents or internal standards. The liquid injection in HPLC devices is performed by UHPLC control valves and sample loops for all CHRONECT Symbiosis systems. The injection into the LC injection port is realized by the Constant Force Technology. Here, the injection head moves into the injection port until a defined counter-pressure is reached. Combining this technique with a specifically developed needle sealing a potential dead volume during injection is prevented.



Injection and switching valves

Sample Storage

PAL offers you various possibilities for sample storage, starting from simple trays for each three racks with vials of different sizes, up to drawers which can be cooled as required. Peltier Stacks allow for temperature control between 4-40 °C and are available with a drawer for 2 racks or, as depicted here, three drawers for 6 racks. There are different racks for different sample containers (MTP, DWP VT15 (15 x 10 mL), VT54 (54 x 2 mL), VT70 (70 x 1 mL)) or combinations thereof. Depending on equipment and size, a PAL may process up to 648 x 2 mL vials, 180 x 10 or 20 mL vials or up to 12 MT or DW plates with up to 384 samples per plate. This flexibility is one of many benefits of all PAL autosamplers.



Peltier Rack for 6 racks

Efficient Mixing

The Vortex Mixer Module provides you with the possibility of an efficient mixing with up to 2000 rpm. The Vortexer contains four different places for different vial sizes: 2 mL, 10 mL, 20 mL and one additional slot for custom specific vials.

The Agitator Module allows for agitation and incubation of samples. Inside of this module there are 6 positions for 20 mL vials. The temperature range is 40 - 200 °C and agitation speed is 250 - 750 rpm. There are adapters for 2 mL or 10 mL vials available.



Vortex Mixer Module & Agitator Module



Fast Wash Module & Solvent Module



2D Barcode Reader



Pipette Module



Decapper Module



Park station & LCMS TOOL

Wash Modules

In order to avoid carryovers, the PAL LSI may be equipped with different Wash Modules. For example, the Fast Wash Module allows for an efficient rinsing of syringes, especially suited for HPLC applications. The Fast Wash Module features two micro pumps which provide the rinsing fluid in the applied syringe size. Therefore, unnecessary solvent consumption is avoided without impairing the rinsing efficiency. The module is charged with two rinsing solvents. If more rinsing liquid is required, a Solvent Module with three additional solvent containers of 100 mL volume each may be added.

2D Barcode Reader

Encoding of sample information as barcodes is a standard tool in laboratory automation. Almost every laboratory information management system (LIMS) offers the ability to generate barcode labels, permitting information to be exchanged easily and reliably between the LIMS and other data systems. The conventional 1D barcodes that are in widespread use in the consumer goods sector can carry only few information. 2D barcodes, on the other hand, are easily able to encode up to 10 items with a high level of detection accuracy. This is possible with small labels, which means that even 2 mL vials can be labelled with a large amount of information.

Pipette Module (requires PAL RTC)

Transferring liquids by pipets is a common procedure in many types of sample preparation. Carryovers are prevented and functionalized tips allow for a more efficient preparation. The PAL RSI delivers the same results with the help of Pipette Tools. Liquids are aspired in a pipet tip and dispensed into the unscrewed vial. Further applications include the protein digest in a tip, serial dilutions and handling of blood or serum. For these applications, tips of $0 - 200 \mu$ L or $0 - 1000 \mu$ L are available.

Decapper Module (requires PAL RSI or RTC)

Many commonly used vials in sample preparation contain a screw cap. Thus, addition of chemicals such as an internal standard through a septum is a step of potential loss. The Decapper Module for the PAL RTC automatically opens and closes screw caps of 2, 10, 20 and 40 mL vials. In combination with the Pipette Tool, syringe can also be avoided in sample preparation. This combination allows for the full automation of laboratory routines, e.g. the preparation of multi standards.

Tool Change (requires PAL RTC)

Robotic Tool Change (RTC) takes productivity to a new level. With one Park Station the autosampler can use up to 3 different tools. Switching between a syringe tool for the addition of an internal standard and e.g. an LC/MS Tool for subsequent analysis can take place fully automated. With two Park Stations 6 tools will be available. The automated selection of the syringe for different tasks like adding standards or preparing serial dilutions takes automation of your workflows to the next level.

Many more options available



Part 2 of CHRONECT Symbiosis Solutions Powerful Solid Phase Extraction based on Spark Technology



powered by Spark technology



CHRONECT® Symbiosis **BASIC**

This machine is ideal as a starting system for the full automation of sample preparation and LC-MS analysis. There is only a minimum of manual sample preparation needed and full traceability of the sample prep coupled to the MS data. As a built-in tool you can flush the SPE cartridges and elute the cartridges to the LC column, cleaning up your sample as much as needed and minimizing the sample elution volume and time. The system is equipped with a single SPE cartridge clamp. Preparing each sample and performing the LC-MS analysis happens in sequence. Sample run times are around 10 minutes, mainly depending on the LC run times because the SPE sample prep time usually can be done within 3 minutes. Also, without reconfiguring your system hardware, you can choose to do a direct UHPLC injection or to include the extraction done by another method than online SPE. The system is upgradable to higher throughput versions.

CHRONECT® Symbiosis PLUS

This configuration contains two SPE cartridge clamps using 250 bar clamps and SPE cartridges. With the second clamp the system is useful for fast SPE method development or for 2D/ orthogonal SPE, applying 2 different types of SPE cartridges in series. Easy breakthroug tests reduce method development time. The system allows to run selective SPE methods to get cleaner sample extracts. Peak Focussing, as a built-in standard mode and selective Mixed Mode SPE cartridges and methods also can be used to extract your samples. With 2 SPE cartridge clamps you can clean-up your sample on the SPE cartridge while at the same time eluting from the second SPE cartridge to the LC-MS which was previously used for the sample clean-up. Then the total sample run time, including the time needed for the SPE sample preparation, will be set and defined by the LC-MS analysis time. Additionally, without reconfiguring your system hardware, you can even choose to do a direct UHPLC injection.

CHRONECT® Symbiosis **ADVANCED**

This machine includes two 1000 bar SPE cartridge clamps using 1000 bar SPE cartridges (10 x 1 mm ID). With these cartridges clamps and cartridge format this system is fully compatible to be used with UHPLC columns up to 1000 bar and lower UHPLC flow-rates than commonly used for LC separations. Forward/backward wash or clean-up of the SPE cartridge is possible, giving clean samples and high assay sensitivities running your multi-component UHPLC analysis. Beside this mode of operation, the system can be used for direct UHPLC injection and concurrent SPE without manual interaction. While the sample clean-up is performed on one cartridge, the SPE-UHPLC-MS can run simultaneously on another cartridge. The run time of each sample is determined by the LC-MS analysis time. Peak Focussing to use Mixed Mode SPE cartridges at 1000 bar can be realized with an additional SPH1299™ UHPLC pump.





Specifications BASIC

- Direct UHPLC injection (LC mode)
- ACE single cartridge clamp (SPE-LC mode): 250 bar or 1000 bar clamp & cartridges, 1 UHPLC valve
- HPD Mix 1x SSM: 7 SPE solvents to select
- HPD syringe volume steps: 10 µL to 2 mL
- HPD SPE syringe flow rates: 100 µL/min up to 10 mL/min
- SPH1299[™] UHPLC gradient pump (binary gradient): 1300 bar, including degasser, 2x2 solvent selection for four different binary gradients, automatic purge and prime valves
- Mistral Cool column oven: 4 °C to 90 °C

Specifications PLUS

- Direct UHPLC injection (LC mode)
- ACE dual cartridge clamp (SPE-LC mode): 250 bar clamp & cartridges (10x 2 mm ID), 4 UHPLC valves
- HPD Mix 1x SSM: 7 SPE solvents to select
- HPD syringe volume steps: 10 µL to 2 mL
- HPD SPE syringe flow rates: 100 µL/min up to 10 mL/min
- SPH1299[™] UHPLC gradient pump (binary gradient): 1300 bar, including degasser, 2x2 solvent selection for four different binary gradients, automatic purge and prime valves
- Mistral Cool column oven: 4 °C to 90 °C

Specifications ADVANCED

- Direct UHPLC injection (LC mode)
- ACE dual cartridge clamp (SPE-LC mode): 1000 bar clamp & cartridges (10x1 mm ID), 4 UHPLC valves
- HPD Mix 1x SSM: 7 SPE solvents to select
- HPD syringe volume steps: 10 µL to 2 mL
- HPD SPE syringe flow rates: 100 µL/min up to 10 mL/min
- SPH1299™ UHPLC gradient pump (binary gradient): 1300 bar, including degasser, 2x2 solvent selection

for four different binary gradients, automatic purge and prime valves

Mistral Cool column oven: 4 °C to 90 °C

PAL Symbiosis standard specifications

- PAL3 LSI, 1 tray plate with 3 racks (VT54: racks for 3x54 2 mL vials)
- 2 Valco injection valves
- 1 250 µL syringe (fixed needle, gauge 22, PST3, different syringes up to 1 mL available, if needed)
- Standard: 100 µL sample loop, various loops possible
- Fast Wash module with pump and reservoirs for 2 solvents

Specifications of options

- Mistral CS Cool UHPLC: 5 columns plus drain, 4 °C to 75 °C, 1000 bar
- Sample cooling with Peltier Stacks 2DW or 6DW: 2 or 6x 54 2 mL vials, 4 °C to 40 °C
- Vortexer: 2 mL / 10 mL / 20 mL, one slot for custom specific vials, mixing with up to 2000 rpm
- Agitator: 6 positions for 20 mL vials, adapters for 2 or 10 mL vials (optional), temperature range 40 to 100 °C, agitation speed 250-750 rpm

CHRONOS Symbiosis software features

- Controls the entire system including integration in the lab environment
- Allows one sample list for front end and LC-MS for MassHunter, OpenLAB, Analyst, LabSolutions, Masslynx, Clarity, Xcalibur & more
- Creates time schedules automatically with overlapping functions, comfortable functions to create task lists, easy navigation through bundling of tasks
- Ready-for-use methods, easy and safe method development, simple cut/copy/paste functions





SPE Cartridges

The online SPE cartridge for Symbiosis ACE systems has been specially designed for online elution to the HPLC column. Dimensions are optimized to combine high extraction capacity with small elution volumes. Standard dimensions are 10 mm in length and 2 mm inner diameter. Naturally, this kind of cartridges will resist typical HPLC system pressures (max 300 bar). All cartridges are also available in 10 x1 mm, these cartridges will resist up to 1000 bar. These cartridges are made with PEEK instead of PVDF. The materials for the sorbents are the same for both types of cartridges.

Traceability

Every cartridge is marked with a code representing brand, type and batch of the SPE sorbent. Furthermore, the cartridges are delivered in 96 position-plates that are placed directly in the CHRONECT Symbiosis[™] System for processing; no need to touch a cartridge! Every tray contains a Rf chip that transmits information on cartridge type, batch number, production number (unique), expiry date, to the Symbiosis[™]. This information is displayed on the PC screen and is attached to the analysis report. After use, the Symbiosis System transmits data to the Rf chip on positions used/not used. Partially used trays can thus be stored safely without labelling or removing the used cartridges.

Method development

Many publications, application notes or scientific posters will help you developing your own methods. The systems will be prepared with ready-for-use methods. These methods can easily be changed due to your specific application.

There are also examples available, how a method for 250 bar cartridges can be transferred to 1000 bar cartridges.



Packaging program

A cartridge packaging program offers you the possibility to use your specific sorbents. In a first phase it is possible to produce a smaller test batch with the materials which are provided by the customer. Therefore 10 gram bulk material is needed for 25 cartridges. The provided materials must include a Health & Safety sheet. If the results are fine, a batch with minimum 10 trays per purchase order can be produced.



Available Cartridges

CHRO ^{SPE} cartridge range: 10 x 2 mm ID, PVDF - 250 bar cartridges							
Part number	Description						
AS-SP-0622.001	CHROSPE C2, 8 µm						
AS-SP-0622.002	CHROSPE C8, 7 µm						
AS-SP-0622.003	CHROSPE C18 HD, 7 µm						
AS-SP-0622.004	CHROSPE C8 EC, 10 µm						
AS-SP-0622.005	CHROSPE C18 EC, 8 µm						
AS-SP-0622.006	CHROSPE CN, 8 µm						
AS-SP-0622.007	CHROSPE Polymer SAX, 25-35 µm						
AS-SP-0622.008	CHROSPE Polymer SCX, 25-35 µm						
AS-SP-0622.009	CHROSPE Polymer DVB, 25-35 µm						
AS-SP-0622.010	CHROSPE Resin SH, 15-25 µm						
AS-SP-0622.011	CHROSPE PLRP-s, 15-20 µm						
AS-AS-2000	CHROSPE Glyphosate (as for CPP Project batch)						
AS-SP-0622.020	CHROSPE Method development tray 250 bar						
AS-SP-0822.001	CHROSPE Cartridge Packing Program - Test batch						
AS-SP-0822.002	CHROSPE Cartridge Packing Program - Project batch						
CHRO ^{SPE} cartridge r	ange: 10 x 1 mm ID, PEEK - 1000 bar cartridges						
AS-SP-0621.001	CHROSPE C2, 8 µm						
AS-SP-0621.002	CHROSPE C8, 7 µm						
AS-SP-0621.003	CHROSPE C18 HD, 7 µm						
AS-SP-0621.004	CHROSPE Phenyl						
AS-SP-0621.005	CHROSPE Polymer DVB, 25-35 µm						
AS-SP-0621.006	CHROSPE Polymer SAX, 25-35 µm						
AS-SP-0621.007	CHROSPE Polymer WAX, 25-35 µm						
AS-SP-0621.008	CHROSPE Polymer SCX, 25-35 µm						
AS-SP-0621.009	CHROSPE Polymer WCX, 25-35 µm						
AS-SP-0621.010	CHROSPE HILIC						
AS-SP-0621.020	CHROSPE Method development tray 1000 bar						
AS-SP-0821.001	CHROSPE Cartridge Packing Program - Test batch						
AS-SP-0821.002	CHROSPE Cartridge Packing Program - Project batch						

Applications

More than 400 publications, scientific posters and application notes and can be found under

www.sparkholland.com/applications

These documents cover different application fields such as

- Acid herbicides
- Drugs of abuse in water
- Pharmaceuticals in water
- Mycrodystins in water
- Pesticides
- PAHs
- Phenolic compounds
- Carbamates
- Antibiotics in water
- Glyphosate in foodstuff
- Aflatoxins
- Glycoalkaloids
- Chlormequat, Mepiquat
- ...

Many assays are developed and there are EPA methods like

- EPA 521 Nitrosamines
- EPA 535 Acetamide
- EPA 555 Chlorinated acids
- EPA 1694 Pharmaceuticals
- EPA 8270 Semi volatiles





Part 3 of

CHRONECT Symbiosis solutions Superior UHPLC with SPH1299™

The complete system is optimized for UHPLC, dead volumes are minimized and all materials designed for the work at high pressures. Heart of the UHPLC is the new SPH1299[™] from SPARK Holland. This pump is an advanced workhorse for robust, state-of-the-art UHPLC performance and beyond. Delivering ultra-precise UHPLC gradient flow up to 18,850 psi (1300 bar). Featuring truly automatic compressibility compensation, real self-priming and clearing plus simple maintenance, this pump will turn users into friends.

Robust proven concept guarantees reliable performance

SPH1299[™] is based on the reliable, proven concept of linear drive technology for two pairs of serially coupled pump heads. Each of the four pump heads is individually driven and controlled. This generates maximum freedom for flow control and pulse reduction. With intelligent novel flow control algorithms this freedom has been fully explored to create a stable and accurate flow, independent of solvent compressibility, pressure and flow rate. This results in solvent gradients with exceptional precision of both the solvent composition and the flow rate; i.e. in robust and precise gradient UHPLC.



www.axel-semrau.de/en



True automatic self-priming

A novel automatic priming concept fully automates the cumbersome priming procedure. A built-in prime pump aspirates solvent through the pump heads when starting with empty solvent inlet lines. No need to help your pump with a syringe for awkward manual solvent aspiration. Using an electrically actuated purge valve, SPH1299TM can truly prime and purge all by itself in just a few minutes!

Accurate flow rate – what you set is what you get

When you set the flow rate of the SPH1299[™] to a certain value, this will be the precise volumetric flow rate as it leaves the column, independent of solvent composition and pressure – even in gradient mode. Automatic solvent compressibility measurement is not only used to compensate for flow pulsation, but also to compensate for flow rate reduction caused by solvent compression. This unique feature of the SPH1299[™] makes UHPLC methods easier to maintain and transfer.

Easy and economic user maintenance

Temp.: Column

Pressure

SPH1299[™] has active piston backwash for longer lifetime of piston seals. This is very effective to increase up-time of the pump, but eventually a seal will need replacement. With this in mind, the pump head has been designed to facilitate easy disassembly and seal exchange. No need to remove covers or take the pump out of the UHPLC stack. No need, also, for expensive exchange of entire pump head/drive assemblies! Simply disconnect the pump head from its drive, remove the piston and replace the seal. In just minutes!

Exceptional flow and gradient precision



Kinetex 1.3 um C18 (50x2.1mm) 300 - 600 bar



Pressure

Pressure range: 0 - 1300 bar / 0 - 18,850 PSI (0 - 2000 µL/min)

Pressure ripple: < 1 % of system pressure or < 5 bar, whichever is greater

Flow

Flow range: 1 – 4000 µL/min

Flow resolution: 1.0 µL/min increments

Flow precision: \leq 0.075 % RSD or 0.005 minutes SD whichever is greater

(water flow range 0.20 - 2.00 mL/min)

Flow accuracy: ± 1 % or $\pm 10 \mu$ L/min whichever is greater (water flow range 0.20 – 2.00 mL/min)

Gradient

Gradient range: 0-100 %

Gradient composition accuracy: ± 0.5 % absolute from 5-95 % (flow range 0.200 - 2.000 mL/min) Gradient composition precision: ≤ 0.15 % RSD or 0.01 minute SD, whichever is greater (flow range 0.200 - 2.000 mL/min)

Gradient delay volume: 50 µL when using 35 µL mixer Delay Volume: <120 µL, 45,6 µL when using standard mixer)



CHRONOS Symbiosis

Powerful System Control and Lab Integration

Most chromatographic or spectrometric investigation processes in the area of instrumental analysis are characterized by the use of autosamplers. The purpose of automation is to increase throughput without the need for additional personnel. Up to now, typically samples have been worked through automatically in sequence. This means that with conventional machine control systems, waiting times frequently occur due to sample preparation during which the chromatographs are not used, offering considerable potential for throughput optimization. And it is precisely this potential which is utilized by CHRONOS. CHRONOS increases the active measuring time of the machines and therefore considerably raises the efficiency of the laboratory.

CHRONOS as a platform

CHRONOS provides many interfaces to special hardware modules and to most of the chromatography data systems (CDS). This makes CHRONOS unique and facilitates the integration of your sample prep into your analytical processes. It does not matter if you work with Sciex, Agilent, Waters, Shimadzu or Bruker MS, CHRONOS will control the sample preparation and organize the connection to your analytical system. You need only one sample list.

Generate your sample list in only a few steps

To generate a sample list, you have two possiblities - you can create a new sample list or you can load an existing list. Whenever it is beneficial for you, you can save sample lists to reuse them as a template, adapting parameters due to the actual needs. You also can load your list directly from your LIMS by the Import function in CHRONOS.

If you create a new sample list you first have to choose the method from your method folder and enter the number of samples to be measured with this method. According to the definitions in your method, the sample list will appear immediately. It is up to you to add another batch of samples with a different method in the same list.

To this is added further strengths of the software: a user-friendly interface minimizes the number of parameters which need to be changed depending on context. The relevant values are recorded in tabular form and can be changed by the user, which means that a complete sample list can be generated conveniently in only a few steps. Sample lists can also be saved and easily reused. If needed, use the *export* button to send your sample list with one click to your chromatography data system.

A priority sample comes in? At every time you have the possibility to interrupt a batch. CHRONOS will stop the batch at the next possible time, put in your priority sample and then continue the batch.

CHRONOS will calculate the optimal time schedule for you performing parallel processes for sample preparation

The CHRONOS software organizes parallel processes for sample preparation. This utilizes the analysis system to a much greater extent, while observing the time margins of each individual sample preparation. Just click on create to start this process. CHRONOS will make you a proposal and you can start your sample list.





Main menu <	Comela		Analysis Mathod	Sample Vial	Same
	Sample 2	1	C:\User_tral.cam	Tray Holder 1:Slot1	1
	4dd	2	C:\Usertral.cam	Tray Holder 1:Slot1	2
Sample list		3	C:\Usertral.cam	Tray Holder 1:Slot1	3
- (1)	Remove	4	C:\Usertral.cam	Tray Holder 1:Slot1	4
	Duplicate	5	C:\Usertral.cam	Tray Holder 1:Slot1	5
Schedules and run control				Her 1:Slot1	6
	Method Cla	ity HLI	PC Direct Injection		7
	Number of samples		1		8
Method editor					9
	List		4 Add	Close Slot1	10

A graphic representation of the sample processing is created at the touch of a button, which means that overall duration and current progress can be followed in real time. Multi-stage sample preparation procedures can be parallelized by means of an integrated algorithm. Here also, it is possible to call up a graphic representation of the sequence of events.

CHRONOS will manage the communication with your CDS

CHRONOS also combines the sample list for the autosampler control with the data system list, so that the user only has to administrate one list. This simplifies handling and avoids errors which could be caused by confusing different items.

Your CHRONOS method will contain the method, which should be used in your data system. This will appear in your sample list and if needed you can also change this method in your sample list. CHRONOS will also start the acquisition of your data with one command to your CDS. The exact time for this is defined in your CHRONOS method.



Create your sample list in three steps

Direct Control

For each component of your system CHRONOS offers a direct control panel.

Also every flow path is clearly defined and the corresponding valve positions are configured. This makes handling easy and safe. In addition graphics will show the flow path.

ACE	ACE						
my	Direct control	Configuration RFID's					
	Inițialize	Status Status:					
HPD	PanicStop	Position left clamp:	Unknown				
11	Stop	Position right clamp	: Unknown				
1	Info gripper:						
Mistral		Info gripper:					
Mistral		Info gripper: Direct control			-		
Mistral		Info gripper: Direct control Left valve O Position 1-2	ISS 1	ISS 2 Position 1-2	Right valve		
Mistral		Info gripper: Direct control Left valve O Position 1-2 O Position 6-1	ISS 1 Position 1-2 Position 6-1	ISS 2 Position 1-2 Position 6-1	Right valve Position 1-2 Position 6-2		
Mistral		Info gripper: Direct control Left valve Position 1-2 Position 6-1 Left clamp	ISS 1 Position 1-2 Position 6-1 Plates	ISS 2 Position 1-2 Position 6-1	Right valve Position 1-2 Position 6-2 Right clamp		
Mistral		Info gripper: Direct control Left valve Position 1-2 Position 6-1 Left clamp Open	ISS 1 Position 1-2 Position 6-1 Plates Front	ISS 2 Position 1-2 Position 6-1	Right valve Position 1-: Position 6-: Right clamp Open		
Mistral		Info gripper: Direct control Left valve O Position 1-2 Position 6-1 Left clamp Open Close	ISS 1 Position 1-2 Position 6-1 Plates Front Home	ISS 2 Position 1-2 Position 6-1	Right valve Position 1-2 Position 6-2 Right clamp Open Close		

Direct control panels for all components of CHRONECT Symbiosis



Method Editor

Together with your CHRONECT Symbiosis system you will receive different readyfor-use methods. It is very easy to modify these methods due to your specific needs. For example: Modify the time or number of wash cycles, the solvents which should be used or the elution volume or all other parameters. You may use copy and paste functions, change the sample list layout, give your operators possibilities to change parameters in the sample list or set fixed values where parameters should not be changed. Extra sample preparations steps or interfacing steps - like Excel read resp. write access import from LIMS or start signal for your MS, all this will be organized method editor also.



CHRONOS offers you more than 60 predefined tasks for the most common sample preparation steps. Each task compiles a package of actions to fulfill a given purpose. This simplifies your method creation significantly. You can overwrite the detail parameters for each step.

Safety and traceability

CHRONOS has an integrated authorization system. Three different authorization levels can be selected. Starting with the simple user, who can only execute methods, to the power user, who can modify released method parameters, to the method developer, who can use the entire range of functions. This role concept can be activated if necessary. Although they are in the universal XML format, the CHRONOS methods are protected against being modified outside of CHRONOS. Every change of a method causes a new fingerprint, given by CHRONOS. Various reports and log files allow complete documentation of the analysis processes. The cartridge racks are recognized and CHRONOS tracks how many times every cartridge has been used.



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\checkmark		Tray Holder 1:Slot1:1 Left				_				
		A1								
		10			10	100				
\checkmark		3			1					
		C:\Users\demo\Desktop\Methoden\Pump\0	Carbamezepine 1ml	per min.pump						
		14			1	_				
			Properties							
		^	Name	Value						
			Enabled	True						
1			Runtime [s]	1						
			RespectRuntime	False	/	_				
			ScheduledAfter	Symbiosis						
			MistralDevice	MISTRAL	-/-					
			State	On	1					
			Temperature [C°]	35	/					
				Param	eters o	of th	ne CHF	RONO)S ta:	sks

Many interfaces for your flexibility

You would like to enhance your sample preparation by adding a centrifugation step? With CHRONOS you can implement several centrifuges into your workflow. Even if you would like to automate the protein percipitation, this is possible with CHRONOS and PAL by adding modules. CHRONOS has also interfaces for balances, dilutors, barcode reader, perstaltic pump or IKA shaker. Ask your local distributor what is possible to optimize your workflow.

All encompassing functionality

- Management of multiple sample lists
- Management of priority samples
- Customizable sample list for easy user interface adjustments
- Easy navigation through bundling of tasks
- Comfortable functions to create task lists
- Free choice of units with helpful proposals
- Simple cut/copy/paste functions
- Automatic reports permit fast control
- Optimized time sequence
- 2D Barcode Reader by Axel Semrau
- CSV import options, e.g. for LIMS integration
- Simple PDF generation from the method
- Access to xlsx files in reading and editing mode
- Improved keyboard control within the sample list
- Extended printing options and improved printout of sample lists
- Ability to send Email messages
- Interfaces to many external software packages

Applicable LCMS Data Systems

- Sciex Analyst 1.41 and higher
- Waters MassLynx 4.1
- Agilent MassHunter LC
- Shimadzu LabSolutions
- Agilent ChemStation, GC, LC and MSD
- Open Lab ChemStation C01.06 und C01.07
- EZChrom Vs. 3.21 and higher
- Import and export of sequences in ChemStation and Xcalibur or cvs-format
- Direct integration in LIM-Systems from ICD

Find more information: www.axel-semrau.de/en



Axel Semrau[®] is active in development, sales and support of specialized solutions for sample preparation and automation of chromatography like online SPE, Multiplexing, efficient front end solutions for LC, LCMS, GC and GCMS as well as applicationoptimized workstations like LC-GC systems. In house product developments like CHRONECT Symbiosis, software solutions and complete workstations like CHRONECT Workstation glyphosate for the sensitive and fully automated analysis of glyphosate in complex matrices are marketed and sold throughout the world.



CHRONECT® Workstation Glyphosate

Sensitive analysis in foodstuff, 3 µg/kg glyphosate in black tea!

CHRONECT® Multiplexing

Ideal system for High throughput LCMS 4x faster with 4 pumps



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