

# OLYMPUS®

Olympus is about life. About photographic innovations that capture precious moments of life. About advanced medical technology that saves lives. About information- and industry-related products that make possible a better living. About adding to the richness and quality of life for everyone. Olympus. Quality products with a **FOCUS ON LIFE**

FIXED STAGE UPRIGHT MICROSCOPE

## BX51WI

FIXED STAGE UPRIGHT MICROSCOPE  
WITH MOTORIZED FOCUSING

## BX61WI

*UIS*  
UNIVERSAL  
INFINITY SYSTEM



# A dual commitment: Preventing vibration and protecting living cell specimens

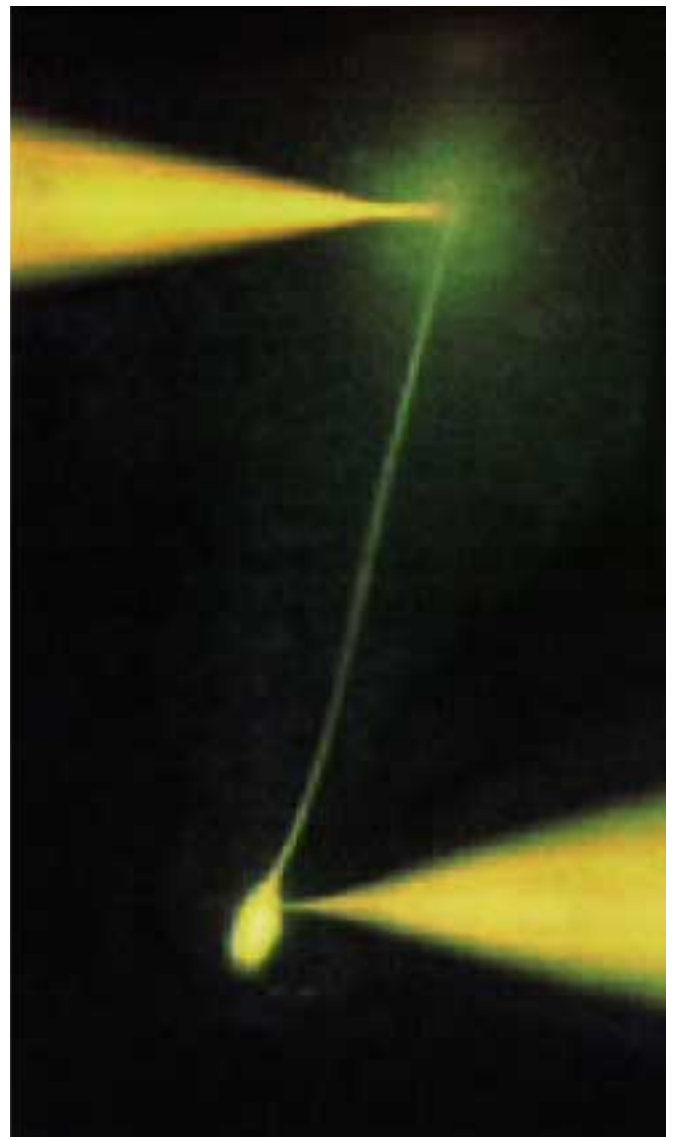
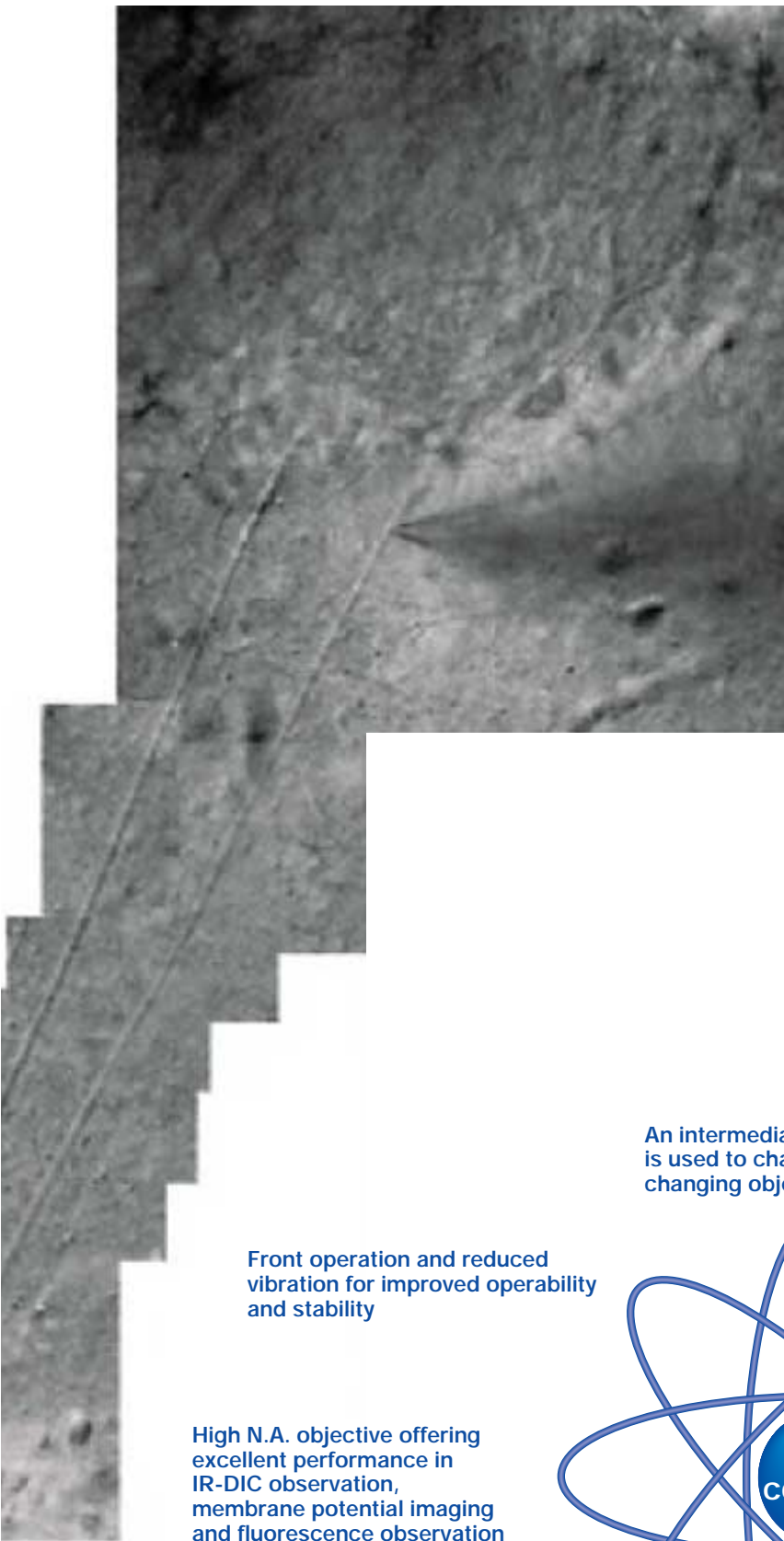
One design theme was central to the development of the new fixed stage microscopes from Olympus — achieve an even higher standard of stability and reliability in electro-physiological applications. The result is a wide range of advanced new features to avoid and prevent vibration. These innovations include the introduction of a new observation method along with detailed analysis of operability and further refinements in image clarity. These improvements work together to make patch clamp operations smoother and more efficient than ever before. Combined with the traditional excellence of UIS optics, the new Olympus fixed stage microscopes define new levels of quality in both performance and ease of use.



BX51WI with Luigs & Neumann Accessories.



Combined with WI-DPMC.  
BX51WI with Burleigh Accessories

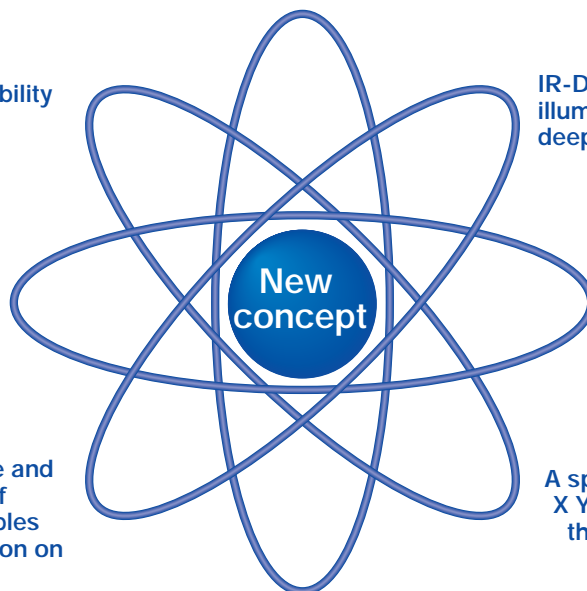


An intermediate magnification changer  
is used to change magnification without  
changing objectives

Front operation and reduced  
vibration for improved operability  
and stability

High N.A. objective offering  
excellent performance in  
IR-DIC observation,  
membrane potential imaging  
and fluorescence observation

Raising the objective and  
lowering the stage of  
the microscope enables  
easier experimentation on  
small animals



IR-DIC and IR oblique  
illumination condenser for  
deep-section observation

Full-system physiological  
confocal microscope,  
BX61WI with Z-axis motor  
is LSM ready

A special bridge stage and  
X Y mover are available for  
the microscope frame

Fluorescence macro objectives for  
membrane potential observation

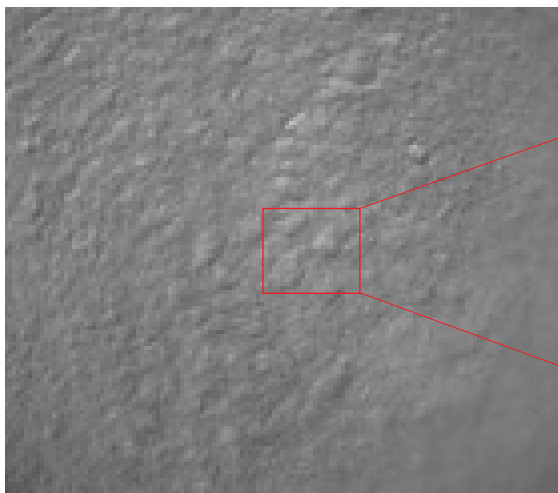
# Interchanging low and high magnifications without changing objectives.

## A new concept in vibration-free design.

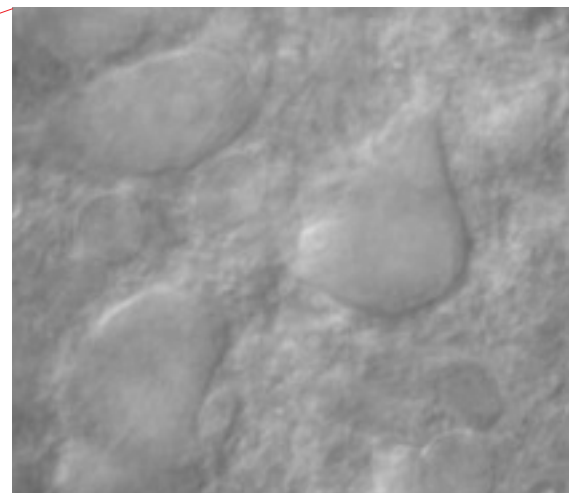
A major concern for researchers conducting electro-physiology experiments is the vibration which occurs when switching objectives and the resulting interference this can cause to the specimens and adjacent equipment. To solve this problem, Olympus introduces a new concept — the provision of an intermediate magnification changer in combination with the new High N.A. long working distance 20x objective that allows the user to switch between low and high magnifications without the need to switch objectives.



7× Intermediate magnification 0.35 x



80× Intermediate magnification 4 x



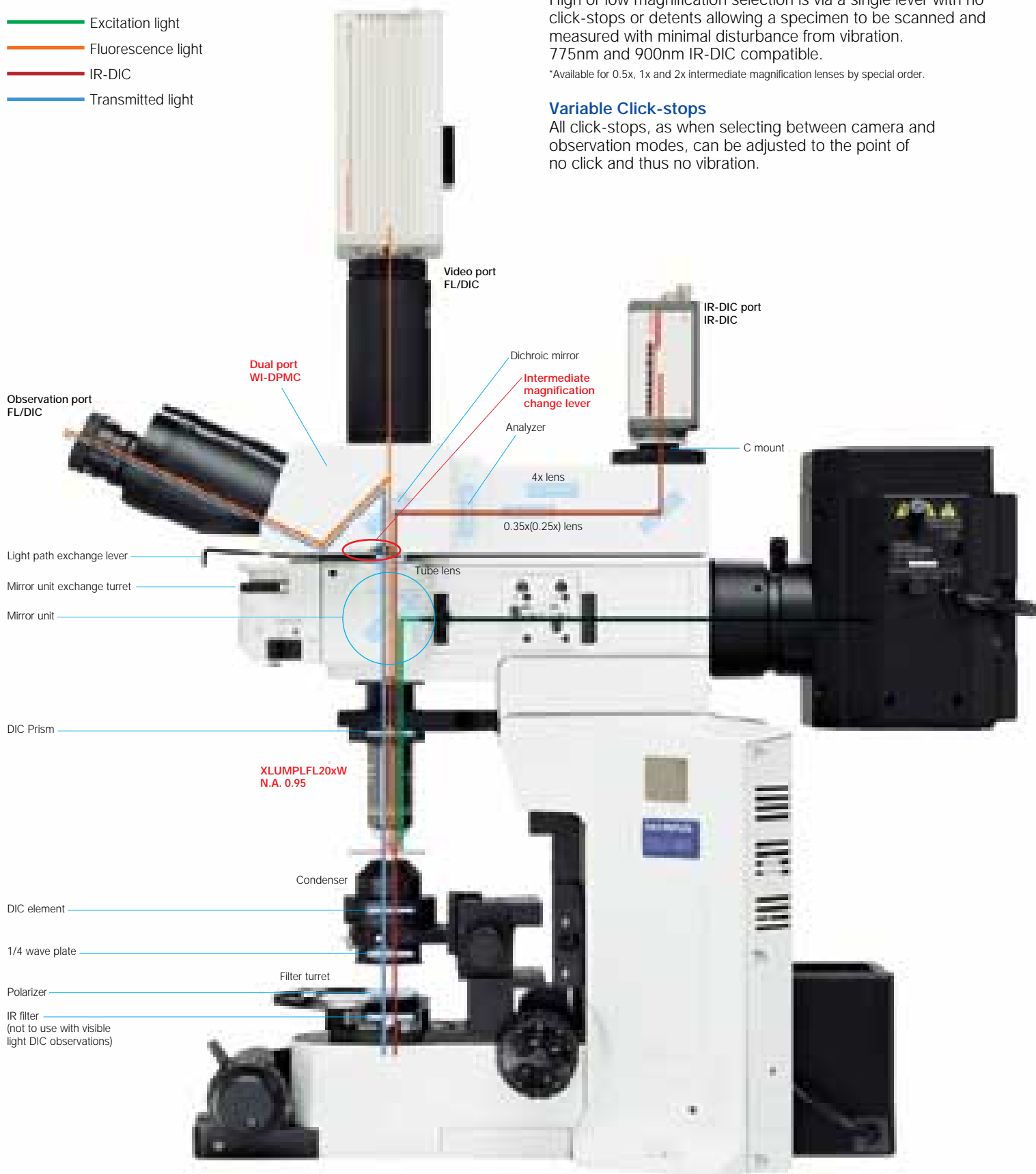
Examples using  
intermediate  
magnification  
changer WI-DPMC



### New 20x objective (XLUMPLFL20XW) N.A. 0.95; W.D.: 2.0mm

The new 20x water immersion objective makes high-resolution observation possible with a wide range of intermediate magnification lenses. Since exchanges between low and high magnification are performed through the intermediate magnification changer, vibration is reduced to a minimum and the usual concern about collisions between objectives and patch clamp electrodes is eliminated.

- Excitation light
- Fluorescence light
- IR-DIC
- Transmitted light



### Simultaneous fluorescence and IR-DIC observations

With the included 690nm dichromatic mirror in the WI-DPMC, fluorescence light is sent to the front port, and IR-DIC light is sent to the back port allowing two cameras to image simultaneously with no vibration introduced by light path selection.

### Variable magnification dual port (WI-DPMC)

The WI-DPMC rear camera port includes a 2 position intermediate magnification selector. A high magnification 4x intermediate lens is included and a (0.25x, or 0.35x) low magnification lens is optional. High or low magnification selection is via a single lever with no click-stops or detents allowing a specimen to be scanned and measured with minimal disturbance from vibration. 775nm and 900nm IR-DIC compatible.

\*Available for 0.5x, 1x and 2x intermediate magnification lenses by special order.

### Variable Click-stops

All click-stops, as when selecting between camera and observation modes, can be adjusted to the point of no click and thus no vibration.

# Front operation with no shock and no noise. A new concept in experimental operation.

The new front operation system prevents interference in patch clamping work.

The design concept is simple and allows frequently performed operations like focusing or filter exchange to be done easily at the front of the unit.

Ample space is provided on both sides of the microscope frame and condenser, so the necessary manipulation equipment can be positioned close to the microscope.

## ① Vibration-free shutter

The fluorescence shutter slides horizontally with no detents and no vibration.



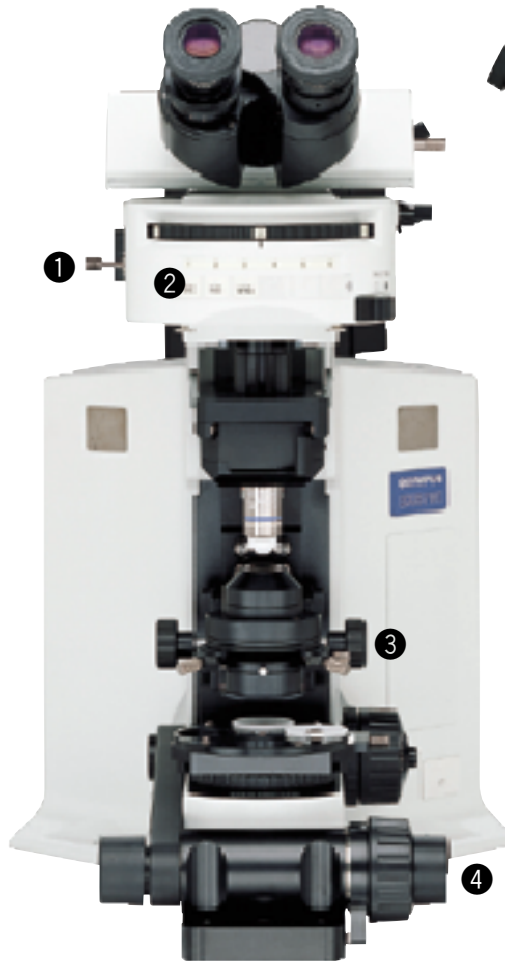
## ② Mirror unit turret with adjustable click release

The click-stop on the 6 position turret can be released with a precision screwdriver.



## ③ Ample space around the condenser

Frame designed for ample space around the condenser, making it easy to adjust Nomarski DIC contrast, exchange filters, adjust the condenser's aperture stop and to easily switch between visible light, Nomarski DIC or IR-DIC.



## ④ Front focus knobs close to the operator's hand

Fine focus control is located at the front on both sides of the microscope body. The knob on the right integrates both coarse and fine focus control.

## ⑤ Coarse focus lock lever

When engaged at the desired position, the objective can be raised with the coarse focus knob and then returned precisely to its original position.



## ⑥ A waterproofing sheet

A waterproofing sheet, attached by the supplied magnets, provides protection against liquid overflow and spills. The sheet is large enough to protect the frame, condenser and focusing mechanisms.



Olympus offers a wide choice of nosepieces for different applications.



#### Swing nosepiece WI-SRE2

Unique slim, compact design and front-to-back swing motion permits objective changes without interfering with electrodes and micromanipulators. Objective positioning incorporates a vibration-free counterspring mechanism.



#### Slide nosepiece WI-SLRE

This nosepiece is designed for the attachment of one large diameter, low magnification fluorescence objective (XLFLUOR 2x/340 or 4x/340) and one objective with normal (RMS) diameter threads. Nosepiece motion is a simple horizontal slide.



#### Single position nosepiece WI-SNPXLU

Designed to accept the unique, large diameter XLUMPLFL20x objective.



#### RMS adapter WI-RMSAD

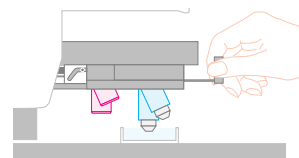
This adapter enables the attachment of an objective with RMS thread size to the WI-SNPXLU.

### The new swing-slide nosepiece prevents the intrusion of air bubbles



#### Swing-slide nosepiece WI-SSNP

This nosepiece features a new swing-slide motion, whereby the objective swings forward while being raised. As a result, the objective clears the walls of the perfusion chamber. This motion also prevents the trapping of air bubbles when the objective is lowered.



### Special bridge stage and microscope mover for the BXWI

#### ■ XY mover WI-XYM

The XY mover allows the movement of the microscope frame without moving either the specimen or electrodes. Especially useful for multiple patch-clamping experiments, the XY mover has convenient frontal controls.

#### ■ Bridge stage WI-XYS

This stage is designed for small animal, in-vivo observations; Stage height can be lowered 50mm by simply detaching the column spacers. Designed for use with the XY mover (WI-XYM), the stage platform is compact requiring minimal desk space. Stage top is pre-tapped and ferro-magnetic for flexibility in mounting manipulators.

\* Some manipulators cannot be used, due to the size of the stage.



### Culture cell observation

IX-SVL2 general purpose platform stage. Mounts for left or right hand operation. Provides stable specimen X-Y movement.



BX51WI+IX-SVL2



### 7 Remote power supply and hand switch

The remote TH4 power supply for transmitted light is designed with no cooling fan to minimize electrical noise. Features on/off and intensity controls. Can also be used with the optional TH4-HS hand switch providing light intensity and on/off control a maximal distance away from the Faraday cage.

# New functionality and solutions to meet a wide variety of needs.

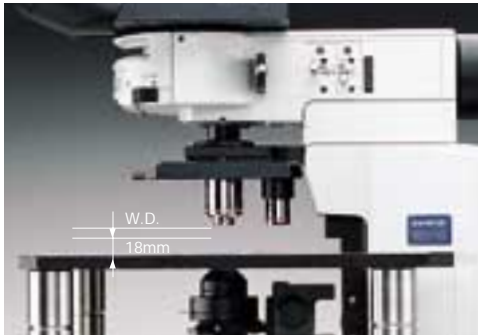
## A powerful new concept.



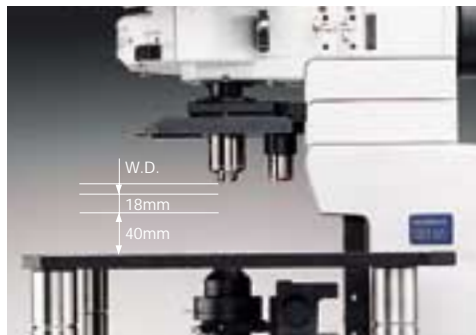
### Experimenting with small animals

#### Raising the objective and lowering the stage to enable small animal experiments

The arm height raising kit (WI-ARMAD) provides an additional 40mm of clearance and is mounted between the microscope frame and the reflected light illuminator. Small animal experiments usually do not require transmitted light thus allowing the removal of the substage condenser assembly. After removal, the stage may be lowered an additional 50mm, providing a total clearance increase of 90mm.



Normal configuration



40mm more clearance via WI-ARMAD



Detaching the condenser assembly and lowering the stage by 50mm provides maximal clearance



### Photoactivation

#### A variety of convenient units to add light sources and control the light

##### Lamphouse adapter U-LHAD

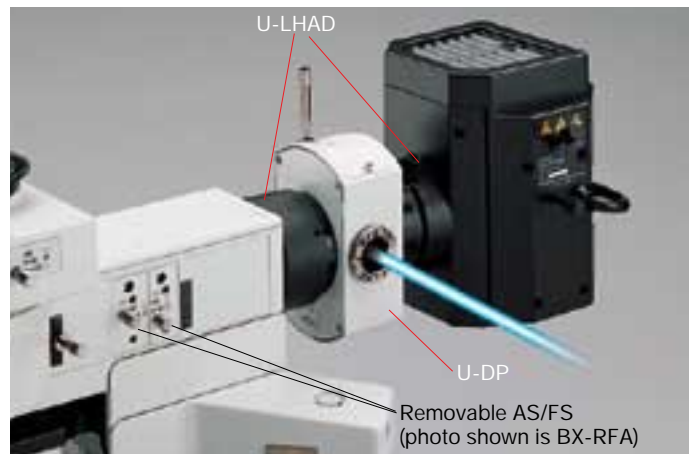
This adapter allows the mounting of the dual port (U-DP) between the microscope frame and lamp housing.

##### Rectangular field stop BX-RFSS

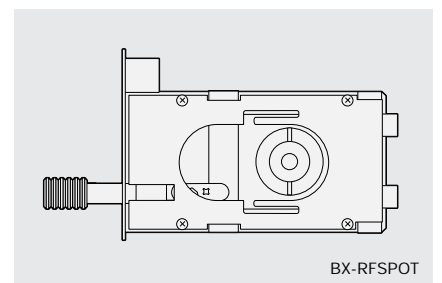
Designed for use with CCD cameras, prevents photobleaching of the specimen outside of the imaging area.

##### Pinhole unit BX-RFSPOT

Lighting the cell via a pinhole allows experimentation on reaction to light. Optional MELLES GRIOT's  $\phi 16$  pinhole is used.



BX-RFSS



BX-RFSPOT





## Microinjection

### **BX Stage and adapter for injection experiments**

The stage adapter WI-STAD is designed to allow the attachment of a traditional microscope right or left hand stage to the WI frame. The compact design of the BX2 stage (U-SVRB-4, or U-SVLB-4) reduces the distance between the specimen and the manipulator and creates a stable platform for injections.



## Confocal Microscope System

### **BX61WI — Built in Z-axis focus motor**

The BX61WI frame incorporates a precise Z-axis focus motor with 0.01 $\mu$ m step size. Designed to incorporate the Olympus Fluoview scan unit and software, the BX61WI is ready for confocal z-stacks. Microscope frame includes programmable buttons for a wide variety of applications.



### **Convenient, optional focusing hand switch U-FH for remote operation**

The remote hand switch allows the user to control the microscope remotely via a 2 meter connection cable. Hand switch allows the selection of coarse and fine focus movement, and nosepiece escape/return. Hand switch buttons can also be custom programmed for individual needs.

### **Optional Olympus Fluoview Confocal System FV500/FV300**

With the scanning unit set at the back of the microscope body, compact layout in the cage is possible.

### **Moving the microscope and scanning unit together (mover available by special order)**

Allows X and Y movement of both the microscope and scan unit together while the stage and specimen are fixed.

### **Additional lasers and accessories**

An assortment of lasers can easily be attached to satisfy a wide variety of applications.

# Ultimate image clarity for electro-physiological experiments

## A new concept in live cell observation.



### IR-DIC/ Nomarski DIC observation

#### IR-DIC Optimized Optics:

##### Designed for observations at 775nm to 900nm

Thanks to the precisely aberration-compensated IR-DIC optics covering from visible to near infrared light of 775nm/900nm wavelength, the clarity of images observed under near infrared light has been improved still further, allowing clear observation of even deep sections of brain slice.

##### • Visible light DIC

Allows operator high-resolution observation of the tissue surface.

##### • 775nm IR-DIC

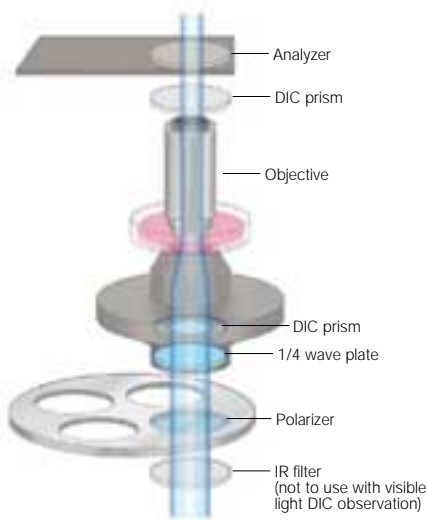
In combination with an IR camera allows observation within the tissue slice. Optics are corrected for visible and IR wavelengths allowing fast switching between wavelengths with minimal refocusing.

##### • 900nm Nomarski DIC

Allows observation deeper into the tissue (requires special polarizer and analyzer optimized for 900nm).

#### Senarmont compensation for Nomarski DIC observation

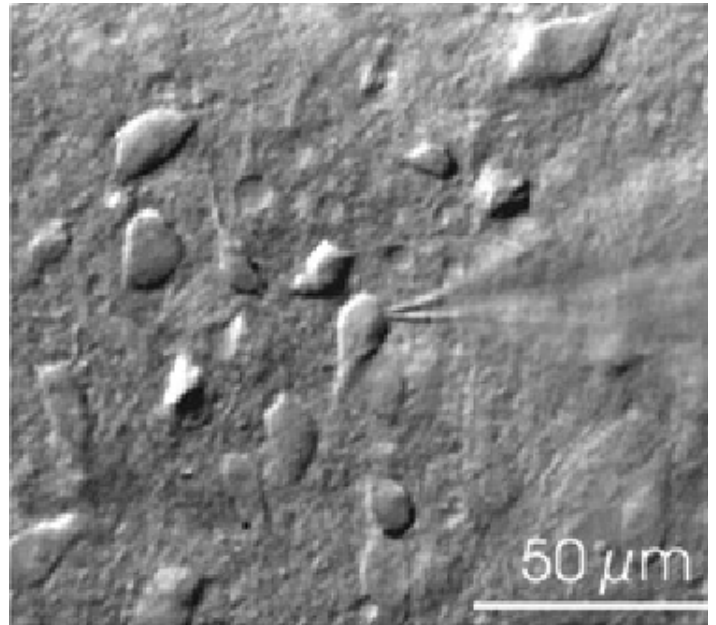
When using a Senarmont equipped condenser, all contrast adjustments are performed with the 1/4 wave plate below the condenser, thus eliminating the risk of bumping the stage, specimen, manipulators or nosepiece.



### Oblique illumination observation

#### Oblique observation optimizes contrast by changing the direction of the specimen shadow

Olympus has developed an oblique condenser (WI-OBOD) whose long working distance enables the angles of shadow to be altered through 360 degrees without moving the specimen. Requiring no additional accessories, oblique illumination is easy to set up and control. Plastic dishes (normally unsuitable for all types of DIC) are easy to image with oblique illumination. The oblique illumination slit aperture is variable in size and on a slider allowing quick changeover.

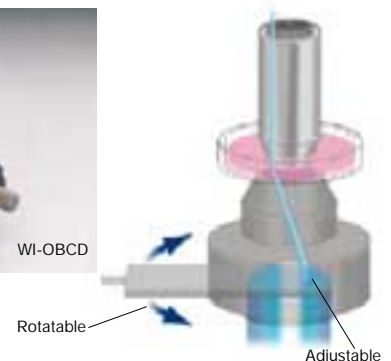


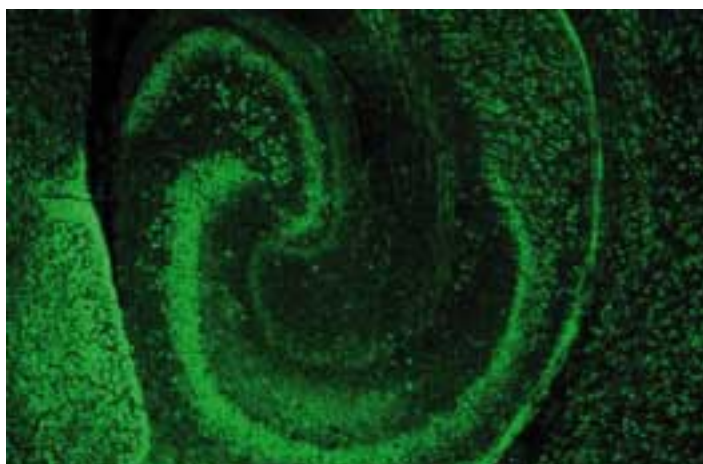
Nucleus of solitary tract from slice of rat medulla oblongata (thickness: 400μm)

Prof. Fusao Kato  
School of Medicine Physiology Dept.,  
Jikei University  
*Kato & Shigetomi, J. Physiol.(2001), 530: 469-486*

#### Universal condenser with DIC for improved contrast

Suitable for use in visible and 775nm/900nm near-infrared light, the U-UCD8 universal condenser is a high N.A., short working distance condenser offering improved contrast in nerve cell observations, for example.





Transverse cryostat section through the hippocampus of a mouse at postnatal day 10 was stained with a mouse monoclonal anti-neurofilament-L (Chemicon, MAB1615). An FITC-conjugated anti-mouse antibody was used for detection of NF-L.  
Objective: XLFLUOR4x/340

Masaharu Ogawa, Ph.D  
Laboratory for Cell Culture Development,  
Brain Science Institute, Riken



## Fluorescence macro observation

**2x and 4x Macro lenses with high numerical apertures provide fluorescence images Designed for GFP imaging of large cells such as neurons**

2x and 4x low magnification fluorescence objectives and a special GFP observation mirror unit are available. The objectives have a long working distance for maximum flexibility. An optional water

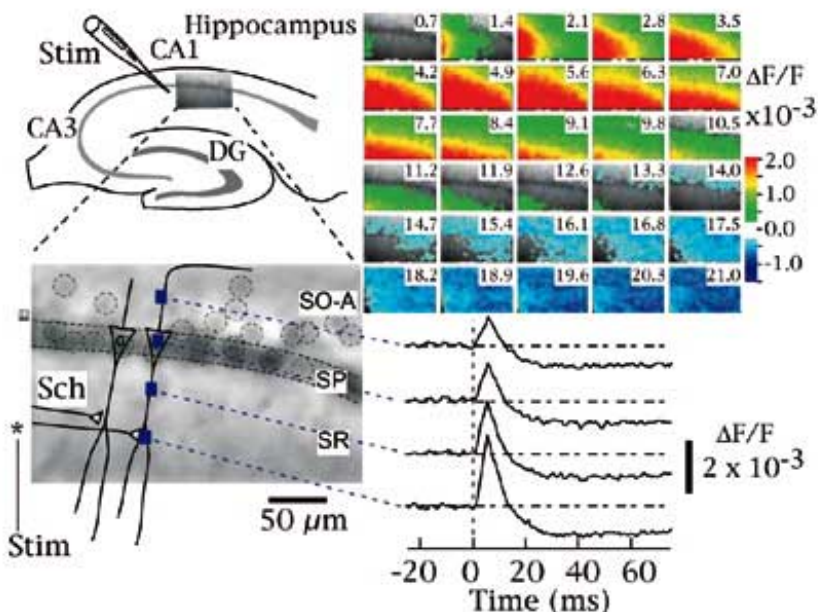
immersion cap (XL-CAP) is also available to remove image aberrations caused by ripples on water surface of immersed specimens.



## Observing changes in membrane potential

**Measuring changes in membrane electric potential by using the XLUMPLFL20xW objective with N.A. 0.95**

The XLUMPLFL20xW objective, with its high N.A., and 2.0mm of working distance allows the measurement of cell membrane electric potential (as seen right). Also, the 4x macro objective (XLFLUOR4x/340) can be used to measure membrane potential at the tissue level. A water immersion cap (XL-CAP) can be attached to the macro 2x or 4x objectives to eliminate disturbances caused by water ripples.



### Imaging of neuronal activity with voltage sensitive dye

Spread of neural activity in area CA1 of acute rat hippocampal slice (400μm thick) in response to a single stimulation applied to Schaffer collateral pathway imaged (at frame rate of 0.7 ms/frame) with a fluorescent voltage sensitive dye (VSD; Di-4-ANEPPS). The fluorescent image (90x60 pixels) captured by a digital high-speed CCD camera (MiCAM01, Brain Vision Inc.; with 20x objective and 0.5x adapter) is superimposed on the illustration of a hippocampal slice (upper left panel). The image is enlarged and shown on the illustration of pyramidal cells (solid line) (lower left panel). Each laminar of CA1 is shown as follows: SO-A, Stratum oriens-alveus; SP, Stratum pyramidal; SR, Stratum radiatum. The individual somas of cells were visible (indicated by dotted circle on the image) and were found along the stratum pyramidal. The changes in the fluorescence of VSD (optical signal) in accordance with the membrane potential change upon a stimulation (Stim) onto Schaffer collateral (Sch) were pseudo-color encoded and shown as consecutive images (upper right panel; number in each image shows time from the stimulation (ms)). The depolarizing signal (red) spread along Schaffer collateral, which was followed by a hyperpolarizing signal (blue) originated in stratum pyramidal. The time courses of optical signals in representative pixels are shown in lower right traces.

Takashi Tominaga Ph.D, Brain-Operative Device Lab., Brainway Group, Brain Science Institute, Riken

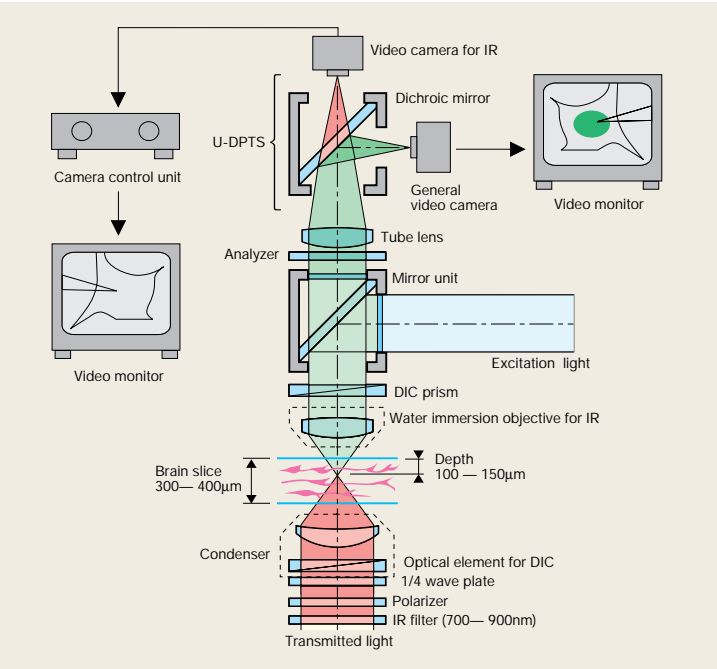


# Accessories

## Multi double port tube U-DPTS

The U-DPTS accepts an optional dichroic mirror allowing the incoming to be split between visible and infrared and be observed simultaneously using two cameras.

\* A fluorescence mirror unit is required.



## Intermediate magnification changer U-ECA, U-CA

The U-ECA, which includes a 2x intermediate magnification position, allows quick magnification changes to a camera or observer without the need to change objectives. The U-CA includes a 4 position turret that allows rapid switching between a 1x, 1.25x, 1.6x and 2x positions. Both changers accept standard Olympus adapters for attaching a wide range of cameras.

\* U-ECA and U-CA are not recommended for IR observation with the U-TR30 trinocular observation head.



## C-mount video magnification change unit (IR-compliant) U-TVCAC

The U-TVCAC includes a 3-position turret with 1x, 2x, and 4x IR corrected positions. Includes a standard c-mount top port.



## UIS Objectives

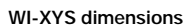


Objectives		N.A.	W.D. (mm)	Visible light	775nm	900nm
Long working distance no cover water immersion objective	UMPlanFL10xW	0.30	3.3	○	○	—
	UMPlanFL20xW	0.50	3.3	○	○	—
	LUMPlanFL40xW	0.80	3.3	○	○	—
	LUMPlanFL60xW	0.90	2.0	○	○	—
	LUMPlanFL100xW	0.90	1.5	○	○	○
For near IR-DIC observation	LUMPlanFL40xW/IR2	0.80	3.3	○	○	○
	LUMPlanFL60xW/IR2	0.90	2.0	○	○	○
Long magnification fluorescence objective	XLFLUOR2x/340	0.14	21.0 (includes 5mm water)	○	○	—
	XLFLUOR4x/340	0.28	29.5 (includes 5mm water)	○	○	—
20x super high N.A. objective	XLUMPLFL20xW	0.95	2.0	○	○	○

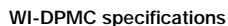


Optics			UIS optical system		
Material			Aluminum		
Illumination	BX51WI	Microscope body	Built-in Koehler illumination for transmitted light (F.N. 22), external light source, 12V100W long life halogen bulb (pre-centered)(average lifetime: approximately 2,000 hours)		
		Light source TH4	Light adjustment: DC2.5V ~ 12.6V (continuous adjustment) 8.4A max. Power consumption: 150W, dimensions: 75(W) x 125(W) x 200(D) mm, weight 2kg		
	BX61WI	Microscope body	Built-in Koehler illumination for transmitted light (F.N. 22) 12V100W long life halogen bulb (pre-centered)(average lifetime: approximately 2,000 hours) Light adjustment: less than DC2V ~ 12V (continuous adjustment) Brightness adjustment, light preset switch		
		Light source BX-UCB	Power consumption: 200W, dimensions: 125(W) x 216(W) x 310(D) mm, weight 5kg		
Focus	BX51WI	Nosepiece focus by roller guide (rack & pinion) Stroke per rotation: fine: 0.1mm coarse: 15mm maximum stroke: 25mm Coarse lower limit stopper mechanism, Torque adjustment mechanism for coarse focus			
	BX61WI	Motorized focusing using stepping motor and ball screw Nosepiece focus by cross roller guide Minimum graduation: fine: 1μm (sensitivity 1μm) resolution: 0.01μm, maximum stage movement speed: 3mm/s. Stroke per rotation: fine: 0.1mm coarse: 1mm Stroke: 25mm, stage escape mechanism			
Nosepiece	WI-SRE2	Swing nosepiece	DIC prism: WI-DICTHRA, WI-DICT	nosepiece arm: WI-NPA	
	U-SLRE	Slide nosepiece	DIC prism: DIC observation is not available	nosepiece arm: WI-NPA	
	WI-SNPXLU	Single position nosepiece	DIC prism: WI-DICTHRA, WI-DICT	nosepiece arm: WI-NPA	
	WI-SSNP	Swing-slide nosepiece	DIC prism: WI-DICTHRA, WI-DICT	nosepiece arm: integrated	
Fluorescent illuminator	BX-RFA	BX fluorescence illuminator, excitation balancer attachable, FS/AS detachable			
	BX-URA2	BX reflected light illuminator			
Observation tube	U-TR30-2	Trinocular, F.N.: 22, inclination angle: 30°, interpupillary distance: 50mm — 76mm Light path exchange; 3 steps ① BI: 100% ② BI: 20% video, photo: 80% ③ Video, photo: 100%			
	U-ETR3	Erect image trinocular, F.N.: 22, inclination angle: 30°, interpupillary distance: 50mm — 76mm Light path exchange; 2 steps ① Binocular: 100% ② Video, photo: 100%			
	WI-DPMC	Double port magnification change unit, F.N.: 22, inclination angle: 24°, interpupillary distance: 50mm — 76mm, Light path exchange; 3 steps			
Stage	IX-SVL2	Mechanical stage, fixed to microscope body with WI-FSH, cross movement mechanism, X, Y axes handle torque adjustable (rack & pinion), movement range: 43mm(Y) x 50mm(X)			
	WI-XY5	Fixed on the anti-vibration table, cross movement mechanism (moved together with microscope body by WI-XYM)			
	U-SVL(R)B-4	Used together with WI-STAD, cross movement mechanism, X, Y axes handle torque adjustable (rack & pinion), movement range: 52mm(Y) x 76mm(X)			
Long working distance condenser	WI-UCD	Universal condenser, N.A.: 0.8, W.D.: 5.7mm, with variable A.S. mechanism, turret: 4-position, four DIC prisms attachable Built-in quarter wavelength plate			
	WI-DICD	DIC condenser, one DIC prism attachable			
	WI-OB CD	Oblique condenser, built-in variable oblique illumination stop			

(unit: mm)



(unit: mm)



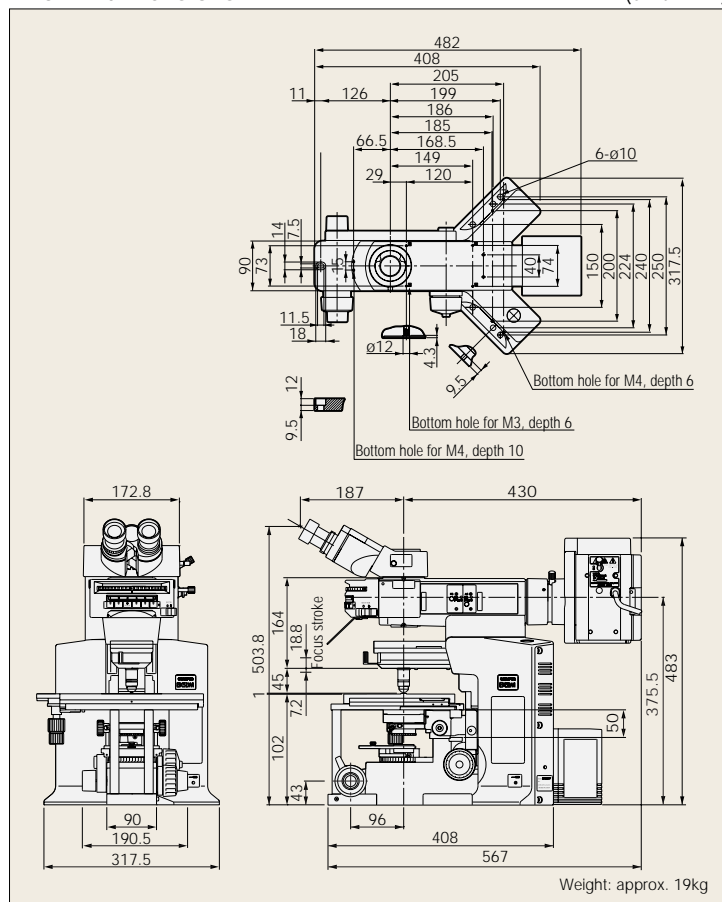
Optical light path exchange	3 steps	BI: 100% Front port 100% Simultaneous use of front (visible light) and back (near IR light) ports		
		Clicker ability adjustable		
Binocular observation tube		F.N. 22, inclination angle 24°, Interpupillary distance: 50 — 76mm		
Front port		For fluorescent observation, F.N. 22, Simultaneous adjustment function with backport		
Back port		For IR observation (c mount adapter)		
Magnification change	Magnification changer lens magnification	Total magnification	N.A.	Projection magnification
* custom made product	0.25x	5x	0.15	1/2 inch
	0.35x	7x	0.22	2/3 inch
(when combining with XLUMPLFL20xW)	0.5x*	10x	0.4	2/3 inch
	1x*	20x	0.95	2/3 inch
	2x*	40x	0.95	2/3 inch
	4x	80x	0.95	2/3 inch
IR-DIC observation	Insert 775nm analyzer or 900nm analyzer into WI-DPMC			

### WI-XYM, WI-XYS specifications

WI-XYM	Microscope	BX51WI, BX61WI
	X-Y stroke	25mm (minimum graduation 10µm)
	Maximum loading	294N (30kgf)
	Weight	Approx. 9.1kg
	Applicable anti-vibration table	25mm or 50mm pitch with M5, M6 screw holes 1inch or 2 inch pitch with 1/4-20UNC screw holes Fixable
WI-XY5	Stage height	271mm or 221mm
	Manipulator setting	Fixable to ø7mm or 25mm pitch holes with M5 or M6 bolts and nuts
	Material	Iron (magnet can be used)
	Weight	Approx. 22.1kg
	Applicable anti-vibration table	25mm or 50mm pitch with M5, M6 screw holes 1inch or 2 inch pitch with 1/4-20UNC screw holes

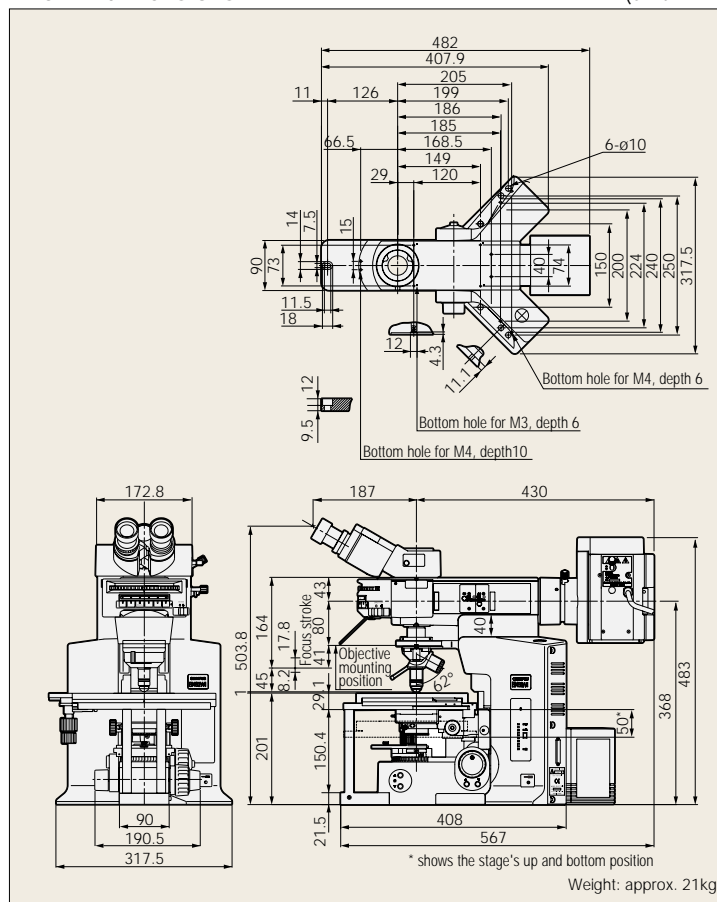
## BX51WI dimensions

(unit: mm)



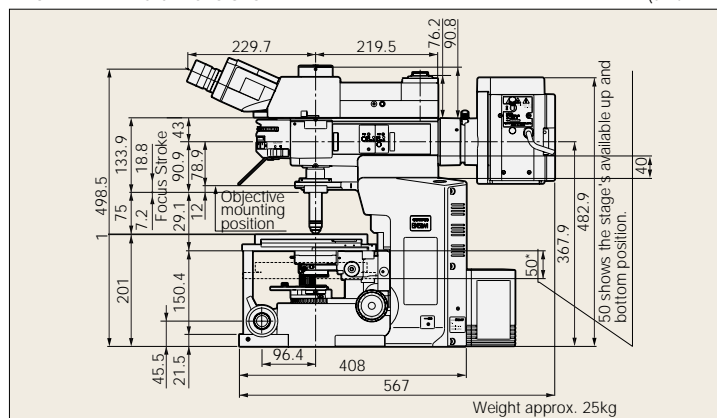
## BX61WI dimensions

(unit: mm)



## BX51+WI-DPMC dimensions

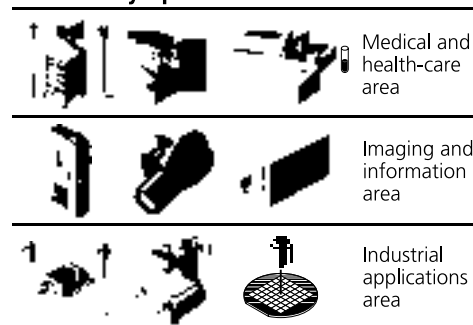
(unit: mm)



Web site address: <http://www.olympus.com>

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Specifications are subject to change without any obligation on the part of the manufacturer.

### Olympus business areas



**OLYMPUS**  
FOCUS ON LIFE

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