

# BD FACSCanto II



Helping all people  
live healthy lives

A proven research platform for maximum  
reliability and the highest quality results



# A proven platform for maximum reliability and the highest quality results

Built on more than 25 years of BD experience and leadership in flow cytometry and multicolor analysis, the BD FACSCanto™ II system is an easy-to-use benchtop analyzer that delivers proven performance, accuracy, and high quality results. The BD FACSCanto II provides the ultimate in flexibility and can be configured with two or three lasers to detect up to eight colors.

The BD FACSCanto II features many innovations. At the heart of the cytometer, for example, the fluidics system features a fixed alignment flow cell to minimize startup time and improve reproducibility. The optical system features a patented design that maximizes signal detection and increases sensitivity and resolution for each color in a multicolor assay. These capabilities and many other innovations make the BD FACSCanto II one of the most powerful and versatile benchtop analyzers available for both clinical and research applications.

For the research lab, the BD FACSCanto II system has the versatility to meet demanding research requirements. Sample introduction can be accomplished in a single tube or via the BD™ High Throughput Sampler (HTS), a microtiter plate loader well suited for 96- and 384-well plates that can accommodate high throughput research applications. BD FACSDiva™ software efficiently controls the setup, acquisition, and analysis of flow cytometry data.

**The BD FACSCanto II is supported by a broad portfolio of reagents. A full complement of highly qualified BD technical and application support personnel is available to help streamline work and maintain optimal instrument performance.**

Saves time, improves reproducibility

## High Performance, Innovative System

The BD FACSCanto II fluidics system is designed to streamline work, save time, and improve performance.



In the fluidics system, the sample travels up the sample injection tube, and hydrodynamic focusing within the flow cell forces particles into a single-file stream where laser light intercepts the stream at the sample interrogation point. The unique flow cell design permits particles to flow through the center of the flow cell. Increasing the sample pressure increases the core diameter and the flow rate.

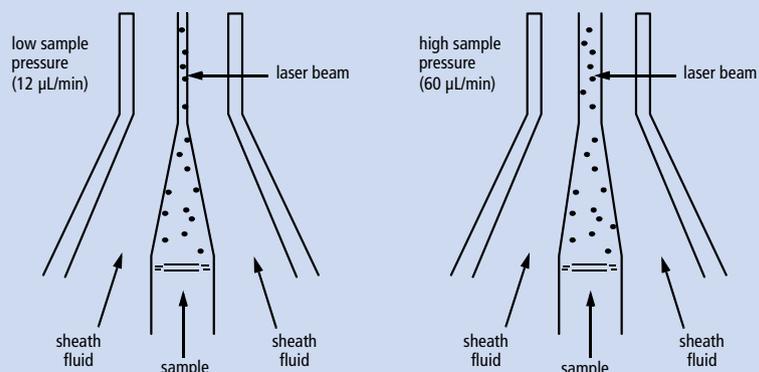
A fluidics cart holds large fluid tanks necessary to operate and maintain the instrument. For sample acquisition, positive-pressure pumps in the fluidics cart send sheath fluid past a 0.2- $\mu\text{m}$  filter to a pressurized interior reservoir inside the instrument called the plenum. The plenum maintains a nearly constant fluid level and dampens pump pulsation using a new dynamic feedback pressure control system designed to regulate pressure. As a result, sheath flow rate does not vary with the level of fluid in the sheath cubitainer, and the reservoir automatically removes small air bubbles from the sheath supply.

Daily routine procedures, such as startup, shutdown, and cleaning routine cycles, are automated as a result of fluidic integration with BD FACSDiva software.

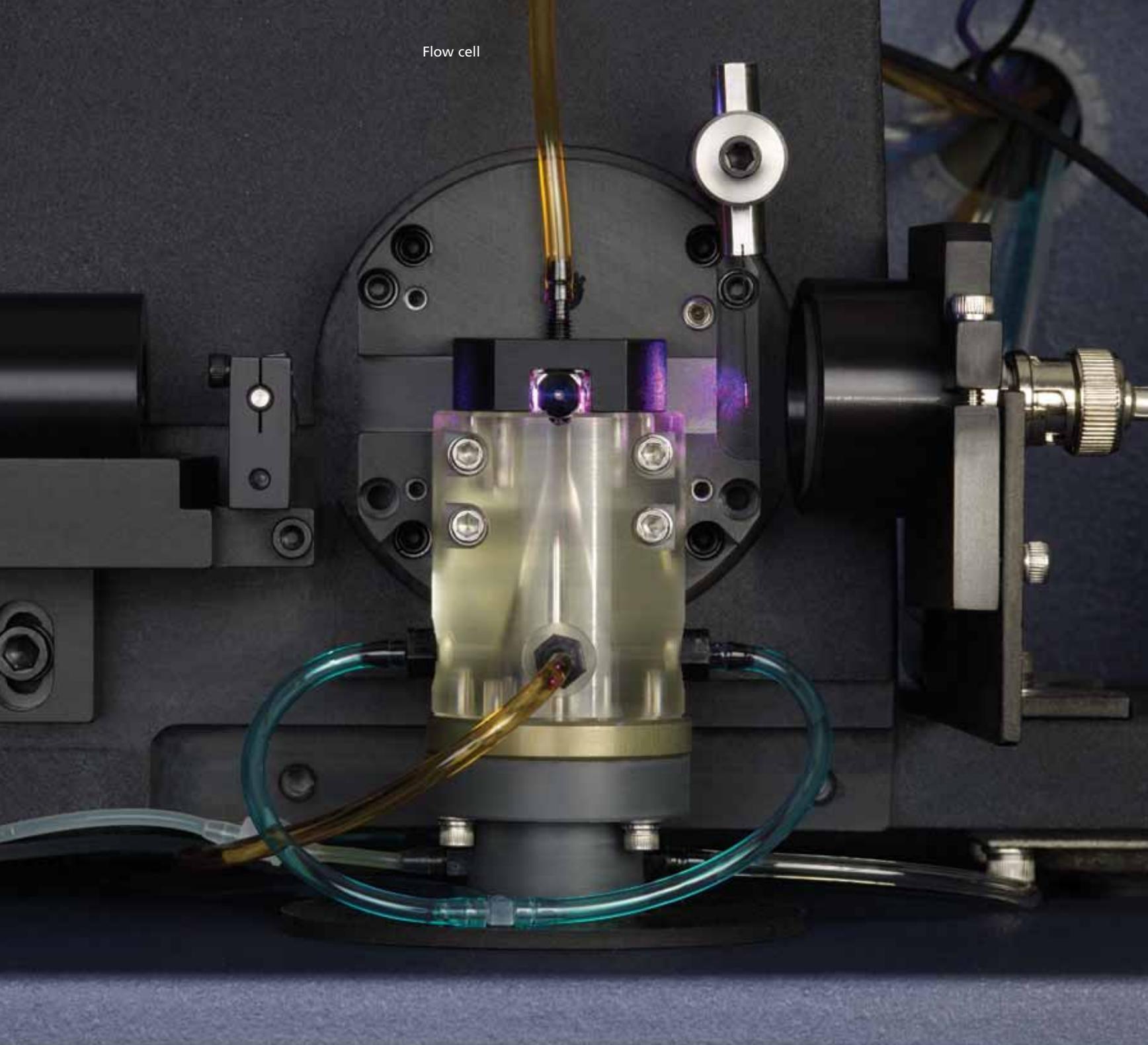
BD FACST<sup>SM</sup> Shutdown solution prevents salt crystal buildup in fluidics lines and is supplemented with a preservative to prevent bacterial growth. During the instrument shutdown procedure, the BD FACS Shutdown solution replaces sheath fluid in all sample and sheath fluid lines.

### Hydrodynamic focusing

A high flow rate is generally used for measurements such as immunophenotyping, for which data is less resolved but is acquired more quickly. A lower flow rate is generally used in applications for which optimal resolution and sensitivity are critical.



Flow cell



**LED alerts**

LEDs are located in the front door to monitor each acquisition parameter. Each LED blinks when the signal level reaches a prescribed threshold.



Maximize multicolor performance

# Innovative Optical Design Delivers Highest Sensitivity

The innovative designs for both the excitation and collection optics reduce excitation losses, yielding more information from each sample.

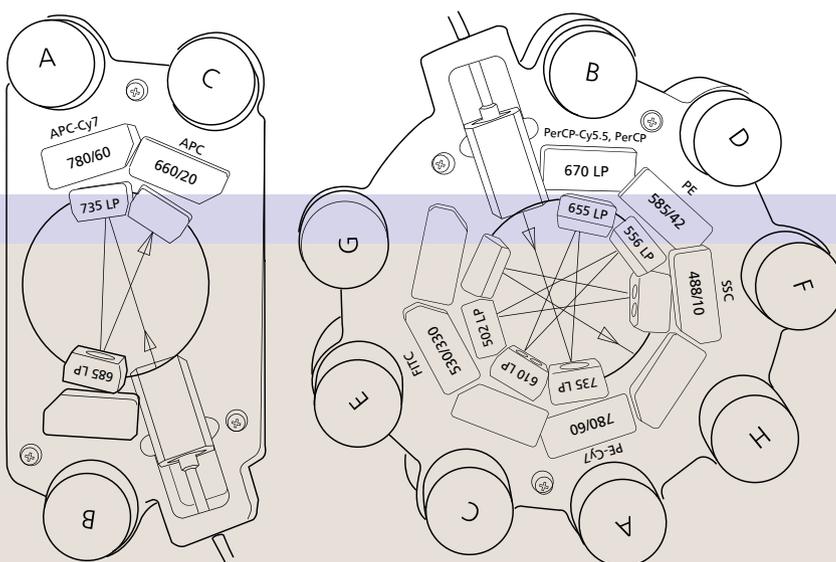
The optics of the BD FACSCanto II system consist of an excitation source with up to three lasers, a blue (488-nm, air-cooled, 20-mW solid state), a red (633-nm, 17-mW HeNe) and a violet (405-nm, 30-mW solid state). Laser excitation optics illuminate cells in the sample and collection optics direct light scatter and fluorescence signals through spectral filters to the detectors.

## Excitation

The excitation optics consist of multiple fixed wavelength lasers, fiber optics up to the beam-shaping prisms, and achromatic focusing lenses that produce spatially separated beam spots in the flow cell. Each lens focuses the laser light into the gel-coupled cuvette flow cell. Since the optical pathway and the sample core stream are fixed, alignment is fixed from day to day and from experiment to experiment with no need for user intervention.

## Emission

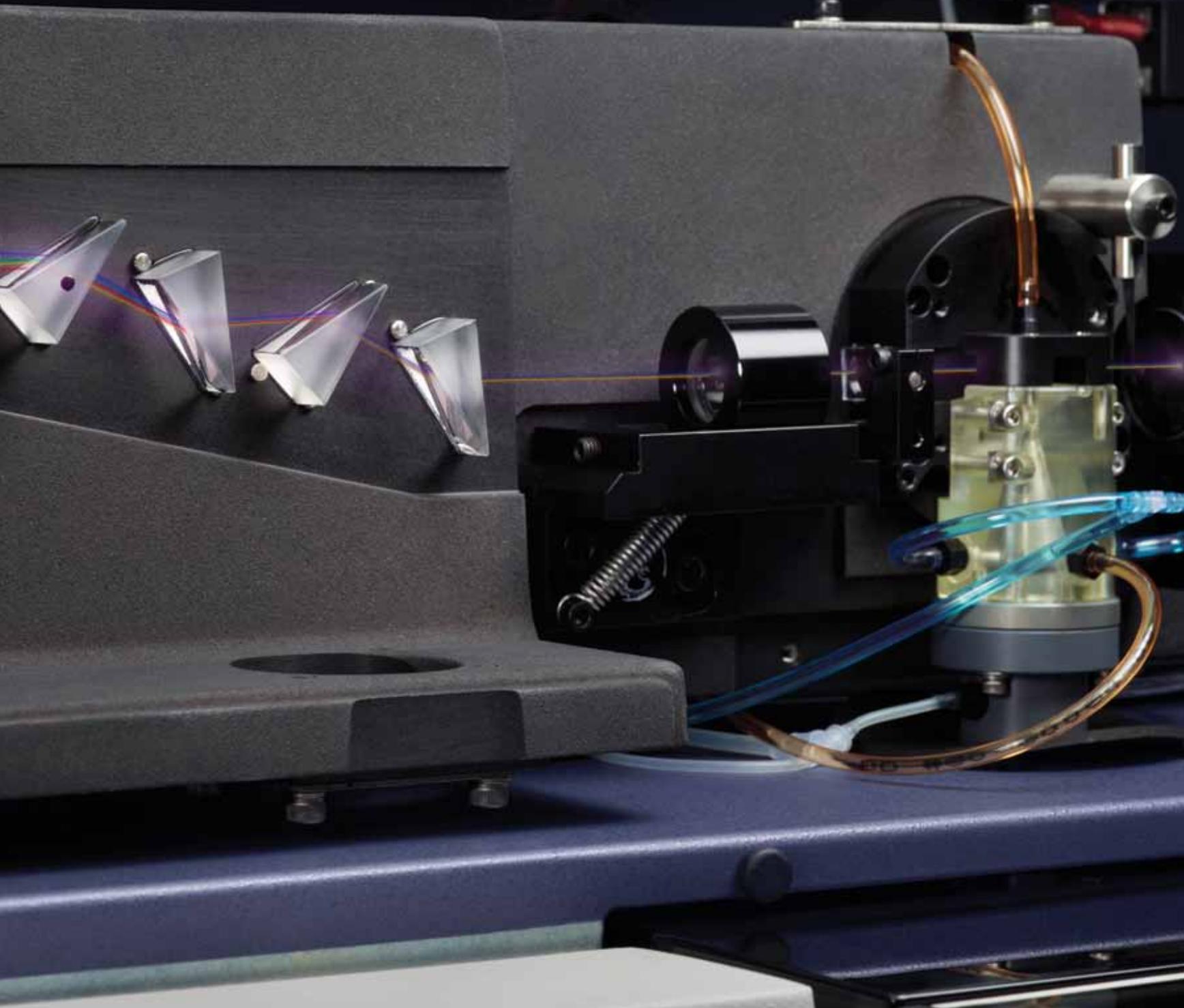
The emission signals are transmitted from the flow cell to the detector arrays, an octagon for the blue and a trigon each for the red and the violet laser signals. The octagon contains five PMTs and detects light from the 488-nm blue laser. A PMT in the octagon collects side scatter signals. The trigons contain two PMTs each and detect light from the 633-nm red and the 405-nm violet lasers.



## Collection Optics

The octagon and trigon are BD patented detector arrays that use serial light reflections to guide signals to their target detectors, resulting in highly efficient light collection and providing maximum signal retention at the detector level.

This BD serial reflective design further enhances instrument sensitivity by collecting the dimmest emission signals first, moving from the longest wavelengths (typically PE-Cy7) to the shortest (FITC).



**Emission spectra of commonly used fluorochromes**

The BD FACSCanto II system is designed for these fluorophore combinations.

Instrument	Laser	Excitation Laser Line (nm)	Fluorescence Channel	Fluorochromes provided by BD Biosciences			
<b>BD FACSCanto II flow cytometry system</b>	Solid State (L1)	488	Green	FITC	Alexa Fluor® 488		
			Yellow	PE	PI		
			Orange	BD Horizon™ PE-CF594	PE-Texas Red®		
			Red	7-AAD	PE-Cy™5	PerCP	PerCP-Cy™5.5
			Infrared	PE-Cy™7			
HeNe (L2)	633	Red	APC	Alexa Fluor® 647			
		Far Red	Alexa Fluor® 700				
		Infrared	BD APC-H7	APC-Cy7			
Violet (L3)	405	Green	BD Horizon™ V500	AmCyan			
		Blue	Brilliant Violet™ 421	BD Horizon™ V450	VPD450	Pacific Blue™	



## Productivity support

# Options and Related Tools to Support Lab Requirements

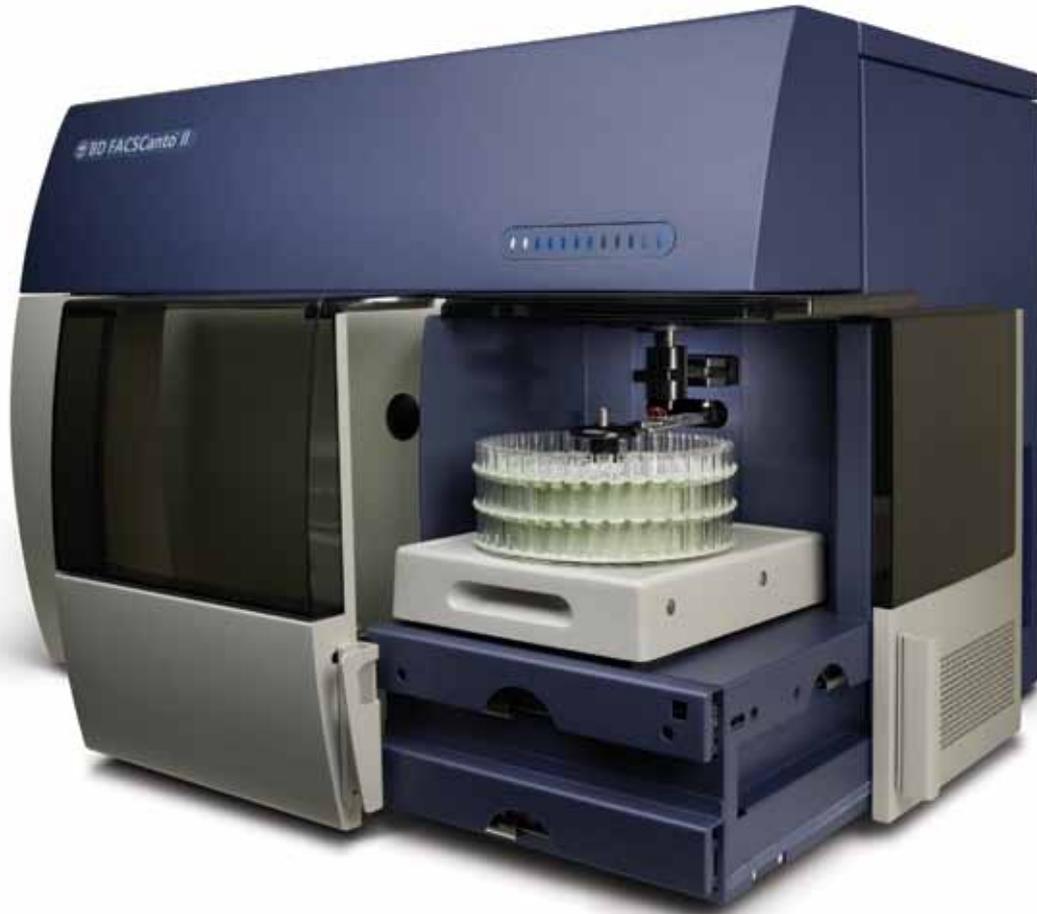
Sample introduction productivity can be gained with the optional BD FACS Loader or the BD High Throughput Sampler (HTS).



### BD High Throughput Sampler (HTS)

Designed for research use, the optional BD High Throughput Sampler (HTS) provides fully automated and rapid sample acquisition that can speed through a microtiter plate in less than 15 minutes, with less than 1% sample carryover. In high-throughput mode, fast acquisition speed is achieved by synchronizing two high-precision pumps for sample mixing, sample injection, and probe washing. Standard-throughput mode can be selected for acquisition of larger sample volumes. The HTS supports standard 96 and 384-well plates. It is operated using BD FACSDiva software, allowing users to define customized delivery protocols, mixing, wash, and analysis parameters.





## **BD FACS Loader**

The BD FACS Loader is an instrument option that allows walkaway sample introduction to further improve productivity. The BD FACS Loader carousel accommodates up to 40 12 x 75-mm tubes and automatically loads them on the BD FACSCanto II system without operator intervention.

Mounted directly on the cytometer, the device includes a drive system, a tube lifter mechanism, and sensors on the sliding drawer. Two sliding doors safely enclose the drawer to protect technicians from moving parts during operation.

The BD FACS Loader utilizes compressed air to allow a more reliable tube load as well as an intelligent tube guide mechanism that automatically sends an alert if a tube is not properly positioned for loading.

A unique ID and optically read label are printed on each carousel for easy carousel identification. The BD FACS Loader is operated through BD FACSDiva software.

Versatile, easy-to-use

# A Powerful Platform for Research Use

The BD FACSCanto II system brings BD flow cytometry and multicolor analysis to a new level to help researchers meet complex challenges and advance their research.



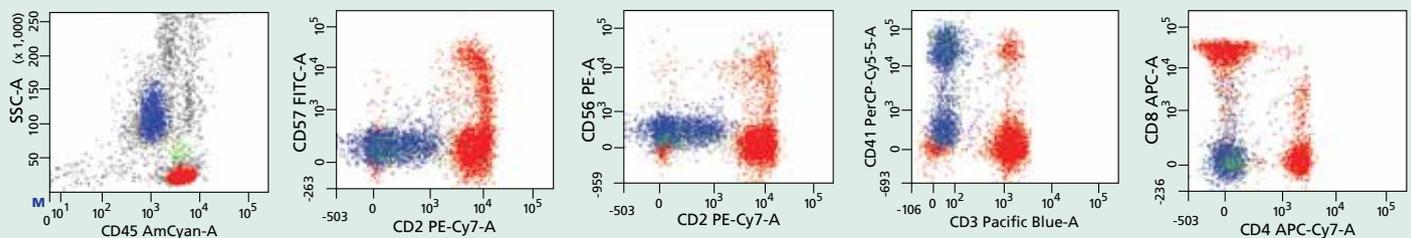
**BD FACSDiva Software for Setup, Acquisition, and Analysis**  
BD FACSDiva software efficiently controls the setup, acquisition, and analysis of flow cytometry data from the BD FACSCanto II workstation. BD FACSDiva operating software is common across many BD cell analyzers and cell sorters, including BD™ LSR and BD FACSria™ systems, giving researchers application flexibility.

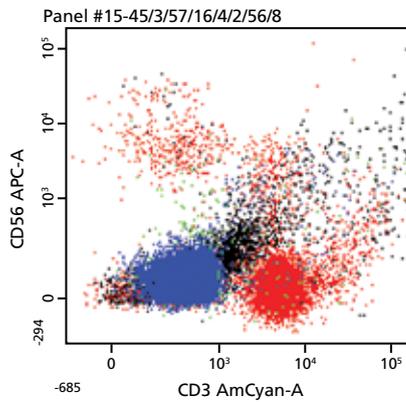
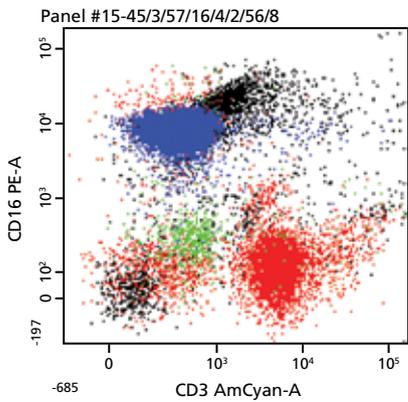
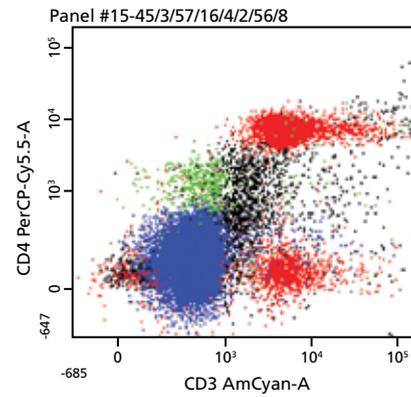
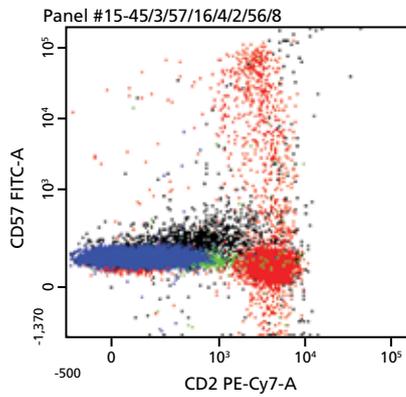
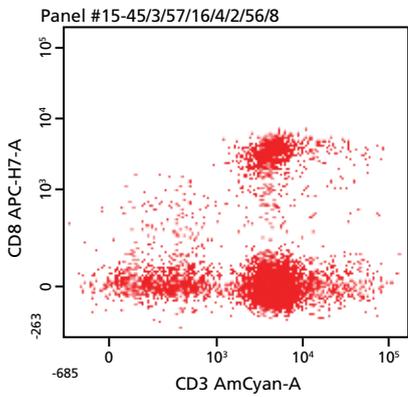
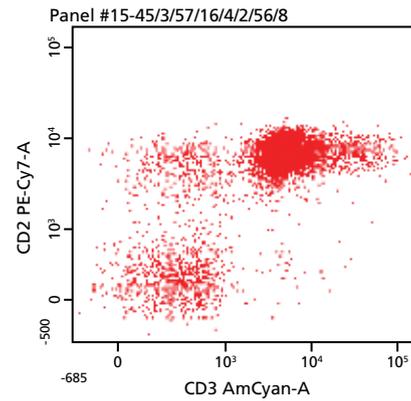
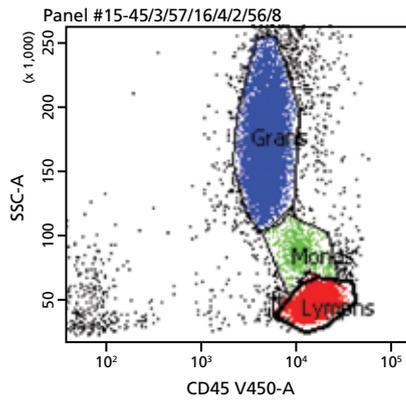
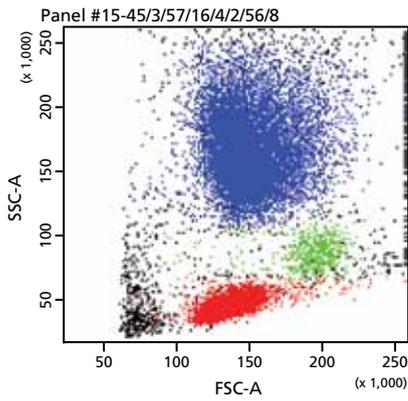
BD FACSDiva software enables researchers to preview and record data from multiple samples with an automated acquisition process. Acquisition templates, user-definable experiment layouts, and simple compensation procedures also managed by the software further facilitate acquisition.

For analysis, the software includes powerful features such as hierarchical snap-to gating, a variety of plots, and batch analysis. Recorded data can be analyzed by creating plots, gates, population hierarchies, and statistical views on a BD FACSDiva global worksheet. The global worksheet can be used to analyze multiple sample tubes from the same experiment, to save time. User-definable batch analysis and automated capabilities such as gate resizing, pausing between data files, exporting statistics, and printing before proceeding to the next data file are additional BD FACSDiva features.

## Lysed whole human blood

Eight-color immunophenotyping panel using FITC, PE, PerCP-Cy™5.5, PE-Cy™7, APC, APC-Cy7, AmCyan, and Pacific Blue™ fluorophores.





### BD FACSDiva Worksheet

Lysed whole human blood sample in an 8-color panel using BD Horizon™ V450, AmCyan, FITC, PE, PerCP-Cy5.5, PE-Cy7, APC, and APC-H7 fluorophores.

### Cytometer Setup and Tracking

BD™ Cytometer Setup and Tracking (CS&T) beads provide, in a single vial reagent format, automated determination of BD FACSCanto II configuration baselines and monitoring of performance over time, using BD FACSDiva software.

BD™ CompBead Compensation Particle Sets are designed to optimize compensation settings in multicolor flow cytometry. Particularly helpful when using tandem dye conjugates, these particle sets simplify establishing compensation corrections for spectral overlap for any combination of fluorochrome-labeled antibodies.



## Choices Now and in the Future

# Special Order Products for Unique Needs

The BD special order research program lets customers leverage the ease of use and proven reliability of the BD FACSCanto II system and configure the instrument with optional PMT filters and lasers to fit precise lab requirements.

Designed for research use the special order BD FACSCanto II allows for up to three colors to be configured on each of the available lasers for a maximum of eight colors. The special order system includes the fluidics wet cart and setup functions provided on the standard BD FACSCanto II IVD system for quick, simple setup and turnkey maintenance routines.



### Choice of Laser Wavelengths

The special order BD FACSCanto II research system can be configured from a selection of four laser wavelengths at selectable output power.

Laser choices include the violet: 405-nm, 30-mW, or 50-mW solid state laser, the blue 488-nm, air cooled, 20, 50, or 100-mW solid state laser, the red 640-nm, 75-mW, or 633-nm, 17-mW HeNe, and the yellow-green: 561-nm, 50-mW solid state laser.

The special order system includes software to set up and control the lasers configured in the instrument.

### PMT Options

For applications that need to detect small particles, the special order BD FACSCanto II can be configured with a forward scatter PMT option. Using this option, up to three colors can be configured on each laser for a maximum of seven-color support. A switch allows the operator to use either the FSC PMT or a fluorescence channel.

Optical system in the special order research BD FACSCanto II system



# CONFIGURATION

## High Throughput Option

The BD FACS Loader and the BD High Throughput Sampler are available for the special order BD FACSCanto II system to meet the needs of high throughput research applications.



Technical expertise from BD

## Committed to Customer Success

**BD Biosciences is fully committed to the success and satisfaction of its customers. Supporting flow cytometry applications for over 35 years, BD training, support, and field service teams are dedicated to helping customers achieve optimal instrument performance, ease of use, and streamlined workflow. With unmatched flow cytometry experience, this world-class service organization is available to help with your BD FACSCanto II product installation, future upgrades, and application support.**

### **Training**

Hands-on training is included with each BD FACSCanto II product. Training courses are held at BD training centers worldwide. BD flow cytometry training courses combine theory and practice to provide participants with the skills and experience they need to take full advantage of the capabilities of their BD FACSCanto II system.

### **Technical Application Support**

BD Biosciences technical application support specialists are available to provide field- or phone-based assistance and advice. Expert in all aspects of flow cytometry, BD technical application specialists are well equipped to address customer needs in both instruments and application support.

### **Field Service**

When instrument installation or service is required, a BD Biosciences Technical Field Service Engineer can be dispatched to the customer site. BD Biosciences field service engineers are located across the world. On-site service and maintenance agreements are available to provide long-term support for BD FACSCanto II systems.



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BD flow cytometers are Class 1 Laser Products.

Unless otherwise noted, applications described in this document are for Research Use Only.

APC-Cy7: US patent 5,714,386

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