OLYMPUS

RESEARCH
INVERTED SYSTEM MICROSCOPE

IX71

IX2 SERIES

Innovations for Advanced Imaging

UIS
UNIVERSAL
INFINITY SYSTEM

Optics

- Expanded range of Olympus UIS optics
- Simple V-shaped optical path maximizes light throughput
- Improved fluorescence illuminator for brighter images
- Newly designed high S/N fluorescence filter cubes
- Improved condensers with high N.A. and longer working distances
- DIC prisms optimized for different specimen types
- Relief Contrast condenser for plastic sample vessels

System Flexibility

- Unique two-tiered multi-port design offers input/output system flexibility
- Maximum free space out of the left side port
- Small footprint and unique back ports for maximum bench space
- Modular motorized accessories for automation and remote operation
- Sextuple nosepiece and fluorescence filter turret

A new standard in inverted microscopy

Stable compact frame, two-tiered multi-port design and outstanding UIS optical performance for imaging, measurement and micromanipulation

The IX71 microscope system begins with a highly rigid, compact and stable frame. Thermal and structural rigidity have been increased by utilizing an external power supply and computer aided design techniques. Unique two-tiered multi-port design and a small footprint combine for maximum system flexibility while conserving critical bench space. Improved fluorescence illuminators and new high S/N ratio cubes combined with a V-shaped optical path result in very bright, low noise fluorescence images. Low stage and focus controls, high visibility setting indicators, front panel operation and a tilting binocular tube combine to provide exceptional ease of use and comfort. IX71: setting new standards in research microscopy.

**Note:*
UIS optics: The original Olympus infinity-corrected optical system.
This system expresses the superb Olympus optical technology, provides high resolution, high contrast images and the flexibility to meet current and future applications.

Applications

- Time-lapse:
  Rigid and stable frame maintains steady specimen focus
- Fluorescence:
  Chromatically corrected illumination from UV to IR
- Microinjection:
  Relief Contrast for injection in plastic vessels
- Multi Dimensional Imaging:
  Multiple simultaneous image ports
- TIRFM:
  Special illuminator for evanescent wave illumination

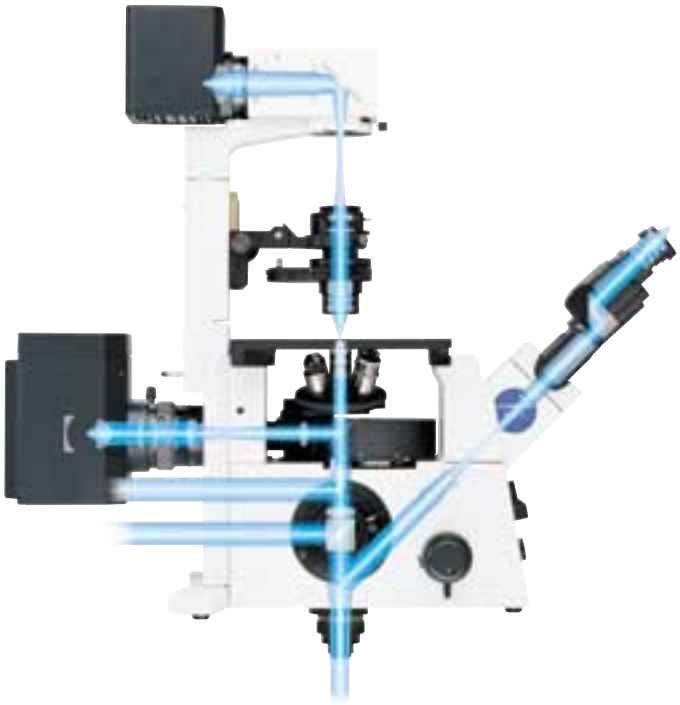
Unique two-tiered multi-port design offers input/output system flexibility and application support

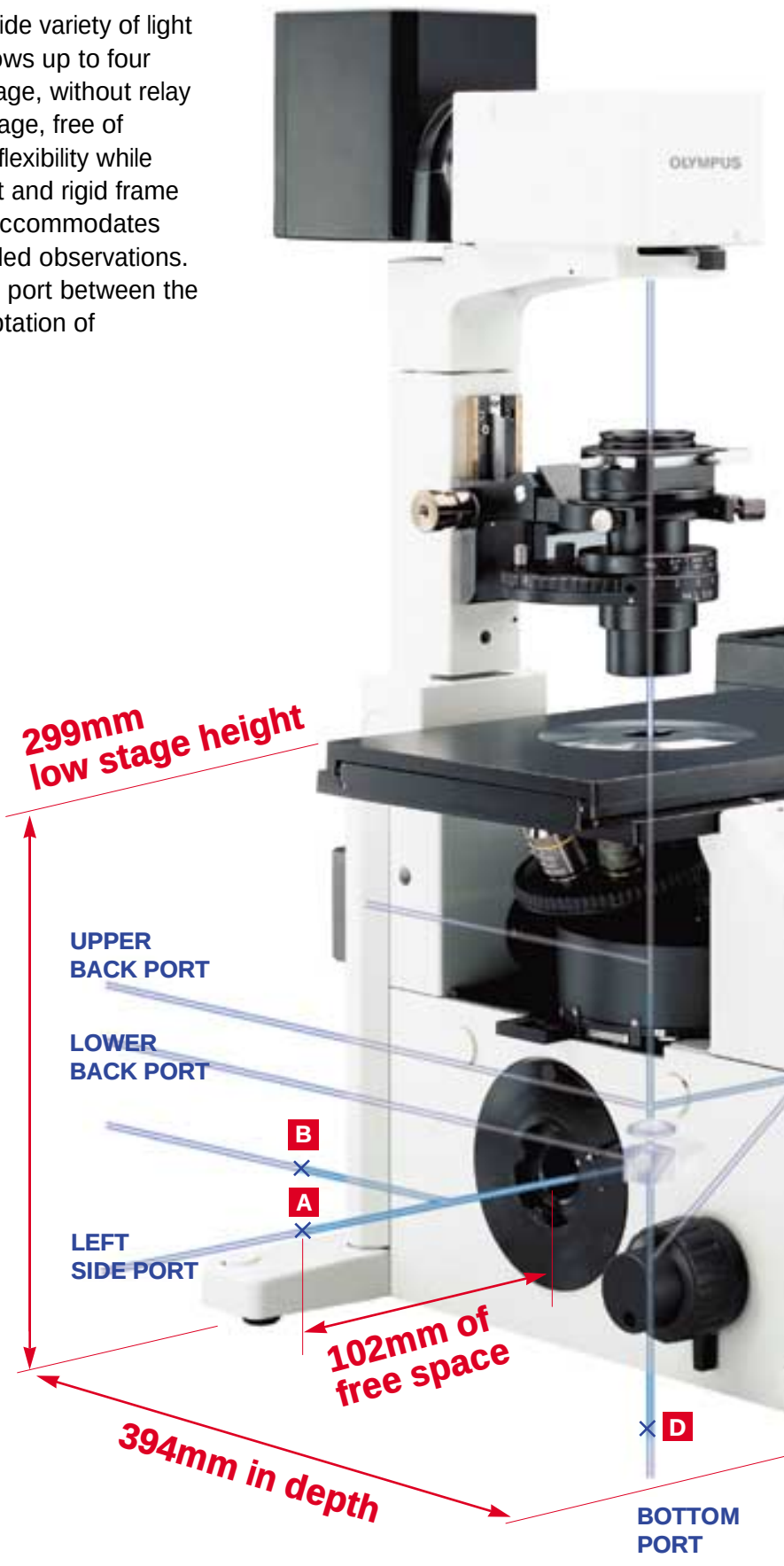
The IX frame begins with 6 input/output ports for a wide variety of light sources or cameras. The unique Olympus design allows up to four ports to have simultaneous access to the primary image, without relay lenses, providing cameras with the highest quality image, free of aberrations. Two-tiered multi-port design maximizes flexibility while maintaining a 299mm low stage height. The compact and rigid frame requires a minimum amount of bench space, easily accommodates external equipment and remains stable during extended observations. Over 100mm of free space is available at the left side port between the frame and the primary image, easily allowing for adaptation of instrumentation for individual research requirements.

Multi-port system

Clear primary image

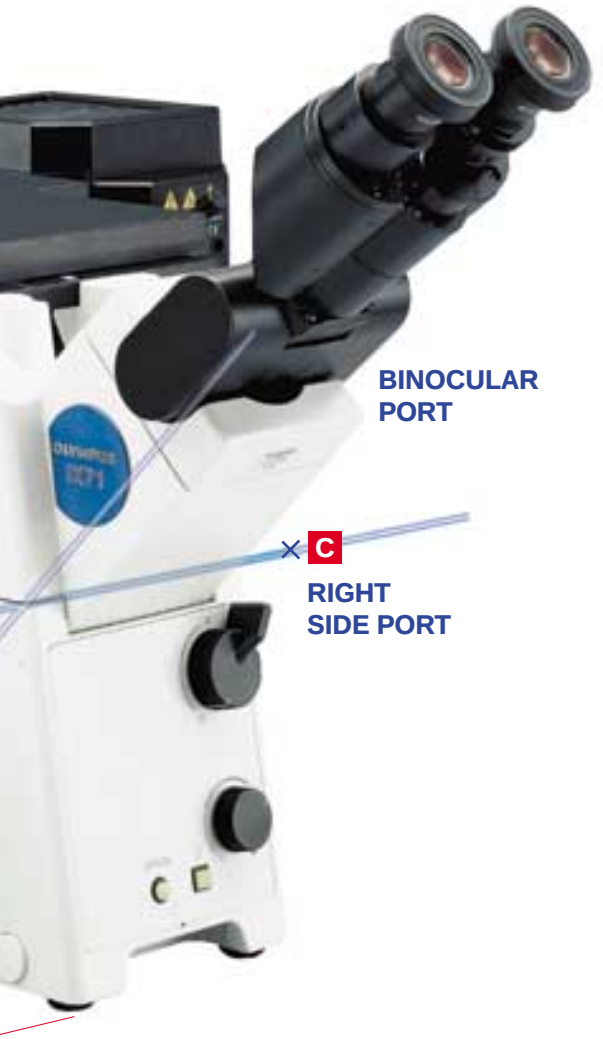
System versatility





A B C D

Primary images are obtainable from all 4 ports simultaneously



LEFT SIDE PORT (Primary Image)

A B

For film or CCD camera systems. Double port tube allows the attachment of two cameras (both primary images). Also accepts Olympus confocal scan units.

U-DPCAD double port tube with C-mounts on left side port

RIGHT SIDE PORT (Primary Image)

C

Used for connecting an additional light source or CCD camera.

IX2-RSPC right side port attachment with C-mount

BOTTOM PORT(Primary Image)

D

Well suited for extremely sensitive low light level imaging.

IX-TVR bottom port unit

UPPER BACK PORT (Primary Image)

Used for connecting an additional light source or CCD camera.

LOWER BACK PORT (Primary Image)

For the attachment of large bodied items such as cooled CCD cameras or confocal scan units.

BINOCULAR PORT

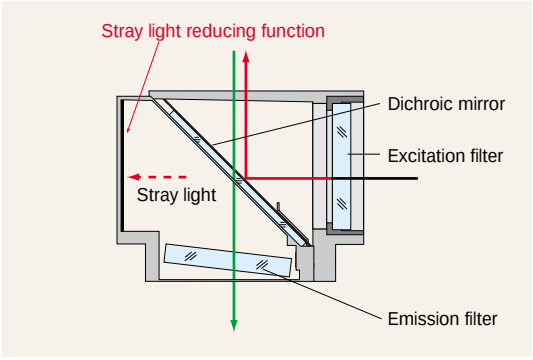
CCD camera mount via side port intermediate tube.

GX-SPU side port intermediate tube

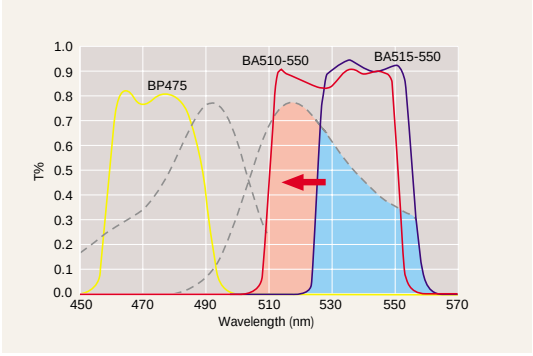
Side port intermediate tube for CCD camera.

New fluorescence accessories and V-shaped optical path for improved sensitivity in critical applications

The very efficient Olympus mercury and xenon lamphouses are combined with fluorescence illuminators designed for utmost flexibility and ease of use. An L-shaped illuminator provides easy access to burner centration and removable aperture and field stops. An improved straight illuminator has greater throughput and also accepts a new dual port adapter for simple switching between two light sources. Fluorescence filter cube performance has been improved with high efficiency coatings optimized for specific fluorochromes such as GFP, YFP and CFP, with minimal signal crossover. Stray light reducing materials are incorporated into all fluorescence filter cubes.



When the fluorescence excitation light is reflected by the dichroic mirror, some light may pass through the mirror and reflect as stray light in the cube assembly. This stray light may reflect out of the cube and into the imaging path, resulting in decreased contrast due to autofluorescence. Low reflection materials are incorporated into the design of all new Olympus fluorescence filter cubes. Such a design absorbs over 99% of all stray light, resulting in high contrast fluorescence images.



The new IBA cube is optimized to maximize both GFP excitation and detection of GFP emission through the use of a new dichroic mirror with minimal crossover.

V-shaped optical path for maximum light throughput

High Contrast fluorescence

Wide range of accessories

Utmost flexibility

Lamphouses with aspherical collector lenses/ U-LH100HGAPO, U-LH75XEAPO

An aspherical collector lens design in the mercury and xenon arc lamphouses improves light collection ability and stretches the apochromatic performance of the illumination optics to include wavelengths from UV to IR.

L-shaped reflected light illuminator/IX2-RFAL

Provides easy access to burner centration and removable aperture and field stops.
The L-shaped design maintains access to both back frame ports.

Rectangular field stop/IX2-RFSS
Pinhole field stop/IX2-RFSPOT

Flexible field stop options IX2-RFSS rectangular field stop module and IX2-RFSPOT pinhole field stop module can be mounted in the L-shaped illuminator for better signal to noise ratio fluorescence imaging or photobleaching experiments.

Reflected light illuminator/IX2-RFA

Straight type illuminator designed for maximum throughput is 20% brighter than the previous model. Well suited for applications requiring high intensity excitation or multiple excitation filters.

Double lamp housing adapter/U-DULHA

Allows simultaneous attachment of two light sources such as halogen and mercury. Selection mirror is replaceable for custom applications.
(Available autumn 2002)

Long working distance objective/LUCPLFL40x

Accommodating vessel thicknesses from 0-2mm with a correction collar mechanism that maintains objective focus during adjustment. Correcting for different vessels is fast and simple. Lens design is also optimized for 340nm transmission for calcium ratio imaging.

Improved thermal and structural rigidity combine to provide a stable platform for time-lapse observations

From the computer engineered compact frame to the external power supply, the IX71 was designed for structural and thermal stability.
The nosepiece stage provides an extremely stable platform for time-lapse experiments by maintaining objective focus. The potentially negative effects of heat and electrical noise have been removed by employing a radiantly cooled, external power supply for transmitted light.
Microscope controls, such as light path selectors and mirror unit turrets are designed for shock-free operation.
Microscope frame and condenser system accommodates incubation and CO_2 chambers for observations requiring a constant environment.

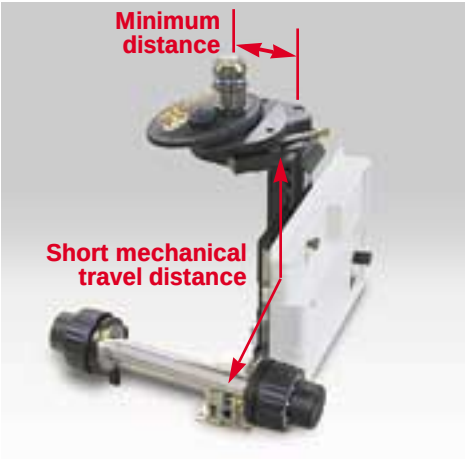
Nosepiece stage/IX2-NPS
Maintains objective focus and essentially eliminates focus-drift during time-lapse and prolonged observations.

Maximum rigidity & stability

Low center of gravity design

Shock-free operation

Maximum rigidity and minimum thermal expansion



Short mechanical circuit structure and high rigidity nosepiece design avoids pitching and yawing when the nosepiece is manipulated during operations such as DIC prism insertion or adjustment of an objective's correction collar.

Low stage, low center of gravity design

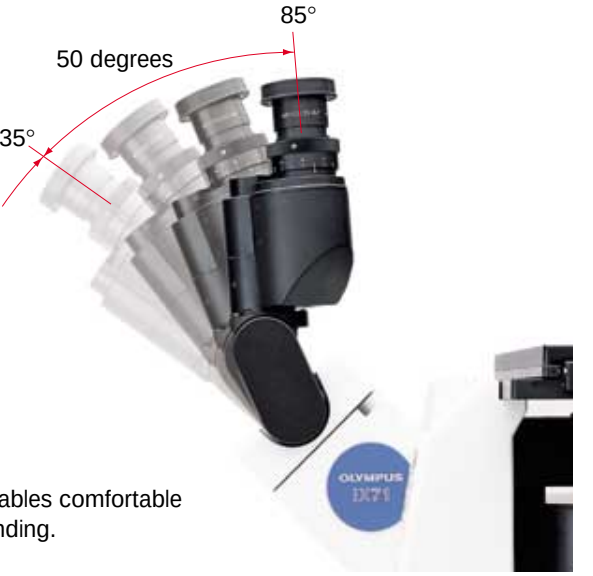
External power supply to prevent thermal expansion

Frontal control allows auxiliary equipment to be placed near the microscope

A key problem when conducting experiments on living cells is the placement of auxiliary equipment. The IX71 is specifically designed to make the fullest use of desktop space by employing such features as a back port and a detachable wing. Even while operating the focusing knobs, the operator can easily perform functions such as changing the light path, light intensity adjustment, shutter ON/OFF and power ON/OFF by means of buttons or levers conveniently located on the front panel. Operability is further improved by a tilting observation tube which lets the operator make observations while standing or sitting.

Tilting binocular tube

Frontal control



Optional tilting binocular tube enables comfortable observations when sitting or standing.

Front mounted microscope controls for improved ergonomic comfort also permit access to additional equipment at the sides of the microscope.

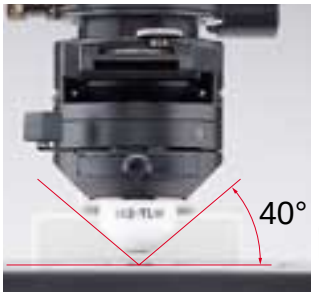
Excellent condenser design and versatility accommodates a wide range of sample vessels and applications

For transmitted light applications, the IX2 condenser system offers both high resolution and high contrast images for a wide range of specimens and sample vessels.
Olympus introduces the Relief Contrast system, providing DIC-type images with plastic vessels.
Relief Contrast, combined with the stability of the IX frame, results in an excellent injection/manipulation workstation.
For electrophysiology, the water immersion condenser provides a high numerical aperture for image quality while maintaining a long working distance and an optimal 40° access angle. For incubation chamber and T-flask observations a longer working distance, high numerical aperture condenser provides excellent phase and DIC images.

Electrophysiology
IX2-DICD

N.A. 0.9 | W.D. 3.7mm | PH | DIC

The slim design of the DICD condenser employs a single DIC slider combined with a tapered front lens for stability and maximum access angles. The result is excellent operability for injection and patch clamping experiments. Dry and oil top lenses are also available for versatility with different observation techniques and sample preparations. Phase contrast condenser inserts are also available.



IVF/Injection
IX2-MLWCD

N.A. 0.5 | W.D. 45mm | RC | PH | DIC

The Relief Contrast condenser is designed to produce contrast and shading effects, similar to DIC, yet within the confines of plastic sample vessels. The unique ability to adjust the illumination angle and shading effect of each objective provides consistent illumination shadowing across all magnifications.
To facilitate injections, the contrast effect on cellular membranes has been optimized.

Incubation Chambers/T-Flasks
IX2-LWUCD

N.A. 0.55 | W.D. 27mm | PH | DIC

Combining a long working distance (27mm) and a high numerical aperture (N.A. 0.55), the LWUCD condenser accommodates most incubation chambers and T-Flasks.
The 5-position turret provides versatility with DIC or phase inserts. DIC components are specially designed to obtain high-contrast, high-resolution images with 20X and 40X objectives.

Ultra-long Working Distance
IX-ULWCD

N.A. 0.3 | W.D. 73mm | PH

This condenser accommodates phase contrast and brightfield microscopy with 4X, 10X, 20X and 40X objectives. Excellent image contrast is assured for any sample — thin to thick cells.
An extended working.

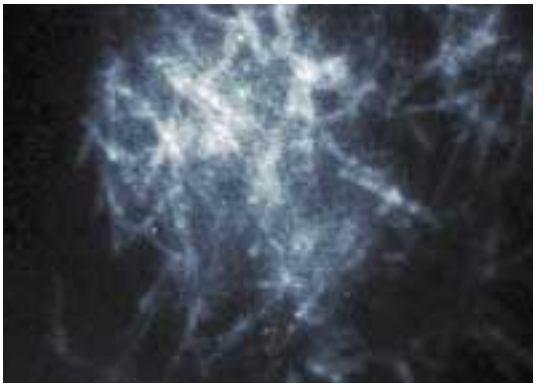
Modular system easily accommodates a wide range of research applications

Micromanipulation

Low stage design combined with a lowered center of gravity offers superior stability for micromanipulation applications. A variety of screw holes are available to securely mount manipulators onto the microscope, allowing optimal choice of angles and positioning. Manipulator joysticks can be placed in the most comfortable, accessible position due to the compact frame design.

TIRFM

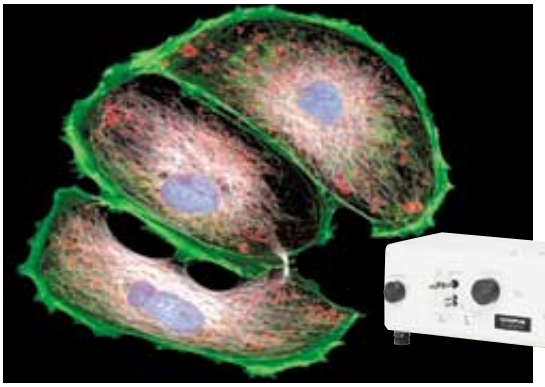
Total Internal Reflection Fluorescence illuminator provides easy setup and alignment of excitation laser light. Mirror unit allows switching between fluorescence and TIRF illumination and can be customized. High numerical aperture APO100XOHR (N.A. 1.65) and PLAPO60XOTIRFM (N.A. 1.45) objectives offer the brightest signal and greatest adjustment range for TIRFM applications.



Laser Scanning Confocal

Frame easily accepts Olympus Fluoview Confocal microscope system for high resolution, low noise observations. Back or left side port accepts confocal scan units. Stable, rigid frame is ideal for laser input/output, z-stacks, and line scanning. Optional motorized accessories can be added to create a powerful confocal workstation.

* Special microscope body available for Fluoview.



Optional units

Motorized fluorescence cube turret/IX2-RFACA
Accepts up to 6 fluorescence filter cubes.

Motorized observation/ emission side filter wheel/ U-FWO
Motorized reflected/ excitation side filter wheel/U-FWR
Up to 6 filters (32mm or 25mm diameter) can be attached.

Motorized long working distance universal condenser/IX2-LWUCDA
6 turret positions allow brightfield, phase contrast and DIC observations (N.A. 0.55, W.D. 27mm).

Motorized bottom port unit with C-mount/ IX2-TVRAC
Entirely aberration-free primary images from UIS objectives are directed to a c-mount CCD camera.

Gliding stage/IX2-GS
Designed for applications such as *C. elegans* observation. Stage rotates a full 360° with 20mm X-Y travel.
The flat design allows horizontal mount of micromanipulators.

Glass stage insert plate/ IX2-GCP
Includes glass plate and colored band system for easy objective magnification confirmation.

* Not available in some areas

Plain stage (IX2-SP)+ Mechanical stage (IX-MVR)
Plain stage plus an optional mechanical stage provide X-Y movement for a variety of sample vessels. Coaxial control knobs are positioned low for user comfort.

IX-MVR accessories:
■ Terasaki plate holder/IX-HOT
Accepts 60 and 72-well Terasaki plates
■ Slide glass holder/IX-HOS
Designed for 1in x 3in slides or hemocytometer
■ Petri dish holder/IX-HOP
Holds 65mm, 54mm and 35mm diameter dishes
■ Well positioner T/IX-CLMT
Provides click stops for well-center of 60 and 72-well Terasaki plates
■ Well positioner 96/IX-CLM96
Provides click stops for well-center of 96-well plate
■ Millimeter scale/IX-PPM
Vernier scale for stage in millimeters
■ Scale for nunc plate/IX-PP24NUN
Scales for NUNC style 24-well plate

Heat plate
Compact automatic temperature control unit that replaces stage insert. Available configurations: Standard (accurate to ± 3°C); High-grade (accurate to ± 0.1°C); and Reduced noise (accurate to ± 0.1°C).

* Tokai Hit Company products

CO_2 incubator
Enables highly accurate control of temperature, moisture and carbon dioxide. Ideal for prolonged time-lapse observations such as cell division.

* Tokai Hit Company products

UIS series objectives

LCPLFL series
These Semi-Apochromat objectives are dedicated for tissue culture observations through bottles and dishes, offering excellent contrast and resolution in brightfield, DIC and fluorescence observations.

LCPLFL-PH series
These objectives are exclusively designed for culture specimens. Thanks to the correction cap method, an excellent phase contrast image is assured regardless of the thickness and material of the vessel.

UPLFL series
These affordable Semi-Apochromat universal objectives deliver superb resolution, contrast and flatness for any microscopy technique.

UPLFL-PH series
The newly designed phase annuli reduce flare and halo to a minimum and ensure high resolution and contrast for unstained specimens, i.e. living cells and microorganisms.

UPLAPO series
Top-performance universal Plan Apochromat objectives, featuring an unsurpassed high N.A., deliver the best resolution, contrast and field flatness for any microscopy technique.

PLAPO series
These Plan Apochromat objectives keep chromatic aberration down to an absolute minimum and deliver the best resolution and contrast for brightfield, DIC and fluorescence observations.

UAPO/340 series
These objectives feature high transmission of 340nm wavelength light, ensuring maximum performance in fluorescence microscopy through UV excitation including Ca^{2+} measurement.

Relief Contrast objectives
These objectives are designed for observation of living cells including oocyte. Plastic vessels applicable for Relief Contrast observation.

Item	N.A.	W.D. (mm)	Cover glass thickness (mm)
CPLFL10XPH	0.30	9.5	1
LCPLFL20X	0.40	6.9	0-2.5
LCPLFL20XPH	0.40	6.9	0-2.5
LCPLFL40X	0.60	2.6	0-2.5
LCPLFL40XPH	0.60	2.6	0-2.5
LCPLFL60X	0.70	1.7	0-2.5
LCPLFL60XPH	0.70	1.7	0-2.5
LUCPLFL40X	0.60	2.7-4.1	0-2
LUCPLFL40XPH	0.60	3.0-4.3	0-2
CPL10XPH	0.25	9.8	1
LCACH20XPH	0.40	3.2	1
LCACH40X2PH	0.55	2.3	1
UPLFL4X	0.13	17.0	—
UPLFL4XPH	0.13	17.0	—
UPLFL10X	0.25	10.0	—
UPLFL10XPH	0.30	10.0	—
UPLFL20X	0.50	1.6	0.17
UPLFL20XPH	0.50	1.6	0.17
UPLFL40X	0.75	0.51	0.17
UPLFL40XO	1.30	0.1	0.17
UPLFL40XPH	0.75	0.51	0.17
UPLFL60XOI3	0.65-1.25	0.1	0.17
UPLFL60XOI3PH	0.65-1.25	0.1	0.17
UPLFL100XO3	1.30	0.1	0.17
UPLFL100XOI3	0.60-1.3	0.1	0.17
UPLFL100XO3PH	1.3	0.1	0.17
UPLAPO10X	0.40	13.0	0.17
UPLAPO10XOI3	0.40	0.17	—
UPLAPO10XW3	0.40	0.44	0.17
UPLAPO20X	0.70	0.65	0.17
UPLAPO20XO3	0.80	0.19	—
UPLAPO40X	0.85	0.20	0.11-0.23
UPLAPO40XOI3	0.5-1.0	0.12	—
UPLAPO60XW3	1.20	0.25	0.15-0.21
UPLAPO60XW3/IR	1.20	0.28	0.13-0.21
UPLAPO60XW/PSF	1.20	0.25	0.15-0.21
UPLAPO100XOI3	0.5-1.35	0.1	0.17
PLAPO60XO3	1.40	0.15	0.17
PLAPO60XOTIRFM	1.45	0.15	0.17
APO100XOHR*1	1.65	0.1	0.15
UAPO20X3/340	0.75	0.55	0.17
UAPO20XW3/340	0.70	0.35	0.17
UAPO40X3/340	0.90	0.2	0.11-0.23
UAPO40XOI3/340	0.65-1.35	0.1	0.17
UAPO40XW3/340	1.15	0.25	0.13-0.25
CPLFL10XRC	0.30	9.1	1.5*2
CPL10XRC	0.25	9.6	1.5*2
LCPLFL20XRC	0.40	6.9	1.5*2
LUCPLFL40XRC	0.60	3.0-4.3	0-2
LCACH20XRC	0.40	2.8	1.5*2
LCACH40XRC	0.55	2	1.5*2

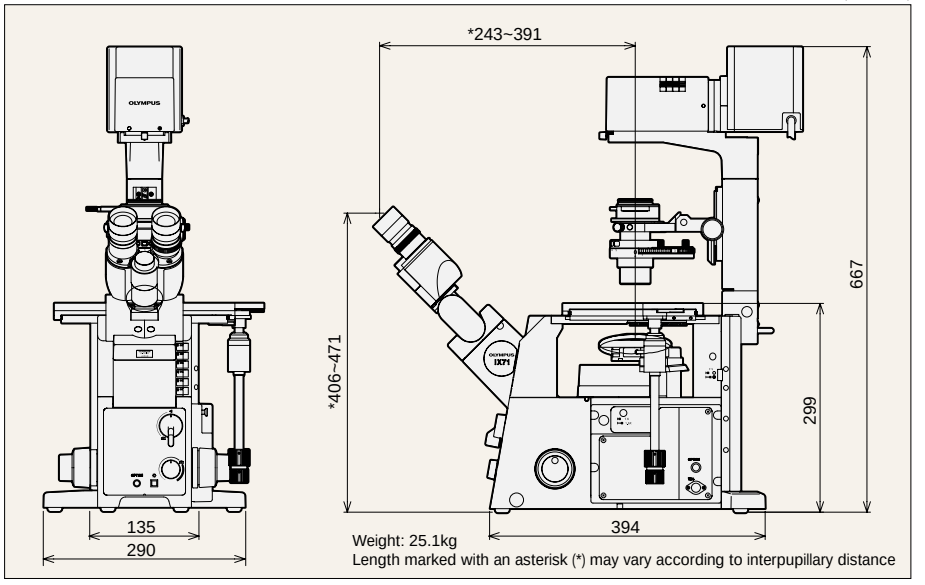
*1 Special oil and special cover glass required
*2 Optically designed to be the best use with TOKAI-HIT's glass heat plate with 0.5mm thickness

IX71 specifications

Microscope body	Revolving nosepiece		Sextuple, simple waterproof mechanism incorporated
	Focus		9mm stroke (from stage surface, 7mm upward and 2mm downward), coaxial coarse and fine focusing knobs (minimum fine focus graduation: 1µm, full rotation of fine focusing knobs: 100µm), upper limit stopper, torque adjustment for coarse focusing
	Primary image port		Lower port (standard left side port: S1F 100% or S8F 80%, or optional lower Back port selectable, 2-step light path selection), Upper port when built-in magnification changer 1x/1.6x is replaced (optional right side port orupper back port selectable, 2-step light path selection), Bottom port (option)
	Frontal operation		Light path selector, Transmitted light intensity control and light ON/OFF switch, TTL Pulse control switch
Transmitted light illuminator	100W transmitted light illumination pillar	IX2-ILL100	Pillar tilt mechanism (30° inclination angle, with shock decreasing mechanism), Condenser holder (with 50mm stroke, swing-in/out mechanism), Field iris diaphragm adjustable, 4 filter holders (ø45mm, t=6mm or less)
	External power supply unit	TH4-100/200	Two versions available (100V and 200V), Optional TH4-HS hand switch can be used, 2.2kg weight
Observation tube	Tilting binocular tube	U-TBI90	35-85° continuous angle adjustable (eyepoint height range: 406mm-471mm), interpupillary distance adjustable between 50-76mm, diopter adjustment function, erect image, F.N. 22
	Binocular tube	U-BI90CT	Built-in focusing telescope, interpupillary distance adjustable 50-76mm, diopter adjustment function, F.N. 22
		U-BI90	Interpupillary distance adjustable 50-76mm, diopter adjustment function, F.N. 22
	Trinocular tube	TR30H+IX-ATU	3 step optical path selectable (observation : straight port = 100:0, 20:80, 0:100), interpupillary distance adjustable 50-76mm, diopter adjustment function, F.N. 22
Stage	Cross stage with flexible right handle	IX2-SFR	50mm(X) x 50mm(Y) stroke, stage insert plate exchangeable (ø110mm)
	Cross stage with short left handle	IX-SVL-2	50mm(X) x 43mm(Y) stroke, stage insert plate exchangeable (ø110mm)
	Plain stage	IX2-SP	232mm(X) x 240mm(Y) stage size, stage insert plate exchangeable (ø110mm)
		IX-MVR	Mechanical stage to be used with IX2-SP, 130mm(X) x 85mm(Y) stroke
	Narrow plain stage	IX2-KSP	160mm(X) x 240mm(Y) stage size, stage insert plate exchangeable (ø110mm)
		CK40-MVR	Mechanical stage to be used with IX2-KSP, 120mm(X) x 78mm(Y) stroke
	Gliding stage	IX2-GS	Upper circular stage 360° rotatable, 20mm(X/Y) travel
Condenser	Long working distance universal	IX2-LWUCD	5 positions for optical devices (3 positions for ø30mm and 2 position for ø38mm), aperture iris diaphragm adjustable, N.A. 0.55 / W.D. 27mm
	Long working distance Relief Contrast	IX2-MLWCD	4 positions for optical devices (for ø50mm, Relief Contrast optical devices rotatable), aperture iris diaphragm adjustable, N.A. 0.5 / W.D. 45mm
	Ultra long working distance	IX-ULWCD	4 positions for optical devices (for ø29mm), aperture iris diaphragm adjustable, N.A. 0.3 / W.D. 73mm
	Water immersion DIC	IX2-DICD + IX2-TLW	Single position for optical device (include two optical device holders), 40° injection pipette or electrode insertion angle, aperture iris diaphragm adjustable, N.A. 0.9 / W.D. 3.7mm
Eyepiece		WH10x	High eyepoint, F.N. 22
		WH10x-H	High eyepoint, diopter adjustment function, F.N. 22
Reflected light fluorescence unit	Fluorescence illuminator	IX2-RFAL	L-shaped design with exchangeable F.S. and A.S. modules, two filter holder sliders (2 positions, ø32mm, t=6mm or less)
		IX2-RFA	Straight design with field iris diaphragm, filter holder slider (2 positions, ø32mm, t=6mm or less)
	Fluorescence cube turret	IX2-RFAC	6 positions in a rotating turret, built-in shutter
	Light source		100W HBO lamp housing and HBO transformer, or 75WXBO lamp housing and XBO transformer

IX71 dimensions

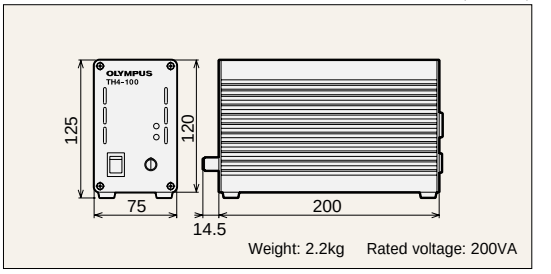
(unit: mm)



Weight: 25.1kg
Length marked with an asterisk (*) may vary according to interpupillary distance

TH4 dimensions

(unit: mm)



Weight: 2.2kg Rated voltage: 200VA

TH4-HS dimensions

(unit: mm)

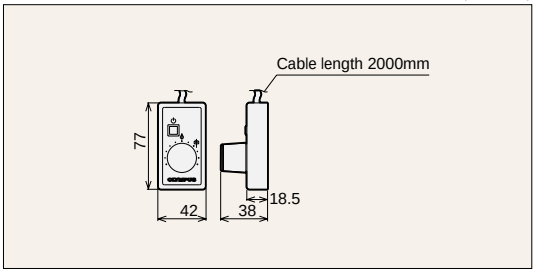


Photo courtesy of: *Yuji Abe M.D. Ph.D., The 1st Department of Obstetrics & Gynecology School of Medicine Toho University (P.10 above IVF)*

ISO9001 Certification
Design and production adheres to ISO9001 international quality standard.

ISO14001 Certification
Design and production at the Olympus Optical Co. Ltd. ina Plant conforms with ISO14001 specifications for environmental management systems.

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

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