

Confocal Scanner Box

All-in-one live cell imaging solution

Cell Voyager

CV1000



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All-in-one confocal scanner system: The ideal tool for long-term live cell imaging

The CellVoyager™ CV1000 Confocal Scanner Box is a fully integrated desktop imaging system that includes a confocal scanner unit (CSU), laser light sources, an EMCCD camera, and precision environmental controls. With its microlens enhanced dual Nipkow disc scanning technology, phototoxicity and photobleaching are drastically reduced, making it ideal for use in observing highly delicate life processes such as iPS/ES cell generation and embryogenesis. The system is easy to use and eliminates the need for a dark room.

Major advantages

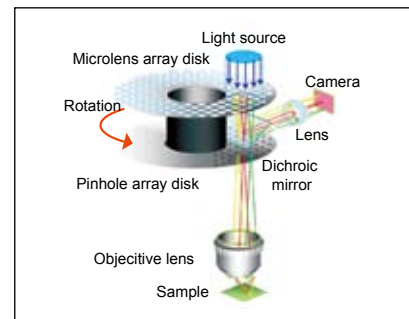


- Reduced photo damage** -----CSU (Dual Nipkow disk scanning)
- Brighter images** -----Ultra-high sensitivity EMCCD camera^(*)
- Reliable environmental control** ---Incubator with high-precision temperature/CO₂ control^(*)
- Precise reproducibility** -----High-precision auto X-Y stage
- User friendly** -----Easy-to-use integrated software

《What makes the CV1000 ideal for long-term live cell imaging?》

Microlens enhanced dual Nipkow disc scanning

A Nipkow spinning disk containing about 20,000 pinholes and a second spinning disk containing the same number of microlens to focus excitation laser light into each corresponding pinhole are mechanically fixed with a motor, and very rapidly raster scan the field of view with about 1,000 laser beams when rotated. Multi-beam scanning with the CSU not only increases scanning speed, but also results in significantly lower photo bleaching and photo toxicity, because multiple excitation needs only a low level of laser power at the specimen to fully excite fluorescence. More than 1,500 units of the CSU series are used as the de facto standard tool for live cell imaging, worldwide.



《Compact all-in-one unit》

System configuration

High-precision X-Y stage

Minimizes pixel shift in multipoint time-lapse imaging

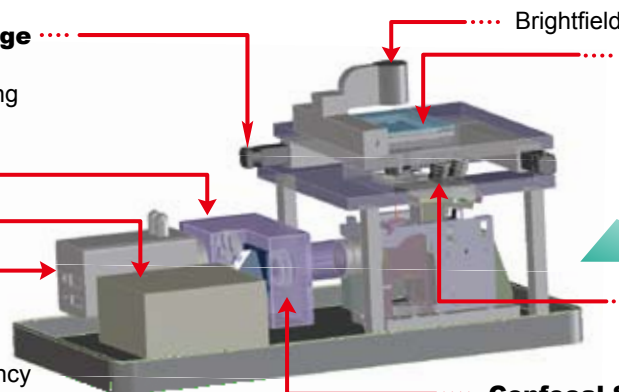
Filter Wheel

Laser Unit

EMCCD camera ^(*)

Its ultra-high quantum efficiency makes it possible to capture images at very low laser power levels, significantly reducing photodamage.

3-color/2-color/Single-color model



Brightfield

Stage incubator ^(*)

Stable environmental control keeps specimens healthy for long periods.

Front

Motorized Z-Axis Control

Confocal Scanner Unit

Significantly low photo bleaching and photo toxicity exhibited in long-time live cell imaging

《User friendly, with functions that prevent photodamage》

Control software

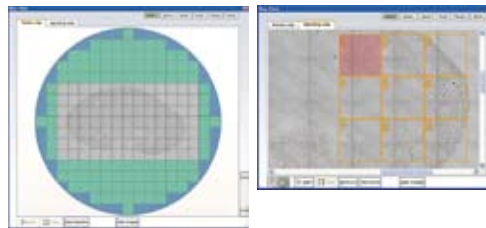
■Map view: Sample search function

X-Y map view images covering a wide image area are automatically generated for easy comprehension of sample distributions. The map view function lets you view specific image areas with the same ease of use as a Web based map search function.

■Optimal condition setting assistance

The software helps you choose the optimal laser power, camera gain, and exposure time to enable clear images with a high S/N ratio and minimal photo bleaching.

This includes a shutter management function that minimizes the amount of time that a specimen is illuminated by a laser.



《User-friendly》

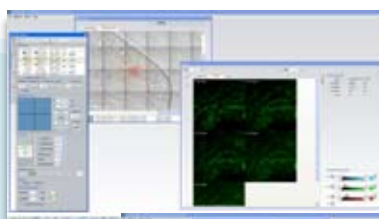
Observation procedure



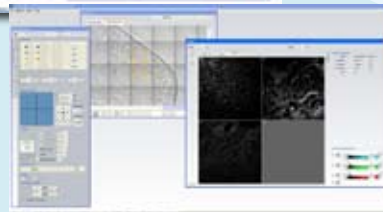
Set sample



Sample setting completed (*2)



Set observation conditions



Start observation / monitor image of the observation stage

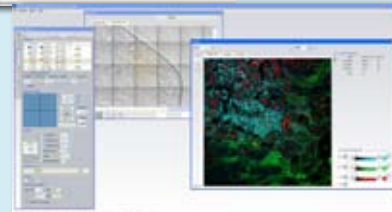
High-precision stable incubator (*1)

■ You can fully rely on CellVoyger to maintain a stable temperature and humidity level.

User-friendly GUI

■ Simple and intuitive operation.

Observation completed

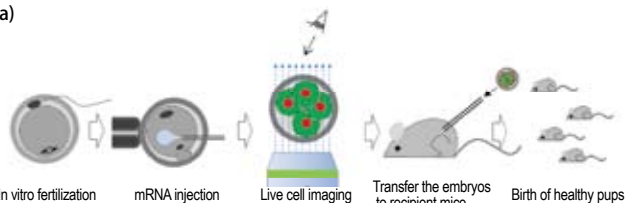


Application example

Long-term, multi-dimensional imaging of early stage mouse embryos

Following the injection of mouse embryos with mRNA, nearly 25,000 multicolor and multilayer confocal images of the embryos were acquired over a 60 hour period as they developed to the blastocyst stage. Thereafter, they were transferred to a recipient mouse that gave birth to healthy pups, each of which developed normally and had full reproductive capability. This is firm evidence that long-term, multi-dimensional confocal imaging with the CV1000 causes no harm to a delicate specimen such as an early stage embryo.

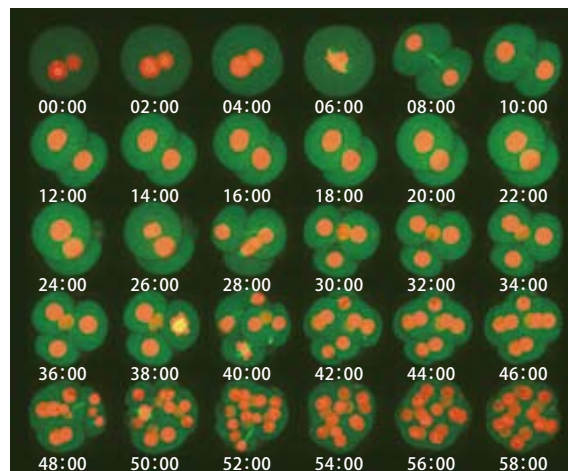
(a)



(b)

Total time	60 hours (2.5 days)
Imaging interval	15 min/stack
Z-sections/stack	51 sections(2 micrometers apart)
Imaging positions	6 positions (72 embryos)
Excitation (nm)	488nm/561nm

(c)



(a) Experiment stages

(b) Imaging conditions

(c) Images extracted at 2-hour intervals from 60 hours of data

Each image is the maximum intensity projection of a total of 51 z-section images

Green: Spindle (E-GFP-alpha-tubulin) Red: Nucleus (H2B-mRFP1)

Specification

Model		CV1000				
Main unit	Type	3-color model	2-color model	Single-color model	Basic model	
	Confocal scanning method	Microlens enhanced dual Nipkow disk scanning				
	Scanning speed	1,500 - 5,000 rpm (Max. 1,000 fps(*1))				
	Excitation laser wavelength	405, 488, 561 nm	405, 488, 561 nm	488 nm	488 nm	
	Bright field imaging	LED transmission			Option	
	Camera	Type	Back-illuminated EMCCD			Cooled CCD
		Effective no. of pixels	512 X 512			1344 X 1024
	XY-stage	High-precision auto X-Y stage	Designated resolution: 0.1 μm			
	Z-axis control	Motorized Z-axis control	Designated resolution: 0.1 μm			
	Objective lens	【Standard】 Dry: 10X 【Option】 Up to 5 lenses can be added Dry: 10X, 20X, 40X Oil: 20X, 40X, 60X Water: 60X				
	Stage incubator(*1)	High-precision temperature controllable incubator 【Temperature】 Range : 30 – 42°C (Room temperature +5°C or higher) Designated resolution : 0.1°C 【Humidity control】 Forced humidification with a water bath unit 【CO₂】 Concentration : 5% Gas cylinder : CO ₂ (CO ₂ gas cylinder not included with CV1000 system)			Optional	
	External dimension	W538 X D817 X H530 mm				
Weight	85 kg					
Utility box	External dimension	W319 X D368 X H518 mm		W319 X D368 X H346 mm		
	Weight	16 kg		10 kg		
Control software	Sets conditions for imaging, camera, time lapse, environments (*2), 3D imaging, map view acquisition, multi-color imaging (*3), and multi-point imaging. Functions include shading correction, image display, 3D display, image processing and movie generation.					
Peripherals	Controller work station, display					
Operating temperature	15-35 °C					
Operating humidity level	20–70% RH (no condensation)					
Power consumption	100–240 VAC/50 or 60Hz, 1500 VA max.					

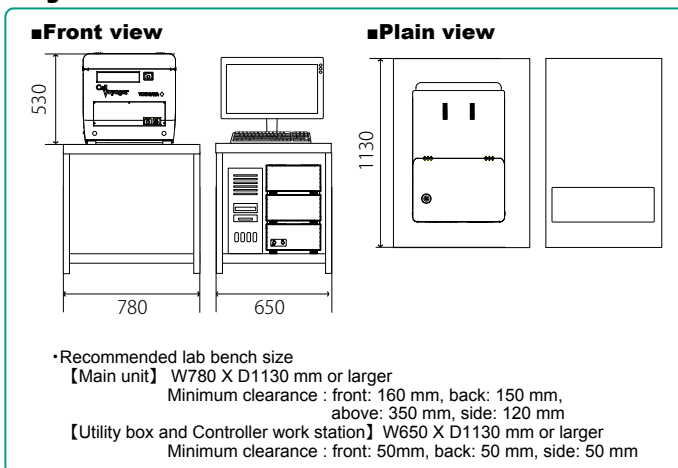
(*1) fsp : frame per second

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Frame rate : Actual frame rate depends on the specification of the camera

(*2) Not available with basic model (*3) Only available with 3-color model and 2-color model

Layout



Safety Precautions



- * Read the user's manual carefully in order to use the instrument correctly and safely.
- * This product falls under the category of class 1 laser products.

Represented by :

YOKOGAWA

YOKOGAWA ELECTRIC CORPORATION
Sensing technologies Headquarters, Bio & Analytical Center

Kanazawa 2-3 Hokuyodai, Kanazawa-shi, Ishikawa, 920-0177 Japan
 Phone: (81)-76-258-7028, Fax: (81)-76-258-7029

Tokyo 2-9-32 Nakacho, Musashino-shi, Tokyo, 180-8750 Japan
 Phone: (81)-422-52-5550, Fax: (81)-422-52-3646

E-mail CSU_Livecell_imaging@cs.jp.yokogawa.co.jp
 URL: <http://www.yokogawa.com/scanner>