

partec

CyFlow[®] ML

Healthcare | Immunology | Pathology
Microbiology | Cell Biology



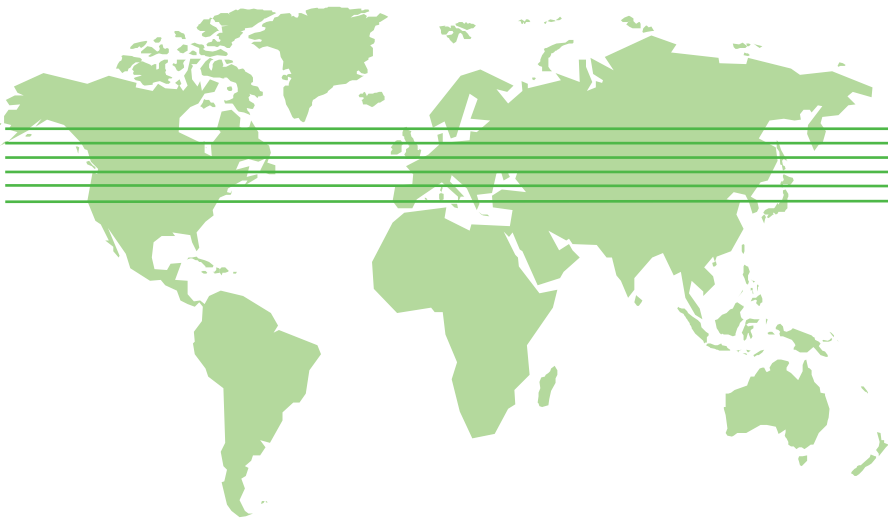
Multilaser 16 Parameter Desktop FCM System

01 _____ COMPANY

Flow Cytometry made in Germany



New sophisticated applications and increasing requirements for reliable results in research and routine within shortest possible time - The challenge for flow cytometry instrumentation, automation and software.



partec

A well-established network of subsidiaries and distributors in more than 60 countries worldwide characterizes Partec's commitment to the increasing focus and need for global access to Flow Cytometry instrumentation and application support:

www.partec.de/partec/distributors.html

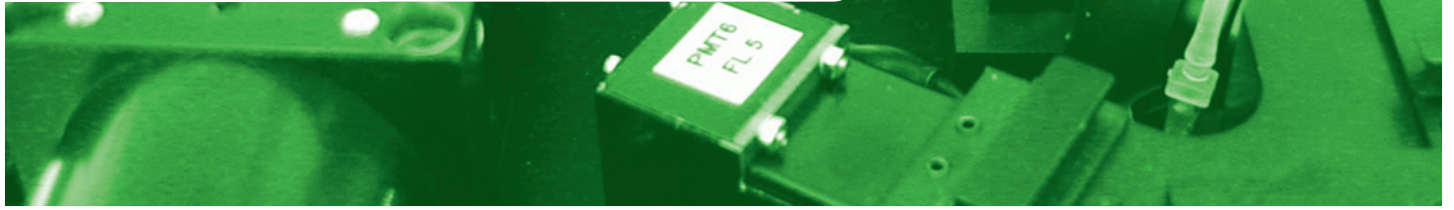


More than 35 Years of Experience and Professional Expertise

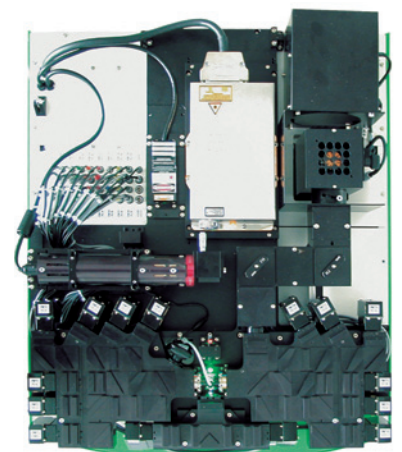
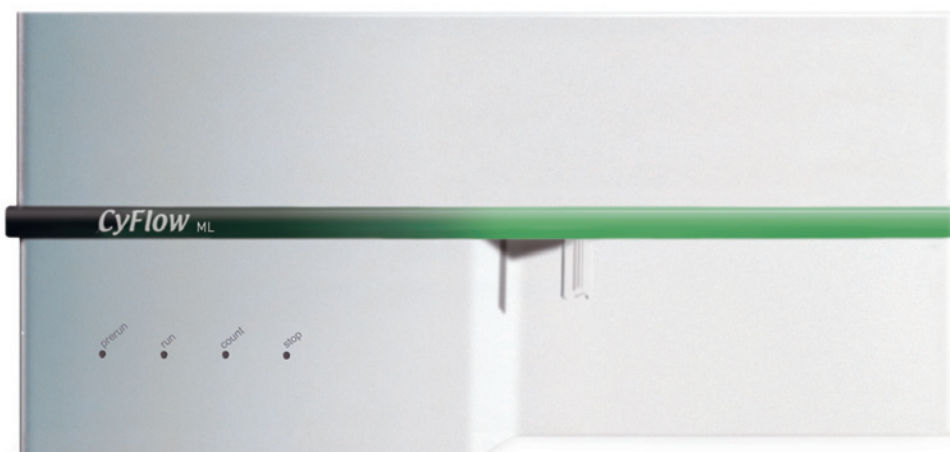
Partec - pioneer in Flow Cytometry since 1968 - responds to these requirements with the new generation of Windows™XP based CyFlow® and PAS™ FCM systems featuring innovative computer controlled flow systems, modular optical systems with advanced PMTs for all optical channels, recently available latest computer and electronic technologies including fast and precise 16 bit ADC converters and realtime data acquisition and display.

02 HIGHLIGHTS

CyFlow® ML Flow Cytometry System



- _ ultracompact desktop high end instrument
- _ dimensions [cm]: L 56 x H 30 x D 65 (stand-alone)
- _ 16 optical parameters: FSC1, FSC2, SSC, FL1-FL13
- _ 4 light sources: triple laser configurations including new powerful 200 mW @ 488 nm blue solid state laser + 100 W UV lamp for highest resolution DNA analysis
- _ Windows™ XP FloMax® software for realtime data acquisition, data display and data evaluation
- _ parallel 16 bit digital pulse processing
- _ flexible and modular system configurations
- _ submicron particle detection (<math><0.2\mu\text{m}</math>) for scatter
- _ high fluorescence sensitivity < 100 MEFL



03 TECHNOLOGY

CyFlow® ML Flow Cytometry System

The ultracompact desktop instrument CyFlow® ML provides 4 light sources and 16 optical parameters for use in any application in research and laboratory routine.

The optical system of the CyFlow® ML features a clear optical pathway, built upon Partec's legendary optical cubes. All optical elements, including the lasers and the UV mercury lamp, are mounted onto a single rigid optical bench, which guarantees optimum mechanical stability and avoids problems when moving the instrument to another place.

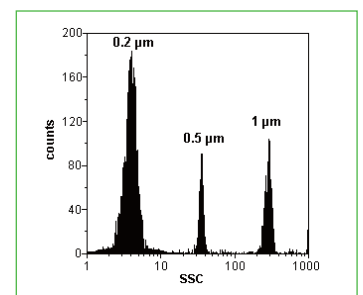
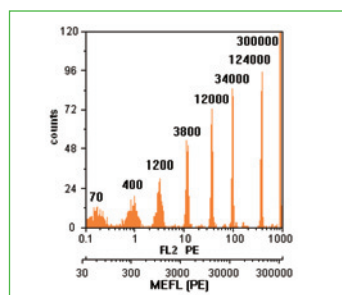
Employing 4 light sources including 3 solid state lasers and the UV lamp

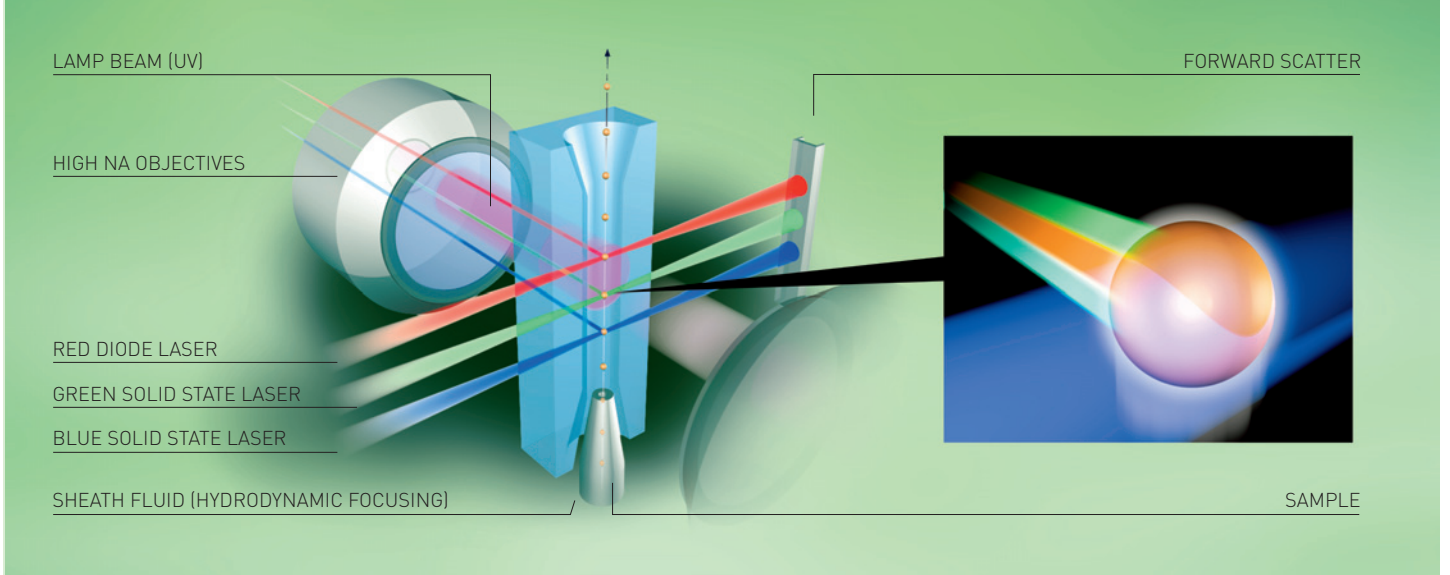
The light source system of the CyFlow® ML in its standard configuration comes up with a new powerful 200mW@488nm blue solid state laser, 25mW@635nm red diode laser, 100mW@532nm green solid state laser and the 100W UV lamp, all with direct light coupling for maximum sensitivity. Other laser light sources are optionally available (violet and UV lasers), therefore offering full upgrade possibilities. Due to the built-in colour CCD camera, the stability of the sample flow can be visually controlled by a video flow monitor.

16 optical parameters, each with its own photomultiplier tube (PMT), including two forward scatter PMTs and side scatter PMT, give you the most flexible choice and offer the best sensitivity as well as enough space for future applications.

Featuring unique fluorescence sensitivity and scatter resolution

By avoiding fiber coupling, the performance of the CyFlow® ML is characterized by a superior fluorescence sensitivity of <100 MEFL (see figure below on the left) and by going to nano-resolution in the scatter (see figure below on the right). Any application focussing on small particle detection and analysis and requiring highest fluorescence intensity, fluorescence sensitivity as well as scatter resolution benefits from the unique performance characteristics of the CyFlow® ML.



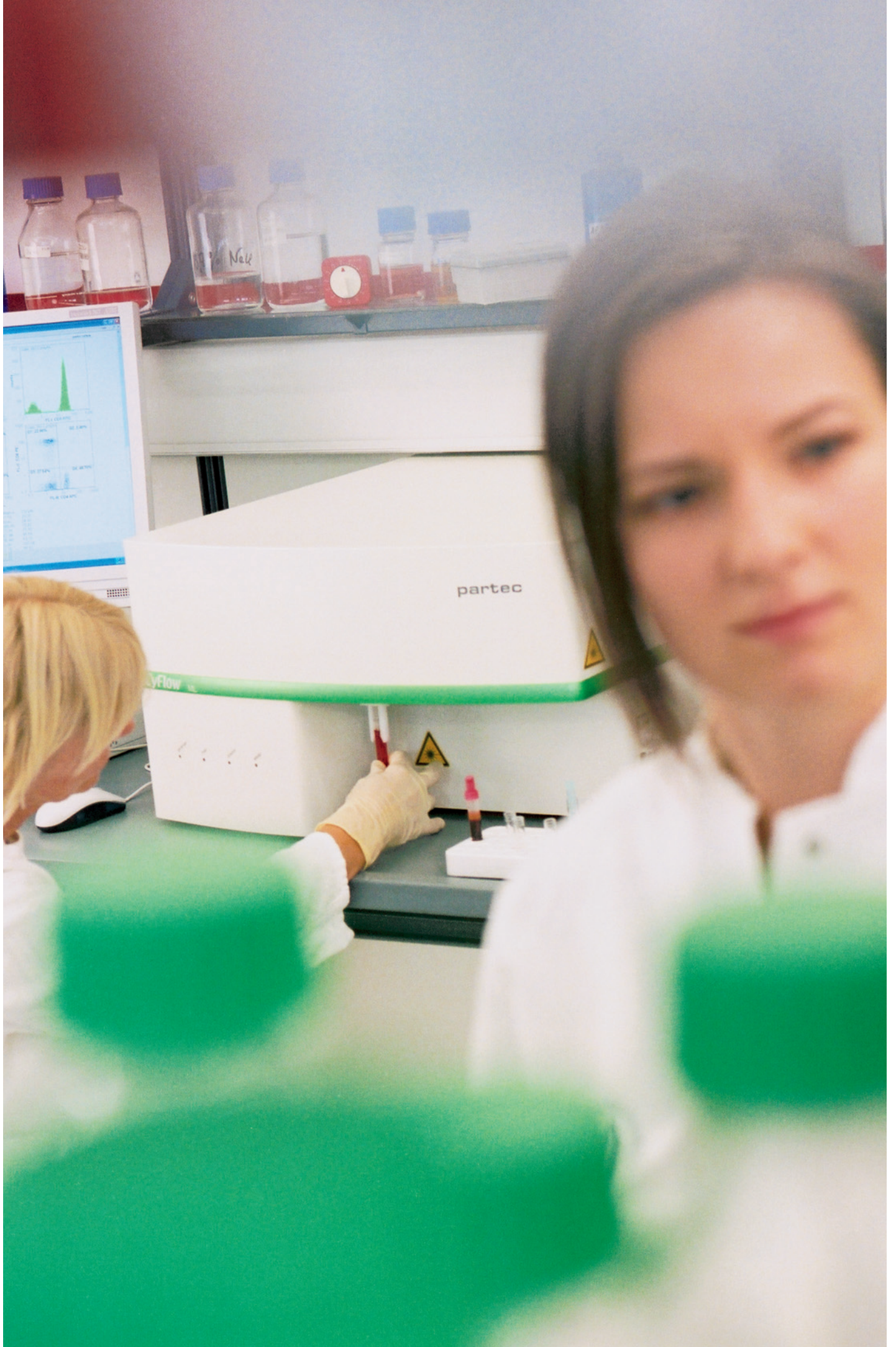


The unique Partec quartz flow cuvette is the heart of the CyFlow[®] ML, ensuring that particles and cells cross the UV and visible excitation light with best possible precision.

The design of the flow cuvette incorporates more than 35 years of experience in handling fluids with sub-micrometer and nanoliter precision. Thanks to the optical and mechanical precision of the flow cuvette, superior results are guaranteed for all parameters, e.g. coefficients of variation (CVs) of better than 1% with DAPI staining - a prerequisite for high

precision DNA measurements for tumor or chromosome analysis. The sample is transported with help of a computer controlled digital syringe pump, part of a virtually cross-contamination-free fluid system.







Laboratories today demand highest flexibility for upcoming applications. The CyFlow® ML's open system architecture is designed for the future.

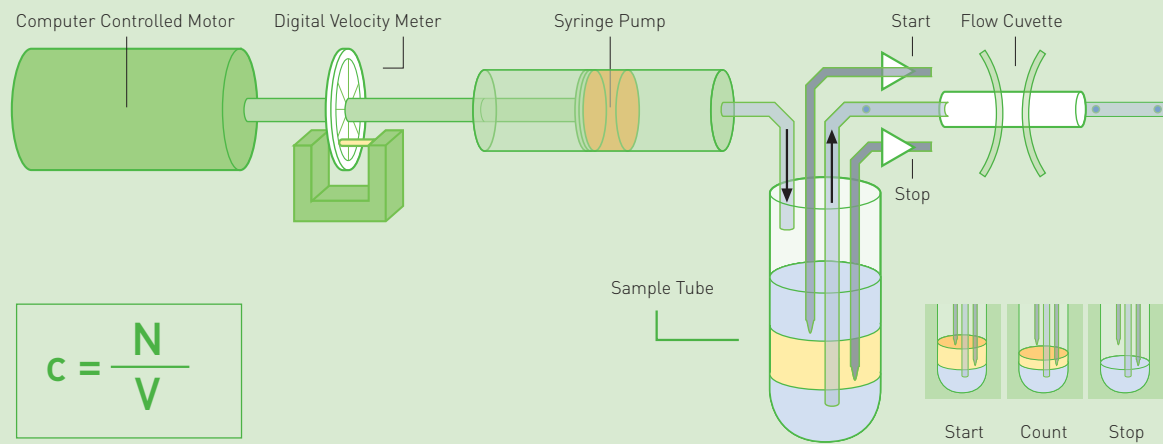


Taking advantage of most recent computer and electronic technologies

Each optical channel is equipped with an independent processor controlled digital pulse analyser for parallel pulse processing in order to minimize signal losses due to coincidence and dead-time effects. 16 bit (65536 channels) analogue-to-digital converters for each parameter are the fundament for software-based colour crosstalk compensation algorithms and other numerical operations, e.g. fluorescence ratio measurements, without artifacts. The computing power of the CyFlow® ML system allows signal analysis, processing and display of each event generated by a particle in realtime, which is a prerequisite for precise high speed analysis and accurate absolute counting.

All-in-one design and modular extension for future cytometric analysis

The CyFlow® ML in its ultracompact design incorporates all modules and components within smallest dimensions of L 56 x H 30 x D 65 [cm]. In contrast to other available FCM systems, the CyFlow® line of instruments does not require any external equipment. Power supply, pressure regulators and the fluidic system are completely built-in. Additional space beside or under your laboratory desk is not any longer required. In order to be prepared for future applications, the CyFlow® ML offers flexible and modular configurations in a most compact system architecture.



The True Volumetric Absolute Counting (TVAC) is a unique feature of all Partec Flow Cytometers, offering highest absolute counting precision and accuracy.

The CyFlow® ML analyses concentrations of any particle or cell subpopulations of interest using True Volumetric Absolute Counting. This unique method is solely based on the fundamental scientific definition of absolute counting resp. the particle concentration c , namely the counted number N of particles (events) in a given volume V , $c = N / V$. In the CyFlow® ML, the volume is measured directly by mechanical means, rather than by calibration with expensive beads with a - sometimes doubtful - „given“ nominal concentration. Thus, the precision of volume measurement is defined by a fixed mechanical design, eliminating any errors related to varying bead concentrations. The CyFlow® ML allows analysis of a fixed volume as defined by the distance between two platinum electrodes reaching into the sample tube with a given

diameter. Alternatively, a well defined volume of free choice involving the digital sample speed control can be used. Benefits of True Volumetric Absolute Counting:

- digital volumetric precision by mechanical design: CV < 2%
- no errors related to calibration
- no additional time and preparation steps for reference beads or haematology reference count
- no expenses for calibration beads
- no separate haematology counter required

Selection of Fluorochromes for the CyFlow® ML Light Source System

Type of laser	Fluorescence Channel	Fluorochromes
blue solid state laser 200 mW		GREEN FITC GFP Alexa Fluor® 488 SYTO 9
		ORANGE PE eYFP
		ORANGE RED PE-Texas Red® PI
		RED PE-Cy5 PE-Cy5.5 PerCP PerCP-Cy5.5 ECD EB
		INFRA RED PE-Cy7
red diode laser 25 mW		RED APC APC-Cy5.5 SYTO 59-61 Alexa Fluor® 633 Alexa Fluor® 647
		INFRA RED APC-Cy7
green solid state laser 100 mW		ORANGE PE Alexa Fluor® 532 SYTO 80-83 CY 3
		RED PE-Cy5 PE-Cy5.5 7-AAD PI
		INFRA RED PE-Cy7
UV lamp 100 W		VIOLET INDO-1
		BLUE DAPI Hoechst Alexa®Fluor 350 AMCA
		BLUEGREEN MBB

other lasers optional

04 ANALYZE

CyFlow® ML Flow Cytometry System



The Windows™ XP FloMax® software integrates instrument control including acquisition, on- and offline data analysis, on- and offline compensation into a complete software package.

Ready prepared and freely adaptable instrument settings and panels facilitate switching between different applications. FloMax® is optimized for immunophenotyping, microbiology analysis, cell cycle, DNA ploidy, and scientific flow cytometric analysis. Data is stored in FCS flow cytometry standard file format for easy exchange with other analysis software. One of the unique features is the digital on- and offline colour crosstalk compensation of the spectral overlap of fluorescence from simultaneously analysed dyes. The N-colour compensation algorithm allows a correction of the crosstalk between any parameters without the need to rerun a sample. FloMax® optimally supports the True Volumetric

Absolute Counting feature of the CyFlow® ML, displaying particle concentrations for any subsets of cells, even if defined by a gate at a later time after the acquisition.

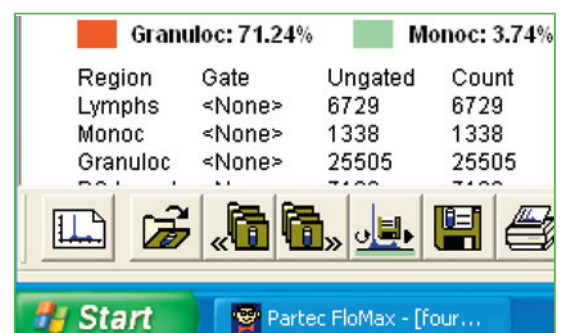
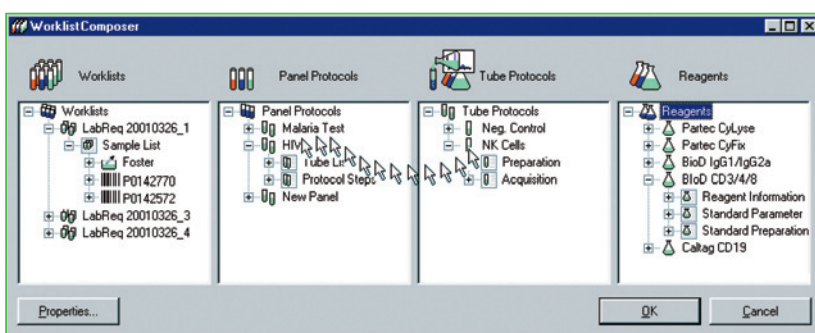


Full flexibility and automation by the multi-tube FloMax® panel system and the FloMax® Report system within the FloMax® software package.



The flexible FloMax® panel system allows automated analysis of repeating sample series employing different dyes or instrument settings. The FloMax® Report system generates

easy-to-adapt automated single or multi-tube panel results. Reports are based on Microsoft Word or Excel written in Visual Basic.



05_SPECIFICATIONS

Partec CyFlow® ML FCM System

GENERAL

- compact flow cytometer for automated sequential analysis of single cells and microscopic particles
- scatter particle size range 0.2 µm - 200 µm
- fluorescence sensitivity: < 100 MEFL (FITC)
- fluorescence resolution: CV < 1% (DAPI)
- configurations with 1 to 16 optical parameters + time parameter

LIGHT SOURCES

- 1 - 4 direct coupled light sources
- blue solid state laser: 200mW@488nm
- red diode laser: 25mW@635nm
- green solid state laser: 100mW@532nm
- 100W HBO mercury arc UV lamp: 366nm
- other lasers optional (violet and UV lasers)

OPTICS

- modular optical system with 1 to 16 optical parameters with selected PMTs with integrated electronic preamplifier for FSC1, FSC2, SSC, FL1-FL13
- standard setup and filters
- colour CCD camera for video flow monitor
- Köhler illumination by HBO lamp
- UV transmitting quartz optics
- standard objective mount with high numerical aperture
- immersion gel coupling, e.g. for detection of weak cytokines (option)
- separated intermediate image planes for optimized spatial filtering by diaphragms

FLOW SYSTEM

- synthetic quartz flow cuvette for laminar sample transport with sheath fluid
- sample port with computer controlled BioSafety cleaning system, avoids sample droplets and minimizes cross contamination

- True Volumetric Absolute Counting based on mechanical volume measurement, no need for reference particles
- contamination-free computer controlled precision syringe pump for sample transport and True Volumetric Absolute Counting, pump speed continuously adjustable from 0-50 µl / s, sheath fluid pressure continuously adjustable from 0-800 mbar
- easily accessible sheath fluid and waste reservoirs with fluid level sensors

ELECTRONICS

- parallel signal processing for each of the optical channels with selectable linear, 3- or 4-decade logarithmic scale
- pulse height, area and width analysis for doublet discrimination
- 16 bit analog-to-digital converters, trigger on any parameter or parameter combinations

COMPUTER

- upgradable built-in industry standard computer Pentium processor ≥ 3.2 GHz, ≥ 512 MB RAM ≥ 200 GB harddisk
- 19" TFT LCD display
- CCD video camera
- dual screen setup (optional)
- DVD-RW, 3,5" Floppy Disk Drive
- keyboard, mouse, barcode reader (optional)
- 100 MB/s / 1000 MB/s Ethernet connection
- DeskJet colour printer, b&w or colour laser printer (optional), printing via network

SOFTWARE

- Microsoft Windows™ XP operating system with full network support
- Apple® Macintosh network connection (optional)
- 32 bit Windows™ XP FloMax® software for routine and research applications

- 64 parameter real-time data acquisition and analysis
- 4-spot acquisition from spatially separated light sources with time-window delay system
- internal floating point numerics with double precision
- one and two parameter histograms and dotplots
- 64 - 32768 channels resolution for 1P histograms
- 32/32 - 1024/1024 channels for 2P dotplots
- multiparameter N-colour crosstalk compensation, settings may be corrected at anytime
- multiparameter ColorGating
- ratio measurement
- doublet discrimination based on pulse height, area and width analysis
- peak and cluster analysis and statistics
- connection to 96 well plate and sample automats
- DNA cell cycle analysis
- DNA peak analysis
- multitube panel system with automated acquisition
- flow cytometry standard data format (FCS) for storage of original and evaluated data
- storage of gates and screen layout
- automated data transfer of graphics, statistics and instrument settings to Word, Excel, PowerPoint and other desktop publishing systems or laboratory information systems (LIS)

