OLYMPUS

Your Vision, Our Future

Fluorescence and CLSM

FSX100 and FluoView FV10i

All-in-One Box Microscopes

Discovery – At Your Fingertips

ALL YOU NEED IS A FINGER AND A TASK

Microscopy for all

Rarely does a novel instrument completely change the way we think about a process, but the new all-in-one box microscopes from Olympus achieve this for microscopy. They make advanced imaging accessible to all, without compromising on quality or speed. The FSX100 provides high-quality multichannel fluorescence, whereas the FluoView FV10i enables complex confocal laser scanning microscopy – both through a highly intuitive user interface.

Your successful future

Olympus is dedicated to making state-of-the-art microscopes, accessories and imaging system solutions to support your work on all levels. We have therefore worked closely with customers to produce the ultimate in flexible and accessible microscopes. As a result, our goal is your success, both now and in the future.

This image shows a flock of white-faced whistling ducks (*Dendrocygna viduata*) flying in “V” formation

EMPOWERING TECHNOLOGY

Refined user integration

Nature gives us many examples of where a mix of components can be put together so perfectly that they facilitate something unique, such as a bird's wings enabling it to fly. Imagine if this could be done for complex scientific techniques such as microscopy. By seamlessly coupling high-quality microscopy and imaging hardware with precision automation and user-centric software within the FSX100 and FluoView FV10i all-in-one microscope imaging systems, Olympus has achieved this exceptional feat.

This image shows a close-up of a bird's wing.

A CHANGE FOR THE GOOD

The increasing number of applications for microscopes has fuelled the need for making complex and advanced microscope imaging techniques available to a broader audience. Multichannel fluorescence microscopy, for instance, has provided insights into the localisation, colocalisation and function of many different proteins and other molecules across a large number of cell types. Confocal microscopy has taken this to another level, providing increased clarity and resolution. Controlling microscope systems capable of such imaging, though, often takes much practice and requires regular use to ensure the best images. The Olympus all-in-one box microscope family is set to change this.

Fully assisted fluorescence

A When the FSX100 microscope is turned on, the user is guided to load the sample onto the adaptable stage. Once loaded, the software interface enables the user to define the set-up within the instrument by selecting an observation mode (fluorescence and phase contrast, phase contrast only or brightfield) as well as an acquisition mode (snapshot, time lapse, Z-stack or stitching). On clicking “Start”, an auto-focused auto-exposed overview image is created at low magnification from where the user can define up to 30 regions of interest (ROI) for imaging. On zooming in on one region the users can chose to proceed directly to capturing the image since light intensity, exposure time and focus are automatically adjusted by the system, or they can set all these parameters manually, change magnification, select fluorescence channels for image overlay and use the motorised coverglass correction to optimise the image – all without actually touching the instrument. Capturing images is equally straightforward, ensuring that all data is captured and stored logically with the click of a button.

Guided confocal

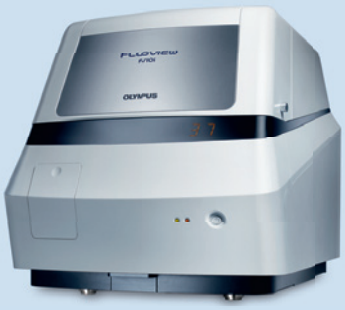
B With the different hardware requirements of the FluoView FV10i confocal laser scanning microscope (CLSM), the user is asked to define the fluorescence dyes in use so that the correct lasers can be used and the right wavelength range set for the detectors. The perfectly focused and exposed overview image is then created, from where users zoom into the ROI and are presented with the acquisition options along with the individual and overlaid channels. The overview image is also shown for easy navigation, and the user has full control over the zoom, focus, laser output, channel sensitivity, Z-stack and time-lapse settings, as well as the sample in view (for multi-sample slides or multiple culture dishes). Images are again captured easily with any associated metadata.

A FSX100

All-in-one fluorescence box microscope

B FV10i

All-in-one confocal laser scanning box microscope



A **All-in-one**
Box microscopes

B **UIS2 optics**
High-performance, lead-free plan optical system

UIS2
World-leading optics

C **"Plug and play"**
Mobile imaging systems

BEGINNERS AND PROS

A The Olympus all-in-one microscope concept ensures that users of any level of experience can carry out high-quality microscopy using advanced imaging techniques such as time lapse, Z-stacks and multi-area imaging. The speed and ease with which fluorescence and confocal laser scanning microscopy images can be created not only makes the FSX100 and FV10i ideal for beginners, but also offers experienced users unique capabilities. For example, the FV10i water immersion model is fitted with an incubator, ensuring that long-term live cell confocal microscopy can be carried out with ease. Furthermore, the self-contained and portable nature of the all-in-one microscopes makes them particularly useful where bench space is an issue or where there is a need to avoid transporting samples.

Optically superior

B All Olympus microscopes are developed around world-leading optics, and the all-in-one microscopes are no exception – fitted throughout with Olympus UIS2 optical components matched to the capabilities of each instrument.

Motorisation

The complexity of controlling a microscope for fluorescence or confocal imaging means that there are many components to motorise in order to provide full automation. The Olympus all-in-one microscopes are fully motorised to provide very precise control over all functions such as focus, objective changes and optical zoom, cover glass thickness correction, dichroic mirror changes and X,Y stage. On the FV10i water immersion model, for example, even the water supply to the objective/sample interface is automated.

Mobility is key

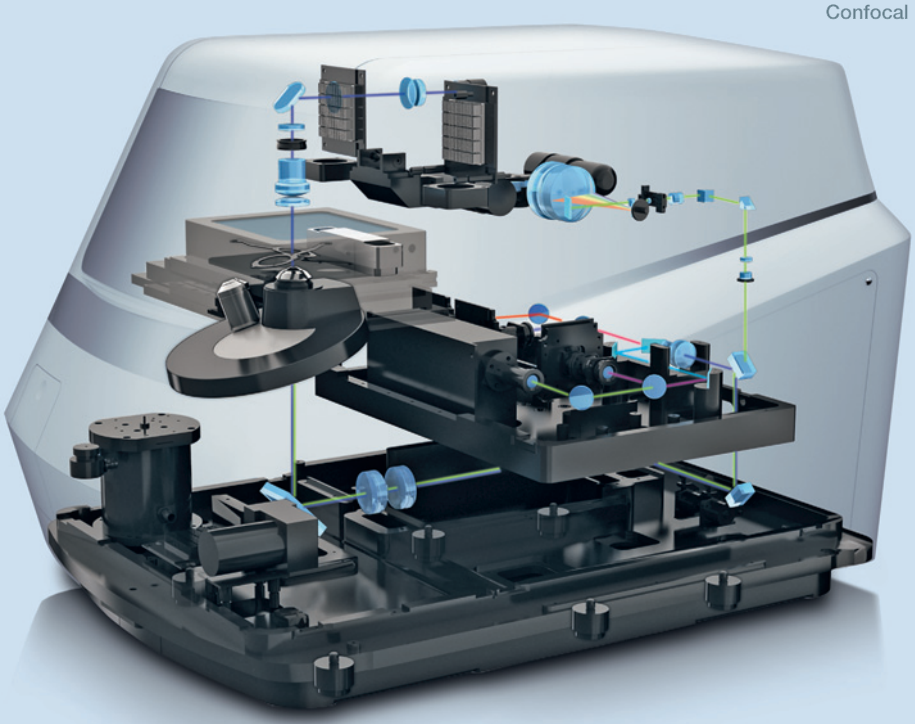
C Moving and setting up a basic microscope is relatively simple, but when you add fluorescence or laser diode illumination, precise motorisation and automation, PC user interface and a darkroom, the task is no longer as straightforward. The Olympus all-in-one microscopes have been designed with this in mind – all the microscopy and imaging components are self-contained and developed to be robust enough to move around on a trolley. As a result, microscopy imaging can be carried out at the point of discovery rather than at a separate location elsewhere in the building.

D **FSX100**

Fluorescence microscope

E **FluoView FV10i**

Confocal laser scanning microscope



A **All-in-one**
Fluorescence microscope

B **Pre-aligned burner**
Metal halide fluorescence light source

FSX100

A Fluorescence microscopy is one of the most common imaging techniques and has been instrumental in the discovery of many important scientific facts. Furthermore, a broader range of scientists are turning to fluorescence microscopy to see what is happening at the cellular and subcellular levels. As a result, not everyone that uses a microscope has the experience to generate good images on their own and therefore skilled users are called upon for assistance, impacting on their time. The FSX100 all-in-one fluorescence microscope from Olympus ensures that all users can maximise the imaging of their samples, quickly and easily, and frees up the experienced users to pursue their research.

Worry-free fluorescence

B The Olympus FSX100 is supplied with three high-quality fluorescence excitation filters and can be fitted with a fourth if needed. The three supplied filters – ultraviolet (360–370 nm), blue (460–495 nm) and green (530–550 nm), cover the excitation requirements for many standard fluorescence dyes, such as DAPI, FITC, TRITC and GFP. The metal halide fluorescence light source has been developed to provide steady illumination throughout each experiment and the lifetime of the burner. It is also pre-centred, which makes changing the burner very straightforward. What is more, by adding a halide gas to the burner, some of the metal “burnt” from the electrodes and deposited on the inside of the glass is recycled back to the electrodes. This not only decreases the rate at which the electrode gap grows, but also reduces the build-up of metal on the glass.

An ND filter ensures that only the right amount of excitatory light reaches the sample to avoid sample bleaching in live mode, and the field stop is automatically synchronised to the optical zoom to only illuminate the part of the sample in view (the field of view). To ensure even illumination across the field of view, a fly-eye lens is used.

Brilliant brightfield

For phase-contrast and brightfield imaging, the FSX100 is fitted with an LED white light source, providing exceptional illumination stability and colour consistency throughout its 16,000 hours expected lifetime. LEDs also provide colour consistency throughout the intensity range and therefore brightness can be controlled without worrying about changes in colour, as is the case with tungsten light sources.

Fantastic phase

The system uses a projection phase contrast set-up, where the phase ring is introduced at the level of the filter turret, rather than being positioned permanently in the objective. As a result, there is no requirement for a dedicated phase-contrast objective and the phase ring is only placed in the lightpath when needed. This also ensures that fluorescence signals are not impeded during fluorescence imaging – which is ideal for samples with weak signals.

On stage

C D The FSX100 supports a number of different specimen formats including standard glass slides and glass and plastic culture dishes. Importantly, the stage is completely contained within the instrument, ensuring that once the sample is loaded, it is essentially held within a darkroom, making fluorescence imaging much more efficient. Furthermore, the precision of the stage ensures that up to 30 separate points can be bookmarked for readout during image capture. The stage also enables the system to stitch together 3 x 3 and 5 x 5 image montages at 20x to 60x magnifications.

Optically advanced

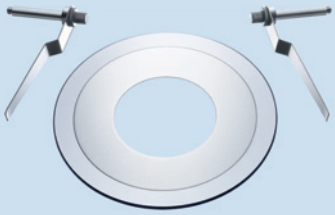
E With Olympus UIS2 optics fitted throughout, the FSX100 provides the best possible transmission of both fluorescence and brightfield illumination, with minimal spherical and chromatic aberrations. The 40x SAPO objective has a very high NA of 0.95 and is fitted with a motorised cover glass correction collar. Due to the high NA of the objective and the superior 0.42x–2x zoom optics, the FSX100 provides a zoom range of 17x–80x without any “empty magnification”, ensuring that resolution increases along with magnification. As a result of the high-end optics, users can be assured of the same clarity and precision they have come to expect from Olympus.

Capturing it all

Both fluorescence and brightfield images are captured via a high-performance CCD camera, which offers excellent monochrome sensitivity and colour reproduction with a maximum resolution of 12.5 megapixels. Control of this camera is fully integrated into the software, ensuring that image capture is always optimised.

C Specimen holder

Ø 50 mm hole plate



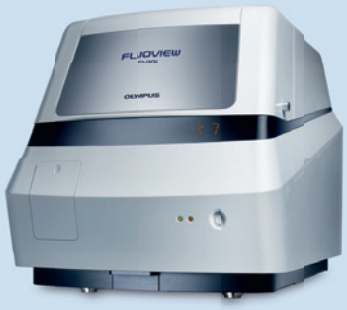
D Specimen holder

For slides and Petri dishes

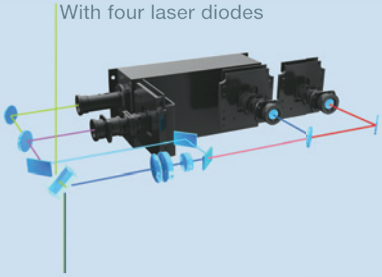
E UPlanSApo 40x

With very high NA

A **All-in-one**
Confocal laser scanning microscope



B **Laser combiner**
With four laser diodes



C **New spectral system**
With 2 fluorescence channels

FLUOVIEW FV10i

A Confocal microscopy takes fluorescence imaging to the next level with pin-point illumination, providing exquisite clarity and resolution. The Olympus FV10i is a confocal laser scanning microscope and is available in either oil or water immersion models. Its compact design is possible due to Olympus' excellence in optoelectronic design and implementation.

Unique confocal system

B The FV10i features 4 laser diodes (405, 473, 559 and 635 nm), carefully arranged in a compact laser combiner housed within the body of the FV10i. The laser diodes are maintenance-free and provide very consistent illumination with low power consumption, which also means very little associated noise pollution. Furthermore, to prolong lifetime, the laser diodes are only switched on during the scanning process.

C On the detection side, the FV10i is fitted with a newly developed spectral system featuring two fluorescence channels supplied by a novel grating, beam splitter and slit arrangement. In addition to this, each channel is fitted with a variable barrier filter which is set automatically to match the wavelength range for each fluorescence dye in use. The system can acquire two fluorescence channels and a phase contrast channel simultaneously or via a line sequence mode, or up to four fluorescence channels and a phase contrast channel using a frame sequence mode, ensuring that multiple fluorescence dyes can be imaged easily.

Immersion optics

The FV10i is available in either oil immersion (FV10i-O) or water immersion (FV10i-W) models, which ensure that this easy-to-use system is capable of utilising high-NA Olympus UIS2 SAPO objectives, providing maximum resolution and clarity. Both models are fitted with a dry 10x (NA 0.4) objective for creating the overview maps and low power images. Combined with the optical zoom, this objective provides a magnification range of 10x–60x. In the water immersion model, the 60x (NA 1.2) objective is fitted with an automated correction collar to ensure that different cover glass/culture dish thicknesses can be accommodated. The oil immersion model also features a 60x objective with an NA of 1.35. The optical zoom offers magnification ranges of 60x–600x using these immersion objectives.

Data genius

The FV10i is equipped with advanced data handling capabilities enabling hard disk drive (HDD) recording. By using this recording technology, large volumes of data can be captured, without restriction, and images can be edited and analysed as soon as captured even if the system is still recording data. What is more, HDD recording can be carried out on any available network drive (LAN), enabling the user to edit and analyse away from the instrument.

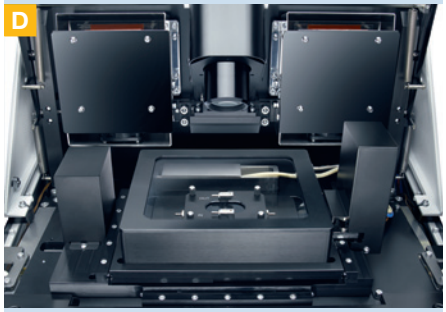
Point of discovery

D Both the FV10i-O and FV10i-W feature a vibration isolation system, which ensures that imaging is essentially stable, even if the bench top is used for other processes as well as microscopy. To further ensure that the FV10i instruments can be placed directly at the point of discovery, once a sample is loaded and the lid shut, the imaging compartment doubles up as a darkroom, increasing the efficiency of confocal imaging so that laser intensities can be minimised and even the weakest of signals can be detected.

Motorised stage

The accurate stage in the FV10i not only provides rapid navigation around the sample, but also enables ten regions of interest to be bookmarked in each map image for readout during image capture. The stage also enables the system to combine 2 x 2 and 3 x 3 mosaic images.

D



Integrated and incubated darkroom on a motorised stage

FLUOVIEW FV10i-W – THE IDEAL LIVE CELL ENVIRONMENT

The FV10i water immersion model is fitted with additional components to provide the ideal environment for long-term, high-quality live cell imaging.

Incubated

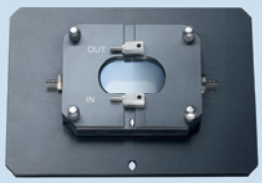
D E The FV10i-W has the additional benefit of a built-in incubator which enables time-lapse imaging of live cells over prolonged periods of time. The simplified incubator provides a temperature of 37 °C for the sample, chamber and optical components. Humidity is also held at 95% and the system is prepared to introduce premixed CO_2 gas. What is more, a specialised incubator pod is also available for standard 35 mm glass bottom culture dishes. This provides an excellent system for circulating culture media and enabling the controlled delivery of compounds, such as drugs or stressors, to the cell culture to view the response of cells.

Wet, wet, wet

The FV10i-W is fitted with an automated water dispensing system which ensures that there is always immersion water between the 60x objective and the sample when it is in use, without the user needing to worry. Before dispensing, previous immersion water is blown away from the interface with a blast of air. A dedicated built-in UV LED within the water tank ensures sterile water conditions to avoid any unwanted contamination.

E **Stage inserts**

For different sample formats



ACCESSIBLE MICROSCOPY

Set, select, capture

It is an amazing sight to watch thousands of birds flying in an amorphous formation with no single leader. Astonishingly, each bird knows intuitively where they are heading and when to turn or swoop. The Olympus all-in-one box microscope range enables all users, even those who have never used a microscope before, to have a similar intuitive, almost a priori, knowledge of how to achieve the best images from their samples. The “set, select, capture” concept enables the user to load their sample and then be guided through a straightforward acquisition process to generate breathtaking fluorescence or even confocal images.

This image shows a murmuration of starlings (*Sturnus vulgaris*) in Gloucestershire, UK.

POWER IS NOTHING WITHOUT CONTROL

A The Olympus all-in-one microscopes bring a higher level of usability to microscopy than has ever been seen before. This not only ensures that a broader range of people can access more advanced imaging techniques, but that they can bring an extra dimension to their research, expanding the tools they use, and as a result discover more.

Set – the sample

B When the all-in-one microscopes are turned on, the user is guided to load the sample onto the adaptable stage. Once loaded, the user selects the imaging mode (FSX100) or defines the fluorescence dyes to be imaged (FV10i). Once this is done, the sample is ready to be imaged.

Select – the regions of interest

The Olympus all-in-one microscopes quickly create overviews (or “map” views) of the sample on the stage. From this overview, the user can select a region of interest (ROI) to investigate more thoroughly. This map is also then available for rapid navigation around the sample in all subsequent steps.

Capture – high quality

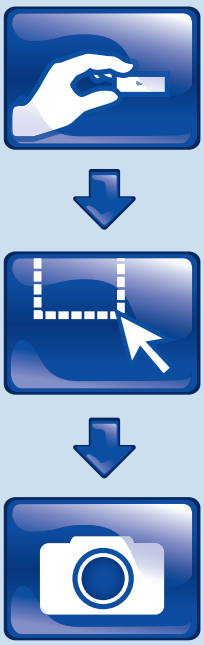
This is where the power of the all-in-one principle comes into its own. With the ROI in the imaging frame, the user can either start imaging immediately or, if required, fine-tune the settings such as the magnification power, focus, exposure, laser power (FV10i), or even change the imaging mode and navigate around the sample. On capturing the image(s), the associated metadata is also recorded, ensuring that the experiment can be repeated with great ease.

A All-in-one

Simplicity for great results

B Set, select, capture

Simplicity for great results



A **All-in-one**
Fluorescence microscope

FSX100

B **Acquisition modes**
Selection of acquisition conditions

Simple acquisition

Time lapse

Z-stack

Stitching

C **Macro view**
Image navigator

D **User assistance**
Built-in step-by-step guide

FLUORESCENCE REDEFINED – FSX100

A Even a well-managed fluorescence microscope requires many user operations to capture high-quality images. There are many filters, inserts and mirrors to control, and even digital cameras can require complex set-up. If a microscope is not managed well, then the user may also need to align the burner and the phase rings.

Stepping forward in time

B The FSX100 removes these often complex user steps, automating almost everything except sample loading, for which the user is visually guided. Once the sample is loaded, the user selects the desired observation and acquisition modes. The FSX100 then creates an autofocused and auto-exposed overview image of the sample from which the starting point for the investigation is chosen. ROIs are selected simply by positioning an adjustable frame around the desired area, which also displays the magnification required and resultant field size. Users can select up to 30 ROIs and define imaging processes for each region.

Remaining focused

On zooming into a region of interest, the FSX100 maintains the perfect image, ensuring that the user can remain fixed on the experiment rather than the operation of the instrument. With the ROI displayed in the main view window, the scientist is presented with a highly intuitive screen providing control over the most important features, such as the shutter, focus, exposure, cover glass thickness, magnification and colour channel.

Seeing is believing

C A small overview image is shown which enables quick navigation to a new ROI. The main viewing window can be changed to show each individual channel or to overlay them for one clear analysis of multicolour fluorescence samples. The display window can also be changed to show all channels separately and simultaneously.

Real-time image quality

A real-time image quality filter enables users to apply three levels of noise reduction as well as edge sharpness enhancement algorithms to samples if required. An automatic black balance correction facility can also be applied to ensure smooth background across the sample (more experienced users can take manual control of this balancing).

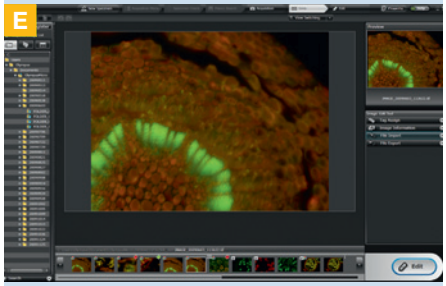
A helping hand

D A built-in user assistance resource provides additional guidance for inexperienced users, guiding them through the process step by step. This can be turned on and off as appropriate depending on how confident the user is.

Data analysis and storage

E As well as the real-time image quality facility, various filters are available for post-processing to improve or emphasise the whole image or just key features. What is more, images can be labelled with graphics and text on a separate overlay to highlight important points. The original image is not affected and the markup overlay can be hidden if not needed. Basic measurements can be performed, such as line length, area and brightness, all of which can be exported to excel for further analysis.

The FSX100 is equipped with an excellent file management library system which ensures that images and data are very easy to find and can be viewed in a number of different formats. Files can also be tagged with user-defined flags to enable grouping and quick sorting. Importantly, image capture settings from a file can be applied to a new image with the simple click of a button: as a result, scientists can be sure that settings are consistent.

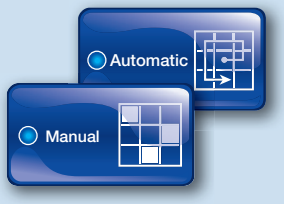


File management library system

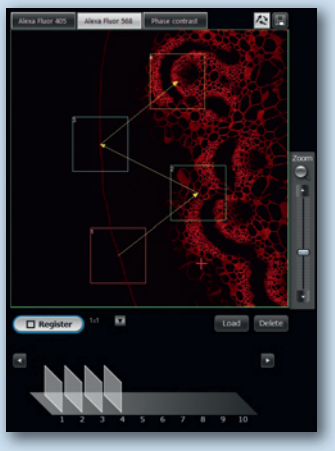
A **All-in-one**
Confocal laser scanning microscope

FV10i

B **Rapid navigation**
Mosaic image readout



C **ROI selection**
Easy navigation on the stage



D **Acquisition mode**
Selection of acquisition conditions

Time lapse

Z-stack

Z-stack – time lapse

Multi-area – Z-stack – time lapse

CLEVER CONFOCAL – FLUOVIEW FV10i

A Confocal microscopy samples are prepared in the same way as for fluorescence microscopy and are also often checked on a fluorescence microscope before being taken to the confocal. Where fluorescence microscopy has a number of procedures that are complex for the inexperienced user, confocal laser scanning microscopy (CLSM) can appear a further step more intricate. Even the concept of confocal microscopy can be difficult to explain. Here the FV10i all-in-one microscope from Olympus offers a double advantage: not only does it remove the complexity of setting up and controlling a CLSM, but it also offers a springboard from which scientists can learn how confocal microscopy works.

Accessibly advanced

B The FV10i takes users from sample to results very quickly, without compromising on quality. It does this by automating many of the processes, leaving the scientist to make important choices, such as which regions to image and what methods to use. Once the user has followed the clear instructions on how to load their sample(s), be it a slide, culture dish or the unique culture pod, they select the fluorescence dyes used in their sample. This enables the instrument to prepare the right lasers and set the correct detection wavelengths for the two confocal channels. All other optical components are then optimised and a low resolution overview image created for navigation. This is created in autofocused and auto-exposed sections, either as an automated spiral from the centre out, or, if the position of the region of interest is known, manual mode enables the user to define the sections to be shown. The fluorescence and phase contrast channels can be viewed separately or overlaid depending on the requirements. The overview screen also enables users to move between different samples on multi-position slides or to different culture dishes on the three place holders.

Regions of interest

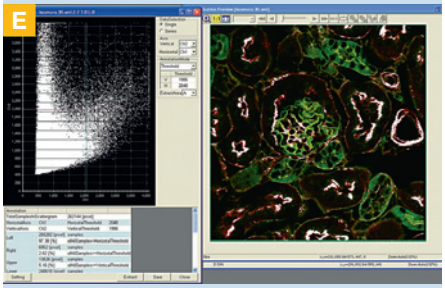
C The ROI can be displayed as five separate channels (four for fluorescence and one for phase contrast) as well as an overlay image of all five channels. Along with this main image, the user is presented with intuitive areas dedicated to the imaging process. The overview and mapping position areas enable easy navigation around the samples on the stage and the register of ROIs (users can select up to 10 ROIs for each map image, defining different imaging processes for each one).

Intuitive functionality

D Clear icons identify which observation mode is currently selected and enable rapid changes between time lapse, Z-stack, Z-stack with time lapse, multi-area time lapse and multi-area Z-stacks with time lapse. On the right-hand side of the screen, the user can control the physical properties of the microscope such as zoom, focus, laser power output, detector (PMT) sensitivity, Z-stack settings and time-lapse conditions. File name and folder properties can also be set from here. As a result, the user has everything required for optimising their images and observation mode on one screen, enabling them to start the defined imaging process or take a single shot of the field of view via the relevant buttons.

Review and analysis

E The FV10i is supplied with a user-friendly data management and analysis package which ensures that all data and metadata are stored logically and that the power of CLSM imaging can be fully leveraged. The software has image analysis tools such as background correction, intensity profiling and histograms, line and series analyses and region measurement functions. The software also enables accurate analysis of colocalisation and enables calculation of the intensity ratio between two channels. What is more, Z-stack images can be combined to create 3-D images, which can be displayed using the Alpha Blend and Maximum Intensity projection method, which enables free rotation and image slicing.



Colocalisation: analysis of emission intensity overlaps between channels (white areas)

FSX100 specifications

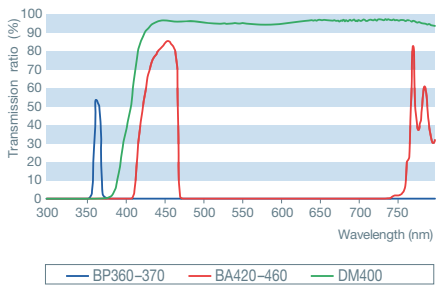
Item		Specification
Illumination	Transmitted illumination light source	White LED light source, average lifetime 16,000 hours
	Fluorescence/phase contrast filter	U excitation (BP360-370 BA420-460 DM400) equivalent to U-MNUA2
		B excitation (BP460-495 BA510-550 DM505) equivalent to U-MWIBA3
		G excitation (BP530-550 BA575IF DM570) equivalent to U-MWIG3
		Projection phase contrast plate (automatic switching)
	Fluorescence illumination light source	Metal halide lamp (pre-centred design), average lifetime 2,000 hours
	Fluorescence illumination	Fly-eye lens, field stop (working with optical zoom), ND filter (automatic switching), shutter
Image acquisition	Acquisition mode	Single, time lapse, Z-stack, and stitching (fluorescence multi-colour imaging possible for all)
	Bookmarks	Up to 30 positions, can be selected and recalled
Detection	Observation mode	Fluorescence/phase contrast, phase contrast, and brightfield
	Transmitted illumination	Condenser lens NA 0.55, working distance 27 mm, phase contrast slit
	Exposure control	Auto (with exposure adjustment), manual
	Optical zoom	0.42x to 2.0x
	Camera type	Single-panel colour CCD pixel shift type
	Imaging sensor	2/3 size (inch), 1.45 megapixels (total number of pixels: 1.5 megapixels), Peltier cooling (max: RT–10 °C)
	Effective image resolution	4,080 × 3,072 (12.5 megapixels), 2,040 × 1,536 (3.1 megapixels), 1,360 × 1,024 (1.4 megapixels),
		680 × 512 (350,000 pixels), 2 x 2 binning; 680 × 510 (350,000 pixels), 4 × 4 binning; 340 × 250 (85,000 pixels)
	Sensitivity	Equivalent to ISO 200/400/800/1600
	A/D converter	12 bits per channel
Focus	Automatic focus (AF)	Automatic during the screen transition with one-click operation
	Standard objectives	Capture: 40x NA 0.95 (17x to 80x with optical zoom)
		Macro: 10x NA 0.40 (4.2x fixed with optical zoom)
	Motorised correction collar	With focusing assist
	Focus range	9 mm
XY stage	XY stage	Stroke: 56 × 26 mm (with slide glass), 11 × 11 mm (with 35 mm dish), 18 × 18 mm (with 50 mm hole plate)
		(automatic switch by recognising the specimen holder)
	Specimen holder	Accepts 1" x 3" slide, Ø 35 mm dish
		Ø 50 mm hole opening, all-metal construction
Main software features	Real-time image processing	Noise reduction (3 adjustment levels) , Sharpness (2 adjustment levels)
	Image overlay	Direct overlay function (live image)
	White balance, black balance	Preset/manual, acquisition/manual
	Image format	BMP, JPG, TIFF, AVI
	Specimen protection	Automatically shuts OFF excitation light when the system is left without any operation for a certain period of time,
		field stop automatically sets to field of view
	Auto image library	Automatically creates a folder every time specimen is changed
	Operation tutorial	Operation guidance display function
	Settings restore function	Multi-user settings storage/reproduction, imaging conditions recording/reproduction functions
	Image playback	Display switching (photo view, scale-down view, thumbnail list, detailed view)
		Time lapse/Z-stack dedicated viewer categorisation function with the colour tag
	Image editing	4-segment display dedicated to multicolour image, full-screen display, print, adding figures and text,
		scale display, date and time display, image rotation, image trimming, image size change, image processing filters,
		RGB colour adjustment (16 bits, 8 bits), greyscale conversion, overlay compensation, RGB adjustment,
		level adjustment, measurement (possible to export to Excel)
	Display frame rate	Max. 15 frames/sec. (at live image size of 1,360 × 1,024)
Control device	Interface	IEEE 1394 cable, Proprietary camera cable
	OS	Windows Vista Business SP1 (32-bit)
Room environment	Operating environment	+10 to +35 °C/35 to 80% RH (no condensation), pollution degree: 2 (in accordance with IEC 60664),
		installation (overvoltage) category: II (in accordance with IEC60664)
	Input power/Power consumption	AC 100–120/220–240 V 50/60 Hz 2.5A /1.2 A
Optional equipment	Objectives	UPLSAPO 60 x O* NA 1.35 (for oil immersion) (26x to 120x with optical zoom)
		LCACHN 40 x PHP** NA 0.55 (for plastic vessel) (17x to 80x with optical zoom)
	Fluorescence mirror unit	Free position for one custom UIS2 filter set. The custom filter cube can be used instead of one of the default cubes.
		A maximum of three fluorescence channels plus one phase contrast image can be overlayed.

*Not available: phase contrast, selection of start position, macro image framing, automatic focus and stitching images

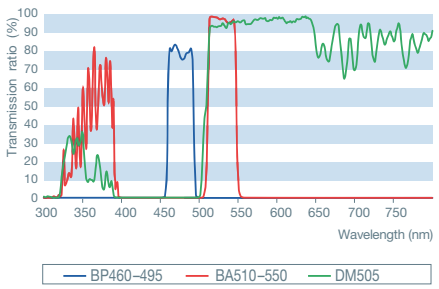
**Not available: ultraviolet fluorescence, selection of start position, macro image framing, automatic focus and stitching images

Fluorescence filter

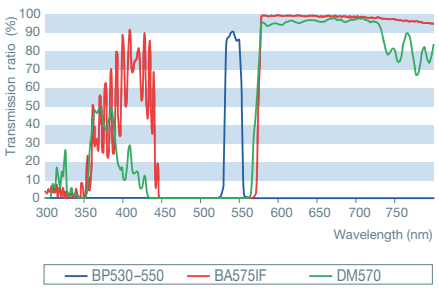
Ultraviolet excitation



Blue excitation



Green excitation



FluoView FV10i specifications

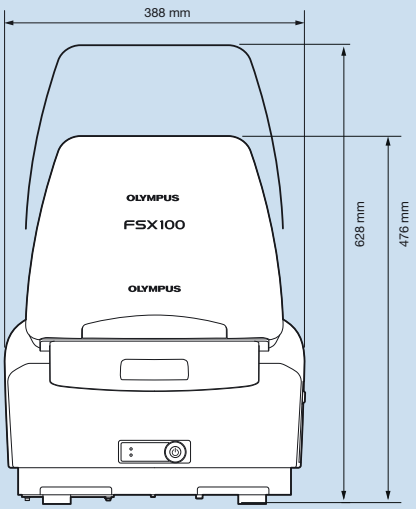
Item		Specification
Illumination	Ultraviolet/visible light LD lasers	405 nm (18 mW), 473 nm (12.5 mW), 559 nm (15 mW), 635 nm (10 mW)
	Modulation	Continuously variable by the LD direct modulation (0.1%–100%, 0.1% increment), line return period – laser OFF
Image acquisition	Scanning method	2 galvanometer scanning mirrors
	Scanning mode	Pixel size: 256 × 256 – 1,024 × 1,024, scanning speed: 0.2 s/frame (for pixel size 512 x 96), 1.1 s/frame (for pixel size 512 × 512); focusing scanning: high frame rate scan by Y-direction interlace scanning (×1, ×2, ×4), dimension: XYT, XYZ, XYZT, Rotation scanning: 0–359.9° in 0.1° increments
Detection	Detector module	Fluorescence: 2 channels, phase contrast: 1 channel, variable barrier filter mechanism for fluorescence channel by diffraction grating and slit
	Detection method	Analogue integration detection by photomultiplier
	Pinhole	Single motorised pinhole, pinhole diameter: Ø 50–800 µm, automatic setting (adjustable to ×1.0, ×1.5, ×2.0 and ×2.5)
	Field number	18
	Optical zoom	10× objectives: 1×–6× in 0.1× increments, 60× objectives: 1×–10× in 0.1× increments
	Automatic exposure	Automatic setting of the laser intensity and photomultiplier sensitivity to fluorescence intensity
Focus	Z-drive	Motorised focus, minimum increment: 0.01 µm
	Objectives	Exclusively designed 10× phase contrast objective/NA 0.4 (equivalent to UPLSAPO 10x), exclusively designed 60× phase contrast water immersion objective/NA 1.2 (equivalent to UPLSAPO 60× W)/with motorised correction collar* Exclusively designed 60× phase contrast oil immersion objective/NA 1.35 (equivalent to UPLSAPO 60× O),** remote switching from software by electric revolver
	Automatic focus (AF)	Automatic detection of interface between specimen and cover glass by laser reflection light detection, automatic detection of cover glass thickness and automatic setting of motorised correction collar*
	Water supply*	Automatic water supply and air cleaning mechanism for 60× water immersion objective
	Oil supply**	Manual, as supporting mechanism, automatic moving of XY stage to oil supply position when switching to 60x
XY stage	XY driving method	Motorized XY stage module by stepping motor, minimum increment: 0.3 µm
	Specimen holder	Only the dedicated specimen holder can be mounted, for three glass bottom dishes with 35 mm diameter,* for one set of cover glass chamber (8 wells type),* culture pod (for a glass bottom dish with 35 mm diameter),* for a glass slide, for a glass bottom dish with 35 mm diameter**
Control device	Controller	Dedicated controller PC/AT-compatible, OS: Windows Vista Business 32-bit (English version), CPU: Intel® Core™2Duo 3.0 GHz, RAM: 2 GB × 2, HDD: 320 GB × 2, Special PCI Express I/F board built in, media: DVD Multi-drive built in
	LCD monitor	24-inch LCD monitor × 1, WUXGA (1,920 × 1,200)
Main software feature	Image acquisition mode	Map image, one shot, time-lapse (XYT), Z-stack (XYZ), Z-stack time-lapse (XYZT), multi-area time lapse (multi-area XYT), multi-area Z-stack time lapse (multi-area XYZT)
	Specimen setting	Automatic setting for fluorescence channel and laser according to dye selected from dye list
	Map image acquisition	Automatic selection of map image of 3 × 3 – 9 x 9 fields according to 10× objective lens, and manual selection of map acquisition area
	Multi-area time lapse	Automatic multi-area time lapse by motorised XY stage, setting for each registered point: image size, scanning speed, crosstalk reduction, pinhole diameter, rotation angle, galvano zoom, acquisition channel, laser power, PMT sensitivity, Z condition, maximum register number: 10 items per one container, maximum interval time: one hour, maximum acquisition number of times: 3,000 times per one point
	Image acquisition area	Area appointment: all area, clipping square area (minimum area: 96 × 96 pixels)
	Image display	Display by channel, overlapping display, image in progress review
	Crosstalk reduction	Line sequential action (2-channel), or frame sequential action (3-channel and 4-channel)
	Acquisition image file type	Olympus image format (OIF)
	Image file type available for viewing	Olympus image format (OIF, OIB), multi-TIFF format (8/16-bit greyscale, index colour, 24/32/48-bit colour), JPEG, BMP, TIFF
	Image editing	LUT: pseudo colour setting, contrast adjustment, comment: inputting graphic, text, scale, etc., image extraction, combination
	3-D image construction	3-D display: Alpha Blend method, Maximum Intensity projection method 3-D animation display, free orientation of cross section display
	Image processing	Various types of image filter: median, enhanced edge, etc., calculations: inter-image, arithmetic and logical operation
	Image analysis	Area and perimeter measurement, time-lapse measurement, colocalisation analysis
Room environment	Temperature	18–28˚C
	Humidity	30–80% (non-condensing)
Incubator*	Room environment*	Temperature: 37 ± 1 °C Humidity: more than 90%, CO_2 concentration: 5% (recommended), 1 – joint fitting (Ø 2 mm) for introduction of premixed CO_2 gas
	Heating method*	Non-contact heating by resistive heater mounted on frame section

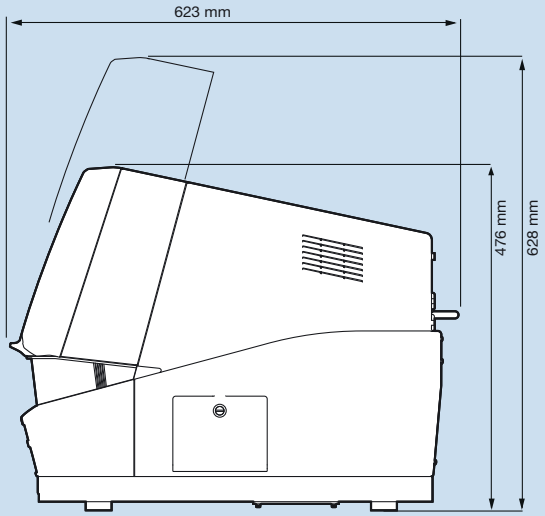
*applicable only to FluoView FV10i-W

**applicable only to FluoView FV10i-O

Dimensions

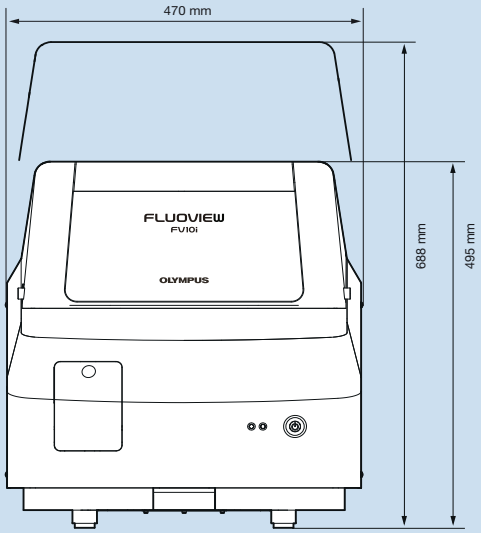
FSX100

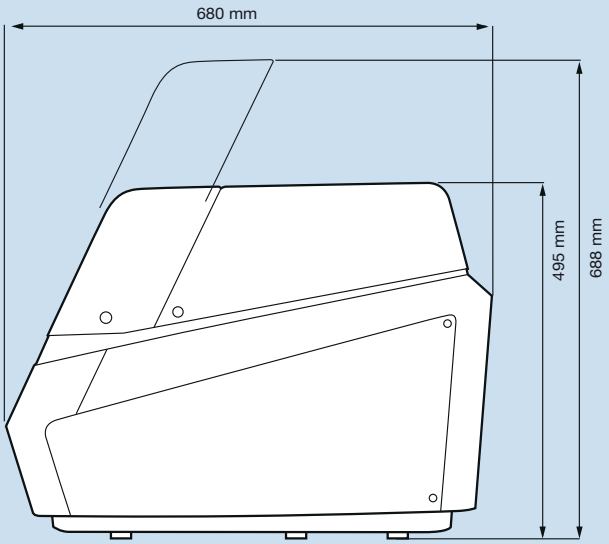




Weight: ~35 kg, power consumption: 280 W

FV10i





Weight: ~62 kg, power consumption: 420 W

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