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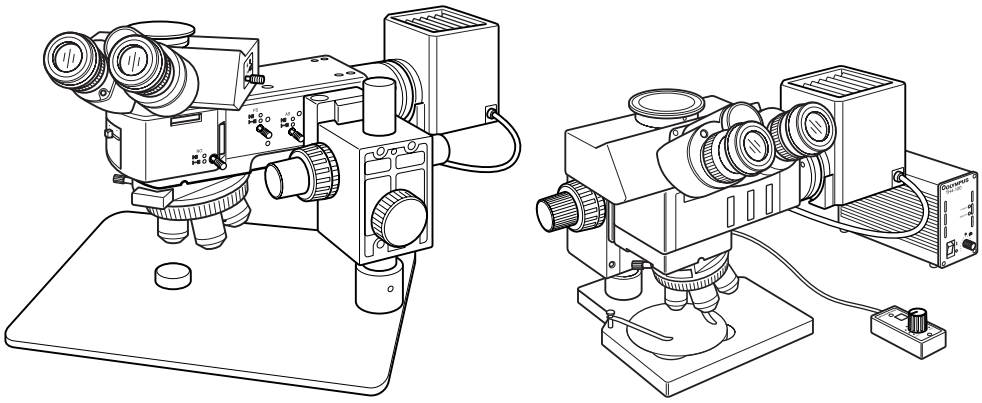

INSTRUCTIONS

BXFM

FOCUSING UNIT

This instruction manual is for the Olympus Focusing Unit model BXFM and associated modules. To ensure safety, optimum performance and familiarize yourself fully with the use of the assembled microscope, we recommend that you study this manual thoroughly before operating the unit. Retain this instruction manual in an easily accessible place near the work desk for future reference.

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CONTENTS

Correct assembly and adjustments are critical for the microscope to exhibit its full performance. If you are going to assemble the microscope yourself, please read chapter 10, "ASSEMBLY" (pages 24 to 27) carefully.

IMPORTANT

The BXFM focusing unit can be used as the basis for installing modules such as reflected light illumination equipment, objectives, eyepieces and observation tube for construction of a microscope system. The BXFM can be installed on the exclusive stand or on your microscope.

⚠ SAFETY PRECAUTIONS

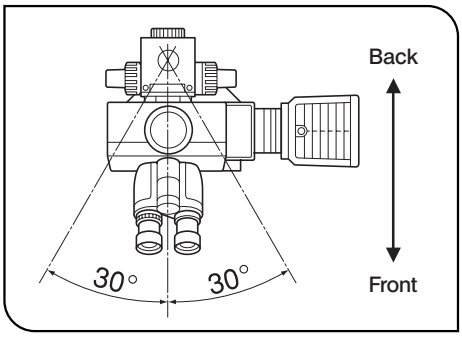


Fig. 1

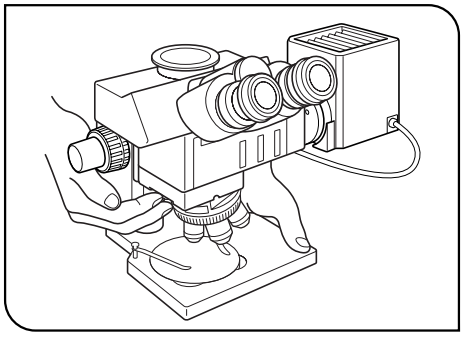


Fig. 2

1. Install the microscope on a sturdy, level table or bench so as not to block the air vents on the underside of the base.
2. When combing the stand (U-ST), install the BXFM so that it forms an angle of ±30° with respect to the pillar as shown in Fig. 1.
   The compact brightfield illuminator (U-KMAS) should be installed so that, when it is seen from the front, the lamp housing is located on its right side.
3. When carrying the BXFM, hold the stand by the bottom with one hand as shown in Fig. 2, and hold the focusing block with the other hand.

★ **Do not hold the BXFM by the coarse/fine adjustment knobs or lamp housing. Otherwise, the microscope may be damaged.**

4. The surface of the lamp housing ① on the rear of the microscope becomes very hot. When installing the microscope system, leave spaces of more than 10 cm around the lamp housing, particularly on the top and bottom.
   Do not install the lamp housing up side down or with the side facing up. Also do not use the microscope in a tilted attitude.
5. The TH4 power supply is air-cooled so it becomes during operation. When installing it, leave spaces of more than around it. Also make sure to distribute cables away from the power supply.
6. Be sure to set the main switch to "O" (OFF) and unplug the power cord before replacing the light source bulb. (P. 26)
7. Always use the power cord provided by Olympus. If no power cord is provided, please select the proper power cord by referring to the chapter "PROPER SELECTION OF THE POWER SUPPLY CORD" at the end of this instruction manual. If the proper power cord is not used, product safety and performance cannot be guaranteed.
8. Always ensure that the **grounding terminal** of the microscope and that of the wall outlet are properly connected. If the equipment is not grounded, Olympus can no longer warrant the electrical safety and performance of the equipment.

9. When using a photographic unit or TV camera, be sure to observe the total weight limit of the modules added to the standard combination as shown below.

Illuminator Mounting Holder	BXFM-ILHS	BXFM-ILH
Standard Combination Weight (Module Names)	5.2 kg (U-KMAS, U-TR30-2, U-LH100-3, revolving nosepiece, objectives, eyepiece)	7.5 kg (BX-RLA2, U-TR30-2, U-LH100-3, revolving nosepiece, objectives, eyepiece)
Additional Load Limit	2.8 kg	4.0 kg (When the BXFM-ILHSPU counter spring is used)

- With the combination using the BXFM-ILH illuminator mounting holder, do not use the U-ST stand because this makes the system unstable.
- The system can be stabilized by using the SZ-STL large stand, but the image may fluctuate or blur irregularly when a 50X or higher-power objective is used.
- It is recommended to fabricate an exclusive clamping tool which uses the support mounting hole (P. 20) or module mounting screw hole of the BXFM-F focusing unit.

Safety Symbols

The following symbols are found on the microscope. Study the meaning of the symbols and always use the equipment in the safest possible manner.

Symbol	Explanation
	Indicates that the surface becomes hot, and should not be touched with bare hands.
	Before use, carefully read the instruction manual. Improper use could result in personal injury to the user and/or damage to the equipment.
I	Indicates that the main switch is ON.
O	Indicates that the main switch is OFF.

Warnings

Warning engraving/stickers are placed at parts where special precaution is required when handling and using the microscope. Always heed the warnings.

Warning engraving position	Lamp housing (Warning against high temperature) 

1 Getting Ready

1. A microscope is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impact.
2. Do not use the microscope system where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations. (For the operating conditions, refer to chapter 7, "SPECIFICATIONS".)
3. One intermediate attachment can be used by installing U-CA magnification changer or U-EPA2 eyepoint adjuster above the reflected light illuminator.

2 Maintenance and Storage

1. To clean the lenses and other glass components, simply blow dirty away using a commercially available blower and wipe gently using a piece of cleaning paper (or clean gauze).
   If a lens is stained with fingerprints or oil smudges, wipe it gauze slightly moistened with commercially available absolute alcohol.

⚠Since the absolute alcohol is highly flammable, it must be handled carefully.
Be sure to keep it away from open flames or potential sources of electrical sparks — for example, electrical equipment that is being switched on or off.
Also remember to always use it only in a well-ventilated room.

2. Do not attempt to use organic solvents to clean the microscope components other than the glass components. To clean them, use a lint-free, soft cloth slightly moistened with a diluted neutral detergent.
3. Never attempt to disassemble any part of the microscope system.
4. When not using the microscope, set the main switch to "O" (OFF). After making sure the lamp housing has cooled down sufficiently, cover it with a dust cover.
5. When disposing of this product, check the regulations and rules of your local government and be sure to observe them.

3 Caution

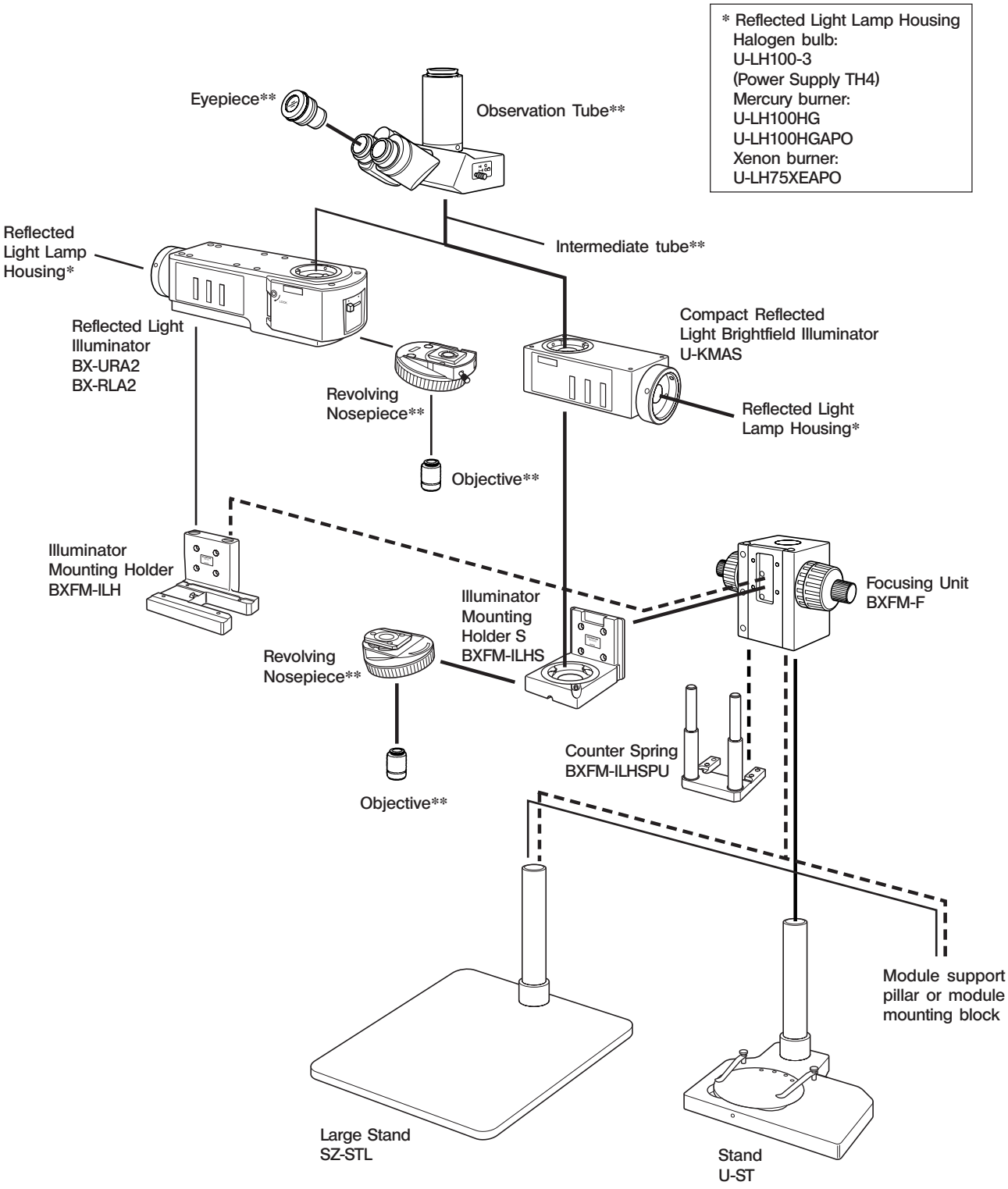
If the microscope is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the equipment may also be damaged. Always use the equipment as outlined in this instruction manual.

The warning, caution and other notes in this manual use the following symbols.
⚠ : Indicates that failure to follow the instructions in the warning could result in bodily harm to the user and/or damage to equipment (including objects in the vicinity of the equipment).
★ : Indicates that failure to follow the instructions could result in damage to equipment.
◎ : Indicates commentary (for ease of operation and maintenance).

1 SYSTEM DIAGRAM

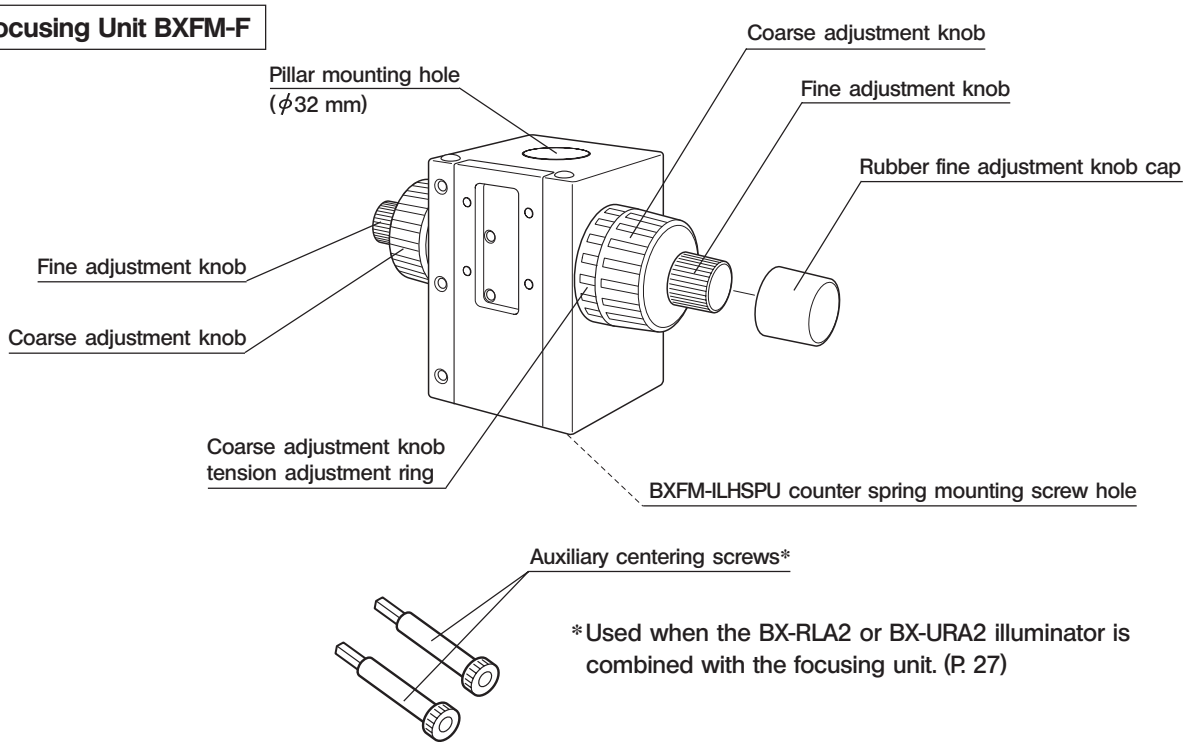
◎This instruction manual gives description the modules which are connected in thick and broken lines in the following diagram. For other modules, please refer to their instruction manuals.

****For the modules without the model names, consult your dealer or the latest catalogues.**



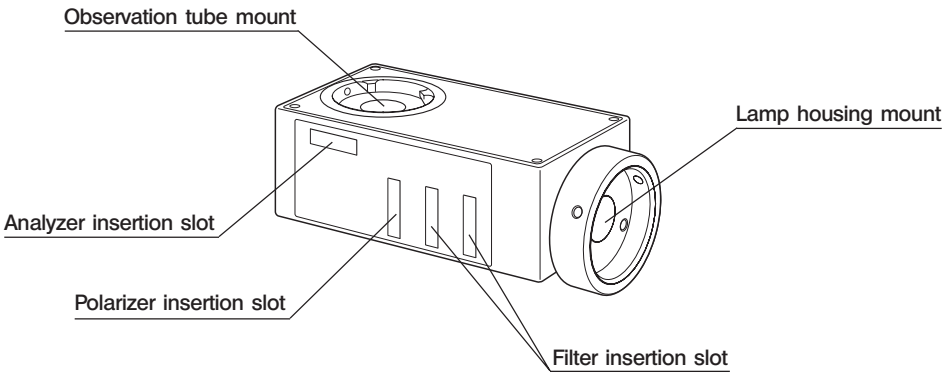
2 NOMENCLATURE

Focusing Unit BXFM-F



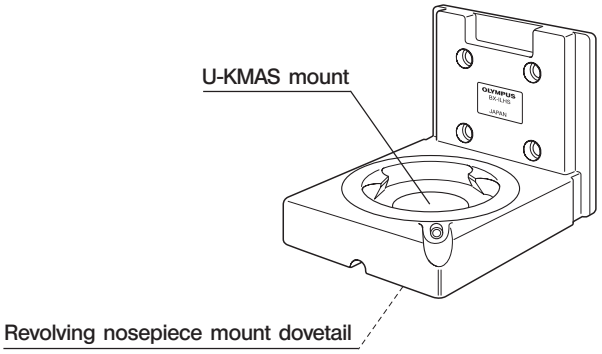
*Used when the BX-RLA2 or BX-URA2 illuminator is combined with the focusing unit. (P. 27)

Compact Reflected Light Brightfield Illuminator U-KMAS



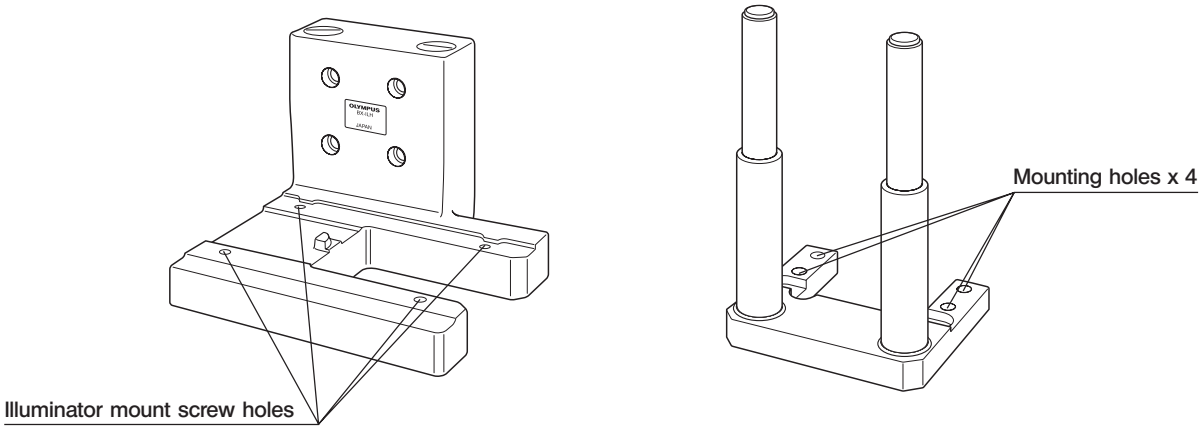
Illuminator Mounting Holder S BXFM-ILHS

◎The U-KMAS reflected light illuminator can be mounted.

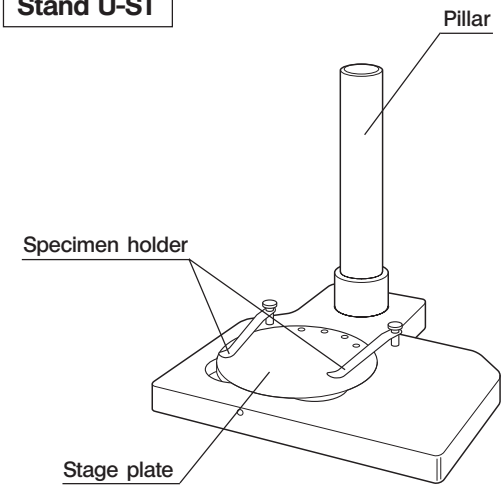


Illuminator Holder BXFM-ILH, Counter Spring BXFM-ILHSPU

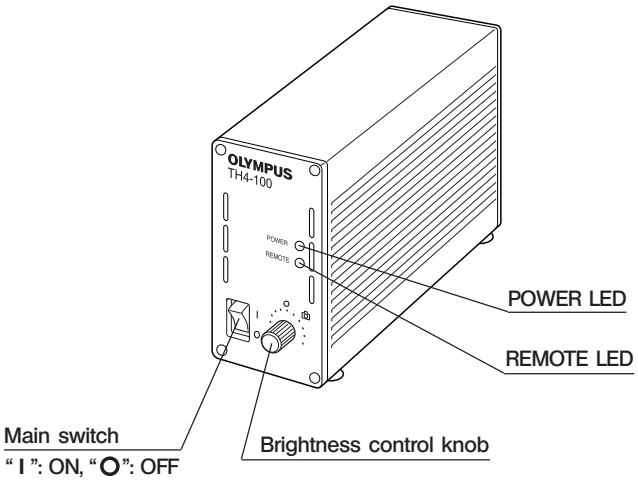
◎The BX-URA2 or BX-RLA2 reflected light illuminator can be installed. The BXFM-ILHSPU is used to reduce the load on focusing due to the weight of the reflected light illuminator and its accessories.



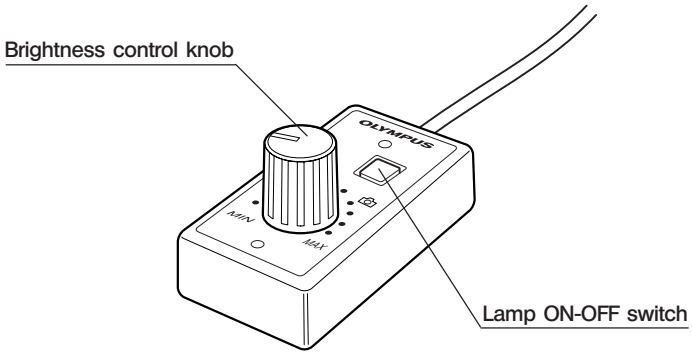
Stand U-ST



Power Supply TH4

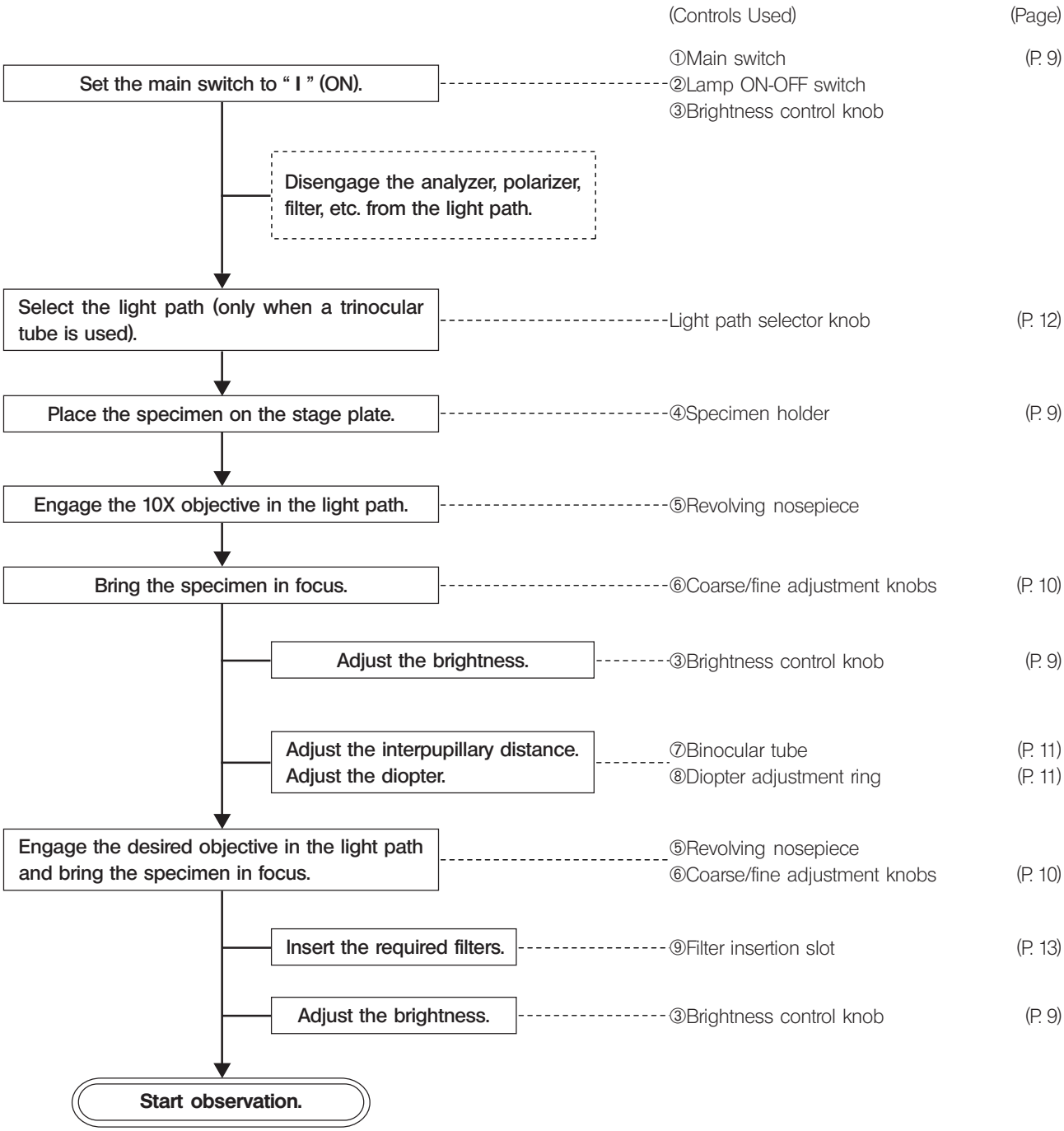


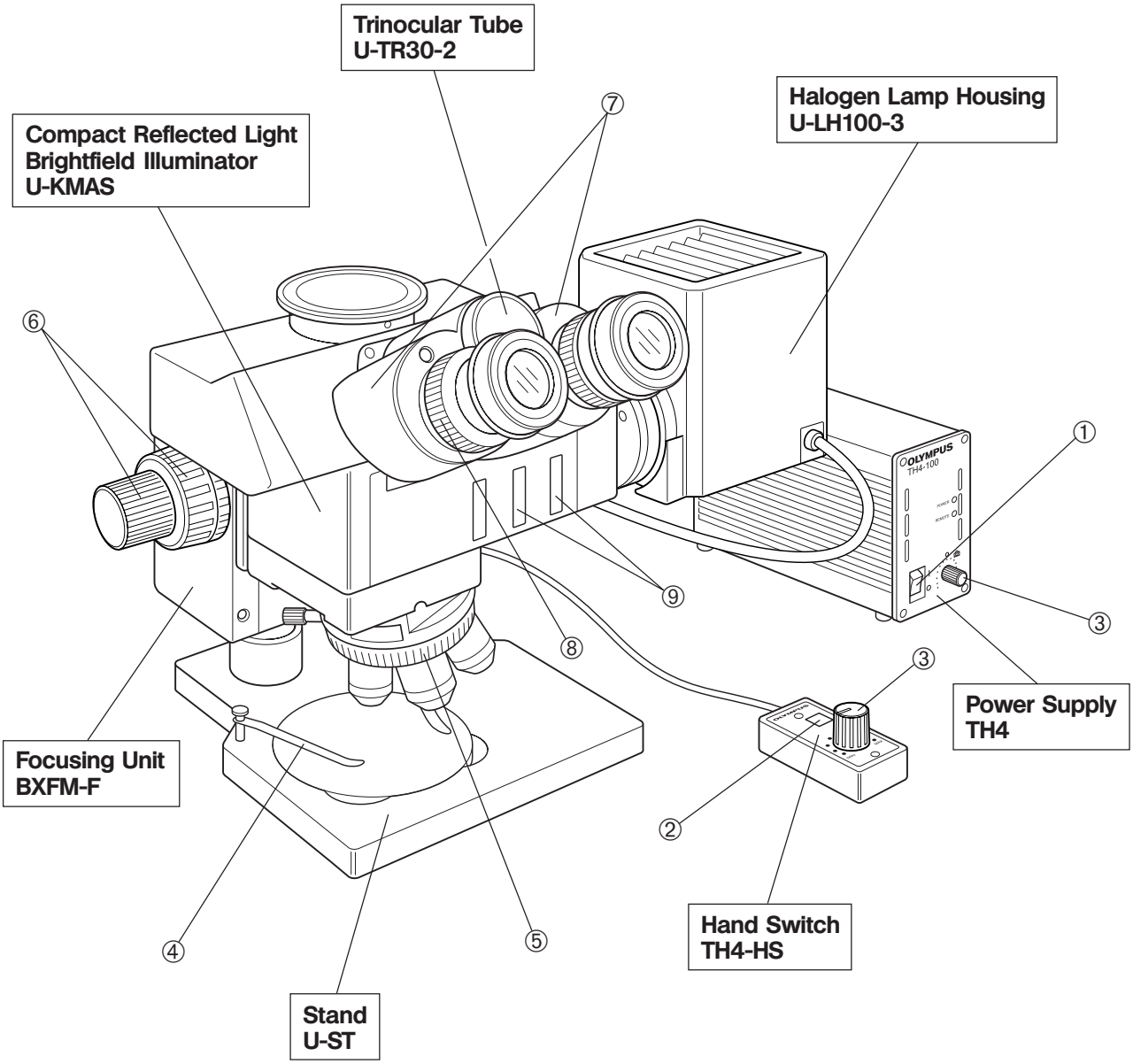
Hand Switch TH4-HS



3 REFLECTED LIGHT BRIGHTFIELD OBSERVATION PROCEDURE

◎The following flow chart pertains only to the reflected light brightfield observation which is the most basic operation. The procedures for the polarized light and Nomarski DIC operations will be described in their respective sections.





◎ Make a photocopy of the observation procedure pages and post it near your microscope.

4 USING THE CONTROLS

4-1 Base and Power Supply

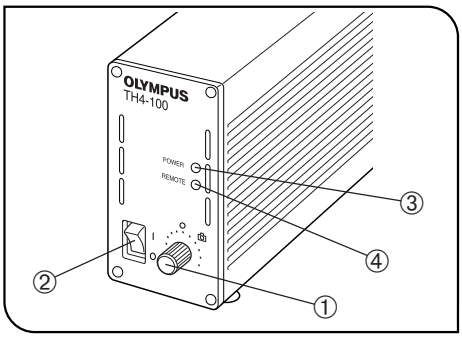


Fig. 3

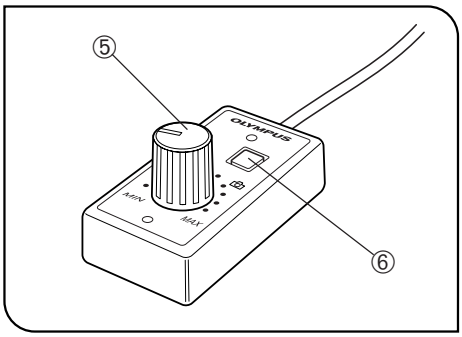


Fig. 4

1 Voltage Indication (Figs. 3 & 4)

1. Ensure that the brightness control knob ① is set to MIN (lowest voltage) then set the main switch ② to " I " (ON). (The POWER LED ③ lights.)
2. Turn the control knob ① toward MAX (highest voltage) to increase the voltage intensity and brighten the illumination.

◎The position marked 📷 indicates the position with which daylight suitable for photography can be obtained when the U-25LBD filter is engaged in the light path.

Hand Switch Operation

◎When the hand switch is connected, (the REMOTE LED ④ lights,) the brightness control knob ① is defeated but the brightness control knob ⑤ of the hand switch is activated.
The hand switch is supplied together with double-side adhesive tape so that the hand switch can be used in the easiest-to-use position for each user.

1. Press the lamp ON-OFF switch ⑥ and adjust the brightness with the control knob ⑤.
2. Press the lamp ON-OFF switch ⑥ to turn the lamp OFF.

★**When the REMOTE LED ④ is lit, the hand switch in standby mode and consumes about 2.5W of power.**
When the unit is not to be used for an extended period of time, set the main switch ② to "O" (OFF).

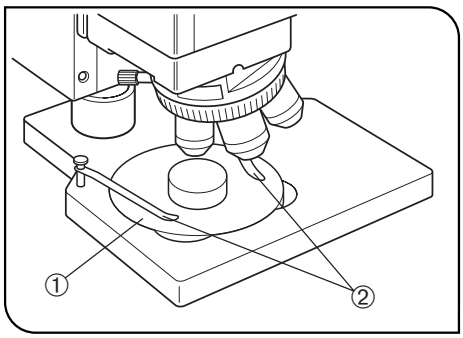


Fig. 5

2 Placing the Specimen (Fig. 5)

Place the specimen on the stage plate ①. If required, hold the specimen with the specimen holder ②.

◎The specimen should be parallel and planar. Otherwise, the reflected light cannot reach the objective, rendering observation impossible.

4-2 Focusing Unit

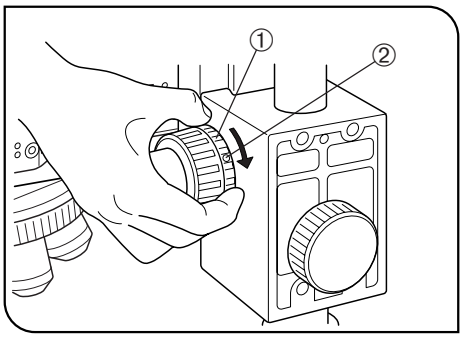


Fig. 6

1 Adjusting the Coarse Adjustment Knob Tension (Fig. 6)

◎The rotation tension of the coarse adjustment knob should be adjusted using the tension adjustment ring. The coarse adjustment knob tension is preadjusted for easy use. However, if desired, you can change the tension using the tension adjustment ring ①. Turning the ring in the direction of the arrow increases tension, and vice versa.

The tension is too low if the stage drops by itself of focus is quickly lost after adjustment with the fine adjustment knob. In this case, turn the ring in the direction of the arrow to increase tension.

◎If you want to increase the tightness of the rotation tension adjustment ring, insert the provided Allen screwdriver into the 4 holes ② on the adjustment ring and tighten.

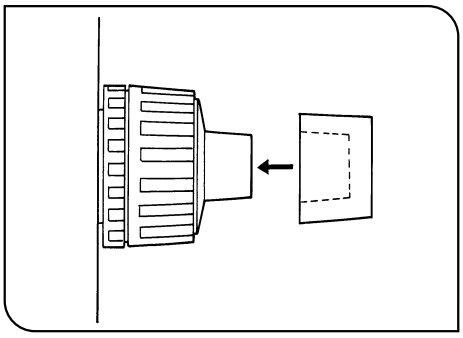


Fig. 7

2 Using the Rubber Fine Focus Adjustment Knob Cap (Fig. 7)

When the fine adjustment knob is fitted with the rubber knob cap, the knob can be adjusted with a lighter force, a making fine focusing easier.

4-3 Observation Tube

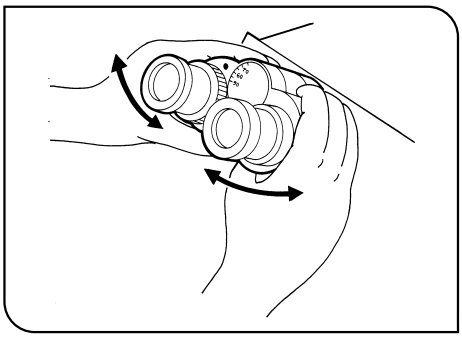


Fig. 8

1 Adjusting the Interpupillar Distance (Fig. 8)

While looking through the eyepieces, adjust for binocular vision until the left and right fields of view coincide completely. The index dot • indicates the interpupillary distance.

◎Note your interpupillary distance so that it can be quickly duplicated.

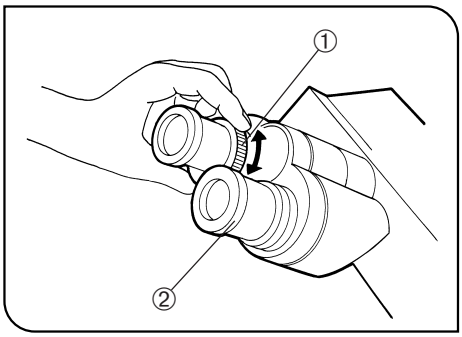


Fig. 9

2 Adjusting the Diopter (Figs. 9 & 10)

1. Looking through the eyepiece without the diopter adjustment ring, rotate the coarse and fine adjustment knobs to bring the specimen into focus.
2. Looking through the eyepiece with the diopter adjustment ring ①, turn it to focus on the specimen. (Fig. 9)

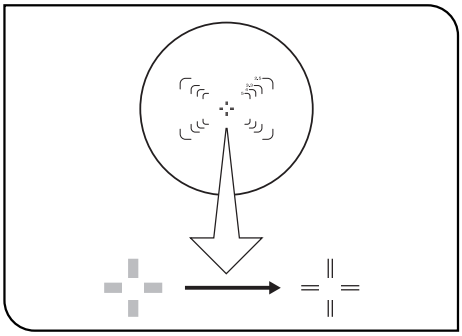


Fig. 10

Using a Finder Eyepiece

1. Looking through the right eyepiece with your right eye, turn the top of the eyepiece ② until a clearly defined double crossline can be seen in the field of view. (Figs. 9 & 10)
2. Looking through the right eyepiece, rotate the coarse and fine adjustment knobs to bring the specimen and double crossline into simultaneous focus.
3. Looking through the left eyepiece with your left eye, turn the diopter adjustment ring ① to focus on the specimen.

Using a Super Widefield Observation Tube

The operation is basically identical to the above. However, as the left eyepiece does not have the diopter adjustment ring, the focus should be adjusted by rotating the top of the right eyepiece.

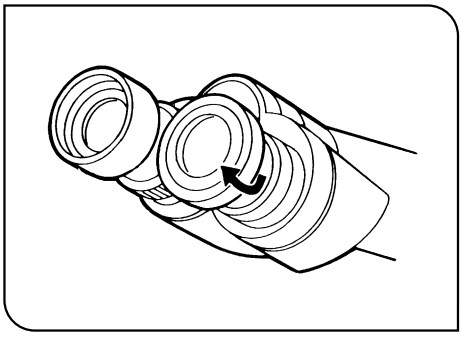


Fig. 11

3 Using the Eye Shades (Fig. 11)

When Wearing Eyeglasses

Use with the eye shades in the normal, folded-down position. This will prevent the eyeglasses from being scratched.

When Not Wearing Eyeglasses

Extend the folded eye shades in the direction of the arrow to prevent extraneous light from entering between the eyepieces and eyes.

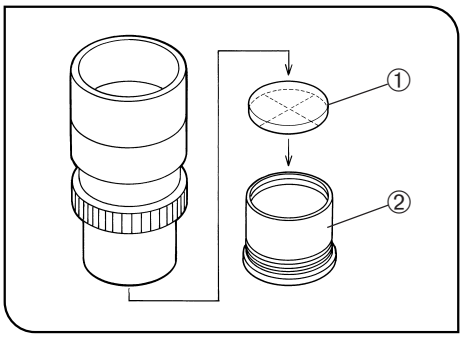


Fig. 12

4 Using Eyepiece Micrometer Disks (Fig. 12)

Eyepiece micrometer disks can be inserted into WHN10X-H (or WHN10X) eyepieces.
However, if the eyepiece does not have the helicoid adjustment facility and your eyesight is poor, you may have difficulties in focusing on the eyepiece micrometer disk. In this case, it is recommended to look into the eyepiece through your eyeglasses.
Use 24 mm dia. x 1.5 mm micrometer disks.
Following Fig. 12, remove the micrometer mounting frame ② from the eyepiece and place a micrometer disk ① into the mounting frame.
Re-attach the micrometer mounting frame in the original position.

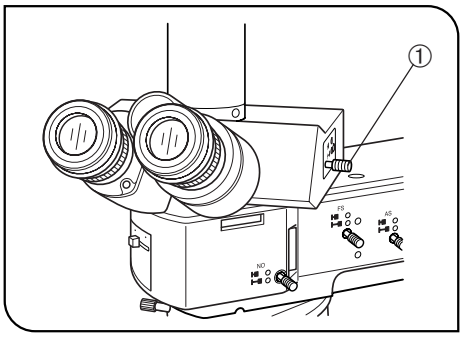


Fig. 13

5 Selecting the Light Path of Trinocular Tube (Fig. 13)

Slide the light path selector knob ① to select the desired light path.

Trinocular Tube	Light Path Selector Position		
	Pushed In	Intermediate	Pulled Out
U-TR30-2	Binocular 100%	Binocular 20% TV, photo 80%	TV, photo100%
U-SWTR-3			
U-ETR3	Binocular 100%		TV, photo100%
U-SWETR			
U-SWETTR2	Binocular 100%		Binocular 20% TV, photo 80%

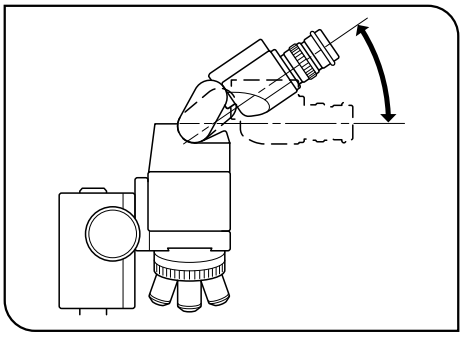


Fig. 14

6 Adjusting the Tilt (with the U-TBI3/SWETTR2) (Fig. 14)

◎Adjust the height and tilt of the observation tube to obtain the most comfortable viewing position.
Holding the binocular section with both hands, raise or lower it to the desired position.

★**Never attempt to force the binocular section past the upper or lower stop position. Applying excessive force could destroy the limiting mechanism.**

★**The U-TBI3 cannot be used in combination with any intermediate attachment.**

4-4 Reflected Light Illuminator (U-KMAS)

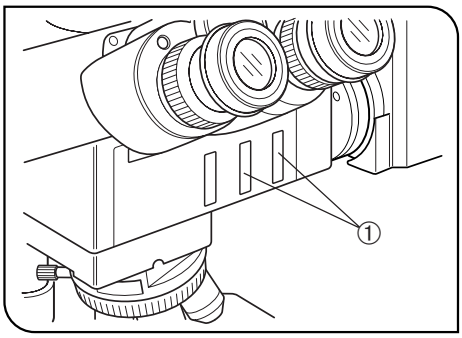


Fig. 15

1 Using the Filters (Fig. 15)

◎Engage the optimum filter sliders for the purpose of observation in the two filter insertion slots ①. Be sure to insert them in the direction shown in Fig. 15.
The first click position is the idle position and the second click engages the filter in the light path.

Usable Filters	Applications
U-25LBD (Color temperature conversion filter)	Turns the illumination light into daylight. Used in general observations and color photography.
U-25IF550 (Green filter)	Enhanced contrast in monochrome observation. Used in monochrome photography.
U-25Y48 (Yellow filter)	Contrast filter for observation of semiconductor wafers.
U-25ND50-2 (Light intensity adjustment filter)	Adjusts the brightness of the light source. (Transmittance: 50%)
U-25ND25-2 (Light intensity adjustment filter)	Adjusts the brightness of the light source. (Transmittance: 25%)
U-25ND6-2 (Light intensity adjustment filter)	Adjusts the brightness of the light source. (Transmittance: 6%)
U-25FR (Frost filter)	Reduces irregularity in the illumination field, but also reduces the brightness.
U-25L42 (UV cut filter)	Cut ultraviolet rays. Used to prevent the polarizer from being burnt by a high-intensity light source.

5 OBSERVATION METHODS (Using U-KMAS)

◎For the observation methods of the BX-URA2 and BX-RLA2 reflected light illuminators, refer to their instruction manuals.

5-1 Reflected Light Brightfield Observation

See "REFLECTED LIGHT BRIGHTFIELD OBSERVATION PROCEDURE" on page 7.

5-2 Reflected Light Nomarski DIC (Differential Interference Contrast) Observation

★The performance of polarizer may deteriorate when it has been exposed to light for a long period (about continuous 2000 hours). If this happens, replace the polarizer.
★When performing sensitive color observation using the U-DICRH DIC slider, combine the U-POTP3 polarizer.
★When using the high-intensity light source, be sure to use the U-25L42 filter to prevent the polarizer from being burnt.

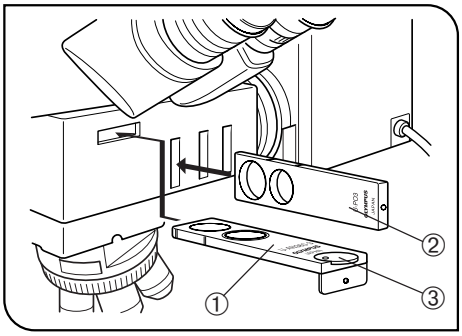


Fig. 16

1 Setting the Analyzer and Polarizer (Fig. 16)

★In the current step, do not engage the DIC slider in the light path.
1. Bring the specimen in approximate focusing using the 10X or 20X objective.
2. Remove the cover to enable installation of the U-AN360-3 analyzer. Then put the analyzer ① in the insertion slot.
3. Insert the U-PO3 or U-POTP3 polarizer ② so that the surface with indication comes on the front, and engage the polarizer in the light path.
4. Rotate the analyzer rotating dial ③ to find the position where the field of view is darkest.

◎An approximate cross-Nicol position can be obtained by setting the index on the dial ③ on the outer side. Fine-adjust the dial by rotating it near this position to find the position where the field of view is darkest.

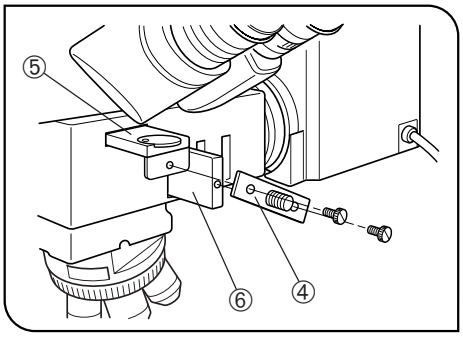


Fig. 17

Using the Joint Plate

When the U-AN360-3 analyzer ⑤ and U-PO3 or U-POTP3 polarizer ⑥ are coupled by using the joint plate ④ provided with the polarizer and tightening the clamping knobs on it, the analyzer and polarizer can be engaged or disengaged in the light path together.

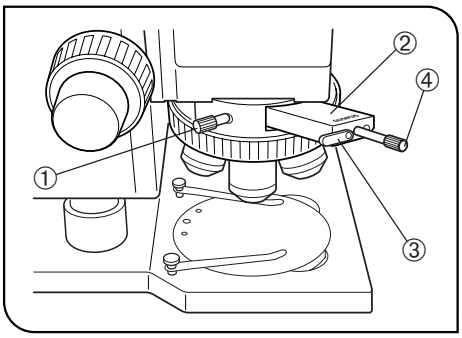


Fig. 18

2 Setting the DIC Slider (Fig. 18)

1. Loosen the mounting knob ① on the front of the DIC revolving nosepiece, insert the DIC slider ② so that the surface with indication faces up, and clamp by tightening the mounting knob.
2. With the U-DICR interference slider, set the slide lever ③ according to the objective in use.

Lever ③ position	Applicable Objectives	
Pushed in	UIS2	MPLFLN/MPLFLN-BD series
	UIS	UMPlanFl/UMPlanFl-BD series MPlanApo20X, 100X MPlanApo100XBD
Pulled out	UIS2	LMPLFLN/LMPLFLN-BD series
	UIS	LMPlanFl/LMPlanFl-BD series LMPlanApo/LMPlanApo-BD series

3. With the U-DICRH or U-DICRHC slider that does not have the slide lever, the applicable objectives are as follows.

DIC Slider	Applicable Objectives	
U-DICRH	UIS2	MPLFLN/MPLFLN-BD series
	UIS	UMPlanFl/UMPlanFl-BD series MPlanFl-BD series MPlanApo20X, 100X
U-DICRHC	UIS2	LMPLFLN/LMPLFLN-BD series
	UIS	LMPlanFl/LMPlanFl-BD series LMPlanApo/LMPlanApo-BD series

3 Observation Method (Fig. 18)

Place the specimen on the stage plate and adjust the focus by using the coarse/fine adjustment knobs.

U-DICR **U-DICRHC**

1. Adjust the background contrast by turning the prism movement knob ④ on the DIC slider as described below. (Fig. 18)
2. When the prism movement knob on the DIC slider is turned, the interference color in the background varies continuously from the gray sensitive color to magenta sensitive color (from -100 to 600 nm). Set the interference color which can provide best contrast with respect to the specimen.
   - Selecting a gray background color enables 3D-looking observation with high contrast thanks to the highest sensibility of the gray sensitive color.
   - Selecting a magenta sensitive color allows even small phase variation to be observed as a change in color.

U-DICRH

1. Adjust the background contrast by turning the prism movement knob ④ on the DIC slider as described below. (Fig. 18)
2. When the prism movement knob on the U-DICRH DIC slider is turned, the interference color in the background varies from -100 to 100 nm. Set the retardation which can provide best contrast.

- Selecting a gray background color enables 3D-looking observation with high contrast thanks to the highest sensibility of the gray sensitive color.
- Selecting a magenta sensitive color allows even small phase variation to be observed as a change in color.
  To select the magenta sensitive color as the background color, use the U-POTP3 polarizer and insert it so that the (indication can be seen from the front.

★Since the DIC observation has a high detection sensitivity, take care against contamination on the specimen surface.

4 Switching to Brightfield Observation (Fig. 18)

1. Loosen the mounting knob ① on the front of the DIC revolving nosepiece, gently pull out the DIC slider ② until it clicks, then clamp by tightening the mounting knob.
2. Slide the analyzer (U-AN360-3) and polarizer to disengage them from the light path.

5-3 Reflected Light Simplified Polarized Light Observation

◎For the preparation of reflected light simplified polarized light observation, perform the operation in "1 Setting the Analyzer and Polarizer" in section 5-2, "Reflected Light Nomarski DIC Observation".

1 Observation Method

Place the specimen on the stage plate and adjust the focus by using the coarse/fine adjustment knobs. Now simplified polarized light observation can be started.

6 TROUBLESHOOTING GUIDE

Under certain conditions, performance of the unit may be adversely affected by factors other than defects. If problems occur, please review the following list and take remedial action as needed. If you cannot solve the problem after checking the entire list, please contact your local Olympus representative for assistance.

Problem	Cause	Remedy	Page
1. Optical System			
a) Bulb lights but the field of view is dark or invisible.	Bulb is burned out.	Replace bulb.	26
	Light path selector knob of trinocular tube is positioned halfway.	Push light path selector knob in.	12
b) Field of view is obscured or not evenly illuminated.	Revolving nosepiece is not in a click position.	Set it in a click position.	–
	Light path selector knob of trinocular tube is positioned halfway.	Push light path selector knob completely in or out.	12
	Filter is not in a click position.	Set it in a click position.	13
c) Dirt or dust is visible in the field of view.	Dirt/dust on lamp bulb	Clean thoroughly.	3
	Dirt/dust on specimen		
	Dirt/dust on extremity of objective		
	Dirt/dust on eyepiece		
d) Visibility of observed image is poor. • Image is not sharp. • Contrast is poor.	Objective is not correctly engaged in light path.	Make sure that revolving nosepiece clicks into place correctly.	–
	Objective or eyepiece in use is not specified models.	Replace it with a specified model.	22
e) One side of image is blurred. Image looks like flowing.	Specimen is tilted.	Correct specimen positioning.	9
	Objective is not correctly engaged in light path.	Make sure that revolving nosepiece clicks into place correctly.	–
	Light axis is tilted because weight is heavier than specified.	Reduce number of modules to or below weight limit.	2
2. Observation Tube			
a) Field of view of one eye does not match that of the other.	Interpupillary distance is incorrect.	Adjust interpupillary distance.	11
	Incorrect diopter adjustment.	Adjust diopter.	11
	Different eyepieces are used on left and right.	Change on eyepiece to match the other so that both sides are the same type.	11
	You are not accustomed to parallel optical axis.	When looking into eyepieces, do not stare at image from the beginning but see the overall field of view. It is sometimes recommended to turn your eyes away from eyepieces, look far off and look into eyepieces again.	–
3. Coarse/Fine Adjustment Knobs			
a) Coarse adjustment knob is too heavy to rotate.	Rotation tension adjustment ring is too tight.	Loosen ring to an optimum tightness.	10
b) Focusing unit drifts down by itself, causing a loss of focus during observation.	Tension adjustment ring is too loose.	Tighten ring to an optimum tightness.	10

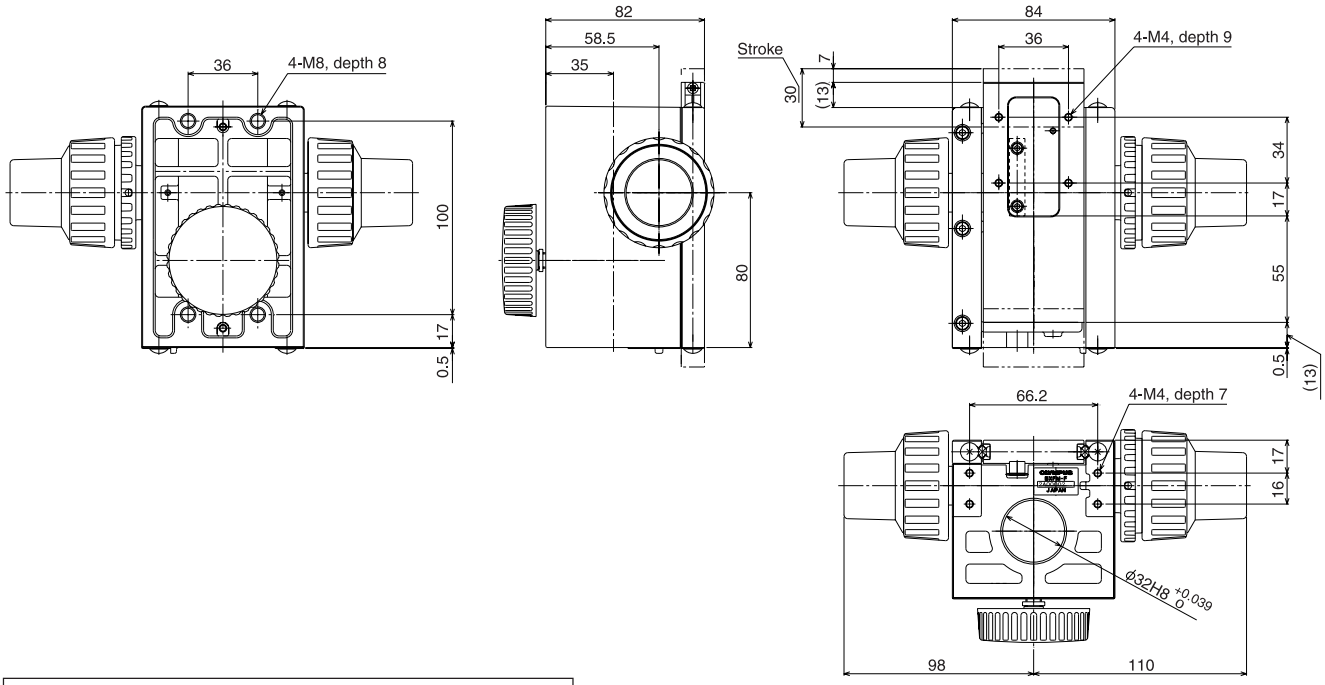
Problem	Cause	Remedy	Page
4. Electrical System			
a) Bulb intermittently lights and goes out.	Bulb is near the end of service life.	Replace bulb.	26
	A cord or connector is not properly connected.	Connect cords and plugs securely.	27
b) LED lights but lamp bulb does not.	Bulb is burnt out.	Replace bulb.	26
	A cord or connector is not properly connected.	Connect cords and plugs securely.	27

7 SPECIFICATIONS

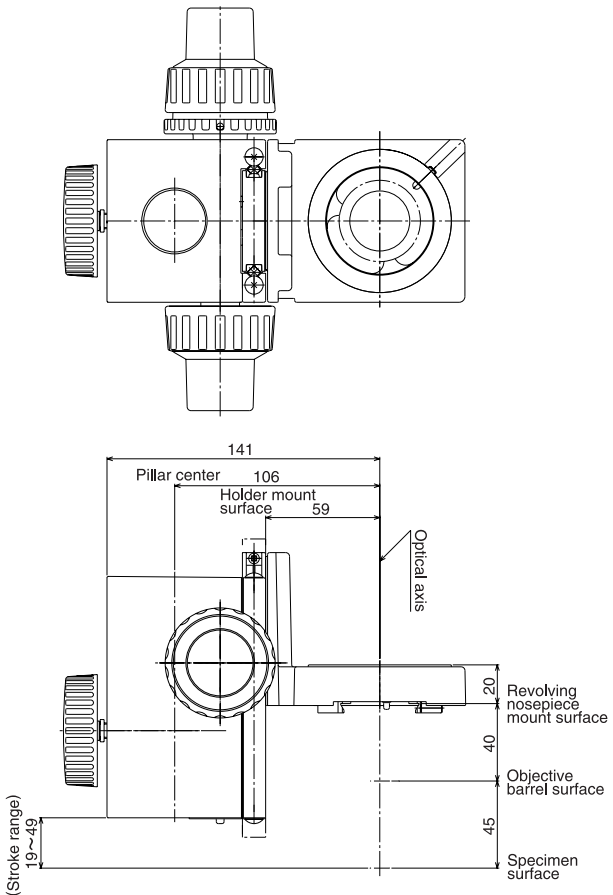
Item	Specification			
Optical system	UIS2 (UIS) (Universal Infinity System) optical system			
Reflected light illumination (U-KMAS illuminator)	Tube magnification 1X, super widefield (FN 26.5) compatible.			
	Available observations: ① Reflected light brightfield ② Reflected light Nomarski DIC ③ Reflected light simplified polarized light			
Electrical system (U-LH100-3 lamp housing, TH4 power supply)	12V, 100W long-life halogen bulb (pre-centered) 12V100WHAL-L (PHILIPS 7724) 12 V, 50 W long-life halogen bulb (pre-centered) 12V50WHAL-L (LIFE JC) Average life time: Approximately 2000 hr. Input rating: 100-120 V ∿ , 3.0 A, 50/60 Hz 220-240 V ∿ , 1.7 A, 50/60 Hz. Output rating: 2.5-12.6 V DC (continuously variable), max. 8.4 A (12.6 V)			
Focusing system (BXFM-F focusing unit)	Observation tube height movement by roller guide (rack & pinion) Stroke per rotation: 0.2 mm (fine), 36 mm (coarse) Full stroke range: 30 mm Tension adjustment on coarse focus adjustment knob.			
Revolving nosepiece	U-5RE-2 DIC slider insertion type: U-D6RE, U-D7RE, (U-D5BDRE, U-D6BDRE) etc. Motorized revolving nosepieces also applicable.			
Observation tube	U-BI30-2 Widefield binocular	U-TR30-2 Widefield trinocular	U-ETR3 Widefield erected trinocular	U-SWTR-3 Super widefield trinocular
	FN 22			FN 26.5
	Tube tilting angle: Fixed			
	Interpupillary distance adjustment: 50 to 76 mm			
Operating environment	• Indoor use. • Altitude: Max. 2000 meters • Ambient temperature: 5° to 30°C (41° to 86° F) • Maximum relative humidity: 80% for temperatures up to 31°C (88°F), decreasing linearly through 70% at 34°C (93°F), 60% at 37°C (99°F), to 50% relative humidity at 40°C (104°F). • Supply voltage fluctuations: ±10% • Pollution degree: 2 (in accordance with IEC60664) • Installation (overvoltage) category: II (in accordance with IEC60664)			

8 MAIN DIMENSION DIAGRAM

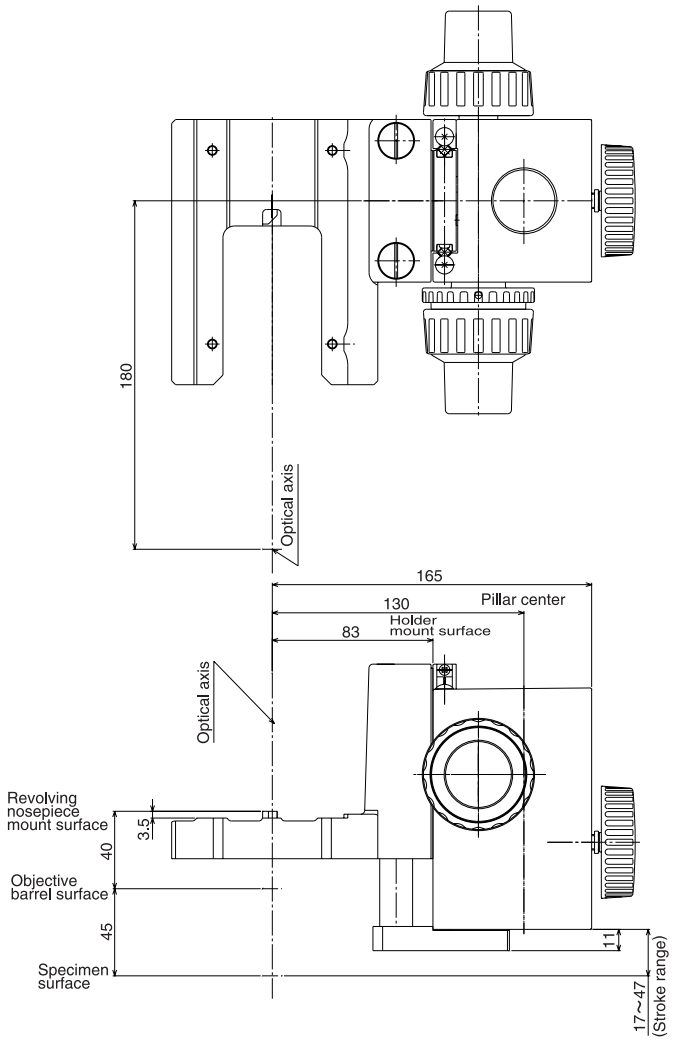
Focusing Unit BXFM-F



Provided with Illuminator Mounting Holder S
BXFM-F + BXFM-ILHS



Provided with Illuminator Mounting Holder/Counter Spring
BXFM-F + BXFM-ILH + BXFM-ILHSPU



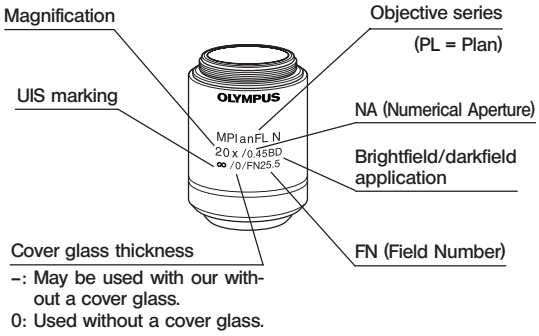
9 OPTICAL CHARACTERISTICS «UIS2 (UIS) Series»

- The UIS series objectives that are not mentioned below can also be mounted on this microscope. -

The table below shows the optical characteristics of different eyepiece and objective combinations. Objective specifications are marked on the objective (as shown in the diagram on the right).

NOTE

Refer to the latest catalogue or consult Olympus for the updated information on the eyepieces and objectives that can be combined with this unit.



	Optical characteristics / Series	Marking	Magnification	N.A.	W.D. (mm)	Cover glass thickness (mm)	Resolution (μm)	Eyepieces: WHN10X (FN22) Total mag.	WHN10X (FN22) Depth of focus (μm)	WHN10X (FN22) Field of view (mm)	SWH10X (FN26.5) Total mag.	SWH10X (FN26.5) Depth of focus (μm)	SWH10X (FN26.5) Field of view (mm)
UIS2 series	MPLN Plan Achromat (FN22)	MPlanN	5X	0.10	20.0	–	3.36	50X	98	4.4	–	–	–
			10X	0.25	10.6	–	1.34	100X	18	2.2			
			20X	0.40	1.3	0	0.84	200X	6.1	1.1			
			50X	0.75	0.38	0	0.45	500X	1.4	0.44			
			100X	0.90	0.21	0	0.37	1000X	0.73	0.22			
	MPLFLN Plan Semi-Apochromat (FN26.5) *1.25X:FN22	MPlanFLN	1.25X	0.04	3.5	–	8.39	12.5X	870	176	–	–	–
			2.5X	0.08	10.7	–	4.19	25X	220	8.8	25X	220	10.6
			5X	0.15	20.0	–	2.24	50X	59	4.4	50X	59	5.3
			10X	0.30	11.0	–	1.12	100X	15	2.2	100X	15	2.65
			20X	0.45	3.1	0	0.75	200X	5.2	1.1	200X	5.2	1.33
			50X	0.80	1.0	0	0.42	500X	1.3	0.44	500X	1.3	0.53
			100X	0.90	1.0	0	0.37	1000X	0.73	0.22	1000X	0.73	0.27
	LMPLFLN Long WD Plan Semi-Apochromat (FN26.5)	LMPlanFLN	5X	0.13	22.5	–	2.58	50X	70	4.4	50X	70	5.3
			10X	0.25	21.0	–	1.34	100X	18	2.2	100X	18	2.65
			20X	0.40	12.0	0	0.84	200X	6.1	1.1	200X	6.1	1.33
			50X	0.50	10.6	0	0.67	500X	2.5	0.44	500X	2.5	0.53
			100X	0.80	3.4	0	0.42	1000X	0.87	0.22	1000X	0.87	0.27
UIS series	MPlanApo Plan Apochromat	MPlanApo	20X	0.60	0.9	0	0.56	200X	3.68	1.1	200X	3.68	1.33
			50X	0.95	0.3	0	0.35	500X	1.04	0.44	500X	1.04	0.53
			100X	0.95	0.35	0	0.35	1000X	0.67	0.22	1000X	0.67	0.27
	SLMPlan Super Long WD Plan Apochromat (FN26.5)	SLMPlan	20X	0.35	21.0	0	0.96	200X	7.2	1.1	200X	7.2	1.33
			50X	0.45	15.0	0	0.75	500X	2.9	0.44	500X	2.9	0.53

Objectives for LCD Panel

	Optical characteristics / Series	Marking	Magnification	N.A.	W.D. (mm)	Cover glass thickness (mm)	Resolution (μm)	Eyepieces: WHN10X (FN22) Total mag.	WHN10X (FN22) Depth of focus (μm)	WHN10X (FN22) Field of view (mm)	SWH10X (FN26.5) Total mag.	SWH10X (FN26.5) Depth of focus (μm)	SWH10X (FN26.5) Field of view (mm)
UIS2 series	LCPLFLN Long WD Plan Semi-Apochromat (FN26.5)	LCPlanFLN*	20XLCD	0.45	7.4-8.3	0-1.2	0.75	200X	5.2	1.1	200X	5.2	1.33
			50XLCD	0.70	2.2-3	0-1.2	0.48	500X	1.6	0.44	500X	1.6	0.53
			100XLCD	0.85	0.9-1.2	0-0.7	0.39	1000X	0.79	0.22	1000X	0.79	0.27

* Equipped with the glass thickness compensation ring.

Significance of Objective Name

(Examples) **M PL FL N 100 BD**

PL (Plan)

- **BD**
  - None : Brightfield
  - BD : Darkfield
  - BDP : Brightfield or polarized
  - IR : IR light
- **100**
  - Figure : Magnification
- **N**
  - None : UIS
  - N : UIS 2
- **FL**
  - None : Achromat, or aberration correction with 2 wavelengths (red and bleu).
  - FL : Semi-Apochromat, or color aberration correction with visual wavelengths (bluish purple to red).
  - APO : Apochromat, or color aberration correction with all visual-domain wavelength (purple to red).
- **PL**
  - PL : Plan, or correction of image curving on peripheral area.
- **M**
  - M : Metal observation (no cover)
  - LM : Long-WD metal observation
  - SLM : Superlong-WD metal observation
  - LC : Observation over glass plate

Glossary of Terms Used in the Optical Characteristics Table

Working distance (WD) : The distance from the top of specimen and the front lens of objective.

Number of aperture (NA) : Important figure determining the objective characteristics (resolution, focal depth and brightness).
- Resolution ..... Increases in proportion with the NA.
- Focal depth ..... Decreases in proportion with the NA.
- Brightness ..... Proportional with the square of NA (comparison under the same magnification).

Resolution : The limit that an objective can identify the images of two points that are close to each other, expressed as the distance between the two points on the specimen.

Depth of focus : The maximum depth of the specimen at which the entire specimen can be brought into focus simultaneously. This value increases when the aperture iris diaphragm is narrowed and decreases when the objective NA is increased.

Field number : The diameter of the image area that can be observed through the eyepieces, expressed in mm.

Field of view : The diameter of the area observable on the specimen, expressed in mm.

10 ASSEMBLY

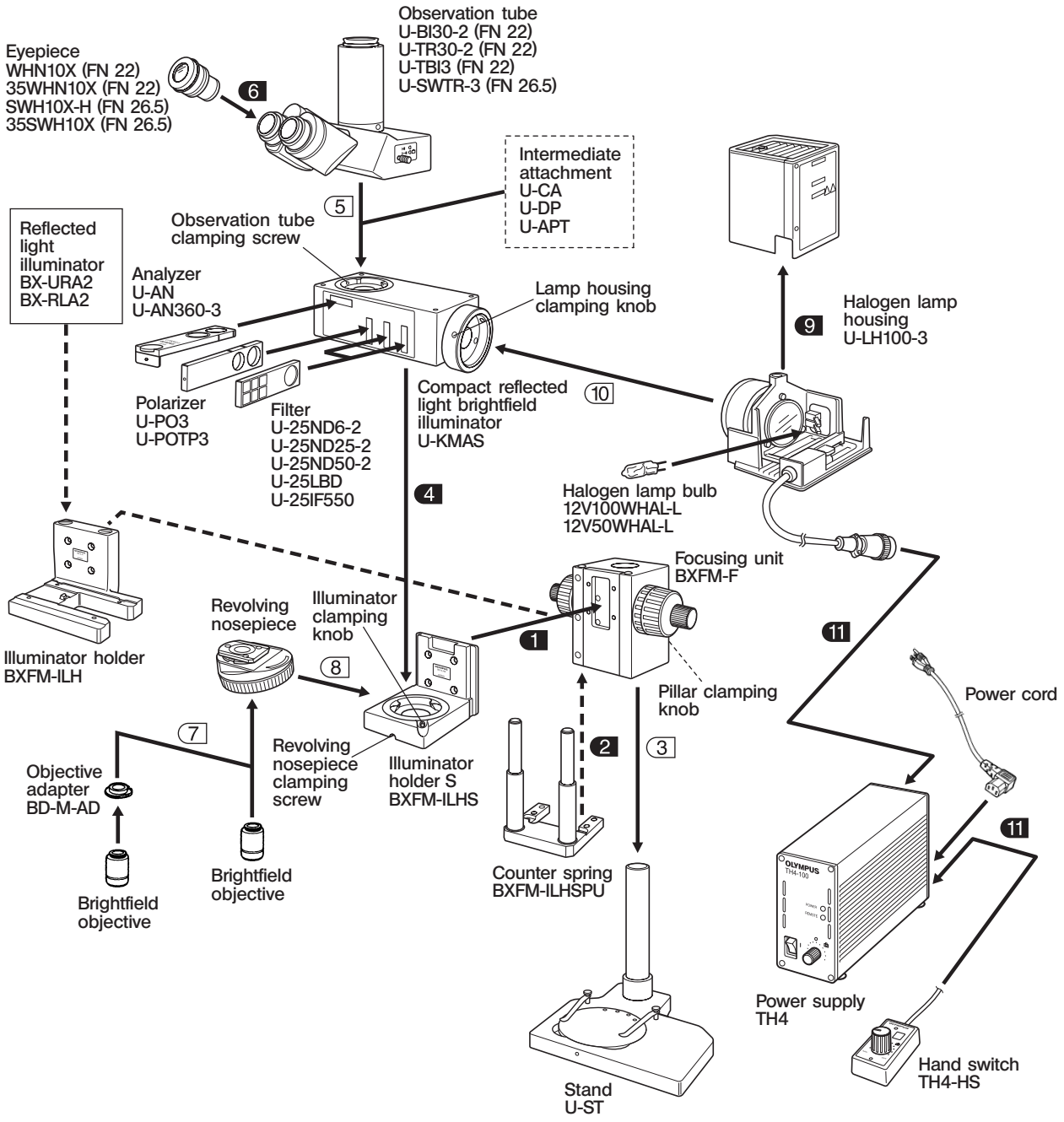
10-1 Assembly Diagram

- The diagram below shows the sequence of assembly of the various modules. The numbers indicate the order of assembly.
- The module numbers shown in the following diagram are merely the typical examples. For the modules with which the module numbers are not given, please consult your Olympus representative or the catalogues.

★ **When assembling the microscope, make sure that all parts are free of dust and dirt, and avoid scratching any parts or touching glass surfaces.**

◎Assembly steps enclosed in ■ will be detailed on the subsequent pages.

◎All assembly operations are possible by using the Allen screwdriver ( ) provided with the microscope. However, the BX-URA2 or BX-RLA2 vertical illuminator should be attached using the Allen wrench ( ) provided with the illuminator to clamp the internal screws.



10-2 Detailed Assembly Procedures

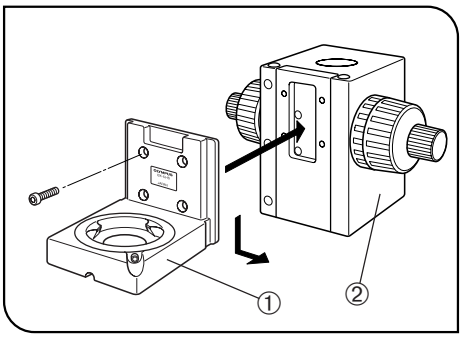


Fig. 19

1 Attaching the Illuminator Holder (Fig. 19)

Attach the illuminator holder ① on the focusing unit ② securing by using the 4 screws provided with the holder and the Allen screwdriver.

◎To obtain the reference position, clamp the illuminator holder by applying it against the bottom and right side.

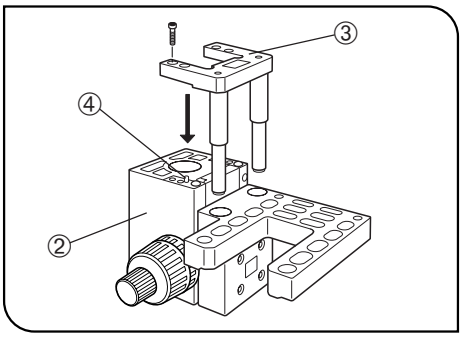


Fig. 20

2 Attaching the Counter Spring (Fig. 20)

◎When using the BX-URA2 or BX-RLA2 reflected light illuminator, attach the counter spring if required.

1. Place the focusing unit ② upside down.
2. Attach the counter sprint to the focusing unit securely by using the 4 screws provided with the counter spring ③ and the Allen screwdriver.

◎To obtain the reference position, clap the counter spring by applying it against the right side.

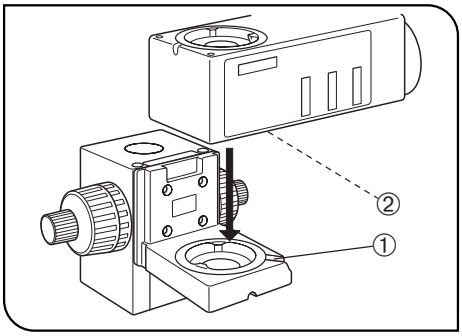


Fig. 21

4 Attaching the U-KMAS Reflected Light Illuminator (Figs. 21 & 22)

1. Loosen the illuminator clamping screw ① using the Allen screwdriver.
2. Fit the illuminator by the round dovetail ② and tighten the clamping screw ① securely.

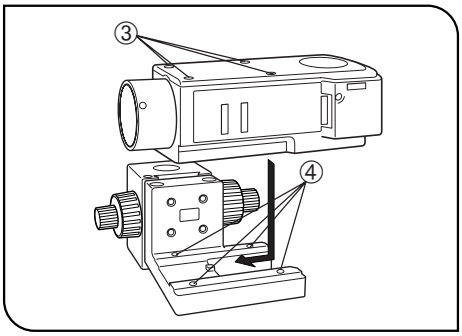


Fig. 22

With BX-URA2 or BX-RLA2

◎Attach the illuminator using the exclusive 4 mm Allen wrench provided with it.

◎Remove the caps of the mounting screws ③ using tweezers, etc.

1. Place the illuminator on the mounting surface by slightly deviating the illuminator to the right. For the present, it is not required to align the illuminator mounting screws ③ of the illuminator with the mounting screw holes ④ on the illuminator holder.
2. Apply the illuminator toward the left. It will fit in the correct position. While maintaining this condition, tighten the clamping screws ③ using the 4 mm Allen wrench.
3. Place the caps of mounting screws ③ on the original position

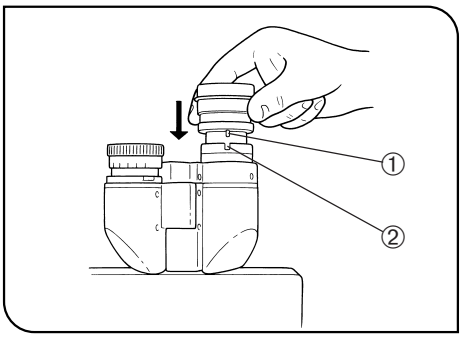


Fig. 23

6 Attaching the Eyepiece (Fig. 23)

Gently insert the eyepiece all the way into each eyepiece sleeve.

★**When using the U-BI30-2 binocular tube, eyepieces with built-in micrometer disk cannot be attached.**

★**When using a finder eyepiece or an eyepiece with micrometer disk, attach it to the right-hand eyepiece sleeve.**
When doing so, make sure that the eyepiece positioning pin ① fits into the notch ② on the eyepiece sleeve.

★**The super widefield trinocular observation tube is equipped with a positioning notch on both eyepiece sleeves. Make sure that the positioning pins on both eyepieces fit into the respective notches.**

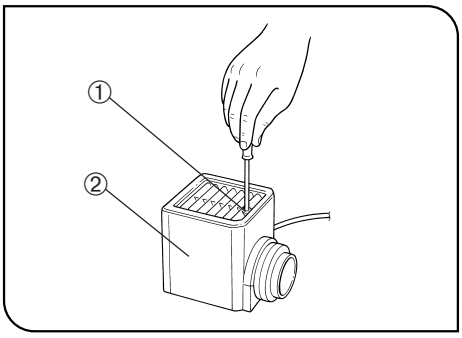


Fig. 24

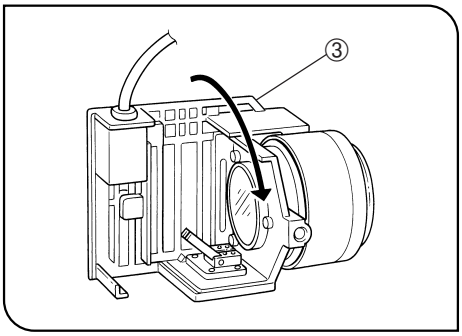


Fig. 25

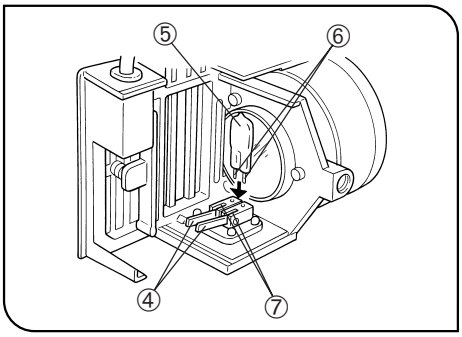
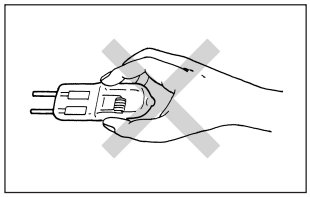


Fig. 26

9 Attaching the Halogen Bulb (Figs. 24 - 26)

◎The applicable lamp bulb is the 12V100WHAL-L (PHILIPS 7724) or the 12V50WHAL-L (LIFE JC).

1. Loose the clamping screw ① on the top of the lamp housing using the Allen screwdriver provided with the focusing unit.
2. Remove the lamp housing by lifting it up.
3. Tilt the lamp socket ③ by 90° toward the direction of the arrow.
4. While pushing down the bulb clamping lever ④ down, hold the bulb ⑤ with a glove or piece of gauze and insert the pins ⑥ into the sections ⑦ as far as they will go.



⚠**To prevent reduced bulb life or cracking, do not touch the bulb with bare hands. If fingerprints are accidentally left on the bulb, wipe the bulb with a soft cloth.**

5. Attach the lamp housing from up and tighten the clamping screw ① by pushing it downward. (Fig. 24)

⚠**Caution for Bulb Replacement During or Right After Use**
The bulb and the lamp socket are areas near these will be extremely hot during and right after use.
Set the main switch to "○" (OFF), disconnect the power cord from the wall outlet, then allow the old bulb and lamp housing to cool before replacing the bulb with a new of the designated type.

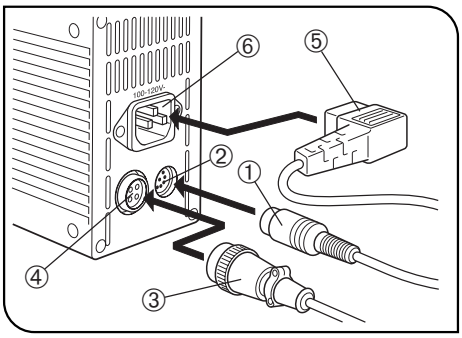


Fig. 27

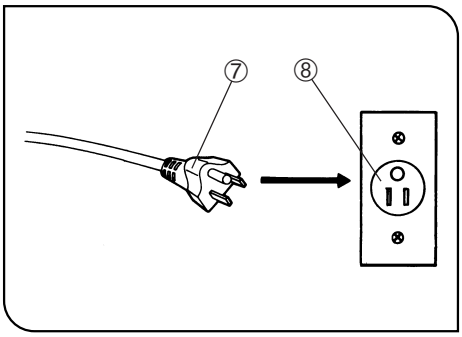


Fig. 28

11 Attaching the Cables and Cords (Figs. 27 & 28)

⚠The cables and cords are vulnerable when bent or twisted. Never subject them to excessive force.

⚠Make sure that the main switch ① is set to "O" (OFF) before connecting cables and cords.

1. Insert the hand switch plug ① into the connector ②.
2. Insert the lamp housing plug ③ into the connector ④.

⚠Always use the power cord provided by Olympus. IF no power cord is provided with the microscope, please select the proper power cord by referring to chapter "PROPER SELECTION OF THE POWER SUPPLY CORD" at the end of this instruction manual.

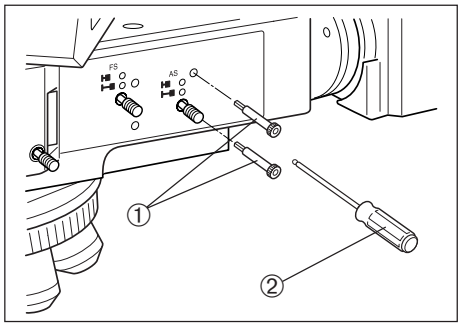
3. Insert the power cord plug ⑤ into the connector ⑥.
4. Insert the power cord plug ⑦ into the wall power outlet ⑧.

⚠The power cord should be connected to a grounded, 3-conductor power outlet. If the power outlet is not grounded properly, Olympus can no longer warrant the electrical safety performance of the equipment.

⚠If a cable or the power cord comes in contact with the lamp housing or the surroundings, the cable or cord may melt down, causing electric shock hazards. Be sure to distribute the cables at enough distance from the lamp housing.

Using the Auxiliary Centering Screws

◎When the BX-RLA2 or BX-URA2 illuminator is mounted on the BXFM-F focusing unit, it may be impossible to center the aperture iris diaphragm since the focusing unit's coarse adjustment knob is positioned in front.



If that is the case:

1. Insert the auxiliary centering screws ① into the AS centering screw holes on the illuminator.
2. Turn the auxiliary centering screws with the Allen screwdriver ② (usable from an oblique position because of its ballpoint design) to center the aperture iris diaphragm.

PROPER SELECTION OF THE POWER SUPPLY CORD

If no power supply cord is provided, please select the proper power supply cord for the equipment by referring to " Specifications " and " Certified Cord " below:

CAUTION: In case you use a non-approved power supply cord for Olympus products, Olympus can no longer warrant the electrical safety of the equipment.

Specifications

Voltage Rating	125V AC (for 100-120V AC area) or, 250V AC (for 220-240V AC area)
Current Rating	6A minimum
Temperature Rating	60°C minimum
Length	3.05 m maximum
Fittings Configuration	Grounding type attachment plug cap. Opposite terminates in molded-on IEC configuration appliance coupling.

Table 1 Certified Cord

A power supply cord should be certified by one of the agencies listed in Table 1 , or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of agencies listed in Table 1. In case you are unable to buy locally in your country the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.

Country	Agency	Certification Mark	Country	Agency	Certification Mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET, JQA, TÜV, UL-APEX / MITI	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		U.S.A.	UL	
Ireland	NSAI				

Table 2 HAR Flexible Cord

APPROVAL ORGANIZATIONS AND CORDAGE HARMONIZATION MARKING METHODS

Approval Organization	Printed or Embossed Harmonization Marking (May be located on jacket or insulation of internal wiring)		Alternative Marking Utilizing Black-Red-Yellow Thread (Length of color section in mm)		
			Black	Red	Yellow
Comite Electrotechnique Belge (CEBEC)	CEBEC	‹HAR›	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	‹VDE›	‹HAR›	30	10	10
Union Technique de l´Electricite´ (UTE)	USE	‹HAR›	30	10	30
Instituto Italiano del Marchio di Qualita´ (IMQ)	IEMMEQU	‹HAR›	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC	‹HAR›	10	10	30
N.V. KEMA	KEMA-KEUR	‹HAR›	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO	‹HAR›	10	10	50
Österreichischer Verband für Elektrotechnik (ÖVE)	‹ÖVE›	‹HAR›	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	‹DEMKO›	‹HAR›	30	10	30
National Standards Authority of Ireland (NSAI)	‹NSAI›	‹HAR›	30	30	50
Norges Elektriske Materiellkontroll (NEMKO)	NEMKO	‹HAR›	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	‹UNED›	‹HAR›	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	‹HAR›	30	30	70
Instituto Portages da Qualidade (IPQ)	np	‹HAR›	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	‹HAR›	10	30	90
Elektriska Inspektoratet	SETI	‹HAR›	10	30	90

Underwriters Laboratories Inc. (UL) SV, SVT, SJ or SJT, 3 X 18AWG
Canadian Standards Association (CSA) SV, SVT, SJ or SJT, 3 X 18AWG

This device complies with the requirements of both directive 89/336/EEC concerning electromagnetic compatibility and directive 73/23/EEC concerning low voltage. The CE marking indicates compliance with the above directives.

MEMO

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