ECLIPSE Ti2

Inverted Research Microscope

Shedding New Light On **MICROSCOPY**

See More Than Before

Imaging platform that supports the forefront of live cell research

Inverted microscopes that support cutting-edge life science research require compatibility with multiple imaging modalities to meet the demands of a variety of applications. In recent years, there is an increasing need to observe thick tissues, organoids, etc. “in a wider, deeper, and more detailed manner,” increasing the importance of confocal and super-resolution imaging.
The Nikon’s Ti2 Series inverted microscopes meet the needs of fundamental to advanced research, with the following four features.

Expandability

Customizable body design supports confocal and super-resolution applications

Flexibility

Reliable performance that enables streamlining of tiling and time-lapse imaging

Sample friendly

Advanced optical technology for clear observation of label-free and weak fluorescence samples

Efficiency

High-performance imaging software and body design that are effective in streamlining workflow

Contents

Motorized model

Ti2-E

- Expandable to confocal, super resolution, spinning-disc confocal uses
- Ultra wide field of view
- Multidimensional imaging
- Tiled imaging
- Time-lapse imaging
- Works with third-party peripherals

Assisted manual model

Ti2-A

- Ultra wide field of view
- Multicolor imaging
- Automatically identifies imaging conditions
- Proper microscope operation guidance
- Ideal as an entry-level model

Expandability

System expandability to meet users' imaging needs

An inverted microscope that supports the ever-evolving field of biological research requires expandability to multiple imaging modalities in order to accommodate a wide range of applications. The Ti2 Series provides diverse components and accessories for customization to enable the creation of a variety of observation systems such as confocal, super resolution, and high-content imaging.

Super resolution 3D confocal imaging Ti2-E

AX/AX R with NSPARC

Combining the Ti2-E together with the AX/AX R with NSPARC confocal based super resolution microscope enables high-definition confocal imaging, utilizing the Ti2-E's high-speed motorized stage, high-precision Z-axis control, and high NA objectives. AX R with NSPARC realizes a high resolution of 8K, a large field of view of FN 25, high-speed acquisition of 720 fps (2K), and super-resolution observation with a resolution of 100 nm using the NSPARC detector. Super-resolution confocal images can be obtained even for 3D observation of thick samples.

Module illumination system

Ti2-LAPP

Ti2-LAPP provides modular illumination capabilities, including TIRF, photo-stimulation, epi-fluorescence, and super-resolution imaging. Up to 5 modules can be mounted on the microscope, utilizing the stratum structure of the Ti2. You can build your own customized bioimaging system with only the functions you need, according to your research purposes.

Combination of two motorized TIRF modules and the EPI-FL module

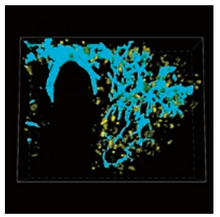
Combination of the H-TIRF module, DMD module, and EPI-FL module

High-speed real-time spinning-disc confocal imaging Ti2-E

Mounting spinning-disc confocal scanner units from various manufacturers on the Ti2-E, which has excellent stability and expandability, enables users to build a system that can handle a wide range of applications. Spinning-disc confocal scanning features high-speed real-time imaging and enables live cell imaging with reduced photobleaching and phototoxicity.

Expansion to two-tier configuration by raising the stage

The Ti2 employs a stratum structure, allowing multiple illumination devices to be installed simultaneously on two levels, top and bottom. When installing the Ti2-LAPP modules on two levels, optimal filters can be attached to each module, greatly improving the accuracy and speed of experiments. Furthermore, the extra level can also be used as a space for users to install their own optical system into the microscope.



3D Super-Resolution Imaging of Glial Cells in Cleared Mouse Brain Tissue using NSPARC

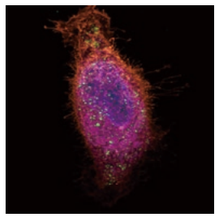
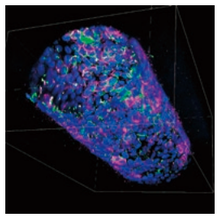
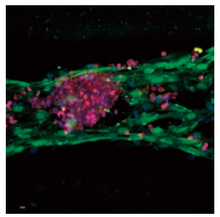


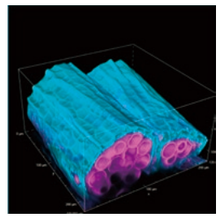
Image-based analysis of intracellular delivery of DNA/RNA therapeutics using NSPARC



3D Confocal Imaging of Thick Samples Using Z Intensity Correction



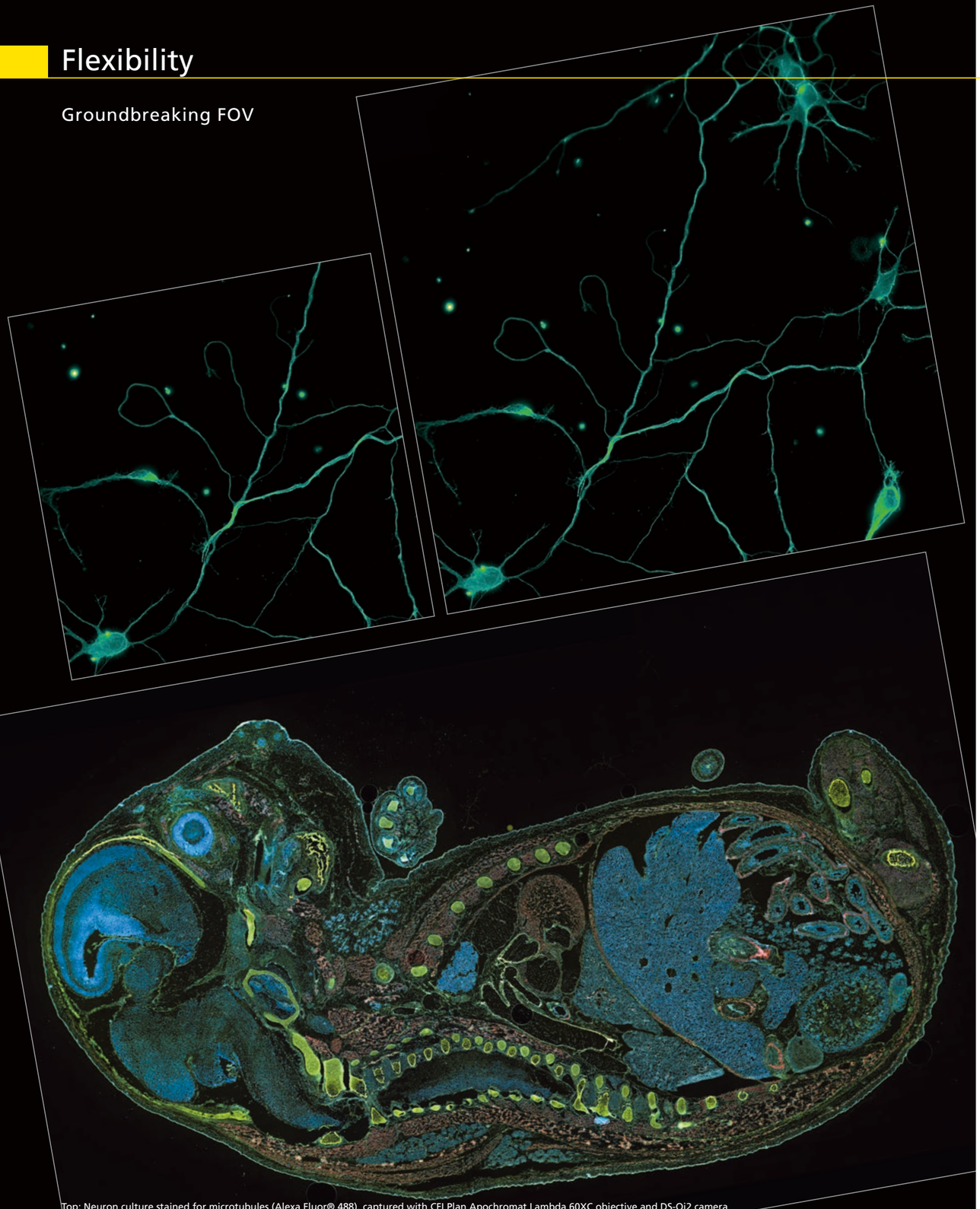
Confocal imaging of immune cells in a vasculature network using the HUMIMIC Chip



High-resolution macro-to-micro 3D observation of cleared rice anthers: sample preparation in view of the refractive index of immersion media

Flexibility

Groundbreaking FOV



Top: Neuron culture stained for microtubules (Alexa Fluor® 488), captured with CFI Plan Apochromat Lambda 60XC objective and DS-Qi2 camera (Comparing conventional FOV and new Ti2 FOV).
Photo courtesy of Josh Rappoport, Nikon Imaging Center, Northwestern Univ.; Sample courtesy of S. Kemal, B. Wang, and R. Vassar, Northwestern Univ.
Bottom: Stitched large image (with no shading correction) of a 19-day-old rat embryo (Alexa Fluor® 488-WGA, Alexa Fluor® 568-Phalloidin, DAPI), captured with CFI Plan Apochromat VC 20X objective

The Ti2, which has a large field of view of FN 25, can obtain data from a wider area in a single image when used in combination with a digital camera that uses a full-size sensor, or a confocal system with a large scan lens. The Ti2 meets the need for efficient, high throughput data acquisition by utilizing optical technology such as a wide range of lenses and illumination systems for large field of view imaging.

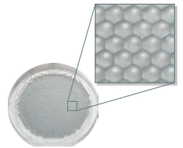
Bright, uniform, wide-area diascopic illumination

High-power LEDs deliver bright illumination across the Ti2's large field of view, ensuring clear, consistent results from demanding applications such as high-magnification DIC. Incorporation of a fly-eye lens design provides uniform illumination from edge to edge for quantitative high-speed imaging and seamless tiling of images in stitching applications.

Detecting even more fluorescent signals with wide-area episcopic illumination

A compact epi-fluorescence module designed for large FOV imaging provides high transmittance across a broad spectrum, including UV. Large diameter fluorescence filters with hard coatings deliver large FOV images with a high signal-to-noise ratio.

High-power LED illuminator

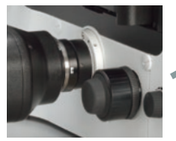


Built-in fly-eye lens

Epi-fluorescence module

Large diameter fluorescence filter cubes

Enlarged tube lens



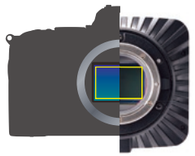
Imaging port with large 25 field number

Large diameter observation optics

The diameter of the observation light path has been enlarged in order to achieve a field number of 25 at the imaging port. The resulting large FOV is capable of capturing approximately double the area of conventional optics, maximizing the performance of cameras equipped with large-format sensors.

Objectives for large FOV imaging

Objectives with superior image flatness ensure high quality images from edge to edge. Utilizing the maximum potential of the OFN25 objective significantly accelerates data collection.



D-SLR camera technology optimized for microscopy

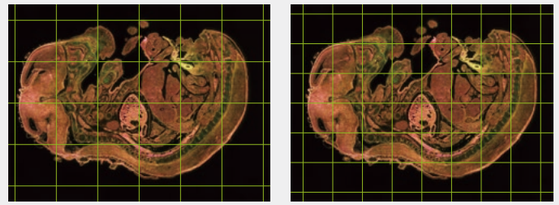
Cameras for large-volume data acquisition

Nikon's Digital Sight 10 and Digital Sight 50M FX-format F-mount cameras are equipped with CMOS image sensors optimized for research use, originally developed for professional D-SLR cameras. They are equipped with a large image sensor of 35.8 x 23.8 mm that allows you to capture to the fullest the wide field of view.

NIS-Elements imaging software provides a wide range of functionality for tiling and multipoint imaging.

NIS-Elements

Obtaining a large field of view in a single image



Wide-area imaging enables the creation of tiled images using fewer images than with previous models.

Flexibility

Solutions for realizing 3D/4D imaging

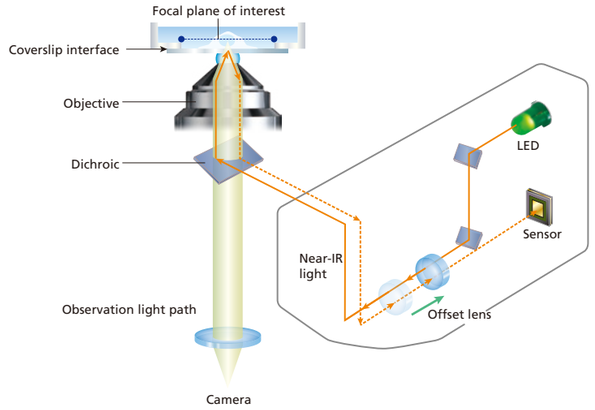
Stitched large image of an entire 96-well plate using PFS and a CFI Plan Apochromat Lambda 4X objective; each well contains neuronal cultures expressing red and green fluorescent proteins. Sample courtesy of Jeanette Osterloh and Steve Finkbeiner, Gladstone Institutes , UCSF

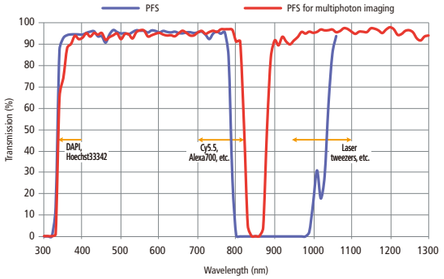
The Ti2-E is equipped with a mechanism that automatically corrects focus drift in real time, in addition to a highly rigid and stable microscope body. It provides functions such as automatic water supply to water immersion objectives, which is effective for live cell observation, and supports Z stack (XYZT) and long-term time lapse (XYZT) imaging.

Unwavering focus stability Ti2-E

The perfect focus system (PFS) automatically corrects focus drift during image acquisition and maintains focus at the set Z position. Proprietary optical offset technology detects the cover glass interface in real time and provides continuous feedback to a high-precision Z-axis drive in the Ti2-E. Even during long-term and complex acquisition sequences such as time-lapse imaging, you can obtain focused, reliable images. It powerfully supports high magnification live cell imaging by correcting focus drift caused by the following:

- Thermal expansion during long-term observation
- Vibration during multi-point observation
- Sudden temperature changes when adding reagents

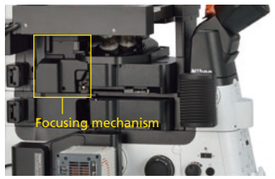




PFS is compatible with screening involving plastic-bottom well plates. It is also compatible with a wide range of wavelengths, from ultraviolet to infrared, meaning it can be used for multi-photon and optical tweezer applications.

Mechanically redesigned for ultra-high stability Ti2-E

The Z-focusing mechanism has been miniaturized and positioned adjacent to the nosepiece to minimize vibrations. The detector portion of the PFS has been detached from the nosepiece in order to reduce the mechanical load on the nosepiece. This design also minimizes heat transfer, thus contributing to a more stable imaging environment. The power consumption of the Z-drive motor has also been reduced.



High stability Z-focusing mechanism is located adjacent to the nosepiece

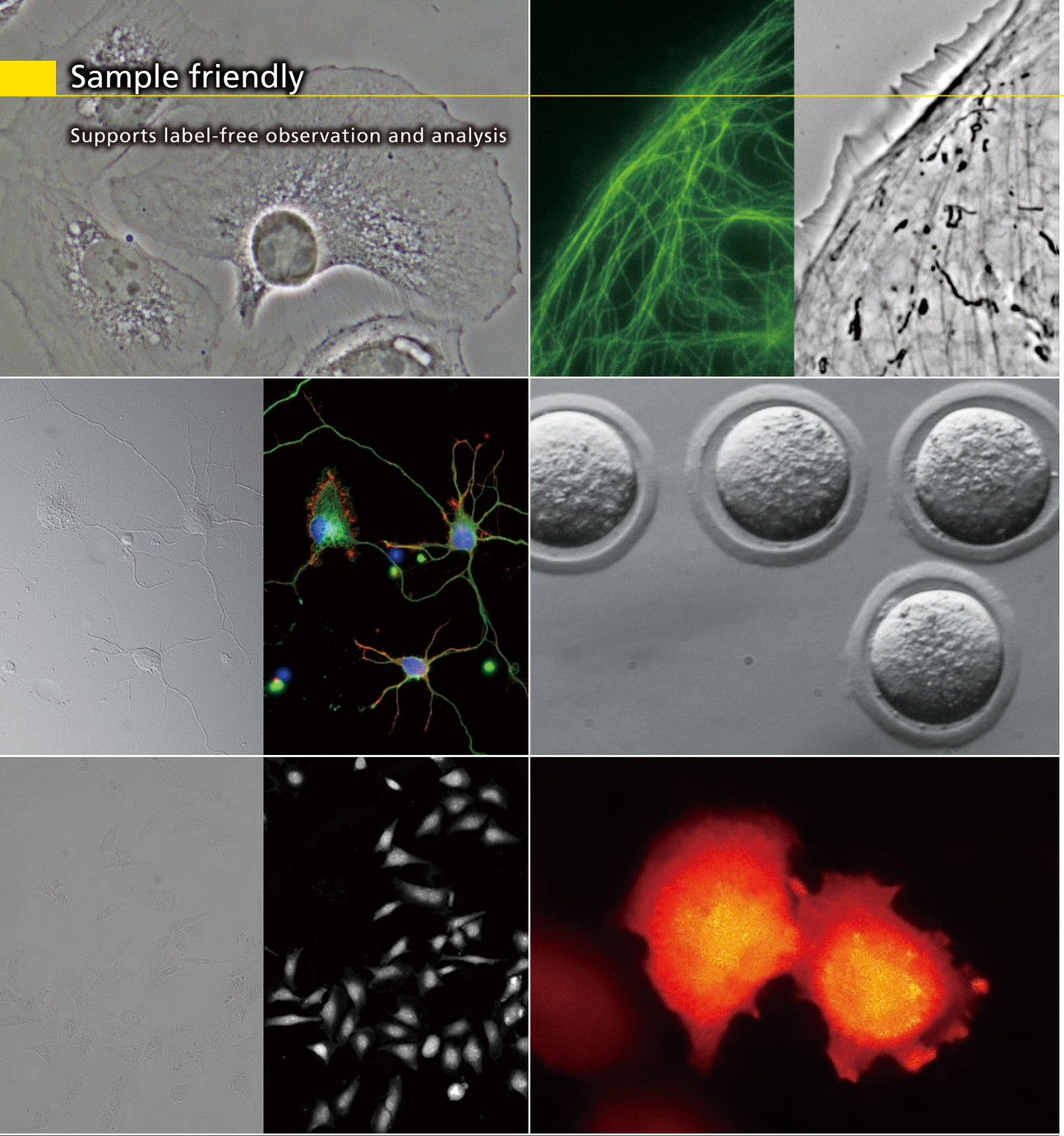
Water Immersion Dispenser Ti2-E

The Water Immersion Dispenser automatically applies the appropriate amount of pure water to the tip of an objective, preventing the immersion liquid from drying out and overflowing during experiments. It is compatible with all types of water immersion objectives and helps to stably provide high-resolution, high-contrast and aberration-corrected time-lapse images over long periods of time.

Dual micro nozzle keeps the proper amount of water on the tip of objectives.

Sample friendly

Supports label-free observation and analysis



Apodized phase contrast image:
BSC-1 cells captured with CFI S Plan Fluor ELWD ADM 40XC objective

DIC and epi-fluorescence images:
FN 25 neuron image (DAPI, Alexa Fluor® 488, Rhodamine-Phalloidin), captured with CFI Plan Apochromat Lambda 60XC objective and D5-Qi2 camera
Photo courtesy of Josh Rappoport, Nikon Imaging Center, Northwestern Univ.;
Sample courtesy of S. Kemal, B. Wang, and R. Vassar, Northwestern Univ.

Brightfield and Volume Contrast images:
HeLa cells captured with CFI S Plan Fluor ELWD 20XC objective

Epi-fluorescence and external phase contrast images:
PTK-1 cells labeled with GFP-alpha-tubulin captured with CFI Apochromat TIRF 100XC Oil objective
Photo courtesy of Alexey Khodjakov, Ph.D Research Scientist VI / Professor, Wadsworth Center

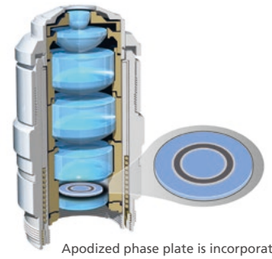
NAMC image:
Mouse embryos, captured with CFI S Plan Fluor ELWD NAMC 20XC objective

Luminescence image:
HeLa cells expressing BRET-based calcium indicator protein, Nano-lantern (Ca^{2+}).
Sample courtesy of Prof. Takeharu Nagai, The Institute of Scientific and Industrial Research, Osaka University

Nikon provides sample-friendly imaging for live cell research, and offers a wide variety of optical systems and analysis tools that support label-free imaging and reduce the effects of excitation light in fluorescence observation.

Apodized phase contrast

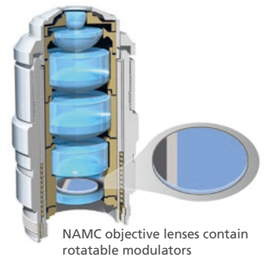
Nikon's unique apodized phase contrast objectives with selective amplitude filters dramatically increase contrast and reduce halo artifacts to provide detailed high-definition images.



Apodized phase plate is incorporated in APC objectives

NAMC (Nikon Advanced Modulation Contrast)

This is a plastic-compatible, high-contrast imaging technique for unstained, transparent samples such as oocytes. NAMC provides pseudo-three-dimensional images with a shadow-cast appearance. The direction of contrast can be easily adjusted for each sample.



NAMC objective lenses contain rotatable modulators

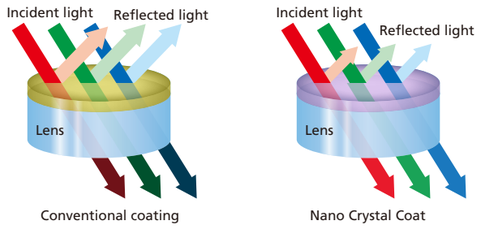
DIC (Differential Interference Contrast)

Nikon's highly-regarded DIC optics provide uniformly clear and detailed images with high resolution and contrast throughout the magnification range. DIC prisms are individually tailored for each objective lens to provide the highest-quality DIC images for every sample.

DIC prisms matched to individual objectives are mounted in the nosepiece

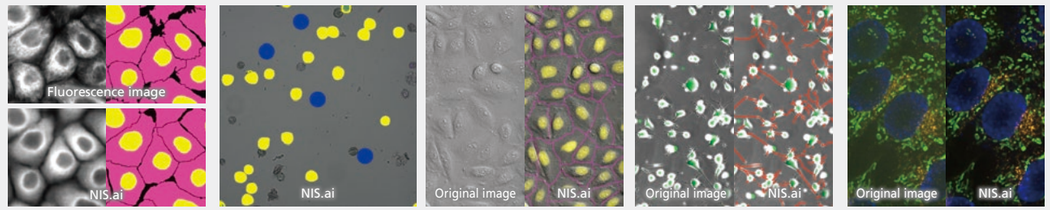
Epi-fluorescence

The Lambda D series objectives, utilizing Nikon's proprietary Nano Crystal Coat technology, are perfect for demanding, low-signal, multi-channel fluorescence imaging that requires high transmission and aberration correction over a wide wavelength range. Combined with new fluorescence filter cubes that offer improved fluorescence detection and stray light countermeasures such as the Noise Terminator, the Lambda D series objectives demonstrate their power in weak signal observations such as single-molecule imaging and even luminescence-based applications.



An NIS-Elements imaging software module, NIS.ai provides functions such as label-free analysis and noise reduction, utilizing AI technology. You can also obtain useful information under sample-friendly imaging conditions.

NIS-Elements NIS.ai



Efficiency

Intuitive interface

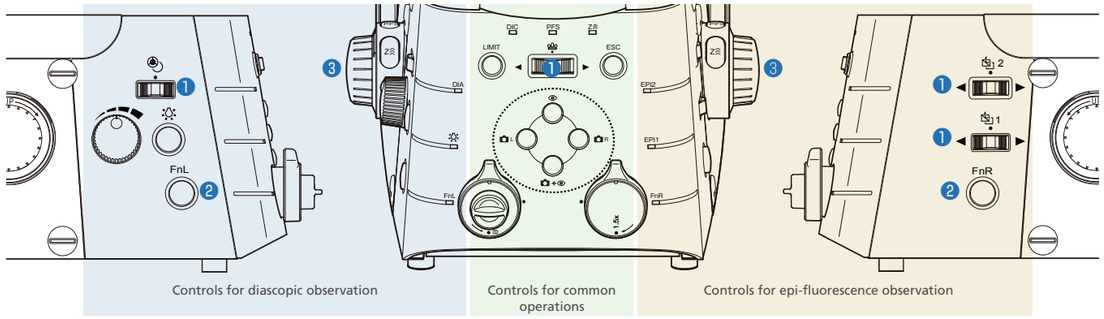
The shape and layout of the operation buttons have been redesigned, allowing intuitive operation even in a darkroom. The motorized functions can be controlled not only from a PC or remote controller, but also from the buttons on the microscope body.

Assist Guidance function

The assist guidance function detects the microscope status and the location of configuration errors to inform the user what to do next. This function powerfully supports efficient image acquisition by providing guidance on correct microscope adjustments and settings.

Thoughtfully designed layout for microscope control Ti2-E Ti2-A

The placement of all of the buttons and switches are based on the type of illumination they control. Buttons that control diascopic observation are positioned on the left side of the microscope and those that control epi-fluorescence observation are on the right side. Buttons that control common operations are on the front panel. This use of zoning provides an easy-to-remember layout, a desirable feature when operating the microscope in a dark room.



❶ Shuttle switch (Ti2-E)
Shuttle switches have been incorporated into the design to control devices such as the epi-fluorescence filter cube turret and objective nosepiece. These types of switches emulate the feel of manually rotating these devices, for intuitive control. Additional functionality can be incorporated into these shuttle switches so that a single switch can operate multiple related devices. For example, the shuttle switch for the epi-fluorescence filter cube turret not only rotates the turret but also opens and closes the fluorescence shutter when the user presses the switch. It is also possible to program these switches to operate a barrier filter wheel and the external phase contrast unit.

❷ Programmable Function buttons (Ti2-E/A)
Conveniently located function buttons allow customization of the user interface. Over 100 functions can be assigned to these buttons, including control of motorized devices such as shutters, and even signal output to external devices via the I/O port for triggered acquisition. Mode functions, which enable the user to instantly switch observation methods by storing the settings of each motorized device, can also be assigned to these buttons.

❸ Focusing knob (Ti2-E)
A focus acceleration button and a PFS engagement button are provided adjacent to the focusing knobs. The two buttons are easily identified by touch because of their different shapes. Focusing speed is automatically adjusted for the objective in use, enabling stress-free operation by maintaining an ideal focusing speed.

Intuitive control with joystick and tablet Ti2-E

The Ti2 joystick not only controls stage movement, but the majority of motorized functions on the microscope, including PFS activity. It can display XYZ coordinates and the status of microscope components, providing an effective means for the user to remotely control the microscope. Motorized functions of the Ti2 can also be controlled from a tablet, connected by wireless LAN to the microscope, providing a versatile graphical interface for microscope control.

Continuous display of microscope status Ti2-E Ti2-A

A collection of built-in sensors detects and relays status information for a variety of components in the microscope. All of the status information is recorded in the metadata when you acquire images with a computer, so you can easily recall acquisition conditions and/or check for configuration errors.
In addition, a built-in internal camera allows users to view the back aperture, facilitating confirmation of phase ring alignment and extinction cross in DIC. It also provides a laser-safe method for aligning lasers for applications such as TIRF.

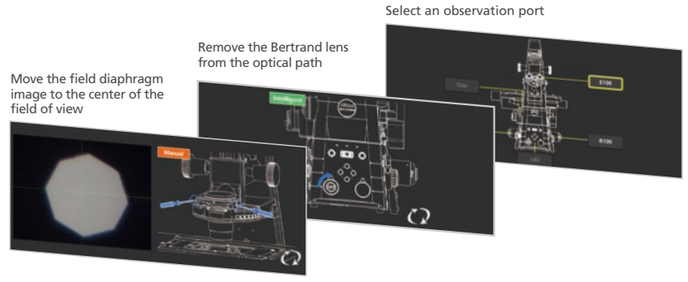
Microscope status can be viewed on a tablet and also determined based on status lights on the front of the microscope, enabling status determination in a dark room.

Status lights

Built-in sensors detect the status of microscope components

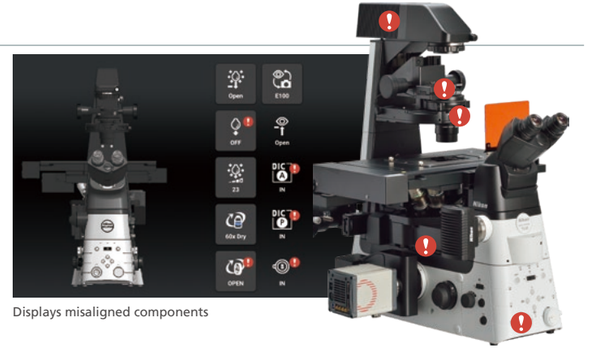
Guidance for operational procedures Ti2-E Ti2-A

The Ti2's Assist Guide function provides interactive step-by-step guidance for microscope operation. The Assist Guide can be viewed on a tablet or PC, and integrates real time data from built-in sensors and an internal camera. The Assist Guide is designed to help users through alignment procedures for both experiment setup and troubleshooting.



Automatically detect errors Ti2-E Ti2-A

The Check Mode allows users to easily confirm, on either a tablet or PC that all the correct microscope components are in place for their chosen observation method. This capability eliminates time and effort normally required for troubleshooting when the desired observation method is not achieved. This functionality is particularly advantageous when multiple users are involved, each with the potential to make unexpected changes to the microscope settings. Custom check procedures can also be pre-programmed.


Displays misaligned components

Accessories that support various sciences

Stage up kit

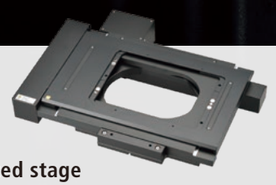
Allows expansion of the infinity space for incorporation of additional devices such as a second epi-fluorescence filter cube turret, barrier filter wheel, back port unit, and LAPP modules.

Epi-fluorescence filter cube turret

Compatible with large FOV. A manual intelligent model and high-speed motorized models with motorized shutter are available.

Motorized barrier filter wheel

Provides high-speed filter switching (50msec. switch time between adjacent positions) and is compatible with large FOV. It can also be mounted in the infinity space, under the epi-fluorescence filter cube turret, when the stage is raised.



Motorized stage

Control methods are optimized for fast stage operation. A stage with a built-in encoder and a piezo stage for Z-stacking are available. Magnetic specimen holders ensure safe operation.

Auto Correction Collar

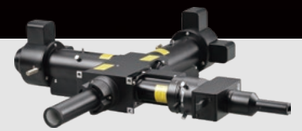
Changes in sample/coverglass thickness, refractive index distribution and temperature can lead to image deterioration. This unique auto correction collar utilizes a harmonic drive and automatic correction algorithm to achieve precise collar adjustment.

Fluorescence LED light source

An eco-friendly light source optimized for fluorescence observation. It is a light source that can be directly mounted on the epi-fluorescence module.

LAPP system

Various illumination modules, such as TIRF and photostimulation modules, can be flexibly combined to customize your imaging system. Up to five modules can be mounted simultaneously.



Motorized TIRF Module

The incident angle of the laser and corresponding penetration depth of the evanescent field can be controlled via NIS-Elements software. When multiple TIRF modules are mounted (see image), the penetration depth can be independently set for each wavelength.

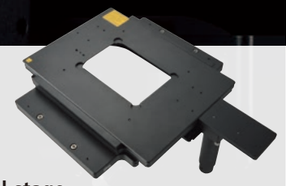
Field stop sliders

Two different rectangular-shaped apertures and one round aperture model are available. The rectangular models prevent excitation outside of the imaging area and unintentional photobleaching of samples. They can be removed for ultra-wide FOV imaging.

Stage top incubator

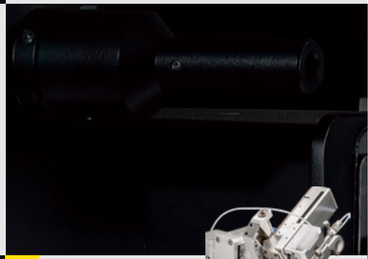
The STX series precisely maintains temperature at 37.0°C and humidity at more than 95%, and controls CO_2 to enable culturing of cells for more than 1 week.

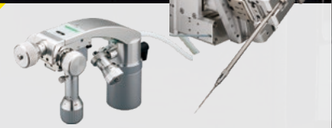
Manufactured by Tokai Hit Co., Ltd.



Manual stage

A long travel stroke allows observation of the entire area of a well plate. The travel area can be restricted to ensure safe operation. Various specimen holders are available.





Oil hydraulic micromanipulator

The MTK-1-N4 achieves simple, easy pipette alignment and smooth pipette movement by means of a four-axis hydraulic joystick.

Manufactured by Narishige Lifemed Co., Ltd.

Water immersion dispenser

Automatic water supply to water immersion objectives is effective for long time-lapse imaging and high-resolution imaging with glass-bottom well plates.

Confocal microscopes

The AX series consists of the high-resolution AX, high-speed high-resolution AX R, multiphoton excitation AX R MP, and super-resolution detector NSPARC.

Super Resolution Microscope

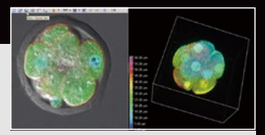
N-STORM has approximately 10 times the resolution of conventional optical microscopes, enabling observation at the single-molecule level.

NIS-Elements

A unified acquisition and analysis software platform

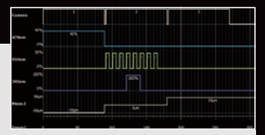
Nikon's unified software platform, NIS-Elements, provides acquisition control for basic to advanced imaging systems as well as powerful analysis tools and stunning display capabilities. NIS-Elements can be streamlined for simple, turnkey use and expanded for fully customized, complex experiments such as conditional workflows. NIS-Elements also offers easy-to-use, graphical programming tools such as JOBS and Illumination Sequence for customizing tasks. In addition to Nikon hardware, NIS-Elements controls devices from a vast array of manufacturers to enable the highest level of customization.

Device Control



Multidimensional Imaging

Optical Configuration (OC) settings memorize custom observation modes and are combined in the ND Acquisition GUI to easily create experiments combining multi-channe, multi-stage position, z-stacking, and timelapse imaging, as well as image stitching. Other functions such as photostimulation and photobleaching can also be flexibly combined.

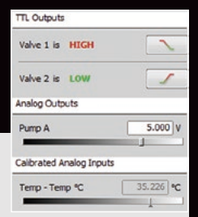


High-speed hardware control

The Ti2's unique hardware triggering capabilities remove software callbacks during acquisition routines to maximize imaging speed. The Illumination Sequence module provides a simple, graphical interface for quickly designing and verifying complex, triggered acquisition experiments.

Graphical programming for custom tasks

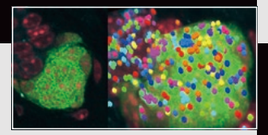
For complex or unique image acquisition needs, the JOBS tool provides an easy-to-use graphical interface for creating custom workflows using drag-and-drop features.



Control of Third Party Products

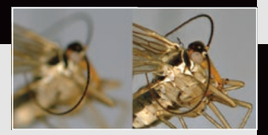
NIS-Elements can natively control a vast number of devices from a variety of manufacturers including high-sensitivity cameras, piezo-devices, light sources, wheels, and National Instruments DAQ devices. This flexibility in hardware control enables custom configurations tailored to individual research needs.

Display & Processing



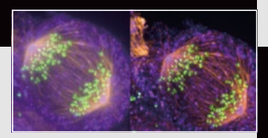
Multi-dimensional Display

Multi-dimensional images that combine multichannel, time-lapse, Z stack, and multi-XY position imaging, as well as image stitching are intuitively displayed in a single window. Powerful volume rendering tools provide unrivalled image quality and interactivity while the Movie-Maker feature enables users to easily create stunning movies.



Advanced Image Processing

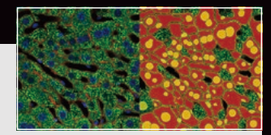
Advanced filters for sharpening, smoothing, and denoising as well as real-time shading correction and image averaging for noise reduction are available. NIS-Elements also offers advanced image arithmetic tools as well as a variety of image projection options such as extended depth of focus (EDF).



Deconvolution

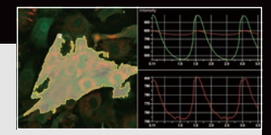
Automatic and manual modes, robust algorithms for noise measurement and removal, and enhanced spherical aberration correction are provided to help actualize theoretical resolutions for even confocal images. Both 3D and 2D deconvolution options are available.

Image Analysis



Automatic measurement

A combination of powerful segmentation tools, morphology functions, classifiers, and an extensive list of measurement tools for 2D, 3D and timelapse datasets enable users to extract quantitative information from their data with ease. Interactive/manual measurement options are also available.

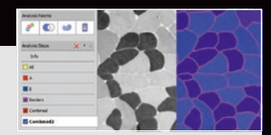


Real-time measurement

Time measurements can be carried out in real time and visualized during acquisition. Real-time analysis results can be especially useful for optimizing experiments that rely on drug treatments or ratiometric imaging like FRET or FRAP.

2D and 3D Object Tracking

NIS-Elements provides powerful tools for identifying and tracking 2D and 3D objects. Measurements include velocity, acceleration, distance, and direction. A variety of innovative display options are available for communicating and presenting tracking analysis results.



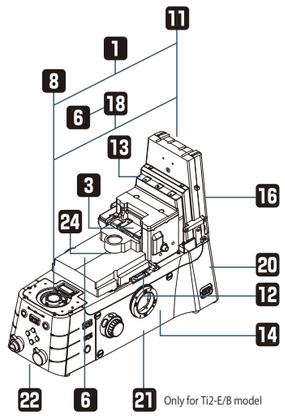
Custom Analysis Routines

The General Analysis (GA) module provides an easy method for creating custom analysis routines that combine image processing and measurement. Routines created in GA can be saved and recalled and even combined with JOBS to create conditional acquisition workflows that rely on real-time analysis results from the integrated GA routine.

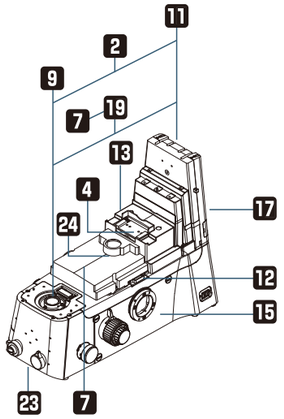
System Diagram

Motorized accessories (with status detection function)

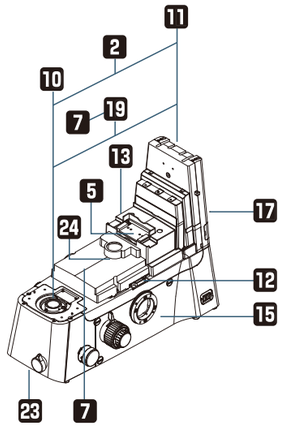
Accessories with status detection function



Ti2-E

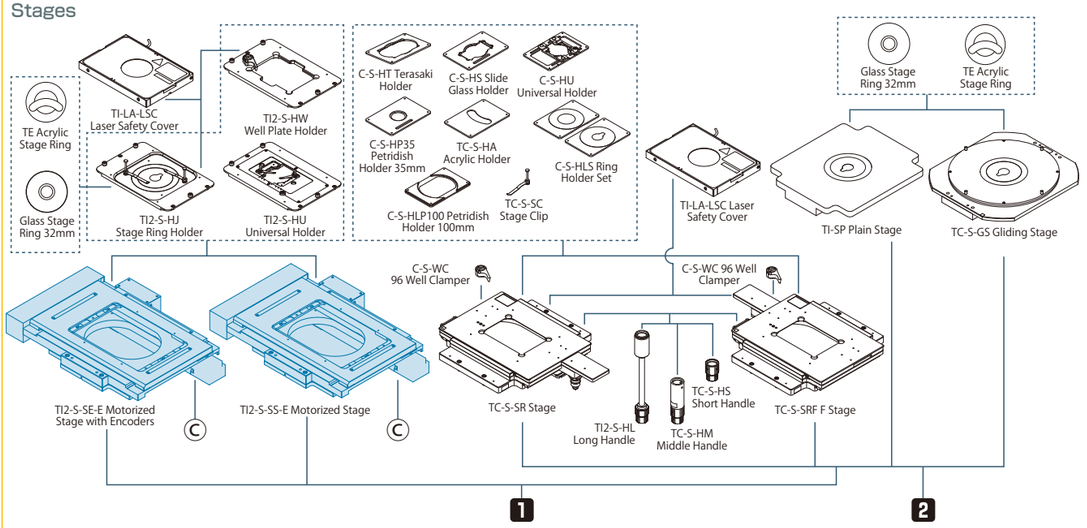


Ti2-A

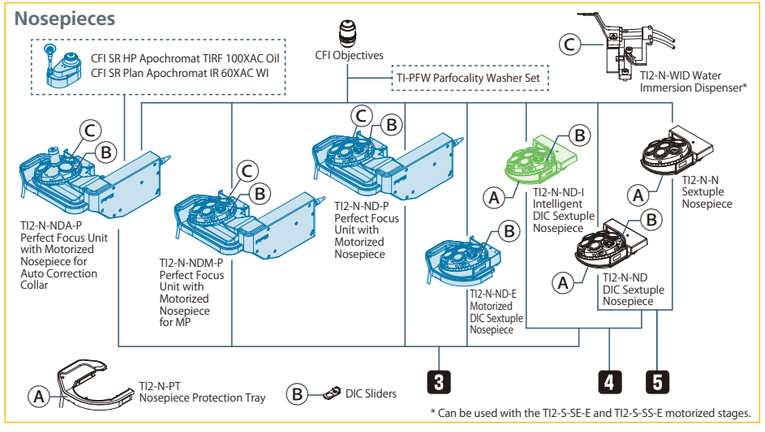


Ti2-U

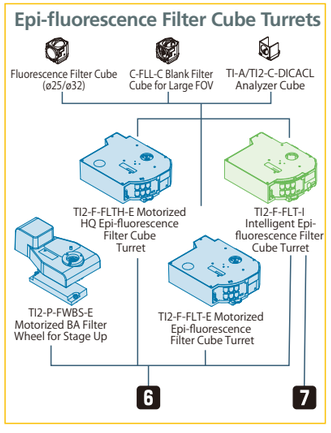
Stages



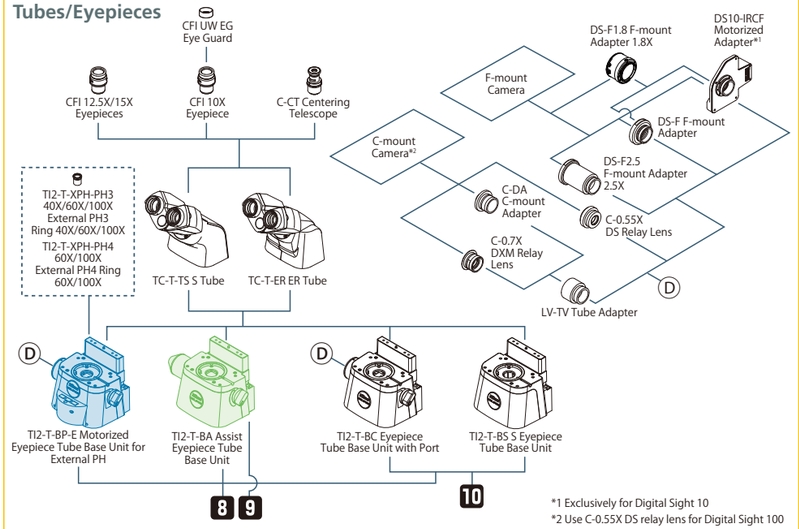
Nosepieces



Epi-fluorescence Filter Cube Turrets



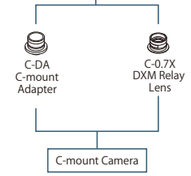
Tubes/Eyepieces



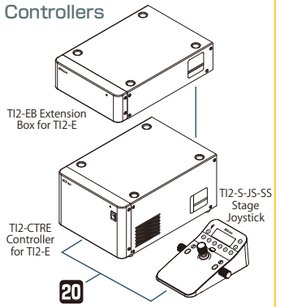
*1 Exclusively for Digital Sight 10

*2 Use C-0.55X DS relay lens for Digital Sight 100

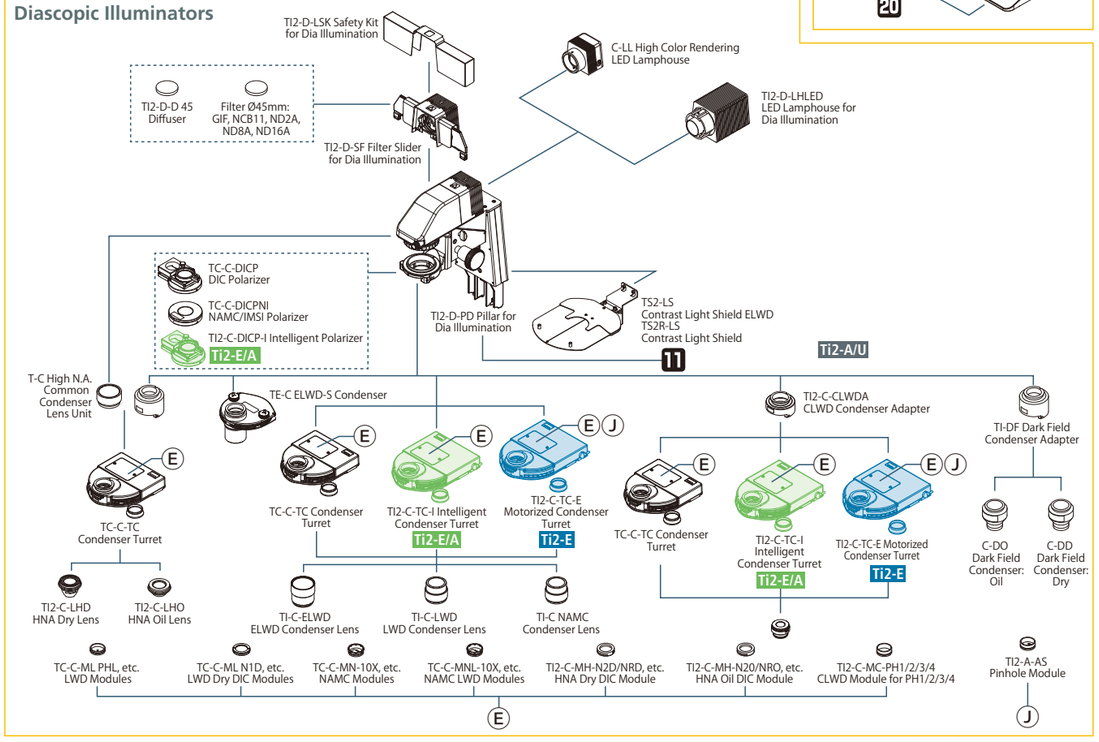
Bottom Port



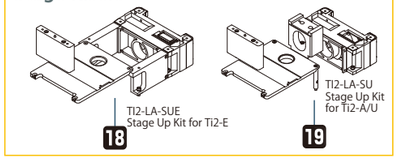
Controllers



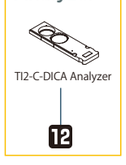
Diascopic Illuminators



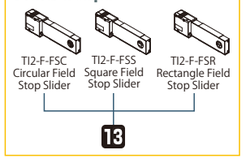
Stage Risers

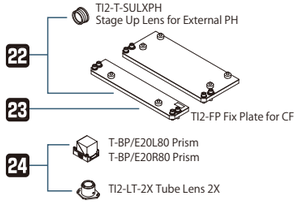


Analyzer



Field Stops



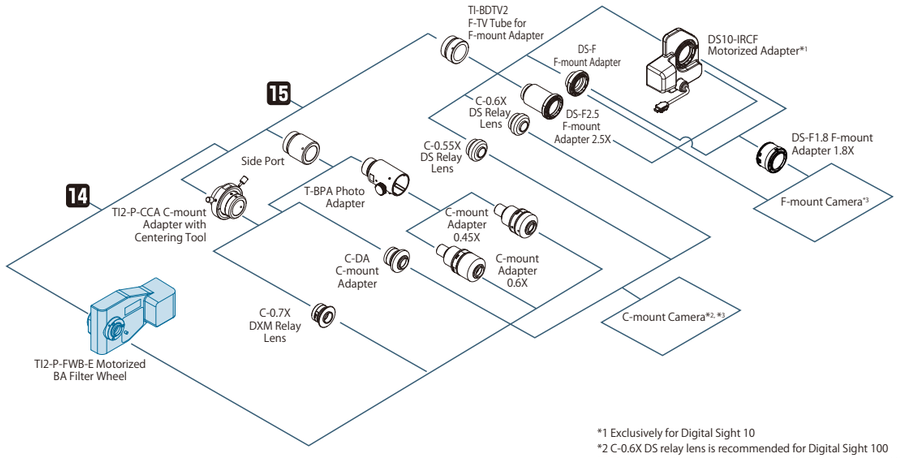


System Diagram

Motorized accessories (with status detection function)

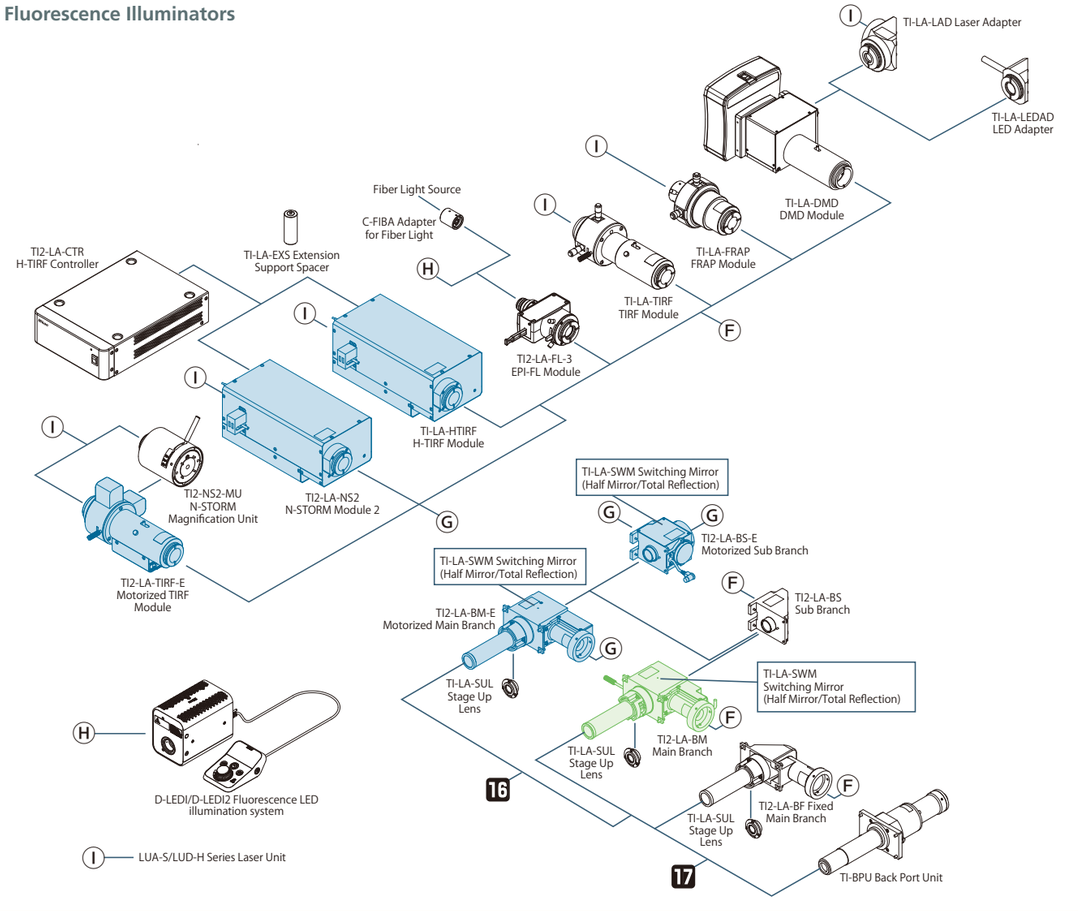
Accessories with status detection function

Side Port



*1 Exclusively for Digital Sight 10
*2 C-0.6X DS relay lens is recommended for Digital Sight 100
*3 There are restrictions on the cameras that can be used and the conditions of their use

Fluorescence Illuminators



Objectives

Type	Model		Immersion	NA	W.D. (mm)	Cover glass thickness	Correction ring	Spring loaded	DIC	Phase contrast	Fluorescence			PFS
											UV	Visible light	NIR	
Plan Fluor	CFI Plan Fluor	4X		0.13	17.20	—					◎	◎		✓
		10X		0.30	16.00	0.17			○		◎	◎		✓
		20X		0.50	2.10	0.17			○		◎	◎		
		20XC MI	Oil Glycerin Water	0.75	0.51-0.35 0.51-0.34 0.49-0.33	0-0.17	✓	✓	○		◎	◎		
		40X		0.75	0.66	0.17		✓	○		◎	◎		✓
		40X Oil	Oil	1.30	0.24	0.17		✓w/stopper	○	EXT PH3-40x	◎	◎		✓
		60XC		0.85	0.40-0.31	0.11-0.23	✓	✓	○		◎	◎		
		60XS Oil	Oil	0.50-1.25	0.22	0.17		✓	○	EXT PH3-60x	◎	◎		
		100X Oil	Oil	1.30	0.16	0.17		✓w/stopper	○		◎	◎		✓
		100XS Oil	Oil	0.50-1.30	0.16	0.17		✓	○		◎	◎		
		DL 4XF		0.13	16.50	1.20				PHL	○	○		✓
		DLL 10X		0.30	16.00	0.17				PH1	○	○		✓
		DL 10XF		0.30	15.20	1.20				PH1	○	○		✓
		DLL 20X		0.50	2.10	0.17				PH1	○	○		✓
		DLL 40X		0.75	0.66	0.17		✓		PH2	○	○		✓
		DLL 100X Oil	Oil	1.30	0.16	0.17		✓w/stopper		PH3	○	○		✓
S Plan Fluor	CFI S Plan Fluor	LWD 20XC		0.70	2.30-1.30	0-1.80	✓		○		◎	◎		✓
		ELWD 20XC		0.45	8.20-6.90	0-2.00	✓		○		◎	◎		✓
		ELWD 40XC		0.60	3.60-2.80	0-2.00	✓		○		◎	◎		✓
		ELWD 60XC		0.70	2.60-1.80	0.10-1.30	✓		○		◎	◎		
		LWD ADM 20XC		0.70	2.30-1.30	0-1.80	✓			PH2	○	○		✓
		ELWD ADM 20XC		0.45	8.20-6.90	0-2.00	✓			PH1	○	○		✓
		ELWD ADM 40XC		0.60	3.60-2.80	0-2.00	✓			PH2	○	○		✓
		ELWD ADL 60XC		0.70	2.60-1.80	0.10-1.30	✓			PH2	○	○		
		ELWD NAMC 20XC		0.45	8.20-6.90	0-2.00	✓				○	○		
		ELWD NAMC 40XC		0.60	3.60-2.80	0-2.00	✓				○	○		
Super Fluor	CFI Super Fluor	4X		0.20	15.50	—					◎ 340	◎		✓
		10X		0.50	1.10	0.17		✓	○		◎ 340	◎		✓
		20X		0.75	1.00	0.17		✓	○		◎ 340	◎		✓
		40X Oil	Oil	1.30	0.19	0.17		✓w/stopper	○		◎ 340	◎		✓
Plan Apochromat	CFI Plan Apochromat	Lambda D 2X		0.10	8.50	0-0.17					◎ CF	◎	◎	
		Lambda D 4X		0.20	20.00	0-0.17					◎	◎	◎	✓
		Lambda D 10X		0.45	4.00	0.17			◎		◎	◎	◎	✓
		Lambda D 20X		0.80	0.80	0.17		✓	◎		◎	◎	◎	✓
		Lambda D 40XC		0.95	0.21	0.11-0.23	✓	✓	◎		◎ CF	◎	◎	✓
		Lambda D 60X Oil	Oil	1.42	0.15	0.17		✓	◎	EXT PH3-60x	◎	◎	◎	✓
		Lambda D 100X Oil	Oil	1.45	0.13	0.17		✓	◎	EXT PH3-100x	◎	◎	◎	✓
		Lambda S 25XC Sil	Silicone Oil	1.05	0.55	0.11-0.23	✓		○		●	◎		✓
		Lambda S 40XC Sil	Silicone Oil	1.25	0.30	0.13-0.21 (23°C) 0.15-0.23 (37°C)	✓		○		●	◎		✓
		Lambda S 60XC Sil	Silicone Oil	1.30	0.30	0.15-0.19	✓		○		◎	◎	◎	✓
		LWD Lambda S 20XC WI**	Water	0.95	0.93	0.11-0.23	✓		○			○	○	✓
		LWD Lambda S 40XC WI**	Water	1.15	0.63	0.15-0.19	✓		○	EXT PH3-40x	◎	◎		✓
		VC 60XC WI**	Water	1.20	0.31-0.28	0.15-0.18	✓	✓	○	EXT PH3-60x	◎	◎		✓
		IR 60XC WI**	Water	1.27	0.18-0.16	0.15-0.19	✓	✓	○	EXT PH3-60x	●	○	◎	✓
		10XC Glyc	Oil Glycerin Water	0.50	2.00***	0-0.17	✓					◎	◎	
	CFI SR Plan Apochromat	IR 60XC WI**	Water	1.27	0.18-0.16	0.15-0.19	✓		○	EXT PH3-60x	●	○	◎	✓
	CFI SR HP Plan Apochromat	Lambda S 100XC Sil	Silicone Oil	1.35	0.31-0.29 (23°C) 0.30-0.28 (37°C)	0.15-0.19	✓		○		◎	◎		✓
Apochromat	CFI Apochromat	LWD Lambda S 20XC WI**	Water	0.95	0.99-0.90	0.11-0.23	✓		○			○	○	✓
		LWD Lambda S 40XC WI**	Water	1.15	0.61-0.59	0.15-0.19	✓		○	EXT PH3-40x	○	◎		✓
		Lambda S 40XC WI**	Water	1.25	0.20-0.16	0.15-0.19	✓	✓	○	EXT PH3-40x	◎	◎		✓
		TIRF 60XC Oil	Oil	1.49	0.16-0.10 (23°C) 0.13-0.07 (37°C)	0.13-0.19 (23°C) 0.15-0.21 (37°C)	✓		○	EXT PH4-60x	●	◎		✓
		TIRF 100XC Oil	Oil	1.49	0.16-0.10 (23°C) 0.15-0.09 (37°C)	0.13-0.19 (23°C) 0.14-0.20 (37°C)	✓		○	EXT PH4-100x	●	◎		✓
	CFI SR HP Apochromat	TIRF 100XC Oil	Oil	1.49	0.16-0.10 (23°C) 0.15-0.09 (37°C)	0.13-0.19 (23°C) 0.14-0.20 (37°C)	✓		○	EXT PH4-100x	●	◎		✓
		TIRF 100XAC Oil*	Oil	1.49	0.16-0.10 (23°C) 0.15-0.09 (37°C)	0.13-0.19 (23°C) 0.14-0.20 (37°C)	✓		○	EXT PH4-100x	●	◎		✓
Achromat	CFI Achromat	NAMC 10XF		0.25	6.20	1.20						●		
		LWD NAMC 20XF		0.40	3.10	1.20						●		
		LWD NAMC 40XC		0.55	2.70-1.70	0-2.00	✓					●		

◎: recommended for best results
○: suitable
●: possible with visible light that has a longer wavelength than excitation light used for DAPI

EXT: external phase contrast modules
340: high transmittance with an ultraviolet wavelength range of up to 340nm
CF: confocal imaging is possible at 488 nm and above

* Compatible with Auto Correction Collar
** Compatible with Water Immersion Dispenser
*** 5.50 for upright microscopes

Specifications

		ECLIPSE Ti2-E, Ti2-E/B*1	ECLIPSE Ti2-A	ECLIPSE Ti2-U
Main body	Optical system	Infinity-corrected CFI60		
	Field number*2	22 with C-mount, 25 with F-mount		
	Intermediate Magnification switching	Manual switching of 1.0x/1.5x (exchangeable from 1.5x to 2.0x)		
		Status detection		—
	Bertrand lens	Manual in/out, and manual focus, Status detection		—
	Output port	4 Motorized positions Eyepiece 100%, left 100%, right 100%, eyepiece 20%/left 80% (Ti2-E/B: bottom 100%)	4 Manual positions Eyepiece 100%, left 100%, right 100%, option (to eyepiece 20%/left 80% or eyepiece 20%/right 80%)	
		Can add ports by use of back port unit and/or choice of tube base unit*3		
	Focusing unit	Motorized drive, Coarse/fine focus changeover, 10mm stroke, Minimum increments: 0.01µm, 0.02µm (with encoder control)	Manual drive, Coarse/fine focusing knob, 10mm stroke	
	Stage up	Available*4		
Tube body	Binocular tube	Binocular S tube TC-T-TS (field number 22), Ergonomic ER tube TC-T-ER (field number 22)		
	Motorized eyepiece tube base unit for external PH (TI2-T-BP-E)	Camera port (field number 16), Motorized PH turret with 4 motorized positions	—	
	Assist eyepiece tube base unit (TI2-T-BA)	Assist camera (field number 22), Status detection		—
	Eyepiece tube base unit with port (TI2-T-BC)	Camera port (field number 16)	—	Camera port (field number 16)
Transmitted illumination	Pillar for transmitted illumination (TI2-D-PD)	Condenser vertical stroke: 66mm, Backward tilting up to 25 degrees, With field diagram and refocusing mechanism 2 filter slot positions (4 filter position option is also available with Filter Slider for transmitted illumination (TI2-D-SF))		
	LED Lamphouse for dia illumination (TI2-D-LHLED)	High power LED		
	High Color Rendering LED Lamphouse (C-LL)	High color rendering LED		
Condenser	Motorized condenser turret (TI2-C-TC-E)	7 motorized positions (Ø37mm x4, Ø39mm x3), LWD/ELWD/CLWD/NAMC condenser lenses are supported	—	
	Intelligent condenser turret (TI2-C-TC-I)	7 manual positions (Ø37mm x4, Ø39mm x3), Status detection, LWD/ELWD/CLWD/NAMC condenser lenses are supported		—
	Condenser turret (TC-C-TC)	7 manual positions (Ø37mm x4, Ø39mm x3), LWD/ELWD/CLWD/NAMC condenser lenses are supported		
	ELWD-S condenser turret (TE-C)	4 manual positions, With ELWD condenser lens (O.D.=65mm, NA=0.3)		
	Condenser lens	LWD (O.D.=30mm, NA=0.52), ELWD (O.D.=75mm, NA=0.3), CLWD (O.D.=13mm, NA=0.72), HNA dry (O.D.=5mm, NA=0.85), HNA oil (O.D.=2mm, NA=1.4), NAMC (O.D.=44mm, NA=0.4)		
Stage	Motorized stage (TI2-S-SE-E, TI2-S-SS-E)	Stroke X: ±57mm, Stroke Y: ±36.5mm, Max drive speed: approx. 25mm/sec, Magnetic sample holder	—	
	Stage (TC-S-SR, TC-S-SRF)	Stroke X: ±57mm, Stroke Y: ±36.5mm, Adjustable stroke range (3 levels) with adjusting pin, Long/middle/short handle options available		
	Gliding stage (TC-S-GS)	Stroke Ø20mm		
Nosepiece	Perfect Focus Unit with motorized nosepiece for Auto Correction Collar (TI2-N-NDA-P)	5 motorized positions, Simple waterproof structure*6	—	
	Motorized DIC sextuple nosepiece (TI2-N-ND-E) Perfect Focus Unit with motorized nosepiece (TI2-N-ND-P) Perfect Focus Unit with motorized nosepiece for MP (TI2-N-NDM-P)	6 motorized positions, Simple waterproof structure*6	—	
	Intelligent DIC sextuple nosepiece (TI2-N-ND-I)	6 manual positions, Status detection, Simple waterproof structure		—
	Sextuple nosepiece (TI2-N-N), DIC sextuple nosepiece (TI2-N-ND)	6 manual positions, Simple waterproof structure*6		
Epi-fluorescence filter cube turret	Motorized epi-fluorescence filter cube turret (TI2-F-FLTH-E, TI2-F-FLT-E)	6 motorized positions, Motorized shutter*6	—	
	Intelligent epi-fluorescence filter cube turret (TI2-F-FLT-I)	6 manual positions, Manual shutter, Status detection*5		
Filter wheel	Motorized BA filter wheel (TI2-P-FWB-E)	7 motorized positions, High speed mode: 50ms, Low vibration mode: 100ms (movement time between adjacent positions)	—	
Epi-fluorescence attachment	EPI-FL module (TI2-LA-FL-3)	Supports D-LEDI Fluorescence LED; includes 2-position filter slider and aperture diaphragm In combination with the C-FIBA Adapter for fiber light, fiber illumination can be used		
	Field stop slider	Circular (TI2-F-FSC), rectangular (TI2-F-FSR), square (TI2-F-FSS) aperture options		
Control unit	Controller, display device	Stage joystick (TI2-S-JS-SS), Tablet	Tablet	—
	Controller for TI2-E (TI2-CTRE)	USB/LAN interface, I/O function	—	
Operating environmental		Temperature: 0˚C+40˚C, Humidity: 60% RH max. (at +40˚C, no condensation), Indoor use only		

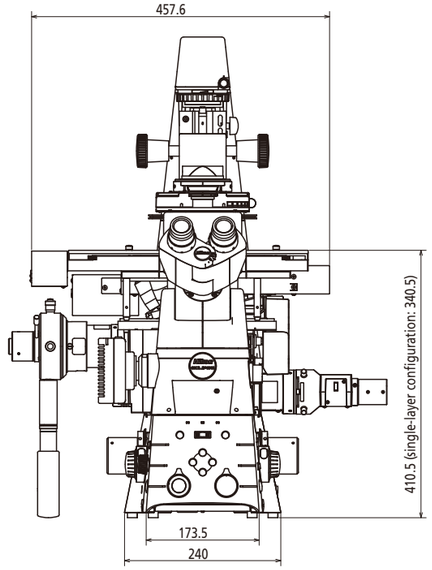
Motorized accessories have a status detection function
*1 Motorized model with a bottom port
*2 Limitations apply based on objective and filter cube choice, stage-up configuration, and illumination module, etc.
*3 Tube base units with a port cannot be used with Ti2-A
*4 Stage up kit is required. Please contact Nikon.
*5 Status detection cannot be used when attached to the Ti2-U

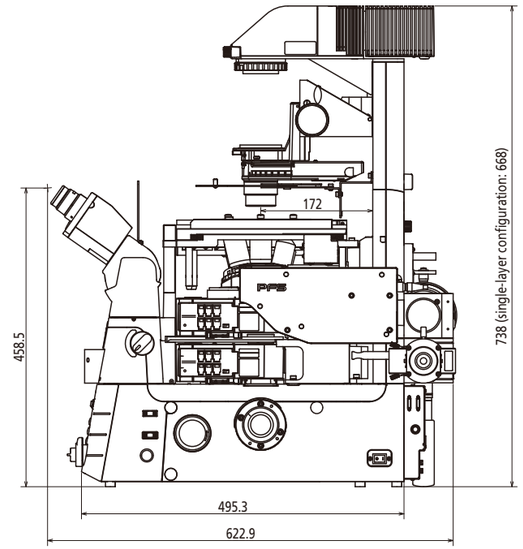
*6 The conditions to ensure waterproof function of the nosepiece are as follows:
(1) Properly attach the following to the nosepiece:
Objective mount: objective or objective mount cap
DIC slider mount: DIC slider or slider mount cap
(2) Properly attach either the supplied water collection tray or the optional TI2-N-PT nosepiece protection tray.
(3) Exercise caution to ensure that water discharged from the drainage tube does not come into contact with the microscope.
For safe use of this product, please follow the instructions in the user manual for proper installation and use.

Dimensional Diagram

Ti2-E

Double layer configuration with an Epi-FL module

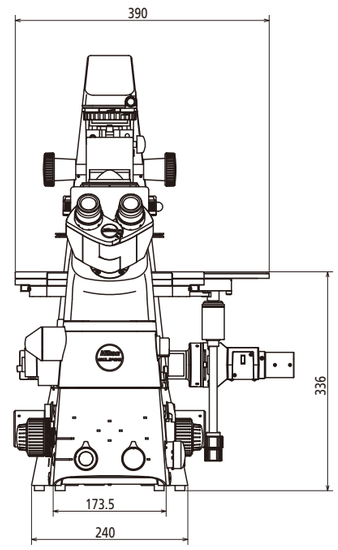




Unit: mm

Ti2-A/U

Single layer configuration with an Epi-FL module



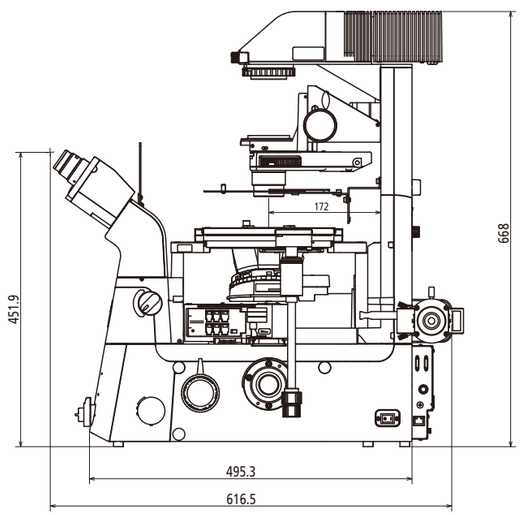


Illustration is of Ti2-A

Unit: mm

Enter the "Microscopy University" on the web
and discover a whole new world. **https://www.microscopyu.com**

The Digital Sight series and Imaging Software NIS-Elements are not for clinical diagnostic use.

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. December 2025

⚠ WARNING	TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.

Monitor images are simulated.
Company names and product names appearing in this brochure are their registered trademarks or trademarks.
N.B. Export of the products* in this brochure is controlled under the Japanese Foreign Exchange and Foreign Trade Law. Appropriate export procedure shall be required in case of export from Japan.
*Products: Hardware and its technical information (including software)

NIKON CORPORATION
Head office
1-5-20, Nishioi, Shinagawa-ku, Tokyo 140-8601, Japan
https://www.healthcare.nikon.com/en/

Manufacturer
471, Nagaodai-cho, Sakae-ku, Yokohama, Kanagawa 244-8533, Japan

Nikon Instruments Inc.
1300 Walt Whitman Road, Melville, N.Y. 11747-3064, U.S.A.
phone: +1-631-547-8500; +1-800-52-NIKON (within the U.S.A. only)
fax: +1-631-547-0299
https://www.microscope.healthcare.nikon.com/

Nikon Europe B.V.
Stroombaan 14, 1181 VX Amstelveen, The Netherlands
phone: +31-20-7099-000
https://www.microscope.healthcare.nikon.com/en_EU/

Nikon Precision (Shanghai) Co., Ltd.
CHINA phone: +86-21-6841-2050 fax: +86-21-6841-2060
(Beijing branch) phone: +86-10-5831-2028 fax: +86-10-5831-2026
(Guangzhou branch) phone: +86-20-3882-0550 fax: +86-20-3882-0580
https://www.nikon-precision.com.cn/

Nikon Canada Inc.
CANADA phone: +1-905-625-9910 fax: +1-905-602-9953

Nikon France, Succursale de Nikon Europe B.V.
FRANCE phone: +33-1-4516-4516

Nikon Deutschland, Zweigniederlassung der Nikon Europe B.V.
GERMANY phone: +49-211-9414-888

Nikon Italy, Branch of Nikon Europe B.V.
ITALY phone: +39-055-300-9601

Nikon Europe B.V., Amstelveen, Zweigniederlassung Schweiz (Egg/ZH)
SWITZERLAND phone: +41-43-277-2867

Nikon UK, Branch of Nikon Europe B.V.
UNITED KINGDOM phone: +44-208-247-1717

Nikon Österreich, Zweigniederlassung der Nikon Europe B.V.
AUSTRIA phone: +43-1-972-6111

Nikon Singapore Pte. Ltd.
SINGAPORE phone: +65-6559-3651 fax: +65-6559-3668

Nikon Australia Pty Ltd
AUSTRALIA phone: +61-2-8767-6900

Nikon Instruments Korea Co., Ltd.
KOREA phone: +82-2-6288-1900 fax: +82-2-555-4415

NIKON INDIA PVT. LTD.
INDIA phone: +91-124-4688-500

Code No. 2CE-MPOH-3 (2512)T

ISO 14001 Certified for NIKON CORPORATION