

# SONY



**SH800Z**  
Cell Sorter

Sony Biotechnology Inc.



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## SH800Z Cell Sorter

### **Sorting Made Simple™ with innovative technologies.**

The SH800Z cell sorter features a novel microfluidics sorting chip integrated with comprehensive fluidics controls to simplify system and sort setup. The versatile design features a compact footprint (width- 55 cm x breadth- 55 cm x height- 72 cm) and built-in automation to provide ease of operation.

A flexible optical design offers up to 4 collinear excitation lasers (488 nm, 405nm, 561nm and 638nm) and 6 fluorescence detectors. The six free-form PMTs enable detection of fluorescence signals from any laser based on filter selection.

From system set-up to acquisition, sort and analysis the SH800Z features automation that simplifies operational workflow. Sorting into tubes and a range of multi-well plates is fully supported. System software is easy to understand and intuitive. The software is intuitive and generates FCS 3.0 and FCS 3.1 files that also can be exported to third party analysis tools.

A Class A2, Level II biosafety cabinet custom designed for SH800Z provides protection for both personnel and products. The cabinet has been verified to meet National Sanitation Foundation International Standard 49 (NSF49), the European Standard 12469 and several other international biosafety standards.

SH800Z supports a broad range of sorting applications to meet research needs making it an excellent fit for both individual labs and core labs.



- **A compact 55 cm x 55 cm x 72 cm (B x W x H) footprint to fit easily on the bench top.**
- **Automated Setup including optical and fluidic adjustments and sort monitoring to deliver consistency and simplify operation.**
- **Novel microfluidics sorting chip and comprehensive fluidics controls to simplify sorting.**
- **Optional custom biosafety cabinet that meets industry standards for personnel and product protection.**

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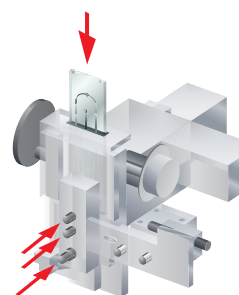
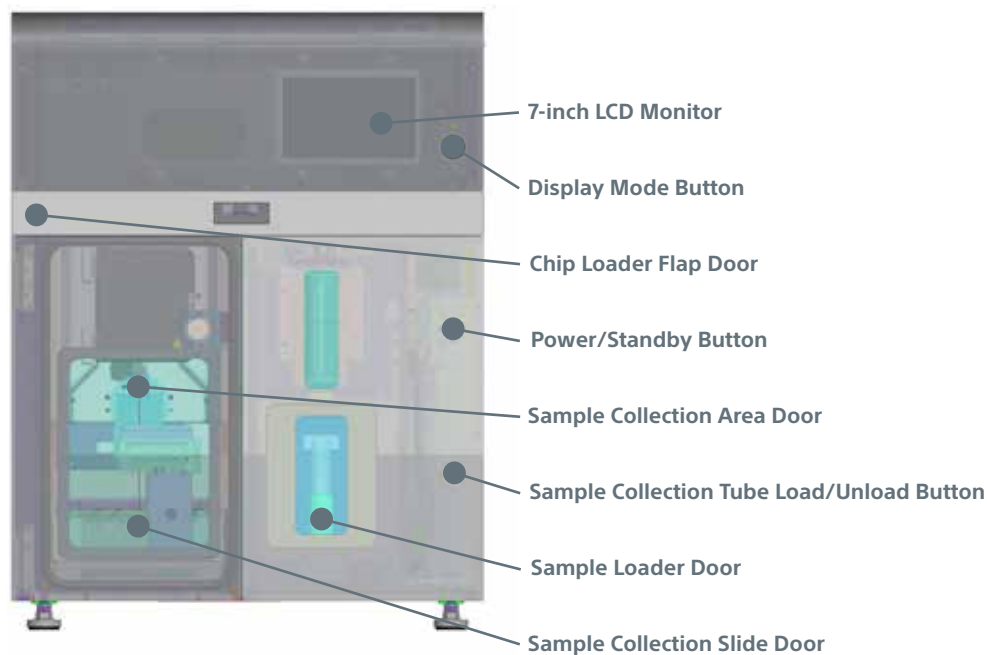
## SH800Z System Overview

At the core of the SH800Z system, the patented CoreFinder™ technology that automates key steps of instrument setup and operation to streamline workflow. Automation capabilities ensure accurate set up, alignment and calibration as well as sort monitoring to ensure consistency, save time and improve the accuracy of results.

### Automated Chip Loading & Positioning

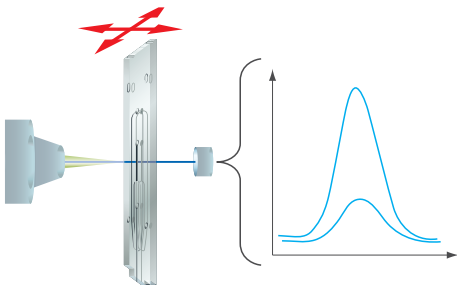
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System set up begins with a one-touch install to load the microfluidics flow cell chip. Actuators ensure precise positioning of the chip inside the chip loader. Sheath, sample and vacuum lines connect and seal automatically to their respective ports once the chip is loaded. Made of durable plastic the chip is easy to replace when needed.



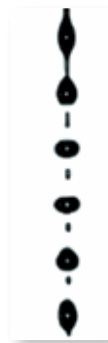
### Automated Optical Axis Adjustment

The alignment of the chip to the lasers is optimized automatically during setup using the Sony patented Blu Ray™ technology for aligning and tracking laser position. On a daily basis, using AutoSetup beads, the X and Z position of the chip is adjusted to ensure consistent results.



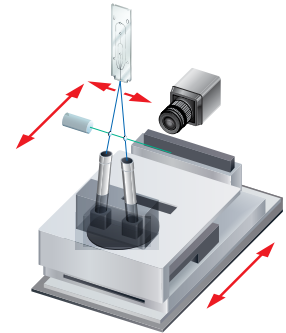
### Automated Droplet Calibration

The droplets are automatically calibrated by adjusting the frequency and the drop drive to achieve optimal break off point (BOP) for each type of sorting chip.



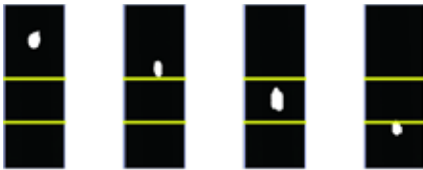
### Automated Side Stream Calibration

The angle and the position of the side streams is calculated and adjusted during setup for tube and plate sorting. This ensures that the sort stream is centered in the collection tube automatically without manual adjustment.



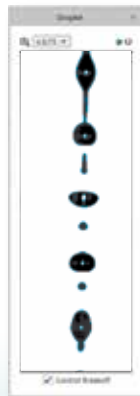
### Automated Drop Delay Calibration

A dedicated laser and camera perform real time analysis of droplet images using AutoSetup beads. Automatic analysis of the binary image of the droplets, in real time, calculates the drop delay using a patented algorithm.



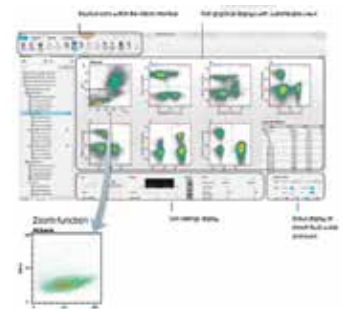
### Automated Sort Monitoring

The SH800Z software monitors and actively makes adjustments to the drop drive to maintain a stable breakoff point. This feature ensures consistently good sort performance and allows detection of clogs, empty tubes and facilitates walk-away operation.



### Intuitive Software

Clear and easy to understand features make using the SH800Z software for setup acquisition and analysis straightforward and intuitive. Data can be easily exported as FCS3.0 or 3.1 formats to use with third party analysis software.



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## Options

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### Exchangeable sample fluidics

The SH800Z sorting chip is an integrated flow cell-nozzle assembly. It contains microfluidic channels for controlling the flow of sample and sheath fluid. The sample is interrogated by the lasers within the chip before it passes through the nozzle for sorting.

Chip installation and removal is quick and easy thereby reducing the downtime associated with changing nozzles during setup and removal of clogs. The chip and the PEEK sample line-chip connector assembly which come in contact with the sample are fully disposable. This gives researchers the option to change out the sample fluidics path if needed.



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### Sort Deposition System

The Sort Deposition System on the SH800Z is robustly designed to facilitate high throughput sorting and highly precise deposition of cells into 96 and 384 well plates. Index sorting analysis capability in the software records the X and Y co-ordinates of each event sorted in a multi well device. Using this feature, end-users can reference the scatter and fluorescence data of the sorted events as well as determine the location of a sorted event in a multi-well plate.



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### Biosafety Cabinet

The BCC300AMS Class II biosafety cabinet custom designed for SH800Z by the Baker Company is available as an option to provide personnel and product protection. It has been tested by microbiological assays with the SH800Z sorter inside the work area to meet the National Sanitation Foundation Standard 49 (NSF49), the European Standard 12469 and several other international biosafety standards.

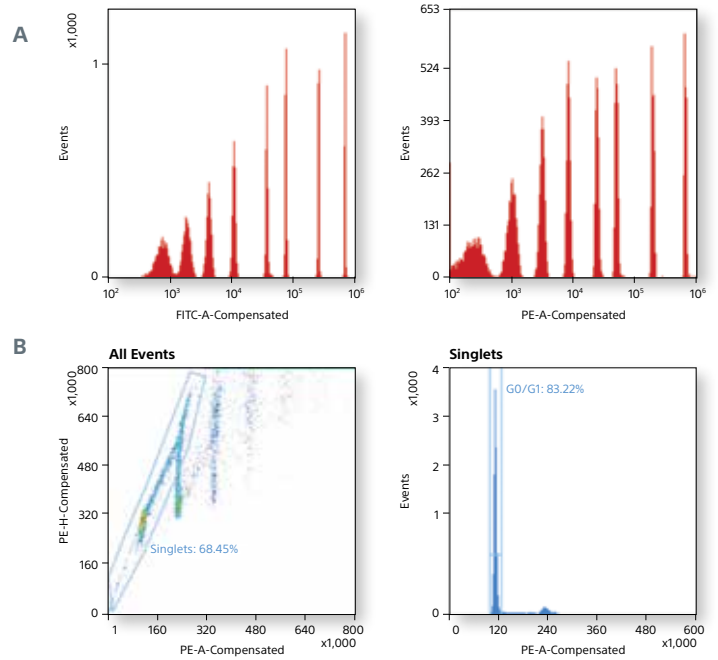
The cabinet measures 1,180 mm (W) x 991 mm (D) x 2,239 mm (H) and incorporates a built-in aerosol management system which operates independently to actively evacuate aerosols from the sort collection chamber of SH800Z. The dual routes of aerosol evacuation ensure maximum personnel protection.





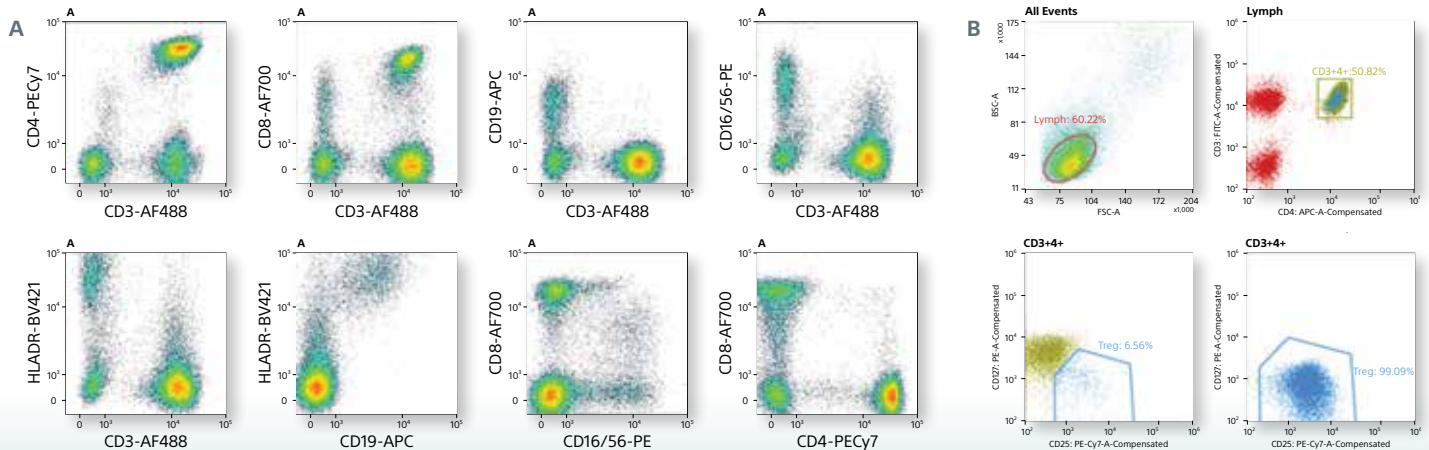
## Resolution and Sensitivity

A. Fluorescence sensitivity MESF values measured using Spherotech 8 peak beads are: FITC 120 and PE 110. B. Fluorescence resolution was measured using propidium iodide (PI) stained chicken erythrocyte nuclei (CEN). Coefficient of variation of <2.5% was observed for the G0/G1 peak.



## Immunophenotyping Assays

Distinct resolution of multicolor samples is seen with a four laser SH800Z system. A. Normal human blood was stained with CD3-AF488, CD4-PECy7, CD8-AF700, CD 19-APC, CD16/56-PE and HLA-DR BV421. All plots were gated on lymphocytes. B. High purity sorting of regulatory T cells (CD3+ CD4+ CD25 high CD127-) population.

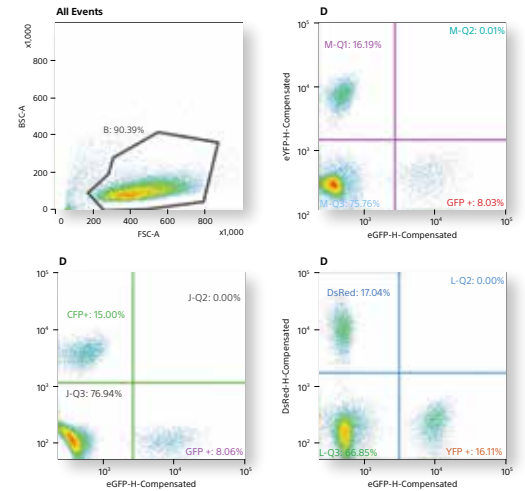


### Gates and Statistics

Name	Events	%Parent	%Total
● All Events	30,000	0.00%	100%
● Lymph	18,067	60.22%	60.22%
● CD3+4+	9,181	50.82%	30.60%
● Lymph	602	6.56%	2.01%

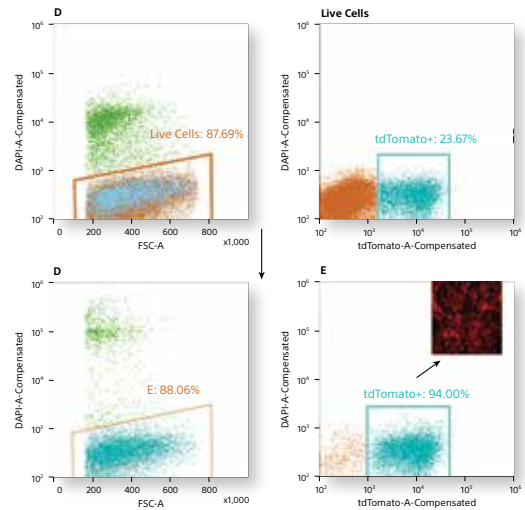
## Fluorescent protein analysis

Human cell lines co-expressing GFP, YFP, dsRed and CFP using the fluorescent protein optical filters is shown. Refer to the filter guides for the fluorescent protein filter sets.



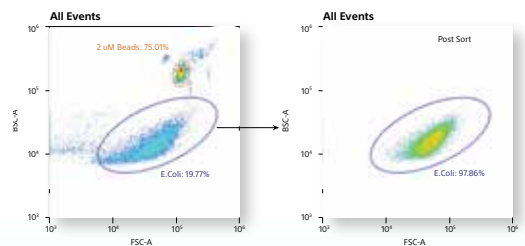
## Sorting and viability analysis

Sorting and viability analysis of differentiating mouse embryonic stem cells expressing Isl1Cre-tdTomato. Analysis of the tdTomato (+) purified population is shown. Inset shows image of cells in culture 24h post sorting.



## Small particle resolution

Sub-micron size particles can be easily observed without requiring any special optical setup. Resolution and post sort analysis of *E. Coli* is shown.





# Filter Guide

## Fluorochrome Guide

Filter Set 1	FL1	FL2	FL3	FL4	FL5	FL6
EGFP	●					
FITC	●					
Alexa Fluor® 488	●					
EYFP	●					
mCitrine	●					
CFSE	●					
PE		●				
PE-Texas Red®			●			
Propidium Iodide			●			
dsRed			●			
tdTomato			●			
mCherry			●			
mPlum				●		
7-AAD				●		
PE-Cy™5				●		
PerCP				●		
PE-Cy5.5					●	
PerCP-Cy5.5					●	
PE-Cy7						●
APC				●		
Cy5				●		
Alexa Fluor 647				●		
APC-Cy5.5					●	
Alexa Fluor 700					●	
APC-Cy7						●
APC-Alexa Fluor 750						●

### Filter Set 1 includes:

LP1 639LP	FL1 525/50	FSC 488/17F 488/17F
LP2 600LP	FL2 585/30	
LP3 561LP	FL3 617/30	BSC 488/17B 488/17B
LP4 752LP	FL4 665/30	
LP5 685LP	FL5 720/60	
	FL6 785/60	

Filter Set 2	FL1	FL2	FL3	FL4	FL5	FL6
Brilliant Violet™421	●					
Alexa Fluor® 405	●					
DAPI	●					
Pacific Blue™	●					
mCFP	●					
Hoechst 33342	●					
EGFP		●				
FITC		●				
Alexa Fluor 488		●				
EYFP		●				
mCitrine		●				
CFSE		●				
PE			●			
PE-Texas Red			●			
PE-Dazzle™			●			
Propidium Iodide			●			
dsRed			●			
tdTomato			●			
mCherry			●			
mPlum				●		
7-AAD				●		
PE-Cy5				●		
PE-Cy5.5					●	
PerCP-Cy5.5					●	
PE-Cy7						●
APC				●		
Alexa Fluor 647				●		
APC-Cy5.5					●	
Alexa Fluor 700					●	
APC-Cy7						●
APC-Alexa Fluor 750						●

### Filter Set 2 includes:

LP1 639LP	FL1 450/50	FSC 488/17F
LP2 561LP	FL2 525/50	
LP3 487.5LP	FL3 600/60	BSC 488/17B
LP4 752LP	FL4 665/30	
LP5 685LP	FL5 720/60	
	FL6 785/60	

## Specifications

Optics	Excitation lasers	488 nm, 405 nm, 638 nm and 561 nm laser
	Output power	30 mW (max.) optical fiber output
	Beam alignment	Collinear optical system
	Detection Parameters	8
	Analog-to-digital converters (ADC)	8-channel 20-bit, 110MHz
	Pulse measurement	Height, Area, Width
Fluidics	Sample tube	Single, auto-loading tube
	Tube types	0.5 ml, 1.5 ml, 5 ml and 15 ml tubes
	Sort Devices	2-way tube, multiwell plates, PCR tubes, slides
	Temperature control	5°C, 37°C (Electric Cooling Method)
	Agitation unit	Eccentric rotation
	Magnetic drive	300 rpm speed
	Sorting chip size	100 µm and 130 µm
Sort Performance	Event rate	100,000 eps
	Sorting Speed	10,000 events/sec
	Scatter resolution	0.5µm
	Fluorescence resolution	< 2.5% Half-peak coefficient of variation (HPCV)
	Fluorescence sensitivity	FITC 120 MESF, PE 110 MESF
	Sorting recovery	> 80% of Poisson's expected yield
	Sorting purity	> 98%
Ancillary	Dimensions	W: 21.7" (55 cm)x D: 21.7" (55 cm)x H: 28.4" (72 cm)
	Fluidics Cart	W: 30" (78.6 cm) x 20.5 in (52.1 cm) x 22.8 in (58.0 cm)
	Weight	216 lb (98 kg)
	Fluidics Cart	71 lb (32 kg) (Dry weight)
	LCD panel	7-inch, 800 x 480 pixels
	Power supply	100 V 50/60 Hz, 120 V 60 Hz
	Power consumption	500 W (max.)
	Operating temperature	17.5 to 27.5°C
	Relative humidity	20 to 80%
Compliance	Operating System	Microsoft® Windows® 8 Professional, 64 bit
	Data File Structure	Flow Cytometry Standard (FCS) 3.0 or 3.1
	Safety Standards Compliance	UL, CE, CSA



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