



Freedom EVO™

Freedom to evolve

Fully automated liquid handling for genomics, proteomics, drug discovery and clinical diagnostics

Successful solutions founded on years of experience

Building on a versatile portfolio. Tecan has a long tradition of providing flexible liquid handling platforms for the Life Sciences. By building on the successes of its installed automation solutions worldwide, Tecan offers the Freedom EVO series platform to provide customers with even higher flexibility and the possibility to expand each system according to future needs. Freedom EVO has therefore been carefully designed to evolve with the application needs of users. This means that all laboratory personnel can improve on existing solutions by easily exchanging or adding new functions.

Meeting customer needs. Life Science practitioners need easy-to-use, flexible and scalable solutions for a wide range of applications in genomics, proteomics, drug discovery and clinical diagnostics. Tecan offers the Freedom EVO platform in three different sizes (100, 150 and 200 cm) that meet these needs and which also deliver the precision and reliability for which Tecan platforms are known worldwide. This unmatched level of performance is complemented by compliance with the very latest regulatory requirements, including the In Vitro Diagnostic (IVD) Directive recommendations for clinical diagnostic applications. Freedom EVO is the culmination of over 20 years of experience in precision liquid-handling, user-friendly robotics and flexible automation.

- 1 Four types of arm available: liquid handling; pick & place; robotic manipulator; and robotic manipulator with extended Z axis
- 2 Liquid handling arm can be equipped with four or eight pipetting tips
- 3 Easy integration of Tecan multichannel pipetting options (Te-MO 3 / 3 or 3 / 5) and multichannel pipetting heads (96- or 384-channel head)
- 4 Up to eight XP Smart dilutors with syringes of 50 – 5000 µl new
- 5 Fully integrated status lamp shows operational status of the instrument new
- 6 Customizable worktable that may include options, plate readers, racks, carriers, and incubators
- 7 Robotic manipulator arm transports microplates efficiently and fast
- 8 Integrated pause / resume button new
- 9 Tecan's high-speed carousel for fast, random access, of stored microplates
- 10 Access to space below the deck allows easy integration of devices such as plate readers, centrifuges, washers or thermocyclers



Freedom EVO 200 screening workstation.

Excellence in software

Simple, intuitive, flexible

Adaptable, scalable solutions. Behind Tecan's Freedom EVO platform is a full range of powerful software options – software solutions that allow customers to work more efficiently, adapt quickly to new requirements, and meet the highest possible standards of regulatory compliance.

new

Freedom EVOware. Freedom EVOware offers users a completely new and easy to use software package that combines pipetting with scheduled operation of multiple devices in a single package. From genomics and proteomics research to drug discovery applications, Freedom EVOware delivers scalability and adaptability where the customer needs it. User management, file protection and traceability features permit full compliance with the FDA's 21 CFR Part 11 Regulations.

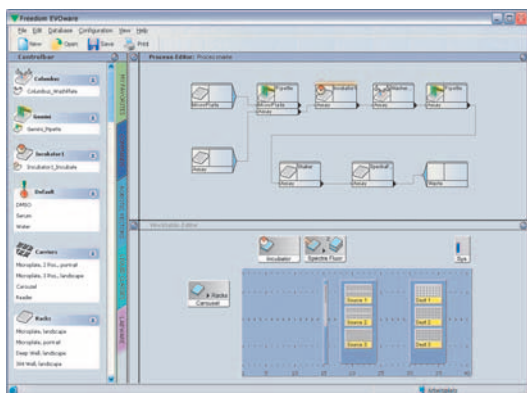
new

Freedom EVO Clinical Software. Tecan offers a series of software solutions that comply with the IVD Directive (Directive 98/79/EC). This series of software solutions for clinical diagnostics ensures the safety, quality and performance requirements for sample distribution, ELISA, Blood Pooling, Blood Typing and other key applications. Tecan's diagnostic software also enables full compliance with the FDA's 21 CFR Part 11 regulations. Only validated protocols that are digitally signed may be operated.

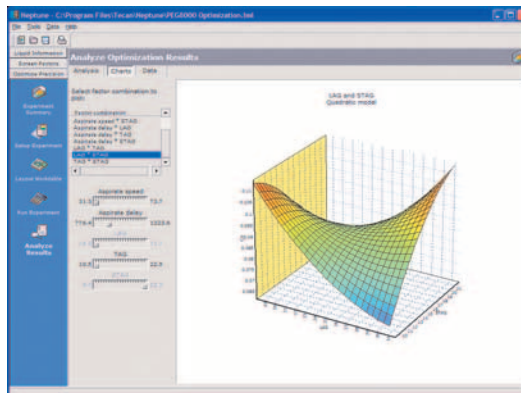


Neptune. Neptune allows fast optimization of different liquid classes by integrating design of experiment methods into robotic liquid handling procedures. Easy identification of key parameters allows users to carefully define the best possible operating conditions. This ensures liquid pipetting of a broad range of liquids with the highest possible accuracy and precision.

FACTS. Tecan provides flexible scheduling software solutions to support higher throughput needs. FACTS enables multiple systems to be operated in parallel and also supports the operation of larger automated systems involving tracked articulating robots (TRAC systems).



Flexible, easy-to-use software in a single package.



Software-optimised liquid handling.

Excellence in liquid handling

Flexible options to meet changing needs

Liquid handling arm. The Freedom EVO liquid handling arm, which combines advanced pipetting precision with reliability and high throughput, may be equipped with four or eight tips. It performs all steps from aspiration to dispensing, taking samples from source to destination, mixing and diluting liquids, detecting liquid levels, and is capable of pipetting into high density plate formats. The liquid handling arm detects both aqueous and organic solvents with high sensitivity and accuracy. Even the smallest volumes of non-conductive organic solvents are detectable.

Liquid system versatility. The liquid handling arm can access to a wide range of tubes, microplates and reservoirs, conveniently located on carriers, and is easily equipped with many configurations of different types of tips. These include standard and disposable tips of varying sizes, coatings and length, as well as dedicated tips for high density plate pipetting (e.g. 1536-well plates) and low-volume pipetting including nano-pipetting. With the fast wash and monitored pump actions, tips are washed efficiently minimizing carry-over. Liquid levels in containers are monitored allowing long-term experiments to be performed with no intervention. The series of Te-MO multichannel pipetting options leverages the modular flexibility of the Freedom EVO to significantly raise the throughput of microplate-based assays.



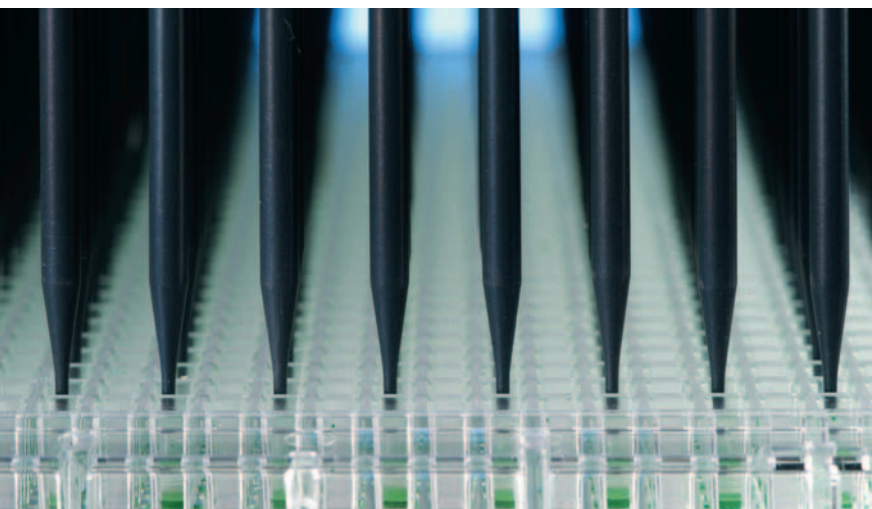
Te-PS (Tecan positioning system) assures reliable and accurate pipetting in 1536-well or protein crystallography plates.

High precision positioning system.

Each Freedom EVO platform can be fitted with Tecan's Te-PS positioning system. Together with the high precision liquid handling arm, the Te-PS system (Te-PS carrier and Te-PS calibration tool) allows efficient and automatic self-calibration of all tips thus assuring accurate, reliable and reproducible pipetting into high density plate formats such as 1536-well plates and protein crystallography plates.

new

new



New 384-channel pipetting for high speed replicating of 384- and 1536-well plates.



High expertise in liquid handling and liquid level detection.

Safety is not an option

User friendly automation with the highest possible safety standards



Continuous loading option for efficient loading and unloading of carriers and racks.

Doorlocks and cover shields prevent unintended access to the worktable during a run.

Freedom EVO has been developed according IVD-Dg8/79/EC (In Vitro Diagnostic Directive).

Intelligent process control

The highest possible levels of safety are guaranteed with the Freedom EVO platform.

Barcode scanner. Positive identification of horizontal and vertical barcodes at any position on the worktable is possible. Carriers, microplates and containers are easily located and even missing tubes may be detected.

Liquid level detection. For both conductive (aqueous) and non-conductive (organic) solutions, liquid levels may be easily determined with high sensitivity and accuracy.

Clot detection. If clots in the sample obstruct the pipetting tip or liquid samples are not properly exchanged, the system quickly locates and notifies the user about the error.

Tip detection. Loading of disposable tips on the liquid handling arm is monitored by the system to ensure safe operation.

Status Lamp. A fully integrated status lamp shows the status of Freedom EVO systems. Errors are signaled both by a warning tone and the lamp changing from green to red.

Pause button. An integrated pause button allows operation to be easily paused and resumed at any time.

Lower disposable tip ejector. Permits reliable and safe tip disposal thus eliminating cross-contamination.

Enhanced operator safety

new

The Freedom EVO platforms include a host of features designed to offer improved operator safety. Doorlock and cover shields – the Access Set – prevent unintended access to the worktable during a run. Gas hinges provide superior operation of both of these safety features. The continuous loading option allows the operator to exchange racks and carriers while the cover shields are closed, and operation continues.

IVD compliant development

new

Based on the Freedom EVO, Freedom EVO Clinical Workstations as well as the Clinical Software have been developed to meet the requirements of the In Vitro Diagnostic Directive (98 / 79 / EC; IVD-D). Hardware and software will be validated and CE marked according to the IVD-D and their intended use. Tecan products for clinical diagnostics will be suitable for applications ranging from fully automated ELISA processing, Blood Typing and Blood Pooling up to Sample Distribution and Molecular Diagnostic applications. Over time the customer will have access to, and be able to implement, the broadest range of IVD-D compliant solutions.

Built-in flexibility and scalability for many different applications



Total flexibility has been built into the complete range of Freedom EVO automation solutions. As open platforms, they can be adapted easily to handle a wide range of applications. To match different throughput and capacity needs, the optimal worktable size may be selected from three different Freedom EVO lengths (100, 150 and 200 cm). The

Freedom EVO is a modular system of hardware and software. Tecan's full range of options and modules for liquid handling, detection, separation can be easily integrated with racks and carriers on the worktable allowing fast adaptation to ever changing needs. The arm configuration can be chosen to optimize device access.



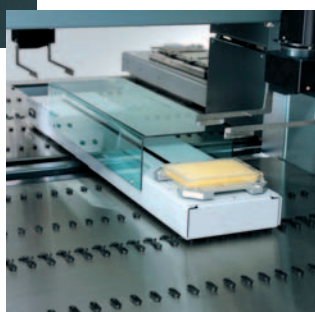
Freedom EVO 150 for nucleic acid preparation.



Freedom EVO 100 for in situ hybridization.



Existing Freedom EVO can be upgraded with a robotic manipulator arm.

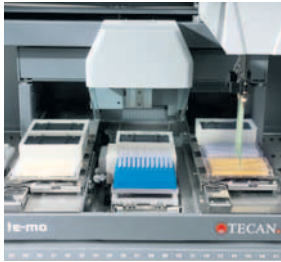


Te-Link allows direct connection between two Freedom EVO.

Robotic manipulator arms. The Freedom EVO incorporates proven special features such as robotic manipulator arms. These arms can transport microplates to readers and plate washers, whether they are located on, beside or beneath the worktable and, if necessary, to a wide range of additional devices such as carousels, incubators or conveyors.

Te-Link. A robotic manipulator arm and Te-Link allow seamless connectivity between two Freedom EVO platforms increasing the throughput of operations and allowing enhanced task optimization and flexibility.

new



The Te-MO is available in two sizes and with 96- or 384-channel heads.



The low-volume option handles smallest volumes precisely.



Mixed-tip configuration with disposable and fixed tips.

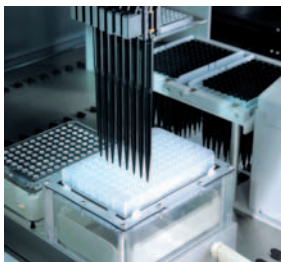


The six-way valve option handles up to six different system liquids.

Liquid handling

Tecan's multipipetting options **Te-MO** increase the throughput of Freedom EVO platforms. When equipped with either a 96- or 384-channel pipette head, Te-MO™ is ideal for many of the applications performed in high density plates in drug discovery and genomics settings.

The **low-volume** option is based on Tecan's unique solenoid valve technology and is integrated into the liquid handling arm. Reliable pipetting down to 500 nL helps minimize the use of expensive liquids. A **large choice of tips** is available for the Freedom EVO platforms. This includes standard tips with different coatings, ceramic tips, disposable tips, low-volume tips, tips for 384- and 1536-well pipetting and Tecan's ActiveTips for nano-pipetting down to 0.5 nL. The **six-way valve** can handle up to six different system liquids thus increasing the versatility of the Freedom EVO.



Te-VacS for solid phase extraction.



The Te-MagS performs magnetic bead separation.

Sample processing

Solid phase extraction. Te-VacS is an automated solution for vacuum solid phase extraction. The system can be assembled by the robotic manipulator arm for fully automated operations and is ideally suited for DNA / RNA extraction, viral RNA isolation, or compound purification. Smoothly regulated pressure allows safe sample extractions with no contamination.

Magnetic bead separation. Te-MagS is a powerful magnetic-bead-based tool for sample purification. Typical applications include DNA / RNA or protein purification as well as cell isolation.

In situ hybridization. GenePaint is a fully automated solution for in situ hybridization and immunostaining of cells or tissue samples on microscope slide formats.

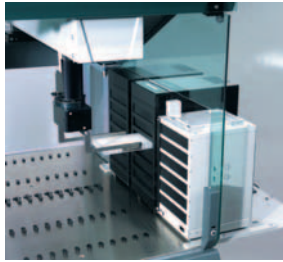
Te-Shake. Te-Shake is a highly effective shaker that handles microplates, deep well plates, Eppendorf and PCR tubes with the added option of sample heating if necessary.



GenePaint for high throughput in situ hybridization and immunostaining.



The Te-Shake shakes MTPs, DWPs, Eppendorf as well as PCR tubes.



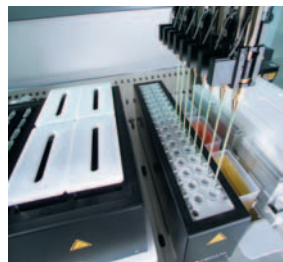
Heated incubator with integrated linear shaker.



The Te-Stack ensures fast and continuous loading of microplates.



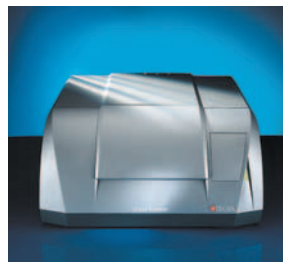
The high speed carousel stores up to 189 microplates.



Temperature-controlled carriers for troughs and tubes.



The Ultra detection system perfectly integrated in the Freedom EVO cabinet.



Laser scanner enables versatile array scanning.



Power washer for high-speed washing of 384-well and 96-well plates.



Third party robotic incubators fit beside and underneath the Freedom EVO.

Sample logistics

Incubators can be placed on the Freedom EVO to provide incubation for four or six microplates, and are ideally suited to cell-based assay applications.

Te-Stack is an efficient tool for automating the storage, retrieval and fast delivery of microplates and disposable tips. Te-Stack is designed for easy integration into Tecan's Freedom EVO platforms and is compatible with the Te-MO multichannel pipetting options.

The **high-speed carousel** is unmatched in speed for random access of microplates and disposable tips. It can efficiently handle 198 microplates, 99 half-height plates or 63 deep-well plates.

Temperature control for reservoirs, tubes and plates is provided by various carriers that fit on the Freedom EVO. These carriers have been developed for optimal integration into the widest possible range of molecular biology and ADMET applications.

Module integration

Tecan detection systems. From the Sunrise absorbance reader to multifunctional advanced luminescence and fluorescence systems such as the GENios family, Safire and Ultra Evolution.

Tecan LS Series. Laser Scanner for detection of samples on microplates or slides, and quantification of a wide range of biochip / microarray-supported substrates, including membrane arrays and gel-based samples on glass.

Tecan washer systems. Tecan offers fully automated microplate washers for Enzyme Linked Immunosorbent Assays (ELISA), and other key applications in the Life Sciences. These include the Columbus and the PW 96 and PW 384 plate washers.

Third party devices. From third-party plate sealers and robotic incubators to dispensers and thermocyclers, the Freedom EVO platform, in combination with software solutions, has been designed to accommodate different customer needs.

Discover the freedom to evolve your key applications in genomics, proteomics, drug discovery and clinical diagnostics



Nucleic acid sample preparation.

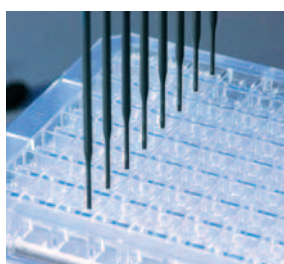


PCR application with integrated thermocycler.

Genomics. The Freedom EVO series of platforms fully supports nucleic acid extraction and purification via vacuum, magnetic-bead-based or centrifugal separation. Sequencing reaction set-up and PCR set-up, genotyping studies, SNP scoring and spot array printing are also possible as well as in situ hybridization applications.



Protein digestion and MALDI plate spotting.



Precision pipetting into 864-well format protein growth plates.

Proteomics. The Freedom EVO platform enables diverse applications in protein identification and characterization. A wide range of optimized solutions are available for protein digestion and MALDI plate spotting and the latest precision pipetting methods for protein crystal growth optimization. Each solution is fully scalable to adapt to different throughput needs.



CaCo 2 cell permeability application.



Ultra high throughput screening with integrated 3rd party robotic devices.

Drug Discovery. Tecan's Freedom EVO platforms support drug discovery applications ranging from the full range of ADMET and other cell-based assays (e. g. microsomal metabolic stability assays, cell permeability and cell maintenance assays) to compound synthesis applications and validation assays, compound logistic procedures and high throughput screening processes.



Blood pooling application with fast and reliable barcode scanning of tubes.



Disposable tips ensure safe pipetting in clinical diagnostic applications.

Clinical Diagnostics. Using its portfolio of products and platforms, Tecan provides a range of IVD-D compliant solutions for its customers. These solutions are suitable for applications ranging from Sample Distribution, Blood Typing and Blood Pooling up to fully automated ELISA processing and molecular diagnostic applications.

Tecan's range of Freedom EVO platforms may also be integrated in Tecan Robotic Assay Composer (TRAC) systems to provide even larger scale high throughput options or further customized solutions for life science applications.



Specifications

Hardware features

Flexible arm configurations	up to 3 robotic arms on the same robot		
Robotic arms	liquid handling arm, robotic manipulator, robotic manipulator extended Z, pick and place		
Different arm configurations	9 different arm configurations possible		
Tip configuration	4 or 8 tips, various combinations of different tip types		
Tip variety	standard (Teflon™-coated stainless steel), ceramic coating, hard Teflon™ coating with full DMSO compatibility, short / long low volume, tips for access of 384 and 1536 well microplates, ActiveTips for nanopipetting and disposable tips with or without filter (10 / 200 / 1000 µl)		
Tip movement	independent Z equidistant	Y (9 to 38 mm between tips), resolution of 0.1 mm in all three axes (X, Y, Z) Liquid handling arm compatible for 1536 well formats	
Syringe sizes	50 / 250 / 500 / 1000 / 2500 / 5000 µl		

Liquid handling features

Standard volume	3 – 5000 µl (standard tips), 3 – 1000 µl (disposable tips)		
Low-volume option	0.5 – 250 µl (low volume tips)		
Nanopipetting	0.5 nl – 10 µl (ActiveTips)		
Pipetting precision (CV)	Volume	Standard tips	Disposable tips
Standard volume*			200 µl 1000 µl
	10 µl	< 1.5 %	< 1.5 % –
	100 µl	< 0.4 %	< 0.4 % < 0.4 %
	* typical results using pipetting water in single pipetting mode under optimized conditions (1000 µl syringe). [guaranteed for standard and disposable tips: 10 µl < 3 %, 100 µl < 0.5 %]		
Pipetting precision (CV)	Volume	Low-volume tips	Low-volume disposable tips
Low volume*	1 µl	< 5 %	< 7 %
	10 µl	< 1.0 %	< 1.0 %
	* typical results using pipetting water in single pipetting mode under optimized conditions (250 µl syringe). [guaranteed for standard and disposable tips: 1 µl < 10 %, 10 µl < 3 %]		

Safety features

Liquid level detection	down to 50 µl of conductive liquid can be detected in round-bottom microplates on standard carriers		
Multiple liquid detection /	part of integrated liquid detection (ILID)		
Clot detection	sensitive detection of tip-clotting and non-exchange of liquid		
Password protection	three password levels: user, integrator and administrator		
Dimensions	Freedom EVO 100	Freedom EVO 150	Freedom EVO 200
height	870 mm / 34,3"	870 mm / 34,3"	870 mm / 34,3"
width	1075 mm / 42,3"	1450 mm / 57,0"	2050 mm / 80,7"
depth	780 mm / 30,7"	780 mm / 30,7"	780 mm / 30,7"
Power requirements	power: 800 VA, voltage: 100 – 240 VAC, frequency: 50 / 60 Hz		
Operating conditions	temp. 15 – 35 °C / 59 – 95 F, rel. hum. 5 – 80 %		

Not all products indicated in this brochure are compliant with the In Vitro Diagnostic Directive 98 / 79 / EC.

For additional information on the Freedom EVO series of liquid handling platforms, please contact your local Tecan office or visit our web site at www.tecan.com

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