ISO 9001 Certification
Design and production adheres to ISO9001 international quality standard.

ISO 14001 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.

OLYMPUS OPTICAL CO.,LTD.
San-Ei building, 22-2, Nishi Shinjuku 1-chome, Shinjuku-ku, Tokyo, Japan
OLYMPUS OPTICAL CO.(EUROPA) GMBH.
Postfach 10 49 08, 20034, Hamburg, Germany
OLYMPUS INDUSTRIAL AMERICA, INC.
1 Corporate Drive, Orangeburg, NY 10962, U.S.A.
OLYMPUS SINGAPORE PTE LTD.
491B River Valley Road, #12-01/04 Valley Point Office Tower, Singapore 248373
OLYMPUS OPTICAL CO.(U.K.) LTD.
2-8 Honduras Street, London EC1Y OTX, United Kingdom.
OLYMPUS AUSTRALIA PTY. LTD.
31 Gilby Road, Mt. Waverley, VIC 3149, Melbourne, Australia.

www.olympus.com

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OLYMPUS®

INVERTED METALLURGICAL MICROSCOPES

GX SERIES

UIS
UNIVERSAL INFINITY SYSTEM

Advanced imaging system plus versatile modular design

Both of these new GX series microscopes feature Olympus' world-renowned UIS infinity-corrected optical system for ultra-clear images, no matter what observation method is used. In addition they are built to a modular design which enables the user to match selected image recording equipment (video, digital or large-format/35mm cameras) to the microscope body and attach them singly or in multiple configurations — along with calibration scales that are recorded directly with the image.
Together with these sophisticated functions and performance features, the GX71 also allows erect image observation. The GX series represents a highly advanced imaging system with the flexibility to meet the diverse needs of current and future materials research and inspection applications.

GX51

GX71

Improved optical performance sets new standards of image clarity for inverted metallurgical microscopes

Getting the full picture with any observation method

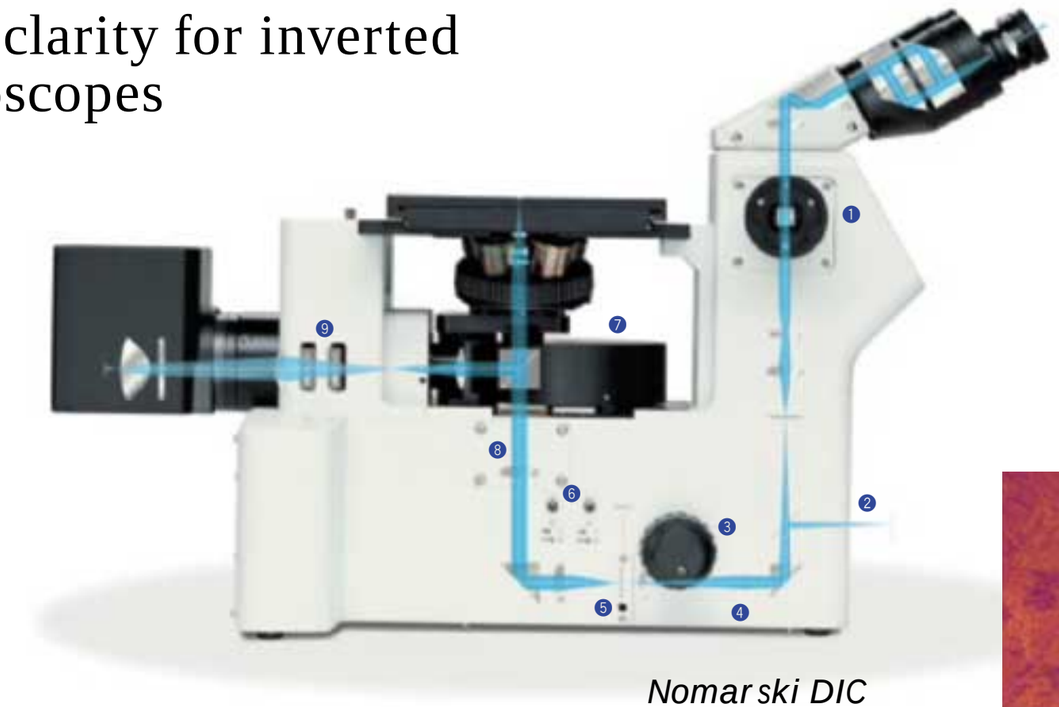
The UIS infinity-corrected optical system was developed with Olympus' original technological know-how — and the GX series is designed to maximize its performance in the context of inverted metallurgical microscopes. The result are sharp, detailed images with excellent contrast and consistently high clarity with any and all observation methods. Equipped with extra-bright 100W halogen lamps and newly improved light collecting efficiency, the GX series microscopes provide the intense and even illumination that contemporary applications demand.

Ergonomic layout of control elements allows a natural working posture

Numerous refinements are included to ensure that the user can adopt a natural posture and work in comfort. They include an ergonomic control layout that places the field stop (FS), aperture stop (AS), focus control and light adjustment dial close to the users hand. The introduction of a flexible stage handle further contrib-utes to the work comfort.

Computer-designed frame with more rigidity and higher reliability

Computer simulations have been used to further improve the rigidity and low center of gravity design of the frame, which is the key to greater stability and a more flexible system structure.

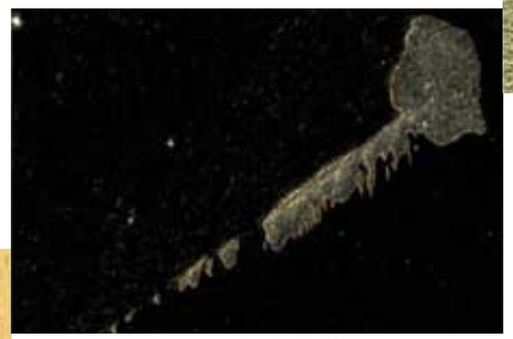


1. Side port
2. Front port
3. Focusing control
4. Zoom system
5. Scale/reticule position
6. FS (field stop) / AS (aperture stop)
7. Beamsplitter turret
8. Optional side port
9. Filter receptacle

Nomarski DIC

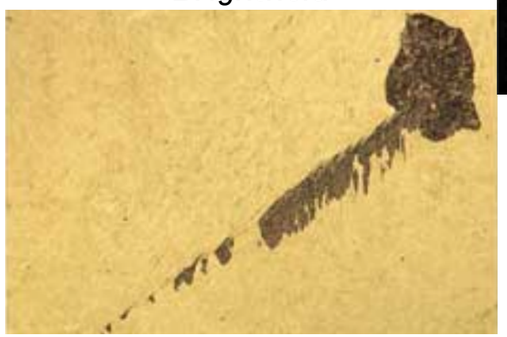
UMPlanFL100xBDP Nomarski DIC observation*

Darkfield



UMPlanFL100xBDP Darkfield observation*

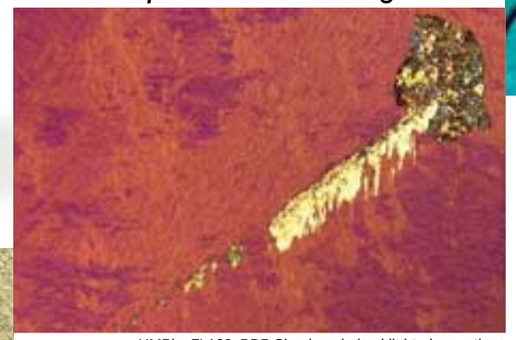
Brightfield



UMPlanFL100xBDP Brightfield observation*

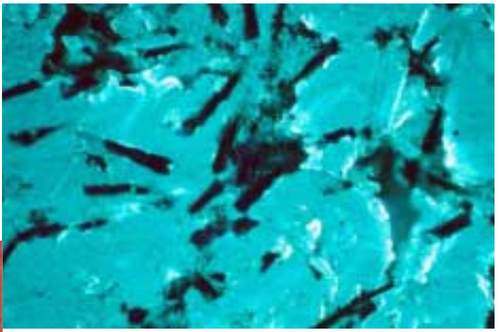
Sample provided by Prof. Kenji Abiko, doctor of engineering, Institute for materials research, Tohoku university

Simple Polarized Light



UMPlanFL100xBDP Simple polarized light observation*

Fluorescence



UMPlanFL5x Fluorescence observation

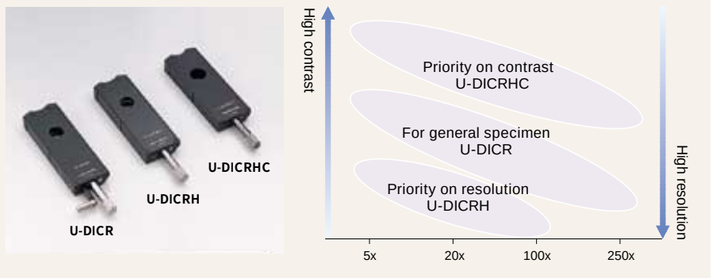
Polarized light: optimizing contrast in the observation of metallographic and crystal structures

The combination of three key components enables high-contrast reflected light polarized observation with a sensitive tint: the special 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.

* Scheduled for introduction in 2003.

Adjusting the image to suit the specimen — Nomarski DIC observation

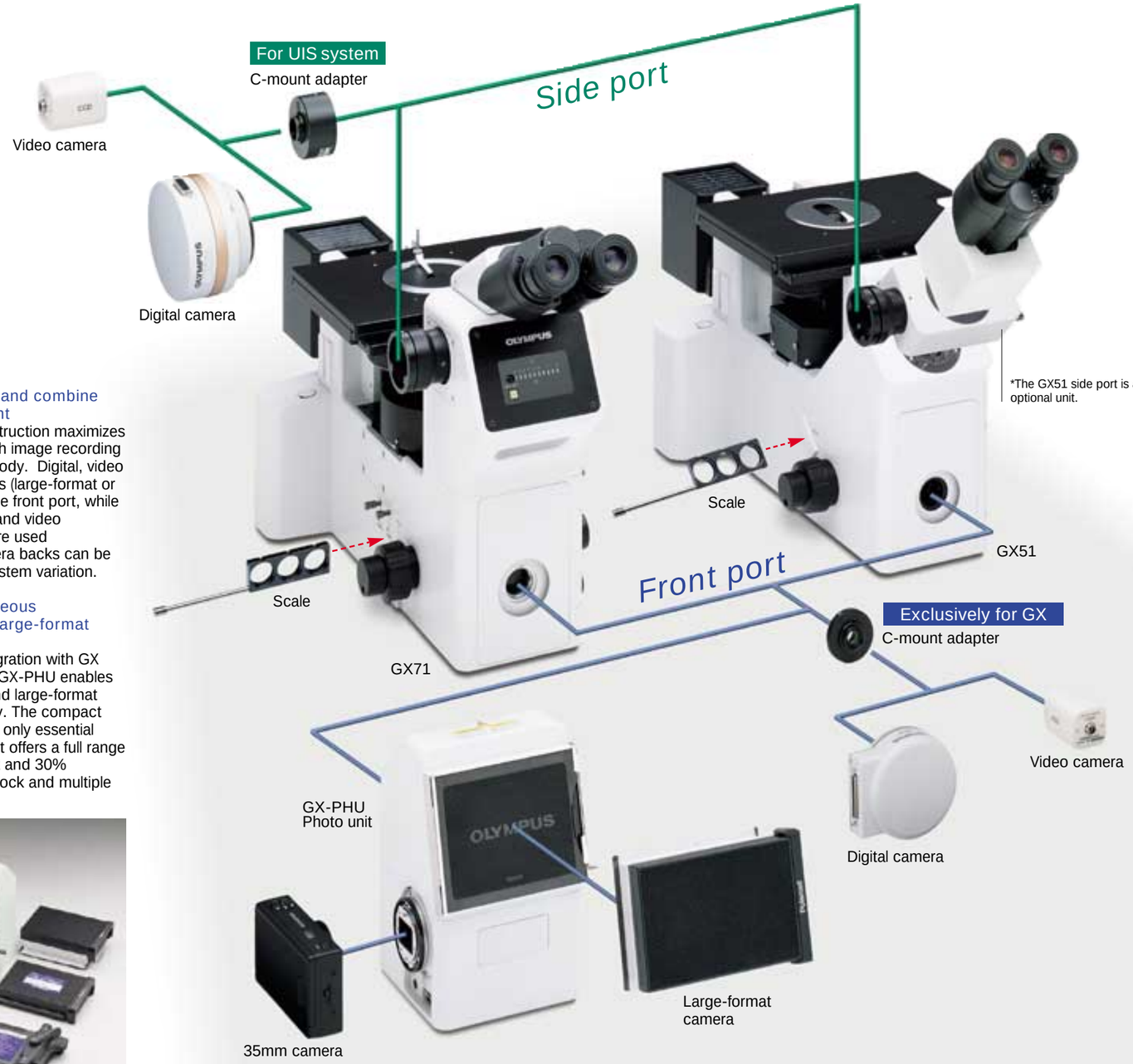
To obtain the ideal combination of resolution and contrast to suit the nature of each specimen, three different Nomarski DIC prisms are provided: The U-DICR prism serves all imaging applications with a balance of contrast enhancement and resolution. For very densely structured specimen the U-DICRH prism provides an additional resolution level. The U-DICRHC prism greatly emphasizes the contrast and detection of minute surface gradients that may otherwise remain unseen. All three are slider-operated, so that the operator can make smooth transitions to different magnifications and can easily switch between observation methods.



A select range of 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.

Modular design for flexible system configuration from digital recording to conventional photography



*The GX51 side port is an optional unit.

Greater freedom to select and combine image recording equipment

The GX series' modular construction maximizes the flexibility to mix and match image recording devices on the microscope body. Digital, video and conventional still cameras (large-format or 35mm) can be attached to the front port, while the side port accepts digital and video cameras. When both ports are used simultaneously, up to 3 camera backs can be attached, providing ample system variation.

GX photo unit for simultaneous attachment of 35mm and large-format camera backs

Specifically designed for integration with GX microscopes, the photo unit GX-PHU enables attachment of both 35mm and large-format camera backs simultaneously. The compact controller is easy to use, with only essential operating control buttons, but offers a full range of features including 1% spot and 30% averaging light metering, AE lock and multiple exposures.

All-camera compatibility

The GX series allows scale imprinting for all ports and with any kind of camera, including digital, 35mm and large-format.

Accurate photo micrographs of any user-selected area

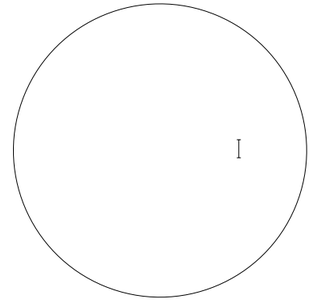
A large-format camera will record any given image (or part of an image) at the same magnification as is used for observation*. With the GX71's free-framing and 1x-2x zoom magnification capabilities, user-selected areas of the image can be easily and accurately recorded.

*When using 10x eyepieces.

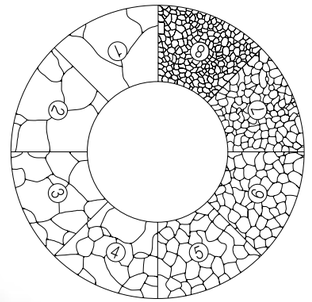
A full range of scales

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.

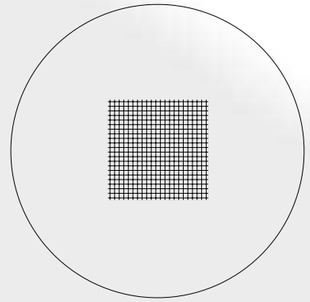
Scale



Grain Size Scale



Square Scale



Integrating the image analysis software OLYSIA m3 makes it easy to measure and analyze raw materials and metallographic structures

Olysia m3

Ideal for sophisticated research analyses: Image Analysis Software OLYSIA m3.

As well as handling basic measurement and analysis operations, OLYSIA m3 — the most advanced image analysis software in the OLYSIA series — comes equipped with several sophisticated functions for analyzing metal constructions. Connecting to an Olympus digital camera enables direct control from the software and allows highly sophisticated analysis right from the day of purchase. What's more, when used with Olympus microscopes, m3 can be customized for various specific purposes. This unique system from Olympus is designed for full compliance with a wide range of different research needs.

OLYSIA m3: The Main Functions

•Image handling
Images can be captured directly from a digital source: the software driver for Olympus' DP12 digital camera is included, so that observation and analysis can be easily performed right away. Images can be labeled as required, and numerous functions and filters are provided for processing images from black/white to true color, advancing the limits of conventional image processing.

•Automatic report production
Multi-page reports can be produced in response to a single command. The attribute data of observation images are used to select multiple enlarged section areas and attach relevant descriptions or explanations; these data are stored in their appropriate fields and can be accessed by using key words. Report composition is easy, by dragging the image, measurement sheet, diagram, text and database field onto the flexibly designed template.

•Comprehensive database function
The database function, which complies with Microsoft Access, enables creation of original user fields and the arrangement of structures according to the user's need or preference.

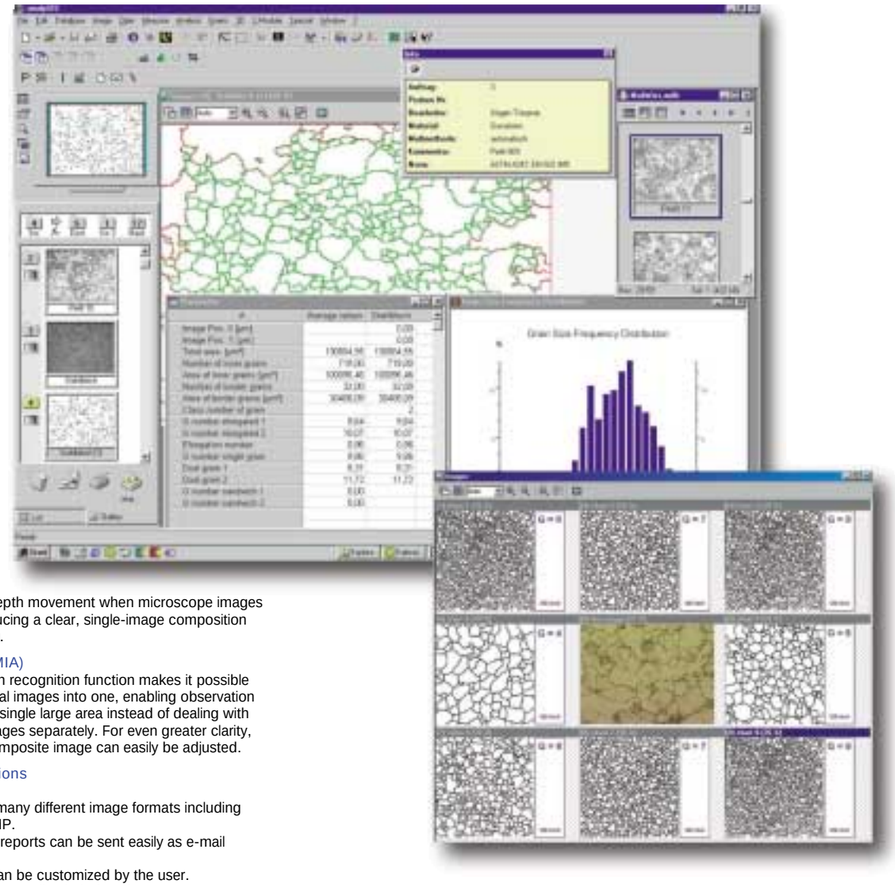
•Grain analysis (Grains)
The special module for analyzing metal construction specimens accords with international grain standards, including JIS G551 and 552. It also enables analysis of crystal grain and non-metallic intervening substances, grain separation by intelligent image processing, grain evaluation by flexible measurement patterns and various report-making functions, including automatic production of statistics.

•Chart comparison (Chart Nav)
Live images can be visually compared with a series of user defined reference images. Various display comparisons are possible, including 3 x 3 and 2 x 2, as is classification by grain number or by impurity patterns compared with a user-definable data sheet.

•Graphite analysis in the structure (Cast Iron)
Users can perform quality inspections of cast iron based on ASTM or other global standards, and analysis of the ferrite perlite rate.

•Micro hardness test (MHT)
Hardness or hardness depth evaluations can be carried out based on the Knoop or Vickers hardness tests.

•Focus composition (EFI)
Planes with different focus can be composed automatically: resolving them into a single image provides infinite focal depth. Multiple images can be restructured, whether live or already stored. The alignment function automatically compensates for depth movement when microscope images are captured, producing a clear, single-image composition with no overlapping.



•Image pasting (MIA)
An intelligent pattern recognition function makes it possible to restructure several images into one, enabling observation and evaluation of a single large area instead of dealing with several different images separately. For even greater clarity, the contrast in a composite image can easily be adjusted.

•Additional Functions
- Macro recorder
- Compliance with many different image formats including TIFF, JPEG and BMP.
- Images, data and reports can be sent easily as e-mail attachments.
- Image structure can be customized by the user.
- Detailed, informative on-line help function.

Microscope digital camera / ColorView I

Employment of a 3.3 million pixel CCD enables storage of high-resolution (2048 x 1536 pixel) digital images. The search mode uses triple-color binning and shows the entire image segment involved. Data can also be transferred to a computer by Fire Wire connection (IEEE1394).

* OLYSIAm3 driver software supplied as standard.

Microscope digital camera / CC12

This digital camera employs a Peltier-cooled 12 bit CCD, for easy-to-handle storage at 1376 x 1032 pixels and excellent quality reproduction which produces high S/N ratio digital images. Data can also be transferred to a computer by Fire Wire connection (IEEE1394).

* OLYSIAm3 driver software supplied as standard.

Easy image capture via control unit with LCD monitor

With a DP12 digital camera attached, microscope images can be captured directly (without a personal computer) and recorded/stored to SmartMedia. The DP12 has a 1/1.8 inch, 3.34 million-pixel CCD and provides sharp, high-precision results with both full-size images and detailed, individually-selected areas. Its 3.5-inch TFT color LCD monitor is directly attached to the control unit. The operator can freely place the control unit for easy viewing, framing and focusing.

GX51+DP12

Captures high-resolution, high-sensitivity digital images fast — equivalent to 12.5 million pixels in approximately 3 seconds.

With the digital camera DP70, users can capture high-resolution still images equivalent to 12.5million pixels* in as little as (approx.) 3 seconds, thanks to the camera's high speed hardware. The DP70's multiple functions make every phase of the operation simple, from original capture right through to filing. Observation images are captured in microscopic detail, with unparalleled clarity and resolution accuracy.

*Special technologies are employed to obtain a resolution equivalent to 12.5 million pixels from the DP70's 1.45 million pixel CCD.

GX71+GX-PHU+DP70

TOP-OF-THE-LINE INVERTED
METALLURGICAL SYSTEM MICROSCOPE

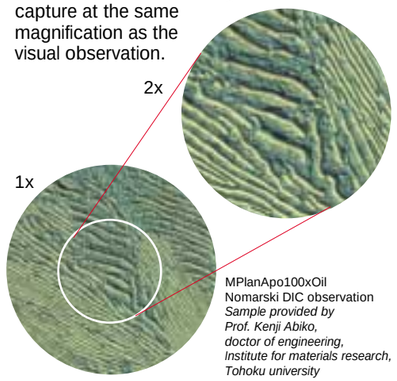
GX71

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

All the quality that today's advanced research demands

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. Photomicrography with a large-format camera allows image capture at the same magnification as the visual observation.



MPlanApo100xOil
Nomarski DIC observation
Sample provided by
Prof. Kenji Abiko,
doctor of engineering,
Institute for materials research,
Tohoku university

Real-time observation and recording of the specimen "as is"

Observation images are not reversed, but seen in real time, exactly as the objective sees them. This absence of reversal makes it much easier to compare the images with photographs.

*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 beamsplitter 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 Port

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 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

GX71 motorized combination

Operability is greatly improved by the incorporation of a single hand switch for controlling motorized units. These include the motorized revolving nosepieces U-D6REM and U-D5BDREM, which enable switching between objectives automatically; the motorized mirror unit turret GX-RTUA, which allows automatic observation changes; and the motorized filter wheel U-FWR which changes filters to vary the illumination.

*The U-D6REM, U-D5BDREM and U-FWR can also be attached to the GX51.

GX71

GX71 observation tubes

The super widefield binocular observation tube (U-SWBI30) and super widefield trinocular observation tube (U-SWTR2) are provided for the GX71.

GX51

GX51 observation tube

Besides trinocular tube U-TR30H and binocular tube GX-BI90, 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).

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.

GX71 GX51

Lamp housing

100W halogen, 100W mercury and 75W Xenon lamps... plus a bright, long-life, high-economy 50W metal halide lamp as well.

GX71 GX51

Revolving nosepieces

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

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.

GX series specifications

		GX71	GX51
Optics		UIS optical system (infinity-corrected)	
	Objective	UIS objectives	
	Eyepiece	UIS eyepiece (F.N. 26.5)	UIS eyepiece (F.N. 22)
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)	
	Photo frame	Incorporated (IN/OUT)	—
	Output port	Front port - Photomicrographic equipment (upright image), 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-2	—
	Widefield (F.N. 22)	—	U-BI90, GX-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, 50W metal halide (optional)	
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	Standrd type	Right handle stage for GX (X/Y stroke: 50x50mm)	
	Option	Flexible right handle stage, left short handle stage (each X/Y stroke: 50x50mm) Gliding stage, rotatable stage for GX (scheduled for introduction in 2003)	
	Stage insert plate	A set of teardrop and long hole types	
Image recording	Photomicrographic	Special photomicrographic lens (attached) gives 10x magnification with large-format camera, 3.3x with 35mm camera Photomicrographic system - 35mm/large-format camera (simultaneously mountable), 1 % spot/30% average measuring area (switchable), auto/manual exposure, exposure time adjustment, automatic ISO setting, AE lock, multiple exposure, etc	
	Digital camera, video camera	OLYMPUS DP series etc, attachable using appropriate adapters	
Combined weight		Approx. 37kg (BF, DF and DIC observations, combined with GX-PHU)	Approx. 28kg (BF, DF and DIC observations, combined with DP12)
Power consumption		170VA, 140 W (excluding photomicrographic system)	

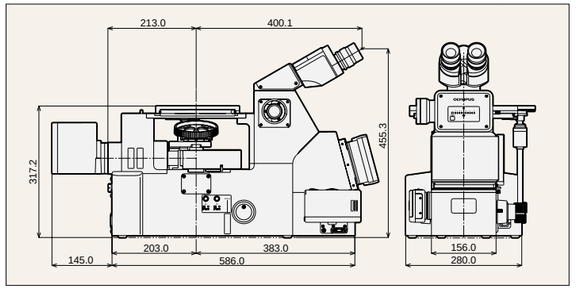
Objective specifications

Objectives	Magnifi-cations	N.A.	W.D. (mm)	Cover Glass Thickness (mm)	Reso-*2 lution (µm)
UMPlanFL	5x	0.15	20.0	—	2.24
	10x	0.30	10.1	—	1.12
	20x	0.46	3.1	0	0.73
	40x	0.75	0.63	0	0.45
	50x	0.80	0.66	0	0.42
	100x	0.95	0.31	0	0.35
UMPlanFL-BD	5x	0.15	12.0	—	2.24
	10x	0.30	6.5	—	1.12
	20x	0.46	3.0	0	0.73
	50x	0.80	0.66	0	0.42
	100x	0.90	0.31	0	0.35
UMPlanFL-BDP	5x	0.15	12.0	—	2.24
	10x	0.25	6.5	—	1.34
	20x	0.40	3.0	0	0.84
	40x	0.75	0.6	0	0.45
	50x	0.75	0.66	0	0.45
	100x	0.90	0.31	0	0.37
LMPlanApo	150x	0.9	1.0	0	0.37
	250x	0.9	0.80	0	0.37
LMPlanApo-BD	150x	0.9	1.0	0	0.37
	250x	0.9	0.80	0	0.37
LMPlanFL	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
LMPlanFL-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	3.4	0	0.42

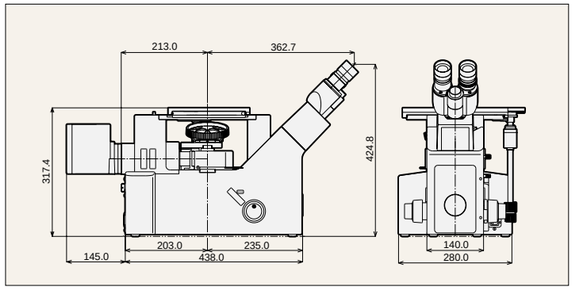
Objectives	Magnifi-cations	N.A.	W.D. (mm)	Cover Glass Thickness (mm)	Reso-*2 lution (µm)
MPlanApo	20x	0.60	0.9	0	0.56
	50x	0.95	0.3	0	0.35
	100x	0.95	0.35	0	0.35
	100xOil	1.40	0.1	0	0.24
MPlanApo-BD	100x	0.9	0.31	0	0.37
MPlan*3	5x	0.12	19.6	—	3.36
	10x	0.25	10.6	—	1.34
	20x	0.40	1.3	0	0.84
	40x	0.65	0.63	0	0.52
	50x	0.75	0.38	0	0.45
	100x	0.90	0.21	0	0.37
MPlan-BD*1*3	5x	0.10	12.0	—	3.36
	10x	0.25	7.0	—	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
SLMPlan	20x	0.35	21.0	0	0.58
	50x	0.45	15.0	0	0.75
LCPlanApo	20x	0.40	8.8	0/0.7/1.1	0.84
	50x	0.60	3.1	0/0.7/1.1	0.56
LCPlanFL-LCD	100x	0.80	0.95/1.1/1.143	0.6—1.2	0.42
LMPlan-IR	5xIR	0.10	20.0	—	—
	10xIR	0.25	18.5	—	—
	20xIR	0.40	8.1	—	—
	50xIR	0.55	6.0	—	—
	100xIR	0.80	3.4	—	—
MPlan-IR*3	100xIR	0.95	0.3	—	—

"BD" refers to brightfield and darkfield objectives
*1 Slight vignetting may occur in the periphery of the field when MPlan-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.

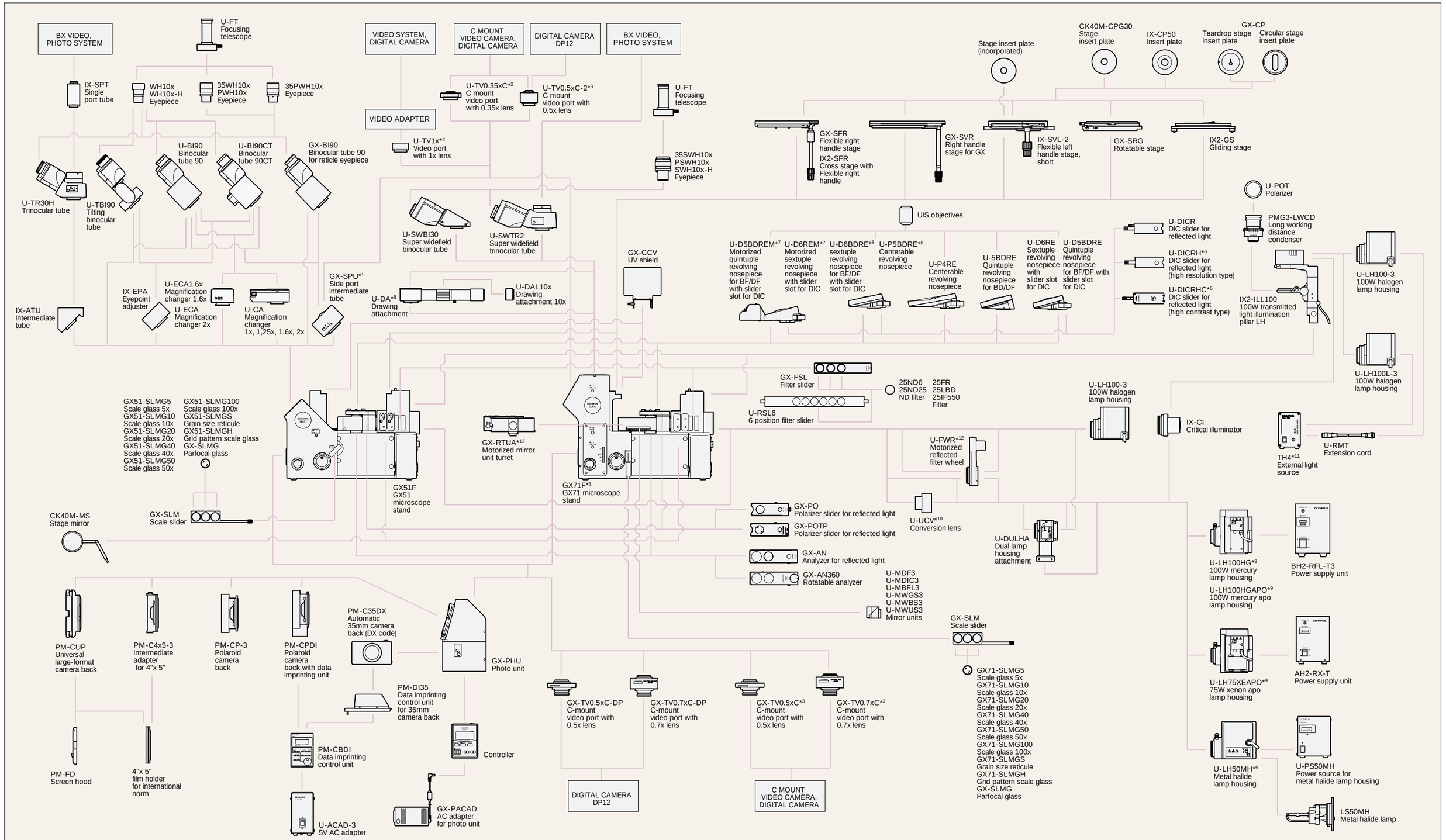
GX71 dimensions (unit:mm)



GX51 dimensions (unit:mm)



SYSTEM DIAGRAM



*1 Please consult your nearest Olympus dealer for cameras compatible with the GX71F side port and GX-SPU. The PM series photomicrographic system cannot be attached. *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.