GERSTEL

MultiPurpose Sampler
MPS robotic series

GERSTEL

sample prep for winners

GERSTEL

MPS robotic

As a new member of the MPS robotic is a highly efficient GC/MS autosampler with extended robotic functionality. The MPS robotic provides reliable processing of complex tasks. Syringe holders and syringes are integrated in individual syringe modules, which can be exchanged automatically within a running sequence when using the MPS robotic^{pro} for maximum flexibility.


The MPS robotic is controlled by the proven GERSTEL MAESTRO software in a simple and efficient manner. MAESTRO provides full flexibility by allowing an ongoing analysis sequence to be modified to incorporate priority samples. The built-in, context sensitive help function enables simple sequence and method development and setup.

1 µL
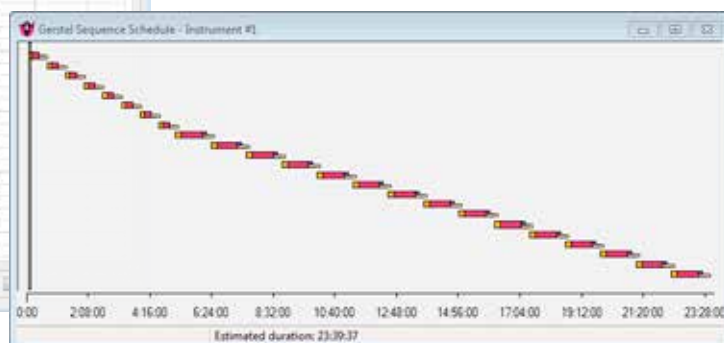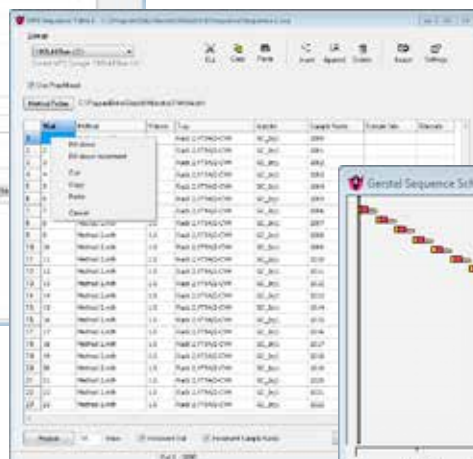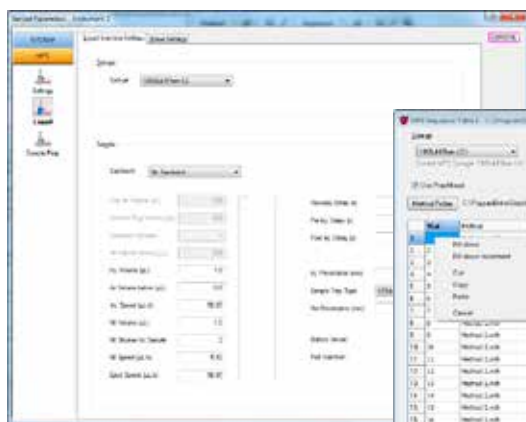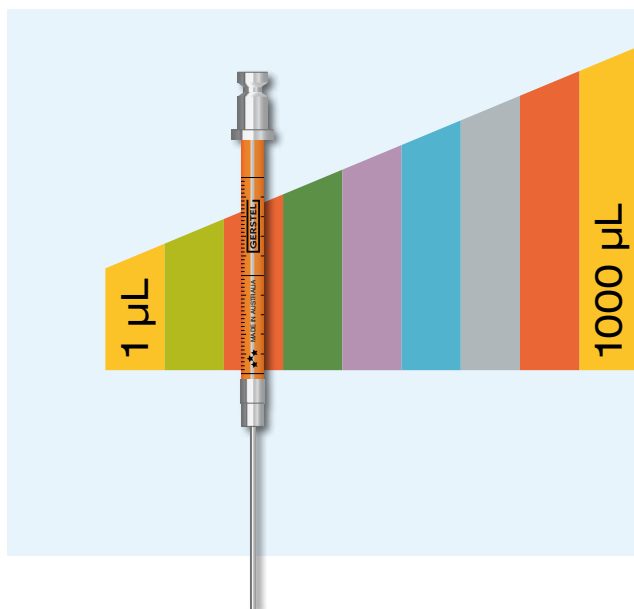
1000 µL

GERSTEL Universal Syringe Module USM

The GERSTEL USM is a universal syringe module for liquid syringes ranging from 1 to 1,000 µL total volume. Given the extended volume range, most application requirements can be met without changing syringe modules, saving both time and money – and reducing the risk of error. The USM is compatible with the GERSTEL Gripper enabling automated performance of multiple sample preparation techniques. As an example, GC liners can be replaced automatically at a user defined frequency, using Automated Liner Exchange (ALEX). A further example is the automated thermal desorption of adsorbent tubes, solid samples such as polymers, or GERSTEL Twisters in the Thermal Desorption Unit (TDU).
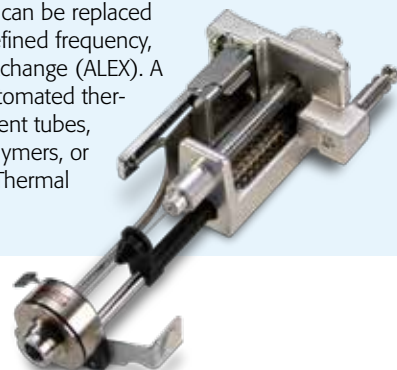
MPS robotic benefits

Multifunctional, flexible autosampler

➔ Autosampler for all sample introduction techniques: Standard liquid introduction, Headspace (HS) and SPME
➔ Modular expansion enables simple adaptation to future analytical needs
➔ Reliable results thanks to optimized discrimination-free transfer of analytes using fast injection in combination with hot split/splitless inlets

Universal Syringe Module USM

➔ One unified syringe module for liquid injection syringes ranging from 1 to 1,000 µL
➔ Future proof, only the GERSTEL USM is compatible with the GERSTEL Gripper, enabling a multitude of sample preparation techniques

Proven MAESTRO Software control

➔ Unified control of the MPS robotic and all GERSTEL modules
➔ Simple and reliable method generation and –set-up thanks to intuitive handling concept and context-sensitive interactive Help function

New Member of the MPS family

➔ Sample preparation platform of the future, long term availability of modules and accessories is guaranteed safeguarding your investment

Extended Robotic Functionalities of the MPS robotic[pro]

➔ µL-Injections performed even from very small sample volumes using Bottom Vial Sensing
➔ Maximum Flexibility: Automated change of two or more syringe modules in a running sequence enables the combination of liquid, HS and SPME sample introduction in one automated method and sequence
➔ Added reliability of complex sample preparation procedures thanks to power feedback for every movement of the sampler

Optimized Tray Design

➔ Higher sample capacity thanks to extended sample trays
➔ Flexible use of different vial sizes: Up to three different tray types can be placed in every tray holder
➔ Extended Headspace and SPME sample capacity: Optimized honeycomb-style tray design for 10- and 20 mL vials and extended sampler reach increases throughput by >50%

MPS

Thermal Desorption Unit TDU 2

The GERSTEL Thermal Desorption Unit (TDU 2) is the most flexible automated solution available for thermal desorption and thermal extraction. The TDU 2 incorporates the latest advances in thermal desorption technology. Based on a "Liner-in-Liner" concept it has no valves or transfer lines, reducing the risk of analyte loss, discrimination and carry-over to an absolute minimum. Automating the TDU 2 with the MPS robotic, up to 480 samples can be processed in one batch, including GERSTEL Twisters®, adsorbent packed tubes, solids, and liquids contained in micro-vial inserts. The TDU sample trays have 40 individually sealed sample positions, safeguarding sample integrity at all times.

Important Features of the TDU 2 System:

Universal Sample Introduction System for a Wide Range of Applications:

➔ Performs multiple techniques without reconfiguration
➔ Temperature programmed desorption ensures optimal conditions for all analytes
➔ Flexible refocusing options; cryogen-free with adsorbent bed or cryogenic to -180 °C
➔ Automated desorption of up to 480 samples

Liner-in-Liner design

➔ No transfer line, excellent recovery of all analytes
➔ No active sites, no memory effects
➔ Chromatography performed using advanced EPC of GC inlet
➔ Improved reliability and easy maintenance

Sealed Sample Storage

➔ Sample integrity ensured through individual, leak-tight storage
➔ Reliable results achieved by eliminating analyte loss, contamination from laboratory air and cross contamination

Twister Desorption

➔ Automated processing of more than 400 Twister Stir Bars of any size
➔ Split and true splitless analyte transfer covers a wide concentration range
➔ Simultaneous desorption of multiple Twisters from sequential SBSE or mSBSE
➔ Temperature programmed desorption ensures optimal conditions for all analytes

Desorption of the GERSTEL Twister®

The GERSTEL Twister® is a unique, patented extraction tool used for Stir Bar Sorptive Extraction (SBSE). The Twister enables ultra-trace determination of organic compounds in aqueous and gaseous matrices. When submerged into aqueous samples, the PDMS phase that surrounds the Twister efficiently extracts organic compounds, while the stir bar actively stirs the sample. SBSE is performed without additional sample preparation and it is up to 1000 times more sensitive than Solid Phase Micro-Extraction (SPME).

The TDU 2 has been carefully optimized for thermal desorption of Twisters: The Twister is placed in a glass liner that is fitted with a transport adaptor, which also serves to seal the liner and eliminate contamination or loss of analytes. The MPS automatically transfers the TDU liner from its tray to the TDU 2. Up to 480 Twisters can be desorbed automatically in one sequence. TDU liners can also be transferred manually if automation is not required. The TDU 2 seals itself using the transport adaptor and the Twister is desorbed using a temperature program to transfer analytes to the CIS where they are cryofocused and concentrated. Analyte transfer can be performed in split or splitless mode, or even in multi-desorption mode, ensuring that a wide range of concentrations can be covered.

Thermal Extraction in micro-vials (ATEX)

Until now, anyone determining volatiles in "dirty matrix" liquids ran the risk of contaminating their GC/MS system. GERSTEL's Automated Tube EXchange (ATEX) using disposable micro-vials placed inside TDU tubes eliminates such problems. The MPS robotic transfers liquids automatically to a disposable micro-vial inside a TDU tube. When the tube is heated in the TDU, volatile analytes are extracted from the sample and transferred to the Cooled Injection System (CIS) where they are concentrated for transfer to the GC/MS. The non-volatile matrix residue is left behind in the disposable micro-vial. The result: Contamination of the GC Inlet and the GC/MS system is eliminated, while productivity, throughput and quality of results are significantly improved.

HIT-Headspace Sensitivity gain (Hot Injection & Trapping)

The Hot Injection and Trapping (HIT) technique combines analytes from several Headspace injections for each GC/MS run. HIT is performed using the GERSTEL MPS with Thermal Desorption Unit (TDU) and a Cooled Injection System (CIS), PTV-type inlet. The system is easily switched between standard and HIT operation by specifying the number of injections in the MAESTRO software. Application examples are VOCs including flavor and off-flavor compounds in water and beverages resulting in improved recovery and very low LODs.

MPS

Automated Dynamic Headspace DHS

The GERSTEL MPS robotic autosampler combined with Dynamic Headspace (DHS) option and the TDU 2 enable complete automation of the DHS technique. In the DHS station, VOCs are extracted from liquid or solid samples placed in standard headspace vials. The headspace above the sample is purged and analytes are concentrated on a user selectable adsorbent filled trap (TDU tube) at user defined sample and trap temperatures and flow. A dry purge step can be selected to purge humidity from the adsorbent bed. Analytes are subsequently introduced into a gas chromatographic system by thermal desorption of the trap in the TDU, resulting in maximum recovery, and lowest possible detection limits. The DHS option offers the improved performance of a dynamic (purge) technique combined with the ruggedness of standard headspace analysis. A wide variety of sample types can be analyzed, such as food, beverages, polymers, personal care products and pharmaceuticals.

DHS Large

The GERSTEL DHS can be extended to accommodate sample containers with a volume of up to 1 L. A single sample extension or an autosampler for up to 11 samples can be chosen. DHS Large can be used for material emission screening and for volatiles in consumer products among other application areas.

Solid Phase Micro-Extraction SPME

Solid Phase Micro-Extraction (SPME) is a well-established technique for extraction of organic compounds from a wide variety of matrices. SPME fibers coated with an adsorbent phase extract and concentrate analytes either from the headspace above a sample or by immersing them directly in the liquid sample. SPME is easily and efficiently automated using the GERSTEL MPS robotic, enabling both high performance and PrepAhead productivity.

Following the concentration step, the SPME fiber is inserted into a GERSTEL Cooled Injection System (CIS), a PTV-type GC inlet, for thermal desorption and transfer of analytes to the GC/MS system. The CIS uses a SPME-friendly Septum-Less Head (SLH) sealing system, eliminating the common problem of septum coring often experienced with blunt-tipped SPME needles and standard GC inlets.

SPME automation based on the GERSTEL MPS robotic and desorption in the CIS or TDU provides the best performance, accurate analysis results, highest productivity and throughput and longest possible SPME fiber life.

- The GERSTEL CIS with patented Septum-Less Head (SLH) eliminates septum coring and buildup of septum particles in the inlet liner. The SPME fibers experience less stress, and last longer.

- The MPS Agitator/Stirrer allows samples to be shaken or stir red. Stirring reduces mechanical stress on the SPME fiber, leading to extended fiber life, higher productivity and lower cost.

- Automated bake-out of the SPME fiber in a conditioning station ensures lowest possible background and minimal analyte carry-over. Alternatively, SPME fibers can be baked out in the CIS inlet

- The MPS robotic PRO offers automated exchange of SPME fibers: New methods are quickly and conveniently developed based on one or more fiber types, and multi-method se quences can be executed using different types of SPME fibers for different methods

- Pre- and post-extraction on-fiber derivatization is performed simply by mouse-click

- SPME fibers can be desorbed in the TDU instead of in the CIS using Hot Injection and Trapping (HIT SPME). Analytes are cryofocused in the CIS and transferred to the GC column for improved limits of detection, sharper peaks, and discrimination free results for both VOCs and SVOCs.

Automated Liner EXchange ALEX

Dirty Matrix samples can lead to significant contamination of the GC inlet liner after just a few injections. Peak broadening, analyte discrimination and other matrix build-up effects can be the result, potentially leading to poor quality of the analytical data. To avoid this, the inlet liner should be exchanged regularly. This is normally a task that requires several manual steps, and the interruption of the analysis sequence, making it impossible to run longer automated sequences without manual intervention. The MPS robotic with GERSTEL Automated Liner Exchange (ALEX) increases overall system efficiency by removing contaminated liners at user defined intervals and enabling the automated sequence to be completed and system productivity to be maintained. ALEX Liner trays for the MPS robotic hold 40 prepared liners each in a sealed compartment to eliminate contamination. Liners are transported by the MPS robotic using heat decoupled transport adapters fitted with 3 mm replaceable septa, which enable liquid injection into the CIS.

Features and benefits of ALEX with MPS robotic

Reliable results

➜ Reliable analysis of matrix-containing samples thanks to replacement of contaminated liners at user defined frequency

➜ Septum bleeding is eliminated through heat-decoupled septa, no need for septum purge

➜ Contamination-free storage of inlet liners in 40 position trays and up to 120 liner tray holders

Rugged operation - highest productivity and throughput

➜ High throughput and improved ROI for the complete analysis system through Automated Liner Exchange in the running sequence – overnight and on weekends.

➜ Faster, more efficient analysis of dirty samples with less sample preparation

➜ Highest system reliability through proven pneumatic sealing technology

Simple operation and method development

➜ Intuitive and efficient operation using GERSTEL MAESTRO Software

➜ Context-sensitive online help in MAESTRO enables fast and error-free method generation and set-up

➜ Simple method development and setup through use of different liner types in one sequence

GERSTEL TriStar Syringes

You need an excellent autosampler syringe in order to perform complex sample preparation methods and reliably inject large numbers of samples into a chromatography system. Lowest possible sample to sample carryover and highest accuracy are required GERSTEL TriStar Syringes are designed and produced to meet these demands.

The TriStar syringe series offers several improvements to minimize or eliminate sources of carry-over, such as reduced dead volume and elimination of active sites. The sample is kept clean and uncontaminated, and the needle remains firmly fixed without the risk of solvent attacking the sealant.

The rugged and inert materials used provide resilience to solvents, expanded temperature range and long operating life.

The new design allows TriStar syringes to perform up to 10 times more liquid injections than standard syringes. TriStar syringes for the GERSTEL MPS are available in all standard sizes.

Color	Syringe volume	
Yellow	1 µL	1 mL
Lime	5 µL	5 mL
Dark Orange	10 µL	
Green	25 µL	
Purple	50 µL	
Aqua	100 µL	
Grey	250 µL	2.5 mL
Dark Orange	500 µL	

Benefits of the GERSTEL TriStar Syringes

Color coded
➔ Easy selection of the correct syringe size through clear and unambiguous color coding
➔ Reliable analysis, the risk of incorrect syringe selection is minimized

Inert, rugged materials
➔ Reliable analysis performance with solvent-resistant surfaces
➔ Extended temperature range for increased ruggedness and application range
➔ Extended operation life

Minimized background
➔ Inert surfaces and elimination of contact between sample and sealants

Optimized assembly
➔ Carry-over minimized through reduced residual volumes in the plunger assembly, improved surfaces and PTFE surface sealing
➔ Carry over and contamination reduced through improved syringe-to-needle connection, eliminating cavities and contact with sealant
➔ Active plunger tip provides improved Headspace syringe sealing and reduced temperature equilibration times resulting in improved flexibility and productivity

www.gerstel.com

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