OLYMPUS®

INSTRUCTIONS

U-UCD8

UNIVERSAL CONDENSER

This instruction manual is for the Olympus Universal Condenser Model U-UCD8. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this condenser, we recommend that you study this manual thoroughly before operating the microscope. Retain this instruction manual in an easily accessible place near the work desk for future reference.

Printed on 100% recycled paper with soy ink.

CONTENTS

IMPORTANT

This product is a universal condenser applicable in advanced research applications based on complex combination of observation methods. By simply exchanging the optical elements, the condenser can be used in a variety of microscopy under transmitted light, including the brightfield, darkfield, phase contrast, Nomarski differential interference contrast (DIC) and simplified polarized light observations. The top lens can be swung in and out to deal with objectives with low magnification (2X) to high magnification (100X). In addition, brightfield and Nomarski DIC observations using oil immersed objectives are also available by changing the top lens with an oil immersed top lens.

1 Getting Ready

1. This manual pertains only to the universal condenser unit. Before using this unit together with the microscope (BX40, BX50, BX60, BX41, BX51, BX52, etc.), make sure that you have carefully read and understand both manuals, and understand how the two units should be used together.
2. This attachment is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impact.
3. Make sure that no dirt, fingerprints, etc. are left on the lens surface.
4. Do not force any control beyond its built-in limit (stopper, click, etc.). Avoid using excessive force.
5. Swing out the top lens before attaching or detaching the condenser to or from the microscope.
6. Be sure to center the condenser before use. At maximum decentration of the condenser, the top lens and stage holder may interfere with each other, making swinging out of the top lens impossible.
7. Remove the condenser from the microscope before attaching or removing the optical elements.
8. Do not clamp the optical element centering screws too tightly.
9. If the optical element centering screws are tightened too much while no optical element is installed, it may be impossible to return the screws to their original positions.
10. An intermediate tube or sliders may be necessary depending on the method of observation.
11. In brightfield observation, engage the optical elements (small) other than 1, 2 and 3 in the light path. The field of view may be cut off if optical elements 1, 2 and/or 3 are used.

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.

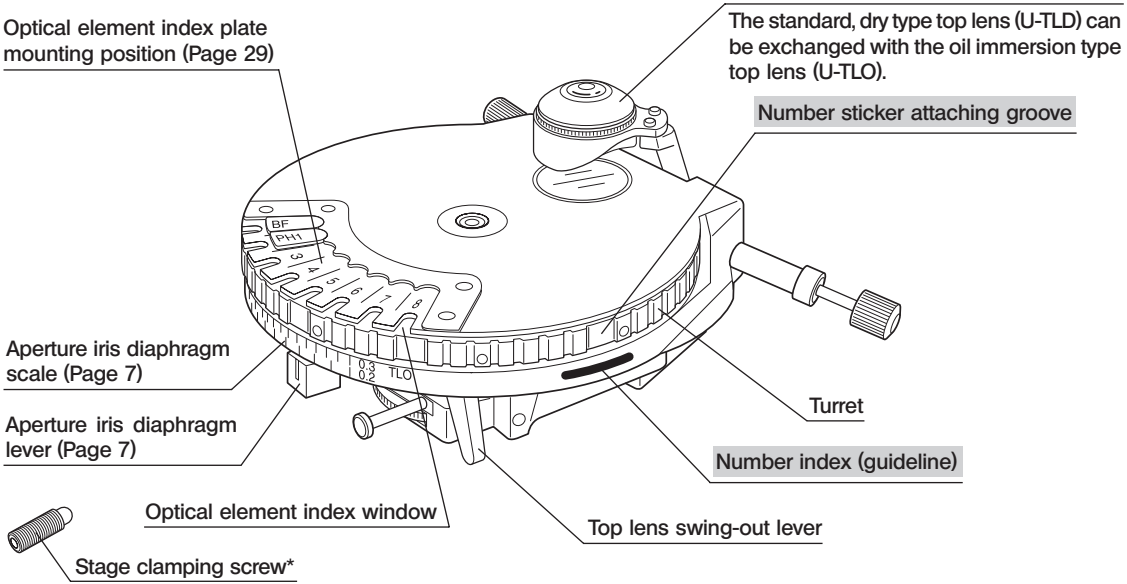
⚠ **Since the absolute alcohol is highly flammable, it must be handled carefully.**
Be sure to keep it away from open flames or potential sources of electrical sparks — for example, electrical equipment that is being switched on or off.
Also remember to always use it only in a well-ventilated room.

2. Do not disassemble any part of the attachment as this could result in malfunction or reduced performance.
3. The optical elements and index plates which are not used should be stored in a case.

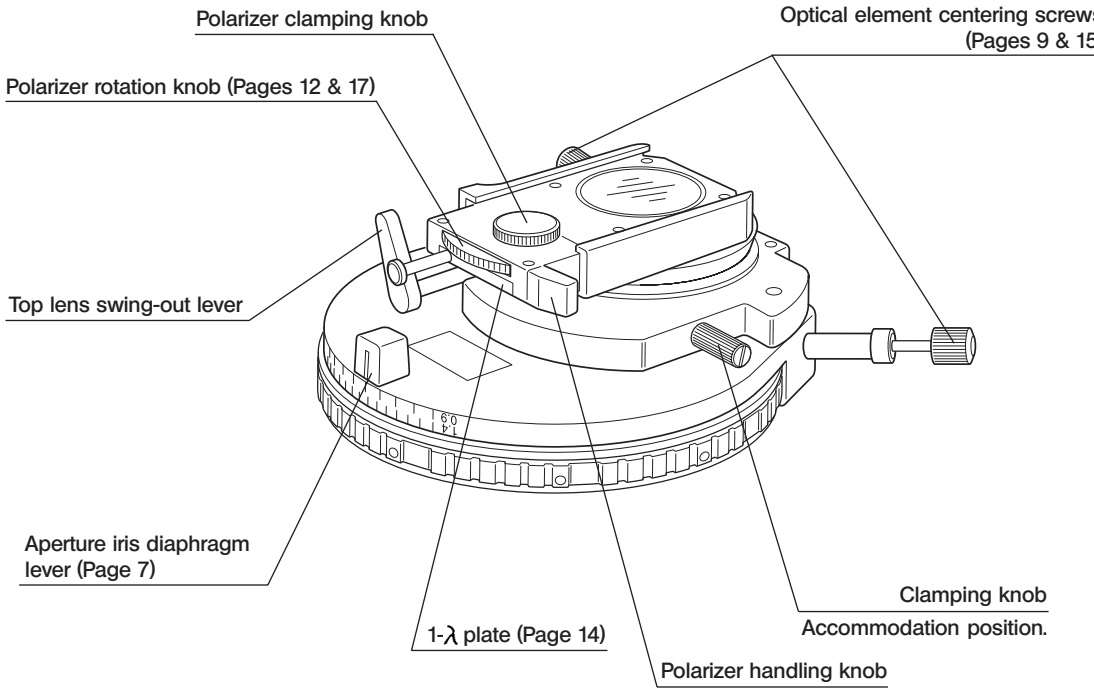
1 NOMENCLATURE

Universal Condenser

(Note) : Used when the U-UCD8 is combined with the IX/IX2 Series or BX51WI microscope. (Page 33)



* For easier viewing of the optical element index window, replace the stage clamping knob with this screw.


Polarizer clamping knob
Optical element centering screws
(Pages 9 & 15)
Polarizer rotation knob (Pages 12 & 17)
Top lens swing-out lever
Aperture iris diaphragm
lever (Page 7)
Clamping knob
Accommodation position.
1-λ plate (Page 14)
Polarizer handling knob

Optical Elements (For the applicable objectives, see pages 22 - 27.)

Phase Contrast Ring (Small)

U-PH1S
U-PH2S
U-PH3S

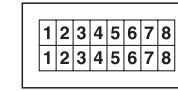
DIC Prism (Small)

U-DIC10S
U-DP10S

DIC Prism (Large)

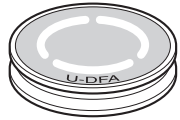
Other DIC rings than the U-DIC10S/U-DP10S.

Number sticker



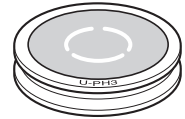
Indication plate sheet

Darkfield ring



U-DFA

Phase contrast ring (Large)



U-PH3

2 VARIOUS MICROSCOPY PROCEDURES

◎If the top lens and optical elements have not been assembled yet, first read Chapter 5, "ASSEMBLY" (pages 21 to 30).

2-1 Brightfield Observation (BF)

■ Applicable objective power

Power	1.25X	2X	4X	10X	20X	40X	60X	100X
Brightfield (BF)	–	○	○	○	○	○	○*	○*
	Top lens OUT			Top lens IN				

* The NA may slightly be insufficient when a dry type top lens is used. However, this does not pose problem in normal observations.

★When a transmitted light DIC slider (U-DICT, U-DICTS, etc.) is used in combination, pull out the slider until it clicks in place to disengage the slider from the light path.

★When a reflected light analyzer (U-AN) is used in combination, pull out the analyzer until it clicks in place to disengage the analyzer from the light path.

1. Rotate the turret to select the BF brightfield observation light path (no optical element engaged).
2. Pull out the polarizer handling knob to disengage the polarizer from the light path.
3. Mount the objective to be used in the revolving nosepiece and rotate the nosepiece to swing the objective in place.
4. When using a 2X to 4X objective, swing out the condenser's top lens. Also open the aperture iris diaphragm.

★When the top lens is swung out, the microscope's field iris diaphragm function as aperture iris diaphragm.

5. Place the specimen on the stage.
6. Move the stage up and down to bring the specimen into focus.

7. Reduce the field iris diaphragm opening until its image circumscribes the field of view.
8. Adjust the aperture iris diaphragm.

★ **If the slide glass is thicker than 1.2 to 1.4 mm, the image of the field diaphragm may remain fuzzy. When performing photomicrography, use a side glass with a thickness between 0.2 and 1.2 mm whenever possible.**

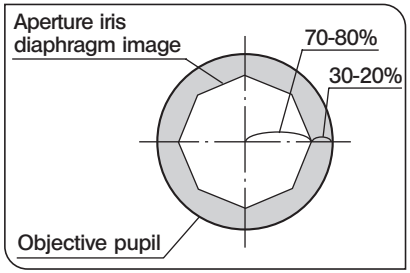


Fig. 1

Field Iris Diaphragm

- The field iris diaphragm controls the size of the illuminated area. By stopping down the field iris diaphragm, in accordance with the objective in use, until its image circumscribes the field of view, stray light can be reduced, which in turn increases the definition and contrast of the image.

Aperture Iris Diaphragm

- The aperture iris diaphragm controls the numerical aperture (N.A.) of the illuminator. In order to achieve the optimum objective performance, the opening of the aperture iris diaphragm should be matched with the N.A. of the objective in use. This will result in better image contrast and resolution as well as increased depth of focus.

◎ When using an oil immersion type top lens, read the upper graduations (marked "TLO") on the aperture iris diaphragm scale. When using a dry type top lens, read the lower graduations (marked "TLD") on the aperture iris diaphragm scale.

• As microscopic specimens are usually low in contrast, reducing the diaphragm opening to 70% or 80% of the objective's N.A. will generally provide an image of acceptable quality. To check the opening, after completing focus adjustment, remove one of the eyepieces and look into the empty eyepiece sleeve. As you stop down the aperture iris diaphragm, the iris diaphragm image can be seen in the objective pupil. (Fig. 1)

2-2 Phase Contrast Observation (PH)

■ Applicable objective power

Power	10X	20X	40X	60X	100X
Phase Contrast (PH)	○*	○	○	○	○
	Top lens (U-TLD) IN (U-TLO cannot be used.)				

* With the superwide-field observation (FN 26.5), flare may be observed in the peripheral areas of the field of view. However, this does not pose problem in photomicrography.

★ When a transmitted light DIC slider (U-DICT, U-DICTS, etc.) is used in combination, pull out the slider until it clicks in place to disengage the slider from the light path.

★ When a reflected light analyzer (U-AN) is used in combination, pull out the analyzer until it clicks in place to disengage the analyzer from the light path.

1. Rotate the turret to engage the phase contrast ring (U-PH1S, U-PH2S, U-PH3S or U-PH3) that matches the objective in use.
2. Pull out the polarizer handling knob to disengage the polarizer from the light path.

3. Mount the phase contrast objective to be used in the revolving nosepiece and rotate the nosepiece to swing in the objective.
4. Open the aperture iris diaphragm.

★**When the aperture iris diaphragm is stopped down, flare may occur at the center.**

5. Place the specimen on the stage and move the stage up and down to bring the specimen in focus.
6. Remove the eyepiece from the eyepiece sleeve and replace with the U-CT30 centering telescope.

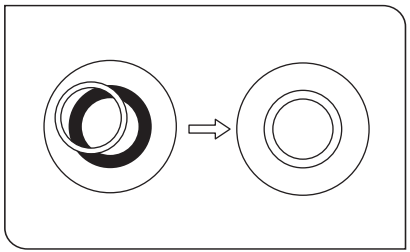


Fig. 2

7. Rotate the upper section of the U-CT30 centering telescope and bring the bright ring (condenser ring slit) and dark ring (objective phase plate) into focus.
8. Use the optical element centering screw to center the phase contrast ring so that the bright ring overlaps the dark ring within the field of view. (Fig. 2)

★**If a multiple number of ring slit images appear, select the brightest ring to overlap with the phase plate.**

9. Repeat steps 7 and 8 for each phase contrast ring.
10. Remove the U-CT30 centering telescope and replace it with the eyepiece.
11. Widen the field iris diaphragm opening until the diaphragm image circumscribes the field of view.

◎If increased contrast is required, insert the 45IF550 green interference filter into the filter mount at the base of the microscope frame.

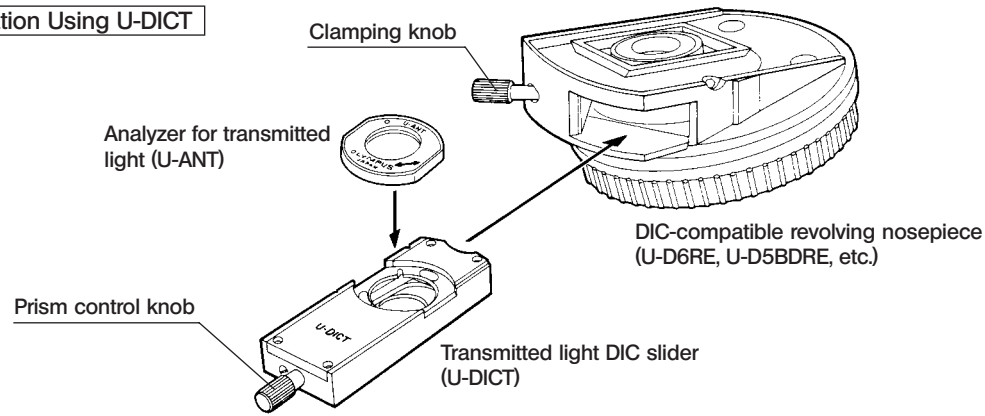
2-3 Nomarski Differential Interference Contrast Observation (DIC)

■ Applicable objective power

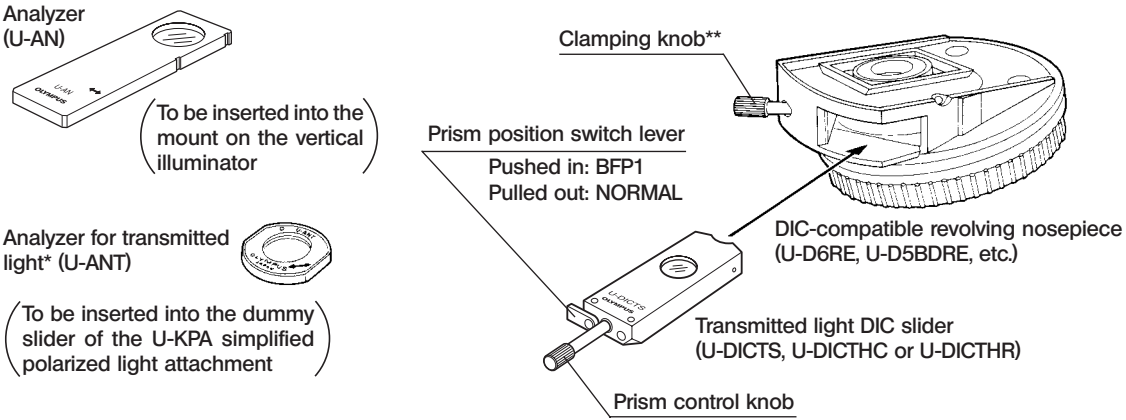
Power	10X	20X	40X	60X	100X
Nomarski Differential Interference Contrast (DIC)	○	○	○	○	○
	Top lens IN				

To perform Nomarski DIC observation, the transmitted light DIC slider and an analyzer (U-ANT or U-AN) are required. Install them by referring to the instruction manual of the DIC slider.

Installation Using U-DICT



Installation using U-DICTS, U-DICTHC or U-DICTHR



* When the U-ANT is used in combination with the U-KPA, the field number becomes 22. If superwide-field observation (field number 26.5) is required without using a vertical illumination, use one of the following combinations:
①MX-AF's optional analyzer unit MX-AFDIC + U-AN.
②U-OPA polarized light attachment + U-AN360P polarizer light rotary analyzer.

NOTE **When an intermediate attachment is used, align the tube clamping knob on the microscope frame with the clamping knob on the attachment in order to determine the orientation of the analyzer.**

** Excessive tightening of the clamping knob hinders operation of the prism position switch lever, so tighten the knob lightely.

1. Adjust the polarizer in accordance with the following procedure.
①Engage the transmitted light DIC prism slider in the light path and tighten the clamping knob. Then engage the reflected light analyzer (U-ANT or U-AN) in the light path.
②Rotate the turret to select the BF brightfield observation light path (with no optical element engaged).
③Push in the polarizer handling knob to insert the polarizer into the light path.

Operation using U-DICT and U-ANT

a) Rotate the prism control knob of the transmitted light DIC prism slider clockwise as far as it will go.
b) Rotate the revolving nosepiece to swing in the 10X objective, bring the specimen into approximate focus, and remove the eyepiece. You can see the pupil of the objective if you look into the inside of the eyepiece sleeve. (You can see the pupil more easily if you use the U-CT30 centering telescope.)

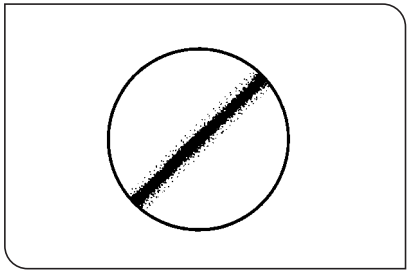


Fig. 3

c) As you rotate the polarizer rotation knob while looking at the objective pupil, a black fringe may appear at a certain position. The polarizer should be rotated to the position where a single fringe appears darkest. (Fig. 3)
★ **If two black fringes appear, rotate the polarizer by approximately 90° so that only one black fringe is visible.**
d) Once the position of the polarizer is determined, tighten the clamping knob to clamp the polarizer.
e) Replace the eyepiece to the original position.

When using U-DICT with analyzer other than U-ANT

a) Disengage the DIC slider from the light path.
b) Push in the polarizer handling knob to insert the polarizer into the light path.
c) Rotate the polarizer rotation knob to the position where the field of view is perfectly dark, then tighten the polarizer clamping knob.

◎ The perfectly dark ("crossed Nicol") position is located near the 0° position index.

d) Re-engage the DIC slider in the light path.
2. Rotate the turret and engage the DIC prism that matches the objective in use.
3. Rotate the revolving nosepiece to swing in the objective to be used.

◎ When a transmitted light DIC slider other than the UDICT is used, set the prism position switch lever to BFP1 or NORMAL according to the objective to be used.

Objective with which the BFP1 position should be set	UIS2 Series	UPlanFLN40XO, PlanApoN60XO, UPlanSApo60XO
	UIS Series	UPlanApo40XOI3, UApo40XOI3/340, UApo40XW3/340, PlanApo60XO3

With any objective other than the above, use the NORMAL position.

4. Place the specimen on the stage and move the stage up and down to bring the specimen into focus.
5. Adjust the field iris diaphragm until the diaphragm opening circumscribes the field of view.
6. Stopping down the aperture iris diaphragm somewhat may increase the contrast.
7. Rotate the prism control knob of the DIC slider to adjust the contrast of the background color as discussed on the next page.

①Rotate the prism control knob of the DIC slider to obtain the background interference color that can achieve the maximum contrast according to the specimen under observation.

U-DICT: The background interference color is continuously variable between sensitive gray and sensitive magenta.

U-DICTS:
U-DICTHC:
U-DICTHR:
} The background interference color is continuously variable between black and dark gray.

◎When observing sensitive colors, engage the U-UCDTP530 1-λ plate (sensitive color plate) in the light path.

- If the background color is black, darkfield-like observation can be performed.
- If the background color is gray, a 3D-like image with maximum contrast with gray sensitive gray can be obtained.
- If the background color is sensitive magenta, even a minor optical retardation is observed as a color change.

★**Care should be taken to keep the specimen surface clean, as even a small amount of contamination on the surface may show up due to the exceptionally high sensitivity of the DIC method.**

②As DIC exhibits directional sensitivity, the use of rotatable stage is recommended.

★**To perform simultaneous reflected light fluorescence and transmitted light DIC observations, refer to the instruction manual of the Reflected Light Fluorescence Attachment.**

★**When the PlanApoN60XO, UPlanSApo60XO, PlanApo60XO3 and U-DICTHC are combined (U-DIC60HC or U-DPO60HC), color irregularities may be noticeable with certain specimens.**

2-4 Darkfield Observation (DF)

■ Applicable objective power

Power	10X	20X	40X	60X	100X
Darkfield (DF)	○*	○**	○**	○**	○**
	Top lens (U-TLD) IN (U-TLO cannot be used.)				

* With the superwide-field observation (FN 26.5), flare may be observed in the peripheral areas of the field of view. However, this does not pose problem in photomicrography.

** Objectives with N.A. of no more than 0.7 can be used. (An objective which is equipped with an iris diaphragm and which can reduce the N.A. to 0.7 or less can also be used.)

◎ When a transmitted light DIC slider is used in combination, pull out the slider until it clicks in place to disengage the slider from the light path.

◎ When a reflected light analyzer (U-AN) is used in combination, pull out the analyzer until it clicks in place to disengage the analyzer from the light path.

1. Rotate the turret to select the DFA darkfield observation light path.
2. Pull out the polarizer handling knob to disengage the polarizer from the light path.
3. Mount the objective to be used in the revolving nosepiece and rotate the nosepiece to swing the objective in place.
4. Open the aperture iris diaphragm.
5. Place the specimen on the stage and move the stage up and down to bring the specimen into focus.
6. Remove an eyepiece from the eyepiece sleeve, and look at the objective pupil. Center the darkfield ring using the optical element centering screw.
7. Insert the eyepiece into the eyepiece sleeve and look at the darkfield image. Repeat centering until the optimal darkfield effect is obtained.

8. Move the condenser up and down until uniform darkfield illumination is attained.
9. Open the field iris diaphragm to the extend that even brightness is attained.

★**Keep eyes away from the eyepiece while changing the objective during darkfield observation or changing from darkfield observation to another observation mode.**
If the objective is changed or the turret is rotated to switch the darkfield observation to another observation mode, direct light may enter your eyes.

2-5 Simple Polarized Light Observation (KPO)

■ **Applicable objective power**

Power	2X	4X	10X	20X	40X	60X	100X
Simple polarized light (KPO)	△	○	○	○	○	○	○
	Top lens OUT		Top lens IN				

* When the PlanApoN2X, PlanApo2X or UPlanSApo4X, UPlanApo4X objective, or Ph objective for phase contrast observation is used in polarized light observation, the image contrast may be poorer than the image observed with other objective magnifications.

◎To perform simple polarized light observation, an analyzer (U-ANT or U-AN) is needed. If you have not installed the fluorescence illuminator yet, install the illuminator by referring to the instruction manual of the U-ANT transmitted light analyzer.

◎When you have already installed the fluorescence illuminator in your system, attach the U-AN reflected light analyzer by referring to the instruction manual of the reflected fluorescence attachment.

1. Rotate the turret to select the BF brightfield light path (with no optical element engaged).
2. Push in the polarizer handling knob to engage the polarizer into the light path.
3. Mount the objective to be used in the revolving nosepiece, and rotate the nosepiece to swing in the objective.

4. Rotate the polarizer rotation knob to achieve a perfectly black field and then tighten the clamping knob.
◎The “crossed Nicol” (perfectly dark) position is located near the 0° position index.
5. Place the specimen on the stage and move the stage up and down to bring the specimen into focus.
6. Adjust the field iris diaphragm opening until it circumscribes the field of view.
7. Stopping down the aperture iris diaphragm may further increase the contrast of the image.

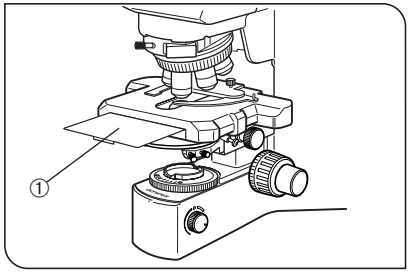


Fig. 4

General Precautions in Operation

1. If reflected light fluorescence microscopy in the U-excitation mode is performed using a 10X or 20X objective with the condenser engaged, flare may become prominent depending on the specimen condition.
   If this occurs and if you do not need transmitted light DIC, either lower the condenser or use the light shield sheet ① provided with the reflected light fluorescence attachment. (Fig. 4)
2. When the polarizer rotation knob is set to the 0° position index, the polarizer and analyzer are nearly at the “crossed Nicol” position. However, since a perfect “crossed Nicol” position can hardly be achieved due to slight unavoidable positioning error of the intermediate tube, always perform fine adjustment.
3. When the top lens is swung out, the field of view become obscured if the aperture iris diaphragm is stopped down (when using a 2X or 4X objective).
4. Due to the large numerical aperture (N.A.), the U-DIC60, U-DPO60S, U-DIC100 or U-DP100 DIC prism for 60X and 100X objectives can also be used for brightfield observation.

3 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
a. Field iris diaphragm image does not appear when 10X to 100X objectives are in use.	Slide glass is too thick.	Use side glasses measuring 1.4 mm or less. When using immersion type top lens, however, thickness should be 1.2 mm or less.	7
	Top lens is swung out.	Swing top lens in.	3
b. Image glare and resolution is low under brightfield observation.	Aperture iris diaphragm is stopped down excessively.	Open diaphragm to proper diameter.	7
	Top lens is swung out.	Swing top lens into light path when 10X to 100X objectives are in use.	6
c. Ring slit does not align with phase plate of objective.	Incorrect optical element is inserted in light path.	Engage optical element that matches objective in use by rotating turret.	22/23
	Incorrect objective is inserted in light path.	Engage correct objective into light path.	23
d. Darkfield contrast performance is inadequate.	Top lens is swung out.	Swing in top lens.	15
	Aperture iris diaphragm is stopped down.	Open aperture iris diaphragm.	15
	Incorrect optical element is inserted in light path.	Engage darkfield ring in light path.	22/23
	Incorrect objective is used.	See “Optical Elements and Compatible Objectives”.	23
	Darkfield ring is not centered correctly.	Center darkfield ring correctly.	15

Problem	Cause	Remedy	Page
e. Polarizing performance is insufficient.	Polarizer is not inserted in light path.	Engage polarizer in light path.	4
	Analyzer is not inserted in light path.	Engage analyzer in light path.	—
	Optical element is engaged.	Engage empty position by rotating turret.	—
	Aperture iris diaphragm is opened.	Either stop down aperture iris diaphragm or swing out top lens.	3
f. No interference color appears during Nomarski observation.	Polarizer is not inserted in light path.	Engage polarizer in light path.	10-14
	Analyzer is not inserted in light path.	Engage analyzer in light path.	
	DIC prism is not inserted in light path.	Engage DIC prism by rotating turret.	
	DIC slider is not inserted in light path.	Engage DIC slider in light path.	
	Polarizer and analyzer are not in "crossed Nicol" position.	Re-adjust polarizer.	
g. Interference color appears during Nomarski observation but color is uneven.	Vertical positioning of condenser is incorrect.	Center condenser.	32
	Incorrect optical element is inserted in light path.	Engage optical element that matches objective in use by rotating turret.	24-27
	Incorrect objective is in use.	See table "Optical Elements and Compatible Objectives" and use correct objective.	24-27
	1-λ plate (U-UCDTP530) is inserted in light path.	Disengage 1-λ plate from light path.	14

4 SPECIFICATIONS

Item	Specifications	
	Dry type top lens (U-TLD)	Immersion type top lens (U-TLO)
Applicable microscope	BX40, BX50, BX60, BX41, BX51, BX52, etc.	
Applicable microscopy	Transmitted light (brightfield, darkfield, phase contrast, DIC, polarizer light)	Transmitted light (brightfield, DIC)
Type	Achromat-Aplanat, swing-out type top lens (Top lens interchangeable)	
Numerical Aperture (N.A.)	0.9 (top lens in), 0.2 (top lens out)	1.4 (top lens in) when immersed in oil, 0.2 (top lens out)
Applicable slide thickness	0.9 to 1.4 mm	0.9 to 1.2 mm
Working distance	1.5 mm (with 1.2 mm slide)	0.6 mm (with 1.2 mm slide)
Illumination field	ϕ 3 mm (top lens in), ϕ 14 mm (top lens out)	ϕ 1.5 mm (top lens in), ϕ 14 mm (top lens out)
Focal length	13.5 mm (top lens in), 231 mm (top lens out)	8.8 mm (top lens in) 231 mm (top lens out)
Turret	8 positions (Small x 3, Large x 5), optical elements may be attached.	
Slider	Polarizer (360° rotatable)	
Aperture iris diaphragm	ϕ 2.8 to 21 mm	
Mounting	Detachable, circular dovetail, attached with clamping screw.	
Dimensions	147.5(W) x 131(D) x 75.5(H) mm (top lens in)	
Weight	600 grams	

5 ASSEMBLY

5-1 Mounting the Top Lens

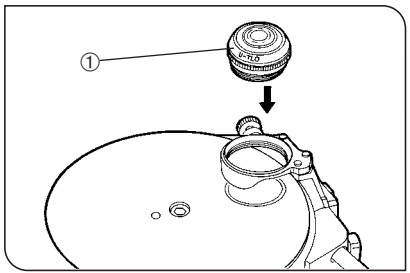


Fig. 5

◎Mount the dry type top lens (U-TLD) or oil immersion type top lens (U-TLO) depending on your observation requirement.

★When replacing the top lens, make sure not to apply excessive force to the top lens arm.
Mount the top lens ① by rotating it clockwise. (Fig. 5)

★Do not tighten too firmly. Rotate the top lens until it contacts lightly with the lens holder.

Notes on Oil Immersion Top Lens

★Before engaging or disengaging the top lens, lower the condenser holder and wipe away oil deposed on the top lens.
(If you attempt to engage or disengage the top lens without lowering the condenser holder, the slide glass may impede the operation.)

★If a slide glass thicker than 1.2 mm is used, the field iris diaphragm image may remain fuzzy.

★Use the oil immersion top lens in combination with an objective of 20X or higher magnification.

5-2 Mounting the Optical Elements

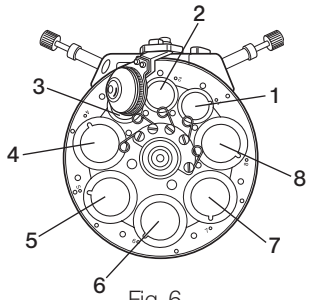


Fig. 6

1 Optical Element Mounting Positions (Fig. 6)

1,3: The U-DIC10S or U-DP10S optical element can be mounted.
2: Any of the U-PH1S, U-PH2S and U-PH3S can be mounted.
4,8: The U-DFA and U-PH3 can be mounted. When not in use, DIC optical elements can be mounted.
5-7: Only DIC optical elements can be mounted because the centering mechanism is not provided.

2 Optical Elements and Compatible Objectives

■ Phase contrast (PH) and darkfield (DF) observations: Using U-TLD top lens

UIS2 Series

Observation	Optical Element	Applicable Objectives
PH	U-PH1S	PlanN10XPh, PlanN20XPh, UPlanFLN10XPh, UPlanFLN20XPh
	U-PH2S	PlanN40XPh, UPlanFLN40XPh
	U-PH3S, U-PH3	PlanN100XOPh, UPlanFLN60XOPh, UPlanFLN100XO2Ph
DF	U-DFA	PlanN10X, PlanN20X, PlanN40X, PlanN50XOI, UPlanFLN10X, UPlanFLN20X, UPlanFLN60XOI, UPlanFLN100XOI, UPlanSApo10X

UIS Series

Observation	Optical Element	Applicable Objectives
PH	U-PH1S	Ach10 x Ph, Ach20 x Ph, Plan10 x Ph, Plan20 x Ph, UPlanFl10 x Ph, UPlanFl20 x Ph, UPlanApo10 x Ph
	U-PH2S	Ach40 x Ph, Plan40 x Ph, UPlanFl40 x Ph, UPlanApo20 x Ph
	U-PH3S, U-PH3	Ach100 x OPh, Plan100 x OPh, UPlanFl60 x OIPh, UPlanFl100 x OPh, UPlanApo40 x OPh, UPlanApo100 x OIPh, PlanApo60 x OPh
DF	U-DFA	Ach10 x, Ach20 x, Ach40 x, Plan10 x, Plan20 x, Plan40 x, Plan50 x OI, UPlanFl10 x, UPlanFl20 x, UPlanFl40 x, UPlanApo10 x, UPlanFl60 x OI3, UPlanFl100 x OI3, UPlanApo20 x, UPlanApo100 x OI3, UApo40 x OI3/340

UIS2 Series

■ DIC observation (U-DICT/DICTS)　(Note) For the U-DICTHC and U-DICTHR, see next page.

DIC Slider		U-DICT		Shift type U-DICTS	
Top Lens		U-TLD	U-TLO	U-TLD	U-TLO
UPlanFLN	10X	U-DIC10, U-DIC10S	—	U-DIC10, U-DIC10S	—
	20X	U-DIC20	U-ODIC20	U-DIC20	U-ODIC20
	40X	U-DIC40	U-ODIC40	U-DIC40	U-ODIC40
	40XO	—	—	U-DIC40	U-ODIC40
	60X 60XOI	U-DIC60	U-ODIC60	U-DIC60	U-ODIC60
	100XO2 100XOI2	U-DIC100	U-ODIC100	U-DIC100	U-ODIC100
UPlanSApo	10X	U-DIC10, U-DIC10S	—	U-DIC10, U-DIC10S	—
	20X 20XO	U-DIC20	U-ODIC20	U-DIC20	U-ODIC20
	40X	U-DIC40	U-ODIC40	U-DIC40	U-ODIC40
	60XO	—	—	U-DIC60	U-ODIC60
	60XW	U-DIC60	U-ODIC60	U-DIC60	U-ODIC60
	100XO	U-DIC100	U-ODIC100	U-DIC100	U-ODIC100
PlanApoN 60XO		—	—	U-DIC60	U-ODIC60
LUCPlanFLN	20X	U-DIC20	U-ODIC20	U-DIC20	U-ODIC20
	40X	U-DIC40	U-ODIC40	U-DIC40	U-ODIC40
	60X	U-DIC60	U-ODIC60	U-DIC60	U-ODIC60

: Used with the DIC slider set to the BFP1 position.

■ DIC observation (U-DICTHC/DICTHR)

DIC Slider		High-contrast type U-DICTHC	High-resolution type U-DICTHR	
Top Lens		U-TLD	U-TLD	U-TLO (for VEC/DIC)
UPlanFLN	10X	U-DIC10HC	U-DIC10HR	—
	20X	U-DIC20HC	U-DIC20HR	—
	40X	U-DIC40HC	U-DIC40HR	—
	40XO	U-DIC40HC	U-DIC40HR	—
	60X 60XOI	U-DIC60HC	U-DIC60HR	U-ODIC60HR
	100XO2 100XOI2	U-DIC100HC	U-DIC100HR	U-ODIC100HR
UPlanSApo	10X	U-DIC10HC	U-DIC10HR	—
	20X 20XO	U-DIC20HC	U-DIC20HR	—
	40X	U-DIC40HC	U-DIC40HR	—
	60XO	U-DIC60HC	U-DIC60HR	U-ODIC60HR
	60XW	U-DIC60HC	U-DIC60HR	U-ODIC60HR
	100XO	U-DIC100HC	U-DIC100HR	U-ODIC100HR
PlanApoN 60XO		U-DIC60HC	U-DIC60HR	U-ODIC60HR
LUCPlanFLN	20X	U-DIC20HC	U-DIC20HR	—
	40X	U-DIC40HC	U-DIC40HR	—
	60X	U-DIC60HC	U-DIC60HR	U-ODIC60HR

: Used with the DIC slider set to the BFP1 position.

UIS Series (Note) Usable regardless of the model number (3, 2 or none).

■ DIC observation (U-DICT/DICTS) (Note) For the U-DICTHC and U-DICTHR, see next page.

DIC Slider		U-DICT		Shift type U-DICTS	
Top Lens		U-TLD	U-TLO	U-TLD	U-TLO
UPlanFl	10X	U-DP10, U-DP10S	—	U-DP10, U-DP10S	—
	20X	U-DP20	U-ODP20	U-DP20	U-ODP20
	40X	U-DP40	U-ODP40	U-DP40	U-ODP40
	60XOI3	U-DPO60S	U-ODPO60S	U-DPO60S	U-ODPO60S
	100XO3 100XOI3	U-DP100	U-ODP100	U-DP100	U-ODP100
UPlanApo	10X 10XW3 10XO3	U-DP10, U-DP10S	—	U-DP10, U-DP10S	—
	20X 20XO3	U-DPA20	U-ODPA20	U-DPA20	U-ODPA20
	40X	U-DPA40	—	U-DPA40	—
	40XOI3	—	—	U-DPO40S	U-ODPO40S
	60XW3 60XW3/IR	U-DPO60S	U-ODPO60S	U-DPO60S	U-ODPO60S
	100XOI3	U-DP100	U-ODP100	U-DP100	U-ODP100
PlanApo 60XO3		—	—	U-DPO60S	U-ODPO60S
UApo	40X3/340	U-DPA40	—	U-DPA40	—
	40XW3/340 40XOI3/340	—	—	U-DPO40S	U-ODPO40S

: Used with the DIC slider set to the BFP1 position.

■ DIC observation (U-DICTHC/DICTHR)

DIC Slider		High-contrast type U-DICTHC	High-resolution type U-DICTHR	
Top Lens		U-TLD	U-TLD	U-TLO (for VEC/DIC)
UPlanFl	10X	—	U-DP10HR	—
	20X	U-DP20HC	U-DP20HR	—
	40X	U-DP40HC	U-DP40HR	—
	60XOI3	U-DPO60HC	U-DPO60HR	U-ODPO60HR
	100XO3 100XOI3	U-DP100HC	U-DP100HR	U-ODP100HR
UPlanApo	10X 10XW3 10XO3	—	U-DP10HR	—
	20X 20XO3	—	U-DPA20HR	—
	40X	—	U-DPA40HR	—
	60XW3 60XW3/IR	U-DPO60HC	U-DPO60HR	U-ODPO60HR
	100XOI3	U-DP100HC	U-DP100HR	U-ODP100HR
PlanApo 60XO3		U-DPO60HC	U-DPO60HR	U-ODPO60HR

: Used with the DIC slider set to the BFP1 position.

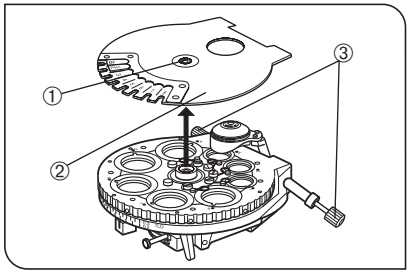


Fig. 7

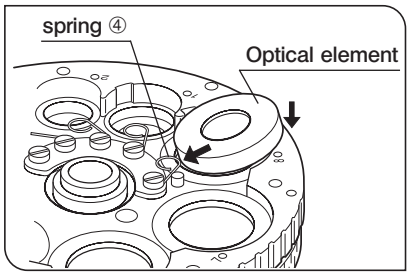


Fig. 8

3 Mounting the Phase Contrast Ring or Darkfield Ring (Figs. 7 & 8)

1. Using the Allen screwdriver provided with the microscope, loosen the turret cover clamping screw ① and remove the turret cover ②.

★ **When removing the turret cover, care should be taken to prevent damage to the top lens and the dust protective glass in the turret cover.**

2. Rotate the turret to engage the aperture position you want to mount the phase contrast or darkfield ring. Then, while pushing in the optical element centering screw ③, loosen it by turning it counterclockwise.
3. Leave the top lens swung out so it does not impede mounting of the optical elements.
4. Insert the phase contrast ring or darkfield ring in the aperture of the turret as far as it will go. Slightly depress the spring ④ provided inside the turret with the side of ring while inserting. (Fig. 8)

★ **Be careful not to push the ring sit plate inside the element frame.**

5. While pushing in the optical element centering screw, tighten it lightly by turning it clockwise.

★ **Do not overtighten as this may deform the mount frame of the optical element.**

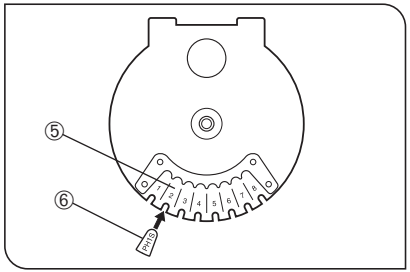


Fig. 9

◎The optical element index plate (Magnet absorption) is provided with the condenser.

6. Align the optical element mount position No. and the index plate attaching position No. ⑤ on the turret cover, then attach the index plate ⑥.

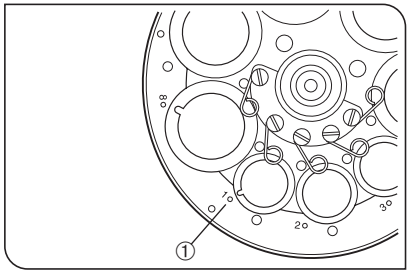


Fig. 10

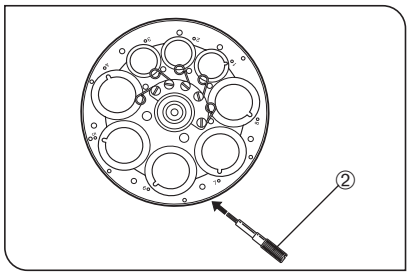


Fig. 11

4 Mounting the DIC Prism (Figs. 10 & 11)

◎The mounting method is variable between the mounting positions with centering mechanism (1, 3, 4, 8) and those without centering mechanism (5, 6, 7).

When the mounting position is 1, 3, 4 or 8:

The DIC prism can be mounted in the same way as a phase contrast ring. However, since a DIC prism is equipped with a positioning pin, it is required to align the index on the DIC prism with the positioning index ① on the turret for mounting. After mounting, attach the index plate.

★**Take care not to touch the prism inside the frame during mounting.**

When the mounting position is 5, 6 or 7:

◎The DIC prism should be clamped with the clamping knob, which is accommodated in the left side panel of the condenser, in place of the built-in optical element centering screw.

1. Using the clamping knob ② loosen the clamping screw at the mounting position.
2. Drop in the DIC prism by aligning its positioning pin with the slot, then tighten the screw using the clamping knob. Then attach the index plate.

When all of the required optical elements have been mounted, place the turret cover in the original position.

5-3 Mounting the Condenser (Fig. 12)

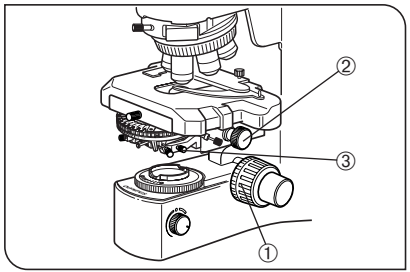


Fig. 12

Also refer to the instruction manual for the microscope in use. Attach the condenser to the condenser holder in accordance with the following procedure.

1. Rotate the coarse adjustment knob ① to raise the stage to a height where it does not hit the objective. Then rotate the condenser height adjustment knob ② on the microscope to lower the condenser holder to the position of the lowest stopper.
2. Loosen the clamping knob ③ on the right side of the condenser holder.
3. Swing out the top lens of the condenser.
4. Insert the condenser in the mounting dovetail of the condenser holder, and press horizontally until the positioning pin of the condenser is engaged in the positioning groove of the mounting dovetail.
5. Tighten the clamping knob ③ on the right side of the condenser holder.
6. Raise the condenser holder by rotating the condenser height adjustment knob ②.

5-4 Centering the Condenser (Fig. 13)

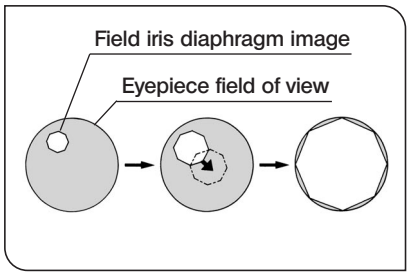


Fig. 13

Also refer to the instruction manual for the microscope in use. Center the condenser in accordance with the following procedure.

1. Rotate the turret to select the BF brightfield observation light path (with no optical element engaged).
2. Pull out the polarizer handling knob to disengage the polarizer from the light path.
3. Switch the top lens into the light path.
4. Rotate the aperture iris diaphragm lever clockwise to open the aperture iris diaphragm.
5. Fully open the field iris diaphragm of the microscope.
6. Place the specimen on the stage, rotate the revolving nosepiece to swing in the 10X objective, and bring the specimen into focus.
7. Reduce the microscope's field iris diaphragm opening until the diaphragm image can be seen.
8. Looking through the eyepiece, raise the condenser almost all the way up to bring the iris diaphragm image into focus.
9. Gradually opening the field iris diaphragm, bring the reduced image into the center of the eyepiece field of view, by adjusting the condenser centering knobs of the microscope. (The reduced polygonal image of the diaphragm should become inscribed in the circle which indicates the field of view.)
10. After the centering is completed, continue to open the field diaphragm slightly until its image circumscribes the field of view.

5-5 Indication Using Number Stickers (Figs. 14 & 15)

★To improve the adhesive strength of the number sticker attaching grooves, remove stain and oil using the ether-alcohol mixture.

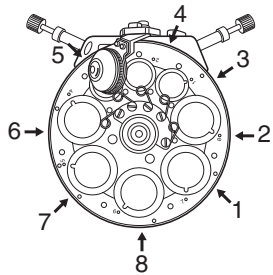


Fig. 14

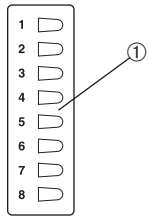


Fig. 15

1. Fig. 14 shows the relationship between the number sticker attaching grooves (1 to 8) and the turret.
   Attach the number stickers to the designated grooves.
   (Note 1) When the condenser is used with an IX/IX2 series microscope, the condenser is attached upside down. In consequence, the number stickers should also be attached upside down.
   (Note 2) When the condenser is used with the BX51WI, attach the number stickers to as low positions as possible of the turret.
2. Mount the optical elements as described in section 5-2 (pages 22 to 27).
   The optical element indication plates should be attached on the indication plate sheet ①. (by means of magnetic adsorption).

◎Check the relationship between the optical element in the light path and the number indicated by the number index (guideline).

3. The indication plate sheet has double-side adhesive tape on the backside. Remove the backing and attach the sheet to an easily visible location.
   (Examples) IX71/51 : Near the front panel.
   BX51WI : Near the product name plate.

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