NanoZoomer 2.0® series

High-speed, high-resolution digital slide scanner with network features

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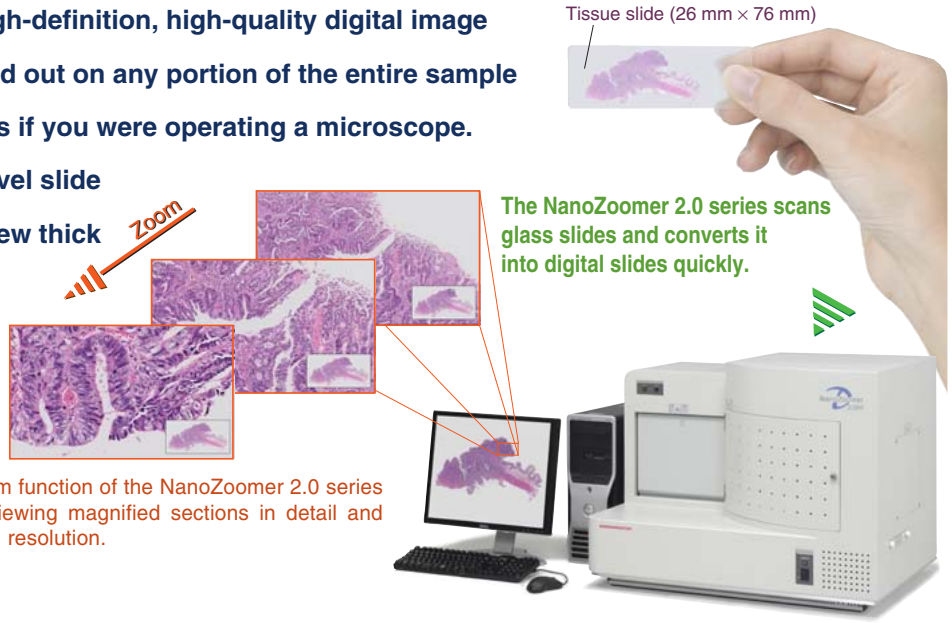
NanoZoomer 2.0HT NanoZoomer 2.0RS

NanoZoomer 2.0 series proposes new methods in drug development and medical research.

The NanoZoomer 2.0 series is a system that converts glass slides into digital slides by scanning them quickly at high resolutions.

Digital slides can be stored as high-definition, high-quality digital image data in which you can zoom in and out on any portion of the entire sample with a simple mouse operation, as if you were operating a microscope.

In addition, the "Z-stack" multi-level slide scanning feature allows you to view thick samples by changing the focus.



The zoom function of the NanoZoomer 2.0 series allows viewing magnified sections in detail and with high resolution.

Digital slides have many advantages!

Digitizing slides opens up a variety of new possibilities.

Copying and Sharing

Digitized slides can be copied and shared. This feature of digital slides can be used in a variety of applications. For example, a large group of people can observe and discuss a single sample.

Slide Storage

Digital data does not deteriorate, and it is more secure from damages and losses than glass slides. You can view digital data in its original quality anytime and anywhere.

Networks

Using the Internet or a local area network, you can observe and evaluate slides from a distant location.

Databases

Large numbers of digital slides can be stored into a database and incorporated into a laboratory information system. You can share data and construct slide libraries with distant facilities and research institutes.

* The NanoZoomer 2.0 series as medical devices may be subject to government regulations where they are used. Hamamatsu makes no representation with regard to the conformity of these products to these regulations. Please consult your local Hamamatsu representative for more information.

High-speed, high-resolution digital slide scanner with network features

Feature 2.0HT

Process up to 210 slides automatically

The NanoZoomer 2.0-HT processes up to max. 210 slides automatically using its dedicated slide cassettes. You can save time by processing large amounts of samples overnight. The NanoZoomer 2.0-HT can also automatically read a slide's barcode information and use it to name the slide file.

Feature 2.0RS

Automatically process up to 6 slides of regular size or 2 slides of double size

The NanoZoomer 2.0-RS is compact and affordable. It maintains the performance of the NanoZoomer 2.0-HT except for the number of slides processed automatically. It processes up to 6 slides of regular size (76 mm × 26 mm) or 2 slides of double size (76 mm × 52 mm) automatically. (The processing of double size slides is an optional feature.)

Functions 2.0HT 2.0RS

High-speed scanning at approximately 1 min. 40 s. for 1.9 billion-pixel slide image*

The NanoZoomer 2.0 series achieves both high speed and high sensitivity by using TDI line scanning instead of traditional CCD tiling. A single slide can be scanned at a resolution of approx. 1.9 billion pixels in approx. 1 minute 40 seconds.

* 1.9 billion pixels is based on the sample size of a 20 mm × 20 mm at 20× mode scan. Additional 1 minute is necessary for setting up a slide.

Improved 40× mode scanning speed, ideal for routine scans

The NanoZoomer 2.0 series reduces scanning time in 40× scan mode to 4.5 minutes only.

Ability to observe fluorescent samples provides a new approach to fluorescence imaging

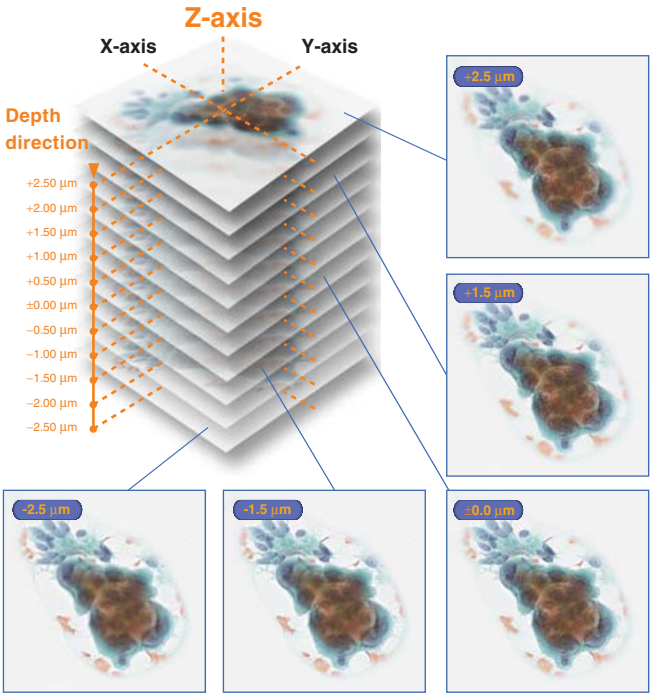
By using the Fluorescence Illumination Optics L10387 with the NanoZoomer 2.0 series, you can observe and analyze fluorescent samples without worrying about photobleaching. It will open up new applications which could not be done with a traditional microscope.

Optional image distribution software

The NanoZoomer 2.0 series has optional image distribution software that is intended to facilitate the broader use of digital slides. You can use the free slide viewing software to view the images on a server at any time anywhere.

Z-stack feature for thick samples

There are samples which have 3D structures such as clumps of cells and thick tissues. They require focus adjustment during observation. To handle these kinds of slides, the NanoZoomer 2.0 series is equipped with the Z-stack feature that allows you to focus on different depths in the sample.
The NDP.view viewer software lets you adjust the focus on a Z-stack slide much like you would adjust the focus of a microscope. You can also point to an area of interest and let NDP.view apply autofocus for maximum clarity.



NanoZoomer 2.0HT NanoZoomer 2.0RS

TDI (Time Delay Integration) technology enables the quick production of high-resolution digital slides.

The NanoZoomer series scanning unit uses "line scanning method" and "TDI method." It can convert a large number of glass slides into digital slides automatically in a short time.

Features

Variety of superior scan features from the expertise of Hamamatsu sensor technology.

TDI combines both high speed and high sensitivity

The NanoZoomer 2.0 series uses time delay integration (TDI) to provide high speed and high sensitivity simultaneously. Hamamatsu technology allows synchronizing TDI sensor signal with the movement of a microscopic sample object being scanned.

High-speed scanning at approximately 1 min 40 s. for 1.9 billion pixel slide image*

A 1.9 billion pixels digital slide is created at 20× mode in approx. 1 minute 40 seconds. It also creates a 7.6 billion pixel digital slide at 40× mode in approx. 4.5 minutes.

* 1.9 billion pixels is based on the sample size of a 20 mm × 20 mm at 20× mode scan. Additional 1 minute is necessary for setting up a slide.

Dedicated system design makes the NanoZoomer 2.0 series user friendly and highly reliable.

The NanoZoomer 2.0 series is a specialized machine designed for routine use. It is user friendly and highly reliable. It employs a variety of sensors monitoring mechanical operations to ensure the safety of your slides.

3-chip TDI camera provides superior color reproduction

The NanoZoomer 2.0 series uses a 3-chip TDI camera to accurately reproduce sample colors. It enables observing minute variations in the colors of the sample. The 3-chip TDI camera has red, green and blue channels, and they are used to produce a single RGB image.

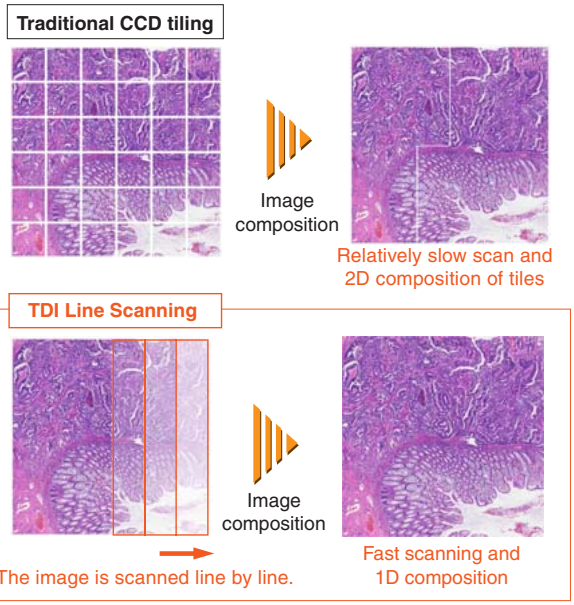
Automatic processing of a large number of slides

The NanoZoomer 2.0-HT processes up to max. 210 slides automatically using its dedicated slide cassettes. Just load the slides and press the start button to automatically load and scan each sample. The NanoZoomer 2.0-RS is compact and affordable. It maintains the performance of the NanoZoomer 2.0-HT except for the number of slides processed automatically.

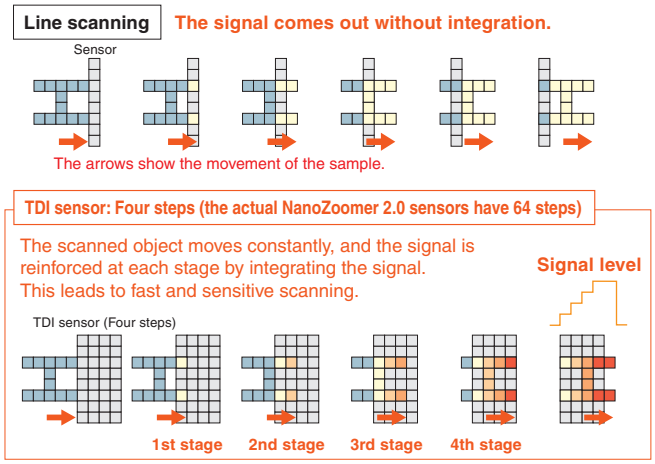
The key to improved scanning

The NanoZoomer 2.0 series achieves both high speed and high sensitivity by using a unique 3-chip TDI line scanning method instead of traditional CCD tiling.

Line scanning makes scanning faster



Unique TDI sensors realizes both high sensitivity and high speed simultaneously



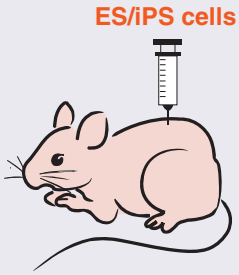
Quickly converts transparencies into high-resolution digital slides!

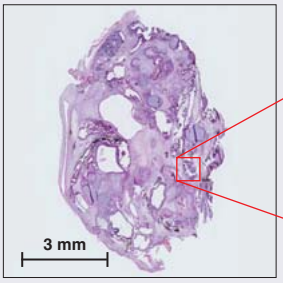
Examples

A powerful tool for a wide range of applications in drug development and medical research

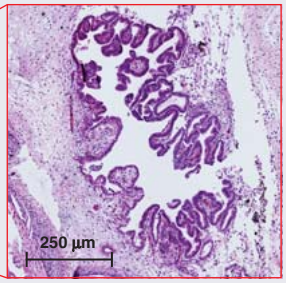
Application for ES and iPS cells research

It is used to test differentiation activity of ES/iPS cells by injecting into an immunodeficient mouse. From any part of a larger overall picture, several differentiated tissues are observed.





▲ Teratoma formation by using mouse iPS cells (HE-stain).
(Entire image)

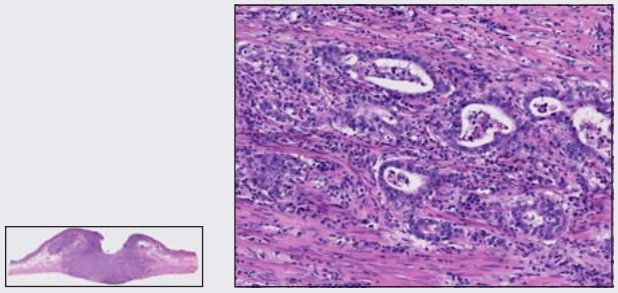


▲ Epithelial-like tissues are observed.
(Selected area, magnified)

Courtesy of Center for iPS Research and Application, Kyoto University

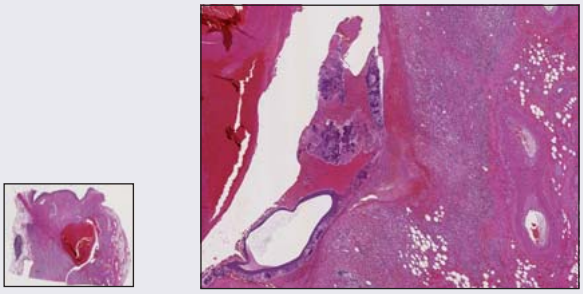
Observing H&E stained samples

H&E staining is the popular staining method for tissue samples.



▲Stomach cancer H&E stain

Courtesy of Hiroshi Ogawa MD, Department of Pathology, Seirei Mikatahara Hospital.

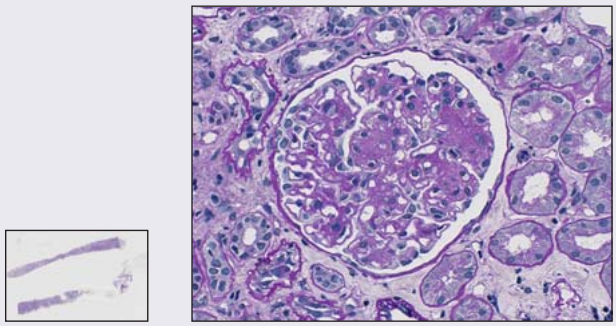


▲Pancreatic AVM with anisakiasis, resulting in pancreatic bleeding

Courtesy of KobeCity Medical Center General Hospital, Department of Pathology, Yukihiro Imai, MD Ph.D.

Conferences using digital slides

With digital slides, you can share the same sample among many people without worrying about sample deterioration.

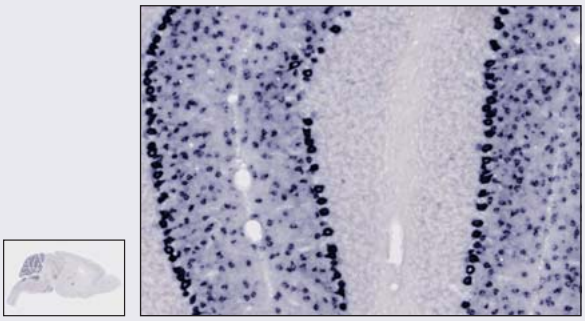


▲PAS stained kidney biopsy sample

Courtesy of Department of Pathology, The University of Tokyo Hospital,
Hiroshi Uozaki, M.D., Ph.D.

Expressed parvalbumin mRNA (In situ hybridization method)

Evaluation of tumor and virus infection by gene expression in a cell or a tissue.



▲NBT and BCIP developed color of mouse brain tissue slice

Courtesy of Ms. Chihiro Saruta, Teiichi Furuichi PhD,
Laboratory for Molecular Neurogenesis, Riken Brain Science Institute.

NanoZoomer 2.0HT NanoZoomer 2.0RS

Options

Optional fluorescence sample scanning feature with

Fluorescence Imaging Module

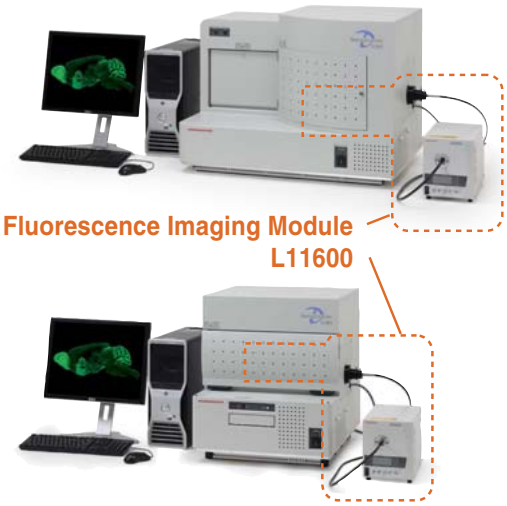
Digitization of fluorescence samples enables long-term observation without worrying about photobleaching.

The Fluorescence Imaging Module combined with the NanoZoomer 2.0 series digitizes entire fluorescence-stained slides with high speed and high resolution. The digitized slides are saved as digital data, and this enables long-term microscopic observation without photobleaching.

The L10387-03 scans fluorescence slides with single, double and triple stains by manually replacing the filter cube. The L11600-21 and -22, which feature excitation and fluorescence filter wheels with 6 filters each, scan fluorescence slides sequentially by automatically switching filters.

The L11600 provides a new approach to fluorescence imaging!

The Fluorescence Imaging Module enables scanning various fluorescence slides.



Scan multiple fluorescence probes

The L11600 with NanoZoomer 2.0 series scans and digitizes slides stained with multiple fluorescence probes such as Q-dots, fluorochromes, fluorescence proteins, and others. The filter wheel unit enables continuous, automatic scanning with 6 switchable filters for fluorescence and excitation wavelengths. Multiple images are acquired sequentially.

Superimpose images of entire tissues (samples)

The viewer software can superimpose a bright field image and a fluorescence image, or two or more fluorescence images. It allows observation of protein localization and expression in the entire image at any magnification.

High-power and long-life light source without alignment

Newly designed fluorescence excitation light source LX2000 realizes high power and long life. It does not require optional alignment even when a lamp is replaced.

Features dark field illumination for sample identification

Fluorescent sample locations are difficult to determine using bright field illumination. So the NanoZoomer 2.0 series uses dark field illumination* to determine sample locations. This makes locating and scanning samples easier.

* Under patent filing.

Features highly efficient optics created for use with a TDI sensor

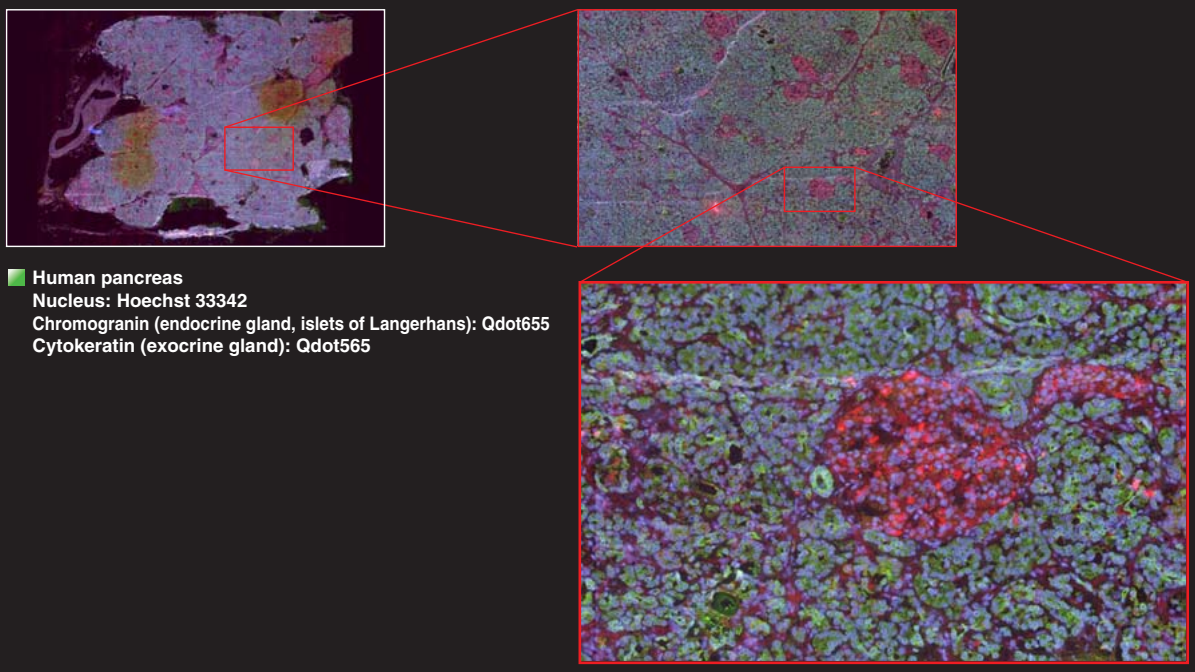
The Fluorescence Imaging Module allows the NanoZoomer 2.0 series to scan even weak fluorescent samples quickly. It also prevents unnecessary photobleaching by minimizing the area of excitation.

Quickly converts fluorescent samples into high-resolution digital slides!

Examples

A powerful tool for a wide range of applications in drug development and medical research

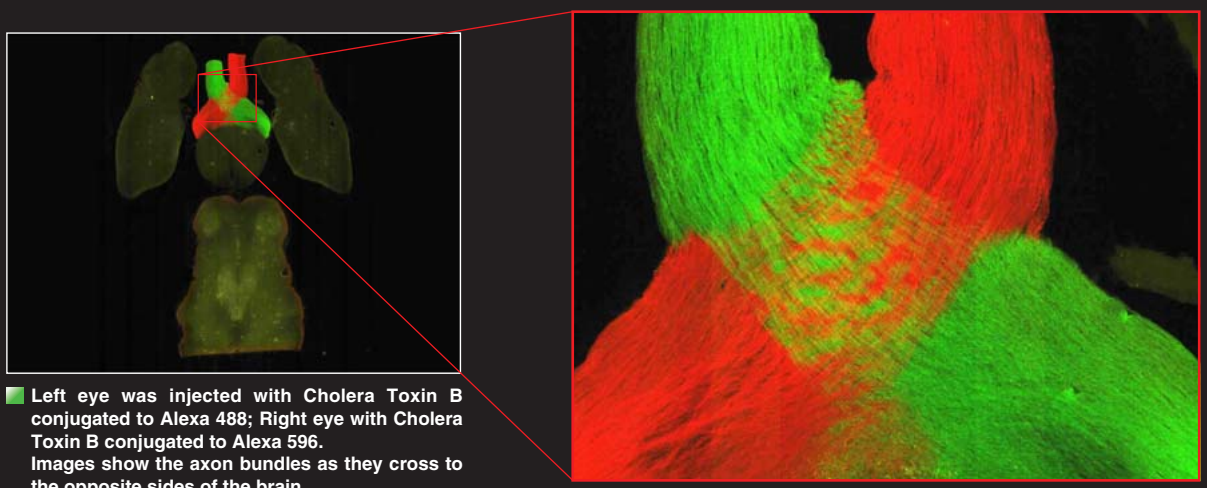
Rapid and High-Fidelity Imaging of Fluorescence-Labeled Q-dots



- **Human pancreas**
  Nucleus: Hoechst 33342
  Chromogranin (endocrine gland, islets of Langerhans): Qdot655
  Cytokeratin (exocrine gland): Qdot565

Courtesy of the Department of Pathology, Keio University School of Medicine

Horizontal Section of the Nile Rat Brain Showing the Crossing of Retinal Axons in the Optic Chiasm



- **Left eye was injected with Cholera Toxin B conjugated to Alexa 488; Right eye with Cholera Toxin B conjugated to Alexa 596.**
  Images show the axon bundles as they cross to the opposite sides of the brain.

Courtesy of the Harvey Karten, University of California-San Diego, USA; Yves Sauve, University of Alberta, Canada; Frederic Gaillard, Universite de Poitiers, Poitiers, France

Specifications

NanoZoomer 2.0 series scanner

		NanoZoomer 2.0-HT (C9600-13)	NanoZoomer 2.0-RS (C10730-13)
Compatible glass slide		76 mm × 26 mm, thickness 0.9 mm to 1.2 mm	76 mm × 26 mm / 76 mm × 52 mm*, thickness 0.9 mm to 1.2 mm
Slide loader		Automatic, max. 210 slides	Standard size: 6 slides, Double size: 2 slides
Scanning range		25 mm × 52 mm	25 mm × 52 mm / 50 mm × 52 mm
Objective lens		20× N.A. 0.75	
Scanning resolution		0.46 μm/pixel (20× standard mode) and 0.23 μm/pixel (40× high resolution mode)	
Scanning method		TDI (Time Delay Integration)	
Barcode reader		One-dimensional, standard (Option: two-dimensional)	
Scanning speeds	20× mode	Approx. 1 min. (area: 15 mm × 15 mm)	
		Approx. 1 min 40 s. (area: 20 mm × 20 mm)	
	40× mode	Approx. 2.5 min. (area: 15 mm × 15 mm)	
		Approx. 4.5 min. (area: 20 mm × 20 mm)	
Image compression		JPEG compression	
Slide format		JPEG compressed image + slide information	
Power supply voltage		AC 100 V to AC 240 V	
Power consumption		400 V • A	

* When using A10743-02 (optional slide tray for scanning double-size glass slides)

Fluorescence Imaging Module L11600/L10387

● L11600-21* for NanoZoomer 2.0-HT

Light source**	LX2000 200 W Ultrahigh-pressure mercury lamp
Number of filter cube position	1
Filter wheel	6Ex/6Em switching

● L11600-22* for NanoZoomer 2.0-RS

Light source**	LX2000 200 W Ultrahigh-pressure mercury lamp
Number of filter cube position	2 (Possible to switch cubes automatically)
Filter wheel	6Ex/6Em switching

● L10387-03 for NanoZoomer 2.0-HT and -RS

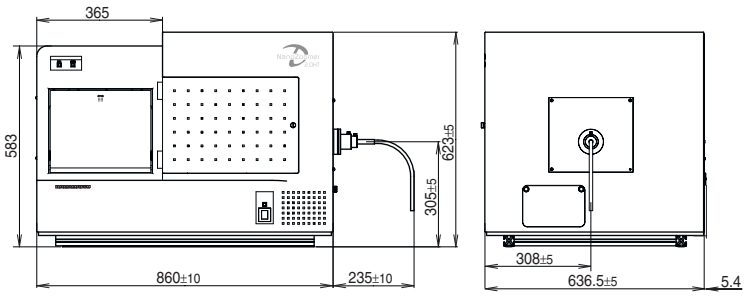
Light source**	LX2000 200 W Ultrahigh-pressure mercury lamp
Filter cube	3 filter cubes: B excitation, G excitation, Triple bands (UV, B, G)
Number of filter cube position	1
Filter wheel	-

*Filter cubes and filters are not included. For more information, please consult your local sales representative.
**Size: 180 mm(W) x 299 mm(D) x 227 mm(H), Approx.6.8 kg, Power consumption: 400 V • A

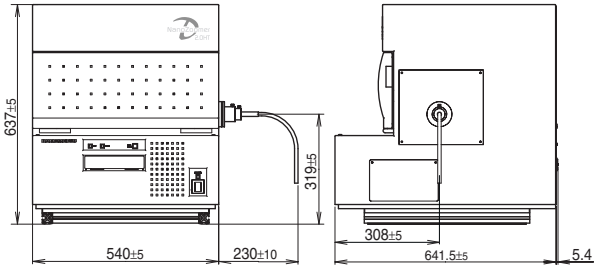
Dimensional outlines

(Unit: mm)

■ NanoZoomer 2.0-HT Scanner C9600-13 (with L11600)



■ NanoZoomer 2.0-RS Scanner C10730-13 (with L11600)



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Cat. No. SBIS0043E03
DEC/2010 HPK
Created in Japan