Miltenyi Biotec

The MACSQuant® Analyzer 16

Colorful new possibilities in automated flow cytometry

JOIN THE FLOW REVOLUTION

More colors, more applications

The MACSQuant® Analyzer 16 is engineered to expand the revolutionary automation of the MACSQuant Analyzer line of flow cytometers. It facilitates fully automated data acquisition in a 24-tube or 96-well plate format. The instrument's compact design is suited for basic research as well as advanced immune monitoring applications. The MACSQuant Analyzer 16 provides users with the flexibility and customization that are required for the increasing demands of modern laboratories.

Automation

Load your samples, import your experiment settings, and leave the staining, data acquisition and analysis to the MACSQuant Analyzer 16.

Expanded fluorescent channels

Amplify your data with a selection from 14 fluorescence channels and an average of 40% less sample volume required.

Flexibility

Easily and immediately switch between tubes and plates at the click of a button.

Simplicity

Minimize the learning curve with straight forward experiment setup and operation.

Multi-instrument alignment

Using our Smart Gain software technology, users can harmonize data with collaborating labs to ensure reproducibility.


MACS
Quant 16

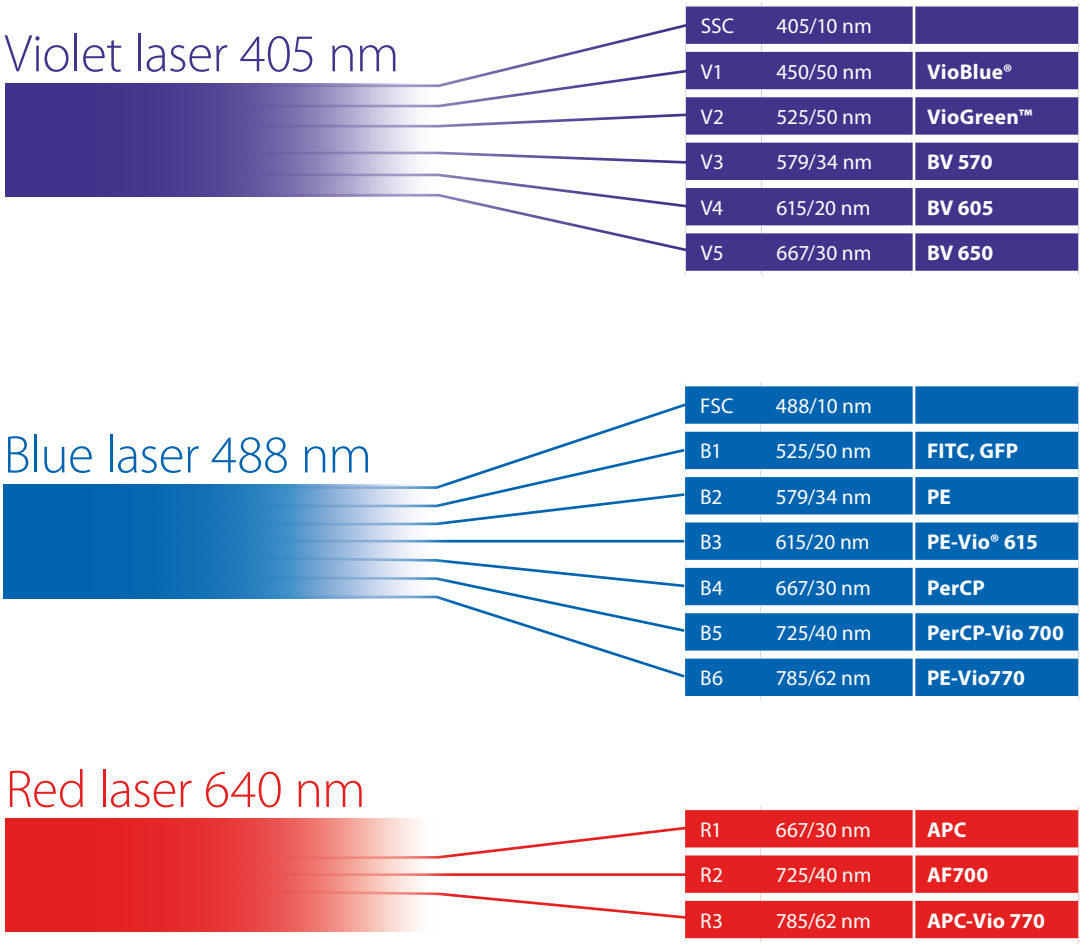
Simplicity

Automation

Colorful

Renowned instrumentation with expanded fluorescence capabilities

As research questions become more complex, let the MACSQuant® Analyzer 16 simplify your data acquisition. With expanded fluorescent capabilities, you can now maximize the number of parameters you can measure for each sample. Fluorescent channels are available with 405, 488 and 640 nm excitation lasers to cover a broad range of dyes and fluorescent proteins, enabling you to tell your story with more color. With the MACSQuant Analyzer 16, you can expand your immunophenotyping applications to span a broad range of cell types, such as T cells, B cells, NK cells, and dendritic cells, as well as tissue-specific, neural and stem cell populations. What would new possibilities mean for your research?



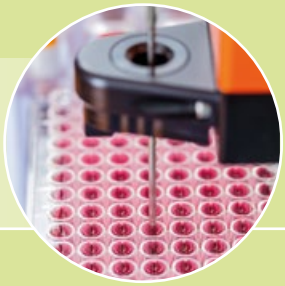
The features that make the difference

Large monitor:

15.6" monitor for simple touchscreen operation

Robotic needle arm:

At the heart of sample mixing, processing and autolabeling



Integrated MACS® Magnetic Cell Enrichment:

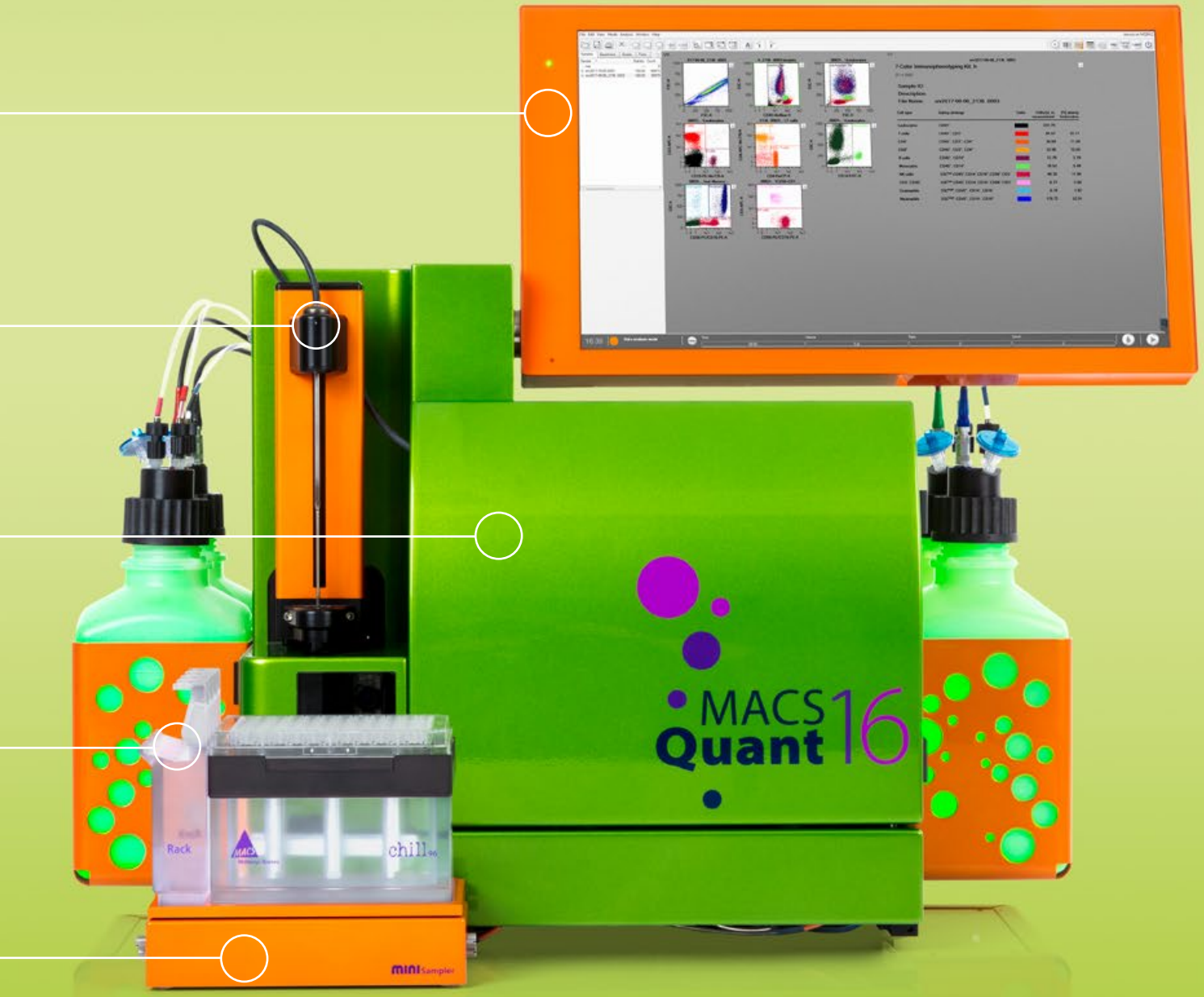
Focus on your cells of interest and fortify your data

Universal Reagent Rack:

Flexible autolabeling options from glass or plastic vials

MiniSampler:

Seamless sampling from single tubes, multiple tubes or 96-well plate


MACS
Quant 16
Rack
chill
mini Sampler

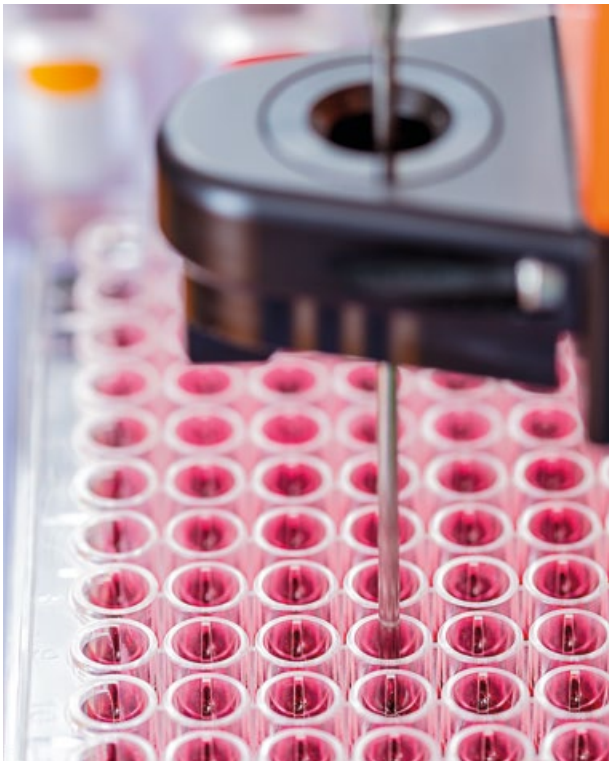
Autolabeling

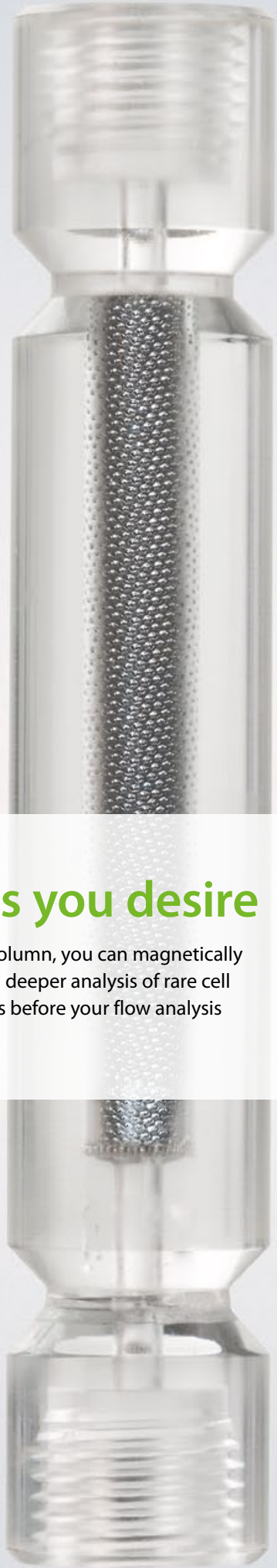
The missing step in a fully automated flow cytometry assay

With the inclusion of the MACS® MiniSampler Plus, the MACSQuant® Analyzer 16 enables autolabeling of your samples using the automated pipetting arm. The newly designed Universal Reagent Rack allows you to add reagents to your tubes or plates from 5 mL glass or 1 mL plastic vials.

Why risk the variability when you can automate your applications

Reduce the risk of pipetting error with the reliability of robotics. All you have to do is program the titer of your reagent, the time for incubation and the dilution of your sample, if applicable. That's it! You are now ready for the instrument to label and prepare your samples automatically.



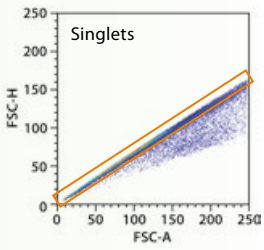


Focus on the cells you desire

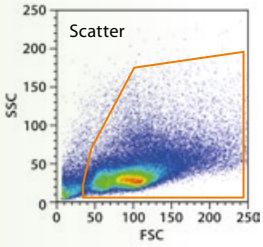
Using the integrated MACS® Enrichment Column, you can magnetically enrich your target population to perform a deeper analysis of rare cell subsets. Removing the non-relevant events before your flow analysis make your assay even more robust.

Get more with the MACSQuant Analyzer 16

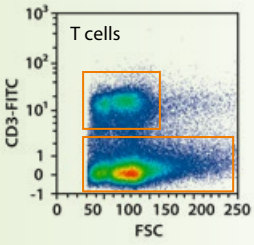
More channels. More data. More subsets.



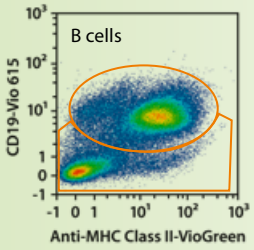
Dive

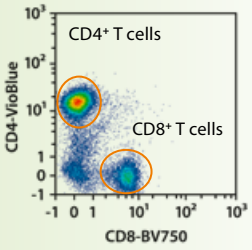


deeper

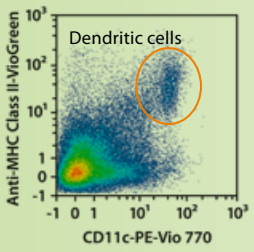


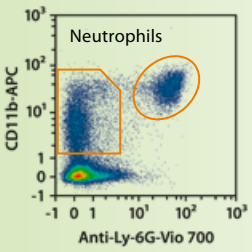
into



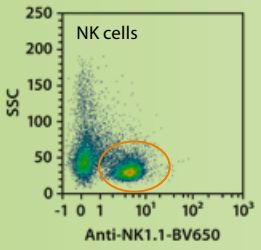


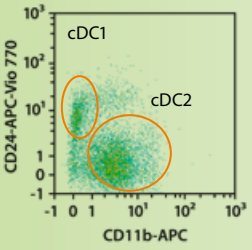
your

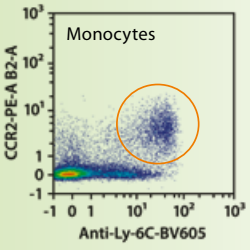




subsets







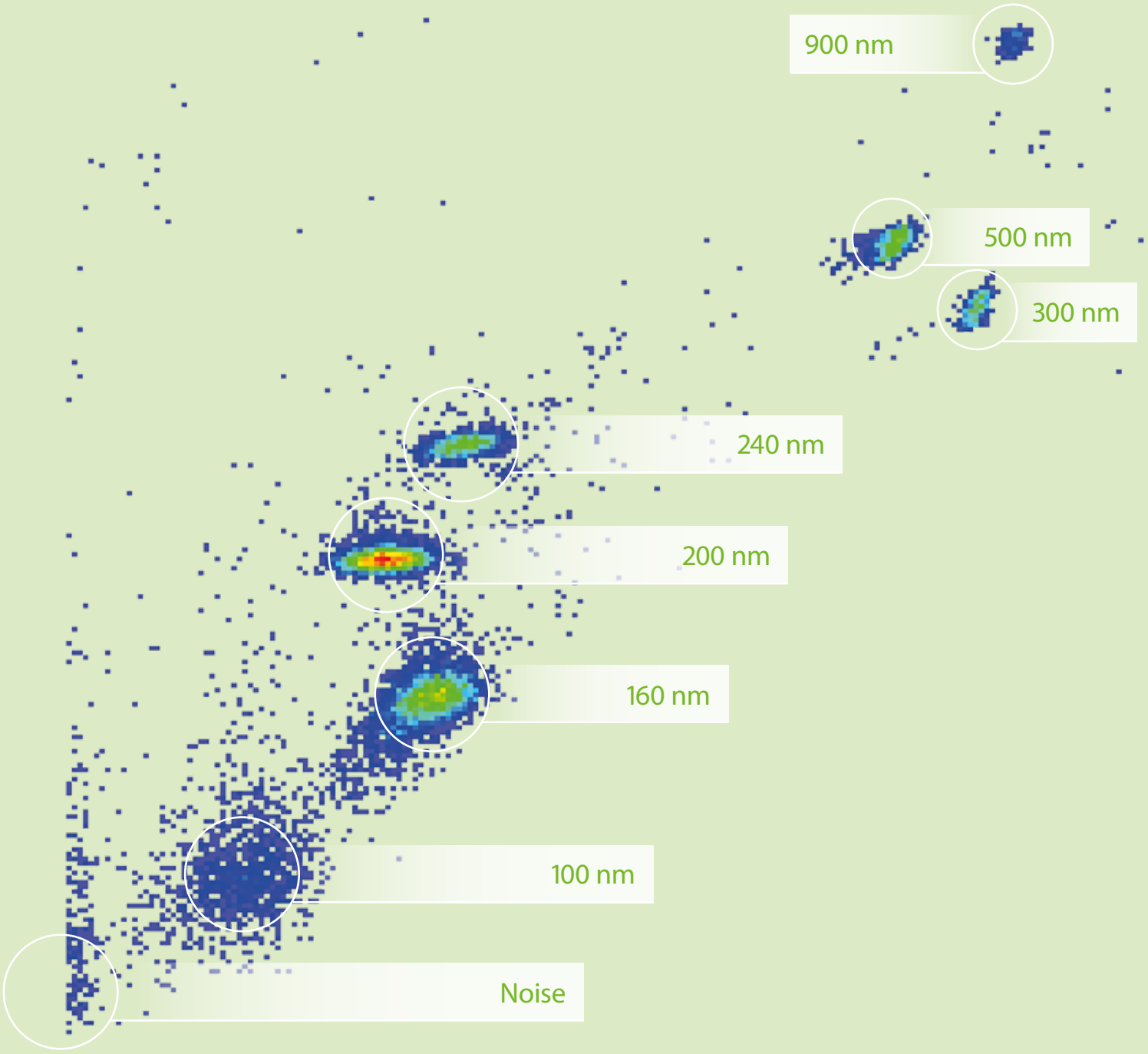
Multiparameter analysis of PBMC subpopulations using Flowlogic™Software

Amplifying your data has never been so easy.
An example is shown here with a gating strategy for a 12-color panel designed to analyze T cell, B cell, NK cell, dendritic cell, and myeloid cell subsets from one sample of peripheral mononuclear cells (PBMCs). The data was analyzed using Flowlogic™ Software, which comes with many automated gating, graphing, and reporting features and generates ready-to-use, high-quality data.

- **Conserve sample – Up to 40% less material**
- **Conserve reagents – Up to 40% less reagent**
- **Conserve your time – 24-tube and 96-well plate automated acquisition**

Nano particle analysis with violet side scatter

Utilize the violet side scatter optics of the MACSQuant Analyzer 16 for small particle analysis



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Harmonizing the world is just an instrument setting away

Smart Gain with MACSQuantify™ Software

Experience consistently reproducible results from day to day, instrument to instrument, and operator to operator. With the Smart Gain technology of MACSQuantify Software, you can transfer your assay from one instrument to another, while passing on all necessary information to ensure an identical setup. As a result, the MACSQuant® Operating System produces comparable, standardized results, every time, everwhere.

Compliance with 21 CFR Part 11

You can be sure that your data is suitable for submission to regulatory agencies with the optional 21 CFR Part 11 feature, which includes:

- **Audit trail**
- **Analysis reports with e-singature**
- **User management system according to 21 CFR Part 11**

Your partner in cell therapy

Further characterize and enumerate your cells in your cell manufacturing applications. The MACSQuant® Analyzer 16 hardware and software are configured to support small to large scale manufacturing requirements.


MACS
Quant 16
Rack
chill 96
mini Sampler

Complete your automation loop with reproducible reagents

Achieving maximum reproducibility between experiments cannot depend on the flow cytometer alone. In order to achieve consistent results, Miltenyi Biotec offers a complete flow cytometry solution including a dedicated range of reagents. We help you make sure that variations in your experiment are due to your sample and not due to unreliable antibodies or instruments.

REAfinity™ Recombinant Antibodies – flow cytometry is in their genes

Miltenyi Biotec has introduced a portfolio of REAfinity™ Recombinant Antibodies that provide superior lot-to-lot consistency and purity compared to mouse or rat monoclonal and polyclonal antibodies. Our recombinant technology also diminishes the need for FcR blocking and allows for analyses with only one single isotype control, generating high quality data with no more background signal while saving efforts when setting up experiments. For more information, visit: **www.miltenyibiotec.com/reafinity**

Advantages of REAfinity Recombinant Antibodies:

- **High lot-to-lot consistency**
- **One universal isotype**
- **No more background signal**

REAfinity Recombinant Antibodies

Vio® Dyes – brighter dyes for flow cytometry

When used in combination with our proprietary Vio® and VioBright™ Dyes, you can take advantage of superior mean fluorescence intensity and high stain indices. As the brightest dyes on the market, setting up complex multicolor experiments has never been so simple. For more information, visit: **www.miltenyibiotec.com/vio**

ViO Dyes

Ready-to-use kits

Use Miltenyi Biotec's range of ready-to-use, pre-titrated kits and save valuable experiment set-up time and assay costs. Our kits have been validated to be used with the automatic labeling capacities of the MACSQuant® Analyzer 16, which in combination with our MACSQuant Express Modes, give you true walk-away capacities. All you have to do is set-up the experiment and come back to look at completely analyzed data.

Customized solutions

Miltenyi Biotec's custom antibody design service enables researchers to benefit from personalized flow cytometry solutions. This service includes purified, functional-grade antibodies, single- and multicolor antibody conjugates as well as multicolor antibody cocktails. To find out more, visit: **www.miltenyibiotec.com/customab**

MACSQuant® Analyzer 16 specifications

Optics

Laser excitation	Spatially separated: 405 nm, 65 mW diode 488 nm, 50 mW DPSS (diode pumped solid state) 640 nm, 72 mW diode			
Emission detectors	FSC: 488/10 nm SSC: 405/10 nm	B1: 525/50 nm B2: 579/34 nm B3: 615/20 nm B4: 667/30 nm B5: 725/40 nm B6: 785/62 nm	V1: 450/50 nm V2: 525/50 nm V3: 579/34 nm V4: 615/20 nm V5: 667/30 nm	R1: 667/30 nm R2: 725/40 nm R3: 785/62 nm
Fluorescence sensitivity (MESF)	FITC < 110 PE < 75 APC < 100			
Fluorescence precision (CV)	< 5% CV with alignment verification particles			
Scatter resolution	Scatter performance is optimized for resolving human peripheral blood lymphocytes, monocytes, and granulocytes			
Flow cell dimensions	200×250 µm			
Fluorescence detectors	Optimized with spectrally matched PMTs for all channels			
Optical alignment	Fixed tree-like configuration, no user adjustments needed			
Laser spot size	15×45 µm			

Fluidics

Minimal masurement volume	1 µL (25 µL for full spectrum)
Dead volume	10 µL
Sample flow rate	25–100 µL/minute plus automated flow rate to maintain 500, 1,000, or 2,000 events/second
Measurement speed [1,4]	25 minutes per 96-well plate (5 µL measurement volume; screen mode)
Sample uptake	Via robotic needle arm
Maximal event rate	15,000 events/second
System maintenance	Automated startup, PMT calibration, cleaning cycles, and shutdown
Sample mixing	Aspiration

Performance

Absolute counts performance (reproducibility) [1,2]	CV < 7%
Sample carryover [1,3]	0.01% (extended washing)
Sample tube/plates allowed	96-well plate (U, V, flat, deep well) FACS tubes (5 mL) Eppendorf tubes
MACS® Cell Enrichment Unit	For pre-analysis enrichment of rare cells

[1] Referred value indicates the average of multiple experiments and can differ for individual sample values.

[2] For counting performance, full 96-well plates were loaded with 200 µL/well of peripheral blood mononuclear cell (PBMC) suspension at a nominal concentration of 5000 cells/µL. The uptake volume was set to 50 µL at medium flowrate.

[3] For carry-over, full 96-well plates were loaded with 200 µL/well of PBMC suspension at a nominal concentration of 5000 cells/µL in every other well ("SRC-wells"). Alternating wells are loaded with an equal volume of MACSQuant® Running Buffer ("CO-wells"). The uptake volume was set to 50 µL at medium flowrate. The carry-over is defined by sum(CO-singlet count)/sum(SRC-singlet count) ×100%.

[4] The measurement speed is determined by measuring the time between the first movement of the robotic arm into the first measured well and the first movement out of the last well. The measurements itself were carried out at the highest possible flow rate in fast mode measuring 5 µL per well.

Support at your fingertips

MACSQuant® Live Support

- Live support at your fingertips via MACSQuant Support portal
- Have your questions answered in real-time by one of our experts

Application and instrument support

- Technical and field application support for assay design and product advice
- Custom automation and express mode development

Instrument training

- Training at regional MACS® Academy Miltenyi Biotec facilities
- Onsite training and assay development
- Online application resources

Service

- Comprehensive service options
- Globally distributed field service teams

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Miltenyi Biotec

Flow cytometry solutions

The MACSQuant® VYB

Excite the color that counts

Achieve pure analytical power

The yellow laser expands your possibilities

The MACSQuant® VYB is designed for maximal versatility

The MACSQuant® VYB delivers all the performance, automation, compactness, and convenience of the MACSQuant Analyzer but with a uniquely configured optical layout, featuring violet, yellow, and blue lasers. With this new optical layout in combination with ten optical detection channels, the MACSQuant VYB is a powerful and versatile flow cytometer for virtually every lab.

A richer dataset in less time

By incorporating a yellow 561 nm laser and ten optical detection channels, the MACSQuant VYB offers researchers a greater choice of fluorescent proteins and conjugates to perform sophisticated multicolor experiments.

- Analyze multiple fluorescent proteins at once, such as mCherry, DsRed, GFP, CFP, and many more.
- Profit from optimal PE sensitivity for enhanced detection of even PE^{dim} populations.
- Rely on an optical configuration optimized for the detection of all commonly used fluorochromes.
- Reliably detect APC signals and APC tandem dyes, such as APC-Vio770™, APC-Cy™7, or APC-H7 with the powerful 100 mW yellow laser.
- Obtain comparable stain indices and mean fluorescence intensities compared with red 635 nm laser systems.

Excitation laser	Channel (filter)	Antibody/ parameter	Fluorescent protein
Violet 405 nm	V1 (450/50 nm)	VioBlue®	CFP
	V2 (525/50 nm)	VioGreen™	vGFP, GFP
Blue 488 nm	B1 (525/50 nm)	FITC	GFP, YFP
	B2 (614/50 nm)	PI	Lss-mKate
Yellow 561 nm	Y1 (586/15 nm)	PE	
	Y2 (615/20 nm)	PE-Texas Red®	mCherry, DsRed, tdTomato
	Y3 (661/20 nm)	PE-Cy5/APC	mKate
	Y4 (750 nm/LP)	PE-Vio770/ APC-Vio770	mPlum
Yellow 561 nm	FSC (561/10 nm)	Forward scatter	
	SSC (561/10 nm)	Side scatter	

Table 1: Optical configuration of the MACSQuant VYB.

"These results […] demonstrate the ability of the MACSQuant VYB to resolve multiple fluorescent proteins and organic dyes at the same time."

Kueh, H. Y. and Diamond, R. (2012) MACS&more 14–1: 8–10.

Minimal compensation

Combine fluorescent protein reporters with antibody surface stainings with ease. With PE detection from the yellow 561 nm laser and FITC or GFP detection from the blue 488 nm laser, there is little need for compensation with the MACSQuant VYB.

Optimal PE performance

PE detection from the yellow 561 nm laser means greater sensitivity for the discrimination of dim populations and improved detection with PE tandems such as PE-Vio770 or PE-Cy5.

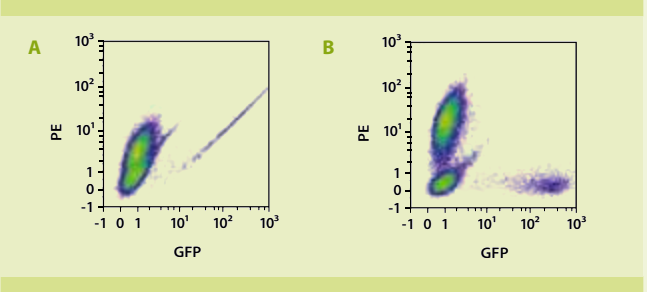

Figure 1: Cells expressing GFP under an Oct4 promoter and stained for Anti-Feeder-PE, a dim marker for fibroblasts, were analyzed using the MACSQuant VYB. Excitation of both PE and GFP with the blue 488 nm laser only minimally resolves the two signals (**A**). In comparison, excitation of PE by the yellow 561 nm laser and of GFP by the blue 488 nm laser fully resolves these two signals without the need for any compensations (**B**).

Discover greater versatility

Multicolor analysis broadens your research horizons

Achieve new answers

Discriminate APC populations with ease

With four-laser functionality in a three-laser instrument, there are no constraints in your choice of fluorescent proteins and conjugates.

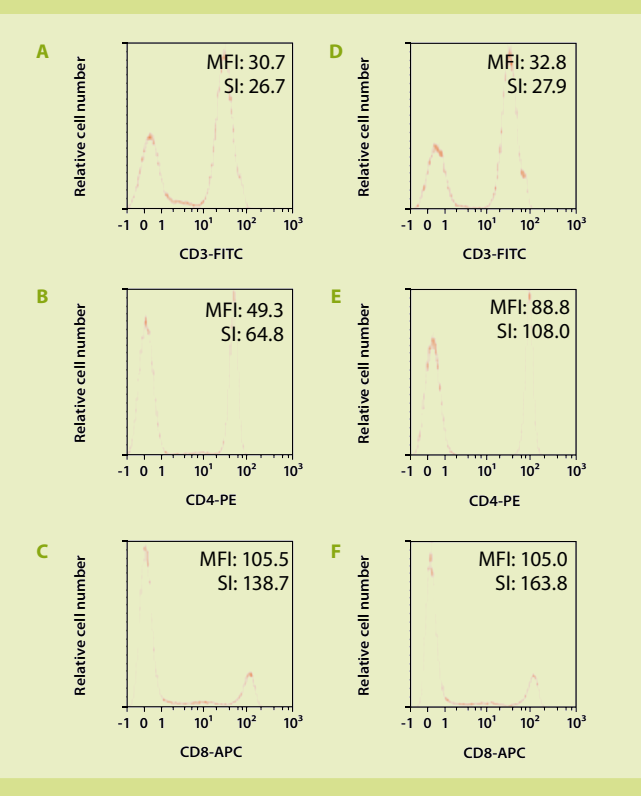

Figure 2: Lymphocytes were stained with CD3-FITC, CD4-PE, and CD8-APC. The MACSQuant Analyzer 10 uses the blue 488 nm laser for excitation of FITC and PE, and the red 635 nm laser for APC (**A–C**), while the MACSQuant VYB uses the blue 488 nm laser for FITC only, and the yellow 561 nm laser for PE and APC (**D–F**). APC resolution with the yellow 561 nm laser is equal to the resolution from a red 635 nm laser. MFI: mean fluorescence intensity; SI: stain index.

Classical immunophenotyping

The MACSQuant® VYB allows researchers to perform elaborate multiplex investigations by detecting a greater number of colors simultaneously. This leads to the acquisition of more meaningful data in less time.

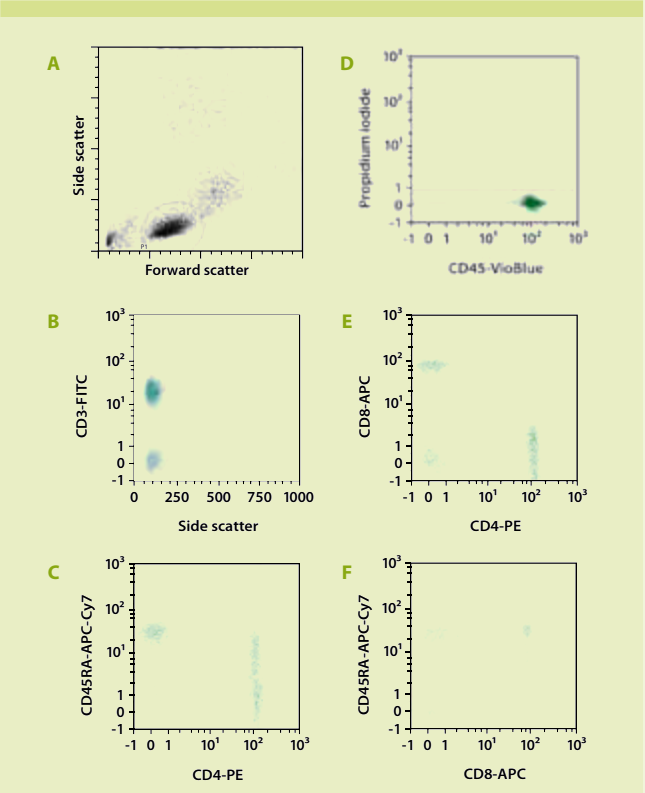

Figure 3: Classic immunophenotyping of peripheral blood stained with a panel of six standard dyes and antibodies (**B–F**): propidium iodide (PI), CD45-VioBlue, CD3-FITC, CD4-PE, CD8-APC, and CD45RA-APC-Cy7.

Rare cell analysis without the waiting

Save time without compromising on the quality and sensitivity of your rare cell analyses. With the MACSQuant Instruments you can easily enrich rare cell populations prior to multiparametric cell analysis.

- Significantly reduce lengthy acquisition times.
- Deliver highly sensitive rare cell analysis.
- Allow easy analysis of particularly challenging cell samples, such as rare cell populations in high volumes of buffer, or precious low volume samples.

Product	Order no.
Instruments	
MACSQuant VYB	130-096-116
MACSQuant Analyzer	130-092-197
MACSQuant Analyzer 10	130-096-343
MACS MiniSampler	130-092-535
Service contracts	
MACSQuant VYB Full Service L	160-001-637
MACSQuant Full Service	160-001-286

Product	Order no.
Accessories	
Chill 5 Rack	130-092-951
Chill 96 Rack	130-094-459
MACSQuant Columns	130-094-458
MACSQuant Calibration Beads	130-093-607
MACSQuant Running Buffer	130-092-747
MACSQuant Washing Solution	130-092-749
MACSQuant Storage Solution	130-092-748
MACSQuant Washing & Storage Solution Kit	130-092-801
MACS Bleach Solution	130-093-663
MACSQuant Starting Buffer Kit	130-094-190

▸ **macsquant.com**

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Miltenyi Biotec

The MACSQuant® X

Reliable high-throughput flow cytometry

JOIN THE
FLOW
REVOLUTION

Innovative benchtop screening

The MACSQuant® Analyzer X is designed to offer maximum speed and reliability for complex high-throughput screening: perfect for labs looking to optimize challenging large-scale applications. Enjoy the certainty of reliable results in every run, in less time, and with less effort.

High-throughput

Process and analyze up to 10 parameters in 384- and 96-well formats.

Speed

Run an entire 96-well plate in only 15 minutes and a whole 384-well plate in under 60 minutes.

Reliability

Get consistent results every experiment regardless of sample type and volume.

Flexibility

Easily and quickly switch between tubes and plates at the click of a button. Apply unique settings to each and every well.

Automation

Take advantage of a truly hands-free instrument, which can be easily integrated into liquid handlers.


MACS Media
KIMTECH
MACS Quant X

High-throughput

Speed

Reliability

Speed meets reliability

Compact and consistent high-throughput flow cytometry

Get more out of every plate

The MACSQuant® X gives you access to affordable and easy-to-use, 10-parameter high-throughput flow cytometry. Building on the core of our successful line of MACSQuant Instruments, we have developed a flow cytometer capable of processing various types of tubes and plates.

- **384-well plates in less than 60 minutes**
- **96-well plates in 15 minutes**

The MACSQuant X fluidics system utilizes less running buffer during each run, enabling the processing of multiple plates without the need to exchange buffer bottles. This miniaturization makes it possible to use 384-well plates for any type of cell- or bead-based assay, allowing you to use less sample volume while getting consistent results.

From start to analyzed data in 15 minutes

Built with speed in mind, the MACSQuant X allows you to screen record amounts of data in a short period of time. Each sample is saved as an individual file, allowing you to either analyze every sample on the fly or access ready-to-analyze samples immediately after the plate processing has finished.

When used in conjunction with our MACSQuantify™ Software, a heat map view allows for rapid visual depiction of the information measured for every sample, even while the instrument is continuously acquiring samples.

Biology's variability measured with consistency

At Miltenyi Biotec we believe that instruments should adapt to your experimental set-up, and not vice versa. That is why the MACSQuant X provides reliable data regardless of the chosen flow rate, sample type, or uptake volume. Expect consistently low sample variability even with an uptake volume as low as 5 µL per sample (fig. 1). Fulfilling the industry's gold standard of less than 0.1% carryover between samples, the MACSQuant X gives you certainty of data you can trust, even when screening hundreds of samples at a time.

Consistent results with as little as 5 µL uptake volume per sample.

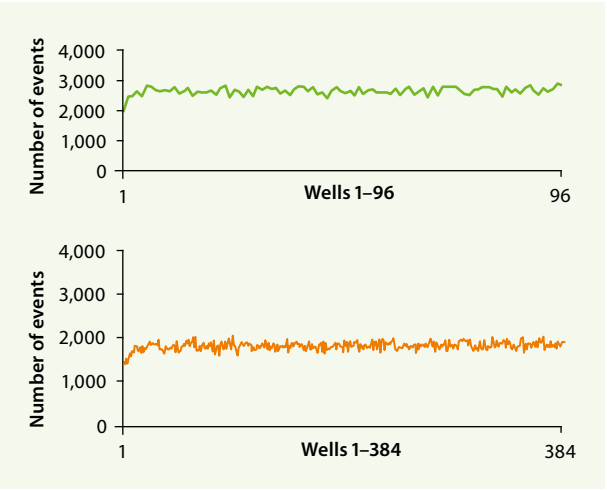
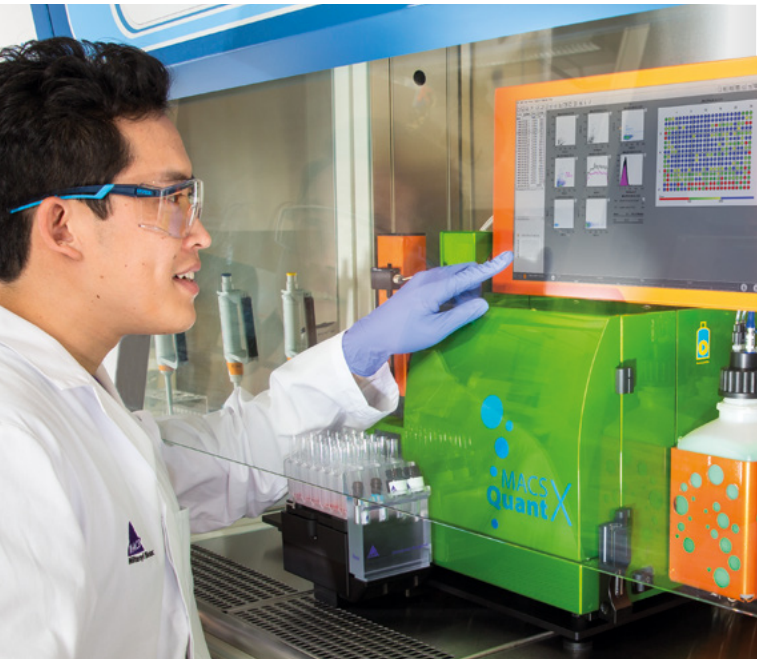


Figure 1: Fast and reliable high-throughput 96- and 384-well plate processing.

Automate your workflow and speed up your analyses



Place your samples and walk away

Enjoy hands-free maintenance and sample processing with the built-in automation capabilities of the MACSQuant® X. From start-up and cleaning routines, to compensation and shut-down, everything is completely automated, leaving you more time to focus on your science.

The MACSQuant X's integrated robotic pipetting arm can also stain your samples for you, allowing you to enjoy hands-free labeling of up to 384 samples at a time. Just load the plate with your sample and let the MACSQuant X do the work for you.

Automated analysis, reproducible results

Setting up and analyzing an experiment using our integrated MACSQuantify™ Software has never been easier. Simply plan and schedule all automated housekeeping functions, sample layouts, and labeling options directly from within the software itself.

Express Modes – reliable data at the push of a button

Express Modes are unique add-on features for MACSQuantify Software. They are standardized data analysis tools that are optimized to automate flow cytometric measurements and analyses via predefined experiment settings, acquisition, and automated gating. Derived from mathematical algorithms based on real-life test cases, they reduce human error and therefore increase experimental reproducibility.

Express Modes contain application-dependent templates that are based on a significant amount of real data, including up to 1,100 datasets for a given application. They contain verified gating ranges that are derived from distinct algorithms for the application-specific distributions. Automated adjustments for each individual datafile allow for optimal analysis without the variability introduced by manual intervention. This data analysis provides consistent results and robust analyses that are easily integrated into standardized operating procedures (SOPs).

Custom Express Modes

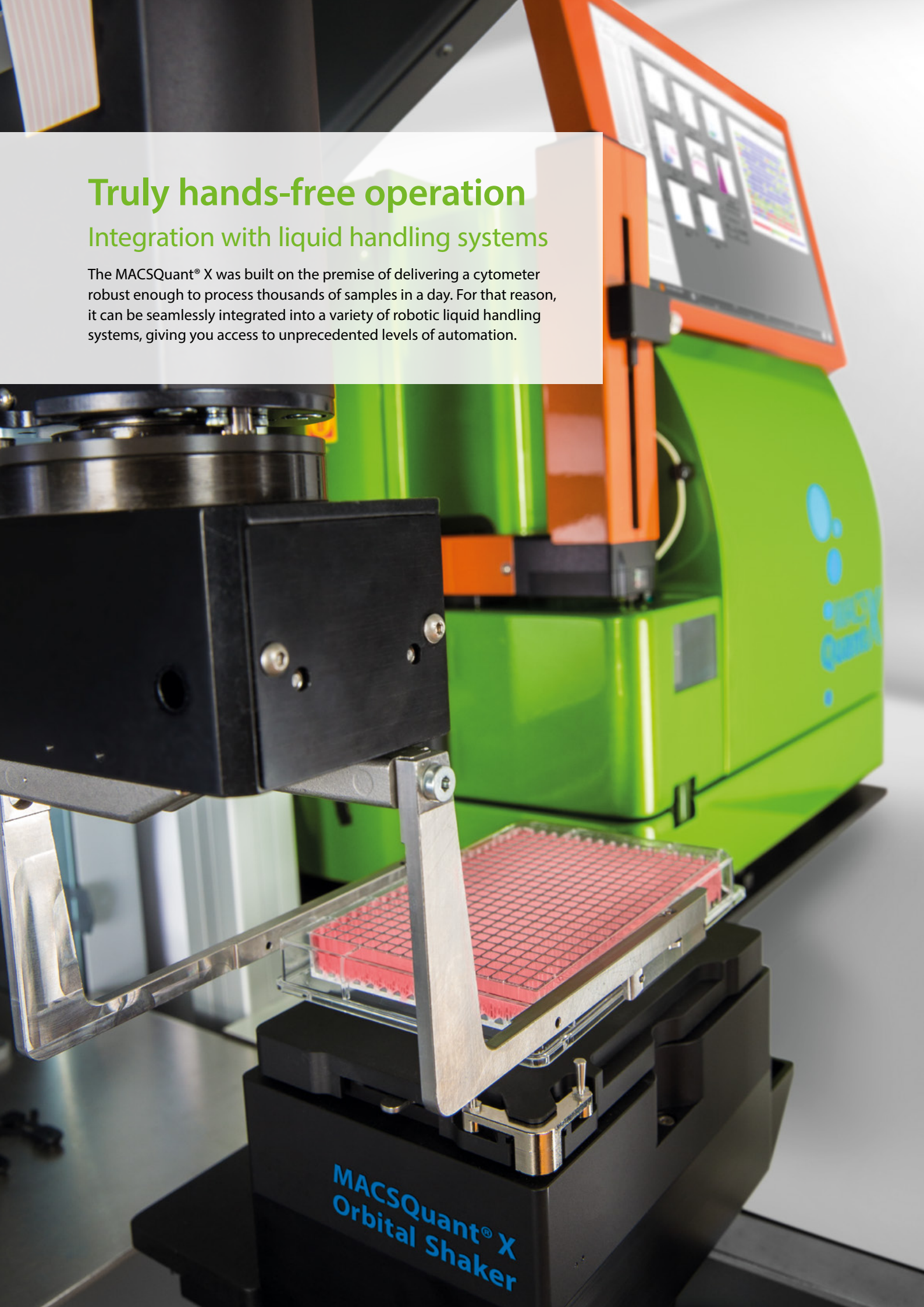
If your research application is not included in our Express Modes packages, we also offer a Custom Express Mode service.

Custom Express Modes are developed specifically for your workflow and are optimized to fulfill your individual needs. They can cover automated acquisition and analysis with custom statistic tables and export of reports in various file formats.
For more information please contact:
Application_Development@miltenyibiotec.de

Truly hands-free operation

Integration with liquid handling systems

The MACSQuant® X was built on the premise of delivering a cytometer robust enough to process thousands of samples in a day. For that reason, it can be seamlessly integrated into a variety of robotic liquid handling systems, giving you access to unprecedented levels of automation.



Autolabeling

Why risk the variability when you can automate your applications?

Reduce the risk of pipetting variability with the reliability of robotics. The MACSQuant® X has an orbital shaker which, in combination with the Universal Reagent Rack, enables autolabeling of your samples. Simply add the titer of your reagent, the incubation time, and the dilution of your sample.

One cytometer for all your needs

The integrated MACSQuant® X Orbital Shaker allows you to easily set up your experiment and choose between a 384-well plate, 96-well plate, multi-tube rack, or single tube set-up at the click of a button. The MACSQuant X gives you the speed of a screener together with the robustness of a day-to-day cytometer, all within one compact instrument.

Choose between different sample re-suspension options, giving you control over how and when to re-suspend your samples, ensuring consistent results regardless of your assay (fig. 2).

Sample mixing options:

- **Orbital shaker** – gentle, 2-dimensional mixing of all samples within the plate at once
- **Needle vibration** – effective, individual mixing even for hard to re-suspend samples

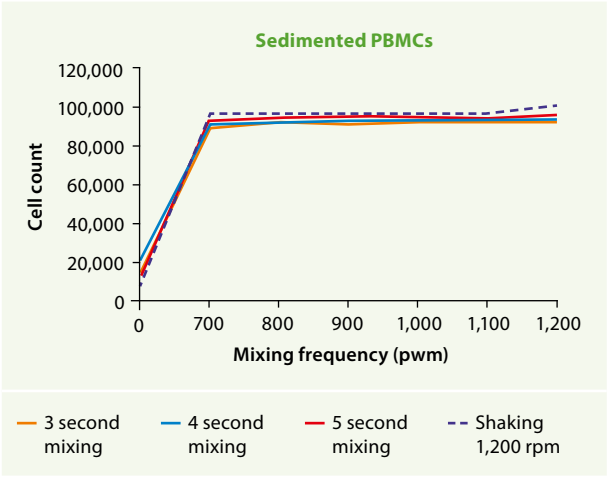


Figure 2: Needle vibration or plate shaking both easily resuspend sedimented PBMC and ensure reliable cell count: with either method, at a mixing frequency of 700 pwm the cells are reproducibly re-suspended.

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Harmonizing the world is just an instrument setting away

Smart Gain with MACSQuantify™ Software

Experience consistently reproducible results from day to day, instrument to instrument, and operator to operator. With MACSQuantify Software's Smart Gain technology, you can transfer your assay from one instrument to another while passing on all necessary information to ensure identical setup.
As a result, the MACSQuant® Operating System produces comparable, standardized results, every time, everywhere.

Compliance with 21 CFR Part 11

You can be sure that your data is suitable for submission to regulatory agencies with the optional 21 CFR Part 11 feature, which includes:

- **Audit trail**
- **Analysis reports with e-signature**
- **User management system compliant with 21 CFR Part 11**


MACS
Quant X

The complete package for reproducible results in flow cytometry

Achieving maximum reproducibility between experiments cannot depend on the flow cytometer alone. In order to achieve consistent results, Miltenyi Biotec offers a complete flow cytometry solution including a broad range of reagents. We help you make sure that variations in your experiment are due to your sample and not due to unreliable antibodies or instruments.

REAfinity™ Recombinant Antibodies – flow cytometry is in their genes

Miltenyi Biotec has introduced a portfolio of REAfinity Antibodies, which are recombinantly generated antibodies that provide superior lot-to-lot consistency and purity compared to mouse or rat monoclonal and polyclonal antibodies. They have been engineered to lack any background binding. Additionally, they all have the same human IgG1 isotope, eliminating any need to include multiple isotype controls during flow analysis.

Advantages of REAfinity Recombinant Antibodies:

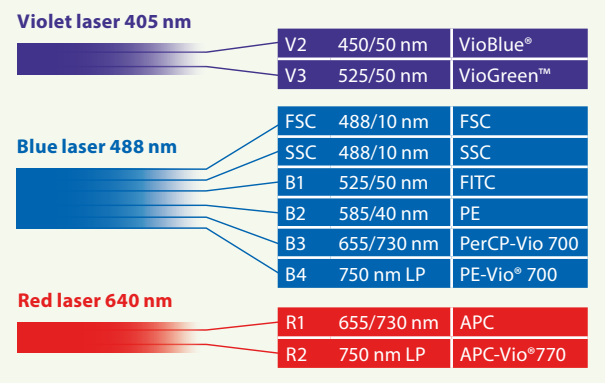
- **High lot-to-lot consistency**
- **One universal isotype**
- **No more background signal**

REAfinity Recombinant Antibodies

Vio® Dyes – brighter dyes for flow cytometry

Vio® and VioBright™ Dyes are a Miltenyi Biotec proprietary family of fluorochromes for flow cytometry and fluorescence microscopy. When used in combination with the MACSQuant® Analyzer X, you can take advantage of superior mean fluorescence intensity and high stain indices. As the brightest dyes on the market, and with low spillover, setting up complex multicolor experiments has never been so simple. Used together with traditional fluorochromes, such as FITC, PE, PerCP, and APC, they allow researchers a greater selection of antibodies for multiparameter cell analysis. Flurorochrome-conjugated MACS® Antibodies are perfectly suited for identification and enumeration of human, mouse, rat, or non-human primate cells.

The MACSQuant Analyzer X optical bench



VISIT

For more bright ideas, visit:

▸ **miltenyibiotec.com/vio**

ViO Dyes

Ready-to-use kits

As a leading supplier of flow cytometry products, offering one of the broadest portfolios of antibodies, kits, and support reagents available, Miltenyi Biotec's range of ready-to-use, pretitrated kits save valuable experiment set-up time and assay costs. MACS® Flow Cytometry kits allow flow cytometry users to perform sophisticated analyses right from the start. Optimized to achieve reproducible results and validated for use with the automatic labeling capacities of the MACSQuant® X, their use in combination with our MACSQuant Express Modes gives you true walkaway capabilities.

Support reagents include instrument support reagents, sample preparation reagents, fluorescence amplification reagents, and a broad range of kits to check cell viability and cell labeling, as well as antibody conjugation and cell staining kits. For many of the most common laboratory assays, all you have to do is set up the experiment and come back later to look at completely analyzed data.

Work with Miltenyi Biotec to take advantage of:

- Simplified flow cytometry with intuitive kits and support reagents
- Unique assays that enable the staining of viable cytokine-secreting cells
- Ready-to-use cocktails for the phenotypic characterization of cells

Customized solutions

Miltenyi Biotec's custom antibody design service enables researchers to benefit from personalized flow cytometry solutions. This service includes purified, functional-grade antibodies, single- and multicolor antibody conjugates, as well as multicolor antibody cocktails.

VISIT

To find out more, visit:

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MACSQuant® X specifications

Optics

Laser excitation	405 nm, 40 mW diode 488 nm, 30 mW DPSS (diode pumped solid state) 640 nm, 20 mW diode
Emission detectors	FSC: 488 / 10 nm SSC: 488 / 10 nm B1: 525 / 50 nm B2: 585 / 40 nm B3: 655–730 nm B4: 750 nm LP V1: 450 / 50 nm V2: 525 / 50 nm R1: 655–730 nm R2: 750 nm LP
Fluorescence sensitivity and resolution	MESFs (CV < 5%): FITC < 200 PE < 100 APC < 150
Flow cell dimensions	200×250 µm
Fluorescence detectors	Optimized with spectrally matched PMTs for all channels
Laser spot size	15×45 µm

Fluidics

Minimal uptake volume*	1 µL (20 µL recommended for volumetric counting applications)
Sample flow rate	25, 50, or 100 µL /minute plus automated flow rate to maintain 500, 1,000, or 2,000 events/second
Measurement speed[1,4]	15 minutes per 96-well plate (5 µL measurement volume; screen mode)
Sample uptake	1–5,000 µL uptake port (for y/z axis movements) with an automated washing station
Maximal event rate	15,000 events/second
System maintenance	Automated startup, PMT calibration, cleaning cycles, and shutdown
Sample mixing	2-dimensional orbital shaking (200 rpm–3,000 rpm) Vibrating needle (300 pwm–1,200 pwm)

Performance

Absolute cell count performance (reproducibility)[1,2]	CV < 5%
Sample carryover[1,3]	< 0.1%
Fluorescence performance	5 decade logarithmic scales (10^{-2} to 10^{-3}), display in lin, log, or hlog scales
Sample tube/plate	384-well plate (U, V, flat well) 96-well plate (U, V, flat well, deep well) FACS tubes (5 mL) Eppendorf tubes

Data management

Measurement parameters	Area, width, height for all parameters, with time and volume
Signal processing	>18-bit dynamic range in area with 32-bit floating point signal processing
Compensation	Automated or manual with 8×8 matrix, during or post acquisition
Threshold	Threshold can be set for any channel by selecting the trigger value
Data files	.mqd (proprietary file type) .fcs (2.0, 3.0, 3.1 compatible)

Operational details

Width×depth (with MACS® Mini Sampler)	605×500 mm (23.8"×19.6")
Height (adjustable touchscreen)	393–520 mm (15.4"–20.4")
Weight	50 kg / 110 lbs
Monitor	15.6" touchscreen (internal)
Power requirements	100–240 VAC, 50/60 Hz
Power consumption	450 W
Ports	4×USB 2.0, 2×DisplayPort, VGA, LAN

*At every uptake, additional excess volume is aspirated by the instrument. The excess volumes are calibration- and process-dependent and do not exceed 10 µL for Fast, Standard, and Extended modes, and 20 µL for Screen mode.

[1]Referred value indicates the average of multiple experiments and can differ for individual sample materials.

[2]For counting performance, full 96-well plates were loaded with 200 µL/well of peripheral blood mononuclear cell (PBMC) suspension at a nominal concentration of 5,000 cells/µL. The uptake volume was set to 50 µL at medium flowrate.

[3]For carry-over, full 96-well plates were loaded with 200 µL/well of PBMC suspension at a nominal concentration of 5,000 cells/µL in every other well ("SRC-wells"). Alternating wells are loaded with an equal volume of MACSQuant® Running Buffer ("CO-wells"). The uptake volume was set to 50 µL at medium flowrate. The carry-over is defined by sum(CO-singlet count)/sum(SRC-singlet count) ×100%.

[4]The measurement speed is determined by measuring the time between the first movement of the robotic arm into the first measured well and the first movement out of the last well. The measurements themselves were carried out at the highest possible flow rate in fast mode measuring 5 µL per well.

Support at your fingertips

MACSQuant® Live Support

- Live support at your fingertips via MACSQuant Support Portal
- Have your questions answered in real-time by one of our experts

Application and instrument support

- Technical and field application support for assay design and product advice
- Custom automation and Express Mode development

Instrument training

- Training at regional MACS® Academy Miltenyi Biotec facilities
- Onsite training and assay development
- Online application resources

Service

- Comprehensive service options
- Globally distributed field service teams

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