CyFlow® Space
Your flexible flow cytometer

www.sysmex-partec.com

CyFlow® Space – its flexibility gives you the space you need for your work

Analysing cells and particles, be it from blood, plasma, tissue, plants, cell cultures or other materials, is an important part of much research and industrial development. To obtain statistically sound results and the confidence to proceed and invest further in your project, you need a high throughput and precise detection of each cell type for your samples. The ability to measure thousands of cells within seconds is a must.

Flow Cytometry (FCM) is the answer. Since it is a non-destructive method, it reflects the real distribution on a cellular level. Quickly and with utmost accuracy. Of course FCM is not new – it has been a proven technology for over 45 years. But there are vast differences in the available solutions and they need to meet your increasing technological demands in both science and development.

In terms of FCM protocols, new fluorochromes with different spectra are launched to the market regularly. To take advantage of these changes, the ability to work with optimised excitation lights through different colour lasers and suitable optical filter sets is therefore of essential interest. This calls for instruments that can be customised with respect to their configuration, but at the same time remain user-friendly with a straightforward workflow. You want to concentrate on your research and not on a complicated tool.

'Space' means space to grow and adapt

The CyFlow® Space is all about offering you flexibility and precision. Thanks to its adaptable configuration, it lets you change in line with your present requirements. And should those needs grow, you can extend it or upgrade it modularly. This kind of flexibility delivers the freedom to operate the instrument in routine settings, in single, specialised research departments or in core facilities with a range of connected working groups. And when you're done with a particular project, you can adapt it to your next challenge.

Figure 1 *CyFlow® Space with Autoloading Station for high-speed auto sampling*

Flexibility, flexibility, flexibility ...

The CyFlow® Space is an open system with high flexibility: from basic equipment up to a multi-laser and multi-parameter system, you're sure to benefit whatever your needs.

Forget about the severe limitations of fixed instrument configurations and restricted laser wavelengths. The CyFlow® Space lets you adapt your flow cytometer to your individual applications and can accommodate the most complex customised solutions. With 10+ different lasers, up to 16 parameters and a large range of optical filters to choose from, you can optimise every fluorescence channel as you wish. Upgrades or changes are quick, easy and performed on site if you so wish.

Application areas

Research field	Industrial field
Biomedical research	Quality control
Microbiology	Industrial biotechnology
Cell biology	Industrial microbiology
Biotechnology	Food & beverage industry
Agroscience	Plant & animal breeding
Marine biology	Aqua culture
Environmental science	Industrial development

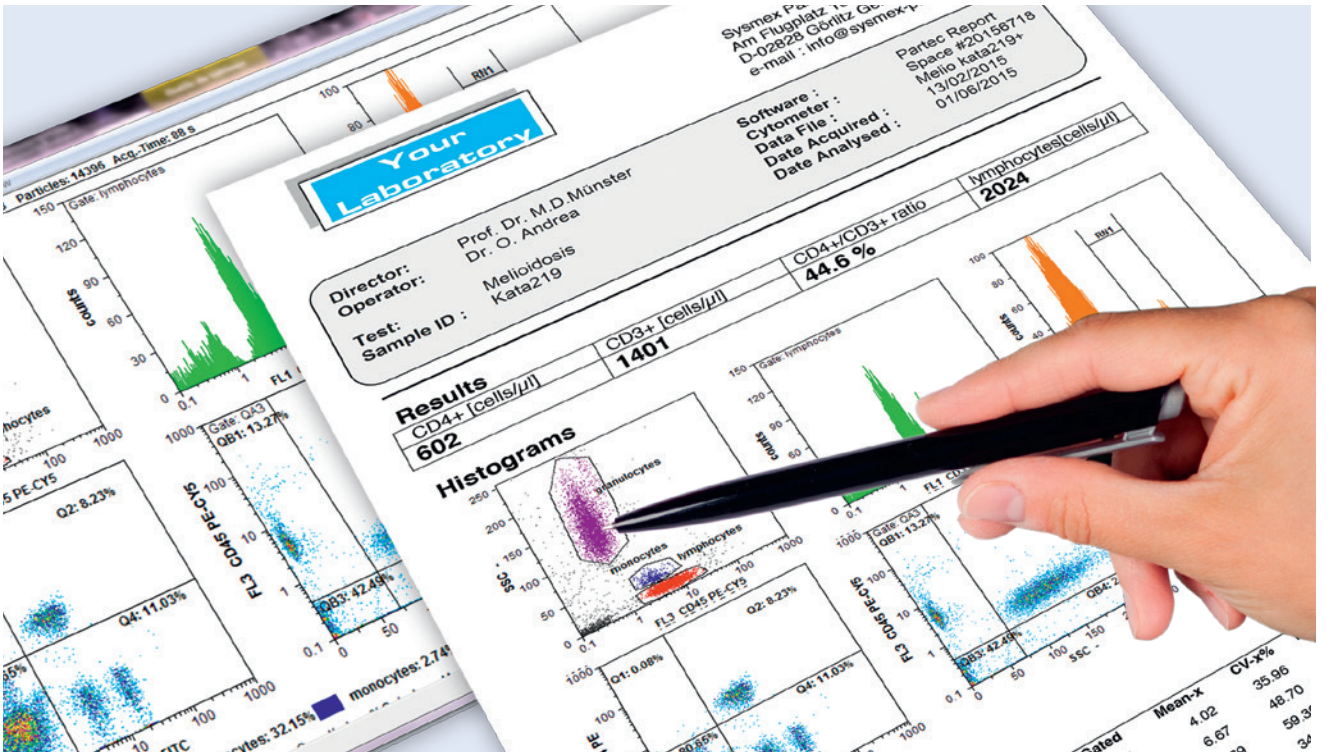


Figure 3 *Report of a multi-colour analysis of CD3/CD4/CD45 on CyFlow® Space with FloMax® software*

Ease of use

The CyFlow® Space is simple to operate and gives users easy access to the instrument's full capacities. Taking just five minutes to start up, you can get to work pretty much straight away. And there's no need to hang around during shutdown either – that's quick and easy too.

To further its user-friendliness, the CyFlow® Space's operating software FloMax® is intuitive and efficient. It integrates instrument control, including convenient acquisition and analysis, with on- and offline data analysis and a compensation tool in a single software package. Many of its functions are just a click away, such as digital compensation of colour cross talks. Pre-defined and freely adaptable instrument settings and panel modes facilitate switching between different applications.

FloMax® is dedicated to applications in immunology, cell biology, microbiology, biotechnology, etc. To ensure compatibility with many of the most common FCM analysis programs, it uses the Flow Cytometry Standard (FCS) data format and lets you generate individual data reports in flexible formats.

The unique Sysmex Partec counting principle of 'True Volumetric Absolute Counting' (TVAC) eliminates the need for time-consuming and cost-intensive use of reference beads for counting purposes. And the integrated CCD camera means you can monitor the signal directly on the display to instantly check the sample flow.

Modular extension possibilities

It's important to us that the devices we deliver find effective, extensive use. As part of the Sysmex Partec FCM concept, the CyFlow® Space can be expanded and upgraded modularly by adding an Autoloading Station and other units, such as a piezo-electric cell sorter device. Upgrade options can also mean adding laser light sources, optical parameters and fluorescence channels.

CyFlow® Space Autoloading Station

To achieve higher throughput, you can add the Autoloading Station, which enables automated and accurate uptake of samples with high-speed sample loading. The station performs a flexible sample-to-sample cleaning procedure with lowest carry-over and can read both 96- and 384-well plates.

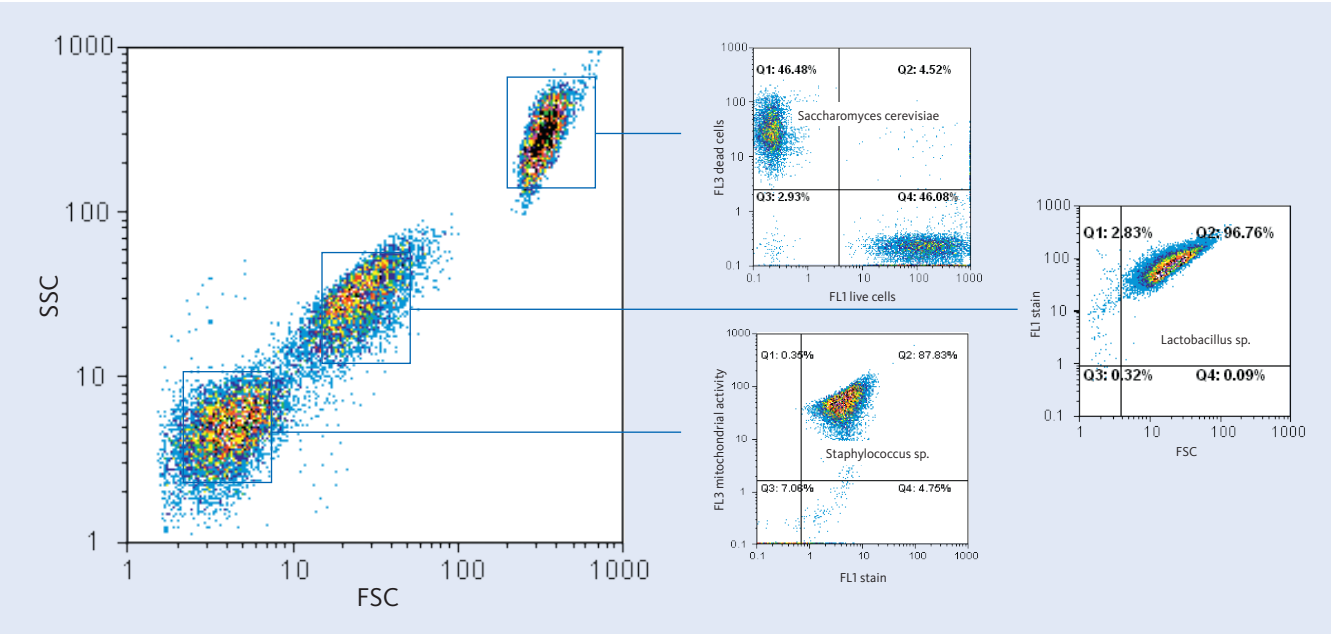


Figure 2 *Separation of differently sized organisms during a single measurement in a scatter plot: Staphylococcus sp. – Lactobacillus sp. – Saccharomyces cerevisiae. The subsequent analysis comprised mitochondrial activity measurement of Staphylococcus, DNA staining of Lactobacillus, and viability measurement of Saccharomyces.*

CyFlow® Space Sorting Module

The sorting module is one of Sysmex Partec's unique technical solutions. It works as a closed system and lets you sort cells and particles precisely, stably and with non-destructive high purity. It combines a high-resolution flow chamber with a piezo element and electric activation. In contrast to standard droplet sorters, the process in Sysmex Partec's sorters is smooth and reduces mechanical stress – essential for numerous applications with fragile cell types, such as e.g. neuronal stem cells. As a closed sorting solution, it also offers the advantages of sterile sorting of viable cells for subsequent cell culture and aerosol-free sorting to prevent bio-hazardous exposure.

Other modules, such as a light polarisation component or an anaerobic cabinet, are available on request.

But what about quality and accuracy? We have the experience ...

In 1968, the company Partec launched the first commercially available flow cytometer to the market. Since then, we have been tightly focused on developing the technology further in line with market demands and retaining the state of the art. Sysmex Partec stands for the highest precision and quality. 'Made in Germany' we now have 45 years of experience in your market, and our technology has been used with great success and acclaim in various fields in industry, research and development.

The high quality of our instruments within our FCM concept delivers systems with great stability and sensitivity. The high precision of the optical bench in the CyFlow® Space system is combined with a powerful electronic and computer system and so forms the basis for real-time signal analysis and processing with high fluorescence and scatter sensitivity.

Technical specifications

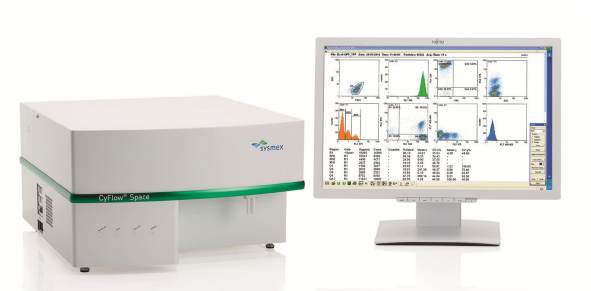
Lasers / LEDs	Detectors	Exemplary dyes
BLUE LASER 488 nm (50 mW fixed/ adjustable to 200 mW)	Green Orange Orange Red Red I Red II Far Red	FITC / GFP / Alexa Fluor 488 PE / YFP PE-Texas Red / PI PE-Cy5 / PerCP PE-Cy5.5 / PerCP-Cy5.5 PE-Cy7
RED LASER 638/640 nm (25/40 mW)	Red I Red II Far Red	APC / APC-Cy5 APC-Cy5.5 / Cy5.5 APC-Cy7
VIOLET LASER 405 nm (100 mW)	Blue Green Orange	Pacific Blue / Alexa Fluor 405 / CFP Cyan / AmCyan / brilliant violet 510 Pacific Orange / brilliant violet 605
UV LASER 375 nm (60 mW) HIGH-POWER UV LED 365 nm	Blue	DAPI / Hoechst 3342
GREEN LASER 532 nm (30 / 100 mW)	Orange Red	mStrawberry / PE mCherry / PI / PE-Texas Red
YELLOW LASER 561 nm (100 mW)	Orange Red	PE / DS Red / PE-Texas Red PE-Cy5 / PI / mCherry / mRuby
ORANGE LASER 594 nm (50 mW)	Orange Red Red Far Red	Texas Red / Alexa Fluor 594 / mStrawberry APC / mCherry / mRFP / JRed mPlum

Figure 4 *Available light sources and exemplary detector configurations*

Light sources and optics	Flexible choice of up to 5/3 light sources (stand-alone analyser/with integrated sorter) Modular optical system with up to 16/8 optical parameters with selected PMTs (stand-alone analyser/with integrated sorter) and time parameter Exchangeable optical filters
Flow system	Quartz flow cuvette for laminar sample transport and hydrodynamic focusing Biosafety cleaning system True Volumetric Absolute Counting (TVAC) based on mechanical volume measurement
Electronics and signal processing	Selectable linear, 3- or 4-decade logarithmic scale 16-bit analogue-to-digital converters, selectable trigger parameter Pulse height, area and width analysis for doublet discrimination
FloMax® operating software	Based on Microsoft Windows™ Master licence for instrument control, data acquisition and data analysis Data analysis software for multi-parametric flow cytometry data files in FCS 2.0 or FCS 3.0 standard format
Computer system	Latest industry standard Windows™ PC with Microsoft Office® Microsoft Windows™ 7 professional 32-bit operating system 22" colour LCD TFT display DVD-RW, USB and Ethernet ports
Options	Immersion gel coupling CyFlow® Space sorter module CyFlow® Space Autoloading Station with CyPad software
Weight	approx. 37 kg
Dimensions (W x H x D)	main unit: 560 x 300 x 650 mm

Product Fact Sheet
CyFlow® Space

Product Picture



Product name
CyFlow® Space

Manufacturer information
The CyFlow® Space is manufactured by Sysmex Partec GmbH.

Sysmex Partec is an ISO 9001:2008 and ISO 13485:2012 certified company.

Summary
The CyFlow® Space is a high performance multi-laser flow cytometer system which offers the most flexible, simple and reliable features for routine and research work.
It´s a compact multi-colour instrument for analysis of individual cells and microscopic particles in suspension.
The advanced flow cytometry technology of the CyFlow® Space covers a wide range of different applications.

Productivity values
Fluorescence excitation by 1 to 5 light sources covering a range from ultra-violet to red excitation lines.
Analysis of up to 13 fluorescence parameters and 3 physical light scattering parameters from near UV to infra-red light.
Analysis of cell and particle concentration by True Absolute Volumetric Counting.
Cell sorting by an optional cell and particle sorter.
Fixed standard configurations and flexible customized configurations tailored for the users requirement.
Walk-away automation by sample auto-loading from 96- and 384-well plates.

Main features of CyFlow® Space
- ✓ Maximum acquisition rate up to 25,000 signals / s
- ✓ Scatter particle size: 0.1 – 100 µm
- ✓ Fluorescence sensitivity: < 100 MESF (FITC), < 50 MESF (PE)
- ✓ Fluorescence resolution: CV < 2%
- ✓ Signal height, signal width and signal length (doublet discrimination)
- ✓ Optional CyFlow® Space Autoloading Station for high speed auto sampling
- ✓ True Volumetric Absolute Counting (TVAC)
- ✓ Windows™ FloMax® software for real-time data acquisition, data display and data evaluation
- ✓ User friendly software compensation online and offline
- ✓ Start-up time < 5 min
- ✓ Easy-to-use acquisition software
- ✓ Parallel 16 bit digital pulse processing (65536 channels)

Specifications

Feature	Description
Parameters	• Up to 16 optical parameters (Analyser) and 8 optical parameters (Cell Sorter)
Light Sources	As Analyser: up to 5 light sources • Blue solid state laser: 50 mW fix or 200 mW adjustable 488 nm • Red diode laser: 638 nm 25 mW or 640 nm 40 mW • Violet diode laser: 100 mW 405 nm • Green DPSS laser 30 or 100 mW 532 nm • Yellow laser: 100 mW 561 nm • High power UV LED: 365 nm • Ultra-violet diode laser: 60 mW 375 nm • Orange diode laser: 50 mW 594 nm As Cell Sorter: up to 3 light sources • Blue solid state laser: 50 mW fix or 200 mW adjustable 488 nm • Red diode laser: 638 nm 25 mW or 640 nm 40 mW • Violet diode laser: 100 mW 405 nm • Green DPSS laser: 30 or 100 mW 532 nm • Orange diode laser 50 mW 594 nm • Yellow laser: 100 mW 561 nm • High power UV LED: 365 nm • Utra-violet diode laser 60 mW 375 nm

Optics	• Modular optical system with up to 16/8 optical parameters with selected PMTs with integrated electronic preamplifier for FSC, SSC, FL1-FL13 • Exchangeable optical filters • Colour CCD camera for sample flow monitoring • High numerical aperture objectives • Immersion gel coupling (option) • Separated intermediate image planes for optimized spatial filtering by diaphragms • Light polarization module (upon request)
Flow System	• Quartz glass flow cuvette for laminar sample transport and hydrodynamic focusing • Completely closed fluid system • Sample port with biosafety cleaning system • True Volumetric Absolute Counting based on mechanical volume measurement • Computer controlled precision syringe pump speed continuously adjustable from 0–20 µl/s • Easily accessible sheath fluid and waste reservoirs with fluid level sensors
Electronics	• Parallel signal processing for each optical channel • Selectable linear, 3- or 4-decade Logarithmic scale • Pulse height, area, and width analysis for doublet discrimination • 16 bit analogue-to-digital converters, trigger selectable on any parameter or on all parameter combination • Individual threshold level settings
Computer / Display	• Windows™ PC • 22" TFT LCD display • Dual screen setup (optional) • DVD-RW • Keyboard, mouse, barcode reader (optional) • USB ports • Graphic, sound and network on-board • 100 Mb/s and 1000 Mb/s Ethernet connection • DeskJet colour printer, black & white or colour laser printer (optional), printing via network

Software	• Microsoft Windows™ operating system with full network support • 32 bit Windows™ FloMax® software for routine and research applications • 64 parameter real-time data acquisition and analysis • 3-spot acquisition from spatially separated light sources with time-window delay • 1-parameter histograms and dot plots • 64 - 32768 channels resolution for 1p histograms • 32/32 -1024/1024 channels for dot plots • Multi-parameter n-colours crosstalk compensation • Multi parameter colour gating • Signal ratio measurement and calculated parameters • Peak and cluster analysis and statistics • DNA cell cycle analysis • DNA peak analysis • Multi tube panel system with automated acquisition • Flow cytometry standard data format (FCS) for storage of original and evaluated data • Storage of instrument settings, screen layout templates, panels, gates and compensation matrices • Automated reporting of statistics, graphics and instrument settings to Word or Excel • Export of list mode data • 3 off-line FloMax® data analysis licences for the use on external PC
Sampler unit capacity (optional)	• 96-well plates, 384-well plates; Throughput down to 15 minutes / 96-well plate
Dimension	• L 560 mm x W 650 mm x H 300 mm
Weight	• Approx. 37 kg
Interface	• PCIe
Operative temperature	• 15 – 30° C
Operative humidity	• 20 – 85 % rel. (non-condensing)
Noise	• < 70 dBA
Electrical Specification	• 2/II
Nominal voltage	• 100 – 240 VAC
Power consumption	• 350 VA

Optional configurations	Description
Standalone	
with Autoloading Station	Autoloading Station for 96 and 384 well plates
With Sorter Unit	Piezo-electric Cell- and Particle Sorting device
With Anaerobic Cabinet	(Upon request)

Article number

Article no.	Item	Description
CY-S-3001R_VA01_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-5P
CY-S-3001R_VS01_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-5P Sorter Upgradable
CY-S-3001R_VA02_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-5P 638nm-25mW-1P
CY-S-3001R_VS02_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-5P 638nm-25mW-1P Sorter Upgradable
CY-S-3001R_VA03_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-200mW-6P 638nm-25mW-2P
CY-S-3001R_VS03_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-200mW-6P 638nm-25mW-2P Sorter Upgradable
CY-S-3001R_VA04_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-6P 638nm-25mW-1P 405nm-100mW-1P
CY-S-3001R_VS04_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-6P 638nm-25mW-1P 405nm-100mW-1P Sorter Upgradable
CY-S-3001R_VA05_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-6P 638nm-25mW-2P 405nm-100mW-2P
CY-S-3001R_VA06_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-6P 638nm-25mW-1P 375nm-60mW-1P
CY-S-3001R_VS05_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-6P 638nm-25mW-1P 375nm-60mW-1P Sorter Upgradable
CY-S-3001R_VA07_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-7P 638nm-25mW-2P 375nm-60mW-1P
CY-S-3001R_VA08_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-6P 638nm-25mW-1P UVLED-1P
CY-S-3001R_VS06_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-6P 638nm-25mW-1P UVLED-365nm-1P Sorter Upgradable
CY-S-3001R_VA09_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-8P 638nm-25mW-4P 405nm-100mW-2P 375nm-60mW-1P

CY-S-3001R_VA10_S	CyFlow® Space Set	Consisting of: CyFlow® Space 488nm-50mW-8P 640nm-40mW-4P 405nm-100mW-2P 375nm-60mW-1P
CY-S-3001R_VS07_S	CyFlow® Space Set	Consisting of: CyFlow® Space UVLED-365nm-1P Sorter Upgradable
CY-S-3001R_VS08_S	CyFlow® Space Set	Consisting of: CyFlow® Space 532nm-30mW-2P Sorter Upgradable
CY-S-3001R_VS09-S	CyFlow® Space Set	Consisting of: CyFlow® Space 532nm-30mW-2P UVLED-365nm-1P Sorter Upgradable
16-02-3000	CyFlow® Space Autoloading Station	Autoloading Station for 96 and 384 well plates
12-01-1000	CyFlow® Sorter for CyFlow® Space	Sorter module

This product is intended ‘For Research Use Only’ (RUO).

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