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LEXT 3D Measuring Laser Microscope

With the Olympus LEXT laser scanning digital microscope, non-contact 3D observations and measurements of surface features at 10 nanometer resolutions are easy to produce.



DSX Digital Microscope

The DSX ensures superior results for any experience level with its superb operating simplicity and absolute performance reliability.

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Your Vision, Our Future

Upright Metallurgical Microscope System

BX53M/BXFM

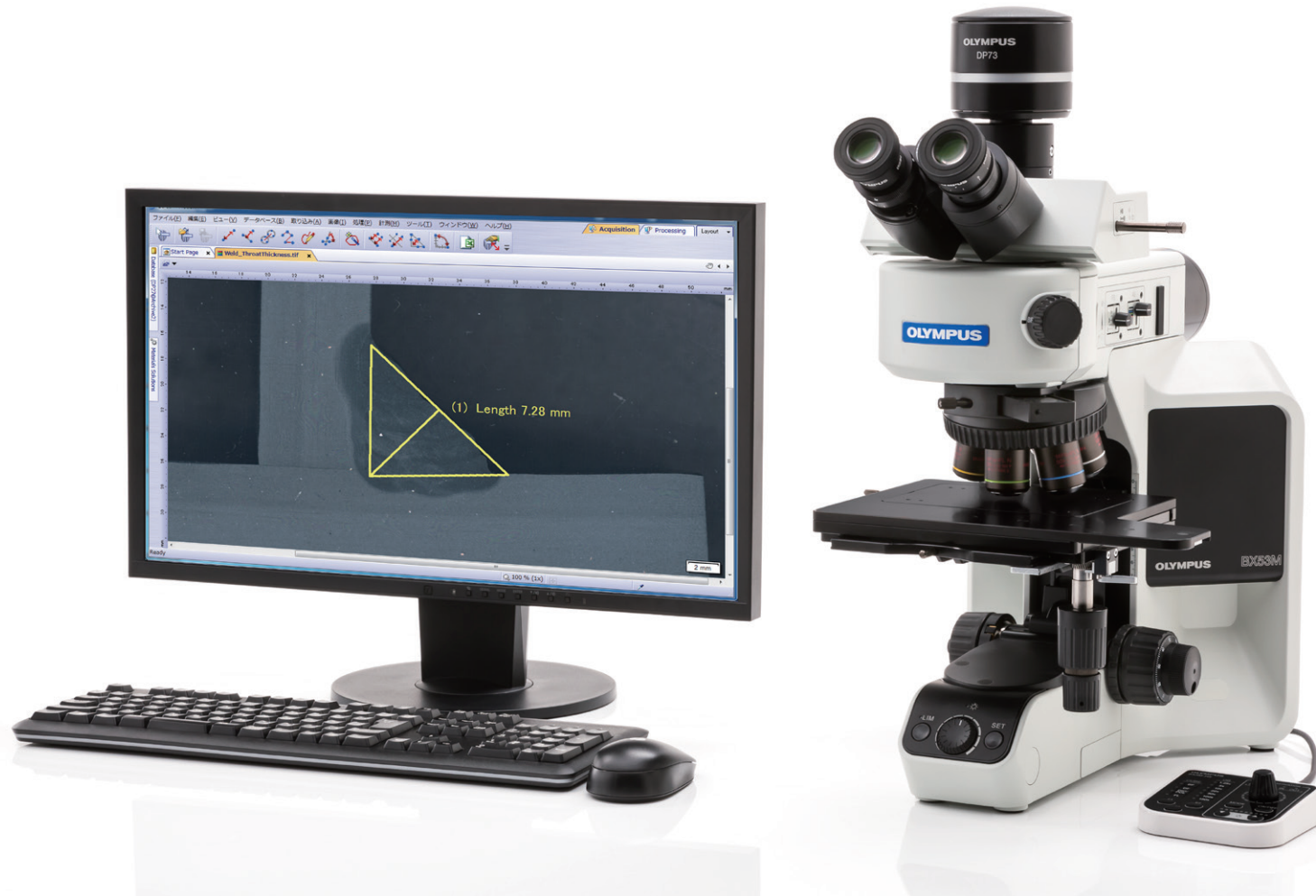
BX3M Series

Getting the best out of the Microscope

NEW



Designed for Industrial and Materials Science Applications



Designed with modularity in mind, the BX3M system provides versatility for a wide variety of materials science and industrial applications. Achieving improved integration with OLYMPUS Stream, BX3M systems provide a seamless workflow for standard microscopy and digital imaging users from observation to report creation.



Functions marked with this icon require OLYMPUS Stream software.

Getting the best out of the Microscope

User-Friendly

Simplified and guided operation of the microscope settings makes it easier for users to make adjustments and reproduce system settings.

Functional

Designed for traditional industrial microscopy and includes expanded functionality to meet a wider range of applications and inspection techniques.

Precision Optics

Olympus has a long history of producing quality optics, providing superior images both in the eyepieces and on the monitor.

Fully Customizable

Modular design gives users flexibility to build a system that meets their specific needs.

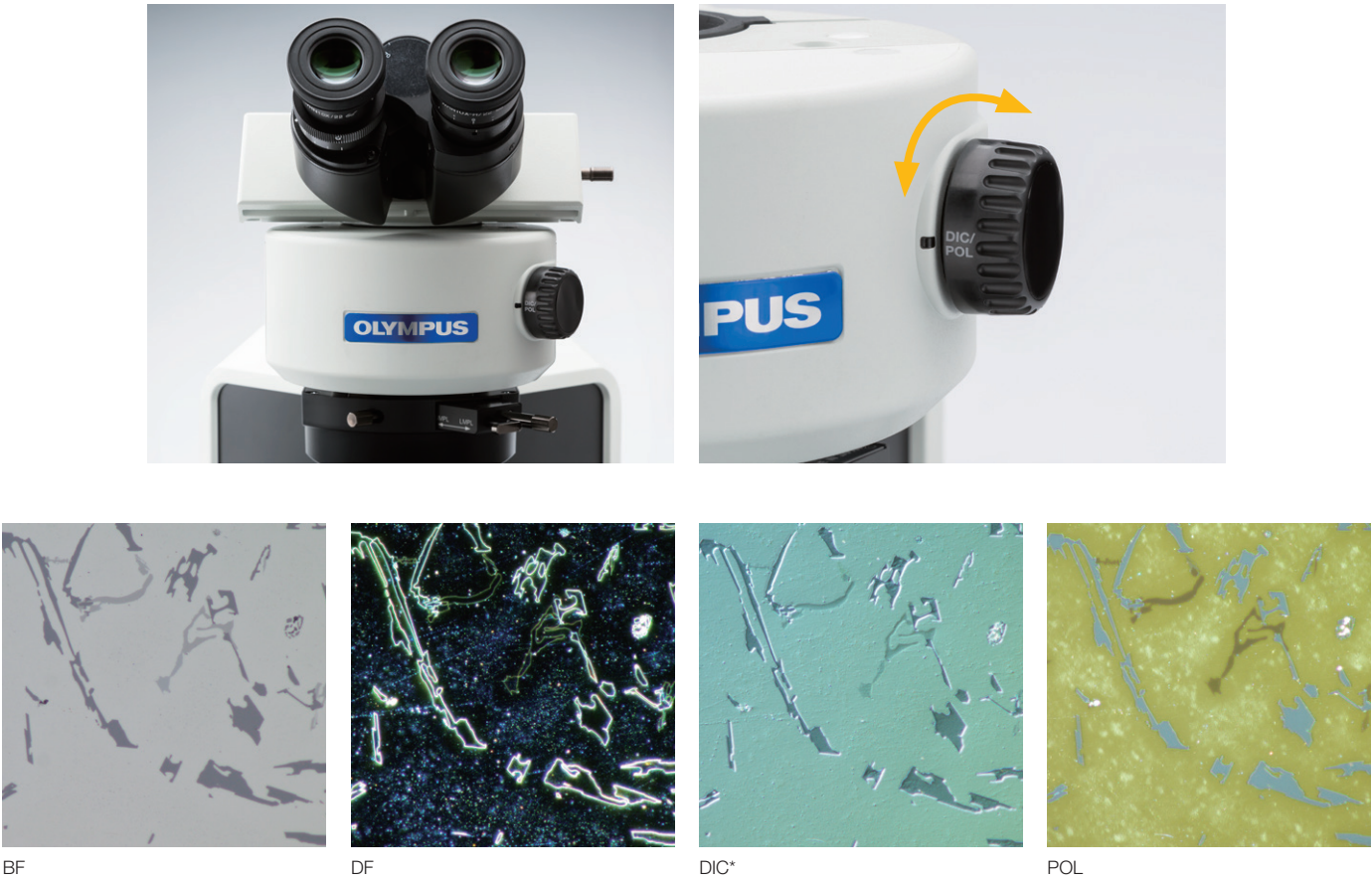
Intuitive Microscope Controls, Comfortable and Easy to Use

Inspection tasks often require a long time to adjust the microscope settings, acquire the image, and make the necessary measurements to satisfy reporting requirements. Users sometimes invest time and money for professional microscope training, or remain with limited knowledge about a microscope's full potential.

The BX3M simplifies complex microscopy tasks through its well-designed and easy-to-use functions. This means that users can get the most out of the microscope without the need for extensive training. The easy, comfortable operation of the BX3M also improves reproducibility by minimizing human error.

Simple Illuminator: Traditional techniques made easy

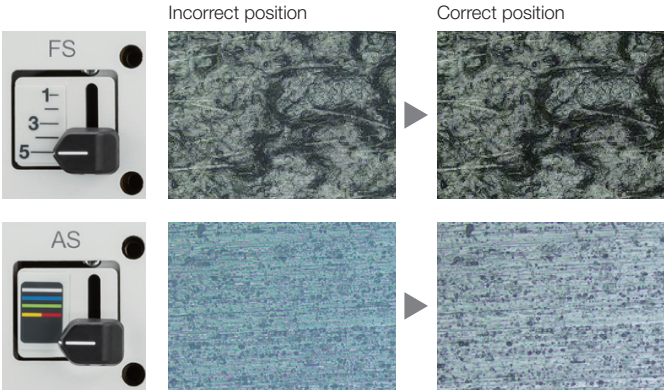
This minimizes complicated actions that are usually necessary during microscope operation. A dial at the front of the illuminator enables the user to easily change the observation method. An operator can quickly switch between the most frequently used observation methods in reflected light microscopy, such as from brightfield, to darkfield, to polarizing quickly, in order to readily change between different types of analyses. In addition, simple polarized light observation is adjustable by rotating the analyzer.



*Requires DIC slider for use

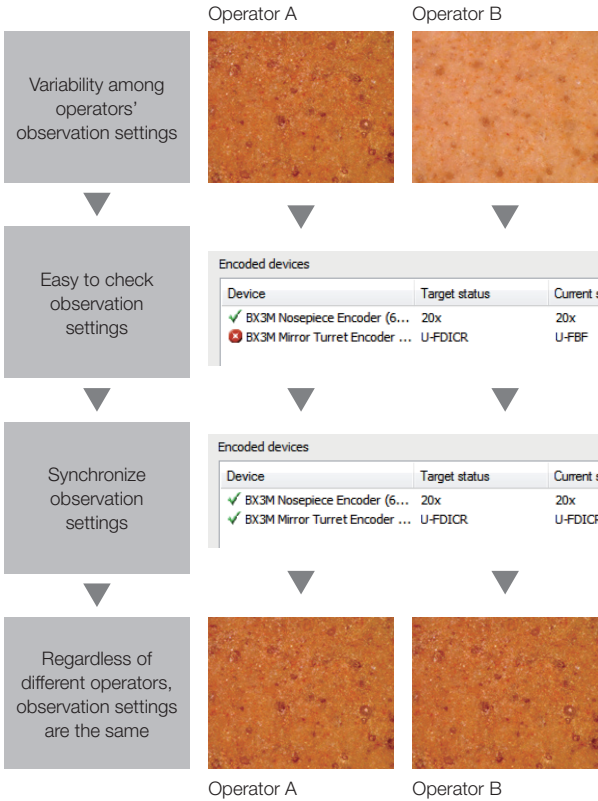
Intuitive Microscope Controls

Using the proper aperture stop and field stop settings provide image contrast and make full use of the numerical aperture of the objective. The legend guides the user to the correct setting based on the observation method and objective in use.



Coded Hardware: For restoring microscope settings

The BX3M employs new coded functions that integrate the microscope's hardware settings with OLYMPUS Stream image analysis software. The observation method, illumination intensity, and objective position are all recorded within the software and/or the handset. The coded functions enable the microscope settings to be automatically saved with each image, making it easier to reproduce the settings at a later time and provide documentation for reporting purposes. This saves the operator time and minimizes the chance that incorrect setting will be used. The current observation settings being used, are always clearly displayed both on the hand switch and in the software.



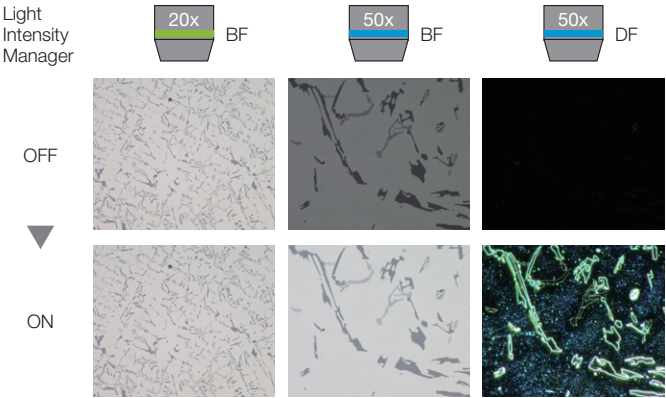
Focus Scale Index: Find focus quickly

The focus scale index on the frame supports quick access to the focal point. Operators can roughly adjust the focal point without viewing the sample through an eyepiece, saving time when inspecting samples that are different heights.



Light Intensity Manager: For consistent illumination

During the initial setup, the illumination intensity can be adjusted to match the specific hardware configuration of the coded illuminator and/or coded nosepiece. Depending on the configuration, up to 35 different intensity settings can be recorded.



Easy and Ergonomic Operation

Ergonomics are of the utmost importance for all users. Both standalone microscope users and those integrating with OLYMPUS Stream image analysis software benefit from ergonomic handset controls display of hardware position and for simple image capture. The simple handsets allow the user to focus on their sample and inspection they need to perform.



Functionality for a Range of Inspection and Analytical Tasks

The BX3M maintains the traditional contrast methods of conventional microscopy, such as brightfield, darkfield, polarized light, and differential interference contrast. As new materials are developed, many of the difficulties associated with detecting defects using standard contrast methods can be solved using advanced microscopy techniques for more accurate and reliable inspections. New illumination techniques and options for image acquisition within OLYMPUS Stream image analysis software give users more options to evaluate their samples and document findings. In addition, the BX3M also accommodates larger size, heavier, and more specialized samples than conventional models.

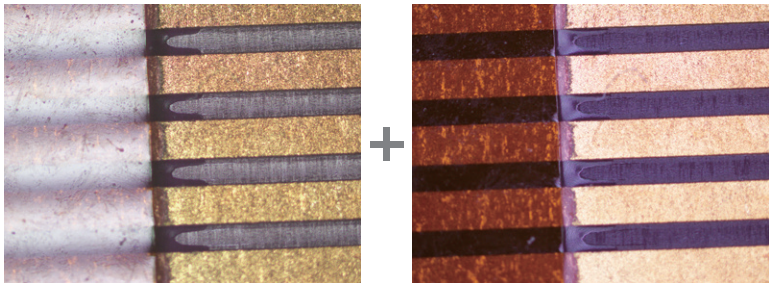
Advanced Imaging

MIX Observation: The invisible becomes visible

The BX3M's MIX observation technology combines brightfield and darkfield illumination methods. The LED's in the MIX slider shine directional darkfield on the sample, similar to traditional darkfield, but with more flexibility. The combination of brightfield and direction darkfield is MIX illumination which is especially helpful to highlight defects and determine raised surfaces from depressions.

Conventional

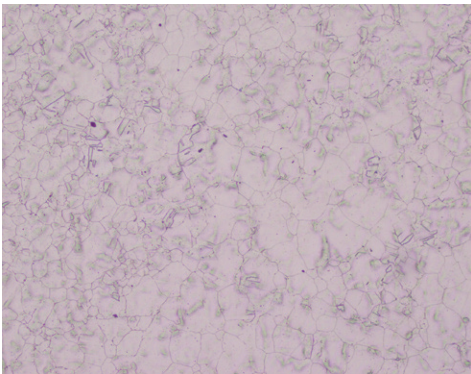
Brighfield shines the light straight down on the sample and traditional darkfield highlights scratches and imperfections of a flat surface by illuminating the sample from the side of the objective.



Brightfield illumination



Darkfield illumination



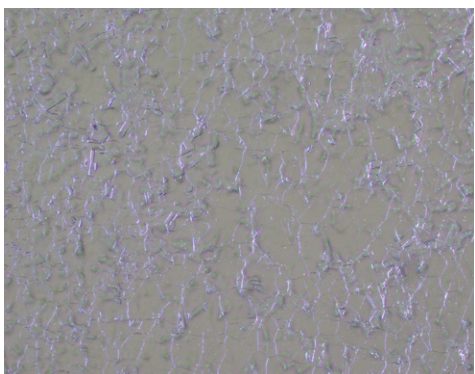
Brightfield illumination

MIX

MIX is a combination of brighfield and directional darkfield from a ring of LED's. The LED's can be adjusted to select which direction to illuminate from.



Full illumination



Front quadrant illuminated

Instant MIA: Easily move the stage for panorama



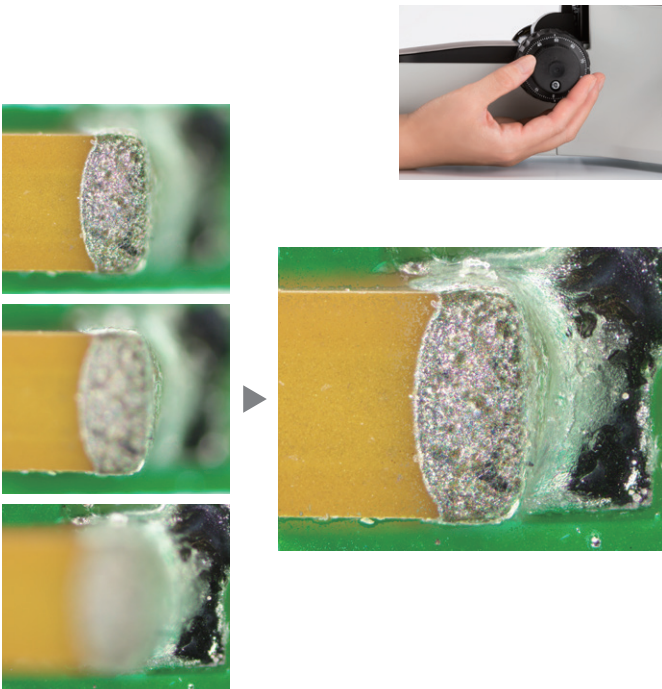
You can now stitch images easily and quickly by just moving the XY knobs on the manual stage, no motorized stage is necessary. OLYMPUS Stream uses pattern recognition to generate a panoramic image giving users a wider field of view than a single frame.



EFI: Create all-in-focus images



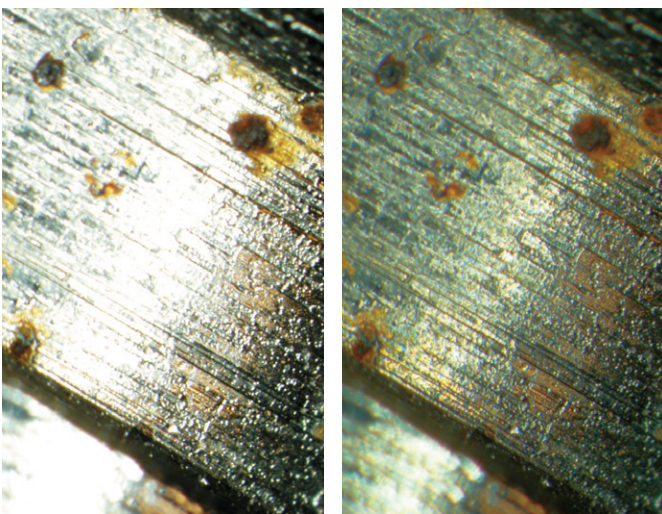
The Extended Focus Imaging (EFI) function within OLYMPUS Stream captures images of samples whose height extends beyond the depth of focus of the objective and stacks them together to create one image that is all in focus. EFI can be executed with either a manual or motorized Z-axis and Instant EFI creates a height map when using a coded or motorized Z-axis. It is also possible to construct an EFI image while offline within Stream Desktop.



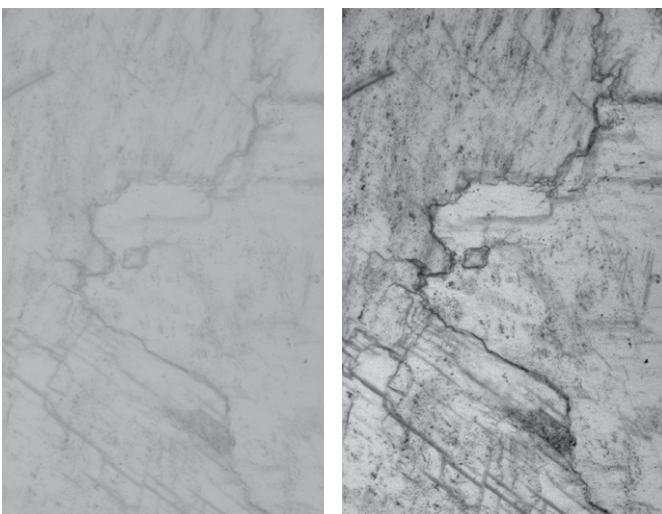
HDR: Capture both bright and dark areas



Using advanced image processing, high dynamic range (HDR) adjusts for differences in brightness within an image to reduce glare. HDR improves the visual quality of digital images thereby helping to generate more-professional reports.



Perfectly exposed for both of dark and bright parts by HDR (Sample: fuel injector bulb)



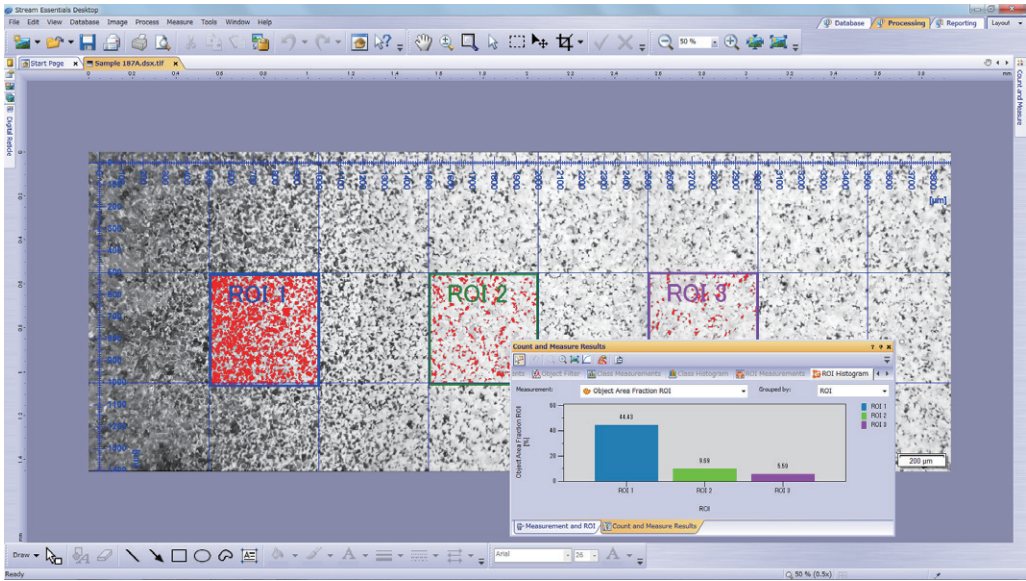
Contrast enhancement by HDR (Sample: Sliced magnesite)

Advanced Measurement

Measurement



Various measurement functions are available through OLYMPUS Stream so that the user can easily obtain useful data from the images. For quality control and inspection, measuring features on images is often required. All license types of OLYMPUS Stream include interactive measurement functions such as distances, angles, rectangles, circles, ellipses and polygons. All measured results are saved with the image files for further documentation.



Count and Measure

Count and Measure

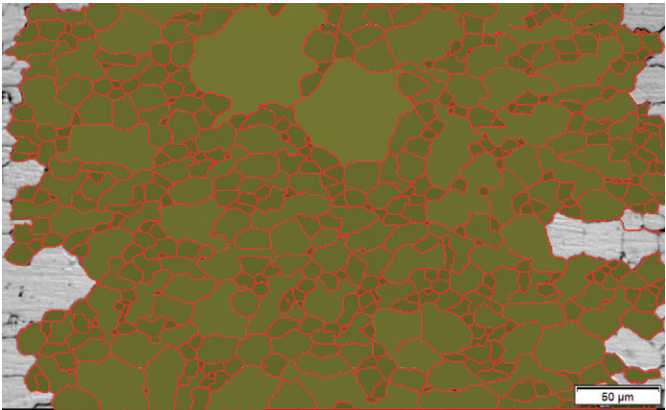


Object detection and size distribution measurement are among the most important applications in digital imaging. OLYMPUS Stream incorporates a detection engine that utilizes threshold methods to reliably separate objects (e.g., particles, scratches) from the background.

Materials Science Solutions



OLYMPUS Stream offers an intuitive, workflow-oriented interface for complex image analysis. At the click of a button, the most complex image analysis tasks can be executed quickly, precisely, and in compliance with most common industrial standards. With a significant reduction in processing time for repeated tasks, materials scientists can concentrate on analysis and research. Modular add-in for inclusions and intercept charts are easily performed at any time.

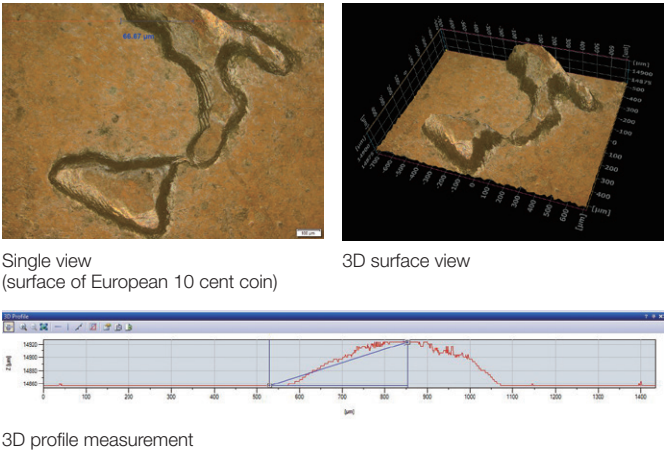


Example: object detection and report for Grains Planimetric

3D Sample Measurement



When using an external motorized focus drive, an EFI image can be quickly captured and displayed in 3D. The height data acquired can be used for 3D measurements on the profile or directly from the 3D image.



Advanced Sample Capacity

View More Sample Types and Sizes

The new 150 × 100 mm stage provides a longer travel in the X direction than previous models. This, together with the flat-top design, allows larger-sized sample or multiple samples to be placed on the stage more easily. The stage plate has tapped holes to attaching a sample holder. The larger stage provides flexibility to users by enabling them to inspect more samples on one microscope, saving valuable lab space. The stage's adjustable torque facilitates fine positioning under high magnification with a narrow field of view.

Flexibility for Sample Height and Weight

Samples up to 105 mm can be mounted on the stage with the optional modular unit. Due to the improved focusing mechanism, the stage can accommodate a total weight (sample + stage) of up to 6 kg. This means that larger and heavier samples can be inspected on the BX3M, so fewer microscopes are required in the lab. The Rotatable folder for 6-inch wafers is designed in an off-center position of the stage. This achieves whole surface observation of wafers by rotating the folder when the moving range is 100mm. Comfortable stage operation is realized through optimum torque adjustment and the handle grip design used for sample weight and observation magnification.



BX53MRF + BX3M-ARMAD (65 mm + 40 mm)

Flexibility for Sample Size

When samples are too large to place on a traditional microscope stage, the core optical components for reflected light microscopy can be configured in a modular configuration. This modular system, the BXXFM, can be mounted to a larger stand via a pole or mounted to another instrument of choice by a mounting bracket. This enables users to take advantage of Olympus' renowned optics even when their samples are unique in size or shape.



BXXFM

ESD Compatible: Protect electronic devices from electrostatic discharge

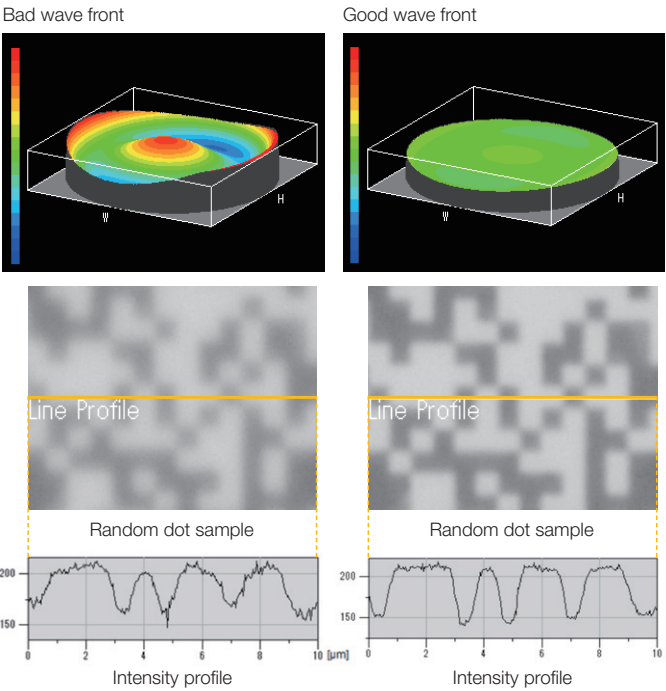
The BX3M has an ESD dissipation capability that protects electronic devices from static electricity caused by human or environmental factors.

A History of Leading-edge Optics

Olympus’ history of developing high-quality optics has resulted in a record of proven optical quality and microscopes that offer excellent measurement accuracy.

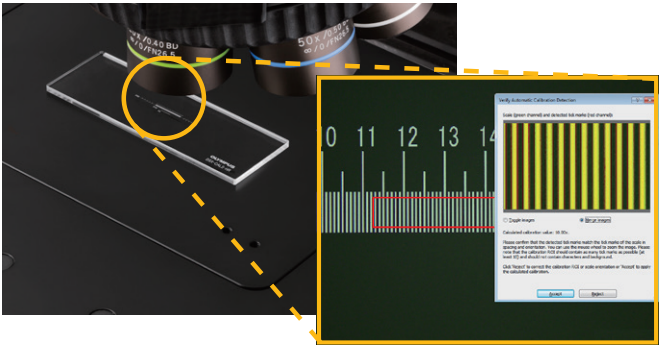
Wave Front Aberration Control

When using a microscope for advanced research or system integration, optical performance must be standardized for all objectives. Olympus’ UIS2 objectives go beyond conventional numerical aperture (NA) and working distance (WD) performance standards by providing wave front aberration control, that minimizes the aberrations that lower resolution.



Auto Calibration

Similar to digital microscopes, automatic calibration is available when using OLYMPUS Stream. Auto-calibration eliminates human variability in the calibration process leading to more reliable measurements. Not just a simple point-to-point measurement, it adopts an automatically calculated algorithm utilizing an average of multiple measurement points. Auto calibration minimizes dispersion by operators and constantly maintains correct accuracy, ensuring reliability for regular verification.



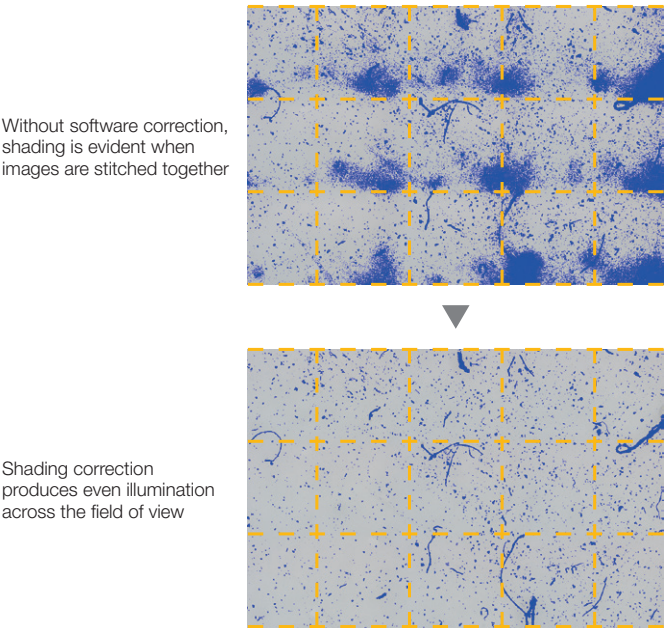
LED Illumination

The BX3M utilizes a high-intensity white LED light source that matches the color characteristics of conventional halogen bulbs. The LED maintains the color temperature of the illumination regardless of the intensity. LEDs provide efficient, long-life illumination that is ideal for inspecting materials science applications.



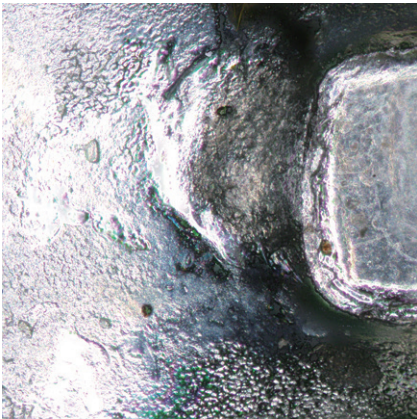
Shading Correction

Shading correction is implemented within OLYMPUS Stream software to accommodate for shading around the corners of an image. When used with intensity threshold settings, shading correction provides more precise analysis. Additionally, a more uniform panoramic image is acquired when tiling images with MIA.



Applications

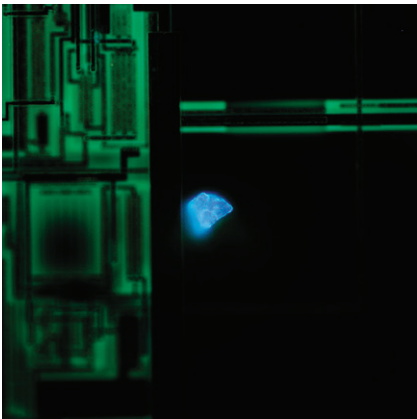
Reflected light microscopy spans a range of applications and industries. These are just some of the examples using different observational methods.



Solder on PCB-Df + EFi

Darkfield

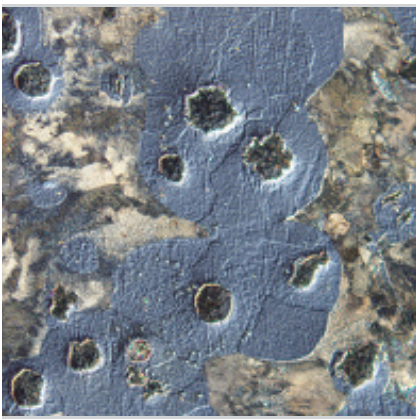
Darkfield allows the observation of scattered or diffracted light from the specimen. The light from the lamp travels through ring-form illumination optics in the illuminator and is focused on the specimen. The light from the specimen is reflected only by imperfections in the Z-axis. The user can identify the existence of even a minute scratch or flaw down to the 8 nm level — smaller than the resolving power limit of an optical microscope. Darkfield is ideal for detecting minute scratches or flaws on a specimen and examining mirror surface specimens, including wafers.



Particle on semiconductor wafer

Fluorescence

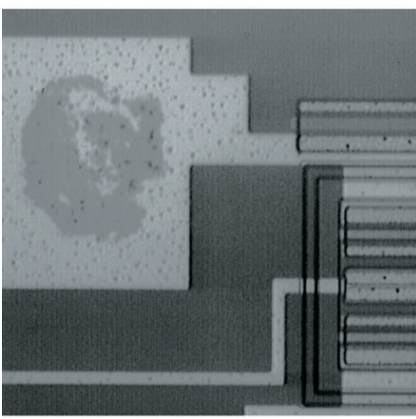
This technique is used for specimens that fluoresce (emit light of a different wavelength) when illuminated with a specially designed filter module that can be tailored to application. It is suitable for inspection of contamination on semiconductor wafers, photoresist residues, and detection of cracks through the use of fluorescent dye. An optional apochromatic lamp house collector lens system can be added to compensate for chromatic aberrations from visible light to near-infrared light.



Nodular cast iron etched-DIC

Differential Interference Contrast (DIC)

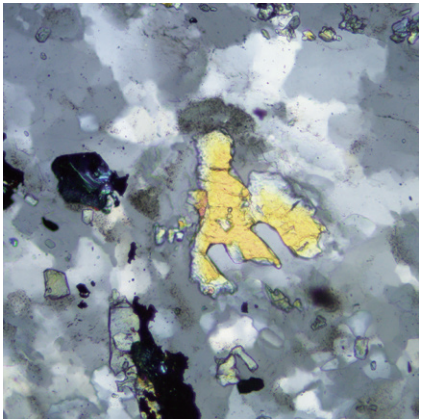
DIC is a microscopic observation technique in which the height difference of a specimen not detectable with brightfield becomes a relief-like or three-dimensional image with improved contrast. This technique, based on polarized light, can be customized with a choice of three specially designed prisms. It is ideal for examining specimens with very minute height differences, including metallurgical structures, minerals, magnetic heads, hard-disk media and polished wafer surfaces.



Electrode section-IR

Infra-Red (IR)

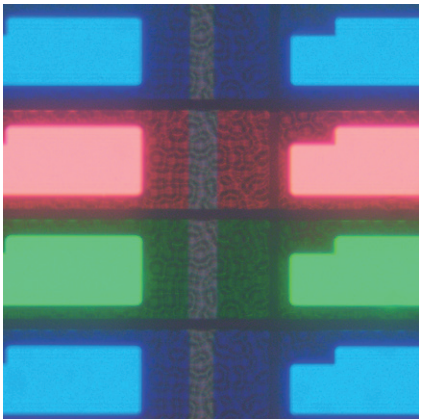
IR observation is the preferred method of nondestructively inspecting the inside of electronic devices constructed with silicon or glass that easily transmit IR wavelengths of light. IR objectives are also used with near-infrared techniques such as Raman spectroscopy and YAG laser repair applications.



Sericite-POL

Polarized Light

This microscopic observation technique utilizes polarized light generated by a set of filters (analyzer and polarizer). The characteristics of the sample directly affect the intensity of the light reflected through the system. It is suitable for metallurgical structures (i.e., growth pattern of graphite on nodular casting iron), minerals, and LCDs and semiconductor materials.



LCD color filter-Transmitted light BF + HDR

Transmitted Light Observation

For transparent samples such as LCDs, plastics and glass materials, true transmitted light observation is available by using a variety of transmitted light condensers. Examine samples in brightfield, darkfield, DIC, and polarized imaging in transmitted light, all in one convenient system.

Fully Customizable

Modular system design enables various configurations to meet users' requirements.

Example Configurations for Materials Science

BX53M Reflected & Reflected/Transmitted Light Systems

There are two types of microscope frames in the BX3M series, one for reflected light only and one for both reflected and transmitted light. Both frames can be configured with manual, coded or motorized components. The frames are outfitted with ESD capability to protect electronic samples.



BX53MRF-S



BX53MTRF-S

BX53M IR System

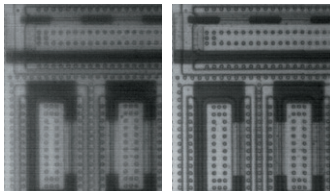
IR objectives can be used for semiconductor inspection, measurement, and processing applications where imaging through silicon is required to see the pattern. 5x to 100x infra-red (IR) objectives are available with chromatic aberration correction from visible light wavelengths through the near infrared. For high magnification work, rotating the correction collar of the LCPLN-IR series of lenses corrects for aberrations caused by sample thickness. A clear image is obtained with a single objective.

Objectives	Magnifications	NA	W.D. (mm)	Cover Glass Thickness*1 (mm)	Silicon Thickness (mm)	Resolution*2 (μm)
LMPLN-IR*4	5x	0.1	23	—	—	6.71*5
	10x	0.3	18	—	—	2.24*5
LOPLN-IR*3	20x	0.45	8.3	0 – 1.2	0 – 1.2	1.49*5
	50x	0.65	4.5	0 – 1.2	0 – 1.2	1.03*5
	100x	0.85	1.2	0 – 0.7	0 – 1.0	0.79*5

*1 —: Applicable to the view of specimens with/without a cover glass
0: Applicable to the view of specimens without a cover glass
*2 Resolutions calculated with aperture iris diaphragm wide open
*3 Limited up to FN 22, No compliance with FN 26.5
*4 Analyzer and polarizer are recommended for usage with MPLFLN1.25x and 2.5x
*5 With the use of 1100 nm laser



IR objectives



Without correction Correction

BX53M Polarized Light System

The optics of the BX53M polarized light system provide earth scientists and geologists with the right tools for high contrast polarized light imaging. Applications such as minerals identification, investigating optical characteristics of crystals and observing solid rock sections benefit from system stability and precise optical alignment.

Bertrand lens for conoscopic and orthoscopic observations

With a U-CPA conoscopic observation attachment, switching between orthoscopic and conoscopic observation is simple and quick. It is focusable for clear back focal plane interference patterns. Bertrand field stop makes it possible to obtain consistently sharp and clear conoscopic images.



Strain Free Optics

Thanks to Olympus' sophisticated design and manufacturing technology, the UPLFLN-P strain-free objectives reduce internal strain to the minimum. This means a higher EF* value, resulting in unmatched image contrast.



UPLFLN-P Series

Item	NA	W.D.
UPLFLN 4xP	0.13	17.0 mm
UPLFLN 10xP	0.3	10.0 mm
UPLFLN 20xP	0.5	2.1 mm
UPLFLN 40xP	0.75	0.51 mm
UPLFLN 100xOP	1.3	0.2 mm

PLN-P

Item	NA	W.D.
PLN 4xP	0.1	18.5 mm

ACHN-P Series

Item	NA	W.D.
ACHN 10xP	0.25	6.0 mm
ACHN 20xP	0.40	3.0 mm
ACHN 40xP	0.65	0.45 mm
ACHN 100xOP	1.25	0.13 mm

*All UIS2 objectives and WHN eyepieces: lead-free eco-glass

BXFM System

The BXFM can also be adapted to special applications or integrated into other instruments. The modular construction provides for straightforward adaptation to unique environments and configurations with a variety of special small illuminators and fixturing mounts.



BX53-P orthoscopic configuration

BX53-P conoscopic/orthoscopic configuration

An Extensive Range of Compensator and Wave Plates

Six different compensators are available for quantitative measurements of birefringence in rock and mineral thin sections. Measurement retardation level range from 0 to 20λ (you can use the system, it's just not in the Adobe program) ranging from 0 to 20λ. For easier measurement and high image contrast, the Berek and Senarmont compensators can be used, which change the retardation level in the entire field of view.



*Used with monochromatic green filter, IF546 or IF550

Measuring range of compensators

Compensator	Measurement Range	Applications
Thick Berek (U-CTB)	0-11,000 nm (20λ)	Measurement of High Retardation Level (R*>3λ), (crystals, macromolecules, fiber, etc.)
Berek (U-CBE)	0-1,640 nm (3λ)	Measurement of Retardation Level (crystals, macromolecules, living organisms, etc.)
Senarmont Compensator (U-CSE)	0-546 nm (1λ)	Measurement of Retardation Level (crystals, living organisms, etc.) Enhancement of Image Contrast (living organisms, etc.)
Brace-Koehler Compensator 1/10λ (U-CBR1)	0-55 nm (1/10λ)	Measurement of Low Retardation Level (living organisms, etc.)
Brace-Koehler Compensator 1/30λ (U-CBE2)	0-20 nm (1/30λ)	Enhancement of Image Contrast (living organisms, etc.)
Quartz Wedge (U-CWE2)	500-2,200 nm (4λ)	Approximate Measurement of Retardation Level (crystal, macromolecules, etc.)

*R = retardation level
For more accurate measurement, it is recommended that compensators (except U-CWE2) be used together with the interference filter 45-IF546



Modular Design, Build Your System Your Way

Microscope Frames

There are two microscope frames for reflected light, one also has transmitted light capability. An adapter is available to raise the illuminator to accommodate taller samples.

		■: Possible	Reflected light	Transmitted light	Sample height
1	BX53MRF-S		■		0-65 mm
2	BX53MTRF-S		■	■	0-35 mm
1,3	BX53MRF-S + BX3M-ARMAD		■		40-105 mm
2,3	BX53MTRF-S + BX3M-ARMAD		■	■	40-75 mm



Stands

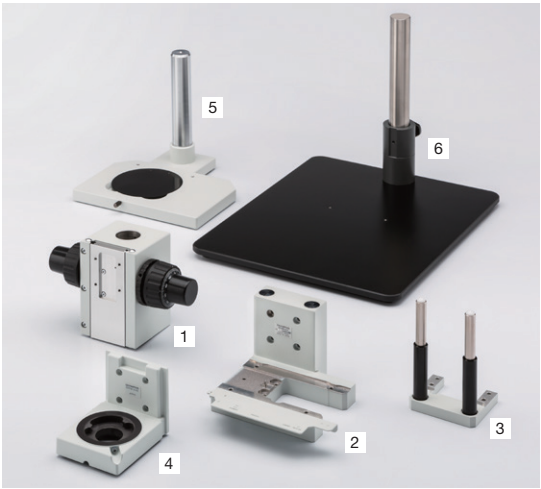
For microscopy applications where the sample will not fit on a stage, the illuminator and optics can be mounted to a larger stand or to another piece of equipment.

BXFM + BX53M illuminator configuration

1	BXFM	Frame interface is wall mounting/32 mm pillar
2	BX3M-ILH	Illuminator holder
3	BXFM-ILHSPU	Counter spring for BXFM
5	U-ST	Stand
6	SZ-STL	Large stand

BXFM + U-KMAS illuminator configuration

1	BXFM	Frame interface is wall mounting/32 mm pillar
2	BXFM-ILHS	U-KMAS holder
5	U-ST	Stand
6	SZ-STL	Large stand



Tubes

For microscope image with eyepiece or camera observation. Select tubes by observation range and operator's posture during observation.

		FN	Type	Angle type	Image	Number of diopter adjustment mechanisms
1	U-BI30-2	22	Binocular	Fixing	Reverse	1
2	U-TBI-3	22	Binocular	Tilting	Reverse	1
3	U-TR30-2	22	Trinocular	Fixing	Reverse	1
4	U-TR30-IR	22	Trinocular for IR	Fixing	Reverse	2
5	U-ETR-4	22	Trinocular	Fixing	Erect	2
6	U-TTR-2	22	Trinocular	Tilting	Reverse	2
7	U-SWTR-3	26.5	Trinocular	Fixing	Reverse	2
8	U-SWETR-5	26.5	Trinocular	Tilting	Erect	2
9	U-TLU	22	Single port	—	—	—
10	U-TLUIR	22	Single port for IR	—	—	—



Illuminators

The illuminator projects light onto the sample based on the observation method selected. Software interfaces with coded illuminators to read the cube position and recognize the observation method automatically.



		■: Possible	Coded function	Light source	BF	DF	DIC	POL	IR	FL	MIX	AS/FS
1	BX3M-RLAS-S		Fixed 3 cube position	LED - Built in	■	■	■	■			■	■
2	BX3M-URAS-S		Attachable 4 cube position	LED	■	■	■	■			■	■
				Halogen	■	■	■	■	■		■	■
				Mercury/Light guide	■	■	■	■		■	■	■
3	BX3M-RLA-S			LED	■	■	■	■			■	■
				Halogen	■	■	■	■	■		■	■
4	BX3M-KMA-S			LED - Built in	■		■	■			■	
5	BX3-ARM		Mechanical arm for transmitted light									
6	U-KMAS			LED	■		■	■			■	
				Halogen	■		■	■	■		■	

Light Sources

Light source and power supplies for sample illumination. Choose the appropriate light source for the observation method.

Standard LED light resource configuration

1	BX3M-LEDR	LED lamp housing for reflected
2	U-RCV	DF converter for BX3M-URAS-S, required for observation with DF and BF when necessary
3	BX3M-PSLED	Power supply for LED lamp housing, requires BXFM system
4	BX3M-LEDT	LED lamp housing for transmitted

Fluorescence light resource configuration

5	U-LLGAD	Light guide adapter
2	U-RCV	DF converter for BX3M-URAS-S, required for observation with DF and BF when necessary
6,7	U-LLG150 (300)	Light guide, length:1.5 m (3 m)
8	U-HGLGPS	Light source for Fluorescence
9,10	U-LH100HG(HGAPO)	Mercury lamp housing for fluorescence
2	U-RCV	DF converter for BX3M-URAS-S, required for observation with DF and BF when necessary
11	U-RFL-T	100V specification power supply for 100W mercury lamp

Halogen and Halogen IR light resource configuration

12	U-LH100L-3	Halogen lamp housing
13	U-LH100IR	Halogen lamp housing for IR
14	U-RMT	Extender cable for halogen lamp housing, cable length 1.7 m (requires cable extension when necessary)
15,16	TH4-100 (200)	100V (200V) specification power supply for 100W/50W halogen lamp
17	TH4-HS	Hand switch for light intensity of halogen (dimmer TH4-100 (200) without hand switch)



Nosepieces

Attachment for objectives and/sliders. Select by number of objectives needed and types, also with/without slider attachment.

■: Possible		Type	Holes	BF	DF	DIC	MIX	ESD	Number of centering holes
1	U-P4RE	Manual	4	■					4
2	U-5RE-2	Manual	5	■					
3	U-5RES-ESD	Coded	5	■				■	
4	U-D6RE	Manual	6	■		■			
5	U-D6RE-ESD-2	Manual	6	■		■		■	
6	U-P6RE	Manual	6	■		■			2
7	U-D7RE	Manual	7	■		■			
8	U-D6RES	Coded	6	■		■			
9	U-D7RES	Coded	7	■		■			
10	U-D5BDREMC	Motorized	5	■	■	■	■		
11	U-5BDRE	Manual	5	■	■				
12	U-D5BDRE	Manual	5	■	■	■	■		
13	U-P5BDRE	Manual	5	■	■	■	■		2
14	U-D6BDRE	Manual	6	■	■	■	■		
15	U-D5BDRES-ESD	Coded	5	■	■	■	■	■	
16	U-D6BDRES-S	Coded	6	■	■	■	■	■	
17	U-D6REMC	Motorized	6	■	■	■	■		
18	U-D6BDREMC	Motorized	6	■	■	■	■		

Sliders

Select the slider to compliment traditional brightfield observation. The DIC slider provides topographic information about the sample with options to maximize contrast or resolution. The MIX slider provides illumination flexibility with a segmented LED source in the darkfield path.

	Type	Amount of shear	Available objectives
1	U-DICR	Standard	MPLFLN, MPLAPON, LMPLFLN, and LCPLFLN-LCD
2	U-DICRH	Resolution	MPLFLN, MPLAPON
3	U-DICRHC	Contrast	LMPLFLN and LCPLFLN-LCD

MIX slider for MIX observation.

		Type	Available objectives
4	U-MIXR	MIX slider	MPLFLN-BD, LMPLFLN-BD, MPLN-BD

Control Boxes and Hand Switches

Control boxes for interfacing microscope hardware with a PC and hand switches for hardware display and control.

BX3M-CB (CBFM) configuration

1	BX3M-CB	Control box for BX53M system
2	BX3M-CBFM	Control box for BCFM system
3	— BX3M-HS	MIX observation control, indicator of coded hardware, programmable function button of software (Stream)
4	— BX3M-HSRE	Motorized nosepiece rotation
5	— U-HSEXP	Shutter operation of camera

U-CBS configuration

6	U-CBS	Control box for coded functions in BCFM configuration
5	— U-HSEXP	Shutter operation of camera

Cable

—	U-MIXRCBL (ECBL)	U-MIXR cable, cable length: 0.5 m (2.9 m)
—	BX3M-RMCBL (ECBL)	Motorized nosepiece cable, cable length: 0.2 m (2.9 m)



Stages

Stages and stage plates for sample placement. Select based on sample shape and size.

150 mm × 100 mm stage configuration

1	U-SIC64	150 mm × 100 mm flat top handle stage
2	— U-SHG (T)	Silicone rubber operability handle rubber for improvement (thick type)
3	— U-SP64	Stage plate for U-SIC64
4	— U-WHP64	Wafer plate for U-SIC64
5	— BH2-WHR43	Wafer holder for 4-3 inches
6	— BH2-WHR54	Wafer holder for 5-4 inches
7	— BH2-WHR65	Wafer holder for 6-5 inches
8	— U-SPG64	Glass plate for U-SIC64

100 mm × 100 mm stage configuration

9,10	U-SIC4R (L) 2	100 mm × 105 mm right (left) handle stage
11	— U-MSSP4	Stage plate for U-SIC4R (L) 2
12	— U-WHP2	Wafer plate for U-SIC4R (L) 2
6	— BH2-WHR43	Wafer holder for 4-3 inches
13	— U-MSSPG	Glass plate for U-SIC64

52 mm × 76 mm stage configuration

14,15	U-SVR (L) M	52 mm × 76 mm right (left) handle stage
2	— U-SHG (T)	Silicone rubber operability handle rubber for improvement (thick type)
16	— U-MSSP	Stage plate for U-SVR (/L) M
17,18	— U-HR (L) D-4	Thin slide holder for the right (left) opening
19,20	— U-HR (L) DT-4	Thick slide holder for the right (left) opening, for pressing the slide glass to stage top surface, the specimen is difficult to lift.

Other

21	U-SRG	Rotatable stage
22	U-SRP	Rotatable stage for POL, from any position can be 45° click stop
23	— U-FMP	Mechanical stage for U-SRP/U-SRG
24	U-SP	Fixed stage of a single plate

Camera Adapters

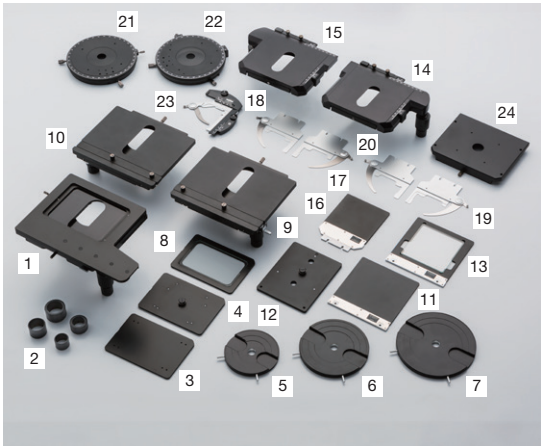
Adapter for camera observation. Selectable from required field of view and magnification. Actual observation range can be calculated using this formula, actual field of view (diagonal mm) = viewing field (viewing number) ÷ objective magnification.

		Magnification	centering adjustment	CCD image area (field number)		
				2/3 inch	1/1.8 inch	1/2 inch
1	U-TV1x-2 with U-CMAD3-2	1	—	10.7	8.8	8
2	U-TV1xC	1	ø2 mm	10.7	8.8	8
3	U-TV0.63xC	0.63	—	17	14	12.7
4	U-TV0.5xC	0.5	—	21.4	17.6	16
5	U-TV0.35xC	0.35	—	—	—	22
6	U-TV0.25xC	0.25	—	—	—	—

Eyepieces

Eyepiece for viewing directly into the microscope. Select based on desired field of view.

■: Possible		FN	Diopter adjustment mechanism	Built-in cross reticle
1	WHN10x	22		
2	WHN10x-H	22	■	
3	CROSS WHN10x	22	■	■
4	SWH10x-H	26.5	■	
5	CROSS SWH10x	26.5	■	■



Optical Filters

Optics filter converts sample exposure light to various types of illumination. Select the appropriate filter for observation requirements.

1,2,3	U-25ND50, 25,6	Neutral density filter, transmittance 50%, 25%, 6%
4	U-25LBD	Daylight color filter
5	U-25LBA	Halogen color filter
6	U-25IF550	Green filter
7	U-25L42	UV-cut filter
8	U-25Y48	Yellow filter
9	U-25FR	Frost filter (Required for the BX3M-URA)

10	U-AN-2	Polarization direction is fixed
11	U-AN360-3	Polarization direction is rotatable
12	U-AN360P-2	High quality polarization direction is rotatable
13	U-PO3	Polarization direction is fixed
14	U-POTP3	Polarization direction is fixed, for use with U-DICRH
15	45-IF546	Green ø45mm filter for POL

22	U-25	Empty filter, for use with user's ø25 mm filters
23	U-FC	Transmitted filter cassette, Used by combining ø45 mm filters

Condensers

Condenser to collect transmitted light. Use for transmitted-light observation.

1	U-AC2	Abbe condenser (available from 5x objectives)
2	U-SC3	Swing-out condenser (available from 1.25x objectives)
3	U-POC-2	Swing-out condenser for POL
4	U-LWCD	Long working distance condenser for glass plate (U-MSSPG, U-SPG64)

Mirror Units

Mirror unit for BX3M-URAS-S. Select the unit for required observation.

		Contents
1	U-FBF	For BF, detachable ND filter
2	U-FDF	For DF
3	U-FDICR	For POL, crossed nicol position is fixed
4	U-FBFL	For BF, built-in ND filter (It is necessary to use both BF* and FL)
5	U-FWUS	For Ultra Violet-FL
6	U-FWBS	For Blue-FL
7	U-FWGS	For Green FL
8	U-FF	Empty mirror unit, Used user's optical element

*For coaxial episcopic illumination only

Intermediate Tubes

Allows the use of various types of accessories for multiple purposes. Install between tube and illuminator.

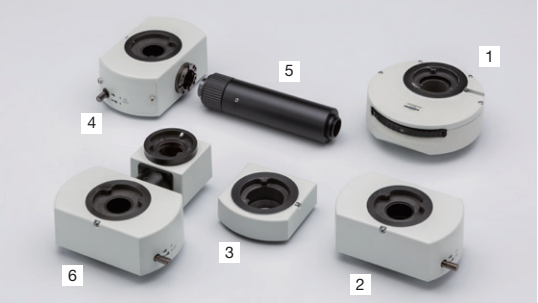
1	U-CA	Magnification changer (1x, 1.25x, 1.6x, 2x)
2	U-ECA	Magnification changer (1x, 2x)
3	U-EPA2	Eye point adjuster: + 30 mm
4	U-DP	Dual port for U-DP1xC
5	U-DP1xC	C-mount TV camera adapter for U-DP
6	U-TRU	Trinocular intermediate unit



16	U-AN360IR	IR polarization direction is rotatable (reduces halation at IR observation when using combination with U-AN360IR and U-POIR)
17	U-POIR	IR polarization direction is fixed
18	U-BP1100IR	Band pass filter: 1100 nm
19	U-BP1200IR	Band pass filter: 1200 nm

20	43IF550-W45	Green ø45 mm filter
21	U-POT	Polarizer filter

*AN and PO are not necessary when using BX3M-RLAS-S and U-FDICR



UIS Objectives

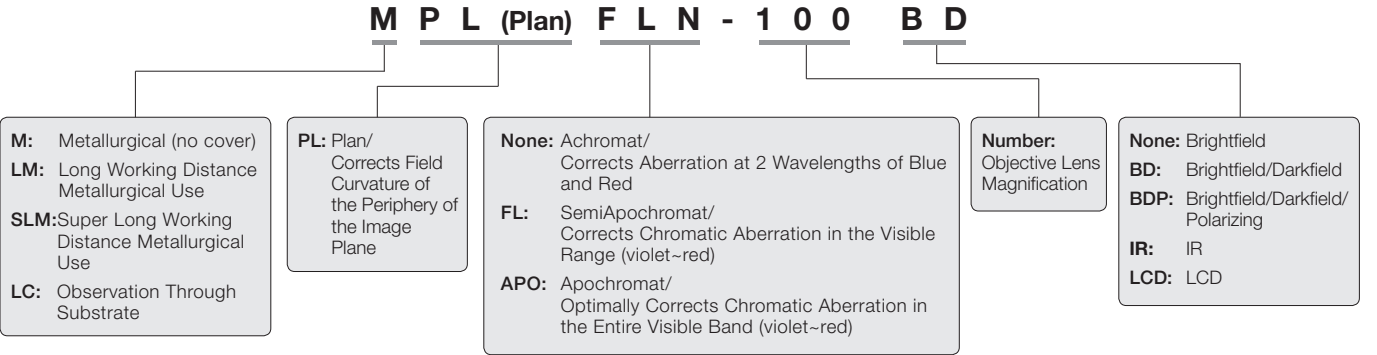
Objectives magnify the sample. Select the objective that matches the working distance, resolving power and observation method for the application.

Objectives	Magnifications	NA	W.D. (mm)	Cover Glass Thickness*3 (mm)	Silicon Thickness (mm)	Resolution*4 (μm)	Chromatic aberration
MPLAPON	1 50x 2 100x	0.95 0.95	0.35 0.35	0 0	— —	0.35 0.35	Excellent
MPLFLN	3 1.25x*5*6 4 2.5x*8 5 5x 6 10x 7 20x 8 40x*2 9 50x 10 100x	0.04 0.08 0.15 0.30 0.45 0.75 0.80 0.90	3.5 10.7 20.0 11.0 3.1 0.63 1.0 1.0	— — — — 0 0 0 0	— — — — — — — —	8.39 4.19 2.24 1.12 0.75 0.45 0.42 0.37	Good
MPLFLN-BD*7	11 5x 12 10x 13 20x 14 50x 15 100x 16 150x	0.15 0.30 0.45 0.80 0.90 0.90	12.0 6.5 3.0 1.0 1.0 1.0	— — 0 0 0 0	— — — — — —	2.24 1.12 0.75 0.42 0.37 0.37	Good
MPLFLN-BDP*7	17 5x 18 10x 19 20x 20 50x 21 100x	0.15 0.25 0.40 0.75 0.90	12.0 6.5 3.0 1.0 1.0	— — 0 0 0	— — — — —	2.24 1.34 0.84 0.45 0.37	Good
SLMPLN	22 20x 23 50x 24 100x	0.25 0.35 0.6	25 18 7.6	— 0 0	— — —	1.34 0.96 0.56	Normal
LMPLFLN	25 5x 26 10x 27 20x 28 50x 29 100x	0.13 0.25 0.40 0.50 0.80	22.5 21.0 12.0 10.6 3.4	— — 0 0 0	— — — — —	2.58 1.34 0.84 0.67 0.42	Good
LMPLFLN-BD*7	30 5x 31 10x 32 20x 33 50x 34 100x	0.13 0.25 0.40 0.50 0.80	15.0 10.0 12.0 10.6 3.3	— — 0 0 0	— — — — —	2.58 1.34 0.84 0.67 0.42	Good
MPLN*5	35 5x 36 10x 37 20x 38 50x 39 100x	0.10 0.25 0.40 0.75 0.90	20.0 10.6 1.3 0.38 0.21	— — 0 0 0	— — — — —	3.36 1.34 0.84 0.45 0.37	Normal
MPLN-BD*5*7*8	40 5x 41 10x 42 20x 43 50x 44 100x	0.10 0.25 0.40 0.75 0.90	12.0 6.5 1.3 0.38 0.21	— — 0 0 0	— — — — —	3.36 1.34 0.84 0.45 0.37	Normal
LCPLFLN-LCD	45 20x 46 50x 47 100x	0.45 0.70 0.85	8.3 – 7.4 3.0 – 2.2 1.2 – 0.9	0 – 1.2 0 – 1.2 0 – 0.7	— — —	0.75 0.48 0.39	Good
MPLAPON	100xOil*1	1.4	0.1	0	—	0.24	Excellent

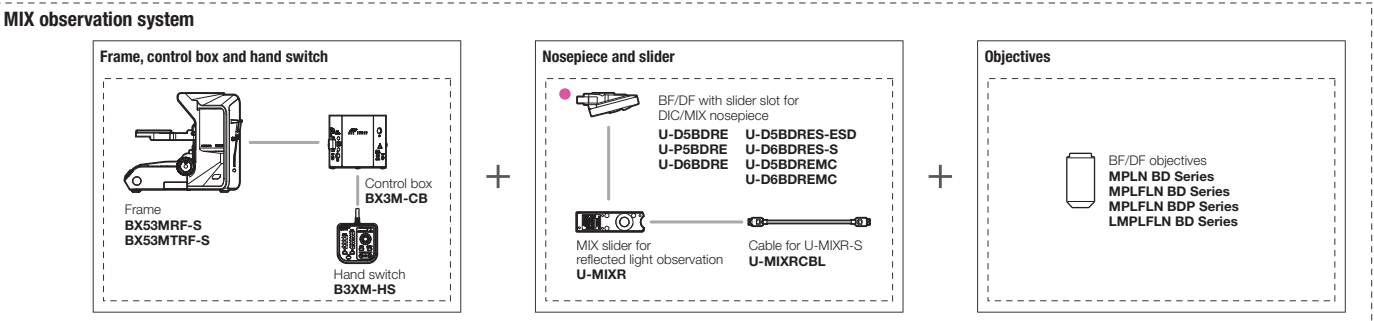
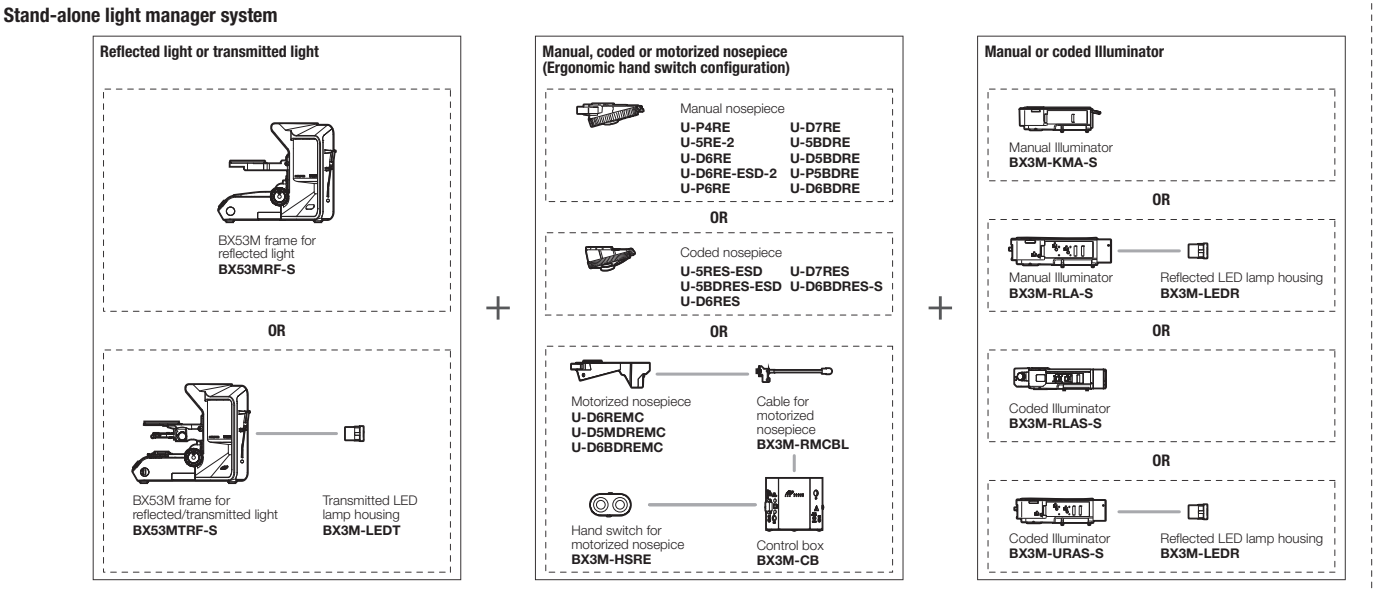
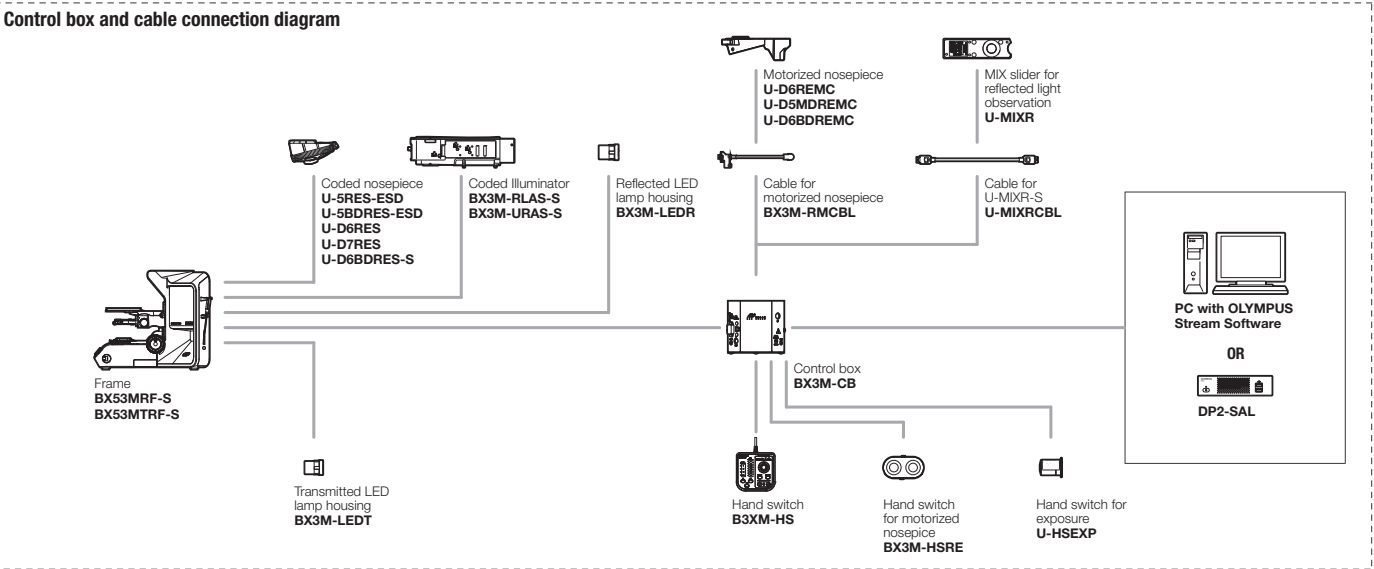
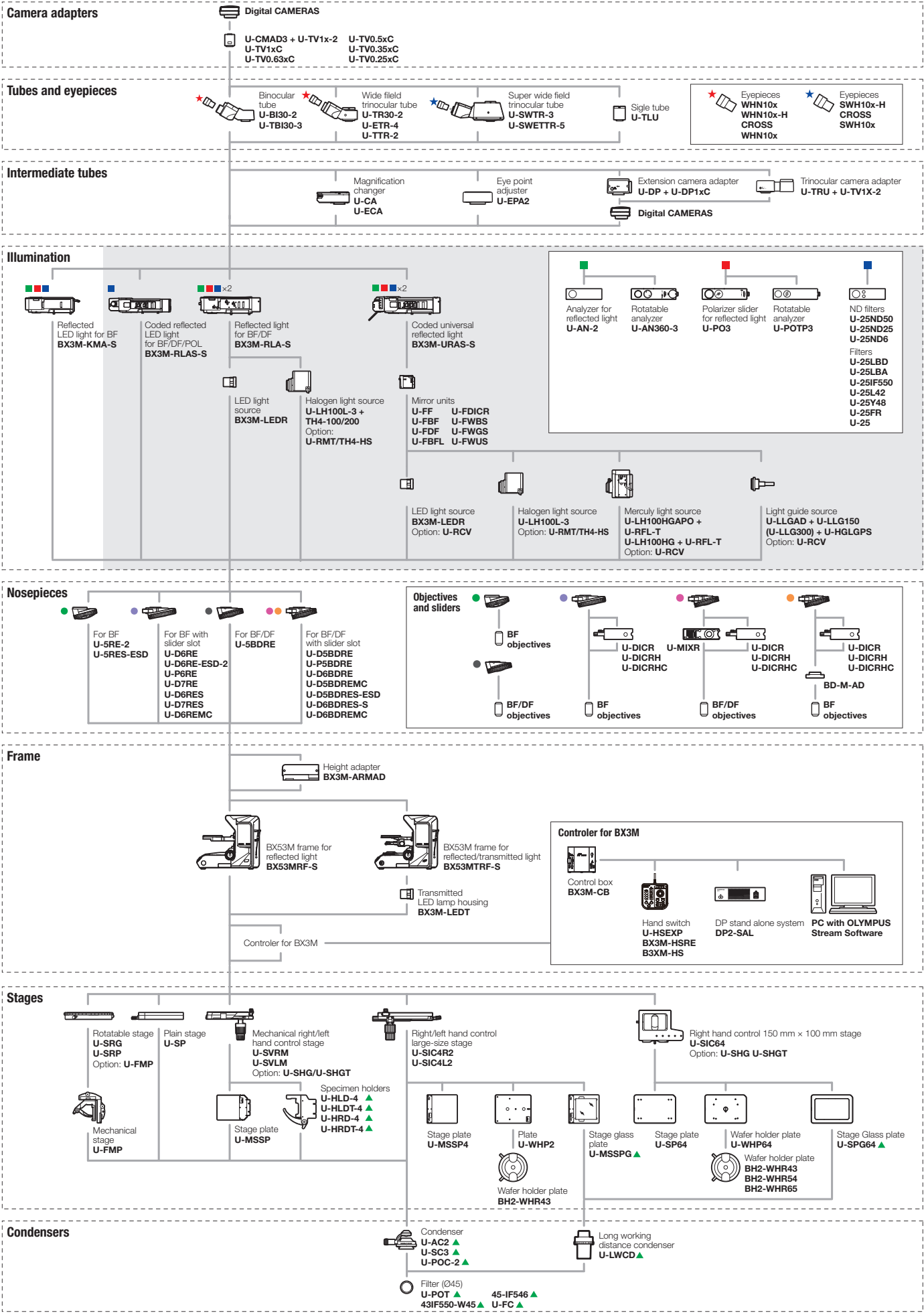


*1 Specified oil: IMMOIL-F30CC
*2 The MPLFLN40x objective is not compatible with the differential interference contrast microscopy
*3 —: Applicable to the view of specimens with/without a cover glass
0: Applicable to the view of specimens without a cover glass
*4 Resolutions calculated with aperture iris diaphragm wide open
*5 Limited up to FN 22, No compliance with FN 26.5
*6 Analyzer and polarizer are recommended for usage with MPLFLN1.25x and 2.5x
*7 BD: Brightfield/darkfield objectives
*8 Slight vignetting may occur in the periphery of the field when MPLN-BD series objectives are used with high-intensity light source such as mercury and xenon for darkfield observation

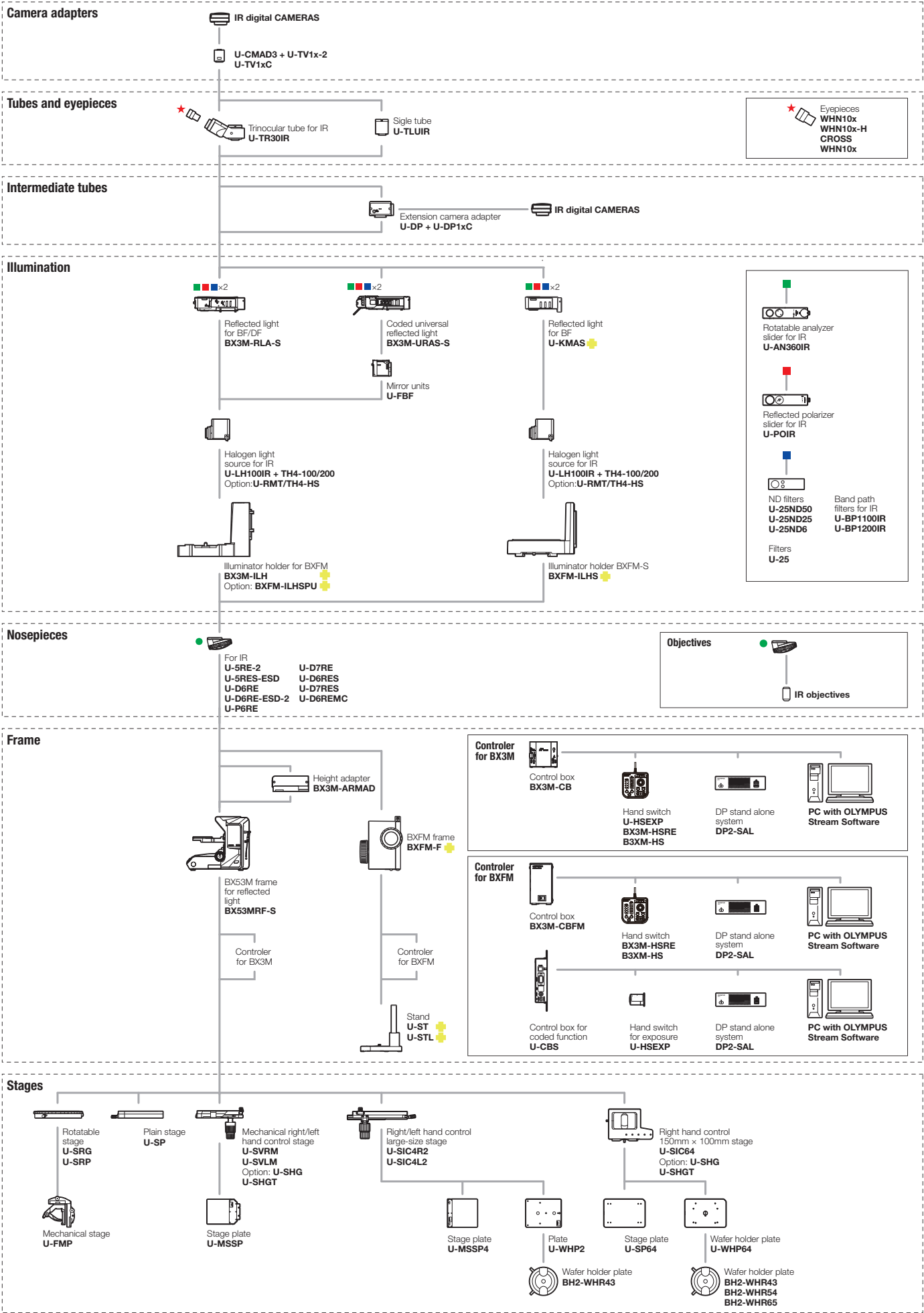
Meaning of Abbreviations Shown on Objective Lens



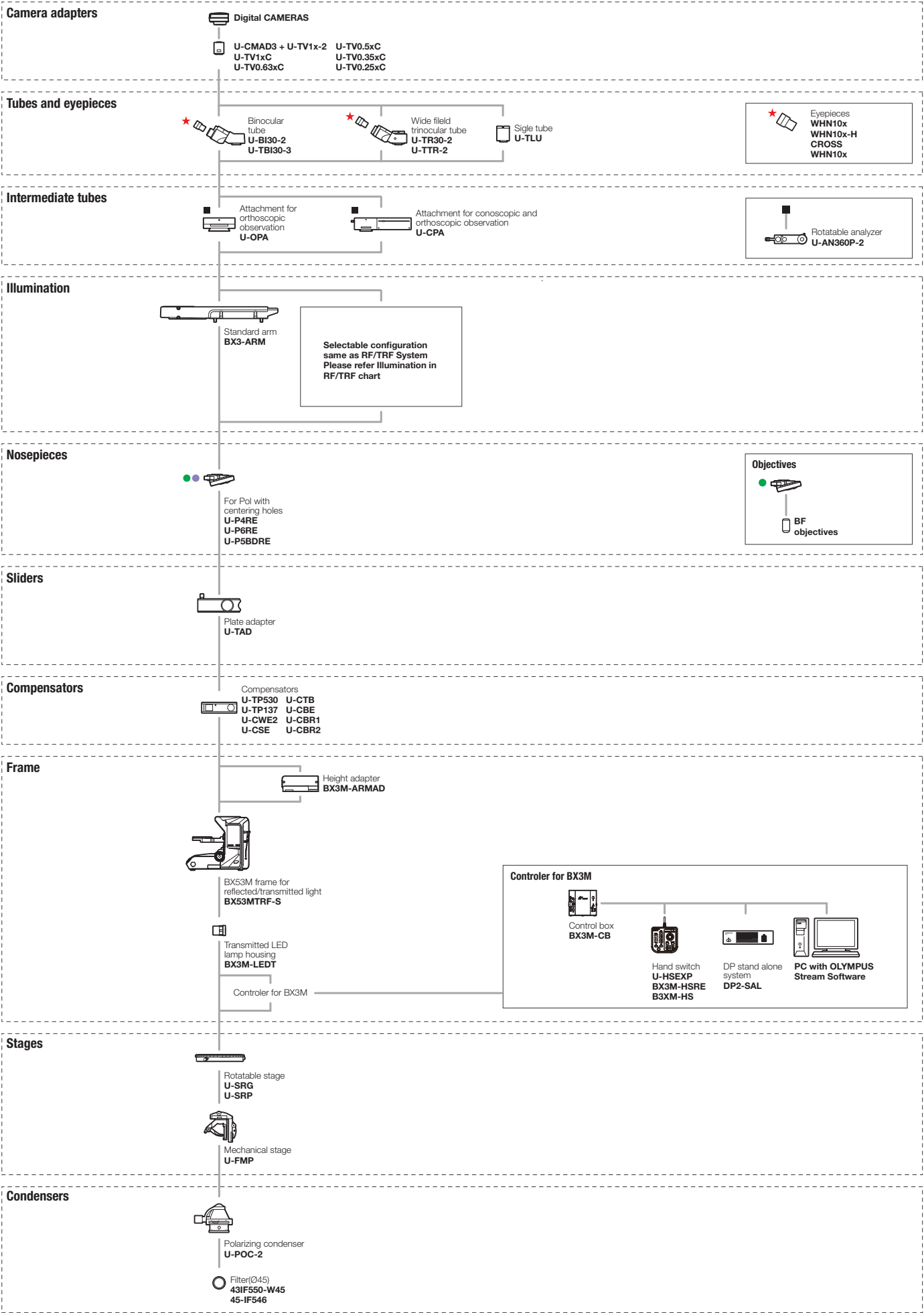
Reflected & Reflected/Transmitted Light Systems Diagram



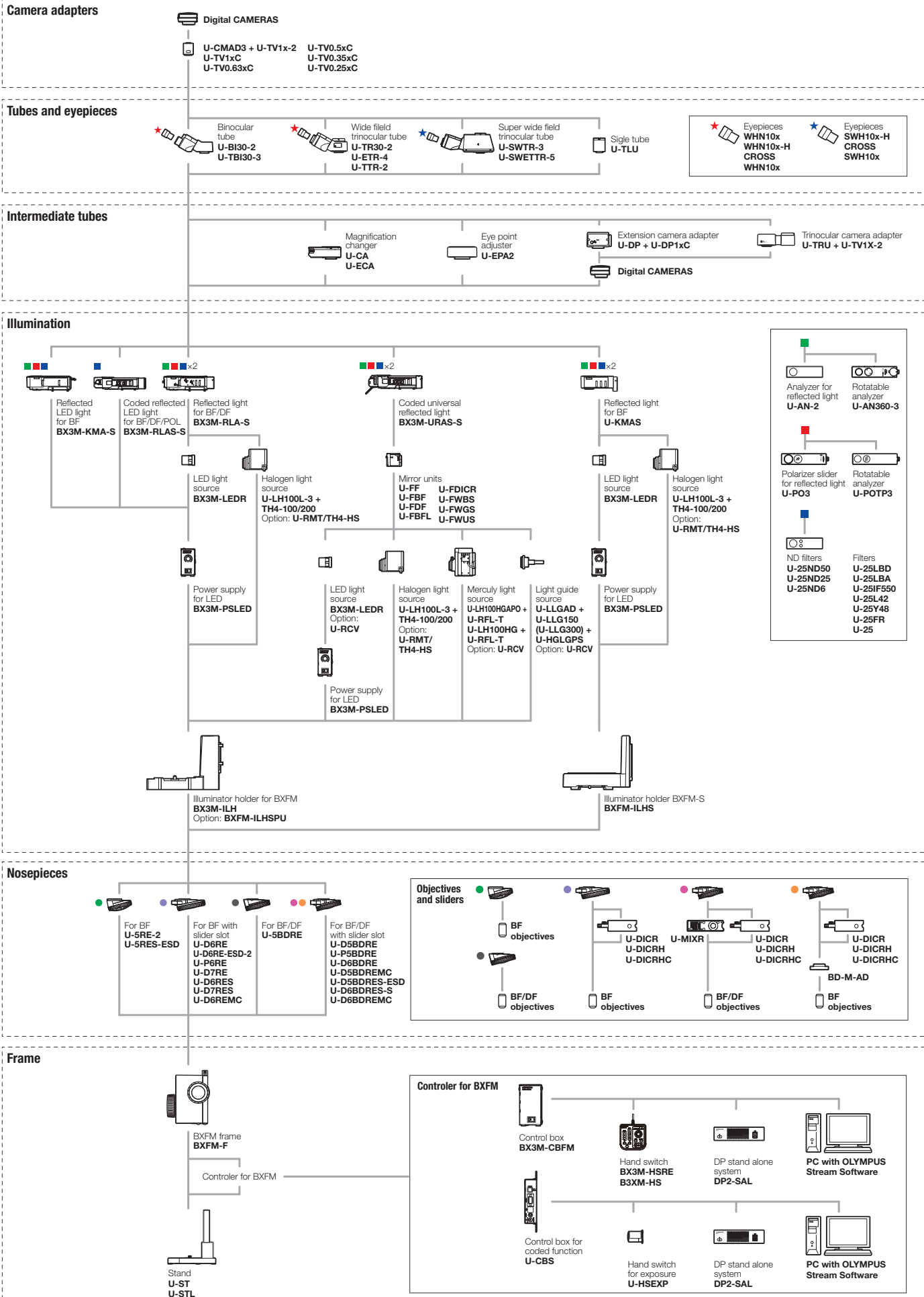
BX53M IR System Diagram



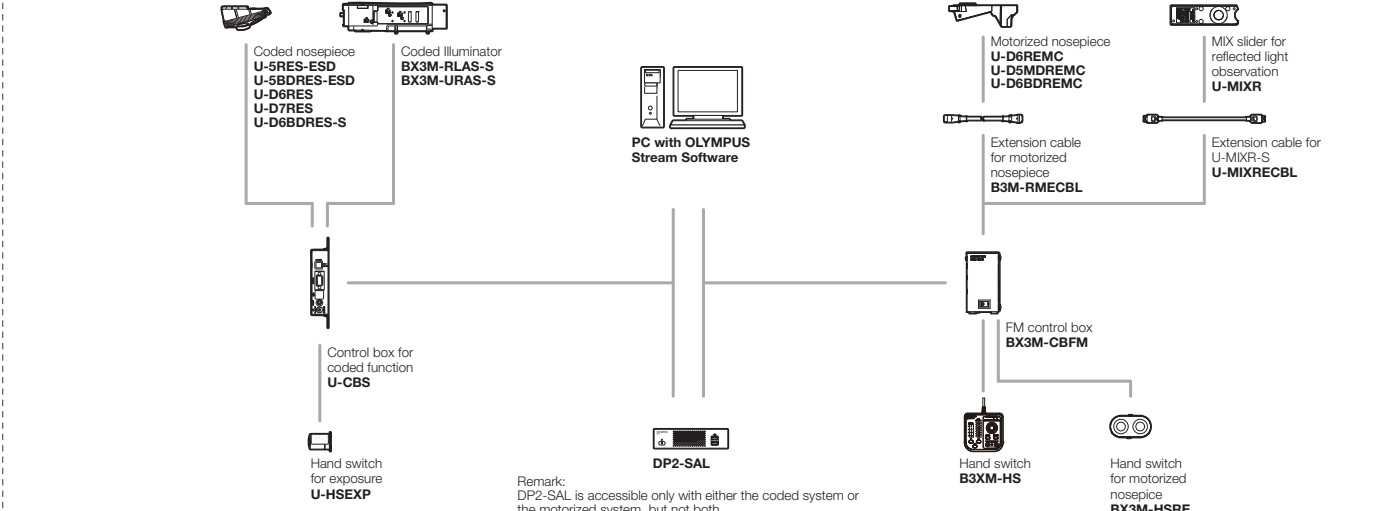
BX53M Polarized Light System Diagram



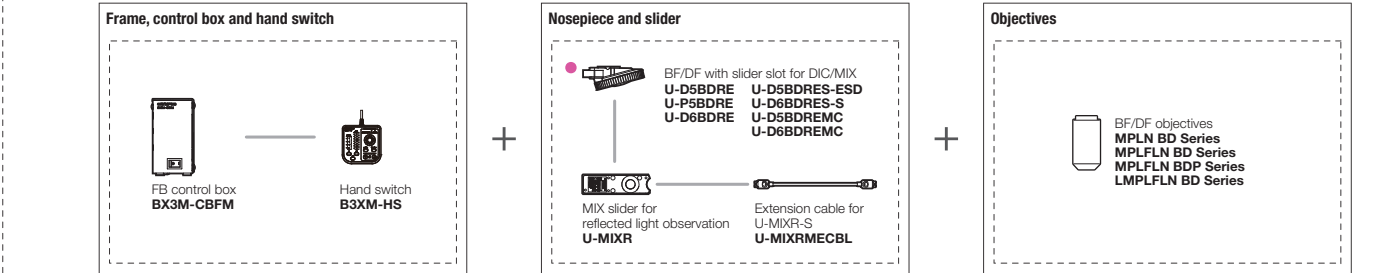
BXFM System Diagram



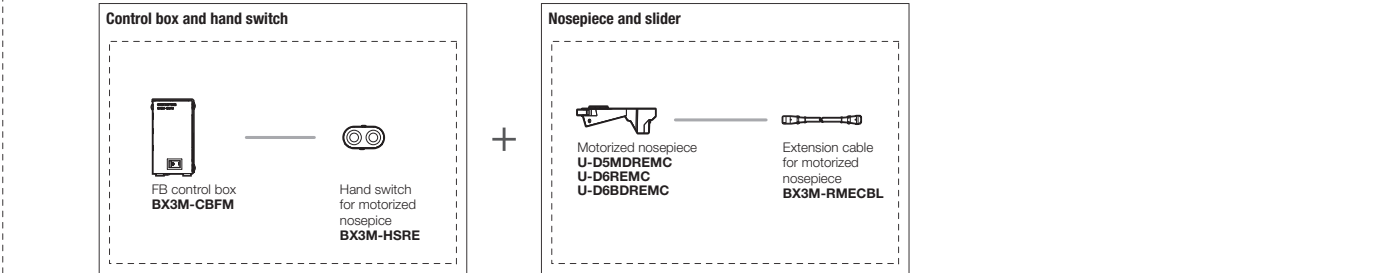
Control box and cable connection diagram



MIX observation system



Motorized nosepiece system



Specifications

BX53MRF-S/BX53MTRF-S/BXFM Specifications

		BX53MTRF-S	BX53MRF-S	BXFM
Optical system		UIS2 optical system (infinity-corrected)		
Microscope frame	Illumination	Reflected/transmitted	Reflected	
	Focus	Stroke: 25 mm Fine stroke per rotation: 100 μm Minimum graduation: 1 μm With upper limit stopper, torque adjustment for coarse handle		Stroke: 30 mm Fine stroke per rotation: 200 μm Minimum graduation: 2 μm With torque adjustment for coarse handle
	Max. specimen height	35 mm (w/o spacer) 75 mm (with BX3M-ARMAD)	65 mm (w/o spacer) 105 mm (with BX3M-ARMAD)	Depends on the mounting configuration
Observation tube	Wide field FN 22	Inverted: binocular, trinocular, tilting binocular Erect: trinocular, tilting binocular		
	Super wide field FN 26.5	Inverted: trinocular Erect: trinocular, tilting trinocular		
Reflected light illumination	Traditional observation technique	BX3M-RLAS-S Coded, White LED, BF/DF/DIC/POL/MIX FS, AS (with centering mechanism), BF/DF interlocking BX3M-KMA-S White LED, BF/DIC/POL/MIX FS, AS (with centering mechanism), BF/DF interlocking BX3M-RLA-S 100W/50W halogen lamp, white LED, BF/DF/DIC/POL/MIX/ FS, AS (with centering mechanism), BF/DF interlocking, ND filter		
		-		U-KMAS White LED, 100W halogen Fiber illumination, BF/DIC/POL/MIX
	Fluorescence	BX3M-URAS-S Coded, 100W mercury lamp, 4 position mirror unit turret, (standard: WB, WG, WU+BF etc) With FS, AS (with centering mechanism), with shutter mechanism		
Transmitted light		White LED Abbe/long working distance condensers	-	
Revolving nosepiece	For BF	Sextuple, centering sextuple, septuple, coded quintuple (optional motorized revolving nosepieces)		
	For BF/DF	Sextuple, quintuple, centering quintuple, coded quintuple (optional motorized revolving nosepieces)		
Stage		Coaxial left (right) handle stage 76 (X) × 52 (Y) mm, with torque adjustment Large-size coaxial left (right) handle stage 100 (X) × 105 (Y) mm, with lock mechanism in Y-axis Large-size coaxial right handle stage 150 (X) × 100 (Y) mm, with torque adjustment, with lock mechanism in Y-axis		-
Weight		Approx. 18.3 kg (Microscope frame 7.6 kg)	Approx. 15.8 kg (Microscope frame 7.4 kg)	Approx. 11.1 kg (Microscope frame 1.9 kg)

BX53M IR Specifications

		BX53MRF-S	BXFM
IR Observation tube	Wide field FN 22	Inverted: trinocular	
Reflected light illumination	IR observation	BX3M-RLA-S 100W/50W halogen lamp for IR, BF/IR, AS (with centering mechanism), with band pass filter (1100 nm, 1200 nm) BX3M-URAS-S 100W/50W halogen lamp for IR, BF/IR, AS (with centering mechanism), with band pass filter (1100 nm, 1200 nm), with shutter mechanism	
		-	U-KMAS 100W/50W halogen for IR, BF/IR
Revolving nosepiece	For BF	Sextuple, centering sextuple, septuple, coded quintuple (optional motorized revolving nosepieces)	
Stage		Coaxial left (right) handle stage 76 (X) × 52 (Y) mm, with torque adjustment Large-size coaxial left (right) handle stage 100 (X) × 105 (Y) mm, with lock mechanism in Y-axis Large-size coaxial right handle stage 150 (X) × 100 (Y) mm, with torque adjustment, with lock mechanism in Y-axis	-
Weight		Approx. 18.9 kg (Microscope frame 7.4 kg)	Approx. 11.6 kg (Microscope frame 1.9 kg)

BX53M Polarized Light Specifications

		BX53MTRF-S	
Polarized light intermediate attachment (U-CPA or U-OPA)	Wide field FN 22	Inverted: binocular, trinocular, tilting binocular Erect: trinocular, tilting binocular	
	Bertrand lens	Focusable	
	Bertrand field stop	ø3.4 mm diameter (fixed)	
	Engage or disengage Bertrand lens changeover between orthoscopic and conoscopic observation	Position of slider ● in Position of slider ○ out	
	Analyzer Slot	Rotatable analyzer with slot (U-AN360P-2)	
Analyzer (U-AN360P-2)		360° dial-rotatable Rotatable minimum angle 0.1°	
Revolving centerable nosepiece (U-P4RE)		Quadruple, centerable attachable components: 1/4 wavelength retardation plate (U-TAD), tint plate (U-TP530) and various compensators can be attached using plate adapter (U-TAD)	
Stage (U-SRP)		Polarizing rotatable stage with 3-point centering function 360° rotatable, lockable in any position, 360° graduated in 1° increments (minimum retardation resolution 6', using vernier scale) 45° click stop function Mechanical stage (U-FMP) can be attached	
Condenser (U-POC-2)		Achromat strain-free condenser (U-POC-2), 360° rotatable polarizer with swing-out achromatic top-lens Click stop at position "0°" is adjustable NA 0.9 (top-lens in) NA 0.18 (top-lens out) Aperture iris diaphragm: adjustable from 2 mm to 21 mm diameters	
Weight		Approx. 16.2 kg (Microscope frame 7.6 kg)	

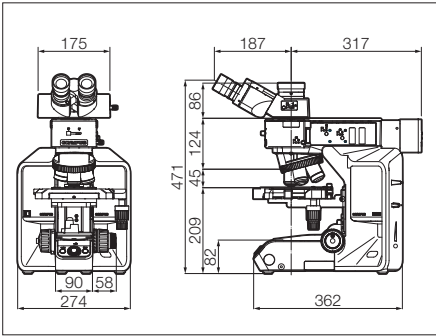
BX3M ESD units

Items	Microscope: frame: BX53M-RF-S, BX53MTRF-S Illuminator: BX3M-KMA-S, BX3M-RLA-S, BX3M-URA-S, BX3M-RLAS-S Nosepiece: U-D6BDRES-S, U-D6RE-ESD, U-D5BDREMC-ESD, U-5RES-ESD Stage: U-SIC4R2, U-SIC4L2, U-SP4, U-MSSP4
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Dimensions

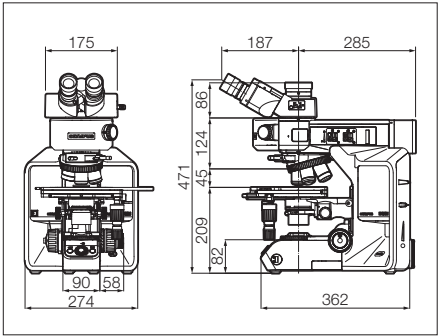
BX53MRF-S System Dimensions

unit: mm



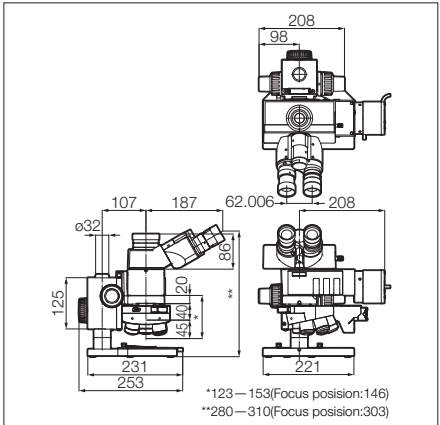
BX53MTRF-S System Dimensions

unit: mm



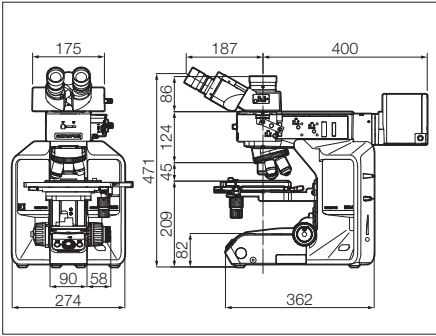
BXFM System Dimensions

unit: mm



IR System Dimensions

unit: mm



Polarized Light System Dimensions

unit: mm

