OLYMPUS®

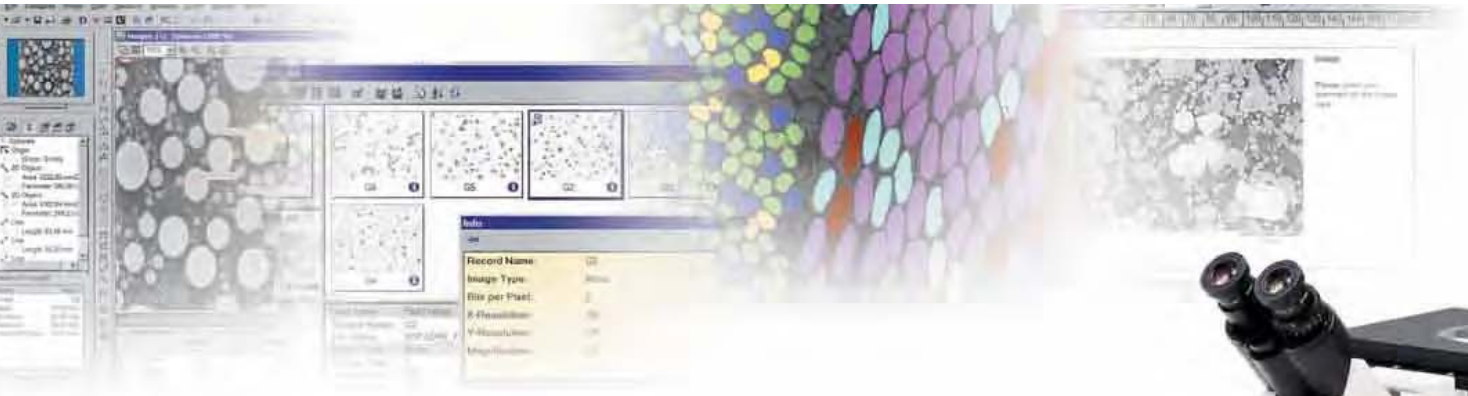
Your Vision, Our Future

INVERTED METALLURGICAL MICROSCOPES

GX SERIES

UIS2
World-leading optics

INVERTED METALLURGICAL MICROSCOPES



World-class UIS2 optics take digital micro imaging systems to the next generation

The optical system, heart of a microscope, uses our UIS2 infinity-corrected optical system evolved from the industrial leading UIS optical system. High quality images are obtained for every observation method, and the performance of the digital camera is maximized for the ultimate flexibility. Digital images transferred to a PC can be easily used by use of advanced image analysis software.
The GX series is Olympus' most advanced inverted metallurgical microscope system. With addition of motorized functions, complete integration into all digital imaging subsystem is possible to provide advanced solutions for cutting edge research by its digital imaging system in pursuit of high quality and simplicity, motorized modules which increase observation efficiency, and other beneficial features. The GX Series also strongly promotes environmentally-friendly manufacturing with a lead-free optical system.

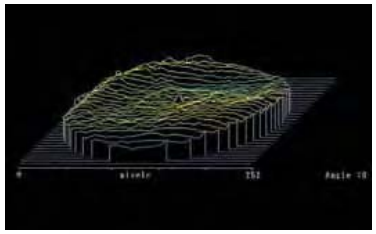
GX51+DP20

GX71 (motorized model) +DP71

Images of the world's highest order created with UIS2 wavefront aberration control

A new standard of the objective performance, using wavefront aberration control

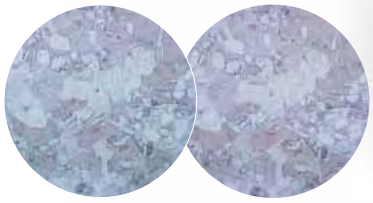
The Olympus UIS2 objectives set a new standard, with wavefront aberration control in addition to common performance standards of N.A. and W.D. Olympus challenges farther highest order optics which has not been fulfilled by the conventional standards. We offer excellent performance objectives by minimizing the aberrations that lower resolution.



An example of 3D display of a wave front measured with a laser interferometer. The flatter the surface of the lens, the better the aberration correction becomes.

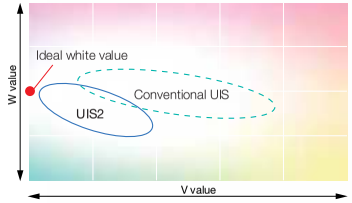
Natural color reproduction faithful to the specimen

UIS2 objectives realize natural color reproduction without any chromatic shifts using stringently selected high transmittance glass and advanced coating technology that provides high transmittance which is flat over an ultra-wide band wavelength. In addition, since the total optical system, including the tube lens is designed to reproduce a natural color, clear images faithful to the specimen are obtained even with digital imaging.



UIS2 image　　Conventional image

■**Color temperature comparison**

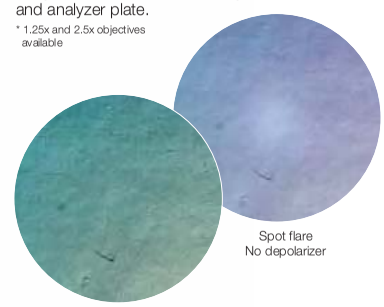


A comparison of the color temperature of UIS2 objectives and conventional UIS objectives. The color temperature of the UIS2 objectives is within a range which is very close to the color temperature target, which represents ideal white value.

Removes spot flare during ultra low magnification observation.

When a low reflection specimen is observed in ultra low power magnification, spot flare may hinder precise observation. In UIS2 ultra low magnification observation, a depolarizer built into the objective end removes spot flare and, a clear, high contrast image is obtained by combining a set of polarizer and analyzer plate.

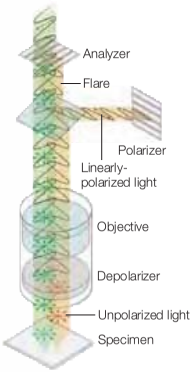
* 1.25x and 2.5x objectives available



MPLFLN1.25x
UIS2

■**Spot flare removal principle conceptual diagram**

Since the light reflected from the surface of the objectives is the linearly-polarized light "as is", it is eliminated by analyzer at Crossed Nicol position and has no affect on the image. On the other hand, the light passed through the depolarizer at the end of the objective becomes unpolarized light, and when the unpolarized light reflected from the specimen passes through the analyzer, only the linearly-polarized light that matches the vibration direction of the analyzer passes through and forms an image.



Promotes environmentally-friendly ecologization and weight reduction

Olympus was the first to consider the environment and to tackle ecologization of microscopes. As part of this, on introduction of UIS2 optical system, eco-friendly glass free of lead and arsenic is used in the objectives and the major Semi-apochromatic UIS2 objectives are lightened by approximately 2/3. This contributes to prevention of environmental pollution, improvement of operability of objectives replacement, etc.

*Some UIS2 objectives are the same weight as conventional objectives

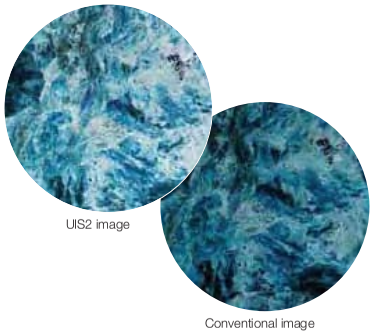
High-performance research and quality control are enhanced by automated modules

Operations that you want to save — various powered modules fulfill your requirements
Thanks to various motorized modules, speedy magnification change, easy observation mode selection from brightfield to simple polarizing and illumination filter switching are performed through hand control panel or PC. Automation allows the operator to focus on the crisp UIS2 images. You only need to add the automation you need without adding any extras.

*Motorized revolving nosepieces U-D6REM, U-D5BDREM and motorized filter wheel U-FWR can also be added onto the GX51.
*Image analysis software analySIS FIVE is necessary for control from a PC.

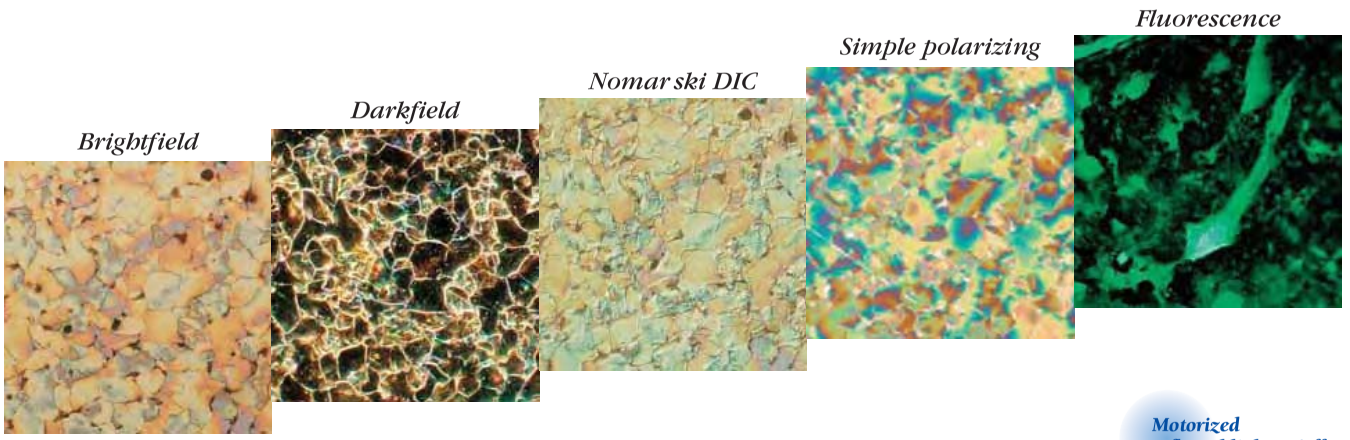
Getting the optimized image with any observation method
The UIS2 infinity-corrected optical system was developed with Olympus unique knowledge — and the GX series is designed to maximize its performance in the context of inverted metallurgical microscopes. The results are sharp, detailed images with excellent contrast and consistently high clarity with any and all observation methods. Equipped with 100W halogen lamp and newly improved efficiency, the GX series microscopes provide the intense and even illumination.

The brightest Darkfield images than ever
The UIS2 contrast has improved brightness and delivers better sensitivities for holes or flaws on metallographic structure.



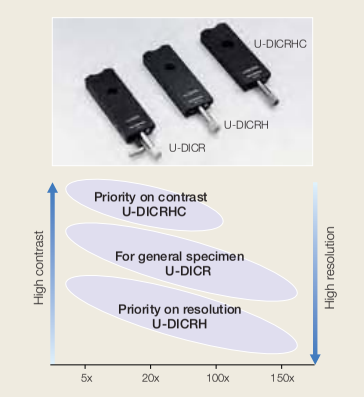
UIS2 image

Conventional image



The GX71 motorized configuration requires the control box, IX2-UCB and the cable, U-REMMT.

Nomarski DIC system provides an optimum image suited to the sample
Olympus Nomarski DIC observation uses a simple observation switching slider type single prism system. Three different DIC prisms are provided: the U-DICR for all imaging applications, high resolution U-DICRH, and high contrast U-DICRHC, so that the best resolution and contrast matched to the state of the sample are obtained. Since the exit pupil position of the objective is standardized by the series, the position of the DIC prism does not have to be switched when the magnification was changed by switching the objective.



Polarized light: optimizing contrast in the observation of metallographic and crystal structures
The combination of three key components enables high-contrast reflected light polarized observation with a sensitive tint: the rotating stage GX-SRG for GX, the polarized slider GX-POTP with wavelength plate, and an analyzer slider, GX-AN360 or GX-AN. In addition, use of the binocular tube U-BI90CT (with GX51 only) makes it possible to observe an anisotropy on the specimen surface caused by reflection (also known as conoscopic image observation). The rotating stage GX-SRG also provides an unrestricted choice of framing angles when taking in photomicrography.

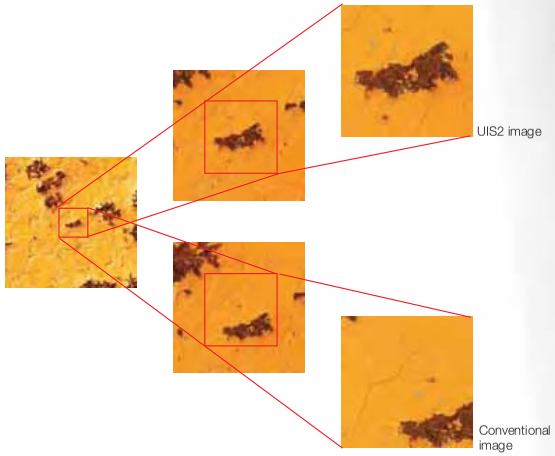
* GX-SRG rotatable stage is not used for motorized revolving nosepiece configuration due to a possibility of confliction. 50x or higher objectives may restrict the use of GX microscope with GX-SRG.

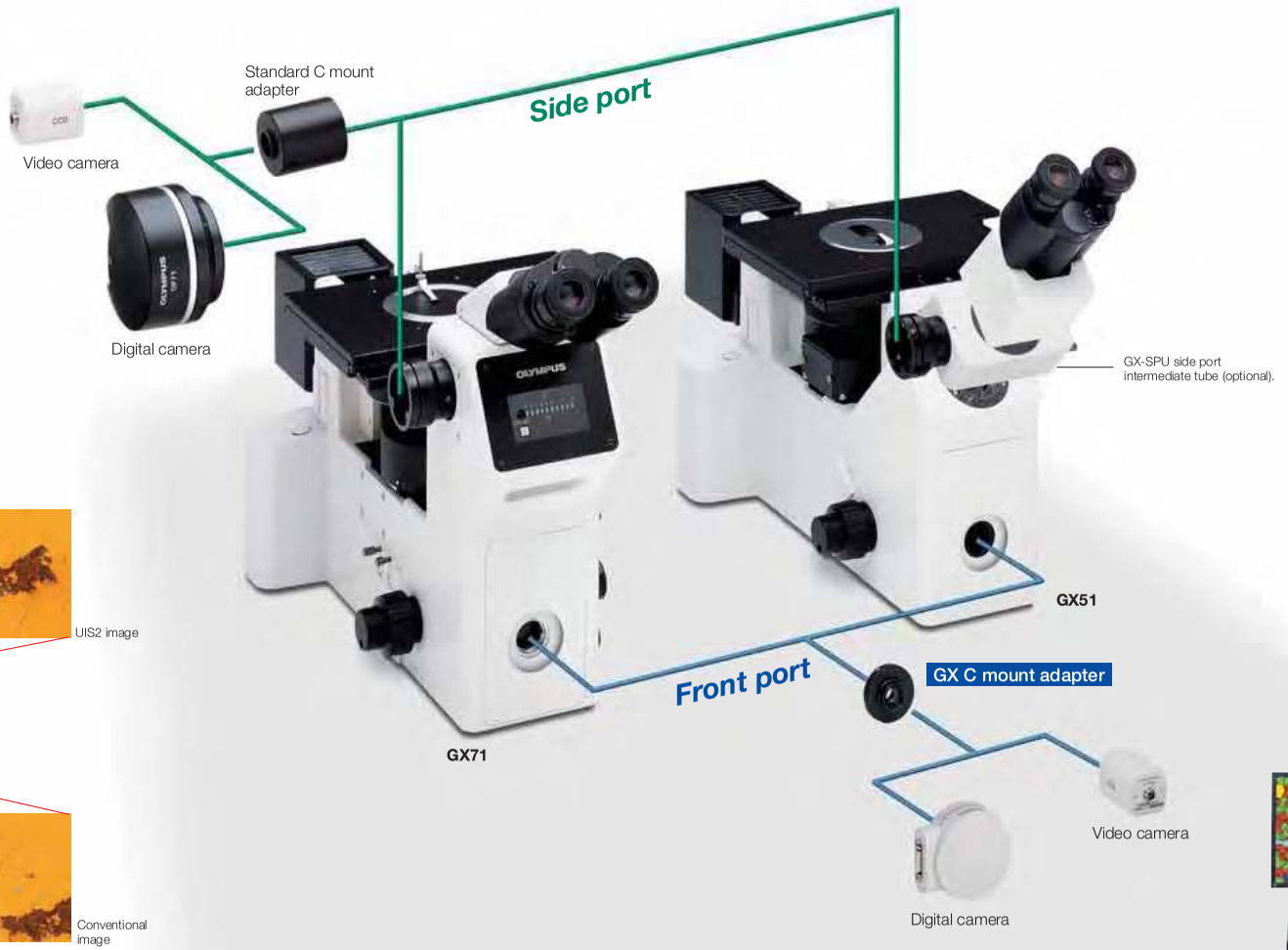
Digital micro imaging solutions for obtaining high quality microscopic images

Digital imaging ? No, it is digital micro imaging
High resolution objectives, high transmittance optical system and uniform brightness illumination system extract maximum performance from the digital camera. Our microscope digital cameras offer high contrast images with color reproduction faithful to the sample. The DP20 microscope digital camera, which can also be used alone, and the DP71 microscope digital camera, which is completely controlled via PC for all observation methods from brightfield to fluorescence, are available. Choose the camera matched to your purpose and budget. Olympus offers digital micro imaging solutions for microscopes based on many years of optoelectronics technologies.

Simultaneous attachment of digital camera and video camera
One of the various digital cameras and a video camera can be attached to a side port* and front port of the GX. The BX2M Series video system can be used with a trinocular observation tube combination. The GX71 can accommodate 3 image digital or photographic cameras.
*The GX51 required an optional side port intermediate tube (GX-SPU).

UIS2 objectives with excellent image parcentricity
High power Semi-apochromatic UIS2 objectives make the centration tolerance between objectives on the microscope nosepiece keep the image within the center of the field of view even with digital cameras.





Microscope digital camera DP20

Smooth live image display.
High-speed image capturing which allows sequential shooting.
Live images at 15 frames/second are displayed in high definition television class resolution so that focusing on the monitor is performed easily without any breaks in traveling the stage during observation and faithful color is obtained at a high resolving power. Also, the DP20 can be connected to a PC through a high-speed USB2.0 interface and image recording and measurement and analysis can be performed using our image analysis software.
*DP20 enables image recording and simple measurements without a PC.


GX51+DP20

Microscope digital camera DP71

Captures high-resolution, high-sensitivity digital images fast — equivalent to 12.5 million pixels in approximately 3 seconds
The digital camera DP71, thanks to its high speed hardware, enables to capture high-resolution still images equivalent to 12.5 million pixels in as little as (approx.) 3 seconds. The DP71's multiple functions make every phase of the operation simple, from image acquisition through to data filing. Observation images are captured in microscopic detail, with unparalleled clarity and resolution accuracy.


GX71+DP71

Making the best use of microscope digital imaging, the more freedom, the more comfort

NOTE: Olympus IA software as shown is not available in the U.S.A. Contact LECO for more information on Image Analysis Systems.

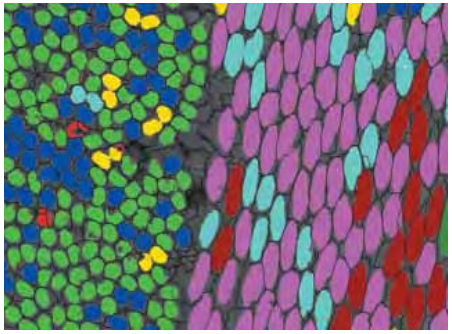
Seamless operation for image acquisition, measurement, advanced documentation and analytical solutions

The image analysis software analySIS FIVE has made possible seamless operation from image processing, measurement, and analysis to database and report generation. The analySIS FIVE comes in 3 types: “imager”, “docu”, and “auto”, according to the difference of the functions incorporated. The type can be chosen according to the application. The “auto” type has all functions, including particle analysis, etc. Customizing to more pleasant software is possible by freely adding the desired functions.

*Add-in software (cast iron analysis, film thickness measurement) for performing special analysis is also available.

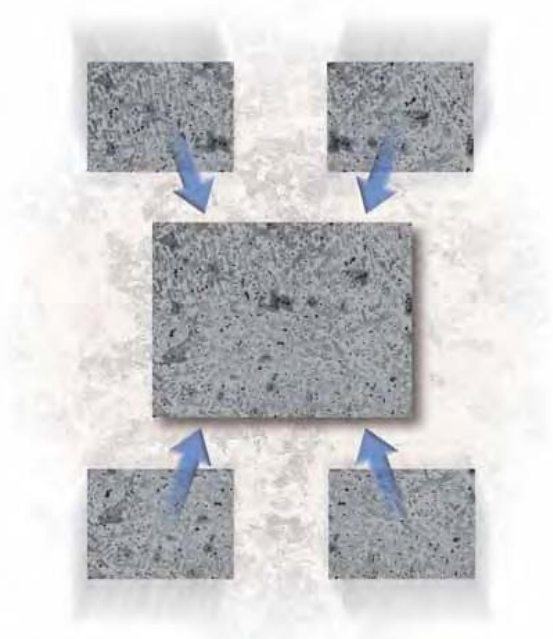
Particle Analysis

Automatic separation of particles within a given image is possible using the integrated separator function. Users can set a specific "detection area" or ROI (region of interest). Many other parameters can be used to measure all particles automatically, or carry out statistical data processing.



Stitching Images

Multiple adjacent images can be stitched together into one, in a natural way that doesn't show abrupt joints. This function is especially useful for observing large areas which cannot be captured in a single image.



analySIS FIVE function

The software package varies by area.

imager

- Camera and Microscope Control
- Measurement
- Database
- Report

docu

- Camera and Microscope Control
- Measurement
- Stitching Images
- Extended Focal image
- 3D Image
- Database
- Report

auto

- Camera and Microscope Control
- Measurement
- Stitching Images
- Extended Focal image
- 3D Image
- Particle Analysis
- Database
- Report

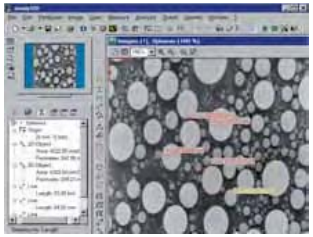
Camera and Microscope Control

This allows digital camera and microscope* operations to be controlled from the software. A complete series of processes, from initial observation to final report creation, can be completed on your PC.

*Controllable cameras are limited to models introduced in this catalog and microscopes are limited to our microscopes. Controllable functions vary according to the models.

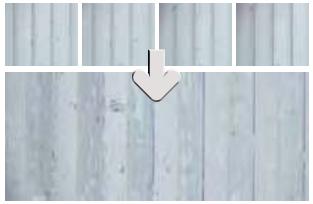
Measurement

Counting particles...measuring dimensions...calculating the distance between two lines...analySIS FIVE handles tasks like these with ease. Results can also be saved/output together with the images.



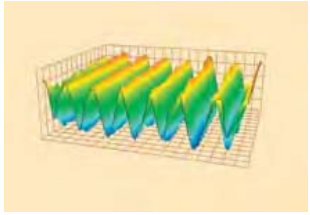
Extended Focal image

Multiple images of the same area, each focused at a different position, can be combined to produce a single, wholly-focused image. This function allows clear imaging of samples with different height levels on the surface, which cannot be observed all together at the same time conventionally.



3D Image

By adding height/texture information to multi-focused images obtained with the "Extended Focal Image"
(see above), you can create realistic 3D views.

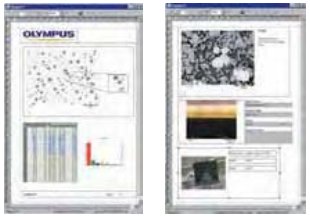


Database

The software systematically stores all your images, analysis results, datasheets, graphs, and other acquired data. This makes it easy to grasp the complete picture, and to search for whatever data you need.

Report

Images can be freely laid out and edited. Some example documentation templates are provided, or you can create original formats, producing professionally-finished reports and documents in whatever styles you choose.



TOP-OF-THE-LINE INVERTED
METALLURGICAL SYSTEM MICROSCOPE

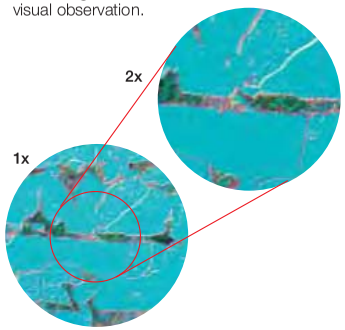
GX71

BF DF DIC POL FL F.N. 26.5 MAX 4 Ports 2x ZOOM

Top-notch performance for today's leading-edge research

Zoom function for easy framing

The 1x-2x zoom facility acts on all ports, shows critical specimen detail more clearly and makes accurate framing especially easy as well as allowing image capture at the same magnification as the visual observation.



Truthful reproduction of specimen in image forming and acquisition

Viewing images are not reversal, the exact reproduction of specimen in vertical/ horizontal directions. The true reproduction makes it easier to compare the images with digital photos.

*Images are reversed if seen via a video/digital camera attached to the side/front port.

Ideal for every observation method from brightfield to fluorescence

Simply by changing the position of the GX71's mirror unit turret, it is quick and easy to alternate between brightfield, darkfield, Nomarski DIC, simple polarized light and fluorescence observation. The Olympus universal objectives accommodate all observation methods. There is no need to change the objective type each time the observation method is changed.
The GX71 also employs super widefield eyepieces (F.N.26.5), for an efficient orientation and observation process.

INVERTED METALLURGICAL
SYSTEM MICROSCOPE

GX51

BF DF DIC POL F.N. 22 MAX 3 Ports

Superb performance and reliability for all kinds of routine observation and documentation

Single lever switchover for brightfield/darkfield observation

The versatile GX51 performs brightfield, darkfield, Nomarski DIC and simple polarized light observations. Switching between brightfield and darkfield observation is done with a single lever, located close to the operator's hand. Changing to Nomarski DIC observation is a simple matter of inserting the DIC-slider.

Expandable functionality

A wide variety of optional units can be easily attached to the GX51, allowing such system upgrades as linking to a digital or video camera via an intermediate tube (GX-SPU).

Designed for ease to use and efficiency

Good working efficiency is the top design priority of the GX51, which was specially developed for handling routine inspection tasks. Its most frequently used operating features are located at the front, while incorporation of the tilting tube U-TBI90 (elevation angle 35-85 degree) allows the operator to work in an easy, natural posture and conduct observations comfortably in a standing position.

GX71/GX51 ACCESSORIES

Compatible with transmitted light polarized observation

GX71 GX51

Transmitted light polarized observation combination

Transmitted light polarized observation, which is ideal for transparent specimens or fine powders, can be performed by combining illumination pillar IX2-ILL100.

①GX-SRG ②PMG3-LWCD ③IX2-ILL100 ④U-POT
⑤GX-AN360 ⑥GX-POTP ⑦U-P4RE

GX71

GX71 observation tubes

The super widefield binocular observation tube (U-SWBI30) and super widefield trinocular observation tube (U-SWTR-3) are provided for the GX71.

GX51

GX51 observation tube

Besides trinocular tube U-TR30H, the lineup includes binocular tube U-BI90, for use in combination with an eyepoint adjuster, and tilting tube U-TBI90, which allows observations to be made in whatever posture suits the individual user.

*Use U-BI90CT in combination with IX-EPA or GX-SPU.

GX51

Intermediate tubes

Other high-performance accessories are available to meet a variety of applications. Included are an intermediate tube (IX-ATU), which allows attachment of a trinocular observation tube, a side port intermediate tube (GX-SPU) and an eyepoint adjuster (IX-EPA).

GX71 GX51

Scales

In addition to the calibration scales for each objective, grain size reticules and square scales can also be recorded. Up to 3 scales can be freely combined in a single slider.

Compatible with macro observation and photographing

GX71

Drawing attachment / U-DA

As well as its conventional use as drawing attachment, this accessory also provides a macro observation function. When combined with a trinocular observation tube, the macro images are stored as photomicrographs or retained in the digital camera.

*Use in combination with 10x lens for drawing attachment U-DAL10x.

GX71 GX51

Lamp housing

A variety of light sources to accomplish bright and even illumination are provided, according to your purpose.

GX71 GX51

Revolving nosepieces

Sextuple revolving nosepieces and quintuple revolving nosepieces with DIC slider compatibility are also provided.

GX71 GX51

Filters

The GX series comes with a select range of filters, including neutral density, color temperature conversion and green filters. Two slider slots are provided, each allowing introduction of up to three filters.

GX series specifications

		GX71	GX51
Optics		UIS2 optical system (infinity-corrected)	
Microscope body	Intermediate magnification	Zoom incorporated (1x - 2x) Clicks in the two intermediate positions (can be released)	—
	Imprinting of scale	All ports Reversed positions (up/down/left/right) from observation positions seen through the eyepiece	All ports Reversed positions (up/down) from observation positions seen through the eyepiece
	Power source	Power source for illuminator (12V100 halogen) incorporated	
	Focusing	Manual, Coarse and Fine coaxial handle. Focus stroke 9mm (2mm above and 7mm below the stage surface)	
	Output port	Front port — Video and DP system (reversed image, special video adapter for GX)	
		Side port — Video, DP system (reversed image)	Side port (option) — Video, DP system (upright image)
Observation tube	Super widefield (F.N. 26.5)	U-SWBI30, U-SWTR-3	—
	Widefield (F.N. 22)	—	U-BI90, U-TR30H
Illuminator	Observation method	Brightfield, darkfield, simple polarized light, DIC, fluorescence	Brightfield, darkfield, simple polarized light, DIC
	Illuminator diaphragm	FS/AS manually controlled, with centering adjustment	
	Light source	100W halogen (standard), 100W mercury, 75W xenon (option)	
Revolving nosepiece	Manual operation	Sextuple for BF/DIC, quintuple for BF/DF, quintuple for BF/DF/DIC, Quadruple for BF with centering	
	Motorized operation	Sextuple for BF/DIC, quintuple for BF/DF/DIC	
Stage	Standard type	Right handle stage for GX (X/Y stroke: 50x50mm)	
	Option	Flexible right handle stage, left short handle stage (each X/Y stroke: 50 x 50mm) Gliding stage, rotatable stage for GX	
	Stage insert plate	A set of teardrop and long hole types	
Image recording	Digital camera, video camera	OLYMPUS DP series etc, attachable using appropriate adapters	
Combined weight		Approx. 39kg (BF, DF and DIC observations, combined with DP71)	Approx. 28kg (BF, DF and DIC observations, combined with DP20)
Power consumption		170VA, 140 W	

UIS2 objective specifications

Objectives	Magnifications	N.A.	W.D. (mm)	Cover Glass Thickness (mm)	Resolution*2 (µm)
MPLFLN	1.25x*3*4*5	0.04	3.5	—	8.39
	2.5x*4*5	0.08	10.7	—	4.19
	5x	0.15	20.0	—	2.24
	10x	0.30	11.0	—	1.12
	20x	0.45	3.1	0	0.75
	50x	0.80	1.0	0	0.42
	100x	0.90	1.0	0	0.37
MPLFLN-BD	5x	0.15	12.0	—	2.24
	10x	0.30	6.5	—	1.12
	20x	0.45	3.0	0	0.75
	50x	0.80	1.0	0	0.42
	100x	0.90	1.0	0	0.37
	150x	0.90	1.0		0.37
MPLFLN-BDP	5x	0.15	12.0	—	2.24
	10x	0.25	6.5	—	1.34
	20x	0.40	3.0	0	0.84
	50x	0.75	1.0	0	0.45
	100x	0.90	1.0	0	0.37
LMPLFLN	5x	0.13	22.5	—	2.58
	10x	0.25	21.0	—	1.34
	20x	0.40	12.0	0	0.84
	50x	0.50	10.6	0	0.67
	100x	0.80	3.4	0	0.42
LMPLFLN-BD	5x	0.13	15.0	—	2.58
	10x	0.25	10.0	—	1.34
	20x	0.40	12.0	0	0.84
	50x	0.50	10.6	0	0.67
	100x	0.80	3.3	0	0.42
MPLN*3	5x	0.10	20.0	—	3.36
	10x	0.25	10.6	—	1.34
	20x	0.40	1.3	0	0.84
	50x	0.75	0.38	0	0.45
	100x	0.90	0.21	0	0.37

Objectives	Magnifications	N.A.	W.D. (mm)	Cover Glass Thickness (mm)	Resolution*2 (µm)
MPLN-BD*1*3	5x	0.10	12.0	—	3.36
	10x	0.25	6.5	—	1.34
	20x	0.40	1.3	0	0.84
	50x	0.75	0.38	0	0.45
	100x	0.90	0.21	0	0.37
LCPLFLN-LCD*5	20x	0.45	8.3~7.4	0~1.2	0.75
	50x	0.70	3.0~2.2	0~1.2	0.48
	100x	0.85	1.2~0.9	0~0.7	0.39

UIS objective specifications

Objectives	Magnifications	N.A.	W.D. (mm)	Cover Glass Thickness (mm)	Resolution*2 (µm)
MPlanApo	20x	0.60	0.9	0	0.56
	50x	0.95	0.3	0	0.35
	100x	0.95	0.35	0	0.35
	100xOil	1.40	0.1	0	0.24
MPlanApo-BD	100x	0.90	0.31	0	0.37
SLMPlan	20x	0.35	21.0	0	0.96
	50x	0.45	15.0	0	0.75
LMPlan-IR	5x	0.10	20.0	—	—
	10x	0.25	18.5	—	—
	20x	0.40	8.1	—	—
	50x	0.55	6.0	—	—
	100x	0.80	3.4	—	—
MPlan-IR*3	100x	0.95	0.3	—	—

"BD" refers to brightfield and darkfield objectives

*1 Slight vignetting may occur in the periphery of the field when MPLN-BD series objectives are used with high-intensity light sources such as mercury and xenon for darkfield observation.

*2 Resolution values are calculated with the aperture diaphragm fully opened.

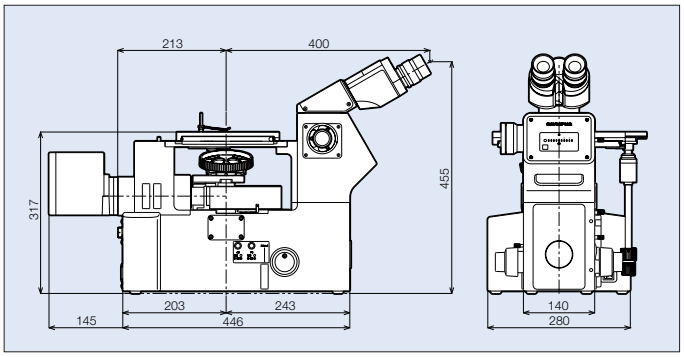
*3 Field numbers are limited (up to F.N.22). Not compatible with F.N.26.5.

*4 Analyzer and polarizer are recommended to the usage with MPLFLN1.25x or 2.5x.

*5 Available in the beginning of 2007.

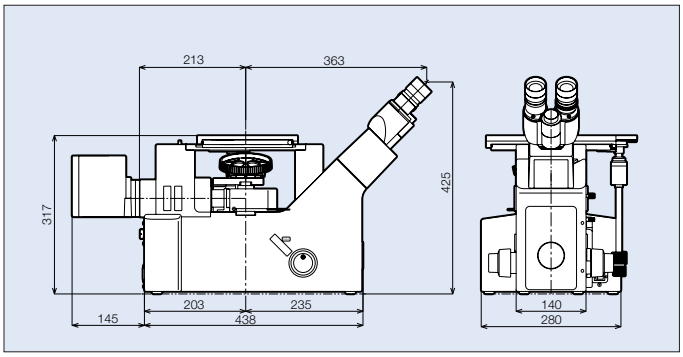
GX71 dimensions

(unit:mm)

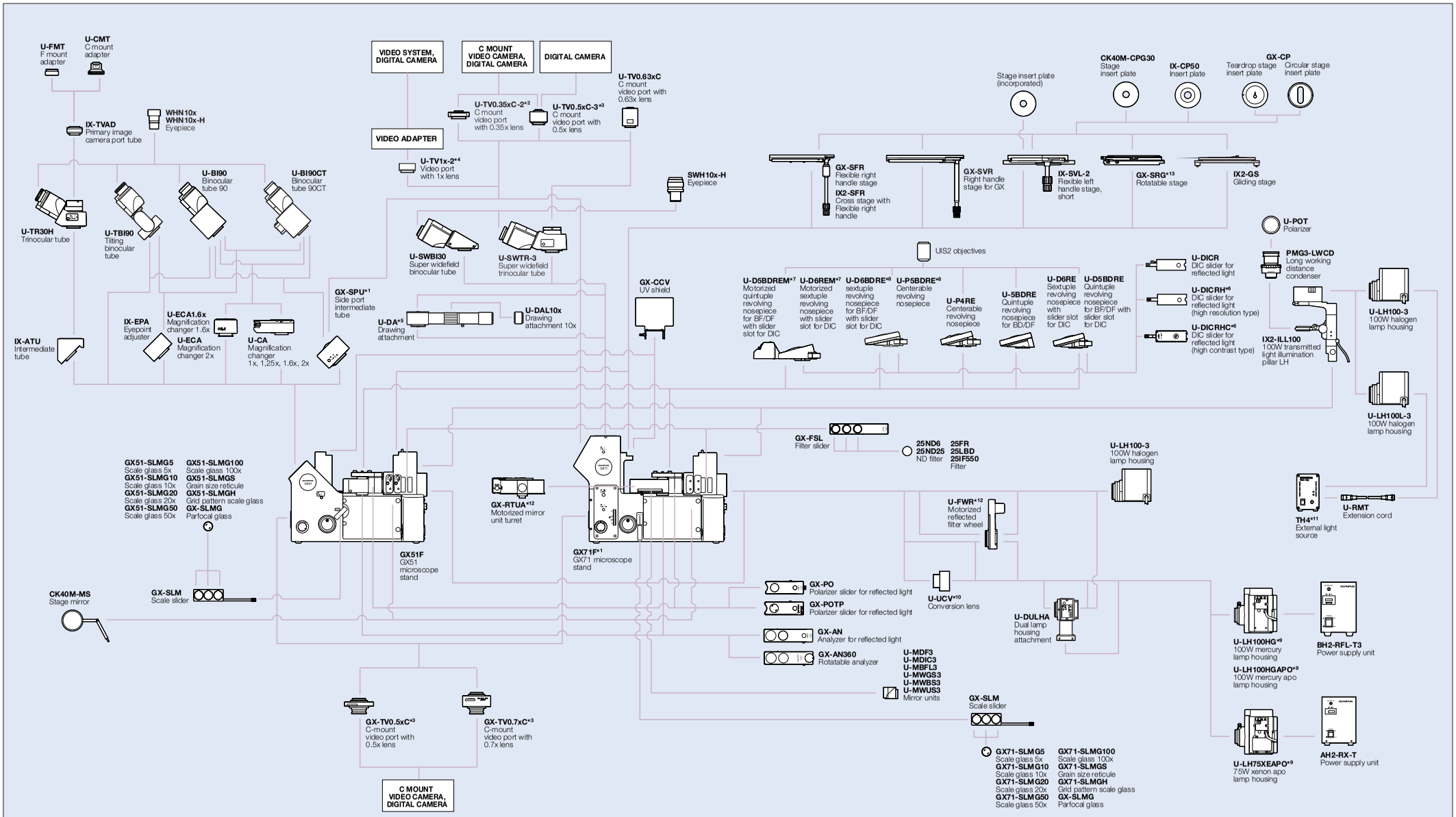


GX51 dimensions

(unit:mm)



SYSTEM DIAGRAM



*1 Please consult your nearest Olympus dealer for cameras compatible with the GX71F side port and GX-SPU. *2 Using the camera with an image sensor less than 1/2 inch in size. Even in this case, illumination near the perimeter of the field of view may slightly insufficient. *3 Using the camera with an image sensor less than 2/3 inch in size.
*4 Using the camera with an image sensor less than 1 inch in size. *5 Macro observation image sizes are fractionally smaller than the SWH10x-H field of view (F.N.26.5). *6 U-DICRH should be used exclusively with the UMPlanFL series objectives and U-DICRHC should be used exclusively with LMPlanApo series objectives. *7 U-REMPS-2 power supply unit is required for U-D6REM and U-D5BDREM.
*8 Objectives may touch the stage when revolving the U-D6BDRE, U-P5BDRE incorrectly. *9 25L42 filter is required for polarized light and Nomarski DIC observation using high intensity lamps such as U-LH100HG. *10 U-UCV can be used for fluorescence observation. *11 TH4 is only necessary when transmitted and reflected light illuminations are used simultaneously. *12 IX2-UCB control unit is required for U-FWR and GX-RTUA.
*13 U-D6BDRE, U-P5BDRE, U-D6REM and U-D5BDREM are not used for GX-SRG rotatable stage configuration due to a possibility of confliction.