DIAGNOSTICS

AIW line

fully automated immunoassay workstations ELISA | CLIA | FIA

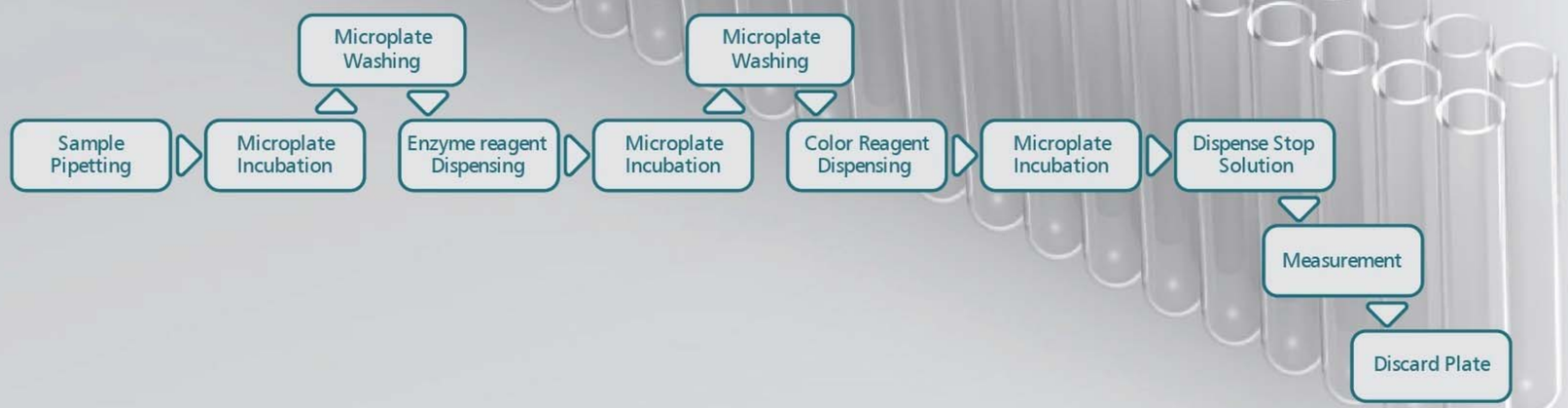
Innovative technology for your liquid handling applications

AIW

High speed and throughput
Convincing performance
Benchtop and cabinet design
Flexible workbench setup
Intuitive and flexible software
Cost-effective

A + A range of immunoassay workstations combine all functions required to process microplate based immunoassays on an efficient, convenient and fast platform. Sample- and reagent transfer are performed by the high precision pipetting system. An array of shaker-incubators carry the microplates, assure accurate reaction temperature and efficient mixing. A high performance 96-well microplate washer module provides fast and efficient washing. The measurement module selected to match your specific assay technology ELISA, CLIA or FIA, provides reliable raw data to be evaluated and the plate transfer arm moves the plate between the modules used for each individual processing step.

The system is complemented by A+A station, a powerful PC-software providing an intuitive user interface to control all system functions, define and execute the desired processes, perform evaluation and provide access to results and process data.



Standard Configurations AIW

All AIW immunoassay workstations are available configured for ELISA, CLIA and FIA. The table below refers to the different types of ELISA workstations. For alternative measurement technologies replace ELISA in the list of models below by CLIA or FIA.

Model	ELISA 200	ELISA 300	ELISA 400	ELISA 600	ELISA 1100
Design	benchtop	cabinet	cabinet	cabinet	dual cabinet
Pipetting channels	2	2	4	8	8 in front cabinet + 4 in rear cabinet
Worktable size WxD mm	1085 x 580	1315 x 730	1315 x 730	1675 x 820	3170 x 820
Tube carriers (samples)	6 (144 tubes)	8 (192 tubes)	8 (192 tubes)	10 (240 tubes)	10 (240 tubes)
	Each standard sample tube carrier can hold up to 24 tubes with a diameter of 12mm				
Plate carriers	4 shaker incubators + 1 ambient (optional)	9 shaker incubators	9 shaker incubators	16 shaker incubators	16 in front cabinet 16 in rear cabinet (shaker incubators)
Microplate washer	8-well washer 16-well (optional)	96-well washer	96-well washer	96-well washer	3 x 96-well washers
Tip racks	1 tip rack holding up to 4 sets of 96 tips (up to 384 tips in total)				1 in front cabinet + 1 in rear cabinet
Tip eject station	1 with a waste container installed below the worktable				1 in front cabinet + 1 in rear cabinet

sample preparation, assay processing systems and individual solution

full range of sample preparation and assay processing systems, based on a selection of workbench platforms, a number of functional modules common across our portfolio and application specific measurement or processing modules.

Sample Pipetting

Air displacement technology and disposable tips

The pipetting modules in sco assay processors utilize drip-proof air displacement pipetting with disposable tips. This technology eliminates any risk of cross contamination by carryover and prevents sample dilution with system liquid, both common in washable tip systems. Different sizes of disposable tips can be used to match the specific pipetting requirements.

Real time tip monitoring

During tip-loading, pipetting and tip-ejection the system continuously monitors the presence and proper fixing of each tip. In case of a problem the software will automatically set necessary actions, like retry loading the tips to assure continuous operation or display the related warning and ask for user intervention if necessary.

Liquid handling process monitor

During aspiration the pipetting system automatically monitors three parameters vital for accurate pipetting and reliable assay processing. If a problem is identified the system provides an alarm and the operator can eliminate the reason immediately.

Liquid level monitoring is used to detect the surface of the liquid to be pipetted, to assure identical conditions for aspiration and accurate pipetting across all channels. The pressure based detection system allows for the use of standard pipetting tips.

Clot monitoring, based on sophisticated analysis of the pressure profile for each individual channel during aspiration, is used to detect clogged tips.

Tube volume monitoring uses the detected liquid level, the sample- or reagent-container geometry- and its position data to calculate the liquid volume available in the related vessel. If the available volume is not sufficient to continue the scheduled process, the system will provide a warning and ask for user intervention.

All 8-, 4- and 2-channel systems provide the possibility to deactivate faulty channels if necessary. The system can then still be operated and continue the protocol with the remaining, intact channels until the problem can be eliminated. This feature prevents critical down time of the system while your lab is busy and gives you the chance to plan maintenance when appropriate.

Dynamic Pipetting Channel Positioning System

The automatic pipetting head allows simultaneous, independent vertical movement of each individual pipetting channel. At the same time the spacing between the individual channels can be automatically adjusted to the required, equidistant grid. This design increases flexibility and processing speed in sophisticated pipetting tasks like the parallel transfer of samples from sample tubes to the microplate or other reaction vessels.

Dispensing Modes of Aspirating Samples

Multiple Dispensing: The aspirated samples can be subsequently distributed to a number of target vessels.

Diversified Dispensing: The aspirated samples are simultaneously transferred to different target vessels.

Intelligent plate transfer arm

Together with sophisticated pipetting head, the intelligent plate transfer arm makes up the centerpiece of the Addcare assay processing platform. It can rapidly, precisely and safely pick up microplates and transfer them between the different modules on the workbench involved in the assay process. In order to increase speed and flexibility the plate transfer arm can be simultaneously positioned along the Y-axis, independent of the pipetting head. In order to increase operating safety the transfer arm will keep holding the plate even during a power failure.

Plate Shaker-Incubators

The shaker incubator modules allows individual control of the required temperature setting and shaking parameters. Depending on the number of pipetting channels available on the system, the number of incubators is carefully defined to match the specific processing speed and system throughput and grouped in arrays of 2, 4, 9 or 16 modules.

Sample pipetting and reagent dispensing are performed with the plates positioned on their assigned incubator. This allows to set the target temperature after pipetting is completed to decrease time shift effects across the plate. If desired, the empty plate can be pre-incubated, resulting in a faster rise of temperature after pipetting.

If required, light protection covers may be placed on the plates during incubation.

Microplate washer modules

All A+A immunoassay processing systems are equipped with a high performance microplate washer modules, designed to provide high throughput and consistent washing performance across the plates with a specified residual volume after aspiration of less than 2µl per well. Depending on the model the systems are either equipped with an 8 - (optionally 16- or 24) or 96-well washer module. The high throughput system sco ELISA 1100 even incorporates 3 parallel 96-channel washer modules located between the two cabinets.

In order to process plates partially filled with strips, groups of 3 adjacent columns of the 96-channel manifold can be individually activated or deactivated. A+A station provides full control over all relevant parameters like the selection of the wash buffer, the wash mode, wash liquid volume, overflow washing height, wash cycles, soak time and others. In order to simplify method definition wash protocols can be predefined and assigned to the related processing methods.

The plate carrier of the 96-channel washer module can hold up to three microplates at a time, so plates can remain on the washer during soak time, while other plates are processed in parallel without the need to transfer them unnecessarily. This eliminates a common bottleneck in automated immunoassay processing and significantly increases throughput of the complete system.

Different wash buffers can be held available in parallel and selected automatically. Each wash buffer container is equipped with a liquid level sensor. Distilled water provided in a separate container is used to purge the manifold and avoid clogging.

Microplate Measurement Modules ELISA, CLIA or FIA

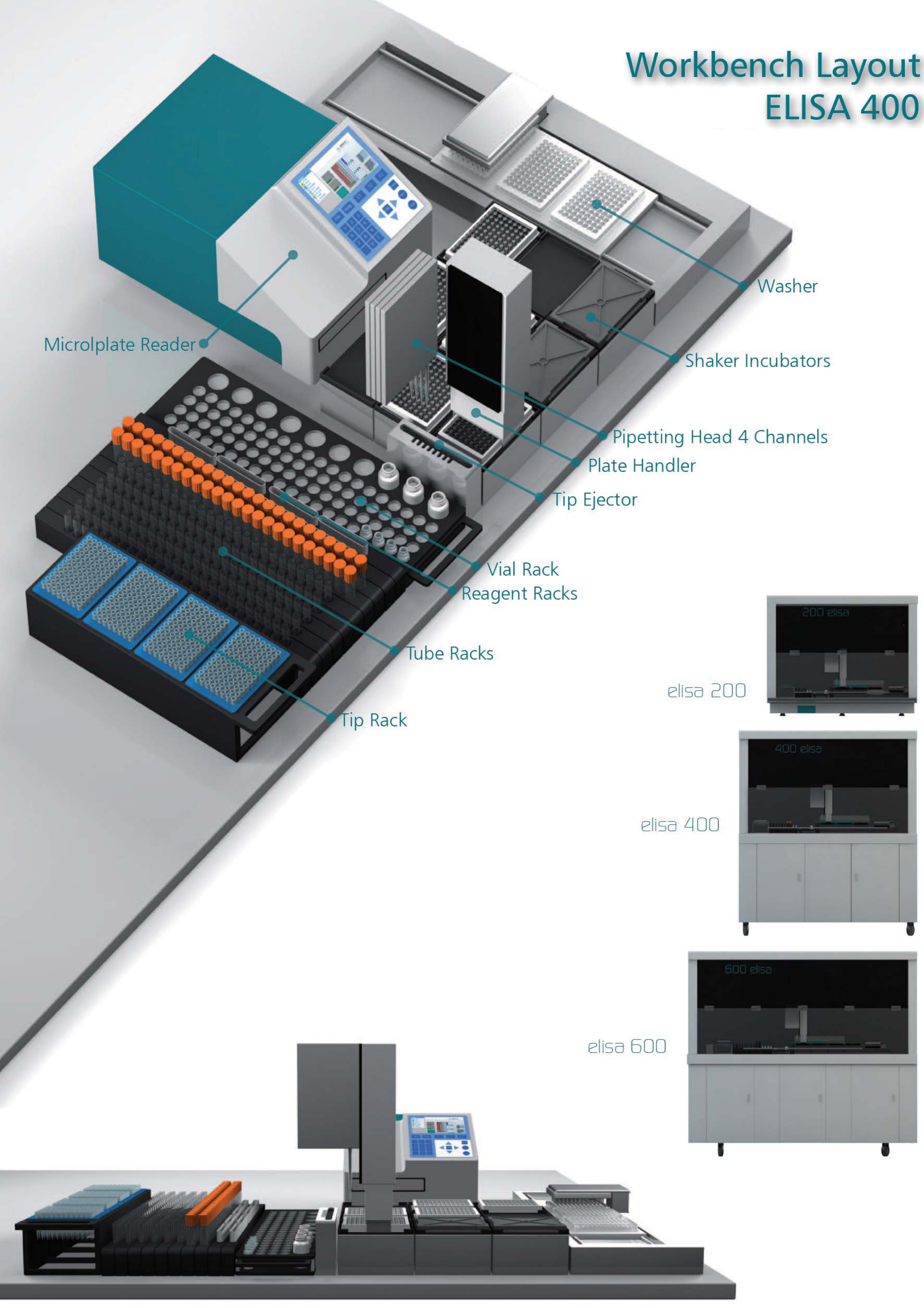
A+A Immunoassay Workstations are equipped with high quality microplate measurement modules, matching the assay technology to be processed. They assure reliable and accurate measurement data acquisition. Alternatively a photometric microplate reader module (ELISA version), a microplate luminometer (CLIA version) or a fluorescence reading module (FIA version) is installed onto the desired processor platform to create a system tailored to your specific needs.

Control of the reader function as well as evaluation, validation and assignment of the results to the sample IDs is completely integrated in the processing methods defined in A+A station.

Barcode Reader

Multi angle barcode scanner. It can be used to identify sample tubes in the tube racks, distinguish between tubes with barcode, tubes without barcode and rack positions without tube. Additionally the location of reagent carriers can be identified.

Workbench Layout
ELISA 400



elisa 200

elisa 400

elisa 600

A+A station

All systems are supplied with the station, a versatile Windows® based software package designed to control all functions of the instrument connected. It allows the user to configure, run and control the required assay or liquid handling procedure and manage sample and result data. The intuitive user interface closely follows and supports the workflow defining the procedures in the lab.

The station is designed to equally handle large workloads of routine assays as well as small sample quantities supplied discontinuously to the lab. Multiple assays can be processed in parallel and different assays can be assigned to individual samples.

Main interface:

The software controls each individual operation and interaction of the modules on the work bench synchronously. It schedules the tasks and provides permanent feedback on the progress and status of the work in progress.

Pre-run simulation

The software utilizes a complex simulation algorithm to schedule parallel processing of assays, to minimize delays and maximize throughput. The working sequence of the assay process is visualized along a common timeline. During operation the user is informed if an intervention is necessary.

Unit Controller

Each module can be individually controlled and adjusted to meet the specific requirements of the application, optimize performance and eliminate potential problems.

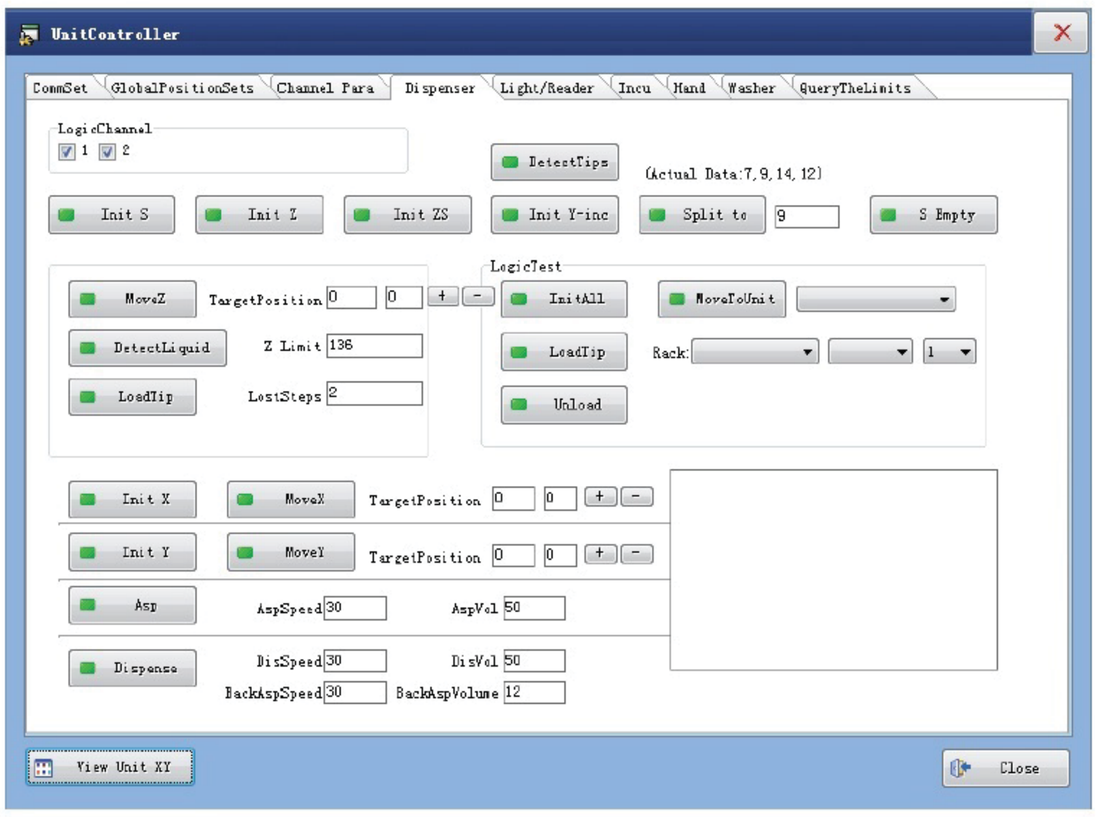
Traceability, quality control, data exchange

A+A station generates detailed track records of the complete assays process, corresponding to the strict guidelines for electronic records, tracking instructions and automated test process records for IVDs.

The software provides convenient interfacing to existing LIS/HIS systems through a standardized laboratory data exchange format.

Westgard or L-J QC functionality supports automatic creation of quality control charts and validation.

The recorded traceability data can be filtered and monitored conveniently, supports identification and elimination of irregularities in the assay process.

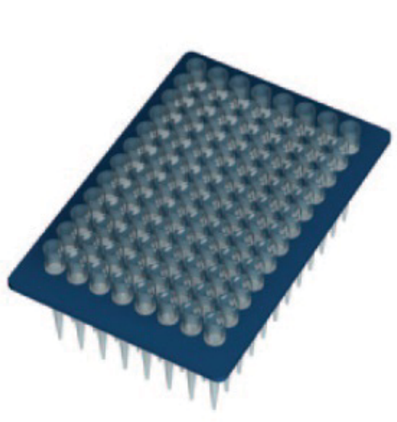


Platforms tailored to your application

The system platforms can be customized to meet the requirements of a wide variety of laboratory applications. A number of standard and optional modules can be combined to perfectly match the desired workflow. The station will display your specific configuration and provide integration of its functionality to implement your individual processing methods.

Accessories

These accessories are identical with the modules included in standard configuration or available as option. In order to facilitate preparation of the necessary material prior to starting a process, additional racks can be ordered to be filled while the system is operating.



Tips for different volumes are available with or without filter. They are either supplied loose or loaded into the corresponding **Tip Carrier.** These are designed to fit onto the addcare tip racks.

Light Protection Covers can be used to protect microplates during incubation from ambient light. The plate handler can position the Light Protection Covers on the plates, remove and stack them if they are not used.

Reagent carrier can hold 4 groups of reagents in disposable trays. Each tray covers 8 channels, allowing for simultaneous aspiration.

In order to avoid evaporation, lids are available to cover the individual trays if the system is not operated.

Sample tube carrier can hold 24 sample tubes with a diameter of 12-13mm or 16mm SST tubes. Additional tube carriers can be filled outside the work area to reduce preparation time on the system for the next samples to be processed.

Custom vial racks are available in different configurations to hold a variety of control- or reagent vials. They generally cover a number of rails and are preconfigured in the software. On request customized versions of vial racks can be designed.

Microplate Measurement Modules ELISA, CLIA or FIA

The A+A Immunoassay Workstations are equipped with high quality microplate measurement modules, matching the assay technology to be processed. They assure reliable and accurate measurement data acquisition. Alternatively a photometric microplate reader module (ELISA version), a microplate luminometer (CLIA version) or a fluorescence reading module (FIA version) is installed onto the desired processor platform to create a system tailored to your specific needs.

Control of the reader function as well as evaluation, validation and assignment of the results to the sample IDs is completely integrated in the processing methods defined in the station.

Specifications ELISA Microplate Reader

Measurement system	detector: silicon photo diodes | light source: quartz-halogene lamp
Wavelength range	340 - 850nm
Filter configuration	405, 450, 492, 620nm + 4 positions for optional filters
Indication range	0.000 - 6.000A
Measurement increment	0.001A
Measurement modes	Single- and dual wavelength measurement
Accuracy	±1% (0.0 to 3.0A) or ±0.003A whichever is greater
Precision	CV ≤0.2% (0.3 to 3A)
Linearity	±2% (0.0 to 3.0A)
Measurement speed	6 seconds fast mode | 12 seconds normal mode

Specifications CLIA Microplate Luminometer

Measurement system	Counter type PMT for glow luminescence measurements
Wavelength range	300 - 650nm
Measurement range	0 - 2.5×10^{7}RLU
Measurement increment	1 RLU (Relative Light Units)
Background signal	≤100RLU @25°C
Crosstalk	≤5×10^{-5}
Linear range	0-2.5×10^{7}RLU
Linearity	≤99% coefficient of correlation
Precision	CV < 3%
Sensitivity	≤5×10^{-17} mol C14
Integration time	0.05 - 10 sec/well

Specifications FIA Microplate Fluorometer

Measurement system	Single channel fluorescence detection
Light source	Tungsten halogene lamp
Wavelengths	Central wavelength Exitation:390nm Central wavelength Emission: 486nm Bandwidth: 10nm
Sensitivity (detecion limit)	0.1mg/dl PHE
Linear range	0 - 15 mg/dl PHE, coefficient of correlation r≥0.95
Precision	CV ≤5%
Measurement time	1 sec/sample (rapid test mode)

Specifications

For alternative measurement technologies replace ELISA in the list of models below by CLIA or FIA.

Model	ELISA 200	ELISA 300	ELISA 400	ELISA 600	ELISA 1100
Design	benchtop	cabinet	cabinet	cabinet	dual cabinet
Working platform	Flexible setup				
Liquid handling system	Common X-movement. Spacing between adjacent channels: 8 channel = 9 - 15mm | 4 channel = 9 - 22mm | 2 channel = 9 - 27mm. Equidistant channel spacing. Independent, simultaneous vertical tip movement. Position increment: ΔX, ΔY and ΔZ = 0.01mm				
Type of tips	Independently operated dispense channels with disposable tips to avoid carryover				
Number of channels	2	2	4	8	8
Sample pipetting principle	Sample pipetting by air displacement				
Specification of tips	300µl and 800µl tips				
Pipetting range | increment	Range: 1 to 1000µl | Increment: 0.1µl				
Pipetting precision and accuracy	Type of tip	@ Volume	Accuracy	Precision (CV%)	
	300µl	100µl	± 1%	<0.75%	
	800µl	100µl	± 1%	<0.75%	
Liquid handling speed (Pipetting incl. tip exchange, Dispensing continuous)		2 Channels	4 Channels	8 Channels	
	pipetting 96 samples | 100µl	600sec	320sec	180sec	
	dispensing 96 wells | 100µl	85sec	45sec	20sec	
Liquid handling functions	Pipetting, dispensing, dilution, conjugation, aliquoting, multiple- and diversified dispensing				
Liquid level monitoring	Liquid level monitoring, clot monitoring and empty tube monitoring				
Samples | Controls | Reagents					
Total Rails	12	16	16	20	20 + 12
Sample/Control Positions	6 x 24 = 144	8 x 24 = 192	8 x 24 = 192	10 x 24 = 240	10 (240) + 0 (0)
Reagent Positions	6 x 4 = 24	8 x 4 = 32	8 x 4 = 32	10 x 4 = 40	10 (40) + 12 (48)
	Optional multifunctional rack covering 6 rails for reagent positions, plate covers or deep well plates				
Plate transfer arm	Transfers microplates between incubators, washer and measurement module				
Plate positions - Shaker-Incubators	4 + 1 ambient (optional)	9	9	16	16 + 16
Temperature range	Room temperature to 60°C adjustable at an increment of 0.1°C				
Accuracy	±0.5°C @ 37°C				
Washer	ELISA 200	ELISA 300	ELISA 400	ELISA 600	ELISA 1100
Washing channels	1 x 8 16-well (optional)	1 x 96 with 3 plate positions	1 x 96 with 3 plate positions	1 x 96 with 3 plate positions	3 x 96 with 3 plate positions each
	96 dispense+aspirate channels per manifold. Dispensing selectable in groups of 3 columns				
Selectable wash buffers	3	3	3	3	6
Wash volume	50 to 1000µl per well				
Residual volume	≤2µl per well				
Washing modes	Dispense - aspirate, overflow washing, crosswise aspiration with selectable injection height, soak time and final aspiration				
Liquid level detectors	For all wash buffer containers and the waste container				
Measurement module	See detailed specifications for microplate reader, luminometer and fluorometer				
Barcode scanner	Manual barcode scanner as option	Automatic barcode scanner as factory option	Automatic barcode scanner as standard		
	Multi angle barcode scanner. It can be used to identify sample tubes in the tube racks, distinguish between tubes with barcode, tubes without barcode and rack positions without tube. Additionally the location of reagent carriers can be identified.				
Software	sco station preconfigured to the individual system				
Optional configurations	Tip carrier, tube carrier, reagent carrier, microplate carrier, washer, reader, plate cover stacking position				
Environmental conditions	Operating temperature: 18 - 25°C, Humidity: 30 - 60% non condensing Storage temperature: 10 - 30°C, Humidity: 15 - 70% non condensing				
Power	Consumption: 500-700W, Voltage: 220V, Frequency: 50-60Hz (standard configuration) System will be pre-configured according to the requirements in the specific country				
Interface	CAN-bus (USB to CAN-bus adaptor included) RS232 for barcode scanner (can be operated with a USB to RS232 converter)				
Model	ELISA 200	ELISA 300	ELISA 400	ELISA 600	ELISA 1100
Dimensions WxDxH mm	1270x785x1000	1500x810x1735	1500x810x1735	1940x900x1735	3440x900x1735
Weight kg	180	330	340	450	800