

# OLYMPUS®

Your Vision, Our Future

Research Inverted Microscope

## IX83/IX73/IX53

IX3 Series

Built for Live Cell Imaging





## Advance to a Higher Level of Live Cell Research with the IX3

The new IX3 is a highly expandable platform for live cell imaging designed with the scientist's workflow in mind.

Built on a robust foundation and able to grow as future needs evolve, the IX3 features modular yet stable construction with an easy access light path. Capture cellular processes with high definition, widefield imaging, and intuitive control.

Equipped with a camera, the IX3 provides fast, user-friendly, high-resolution digital imaging with high reproducibility.



## Expandable to Grow with Your Research



The fully-motorized IX83 and semi-motorized IX73 are designed to satisfy a vast array of research needs. With additional modules providing expanded functionality, both microscopes enable a multitude of imaging techniques, ranging from casual documentation to long-term time-lapse imaging and other demanding procedures.

The unique open frame design of the IX3 provides ready access to the light path, making it easy to manipulate the light or bring in additional inputs. Deck modules can easily be exchanged on-the-fly, enabling the user to add or remove functions as their experiments change. The IX3-ZDC2 module, with its own specialized deck, is available for IX83 systems to maintain continuous focus throughout extended time-lapse use.

Regardless of whether the user is interested in acquiring large, 3D fluorescent images or in capturing ultrafast dynamic processes in live cell samples, the improved efficiency and reproducibility of the IX3 system makes it the ideal solution for a wide range of research applications.

### IX83: Two-Deck System



Enables high-speed, fully automated device selection during live cell research including time-lapse imaging. Two decks offer excellent expandability.

### IX83: One-Deck System



An intelligent, motorized microscope that can be equipped with the IX3-ZDC2 to create a new standard for live cell imaging.

### IX73: Two-Deck System



The IX73 two-deck system can be combined with coded and motorized units\* to produce a semi-motorized system with exceptional expandability.

\*Except IX3-ZDC2

### IX73: One-Deck System



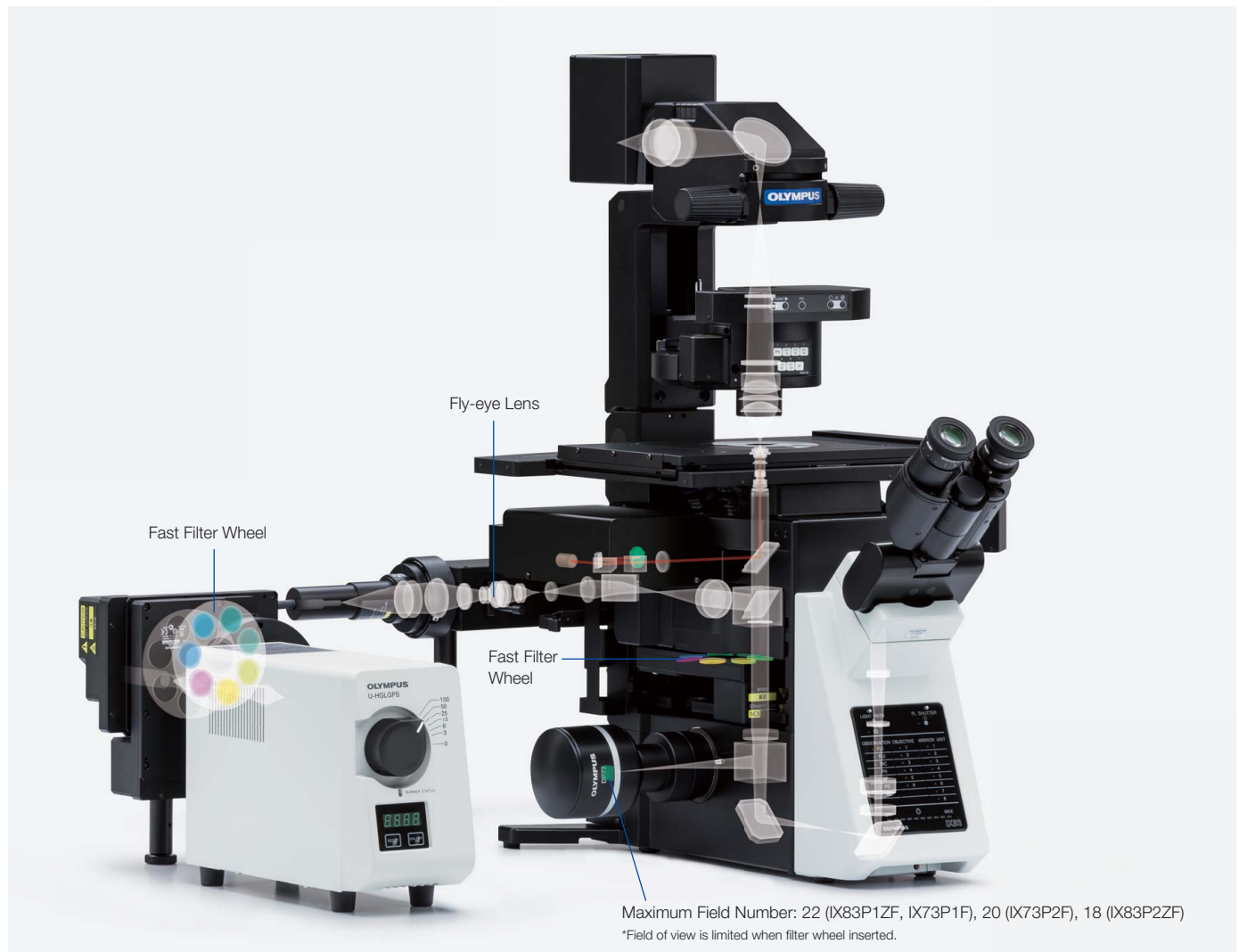
A microscope designed with emphasis on working efficiency for documentation, routine testing, and other tasks.

### IX53: One-Deck System



An outstanding microscope delivering cost efficiency for brightfield and fluorescence applications.

## Reliable, High-Resolution Images that are Clear and Bright

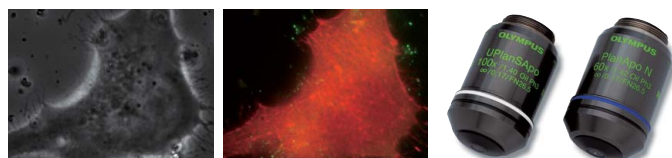


Olympus UIS2 infinity-corrected optics provide high optical transmittance with a broad range of objectives providing wide chromatic correction and high resolution, as well as high S/N primary images regardless of the observation method. The wide field of view and fly-eye lens system provide uniform fluorescence images and enable the use of sCMOS cameras with large sensors.

## Excellent Image Quality

### Apochromatic Objectives Enable High Resolution Observation of Phase Contrast and Fluorescence

Phase contrast apochromatic objectives (UPLSAPO100XOPH, PLAPON60XOPH) enable high-precision observation free from optical axis displacement—even during simultaneous observation of phase contrast and fluorescence, negating the need to change the objective when switching methods.



HeLa Cell Expressing mCherry Actin

Image data courtesy of:  
Tomonobu Watanabe, Ph.D.  
Laboratory for Comprehensive Bioimaging,  
RIKEN Quantitative Biology Center

### Silicone Objectives\* Provide Unparalleled Visibility Deep into Live Cells

Olympus offers a number of high-NA silicone immersion objectives: UPLSAPO30XS, UPLSAPO40XS, UPLSAPO60XS2 and UPLSAPO100XS. The refractive index of silicone oil ( $n \approx 1.40$ ) is close to that of living tissue ( $n \approx 1.38$ ), enabling high-resolution observations deep inside living tissue with minimal spherical aberration caused by refractive index mismatch. Silicone oil does not dry out or harden, so there is never a need to refill oil, making it ideal for extended time-lapse observations.

\*Use dedicated silicone oil.



3D reconstruction images of a live sphere made of NMuMG/Fucci2 cells. Confocal images were acquired by a confocal microscope (FV1000). (Red: cell cycle G1 phase, Green: cell cycle S/G2/M phase)

Image data courtesy of:  
Asako Sakaue-Sawano, Ph.D. Atsushi Miyawaki, M.D., Ph.D.  
Laboratory for Cell Function Dynamics, Advanced Technology Development Core,  
RIKEN Brain Science Institute

### NA 1.7 TIRF Objective

The NA 1.7 APON100XHOTIRF\*\* objective expands the adjustable range for production of evanescent fields, enabling the user to form thin evanescent fields by simply adjusting the angle of incidence. High NA objectives for TIRF from 60X to 150X are also available.

\*\*Uses dedicated immersion oil and cover glass.



### High S/N Fluorescent Mirror Units for Efficient Detection of Fluorescent Signals

All fluorescence mirror units feature filters treated with a coating specially developed to minimize noise by absorbing more than 99% of stray light, while the sharp performance and high transmittance of the mirror units provide efficient fluorescence signal detection.

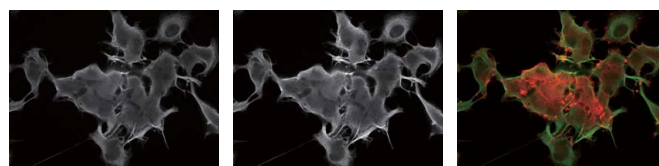
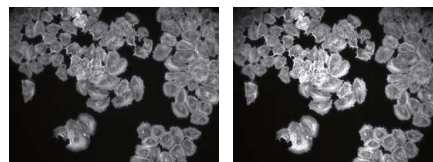


Image Captured with a Conventional FL Mirror Unit

Images Captured with New FL Mirror Units

### Bright, Uniform Fluorescent Illumination

The fluorescence illuminator (IX3-RFALFE) incorporates a fly-eye lens system to provide an even distribution of fluorescence illumination, providing bright and even illumination to the entire field, including the periphery of the visual field.



With Fly-eye Lens System

Without Fly-eye Lens System



## Intuitive and Ergonomic Microscope Control



The IX3 imaging system incorporates a range of advanced technologies to enable fine control of your imaging. As a result, it enables researchers to refine complex sequences of operations into workflows with speed and comfort, eliminating burden on the observer and minimizing cell damage.

A repositionable controller can be located comfortably close to hand, while Olympus cellSens\* imaging software enables advanced control of functions. There is also an innovative, user-friendly touch panel that makes digital control simple and accurate, even when working under darkroom conditions. The Z-drift compensation system employs a near-infrared light to minimize cell damage while enabling constant focus.

The IX83 can be equipped with a microplate compatible ultrasonic stage and the Z-drift compensation system for efficient observation and the ability to record multiple sample locations.

\*cellSens software is not for clinical diagnostic use.



## Smart Control

### Switch Observation Methods with a Single Touch

Olympus offers a touch panel controller for the IX83 to configure all motorized and automated functions on the microscope, including advanced functions such as automatically adjusting lamp intensity according to magnification. The touch panel controller used in combination with cellSens software enables advanced customization, with the ability to program observation procedures and a range of other functions as touch panel soft keys. A hand switch is available for the IX73.



IX83 Touch Panel Controller



IX73 Hand Switch

### Intuitive Microscope and Stage Control

The combination of the U-MCZ and XY-controller provide the familiarity of conventional handle operation to enable researchers to work confidently even in a darkroom.



## Operator-friendly Design

### Smooth Tracking at High Magnification

The IX3-SVR/IX3-SVL manual stages feature a smooth positioning system which enables the easy tracking of cells even in high magnifications. The user-defined limits immobilize the stage, ensuring that the observation position is maintained during operations such as reagent application. It is also possible to remove 35 mm dishes from the stage, place them in an incubator for culturing, and return them to the stage—repositioning the exact location of the cells within the field of view.\*



\*This equipment was based on the technical development at RIKEN BSI-Olympus Collaboration Center.

### ZDC One-Shot Function Quickly Detects Focus, Even at High Magnifications

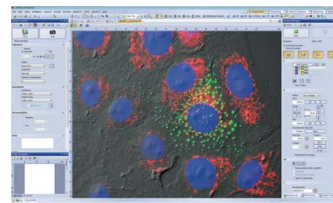
IX3-ZDC2 focus detection and tracking can be performed via the innovative touch panel independent of software. There's also a focus search function supported by a cell-safe, near-infrared laser enabling instant focusing on samples—even at high magnification.



Simply tap the touch screen → For Instant Focus

### Store and Recall Microscope Configurations with cellSens

The system saves microscope configurations alongside image data through incorporation of a readout function that utilizes motorized units and coded units. With this advanced system, a wide range of settings can be recalled to recreate the desired imaging conditions, thus creating an easy-to-use reproducible high-end imaging system.



### Easy Koehler Illumination via the Front Condenser Knob

Using a condenser lock and the front-located control knobs, the condenser can be moved and easily reset to Koehler Illumination.



### Frame Construction Prevents Optical System Contamination

A catch tray under the nosepiece prevents damage to the microscope caused by contamination from spilled liquids and simplifies maintenance.



# A Live Cell Imaging Platform

Rapid and Accurate Acquisition of Multipoint, Time-Lapse Images for Live Cell Experimentation



The IX3 system is optimized for a wide range of live cell observations. It can be equipped with the real-time Z-drift compensation (ZDC) system to keep cells precisely in focus during long-term time-lapse imaging. The IX3-SSU motorized stage enables the user to produce highly accurate, multipoint images through excellent reproducibility and intuitive control. When used in combination with a microplate holder, the IX3-SSU allows the user to image 96-well microplates with impressive speed and repeatability during long-term time-lapse experiments.

## Image Accurately and Efficiently

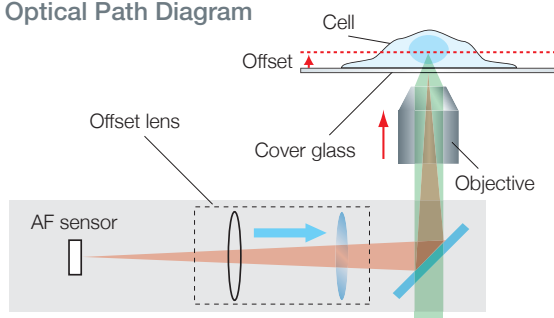
### Maintain Focus with Z-Drift Compensation (ZDC) System NEW

The IX3-ZDC2 uses minimally-phototoxic IR light (laser class 1) to identify the location of the sample plane. One-shot autofocus (AF) mode allows several focus positions to be set as desired for deeper samples, enabling efficient Z-stack acquisitions in multi position experiments. The IX3-ZDC2 is also compatible with silicone objectives (in AF mode) and a broad range of dyes such as Fura-2 (excitation maximum at 340 nm/380 nm, emission maximum at 510 nm), and Cy7 (excitation maximum at 743 nm, emission maximum at 767 nm) due to motorization of DM. Continuous AF mode keeps the desired plane of observation precisely in focus, avoiding focus drift due to temperature changes or the addition of reagents, making it ideal for measurements that requires more stringent focusing. Furthermore, increased optical offset enables continuous AF over plastic vessels or with dry objectives.



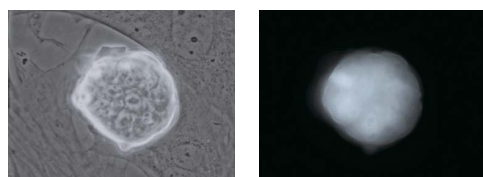
IX3-ZDC2 Z-Drift compensator

### IX3-ZDC2 Optical Path Diagram



### Objectives for Plastic Bottom Dishes and Floating Cell Observation

This high NA phase contrast objective (UCPLFLN20XPH) is well suited for the observation of cellular adhesion and other processes that utilize plastic wells. Users do not have to worry about the issues associated with transferring cells from plastic wells to glass bottom dishes.



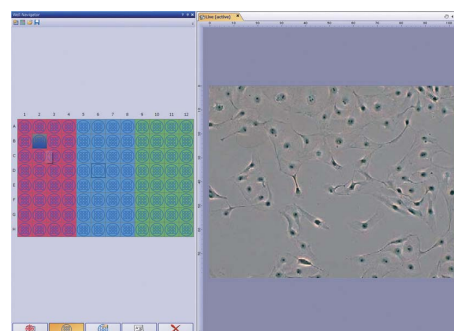
iPS-cell expressing Nanog reporter (GFP)

Image data courtesy of:  
Tomonobu Watanabe, Ph.D.  
Laboratory for Comprehensive Bioimaging,  
RIKEN Quantitative Biology Center

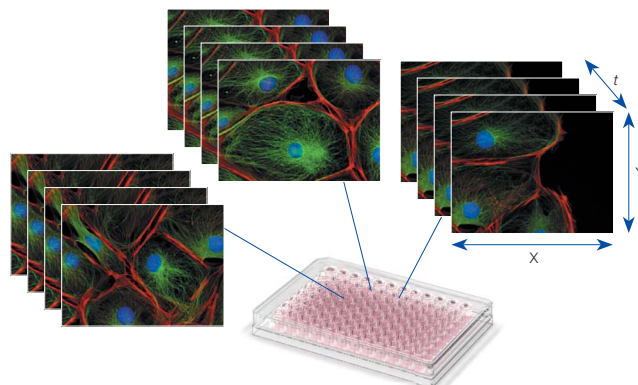
### High-Precision, Multi-Area Imaging with cellSens Software

Olympus cellSens software improves the efficiency of multi-area time lapse imaging. When used with the continuous autofocus mode of the IX3-ZDC2, 96-well microplates can quickly be imaged with ease (duration of image acquisition for a 96-well microplate is ~2 min\*), improving sample throughput.

\* In case of acquiring images continuously with 30 ms exposure time on a single point of each well on a 96-well microplate.

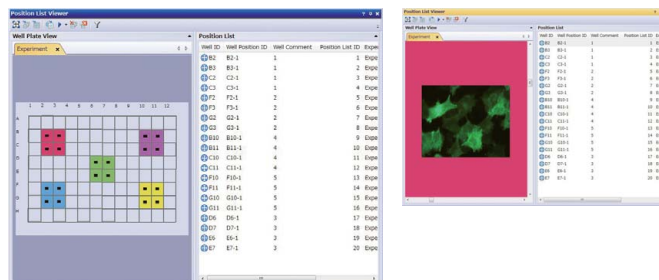


### Multi-Area Observation



### Easy Analysis of Captured Images

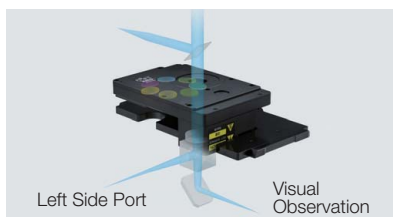
Olympus cellSens software allows users to easily view and analyze microplate images. Image parameters (ex. date, file name, microplate number, etc.) can easily be stored and retrieved with the click of a button. IX3 users can more efficiently process large amounts of data with cellSens software.



## Interchangeable Optical Modules Provide Flexible Imaging Options



A diverse range of units is available for the Olympus IX3 microscope system, bringing greater efficiency to everything from casual observation to serious imaging. Simple cassette-like insertion into the deck makes it easy to mount fluorescence mirror turrets, a right side port with C-mount, an encoded magnification changer, reflected light fluorescence illuminators, and other desired units. The large, open frame allows for the fitting of a motorized emission filter wheel within the infinity space of the microscope. This eliminates image shift between channels and allows the eyepieces to see what the camera sees. An automated or manual right side port deck module provides camera mounting flexibility.





## Deck Units/High Speed Units

### Motorized Fluorescence Mirror Turret (IX3-RFACA)

An automated vibration-free turret fitted with 8 mirror units delivers smooth, fast switching. Mirror units can be used with 25 mm diameter filters or 32 mm diameter filters. No tool use is required to change mirror units, which are easily installed or removed in seconds.



IX3-RFACA

### Motorized Right Side Port with C-mount (IX3-RSPCA)/ Manual Right Side Port with C-mount (IX3-RSPC)

Right side ports with a C-mount allow the light-path switching component to be fitted with up to two mirror units, enabling the construction of customized systems for applications such as split imaging.



IX3-RSPCA

### Coded Intermediate Magnification Changer (IX3-CAS)

Magnification can be changed between 1X, 1.6X, and 2X by smooth lever operation. Since the system incorporates coded functionality, information on intermediate magnifications is saved with image data.



IX3-CAS

### Motorized Fast Filter Wheels and Shutters

Filter wheels can switch between filters in just 60 milliseconds, while shutters can open and close in just 26 milliseconds. The IX83 is capable of controlling up to six filter wheels and four shutters to satisfy complex multi-modal imaging.



U-FFWEM



U-FFW



U-FSHU

## Fluorescence System

### Reflected Light Fluorescence Illuminators

An L-shaped fluorescence illuminator with a fly-eye lens system provides bright, consistent illumination without adjustment; an L-shape-fluorescence illuminator is equipped with a field iris diaphragm and aperture iris diaphragm; and a straight-through fluorescence illuminator is available for applications demanding intense excitation light. A wide range of light sources are available, including light guide light sources and lamp houses compatible with both 100 W mercury and 75 W xenon illumination.



- ① U-LH100HG
- ② U-LH75XEAP0
- ③ U-LH100HGAP0
- ④ U-HGLGPS
- ⑤ IX3-RFA
- ⑥ U-LLGAD
- ⑦ IX3-RFAL
- ⑧ IX3-RFALFE

### 130 W Mercury Lamp Housing with Fiber (U-HGLGPS)

Fluorescent light source offering long life and maintenance-free operation. Delivers bright, even illumination and requires no centering adjustment. A liquid light guide provides that extended observations can be carried out without concern regarding heat transfer to samples.



## Motorized Units/Coded Units

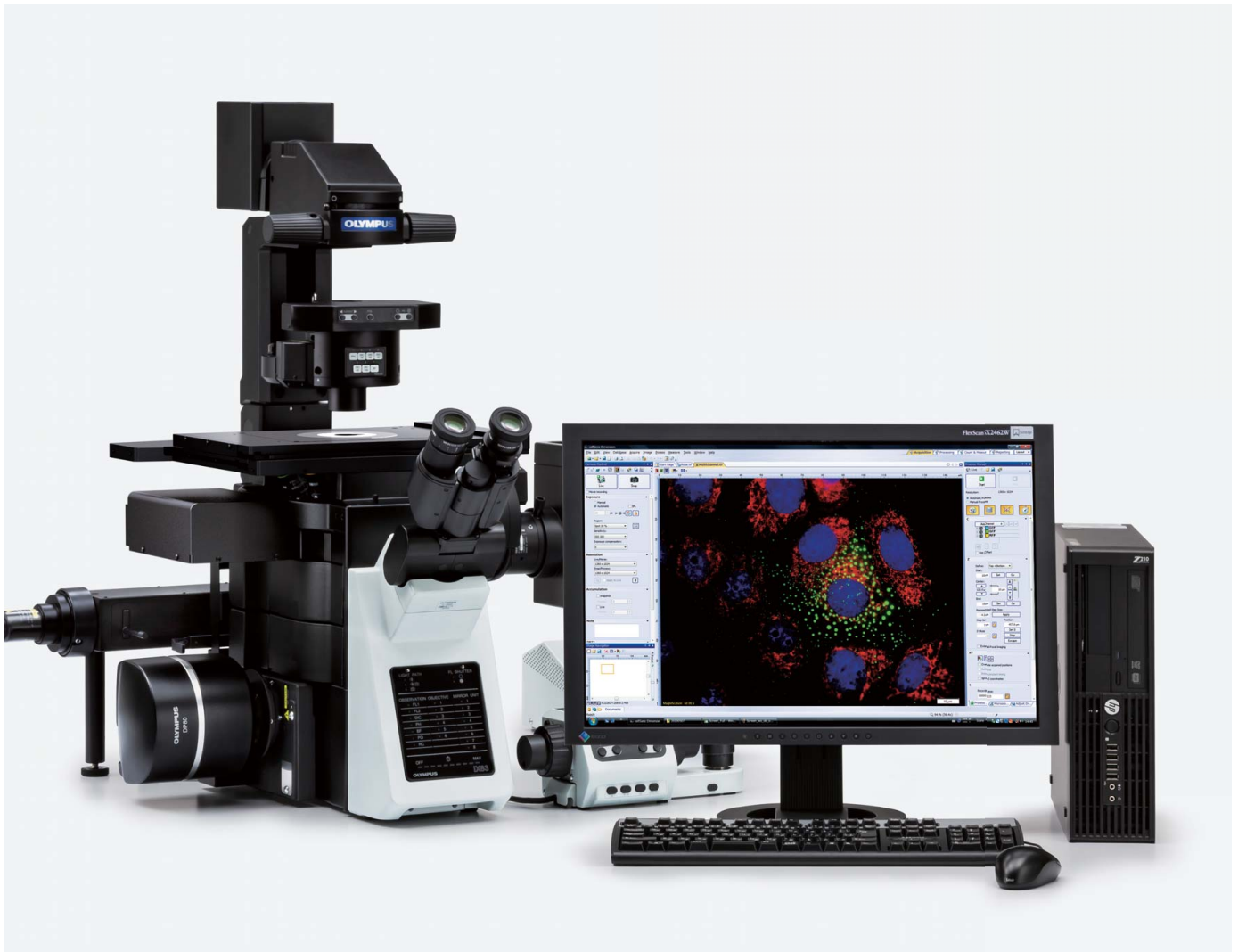
### A Cost-Effective Way to Upgrade to a Motorized Microscope

A wide range of motorized and encoded units are available, including an 8-position motorized fluorescent mirror turret, an encoded fluorescence mirror turret, a motorized 6-position nosepiece, an encoded 6-position nosepiece, a motorized long working distance universal condenser, filter wheels, and shutters.



- ① IX3-LWUCDA
- ② IX3-MLWCDA
- ③ U-FFWEM
- ④ U-FFW
- ⑤ U-FSHU
- ⑥ IX3-RFACA
- ⑦ IX3-RFCS
- ⑧ IX3-RSPCA
- ⑨ IX3-D6RES
- ⑩ IX3-D6REA
- ⑪ IX3-DICTA

## Delivering a Range of Imaging Options



Olympus cellSens\* imaging software streamlines the process from observation to image analysis and data management in complex imaging systems that combine multiple methods of observation.

The software offers advanced compatibility with the IX3 system to easily control the positions of the ultrasonic stage and Z-drift compensation system, and perform other operations such as time-lapse control and DSU disk IN/OUT function to switch between confocal and regular observations.

When the software is started, the observation method set by the software can be controlled by touch panel, manual controller, or hand switch in addition to control from the computer screen.

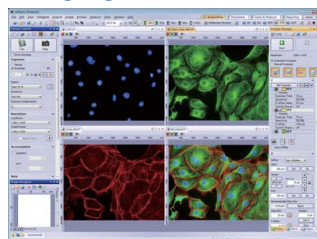
The software can record microscope conditions when performing an experiment so that users can easily reproduce the same experiment at a later point in time.

\*cellSens software is not for clinical diagnostic use.

## Olympus cellSens Imaging Software

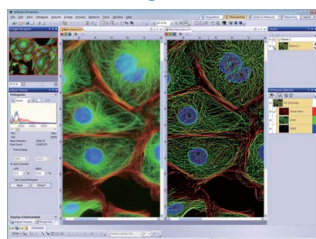
Olympus cellSens imaging software is available in three packages to meet individual workflow needs. "Entry" is used for simple image acquisition, "Standard" provides simple operation for imaging documentation, and "Dimension" allows control of the complete workflow from image capture to analysis.

### Imaging



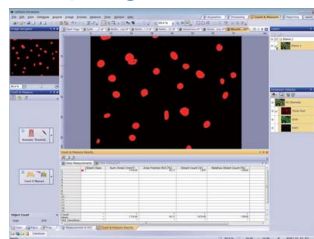
Capture multi-color, time lapse, and Z-stack images with ease. Just select the appropriate capture button, add relevant parameters, and click "Start." The Process Manager makes it easy for experts and beginners to capture multidimensional images.

### Processing



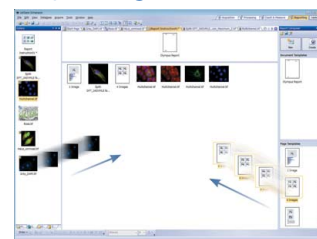
Automatically view your data in the colors and layout you choose. Take advantage of an array of professional image processing functions, such as stitching, extended focus, deconvolution, and unmixing.

### Analyzing



Make measurements using an intuitive interface. The software offers region of interest, phase analysis, and cell count capability. Export raw measurement data to an MS Excel or cellSens workbook format with a single click.

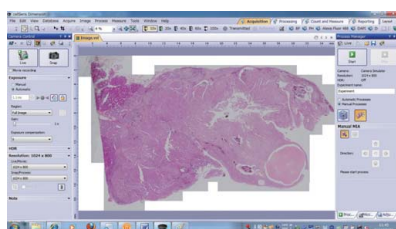
### Reporting



Actively collaborate with colleagues and coworkers with special tools including Database and Reporting functions. These functions make it simple to manage, share, and distribute your own image and data reports.

### Image Stitching

The manual multiple image alignment composes a single montage image as you traverse the specimen. Multiple saved images with adjoining components can also be combined into a single free-shape image. Panoramic imaging can be completely automated when Dimension and its optional multiposition function are integrated into a motorized microscope.



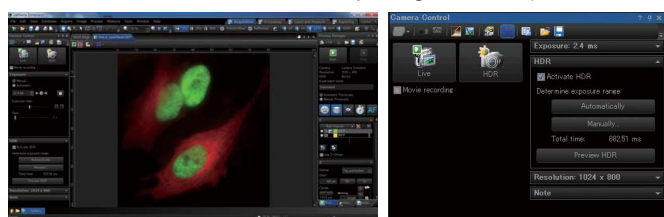
### Graphical Experiment Manager (GEM)

Tailor unique experiments and achieve greater flexibility with the Graphical Experiment Manager. This high-end device solution provides compatibility with image splitting and piezo devices, helping simultaneous two-color imaging and high-speed Z-stack image acquisition.



### Dark Interface Skin

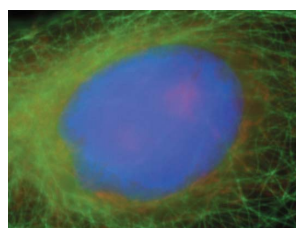
The Dark interface skin lets cellSens adapt to sensitive environments: icons are however still colored for easy recognition and quick selection.



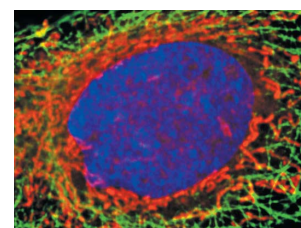
Dark Interface Skin

### Deconvolution

This useful feature eliminates blur from single plane images. Processing can be carried out multiple times and the results can be adjusted while viewing them on the screen. A 3D deconvolution module is also available for use on multi-plane images.



Original Image



Deconvolved Image



# System Description

## FLUOVIEW System

### Confocal Laser Scanning Microscope/FV3000

The FLUOVIEW FV3000 Series is designed to meet some of the most difficult challenges in modern science. The new hybrid scanning unit combines the leading-edge speed of a resonant scanner with the high sensitivity of a galvanometer scanner to produce a confocal laser scanning system that is optimized for live cell and tissue imaging. The FV3000 also provides an intuitive and adaptable interface, and is capable of microplate imaging and complex screening protocols. The series supports complete workflows from live cell 2D-6D imaging (x,y,λ,z,t,p) through image processing, like deconvolution and analysis. Particular attention has been paid to the needs of cell biology, cancer research, and stem cell research. The FV3000 is a versatile imaging system optimized for macro to micro imaging of cells, tissues, and small organisms.



Image data “Whole mouse kidney” courtesy of:  
Dr. Mike Davidson. Images presented with lasting gratitude for his lifetime commitment to science and microscopy.

### Scanners

#### Hybrid Scan Unit (Resonant/Galvanometer)

The hybrid scanner combines the capabilities of a galvanometer scanner with a resonant scanner for high-speed imaging in the full field of view at 30 fps and up to 438 fps at 512 × 32. The Sequence Manager makes it simple to automatically switch between resonant and galvanometer imaging in the same experiment.

#### Galvo Scan Unit

The galvanometer-only scanner provides precision scanning from 1 fps at 512 × 512 to 16 fps. High-speed multipoint stimulation or detection experiments can travel between multiple cells at over 100 Hz with data output as high as 500 kHz.

### Spectral Detectors

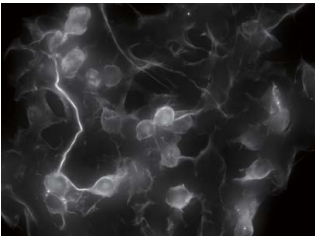
#### High Sensitivity Spectral Detector (GaAsP PMT) with TruSpectral Technology

The 2-channel High Sensitivity Spectra Detector (HSD) employs the same Volume Phase Holographic (VPH) technology as the spectral detector (SD), with Peltier cooled GaAsP PMTs and a high quantum efficiency of 45% and detection up to 750 nm. This unit can be combined with the 2-channel SD for a flexible dynamic range or a second 2-channel HSD unit for powerful 4-channel sensitivity. Spectral Detector (Multialkali PMT) with TruSpectral Technology The 2-channel SD employs efficient VPH transmission and an adjustable slit with 1–100 nm bandwidth from 400–800 nm detection. The multialkali PMTs provide a broad dynamic range for detection up to 800 nm.

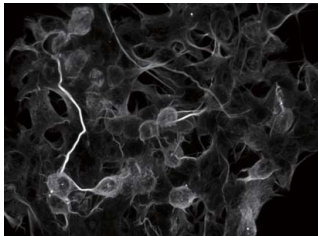
## Spinning Disk Confocal System (IX3-DSU)

### Real-time Cell Imaging with Excellent Optical Sectioning Disk Scanning Unit (DSU) for IX83

Enables real-time confocal observation of images with excellent sectioning. Fits to the left side camera port instead of the light source illumination port, allowing for simultaneous attachment with other units.



Widefield Fluorescence Image



DSU Image



### DSU Specifications

Optical System	•FN: 11 (only for camera observation) •FS (PUSH / PULL system, equipped with centering mechanism) •Projection Magnification of Field Stop : 1
Shutter	•Imaging Magnification : 1 •Supported Observation Methods 1) Confocal Observation 2) Widefield Observation 3) Transmitted Observation (BF, PH, DIC)
Confocal Disk	•Manual shutter : 1 (PUSH / PULL system) •Motorized shutter : 1 [Use No.6 (light shielding) position of ND filter wheel]
Mirror Unit Cassette	•Slit type confocal disk •Selectable disk (Provided with standard DSU-D2) •Motorized light path IN / OUT.
ND Filter Wheel	•Mirror units can be selected by the motorized turret. •Number of attachable mirror units : 6 pieces (Provided with standard DSU-MGFP and U-MRFPHQ)
Attaching Camera	•ND filters are selected by the motorized turret.
Software	•ND filter assignment No.1 : Idle hole No.2 : ND50 No.3 : ND25 No.4 : ND6 No.5 : ND1.5 No.6 : Light shielding plate (shutter position)
Attachable microscope	C mount (1-32UNF)
	cellSens (Operates and controls IX3-DSU, IX83F and motorized parts of other motorized units)
	Left side port of IX83P1ZF and IX83P2ZF



## cellTIRF 1Line and cellTIRF 4Line Systems

### TIRF Microscope Illuminator with Motorized Penetration Depth and Simultaneous 4-channel Image Capture

The cellTIRF family takes TIRF technique to the next level with a series of peerless features such as advanced optics, independent laser control, and exceptional accuracy. The cellTIRF family can be equipped with the Olympus IX3-ZDC2 for live cell TIRF imaging with lasers spanning from 405 nm to 640 nm.

The cellTIRF 1Line system features a single beam path that can be used with a single laser or a laser combiner.

The cellTIRF 4Line system enables ultra-sensitive, simultaneous multicolor TIRF using four laser channels with independent beam paths. Individual motorized angle control for each laser provides equal evanescent ( $\pm 1$  nm), which enables you to produce high-contrast images with minimal background noise for cell surface and single molecule studies. The cellTIRF 4Line system has integrated point FRAP optics for the first laser line.

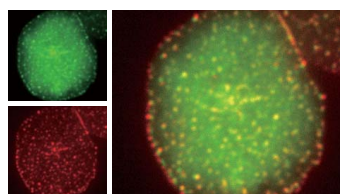


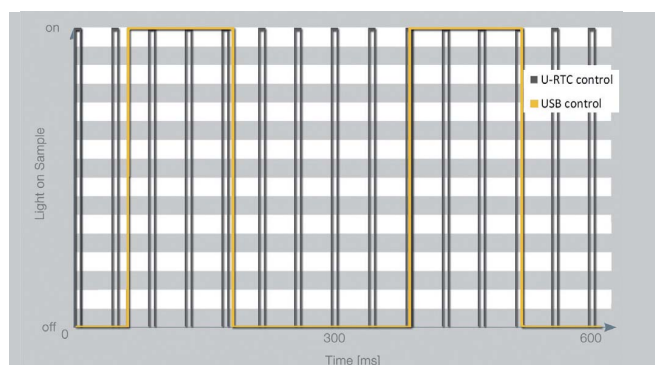
Image data courtesy of:  
Akiko Hashimoto-Tane, Ph.D.  
Takashi Saito, Ph.D.  
Laboratory for Cell Signaling,  
RIKEN Research Center for Allergy  
and Immunology

Colocalization of the Dynein Complex with T Cell Receptor Microclusters  
Reference material : Akiko Hashimoto-Tane, Takashi Saito, *et al.* (2011). Dynein-Driven Transport of T Cell Receptor Microclusters Regulates Immune Synapse Formation and T Cell Activation. *Immunity* 34, 919-931.  
•Upper images acquired by IX81.

## Real-Time Controller (U-RTC, U-RTCE)

### Ultrafast Image Capture, Illumination and Experimental Control

Complex 3D time-lapse observation and live cell imaging benefit from precise temporal control. The Olympus Real-Time Controllers, U-RTC and U-RTCE (enhanced), expedite multi-image acquisition while minimizing phototoxicity to live samples and photobleaching to fixed samples. Both controllers optimize overall system performance by synchronizing accessory devices through parallelized control, leading to rapid execution of experimental protocols. The U-RTC and U-RTCE feature an independent CPU board that eliminates delays even in complex experimental set-ups.



The precision and speed (i.e. images taken per time) of experiment set-ups is more accurate and faster when the experiment is controlled via the RTC (blue) compared to PC control only (orange). Measurements were performed by using Lumen Dynamics XLED1 light source, Andor iXON 897 EMCCD camera, and a light meter at the objective lens. Data were acquired with 5 ms exposure running the camera as fast as possible.



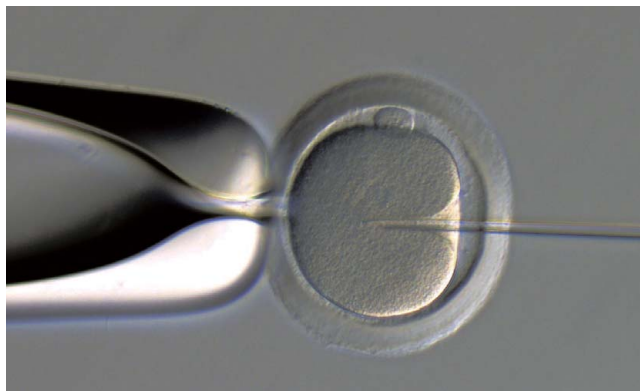
Take advantage of the fast, real-time controller with the easy-to-use Olympus cellSens software and GEM interface.

# System Description

## Additional Expandability Options

### Motorized Middle Long Working Distance Condenser/IX3-MLWCDA

The IX3-MLWCDA supports brightfield, DIC, relief-contrast, and polarized light observations. The condenser can handle up to four optical elements in the turret and features a motorized polarizer. The condenser is ideal for sperm selection and observation of non-human oocytes spindles. Motorized adjustment helps produce optimum contrast, and a long working distance and slim design make injections easy.



Rat Oocyte

### Accurately Measure Light Intensity at the Sample Adapter for Excitation Irradiance Meter/IX3-EXMAD\*

Olympus now offers an adapter for a power meter that can directly measure the excitation light intensity per unit surface area of the sample, as well as offering irradiance display software. Software displays the measurement results on a monitor and records the data, eliminating the need for laborious calculations. This makes it possible to check the excitation light intensity before starting an experiment, enhancing the reliability of experiments. Data can also be easily shared.

\*This equipment was based on the technical development at RIKEN BSI-Olympus Collaboration Center.



### High-precision Multi-area Imaging Ultrasonic stage for IX3/IX3-SSU

With low thermal drift and accuracy, the ultrasonic stage delivers excellent reliability for multi-area imaging. Sample holders are firmly anchored to provide accurate positioning while the stage is in motion, so the observation position stays fixed even during high-magnification multi-point observations using slides or dishes.



IX3-SSU



IX3-HOW-2, IX3-HO35DF,  
IX3-HO35D, IX3-HOS

## Objective specifications

UIS2 objective		NA	W.D. (mm)	FN	Cover glass thickness (mm)	Immersion	Spring	Correction ring	Iris diaphragm	IX3-ZDC2
UPLSAPO	UPLSAPO 4X	0.16	13	26.5	—					
	UPLSAPO 10X2	0.40	3.1	26.5	0.17					✓
	UPLSAPO 20X	0.75	0.6	26.5	0.17		✓			✓
	UPLSAPO 20XO	0.85	0.17	26.5	—	Oil	✓			✓
	UPLSAPO 30XS	1.05	0.8	22	0.13–0.19	Silicone		✓		✓
	UPLSAPO 40X2	0.95	0.18	26.5	0.11–0.23		✓	✓		✓
	UPLSAPO 40XS	1.25	0.3	22	0.13–0.19	Silicone	✓	✓		✓
	UPLSAPO 60XW	1.20	0.28	26.5	0.13–0.21	Water	✓	✓		✓
	UPLSAPO 60XO	1.35	0.15	26.5	0.17	Oil	✓			✓
	UPLSAPO 60XS2	1.30	0.3	22	0.15–0.19	Silicone	✓	✓		✓
	UPLSAPO 100XO	1.40	0.13	26.5	0.17	Oil	✓			✓
	UPLSAPO 100XS	1.35	0.2	22	0.13–0.19	Silicone	✓	✓		✓
	UPLSAPO 100XOPH	1.40	0.13	26.5	0.17	Oil	✓			
PLAPON	PLAPON 60XO	1.42	0.15	26.5	0.17	Oil	✓			✓
	PLAPON 60XOSC2	1.40	0.12	22	0.17	Oil	✓			✓
	PLAPON 60XOPH	1.42	0.15	26.5	0.17	Oil	✓			
UPLFLN	UPLFLN 4X	0.13	17	26.5	—					
	UPLFLN 10X2	0.30	10	26.5	—					✓
	UPLFLN 20X	0.50	2.1	26.5	0.17		✓			✓
	UPLFLN 40X	0.75	0.51	26.5	0.17		✓			✓
	UPLFLN 40XO	1.30	0.2	26.5	0.17	Oil	✓			✓
	UPLFLN 60X	0.90	0.2	26.5	0.11–0.23		✓	✓		✓
	UPLFLN 60XOI	1.25–0.65	0.12	26.5	0.17	Oil	✓		✓	✓
	UPLFLN 100XO2	1.30	0.2	26.5	0.17	Oil	✓			✓
PLFLN	PLFLN 100X	0.95	0.2	26.5	0.14–0.2		✓	✓		
	UCPLFLN 20X	0.7	0.8–1.8	22	0–1.6			✓		✓
UCPLFLN	UCPLFLN 20XPH	0.7	0.8–1.8	22	0–1.6			✓		✓
LUCPLFLN	LUCPLFLN 20X	0.45	6.6–7.8	22	0–2			✓		✓
	LUCPLFLN 40X	0.60	2.7–4	22	0–2			✓		✓
	LUCPLFLN 60X	0.70	1.5–2.2	22	0.1–1.3			✓		✓
	LUCPLFLN 20XPH	0.45	6.6–7.8	22	0–2			✓		✓
	LUCPLFLN 20XRC	0.45	6.6–7.8	22	0–2			✓		
	LUCPLFLN 40XPH	0.60	3.0–4.2	22	0–2			✓		✓
	LUCPLFLN 40XRC	0.60	3.0–4.2	22	0–2			✓		
	LUCPLFLN 60XPH	0.70	1.5–2.2	22	0.1–1.3			✓		✓
UPLFLN-PH	UPLFLN 4XPH	0.13	17	26.5	—					
	UPLFLN 10X2PH	0.30	10	26.5	—					✓
	UPLFLN 20XPH	0.50	2.1	26.5	0.17		✓			✓
	UPLFLN 40XPH	0.75	0.51	26.5	0.17		✓			✓
	UPLFLN 60XOIPH	1.25–0.65	0.12	26.5	0.17	Oil	✓		✓	
	UPLFLN 100XO2PH	1.30	0.2	26.5	0.17	Oil	✓			✓
CPLFLN	CPLFLN 10XPH	0.30	9.5	22	1					✓
	CPLFLN 10XRC	0.30	9	22	1.5					
LCACHN	LCACHN 20XPH	0.40	3.2	22	1					
	LCACHN 20XRC	0.40	2.8	22	1.5					
	LCACHN 40XPH	0.55	2.2	22	1					
	LCACHN 40XRC	0.55	1.9	22	1.5					
CPLN	CPLN 10XPH	0.25	10	22	1					
	CPLN 10XRC	0.25	9.7	22	1.5					
UAPON 340	UAPON 20XW340	0.70	0.35	22	0.17	Water	✓			✓
	UAPON 40X0340-2	1.35	0.1	22	0.17	Oil	✓			✓
	UAPON 40XW340	1.15	0.25	22	0.13–0.25	Water	✓	✓		✓
TIRF	APON 60XOTIRF	1.49	0.1	22	0.13–0.19	Oil		✓		✓
	APON 100XHOTIRF*	1.70	0.08	22	0.15	Oil		✓		✓
	UAPON 100XOTIRF	1.49	0.1	22	0.13–0.19	Oil		✓		✓
	UAPON 150XOTIRF	1.45	0.08	22	0.13–0.19	Oil		✓		

\*HIGHINDEX-CG cover glass and dedicated immersion oil required.

**Observation tubes, eyepieces**

WHN10X WHN10X-H Eyepieces  
U-CT30-2 Centering telescope

U-BI90 Binocular tube

U-TBI90 Tilting binocular tube

U-TR30-2, U-TR30NIR Trinocular tubes

U-TR30H-2 Trinocular tube

IX-ATU Intermediate tube

GX-SPU Side port intermediate tube

U-EPA2 Eyepoint adjuster

U-CA Magnification changer 1X, 1.25X, 1.6X, 2X

U-ECA Magnification changer 2X

**Stages**

IX-HOP Petri dish holder

IX-HOS Slide glass holder

IX-HOT Terasaki plate holder

IX-CLM96 Well positioners

IX-MVR Mechanical stage

U-FMP Mechanical stage

Incubator

IX3-HO35DF Dish fixing unit for IX3-HO35D

IX3-HO35D Dish holder

IX3-HOS Slide holder

IX3-EXMAD Adapter for excitation irradiance meter

IX-SCL Slide clip

IX3-HOW-2 Microplate holder

Stage top incubator

IX-SCL Slide clip

IX-SCL Slide clip

IX-SCL Slide clip

IX-SCL Slide clip

CK2-SS Side stage

IX2-SP Plain stage

IX3-SVR Mechanical stage with right handle

IX3-SVL Mechanical stage with short left handle

IX2-GS Gliding stage

GX-SVR Right handle stage for GX (Insert plate separately required.)

GX-SFR Flexible right handle stage (Insert plate separately required.)

IX3-SSU Ultrasonic stage for IX3

IX3-SSU Control box (attached to IX3-SSU)

IX3-SSU XY-controller (attached to IX3-SSU)

IX3-SSU Thermoplate

IX3-SSU Slide clip

IX3-SSU Glass stage insert plate

IX3-SSU Insert plate

**Transmitted illumination**

IX-ADUCD Condenser adapter

U-UCD8-2 Universal condenser

U-TLO Oil top lens

U-TLD Dry top lens

IX2-MLWPO Polarizer attachment

IX2-MLWCD Mid long working distance condenser

IX3-MLWCD Motorized middle long working distance condenser

IX2-LWUCD Long working distance universal condenser

IX3-LWUCDA Motorized LWD condenser

IX-ULWCD Ultra long working distance condenser

IX3-FDICT Transmitted DIC filter unit

IX3-FFXL IX3-FCFPXL IX3-FGFPXL IX3-FYFPXL IX3-FMCHEXL IX3-FUWXL IX3-FGWXL IX3-FBVWXL XL mirror units (ø32)

Mirror units

**Camera adapters, camera ports**

U-BMAD Bayonet-Mount Adapter

U-CMAD3 C-Mount Adapter

U-SMAD Sony-Mount Adapter

U-TMAD T-Mount Adapter

U-CMT C-Mount Adapter

U-FMT F-Mount Adapter

U-TV1XC C-Mount Adapter 1X (XY adjustment)

IX-TVAD TV Adapter

U-TV1X-2 TV Adapter

U-TVZ Zoom Adapter

IX3-TV1XTL T-mount camera adapter 1X

U-TV0.63XB 0.63X B4-Mount Adapter

U-TV0.63XC 0.63X C-Mount Adapter

U-TV0.5XC-3 0.5X C-Mount Adapter

U-TV0.35XC-2 0.35X C-Mount Adapter

U-TV0.25XC 0.25X C-Mount Adapter

U-FFWEM Motorized fast filter wheel for emission

U-DPCAD Dual port tube with C-mounts

IX3-SSU Hand set

IX3-SSU RS232C Interface cable

IX3-SSU Shutter interface

IX3-SSU System controller

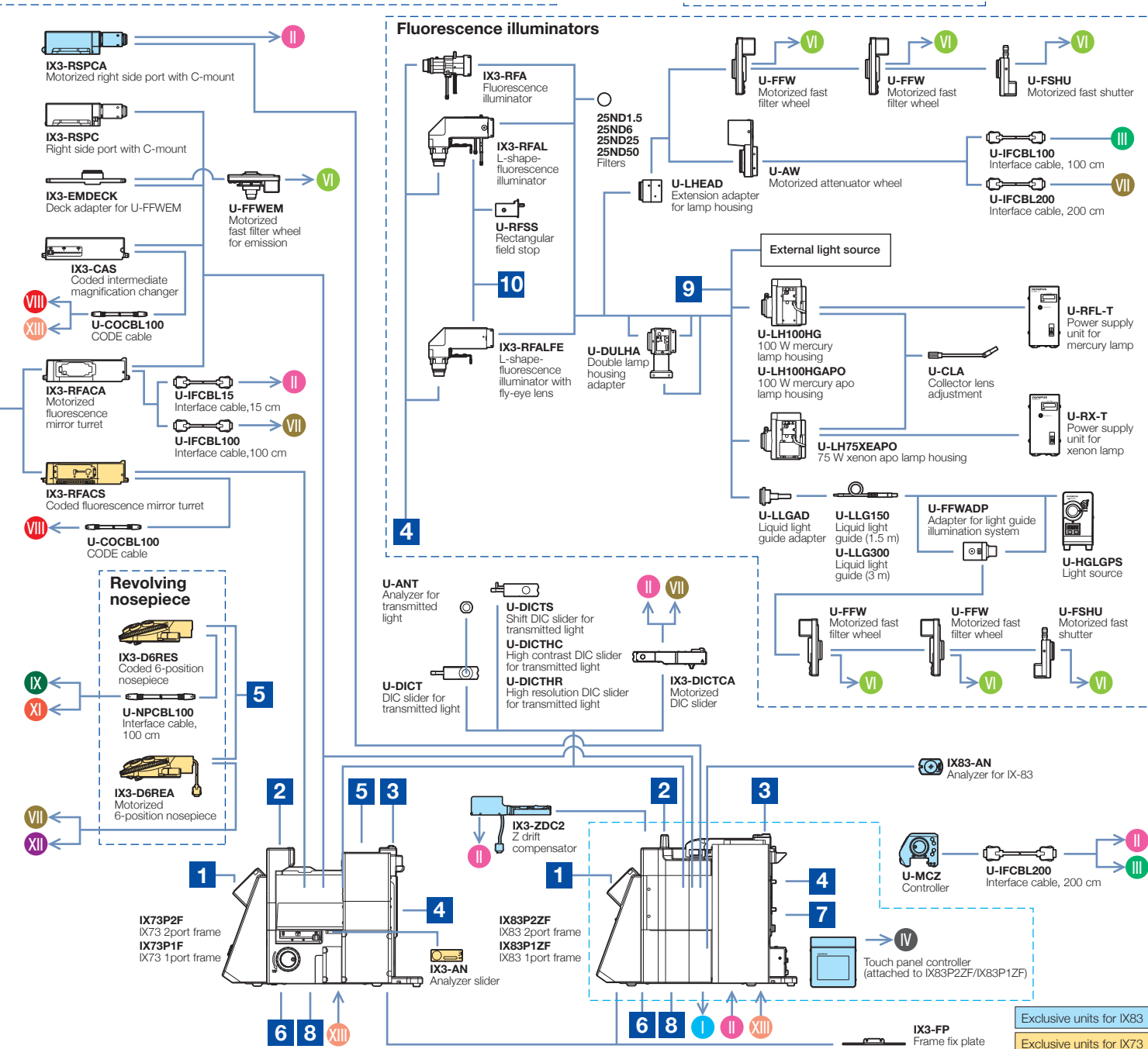
IX3-SSU Motorized shutter

IX3-SSU Mirror units

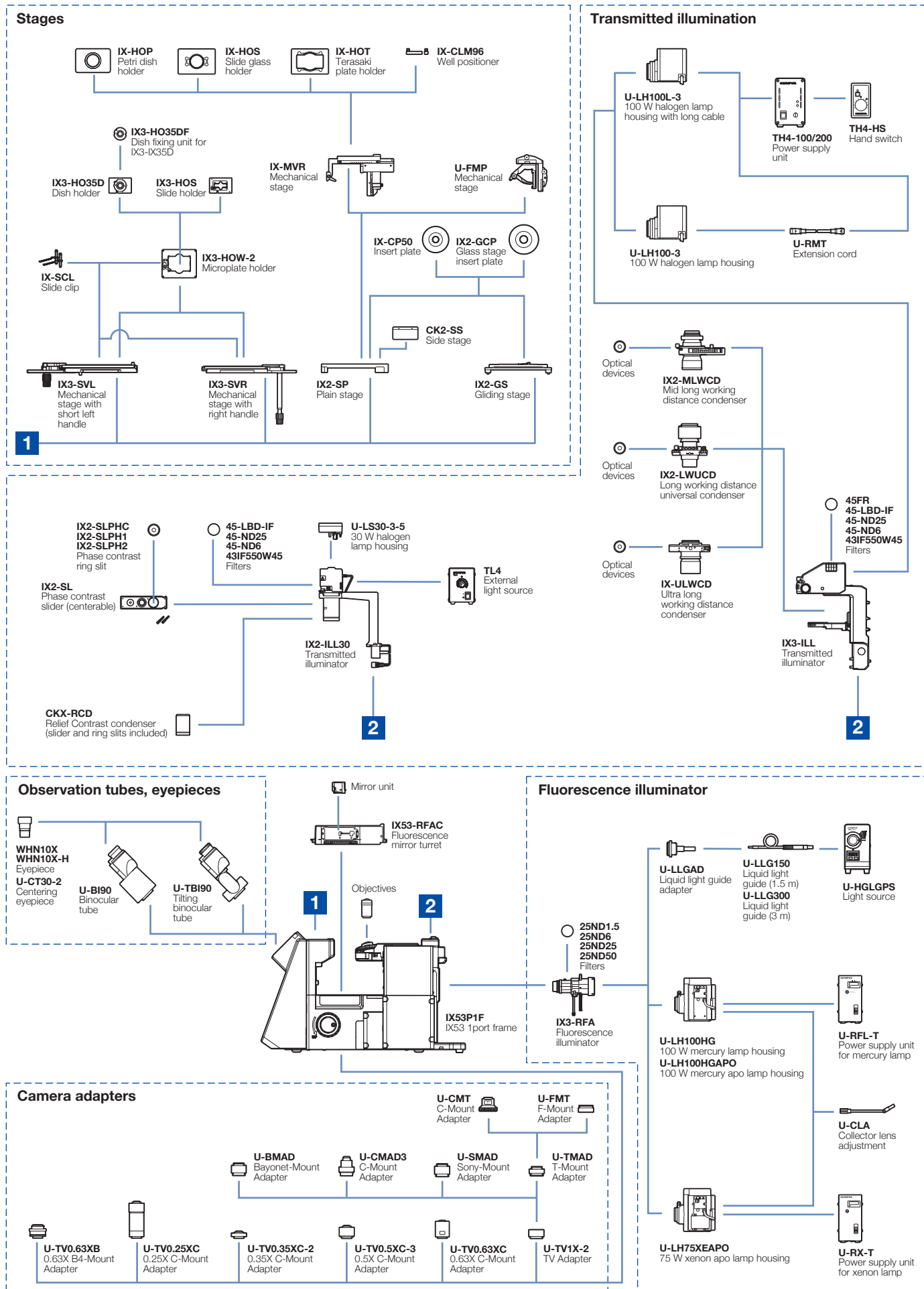
IX3-SSU Disk scanning unit for IX3 (DSU-D2, U-MRFPHQ, DSU-MGFPHQ included)

IX3-SSU DSU-D1 DSU-D3 DSU-D4 DSU-D5 Disks





## IX53 system diagram



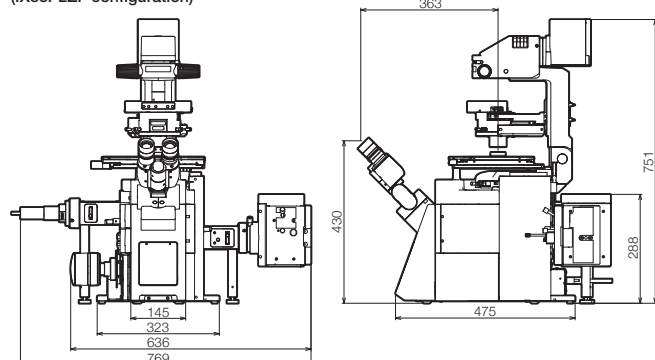
## IX3 specifications

		IX83	IX73	IX53
Microscope frame	Optical system	UIS2 optical system		
	Revolving nosepiece	<ul style="list-style-type: none"> <li>Motorized sextuple revolving nosepiece (DIC slider attachable), simple waterproof structure</li> </ul>	<ul style="list-style-type: none"> <li>Motorized sextuple revolving nosepiece (DIC slider attachable), simple waterproof structure</li> <li>Coded sextuple revolving nosepiece (DIC slider attachable), simple waterproof structure</li> </ul>	<ul style="list-style-type: none"> <li>Sextuple revolving nosepiece, simple waterproof structure</li> </ul>
	Focus	Stroke: 10.5 mm Minimum increment: 0.01 $\mu$ m, Maximum nosepiece movement speed: 3 mm/s	Stroke: 10 mm	Stroke: 10 mm
	Light path selection	Motorized 0:100/50:50/100:0 (Left side port: BI port)	0:100/50:50/100:0 (Left side port: BI port)	50:50 (Left side port: BI port)
Transmitted light illuminator		Pillar tilt mechanism (30 ° inclination angle, with vibration reducing mechanism), Condenser holder (with with 88 mm stroke, refocusing mechanism), Field iris diaphragm adjustable, 4 filter holders Light source: •12 V 100 W halogen bulb (pre-centered) • High color reproductive LED light source		<ul style="list-style-type: none"> <li>•30 W halogen illuminator: Detachable condenser lens system (NA 0.3, W.D. 72 mm), single filter holder aperture iris diaphragm adjustable</li> <li>•100 W halogen illuminator: Pillar tilt mechanism (30 ° inclination angle, with vibration reducing mechanism), Condenser holder (with 88 mm stroke, refocusing mechanism) Field iris diaphragm adjustable, 4 filter holders</li> </ul>
Observation tube	Widefield (FN 22)	•Widefield tilting binocular •Widefield binocular •Widefield trinocular		•Widefield tilting binocular •Widefield binocular
Stage	Scanning stage with ultrasonic	IX3-SSU: Stage stroke: X: 114 mm x Y: 75 mm, maximum stage movement speed: 20 mm/s		
	Mechanical stage with right handle	Stage stroke: X: 114 mm x Y: 75 mm, stage position locking function		
	Right handle stage	Stage stroke: X: 50 mm x Y: 50 mm		
	Flexible right handle stage	—	Stage stroke: X: 50 mm x Y: 50 mm	—
	Gliding stage	Upper circular stage 360 ° rotatable, 20 mm (X/Y) travel		
	Plain stage	232 mm (X) x 240 mm (Y) stage size, stage insert plate exchangeable ( $\phi$ 110 mm)		
Condenser	Motorized long working distance condenser	W.D. 27 mm, NA 0.55, motorized turret with 7 position slots for optical devices (3 positions for $\phi$ 30 mm and 4 positions for $\phi$ 38 mm), motorized aperture and polarizer		—
	Motorized middle long working distance condenser	NA 0.5, W.D. 45 mm, 4 positions for optical devices (for $\phi$ 50 mm, Relief Contrast optical devices rotatable)		—
	Long working distance universal condenser	NA 0.55, W.D. 27 mm 5 positions for optical devices (3 positions for $\phi$ 30 mm and 2 position for $\phi$ 38 mm)		
	Mid long working distance relief contrast	NA 0.5, W.D. 45 mm, 4 positions for optical devices (for $\phi$ 50 mm, Relief Contrast optical devices rotatable)		
	Ultra long working distance	NA 0.3, W.D. 73.3 mm, 4 positions for optical devices (for $\phi$ 29 mm)		
Fluorescence illuminator	L-shape-fluorescence illuminator with flyeye lens	L-shaped design with exchangeable FS module		—
	L-shape-fluorescence illuminator	L-shaped design with exchangeable FS and AS modules		—
	Fluorescence illuminator	Straight design with field iris diaphragm		—
Fluorescence mirror turret	Motorized fluorescence mirror turret	Motorized turret with 8 positions, built-in shutter, simple waterproof structure		—
	Coded fluorescence mirror turret	—	Coded 8 positions turret, built-in shutter, simple waterproof structure	—
	Fluorescence mirror turret	—	—	Turret with 8 positions, built-in shutter, simple waterproof structure
Fluorescence light source		•130 W Hg light guide illumination •100 W Hg apo lamp housing and transformer •100 W Hg lamp housing and transformer •75 W Xe lamp housing and transformer		
Focus compensator	Z drift compensator	Offset method (Focus search, one-shot focus, continuous focus), Class 1 laser product	—	
Filter wheel/shutter	Motorized fast filter wheel	High speed mode 60 ms, Low vibration mode 100 ms (rotation time until next hole on the wheel)		—
	Motorized fast filter wheel for emission	High speed mode 60 ms, Low vibration mode 100 ms (rotation time until next hole on the wheel) C-mount adapter and bayonet mount adapter are enclosed		—
	Motorized fast shutter	High speed mode 26.2 ms, Low vibration mode 60 ms (rotation time on one way)		—
	Motorized attenuator wheel	Time to shift another filter 300 ms (rotation time until next hole on the wheel)		—
Operating environment		<ul style="list-style-type: none"> <li>• Indoor use</li> <li>• Ambient temperature: 5 ° to 40 °C (41 ° to 104 °F)</li> <li>• Maximum relative humidity: 80% for temperatures up to 31 °C (88 °F), decreasing linearly through 70% at 34 °C (93 °F), 60% at 37 °C (99 °F), to 50% relative humidity at 40 °C (104 °F)</li> <li>• Supply voltage fluctuations: Not to exceed <math>\pm</math>10% of the normal voltage</li> </ul>		

## Dimensions

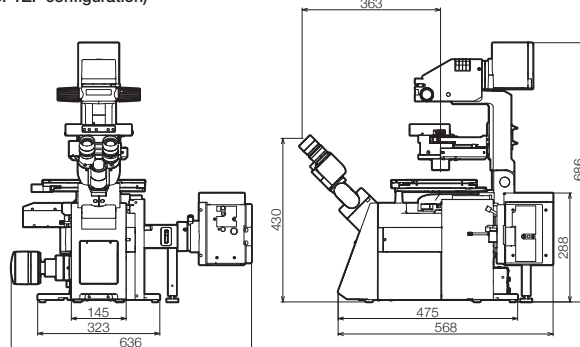
(Unit : mm)

### IX83: Two-Decks (IX83P2ZF configuration)



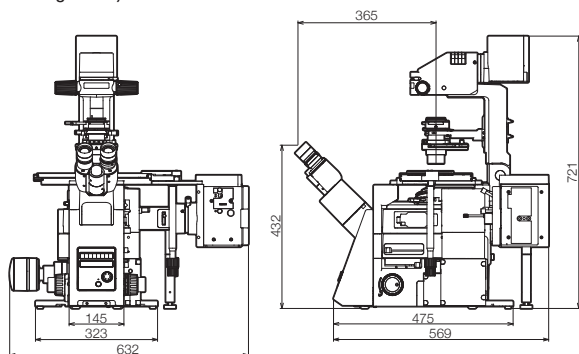
Weight: approx. 54 kg Power consumption: approx. 530 W

### IX83: One-Deck (IX83P1ZF configuration)



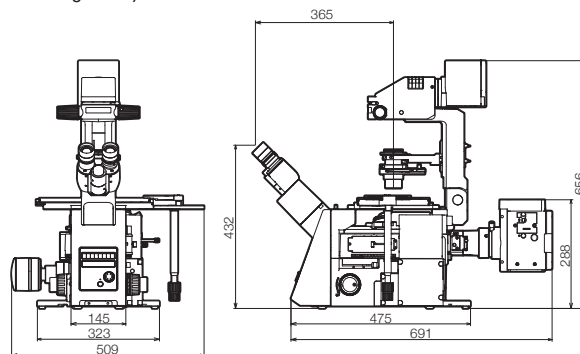
Weight: approx. 47 kg Power consumption: approx. 370 W

### IX73: Two-Decks (IX73P2F configuration)



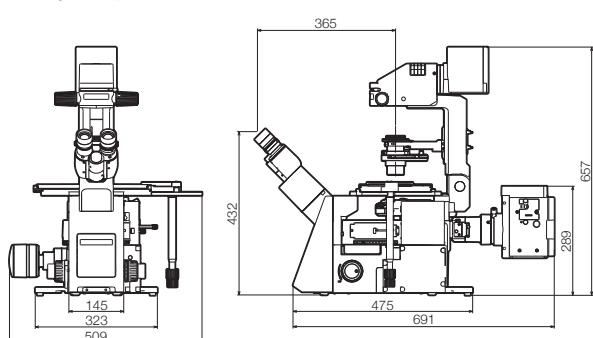
Weight: approx. 41 kg Power consumption: approx. 310 W

### IX73: One-Deck (IX73P1F configuration)



Weight: approx. 35 kg Power consumption: approx. 310 W

### IX53: One-Deck (IX53P1F configuration)



Weight: approx. 32 kg Power consumption: approx. 300 W

- OLYMPUS CORPORATION is ISO14001 certified.
- OLYMPUS CORPORATION is FM553994/ISO9001 certified.
- OLYMPUS CORPORATION is MD540624/ISO13485 certified.
- Illumination devices for microscope have suggested lifetimes. Periodic inspections are required. Please visit our website for details.

- All company and product names are registered trademarks and/or trademarks of their respective owners.
- Images on the PC monitors are simulated.
- Specifications and appearances are subject to change without any notice or obligation on the part of the manufacturer.

[www.olympus-lifescience.com](http://www.olympus-lifescience.com)

**OLYMPUS®**

For enquiries - contact

[www.olympus-lifescience.com/contact-us](http://www.olympus-lifescience.com/contact-us)

#### OLYMPUS CORPORATION

Shinjuku Monolith, 2-3-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-0914, Japan

#### OLYMPUS EUROPA SE & CO. KG

Wendenstrasse 14-18, 20097 Hamburg, Germany

#### OLYMPUS CORPORATION OF THE AMERICAS

3500 Corporate Parkway, P.O. Box 610, Center Valley, PA 18034-0610, U.S.A.

#### OLYMPUS SINGAPORE PTE LTD.

491B River Valley Road, #12-01/04 Valley Point Office Tower, Singapore 248373

#### OLYMPUS MEDICAL SYSTEMS INDIA PRIVATE LIMITED.

Ground Floor, Tower-C, SAS Tower, The Medicity Complex, Sector-38, Gurgaon 122001, Haryana, India

#### OLYMPUS LATIN AMERICA, INC.

5301 Blue Lagoon Drive, Suite 290 Miami, FL 33126, U.S.A.

#### OLYMPUS (CHINA) CO., LTD.

A8F, Ping An International Financial Center, No. 1-3, Xinyuan South Road, Chaoyang District, Beijing, 100027 P.R.C.

#### OLYMPUS KOREA CO., LTD.

8F Olympus Tower, 446 Bongeunsa-ro, Gangnam-gu, Seoul, 06153 Korea

#### OLYMPUS AUSTRALIA PTY. LTD.

3 Acacia Place, Notting Hill VIC 3168, Australia