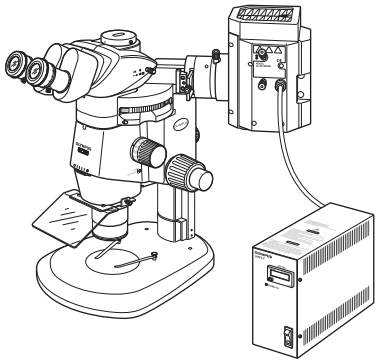
Main modules described in this manual

SZX2-RFA16 / SZX2-RFA16A
Fluorescence filter units
SZX2-CCV
U-LH100HG
U-RFL-T



INSTRUCTIONS

SZX16 REFLECTED FLUORESCENCE SYSTEM

Optical Microscope Accessory

This instruction manual is for the Olympus SZX2 Reflected Fluorescence System. To ensure safety, obtain optimum performance, familiarize yourself fully with the use of this equipment, 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.

The following descripitons are applied to SZX2-RFA16A only.

This product is applied with the requirements of standard IEC/EN61326-1 concerning electromagnetic compatibility.

- Immunity Applied to industrial and basic environment requirements.

In accordance with European Directive on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.
Refer to your local Olympus distributor in EU for return and/or collection systems available in your country.

NOTE: This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the product.

CONTENTS

Correct assembly and adjustments are indispensable for the microscope to manifest its full performance. If you want to assemble the microscope by yourself, see Chapter 5, "ASSEMBLY" (pages 8 to 12) first.

IMPORTANT

This equipment can provide the highest level of brightness required in macro fluorescence observation using fluorescence filter units (up to 5 units can be mounted) when it is combined with the SZX2-ZB16 zoom microscope body, an objective for the SZX16 and the lamp housing for 100 W mercury burner.

⚠ SAFETY PRECAUTIONS

1. This equipment consists of precision instruments. Handle it with care and avoid subjecting it to sudden or severe impact.
2. The ultrahigh pressure mercury burner used should be the USH-103OL (OLYMPUS) or HBO103W/2 (OSRAM) DC mercury burner supplied by Olympus.
3. Ensure that the burner is installed and that connection cords are connected properly before operating the unit.
4. Do not open the lamp housing while the lamp is turned on, or for at least 10 minutes after the lamp has been turned off. Lamp housing parts are extremely hot and will cause burns if touched. (See page 13.)
5. Do not apply excessive force to the stoppers which are provided for some functions. Otherwise the stopper may be damaged.
6. Do not attempt to open or disassemble the power supply unit because it includes high voltage parts inside.
7. To ensure safety, be sure to **ground/earth** the power supply unit. Otherwise the intended electrical safety performance cannot be obtained.
8. Before opening the lamp housing for replacement of the burner or any other internal part, set the main switch to "O" (OFF) , unplug the lamp housing's connecting cord plug from the output connector on the power supply unit, and wait for 10 minutes or more until the lamp housing cools down.
9. Before replacing the filter unit, be always sure to set the shutter slider of the reflected fluorescence illuminator tube in the fully pulled-out (light excluding) position or set the main switch of the power supply unit to "O" (OFF).
10. Before transporting the system, remove the modules attached to it to make the overall weight as lightweight as possible.
11. The standard service life of the lamp housing is eight (8) years of use or 20,000 hours of total power ON period, whichever is the shorter period.
    For details, see Inspection Sheet on page 21.

Safety Symbols

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

Symbol	Explanation
⚡	Indicates the presence of high voltage (1 kV or more). Take caution to guard against electric shock.
♨	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.

Warning Indications

Warning indications are placed at parts where special precaution is required when handling and using the equipment. Always heed the warnings.

Warning indication position	Lamp housing for 100 W mercury burner (rear panel) • U-LH100HG • U-LH100HGAPO	[Warning against high temperature] ♨ [Warning against high voltage] ⚡

1 Getting Ready

1. This manual pertains only to the reflected fluorescence system. Before using this system together with the SZX16 microscope and associated options, make sure that you have carefully read and understood their manuals, and understand how the microscopic system should be used together.
2. The reflected fluorescence system is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impact.
3. Do not use the equipment where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations. (The operating environment should be identical to that of the zoom microscope body.)
4. Always use the power cord provided by Olympus.
   Before plugging the power cord, make sure that the main switch of the power supply unit is set to "O" (OFF).
5. To allow heat from the system to dissipate well, reserve a distance of at least 10 cm around the lamp housing and power supply unit.
6. The power cord can be used to cut the power supply in case of emergency. To make this possible, the power supply unit should be installed so that the power input connector (on the rear of the power supply unit) or the power outlet is easily accessible for unplugging in case of emergency.

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 use organic solvents to clean non-optical components. If smudges are difficult to clean, wipe them with a soft cloth slightly moistened with a diluted neutral detergent.
3. Never disassemble any part of the equipment as this could cause malfunctions or reduced performance.
4. The burner has a service life period of 300 hours. For details on the conditions, see page 12.
   When the hour counter on the power supply unit indicates 300 hours, set the main switch to "O" (OFF) for safety, wait for more than 10 minutes and replace the burner with a new one (see page 12.). Since the mercury burner seals high-pressure gas in the glass tube, extended use after the service life may accumulate distortion in it and could eventually cause it to burst. After the service life of the mercury has expired, dispose of it as an industrial waste.
5. When the microscope is not in use, be sure to set the main switch to "O" (OFF). After checking that the lamp housing has been cooled down, place the dust-prevention cover on the microscope for storage.
6. When disposing of the system, be sure to follow your local regulations or ordinances.

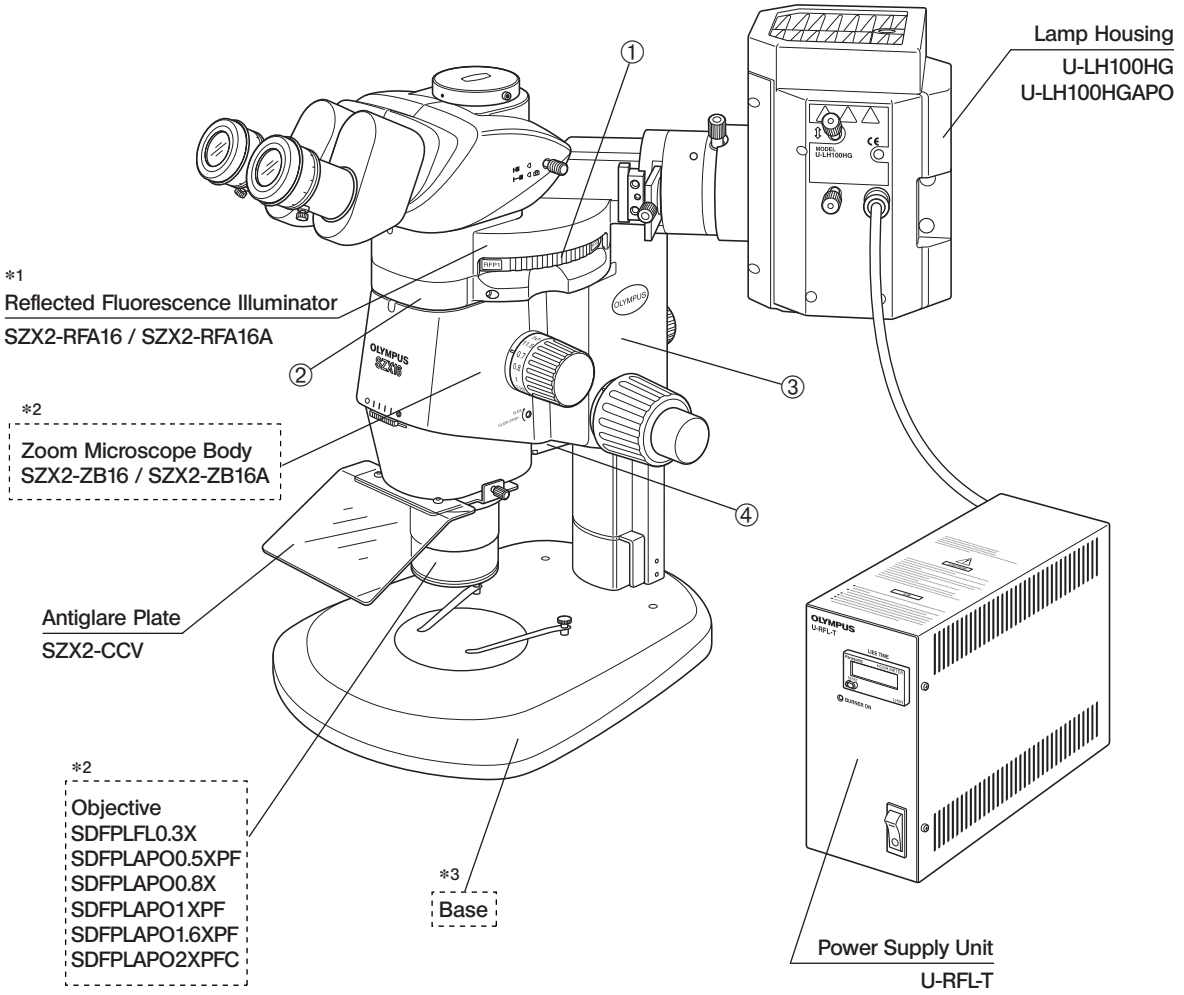
3 Caution

If the equipment 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 the instruction manual.

The following symbols are used to set off text in this instruction manual.
⚠: 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 the equipment.
◎: Indicates commentary (for ease of operation and maintenance).

1 NOMENCLATURE

◎If you have not yet completed the assembly of the microscope, go to Chapter 5, “ASSEMBLY” (pages 8 to 12) first.

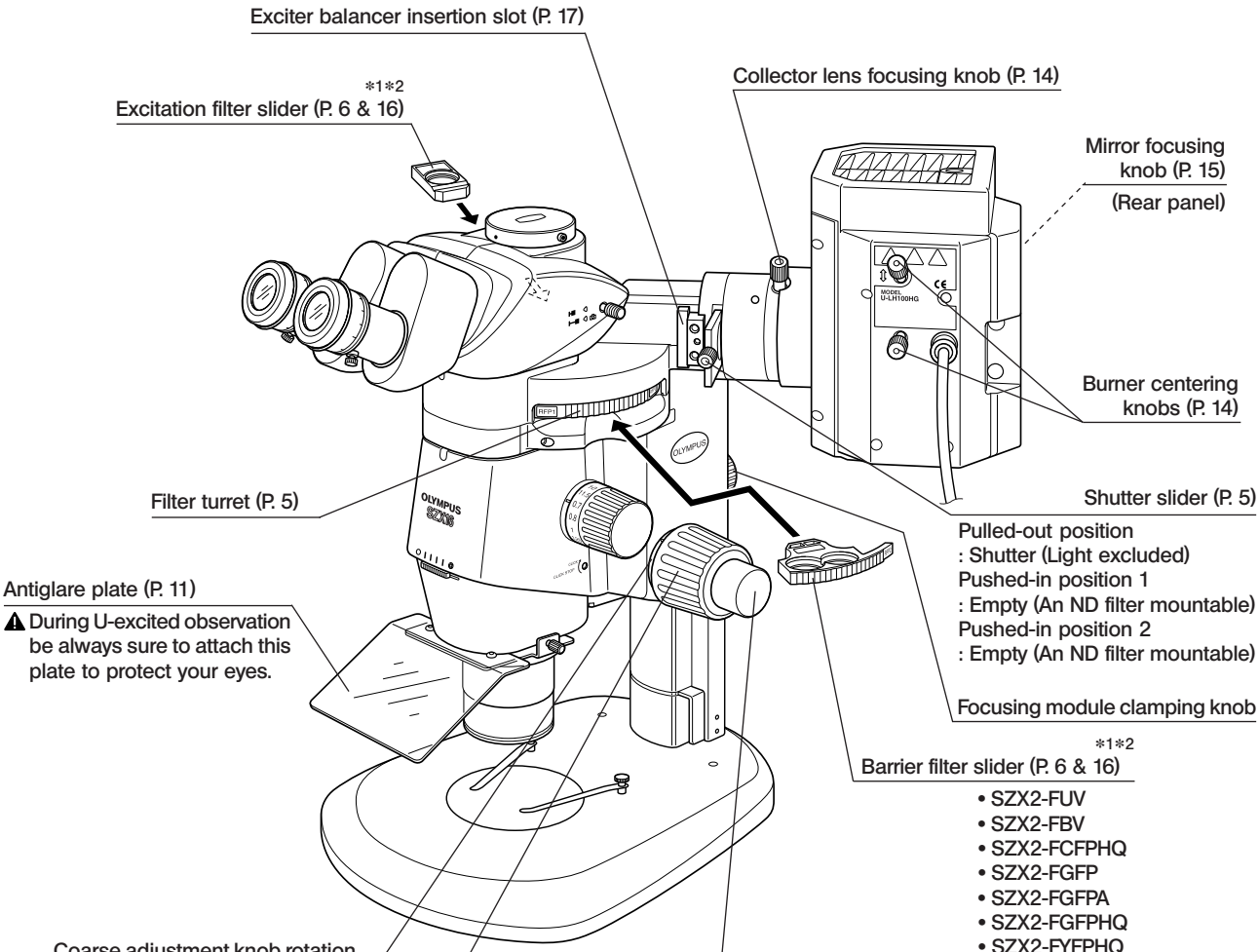


*1. The Reflected Fluorescence Illuminator is composed of;
① filter changer, ② microscope mount adapter; ③ focusing assembly; ④ illuminator head.

*2. The zoom magnifications with which illumination is available are from 1X to the maximum magnification. At less than 1X magnification, the peripheral part of the illumination field may be shaded. When the SDFPLAPO1.6XPF/2XPFC objective is used, the illumination may be obscured at low magnifications.

*3. In screening applications for identifying expressions, it is recommended to use the illumination stand for convenience.

2 CONTROLS

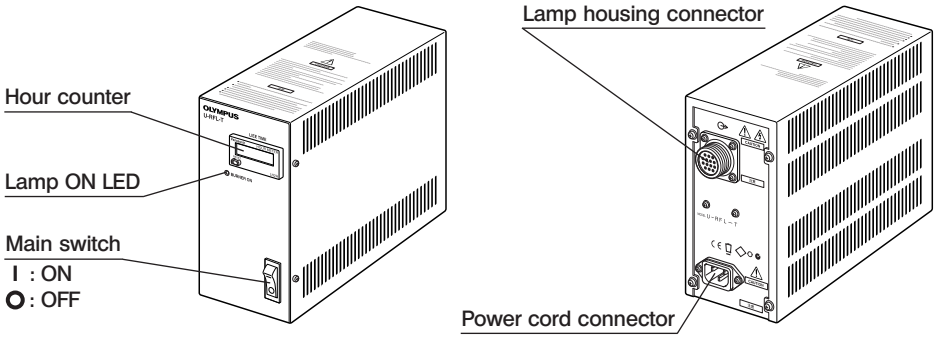


⚠ Observe the following notes to prevent the risk that may be caused by direct irradiation of the UV-rays on the specimen surface.

*1. Always mount one of the specified combinations of specified excitation and barrier filters in line as shown in the illustration. A combination other than specified leads to a danger.
*2. Always attach the dummy filters when not using the excitation and barrier filters.

Power Supply Unit U-RFL-T

◎For details, see the instruction manual provided with the U-RFL-T.



3 OBSERVATION

CAUTION **Always use a zoom magnification of 1X or more. The peripheral part of the illumination field will be shaded under lower magnifications.**
For the operating methods of the controls on the zoom microscope body, refer to the instruction manual for the SZX16.

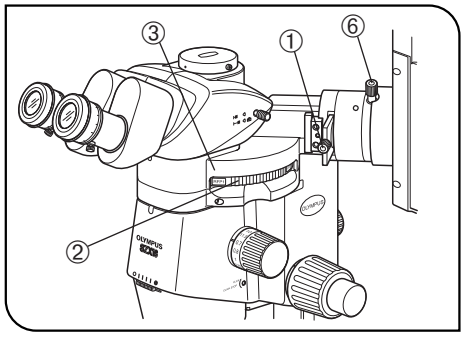


Fig. 1

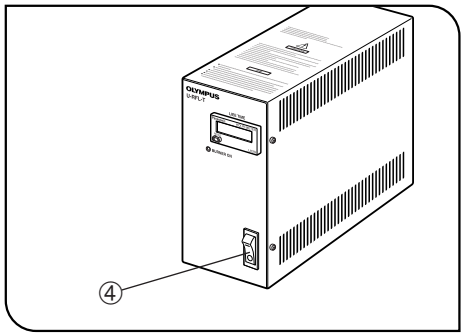


Fig. 2

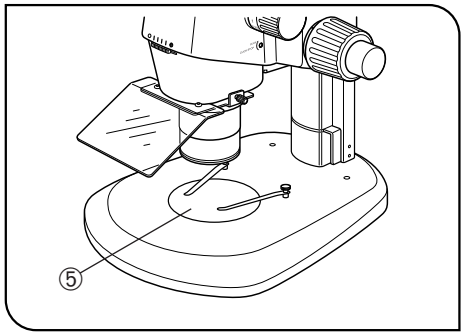


Fig. 3

1 Fluorescence Observation (Figs. 1 to 3)

1. Pull out the shutter slider ① fully to the "shutter in" condition for the sake of safety.
2. Rotate the filter turret ② to engage the desired filter in the light path. The filter being engaged in the light path can be confirmed at position ③.

◎See " 3 Combinations and Applications of Fluorescence Filters" on page 6.

3. Set the main switch ④ of the power supply unit to " I " (ON).
   The arc will stabilize in 5 to 10 minutes after ignition of the burner.
   If you have not yet adjusted the centering of the mercury burner, center it now (pages 13 to 15).
4. Place the specimen on the center of the stage plate ⑤.

◎If transmitted light observation is not required, set the stage plate so that the black side faces up.
If autofluorescence is noticeable, use the black plate of the optional SP-FL fluorescence center plate.
If transmitted light observation is also performed, use a glass center plate.
If autofluorescence is noticeable during this, use the glass plate of the optional SP-FL .

5. Push in the shutter slider ① to the empty or either ND filter position, bring the specimen into focus and observe it.

◎Adjust the collector lens focusing knob ⑥ as required.
◎If the illumination is too bright, engage an ND filter in the shutter slider into the light path.
◎When fluorescence microphotography is required, all of the observation light can be led to the TV/photo light path by using the optional SZX2-TR30PT or SZX2-TTRPT trinocular observation tube with the 100% TV/photo light path.

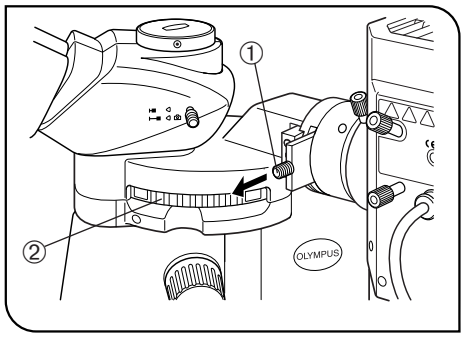


Fig. 4

2 Transmitted Light Observation (Fig. 4)

1. Pull out the shutter slider ① fully to the "shutter in" condition.
2. Rotate the filter turret ② to engage the dummy filter position in the light path.
3. Bring the specimen into focus and observe it.

4 SPECIFICATIONS

1 Reflected Light Fluorescence Illuminator SZX2-RFA16

Illumination system	Zoom-interlocked, near-vertical fluorescence illumination. Independent zooming of the illumination system is possible by releasing the interlock.
Filter turret	5-position turret. Up to 5 sets of excitation/barrier filter sliders can be mounted. Flash light prevention shutter interlocked with switching is provided.
Shutter slider	3 positions including 1 shutter and 2 idle positions. The idle positions accept ND filters.
Filter slider	An exciter balancer can be mounted.
Focusing module	Rack & pinion roller guide (with coarse adjustment knob rotation tension adjustment ring).
	Gas-spring counterbalance built in. Coaxial coarse/fine adjustment knobs.
	Coarse adjustment knob stroke: 69 mm. Stroke per turn: 36.8 mm.
	Fine adjustment knob stroke: 69 mm. Stroke per turn: 0.77 mm.
	Load capacity: 4 to 18 kg.
Weight	6 kg

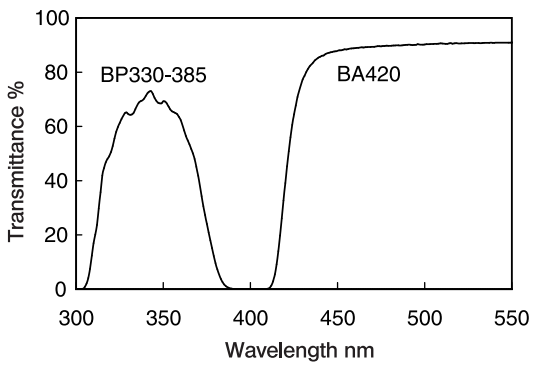
2 Combinations and Applications of Fluorescence Filters

Filter Unit	Indication	Excitation Filter	Barrier Filter	Applications
SZX2-FUV	UV	BP330-385	BA420	BFP & U-excited observations
SZX2-FBV	BV	BP400-440	BA475	CFP & BV-excited observations
SZX2-FCFPHQ	CHPHQ	BP425-445	BA460-510	CFP separation & BV-excited separation observations
SZX2-FGFP	GFP	BP460-495	BA510IF	GFP & B-excited observations
SZX2-FGFPA	GFPA	BP460-495	BA510-550	GFP separation & B-excited separation observations
SZX2-FGFPHQ	GFPHQ	BP460-480	BA495-540	GFP observations
SZX2-FYFPHQ	YFPHQ	BP490-500	BA515-560	YFP observations
SZX2-FRFP1	RFP1	BP530-550	BA575IF	RFP & G-excited observations
SZX2-FRFP2	RFP2	BP545-580	BA610IF	RFP separation & U-excited observations

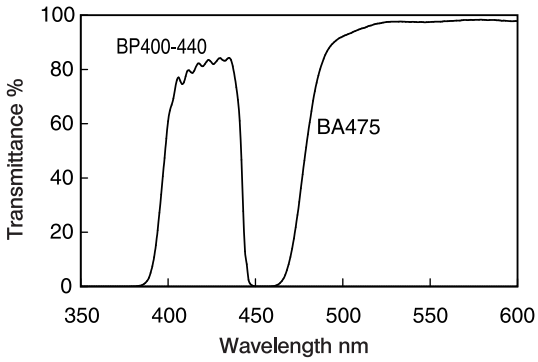
⚠ Be sure to engage the barrier filter slider, excitation filter slider and/or dummy filter slider in every light path.

Spectral Characteristics of Filters

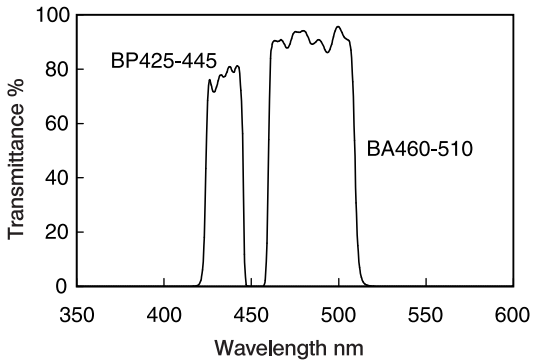
1. SZX2-FUV



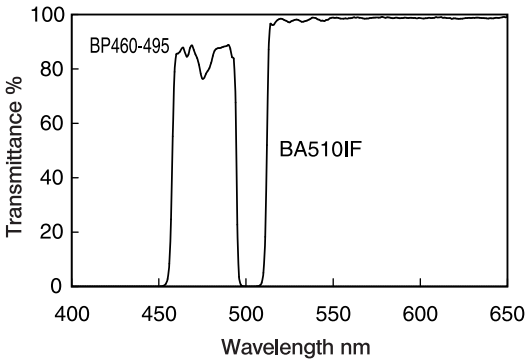
2. SZX2-FBV



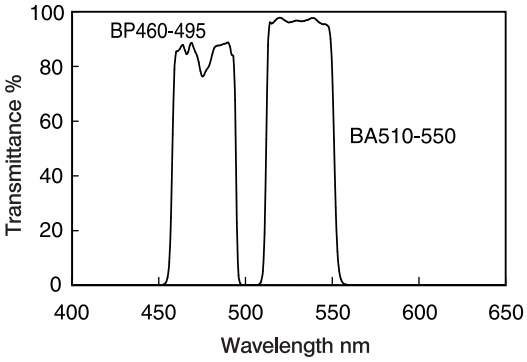
3. SZX2-FCFPHQ



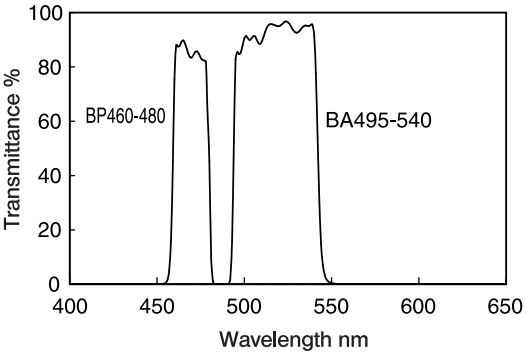
4. SZX2-FGFP



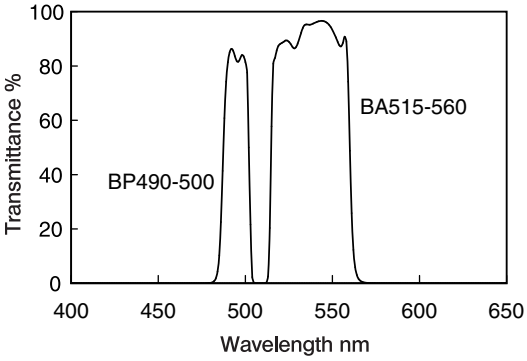
5. SZX2-FGFPA



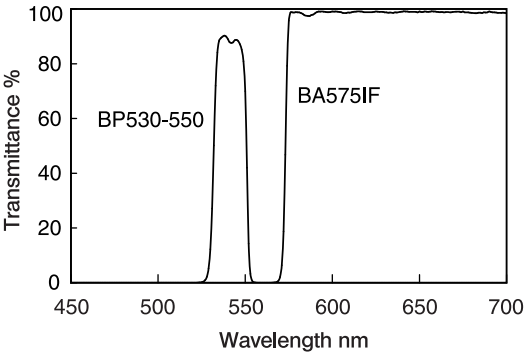
6. SZX2-FGFPHQ



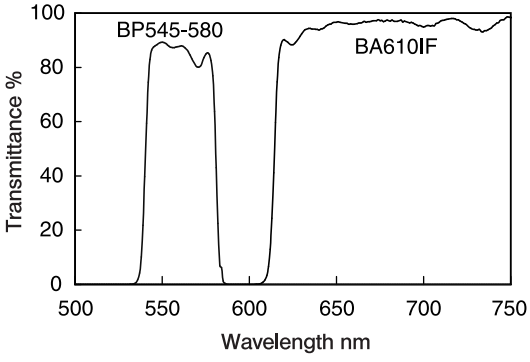
7. SZX2-FYFPHQ



8. SZX2-FRFP1



9. SZX2-FRFP2



5 ASSEMBLY

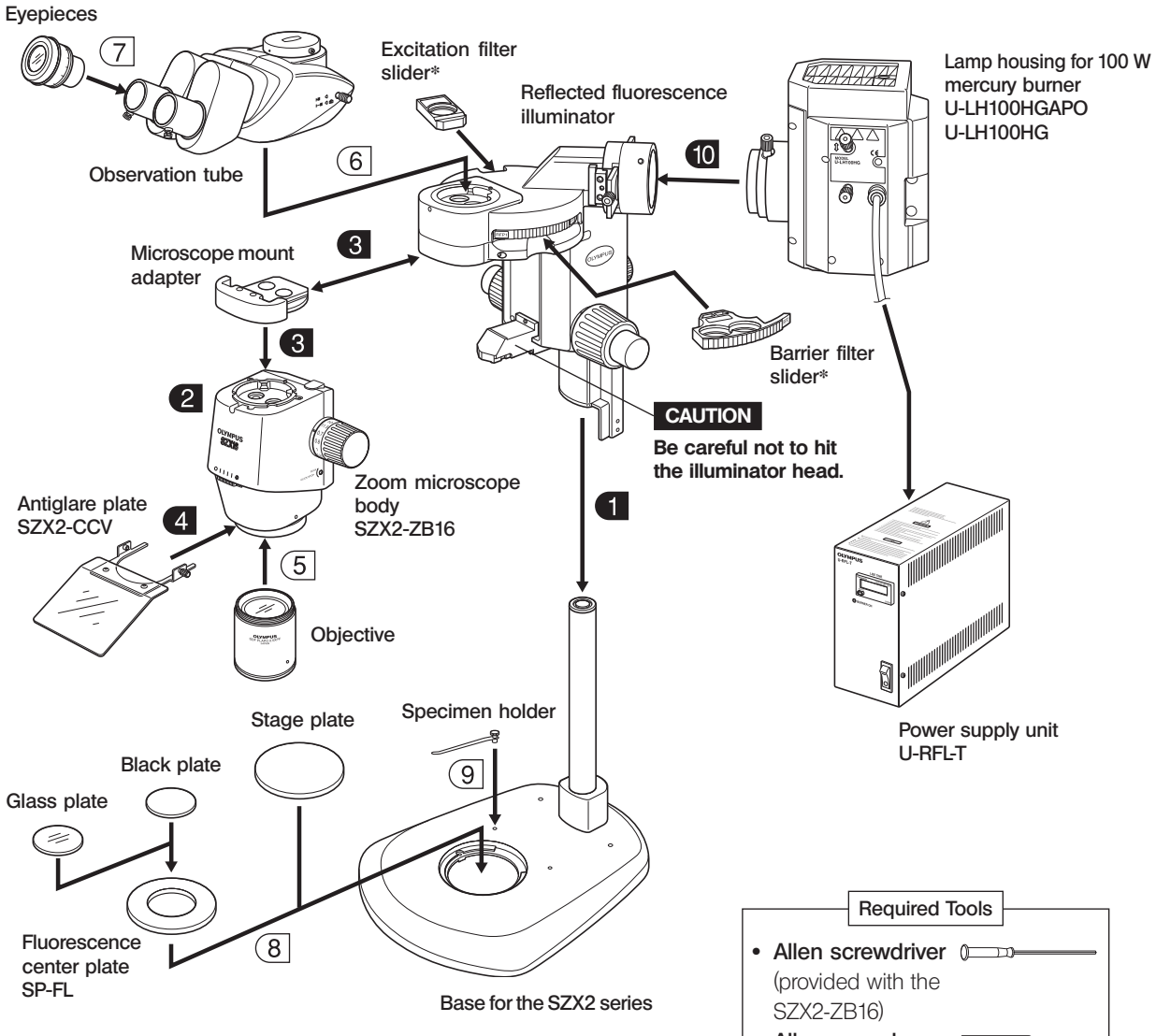
◎Have your Olympus dealer or representative assembly the system.
During assembly take special care not to hit the illuminator head of the reflected fluorescence illuminator against anything because the prism is exposed in this part.

5-1 Assembly Diagram

The diagram below shows how to assemble the various modules. The numbers indicate the order of assembly and those inside ■ have the detailed assembly steps described on subsequent pages. For the assembly related to the zoom microscope body, refer to the instruction manual provided with it.

*Always use one of the specified combinations of excitation and barrier filters and mount them in line as shown below. Also be sure to mount them simultaneously so as not to forget mounting of one filter.

★**When assembling the equipment, make sure that all parts are free of dust and dirt, and avoid scratching any part.**



Required Tools

- **Allen screwdriver** (provided with the SZX2-ZB16)
- **Allen wrench** (provided with the SZX2-RFA16)

5-2 Detailed Assembly Procedure

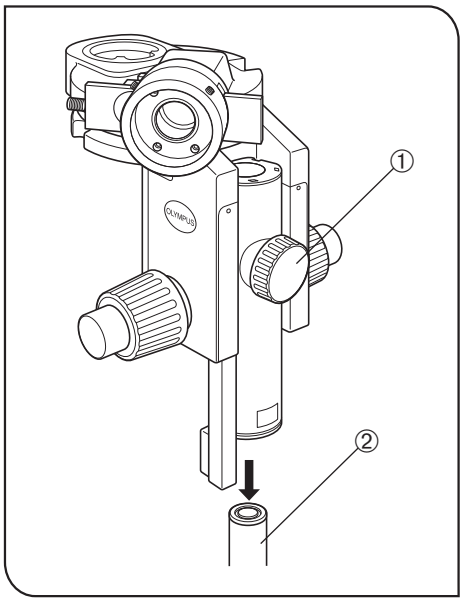


Fig. 5

1 Attaching the Reflected Fluorescence Illuminator (Fig. 5)

1. Fully loosen the focusing assembly clamping knob ① of the vertical fluorescence illuminator and, holding the illuminator with both hands, insert it gently and straight into the pillar support sleeve ② by aligning the clamping knob with the mounting hole on the pillar support sleeve.

★ **Be careful not to tilt the illuminator when inserting it.**

2. After inserting the illuminator all the way until it is stopped, tighten the clamping knob ① firmly.

⚠ **To prevent the system from turning over, install the illuminator so that it faces the front.**

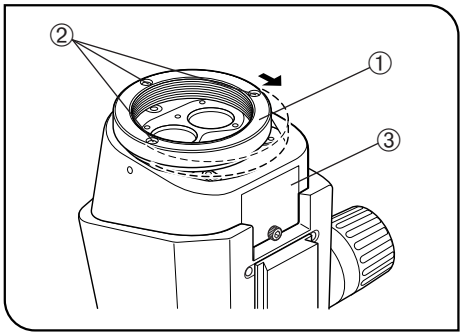


Fig. 6

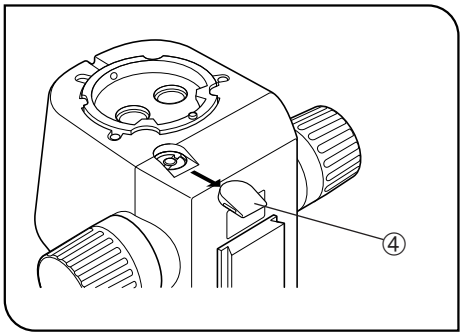


Fig. 7

2 Preparing the Microscope Body (Figs. 6 & 7)

Moving the Objective Mount

1. Place the zoom microscope body upside down on a flat desktop surface.
2. Using the Allen wrench, loosen the three screws ② clamping the objective mount ①, and remove it temporarily.
3. After the objective mount ① is removed three screw holes are exposed in the locations 5 mm away in the direction of the arrow from the originally used screw holes. Attach the objective mount into these three screw holes by inserting and tightening the three screws.

★ **When using the SZX2-2RE16 revolving nosepiece, also move it to the position 5 mm deviated from the original position. If the SZX2-2RE16 is used, also note that it should be mounted after attaching the zoom microscope body in section " 3 Mounting the Zoom Microscope Body".**

Preparing the illuminator head insertion slot

1. To allow the illuminator head to be installed inside the microscope body, remove the screws clamping the microscope body dummy cover ③ using the Allen screwdriver and remove the dummy cover ③.

◎ Keep the dummy cover and screw for reusing them in observations other than the reflected fluorescence observation.

Preparing the Zoom Interlock Mechanism

1. Place the zoom microscope body in the erect position and remove the cover cap ④ using tweezers or a precision screwdriver.

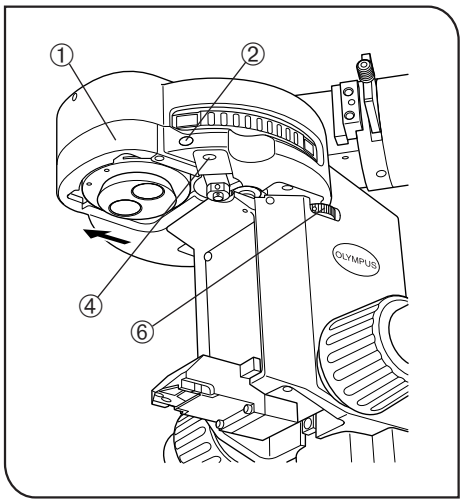


Fig. 8

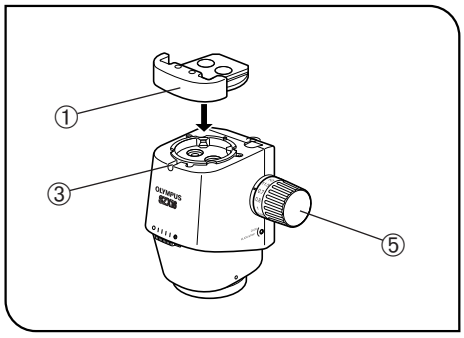


Fig. 9

3 Mounting the Zoom Microscope Body (Figs. 8 & 9)

1. Using the Allen screwdriver, loosen the clamping screws ② of the microscope mount adapter ① and pull out the adapter in the direction of the arrow. (Fig. 8)
2. Loosen the clamping screw ③ on the microscope body using the Allen screwdriver, and attach the adapter ① in that position. (Fig. 9)
3. The screw ④ of the interlocking section of the vertical fluorescence illuminator is tightened when shipped from the factory (interlocking disengagement conditoin). By way of precaution, use the Allen screwdriver to tighten the screw ④ (by turning it clockwise) fully until it will not move any more.
4. Hold the microscope body with both hands, insert it into the adapter ① all the way until it stops, and then tighten the clamping screw ② firmly.
5. Using the Allen screwdriver, loosen the screw ④ of the interlocking section (by turning the screw counterclockwise) fully until the screw will not move any more.
6. Gently rotate the zooming knob ⑤ all over the magnification scale and repeat reciprocations for a few times.
   If the zooming mechanism of the microscope body and the illuminator system are coupled correctly, the zooming dial ⑥ on the illuminator system should rotate according to the rotation of the zooming knob ⑤ on the microscope body.

If the Zooming Dial ⑥ Is Not Interlocked with the Zooming Knob

The zooming dial ⑥ is positioned at an extreme position. Rotate the dial ⑥ away from the extremity and repeat step 6) again.

★ **When the zooming dial ⑥ is interlocked with the zooming knob ⑤, do not turn the zoom dial ⑥ manually.**

Caution When Removing the Microscope Body

First perform the operation in step 3) above to disengage interlocking, confirm that the zooming dial ⑥ of the illuminator system is no longer interlocked with the movement of the zooming knob ⑤, and perform the operations in steps 4), 2) and 1) in this order.

About Highlight Zoom Illumination

The zoom on the illumination side can be adjusted during observation, independent of the zoom on the microscope body side, by performing the operation in step 3) above to disengage interlocking and turning the zooming dial ⑥ manually.

This adjustment makes the illuminated range concentrate on the center of the field of view to achieve brighter observation.

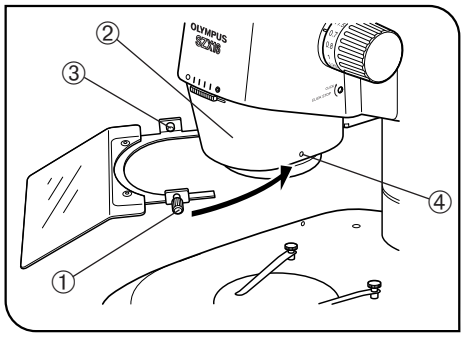


Fig. 10

4 Attaching the Antiglare Plate (Fig. 10)

◎Before starting fluorescence observation, be sure to attach the optional SZX2-CCV antiglare plate.
This is particularly important when using the U-excitation (SZX2-FUV) in order to protect your eyes from UV-rays.

1. Loosen the antiglare plate clamping knob ① and fit the pin ③ of the antiglare plate into the positioning hole on the left side of the microscope body ②.
2. Rotate the antiglare plate in the direction of the arrow so that the tip of the clamping knob ① enters the positioning hole ④ on the right side of the microscope body, and tighten the clamping knob.

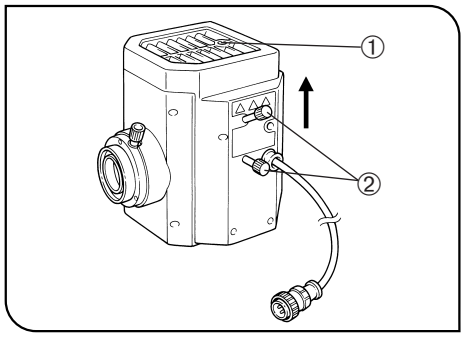


Fig. 11

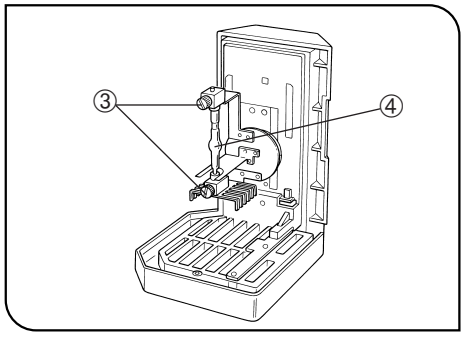


Fig. 12

10 Attaching the Lamp Housing (Figs. 11 to 13)

Installing the Mercury Burner

1. Loosen the socket clamping screw ① using the Allen screwdriver.
2. Hold the upper section of the lamp housing and pull it upward to remove the socket section.

★ **To prevent malfunction, do not hold the lamp housing by the centering knobs ②.**

3. Place the socket section upside down as shown in Fig. 12.

◎The lamp housing is equipped with the holder for transportation in the factory shipment condition or with an old burner when the burner is replaced. Remove the holder or old burner by loosening the two burner holding screws ③.

4. Attach the + (positive) pole of a specified mercury burner ④ to the fixed mount on the upper side, then the - (negative) pole to the mount on the lower side.

★ **Be sure to use the USH-103OL (OLYMPUS) or HBO103W/2 (OSRAM).**

⚠ **To prevent burner cracking due to glass distortion caused by stain, be careful not to stain the burner with fingerprints or dirt. If it is contaminated, clean by wiping gently with a piece of gauze moistened with absolute alcohol.**

5. Attach the socket section with burner to the original position and tighten the socket clamping screw ①.

★ **Align the external edges of the lamp housing with those on the socket section, and push the lamp housing straight downward.**

Burner Service Life

USH-103OL: 300 hours

◎This value assumes light cycles composed of 2 hours of lighting and 30 minutes of extinction. Do not turn it on and off at a shorter cycle than the above, for this will shorten the service life of the burner.

⚠ **After replacing the burner, reset the hour counter to "0.0" as outlined above.**

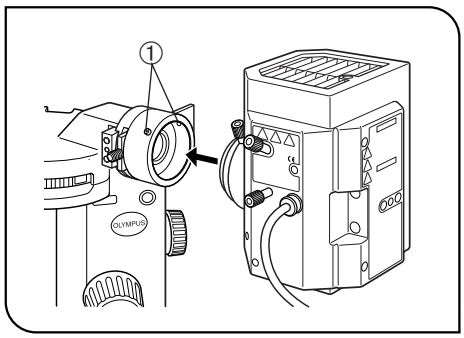


Fig. 13

Installing the Lamp Housing

1. Using the Allen screwdriver, loosen the two clamping screws ① on the lamp housing mount hole.
2. Fir the lamp housing all the way into the hole as shown in Fig. 13.
3. Tighten the clamping screws ① using the Allen screwdriver.

★ **The lamp housing and its surroundings become extremely hot. When installing the microscope system, reserve ample spaces around the lamp housing, particularly above it. Also be sure not to install the lamp housing obliquely.**

6 ADJUSTMENTS, GENERAL

1 Centering the Mercury Burner

Turning On the Power Supply Unit

Set the main switch to " I " (ON). Between 5 and 10 minutes are required for the arc to stabilize after the burner is ignited.

◎Discharge-type mercury burners may not ignite the first time the power is turned on due to its characteristics. If the burner does not ignite, set the main switch to " O " (OFF) once, then set the main switch to " I " (ON) again after 5 to 10 seconds.

★**To avoid shortening the life of the burner, do not turn the burner off within 2 hours after ignition.**

◎After turning the burner off, it cannot be re-ignited until the mercury vapor cools and condenses to liquid. Wait for more than 10 minutes before restarting the burner.

⚠**Even while the burner is turned on, opening the lamp housing causes the safety interlock function to shut off power automatically. In this case, set the main switch to " O " (OFF), and then wait for more than 10 minutes before restarting the burner. Before opening the lamp housing, wait until it becomes sufficiently cool.**

★**When resetting the hour counter, be sure to hold down its button until it reads "0.0".**

⚠**The mercury burner radiate UV rays that are dangerous. Do not ignite it until the equipment has been assembled correctly.**

Centering Procedure

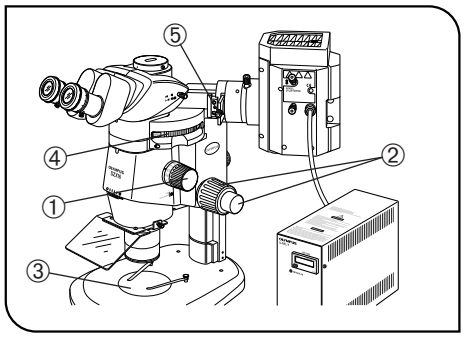


Fig. 14

1. Set the zooming knob ① to around 5X because this magnification facilitates centering.
2. Turn the coarse and fine adjustment knobs ② to bring the stage plate ③ into approximate focus.
3. Rotate the filter turret ④ to engage a filter other than the GFP or U-excitation filter in the light path.
4. Push in the shutter slider ⑤ to the "shutter OUT" condition.

◎If the illumination is too bright, engage an ND filter or use the black surface of the stage plate (or place a sheet of black paper on the stage).

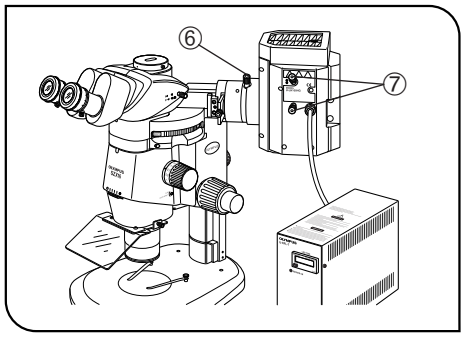


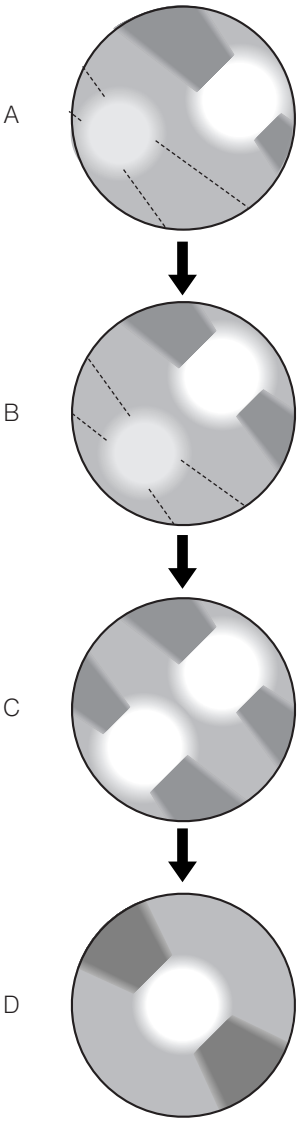
Fig. 15

4. Rotate the collector lens focusing knob ⑥ to project the arc image on the stage plate. (A)
   If the arc image is not projected, adjust the burner centering knobs ⑦.
5. Rotate the burner centering knobs ⑦ to move the arc images on the 45° position on the top right (or bottom left) of the illumination field. (B)
6. Insert the Allen screwdriver into the mirror focusing screw ⑧ (Fig. 16) and turn the screw to focus on the mirror arc image. (C)
7. Rotate the burner centering knobs ⑦ to overlap the arc image with the mirror arc image. (D)

◎After starting observation, rotate the collector lens focusing knob ⑥ to make the observation field uniform.

◎Hereafter, the mercury burner does not need centering until the next time it is replaced.

◎When the objective is removed, more accurate centering of the mercury burner is possible. At this time, set the zoom knob magnification at around 3.2X.



Precise Centering of the Mirror

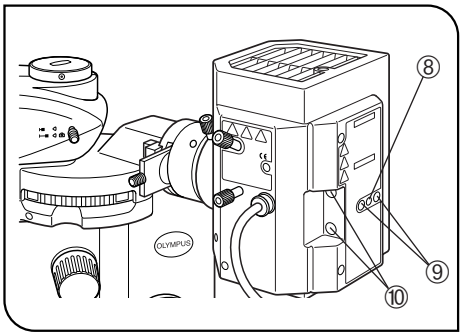


Fig. 16

◎The position of the mirror has been adjusted and locked before shipment. Only if you want more precise adjustment of the mirror position, proceed to the following steps immediately after the procedure in the previous paragraphs.

1. Using a pair of tweezers, etc., peel off the two blind stickers ⑨ on the rear of the lamp housing.
2. Fit the Allen screwdriver into each of the screws hidden below the stickers and loosen them. Loosening the two screws releases the locking of the mirror.
3. Peel off other two blind stickers ⑩ to expose the mirror centering holes.
4. Insert the Allen screwdriver into the screw in each mirror centering hole and adjust the centering of the mirror arc image.

2 Mounting an ND Filter (Fig. 17)

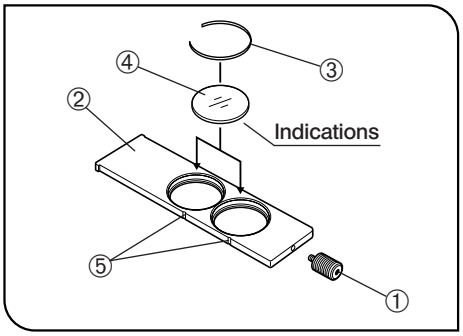


Fig. 17

⚠Before mounting the ND filters, be sure to turn off the mercury burner and confirm that the shutter slider is cooled down.

1. Remove the knob ① from the shutter slider ② and pull out the slider.
2. Remove the ring spring ③ from one of the slider positions.
3. Place the required ND filter ④ (32ND6, 12, 25 or 50) in either filter position so that the indication surface of the filter faces downward, and fix the filter with ring spring ③.

◎If two ND filters are mounted in both filter positions, it would become impossible to obtain the 100% illumination light.

★If the filter is inserted upside down, it may crack due to the heat from the light source.

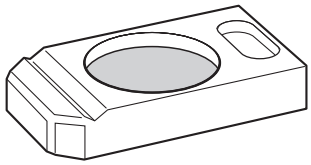
4. Return the shutter in the original position so that the click grooves ⑤ come downside, and attach the knob ①.

3 Using the Dummy Filters

◎Mounting a dummy filter in a dummy filter slider allows it to be used in fluorescence observation.

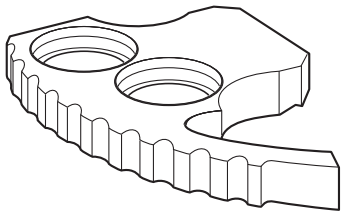
⚠**When using UV rays as the excitation light, select a combination that makes it possible to cut the UV rays on the barrier side.**

Dummy excitation filter slider



1. Remove the ring spring and then remove the light shielding plate.
2. Place the required excitation filter (ϕ25 mm, thickness no more than 6 mm) and fix it with the ring spring.

Dummy barrier filter slider

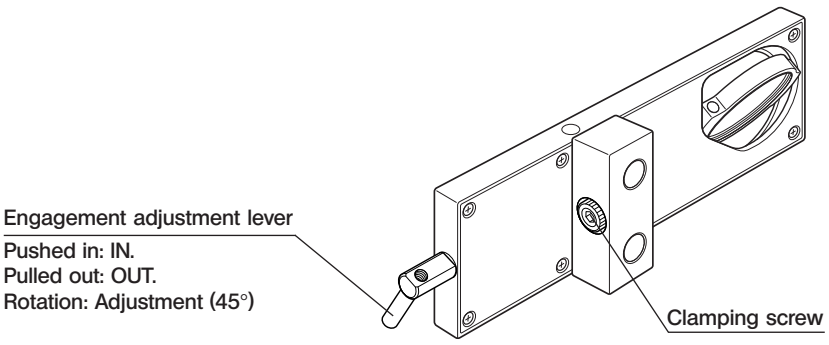


1. Place the required barrier filter (ϕ25 mm, thickness no more than 6 mm).

★**Rotate the turret especially gently since the filter is not fixed.**

4 Using the Exciter Balancer U-EXBABG/EXBAUB/EXBAUG

◎When observing fluorescence generated with U/B/G multiple excitation using double-dye fluorescence excitation and a barrier filter, the exciter balancer can be used to adjust the balance between the intensities of the excitation light of the fluorescent dyes.



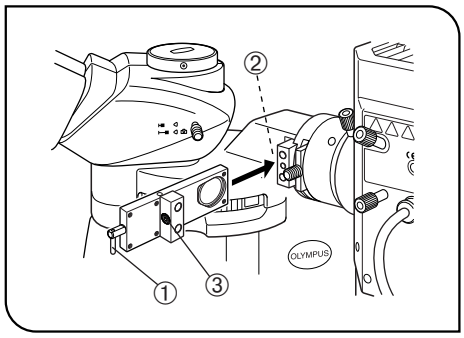


Fig. 18

Attaching Procedure

1. Remove the dummy from the exciter balancer insertion slot.
2. Set the balancer's engagement adjustment lever ① in the vertical position and insert the balancer into the insertion slot ② on the right side of the illuminator.
3. Tighten the clamping screw ③ using the Allen screwdriver to fix the balancer.

Operating Procedure

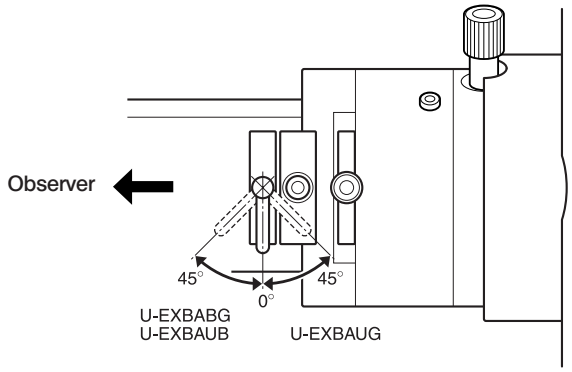
1. Mount a commercially available double-dye fluorescence excitation filter and a barrier filter in the slider position (see page 16 for the attaching method).
2. Rotate the turret to engage these filters in the light path.

★ **Due to the characteristics of G-excitation, its brightness adjustment range is lower than that of the B- or U-excitation. The brightness adjustment range is also variable depending on the variance in characteristics of the filter.**

★ **Due to the filter rotation angle and the variance in characteristics of the filter, irregularities in illumination may be observed on the top and bottom of the visual field. But these irregularities do not affect the area captured in photomicrography.**

3. Push in the engagement adjustment lever of the exciter balancer to engage the filter in the light path.

◎The angle of the engagement adjustment lever can be adjusted in the following range, only when the lever is pushed in. Before disengaging the filter from the light path, be sure to set the engagement adjustment lever to the vertical position (0° position).



4. Start fluorescence observation and adjust the tilting angle of the engagement lever of the balancer in the light path.
   - U-EXBABG: The balance of the B/G-excitation can be adjusted. Setting the lever to the 0° position enhances the fluorescence with the longer wavelength (closer to red), and setting it to the 45° position enhances the fluorescence with the shorter wavelength (closer to green).
   - U-EXBAUB: The balance of the U/B-excitation can be adjusted. Setting the lever to the 0° position enhances the fluorescence with the longer wavelength (closer to blue), and setting it to the 45° position enhances the fluorescence with the shorter wavelength (closer to green).
   - U-EXBAUG: The balance of the U/G-excitation can be adjusted. Setting the lever to the 0° position enhances the fluorescence with the longer wavelength (closer to red), and setting it to the 45° position enhances the fluorescence with the shorter wavelength (closer to blue).

Caution

1. When the exciter balancer is not required, be sure to disengage it from the light path because flare tends to occur due to repetitive reflections on the filter surface when the engagement adjustment lever of the exciter balancer is set in the vertical position.
2. Be sure to set the engagement adjustment lever to the vertical position before disengaging the filter from the light path or removing the exciter balancer.

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

7 LAMP HOUSING INSPECTION SHEET

- Study the instruction manual for the lamp housing before inspection.
- For safe use of the lamp housing, we recommend performing the following inspection periodically (every time you replace the lamp bulb and at least every 6 months).
- The table below identifies the check items to be observed. Put (X) if not applicable or (√) if applicable.
- If there is any (√) mark noted, immediately stop use of the product, and contact Olympus for detailed inspections or replace the lamp housing.
- If you detect an abnormality other than that listed below or with other Olympus product, also stop the use of the product and contact Olympus for detailed inspections.
- Note that the service, replacement and detailed inspections are charged after expiration of the warranty period.

If you have any questions, please contact Olympus.

	Check results (Date)			
Check items	/	/	/	/
1. More than 8 years have passed since original purchase or the total power ON time has exceeded 20,000 hours.				
2. Illumination flickers when you move the lamp cable or lamp housing.				
3. Lamp cable is unusually hot to the touch.				
4. Scorching or burning odor is produced during use.				
5. Deformation, backlash, or looseness, etc. when you assemble the lamp housing. (Impossibility of removing the top section of lamp housing when you attempt to replace the lamp bulb, etc.)				
6. Discoloration, deformation or cracking of the lamp housing.				
7. Melting, crack, deformation or solidification of the lamp cable or a wiring part.				
8. Increased frequency of servicing compared to similar devices put into use at the same time as the lamp housing.				

* When the Check Result columns become insufficient, copy this sheet.

MEMO

MEMO

This product is manufactured by **EVIDENT CORPORATION** effective as of Apr. 1, 2022.
Please contact our "Service Center" through the following website for any inquiries or issues related to this product.

EVIDENT CORPORATION

6666 Inatomi, Tatsuno-machi, Kamiina-gun, Nagano 399-0495, Japan

(Life science solutions)

Service Center

https://www.olympus-lifescience.com/support/service/

(Life science solutions)

Our Website

https://www.olympus-lifescience.com

(Industrial solutions)

Service Center

https://www.olympus-ims.com/service-and-support/service-centers/

(Industrial solutions)

Our Website

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AX7476 10 Issued in April, 2022

Printed in Japan 20220315 M0000