

TECHNICAL SPECIFICATIONS

VisionSort Platform

VisionSort brings together fundamental advances in optics, microfluidics, and artificial intelligence (AI) to deliver morphological profiling and label-free cell sorting on top of the capabilities you have come to expect from traditional fluorescence-only cytometers.



GHOST CYTOMETRY

Powered by scientifically established Ghost Cytometry technology and three fluorescence lasers, VisionSort enables researchers to perform real-time, AI-driven, single cell sorting with or without labels. Flexible, easy-to-use, and user-controlled AI algorithms embedded directly in the instrument enable unbiased morphometric characterization and isolation of rare and unique cell populations.

OPTICS

Lasers	405 nm - 365 mW nominal output power (Structured Illumination) 488 nm - 150 mW nominal output power 637 nm - 160 mW nominal output power
Scatter detectors	Forward scatter (FSC) Backward scatter (BSC)
Fluorescence detectors	5 channels Blue: 440/40 nm (405 nm excitation) Green: 525/50 nm (488 nm excitation) Yellow: 600/37 nm (488 nm excitation) Red: 680/42 nm (488 nm excitation) Infrared: 785/62 nm (637 nm excitation)
Ghost Motion Image (GMI) signal detectors	Forward scattered GMI signal (fsGMI) Backward scattered GMI signal (bsGMI) Brightfield GMI signal (bfGMI) Diffractive GMI signal (dGMI) Fluorescence GMI signal (405 excitation, 440 emission)
Objective lens	0.63 μm (NA: 0.8)

FLUIDICS

Sample input	5 mL round bottom tube and 15 mL conical tube
Sample collection	15 mL and 50 mL conical tubes
Fluidic reservoirs	10 L autoclavable sheath 10 L autoclavable waste 5 L autoclavable deionized (DI) water
Minimum sample volume	100 μL (when using 5 mL round bottom tube)
Dead volume	<50 μL (when using 5 mL round bottom tube)
Temperature control	Temperature of inlet and outlet is software-adjustable: Cool to room temperature (~10 - 23 $^{\circ}\text{C}$, 50 - 73 $^{\circ}\text{F}$)

PERFORMANCE

Fluorescence sensitivity	FITC: <1000 molecules of equivalent soluble fluorochrome (MESF-FITC)
Fluorescence resolution	< 5% (HPCV)
Purity and yield	With an average sample cell flow rate of 1,000 events per second, a one-way sort achieved purity of >98% and yield >80% of Poisson's expected yield. Higher flow rates up to 3,000 events per second can be achieved without affecting purity; however, yield decreases based on Poisson statistics.
Cell flow rate	Up to 3,000 cells/s (1.1x10 ⁷ cells/h) 1.2 mL/h (Processing Rate)
Detection rate	Up to 3,000 events per second
Viability	>99% for lymphocytes
Analysis method	Height / Width / Area / Classification
Maximum operating pressure (Pressure applied to cells)	Up to 150 kPa (21 psi)

SORTING CHIP

Material	PDMS (Dimethylpolysiloxane), Glass
Size	136 x 88 x 7.5 mm (5.4 x 3.5 x 0.3 in)
Channel dimension	32.5 x 50 μm
Target particle size	7-30 μm
Maximum loading cell number	1 x 10 ⁷ cells/mL
Sorting mode	One-way (Positive / Other), Two-way viable cell collection

SYSTEM & SOFTWARE

Workstation CPU	Intel Core i9-10900TE
Operating system	Windows®10 IoT Enterprise LTSC
Signal processing	14-bit analog-to-digital conversion and signal processing
USB ports	2 x USB 3.0
Ethernet	1 Port
Monitors	2 x 27" LCDs, 1,920 x 1,080-pixel resolution
Memory	64 GB (DDR4)
Storage	240 GB SATA SSD; 8 TB SATA SSD
Software	VisionSort Control Software
Data types	*.gcs (proprietary file type) Scatter Height, Width, and Area and conventional fluorescence can be exported to Flow Cytometry Standard (FCS) 3.1 file format (*.fcs)

INSTALLATION DETAILS

Dimensions (W x D X H)	154 x 76 x 151 cm (60.6 x 29.9 x 59.5 in) System Cabinet 92 x 76 x 151 cm (1.05 m ³); (36.2 x 29.9 x 59.5 in) Control Cabinet 61 x 75 x 98 cm (0.45 m ³) (24.0 x 29.5 x 38.6 in)
Weight	431 kg (950 lbs.) System Cabinet 328 kg (723 lbs.) Control Cabinet 103 kg (227 lbs.)
Power requirements	100-240 VAC, 50/60 Hz / 1,500 W
Pressure supply requirements	Higher than 700 kPa (100 psi)
Operating temperature	17-23 °C
Operating humidity	5-80% relative humidity, non-condensing



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