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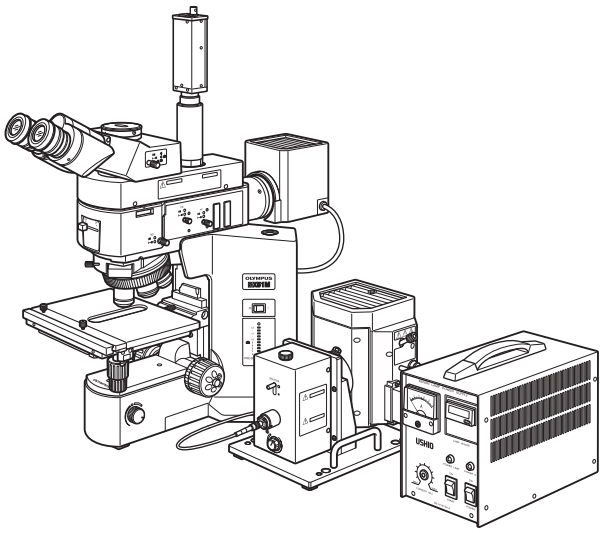


INSTRUCTIONS

U-UVF248

248 nm UV MICROSCOPE UNIT

This instruction manual is for the Olympus 248 nm UV Microscope Unit Model U-UVF248. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this unit, we recommend that you study this manual thoroughly before operating the microscope system. Retain this instruction manual in an easily accessible place near the work desk for future reference.

AX7645

CONTENTS

IMPORTANT

This unit is designed to be mounted on a BX or MX series microscope to enable high-resolution observation using 248 nm UV (ultraviolet) light as well as visible light observation.
Note that the 248 nm UV rays are harmful to your eyes and skin. Be sure to "⚠ Precautions on UV Light" below before use.

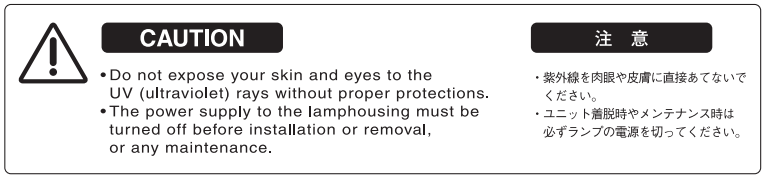
⚠ Precautions on UV Light

1. Before mounting or dismounting a unit or maintenance, be sure to turn off the light source or close the shutter of the UV248 light source box by sliding its shutter lever toward the ● marking so that the UV rays do not irradiate human eyes or skin.
2. To prevent unexpected irradiation of UV rays, be sure to close the idle objective positions of the revolving nosepiece by attaching the caps provided with the revolving nosepiece.
3. When there is a module that accepts a breath shield, the safety of the module can be improved by attaching the breath shield.
4. Do not bend the UV light guide into a radius below 100 mm to prevent it from breaking. The UV light guide should be inspected periodically to confirm absence of crack that may lead to UV leak.

UV caution labels

Contact Olympus for replacement in case a caution label is stained or peeled off or for other inquiries.

- **Right side panel of the UV248 observation tube**



- **Right side panel of the UV248 light source box**

⚠ SAFETY PRECAUTIONS

1. This unit is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impacts.
2. The mercury/xenon burner should be the UXM80E (USHIO), which is available through Olympus.
3. Before using the unit, ensure that the burner is mounted and that cords are connected properly.
4. The lamp housing becomes very hot during and right after use. Do not open the lamp housing during these periods.
5. When the hour counter on the power supply indicates 1000 hours, set the main switch to "O" (OFF), wait for more than 10 minutes and then replace the burner. Unlike a fluorescent lamp, the mercury/xenon burner seals high-pressure gas inside. If it is used extremely beyond the service life, accumulated distortion of the glass tube could cause the burner to burst, though this is a very rare case..
6. The power supply contains high-voltage parts inside and should not be disassembled.
7. Always use the power cord provided by Olympus. Before connecting the power cord into the power outlet, ensure that the main switch of the power supply is set to "O" (OFF).
8. Be sure to ground the power supply to ensure safety. If it is not **grounded**, Olympus can no longer warrant the electrical safety performance of the equipment.
9. Before opening the lamp housing for replacing the burner, etc., be sure to set the main switch of the power supply to "O" (OFF), disconnect the lamp housing output connector on the power supply, and wait for more than 10 minutes after use to cool down the burner.
10. The top panel of the lamp housing becomes very hot during operation. To prevent a fire hazard, be sure not to block ventilation of this part. A space of 10 cm or more should also be reserved around the lamp housing to allow ventilation.
11. If a connection cable contacts the lamp housing or is distributed near it, the cable may melt and cause an electric shock. To prevent this, be sure to distribute the connection cables at an enough distance from the lamp housing.
12. Do not apply an excessive force to any of the stopper mechanisms provided for the functions of the unit. Otherwise, the stopper mechanism may be destroyed.
13. The power cord is used to shut down the power supply in case of emergency.
    The power cord connector (on the rear of the power supply) or the power outlet should be easily accessible for power cord disconnection in case of emergency.
14. Never insert a metallic object, etc. into a ventilation slot. Otherwise, an electric shock or malfunction may result.
15. To prevent the system from toppling down, do not combine the module if the total height of the microscope system exceeds 1 meter.

Safety Symbols

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

Symbol	Explanation
	A high voltage (1 kV or more) is present. Be careful 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 handling could result in 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.

Caution indications

Caution indications are affixed at parts where special precaution is required when handling and using the microscope. Always heed the cautions.

Caution indication positions	Lamp housing for mercury/ xenon burner (U-LH80HGXE)	High temperature caution] 
	Power supply	[High voltage caution] 

1 System Applicability

◎The modules mentioned in this manual are simply the typical modules. Some modules are applicable even when they are not mentioned in this manual. For details, contact Olympus.

1. Microscope frame
   - BX51/61
   - MX51/61

2. Reflected light illuminator
   - BX-RLA2
   - BX-RLAA (UV compatible model)
   - BX-URA2 (Provided that an idle mirror unit or the U-MDF-3 DF mirror unit is used)

3. Objectives
   - UV observation: MApo100X objective for 248 nm UV rays only (NA 0.9, WD 0.2 mm, Actual field of view 50 μm).
   - Visible light observation: UIS2 (UIS) series objectives of the MPLN, LMPLFLN or UMPlanFI models.

4. TV camera for UV observation
   - The applicable CCD size is 2/3 inch or smaller.
   - Recommended TV camera: Sony XCD-SX910UV (1/2-inch CCD)

5. Operation using an AF unit
   - The AF unit should be UV-compatible. (Contact Olympus for the model names of UV-compatible AF units.)
   - The FN of visible light observation is 16.

6. The spacer 10 provided with the UV248 observation tube is to be used when a difference in height is produced due to the combined AF unit or microscope frame.

2 Getting Ready

1. This manual pertains only to the information related to the UV microscopy unit. Please also read the instruction manuals for the BX2/MX microscope and associated modules to obtain understanding on the general operating methods.
2. The operating temperature range when a UV objective is used is from 18 to 28°C (64 to 82°F). Outside this temperature range, the UV objective may be unable to exhibit its full performance.
3. To perform UV observation, engage a UV-dedicated objective in the light path and set the light path of the reflected light illuminator to the DF position.
   If UV rays irradiates on an objective for visible light observation, the performance of the objective will deteriorate.
4. Since UV observation employs high magnification and high resolution, it is affected easily by oscillations. It is therefore recommended to use an anti-vibration bench.
5. The 248 nm UV rays damage the resist so the observation period should be reduced as short as possible.
6. A very small black dot may be produced at the center of the UV light guide in the initial period after start of UV irradiation. This dot will disappear spontaneously as the irradiation is continued.
7. Due to the characteristics of the UV light guide, flickering or unevenness in observation images may occur if the light guide is wound tightly or moved during observation.
8. When not using the microscope, be sure set the main switch to " O " (OFF). After confirming that the microscope has cooled down sufficiently, be sure to cover it with the dust cover and store in a place with low humidity where moth or rust hardly occurs.
9. When disposing of the microscope, check the regulations and rules of your local government and be sure to observe them. The used mercury/xenon burner should be disposed of as an industrial waste. If you cannot dispose of it by yourself, contact Olympus.

3 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. If any part of the equipment (other than glass components) gets dirty, wipe it with a clean cloth.
   If the part is extremely dirty, do not attempt to use organic solvents to clean it; instead, use a soft, lint-free cloth slightly moistened with a diluted neutral detergent.
3. Never disassemble any part other than instructed of the unit. This could result in malfunctions, reduced performance or UV leak.

4 Caution

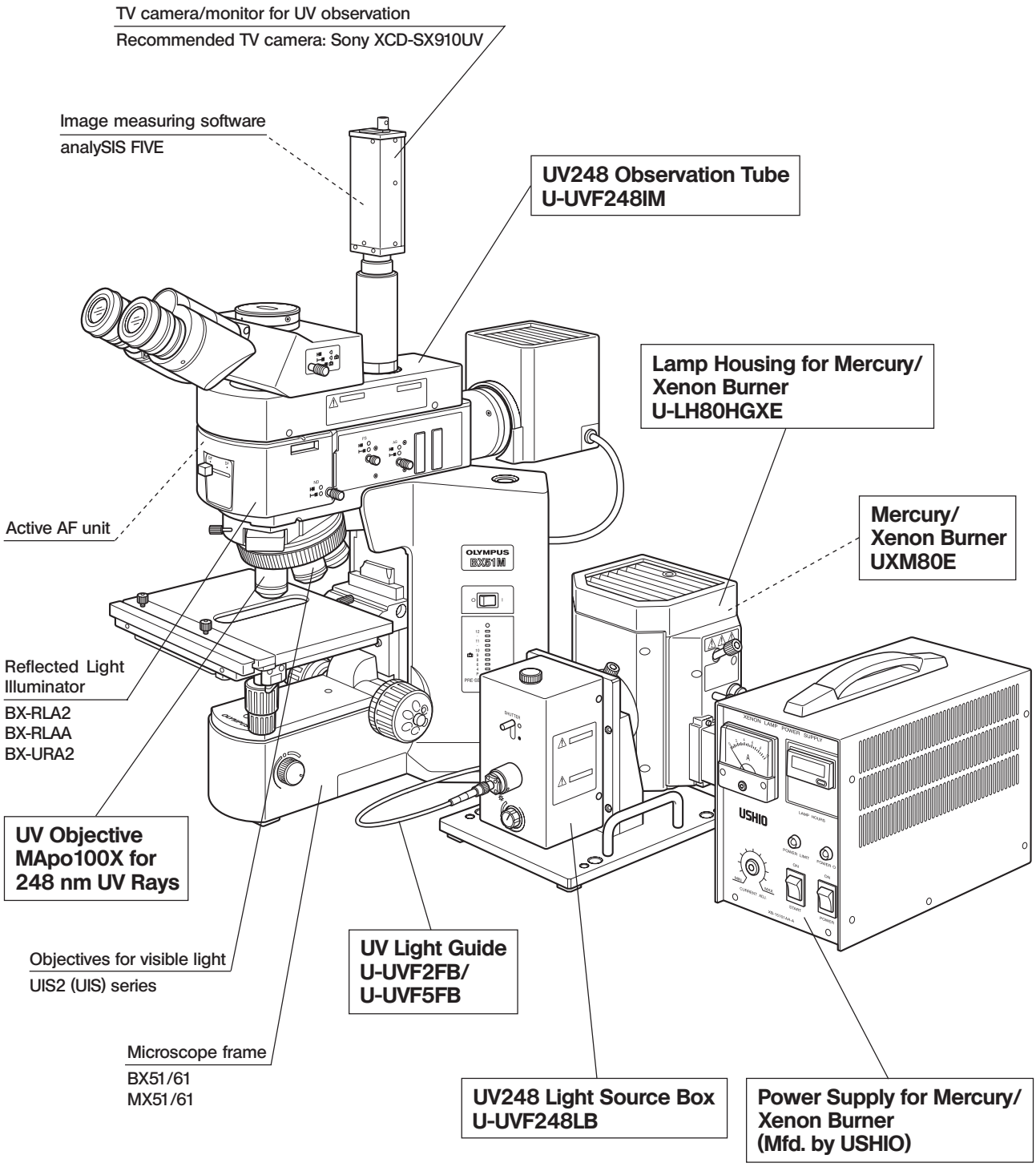
If the microscope system is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the equipment may also be damaged. Always use the equipment as outlined in this instruction manual.

The 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 equipment.
◎ : Indicates commentary (for ease of operation and maintenance).

1 NOMENCLATURE

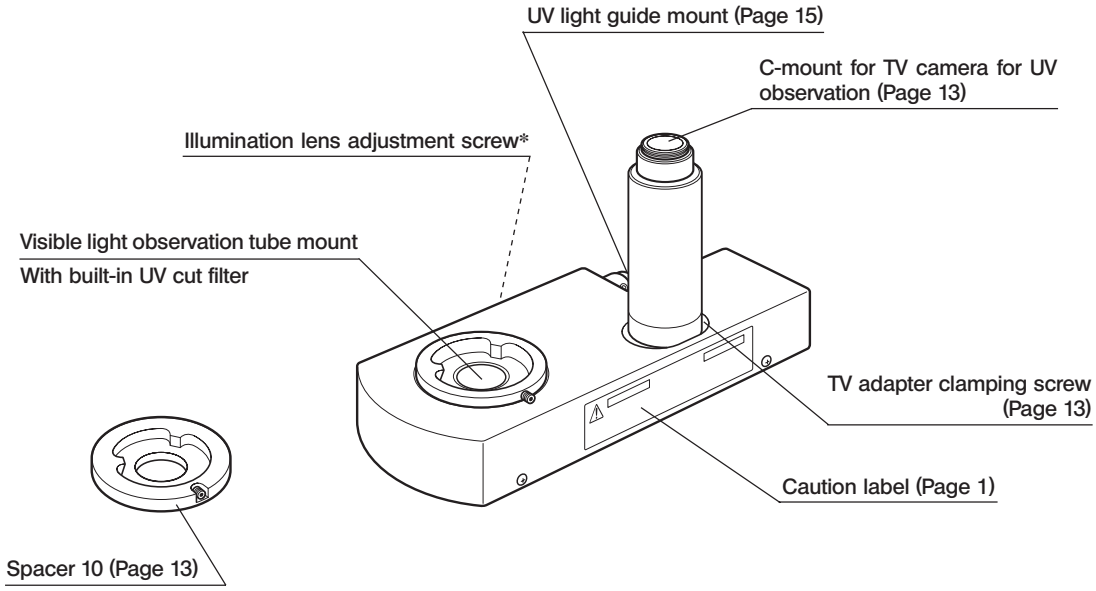
The modules enclosed in ☐ belong to the U-UVF248 UV Microscope Unit.
Other modules should be prepared by the user.

◎If you have not completed the assembly yet, see chapter 7, "ASSEMBLY" before proceeding to the following.



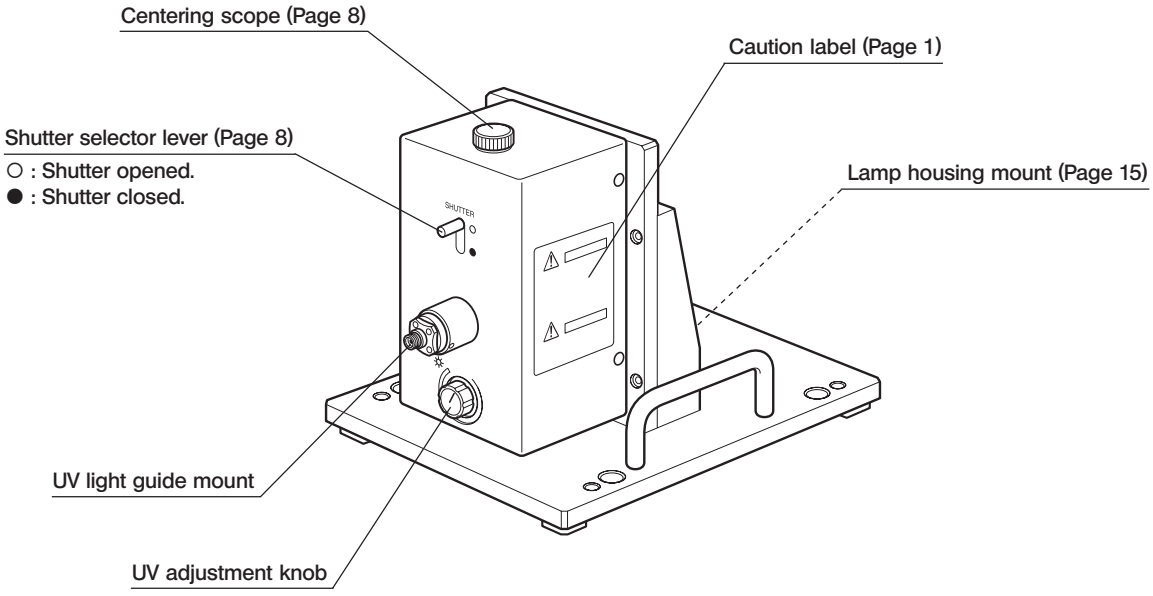
2 CONTROLS

UV248 Observation Tube
U-UVF248IM

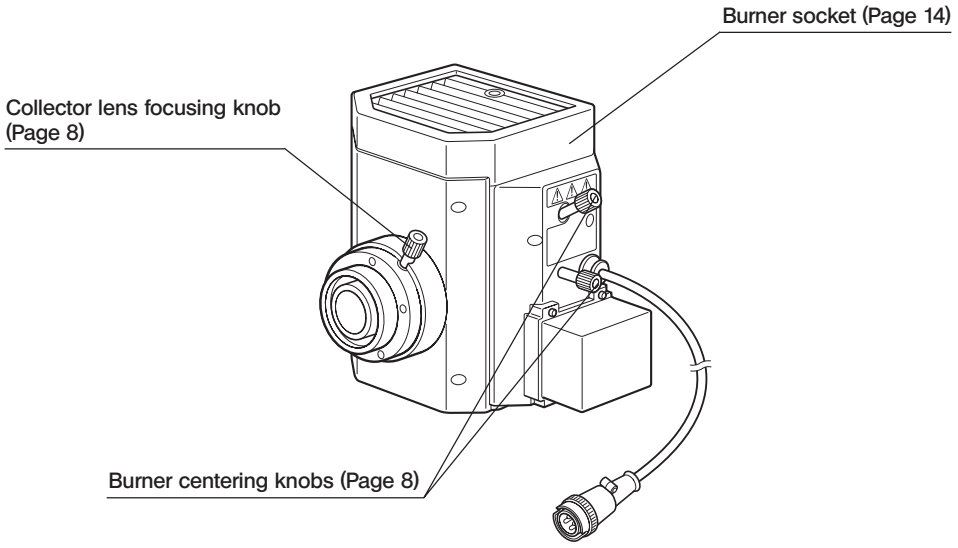


* The illumination lens adjustment screw should be left in the factory-shipped setting (position closer to the UV light guide mount). It needs to be adjusted only in special applications.

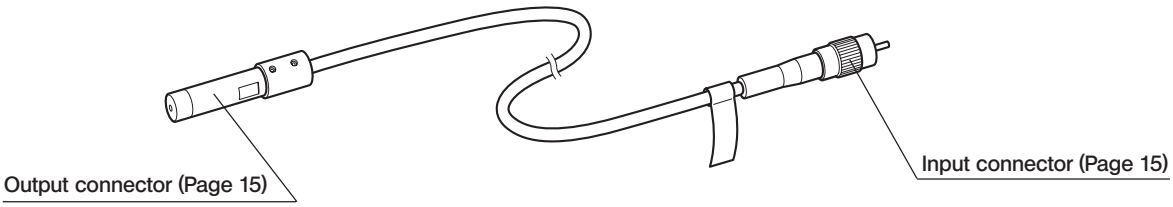
UV248 Light Source Box
U-UVF248LB



Lamp Housing for Mercury/ Xenon Burner U-LH80HGXE

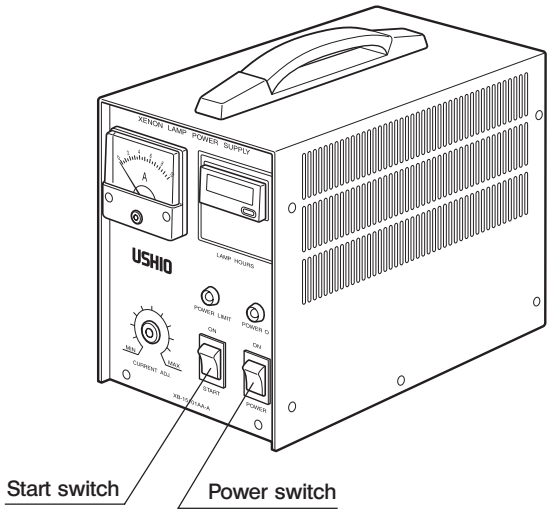


UV Light Guide U-UVF2FB/U-UVF5FB



Power Supply for Mercury/ Xenon Burner (Mfd. by USHIO)

◎Refer to the separate instruction manual.



3 PREPARATION

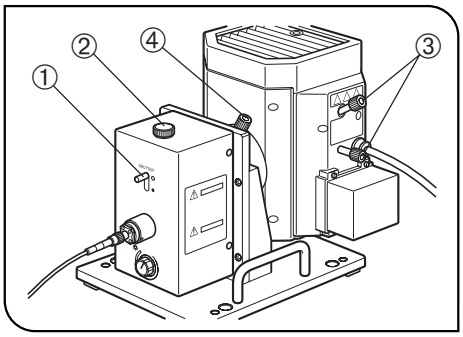


Fig. 1

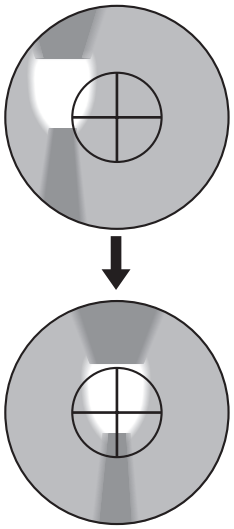


Fig. 2

1 Centering the Mercury/Xenon Burner (Figs. 1 & 2)

1. To prevent the UV rays from being output unexpectedly, set the shutter selector lever ① of the light source box to the bottom position (marked ●).
2. Turn on the power supply (by setting the power switch to " | " and then setting the start switch to ON) to ignite the burner, and wait for 5 to 10 minutes until the arc image stabilizes.
3. Remove the cap ② of the centering scope by turning the cap counter-clockwise.
4. Observing the UV-cut centering scope, adjust the following controls so that the brightest and most well focused part of the arc image comes on the center of the cross lines in the centering scope.
   - Burner centering knobs ③
   - Collector lens focusing knob ④
5. Observing the monitor for UV observation, perform final adjustment so that the observation image is brightest.
6. Attach the cap ② in the original position.

◎After long hours of use, the electrodes will be consumed and the centering position be deviated. The centering should therefore be adjusted periodically.

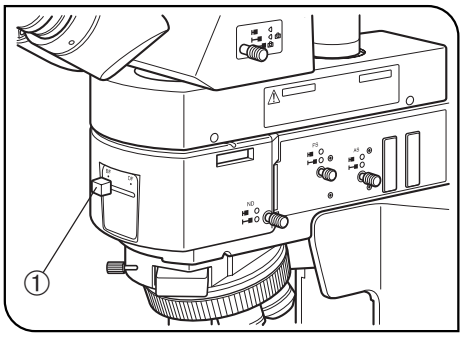


Fig. 3

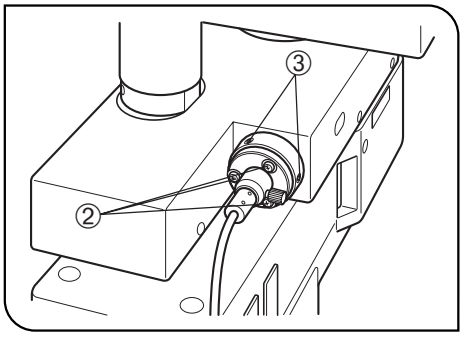


Fig. 4

2 Adjusting the Illumination Center (Figs. 3 & 4)

◎This adjustment consists of aligning the UV light guide with the center of the MApo100X objective for 248 nm UV observation.

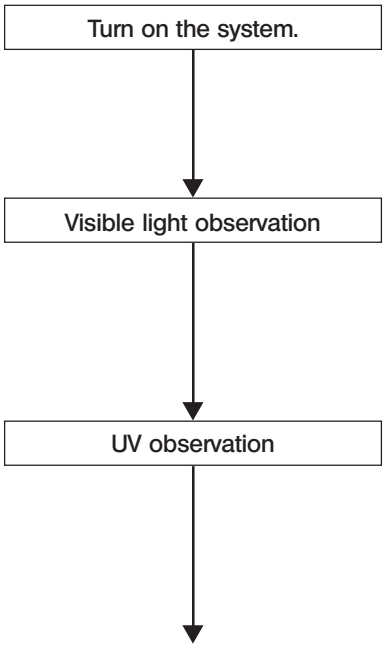
1. Set the light path selector lever ① of the reflected light illuminator to the BF position.
2. Place a specimen with a mirror surface on the stage.
3. Bring the specimen into focus by switching the objectives for visible light from the lowest to the highest magnifications.
4. The light path selector lever ① of the reflected light illuminator to the DF position for UV observation.
5. Engage the MApo100X objective for UV observation into the light path.
6. Set the shutter selector lever of the light source box (① in Fig. 1) to the upper position (marked O) to open the shutter.
7. Bring the specimen into focus by observing the monitor for UV observation. If the observation image is not displayed or abnormally dark, the illumination center is deviated. In this case, the light guide mount should be adjusted.
8. Using a Phillips screwdriver, loosen slightly the three clamping screws ② of the UV light guide mount.
9. Insert the provided Allen screwdriver alternatively into the two adjustment screws ③ and turn the screws until the brightest observation image is obtained.
10. After completing the adjustment, be sure to tighten the three clamping screws ②.

◎Hereafter, the illumination center adjustment is not required until the UV light guide is replaced. However, when a combined microscope is changed or an AF unit is added, the illumination center needs to be readjusted.

The UV light guide is a consumable part. It should be replaced when the image is deteriorated to a degree it cannot be rendered brighter even by adjusting the illumination center.

4 SUMMARY OF VISIBLE/UV LIGHT OBSERVATION PROCEDURE

◎Before turning on the system, be sure to close the shutter by setting the shutter selector lever of the UV248 light source box to the bottom position (marked ●).



(Operation)

1. Switch on the power supply for mercury/xenon burner (by setting the power switch to " | " and then setting the start switch to ON).
2. Switch on the microscope.
3. Switch on the TV camera/monitor for UV observation.
4. Switch on other set-up modules.

1. Set the light path of the reflected light illuminator to the BF position.
2. Engage a low-power objective for visible light observation in the light path.
3. Place a specimen and adjust the focusing and brightness.
4. Engage a high-power objective for visible light observation and adjust the focusing and brightness.

1. Set the light path of the reflected light illuminator to the DF position.
2. Engage the MApo100X objective for UV observation.
3. Set the shutter selector lever of the UV248 light source box to the upper position (marked ○).
4. Observing the monitor, adjust the focusing and brightness.

5 SPECIFICATIONS

■UV248 Observation Tube U-UVF248IM

Item	Specifications	
	Visible light path	UV light path
Tube magnification	1X (with built-in UV cut filter)	2.5X
Field number	FN 22 (FN 20 for camera observation)	FN 12.5 (Actual field: 50 μm)
Optical wavelength	Visible light	248 ±4 nm
Applicable objectives	UIS2 (UIS) series	MApo100X for 248 nm only.
Applicable light source	Depending on the microscope model.	80 W mercury/xenon burner
Applicable TV camera	Depending on the TV system.	C-mount, CCD size of 2/3 inch or less. [Recommended model] Sony XCD-SX910UV (1/2-inch CCD)
Dimensions & weight	108(W) x 157.5(H) x 259(D) mm, approx. 1.9 kg.	

■248 Light Source Box U-UVF248LB

Item	Specifications
Applicable light source	Lamp housing: U-LH80HGXE. Mercury/xenon burner: UXM80E (Life: Approx. 1000 hours). Power supply: Mfd. by USHIO.
Optical wavelength	248 ±4 nm.
Brightness adjustment	Continuously variable from 0% to 100%.
Shutter	Up/down sliding selector lever.
Dimensions & weight	170(W) x 170(H) x 240(D) mm, approx. 3.4 kg.

■UV Light Guide U-UVF2FB/UVF5FB

Item	Specifications
Optical wavelengths	210 to 800 nm
Fiber diameter	500 μm
Length & weight	U-UVF2FB: 2 meters, approx. 40 grams. U-UVF5FB: 5 meters, approx. 70 grams.

6 TROUBLESHOOTING GUIDE FOR UV OBSERVATION

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 Olympus for assistance.

Trouble	Cause	Remedy	Page
The UV observation image on the monitor is invisible or dark.	Cables are connected improperly or the system is not turned on.	Check all connections and turn on the system.	16
	No mercury/xenon burner is mounted on the lamp housing.	Mount the UXM80E mercury/xenon burner.	14
	The time elapsed after ignition of the mercury/burner is short.	Wait for about 5 to 10 minutes until the arc image stabilizes.	8
	The shutter of the light source box is closed (the lever is set to the position marked ●),	Set the shutter selector lever to the upper position (marked ○) to open the shutter.	9
	The light path of the reflected light illuminator is set to a position other than DF.	Set it to the DF position.	9
	The objective for UV observation is not engaged in the light path.	Engage the MApo100X objective for 248 nm UV observation in the light path.	–
	The mercury/xenon burner is not centered correctly.	Adjust the centering correctly.	8
	The illumination center is deviated.	Adjust it correctly.	9
	The setting of the illumination lens adjustment screw is deviated.	Set it to the correct position.	6
	The UV adjustment knob is set to the MIN position.	Adjust it by turning it toward MAX while observing the image.	6
	The mercury/xenon burner is blown or its life is expired.	Replace with the specified burner.	14

7 ASSEMBLY

★Some of the modules already mounted on the microscope system should be dismounted when mounting this unit.
When dismounting or mounting a module, handle it carefully, remove dirt or dust on the mounting section and take care not to damage the module.

1 Attaching the Reflected Light Illuminator

Mount an applicable reflected light illuminator on the microscope frame.
◎Refer to the applicable instruction manual.

2 Attaching the UV248 Observation Tube (Fig. 5)

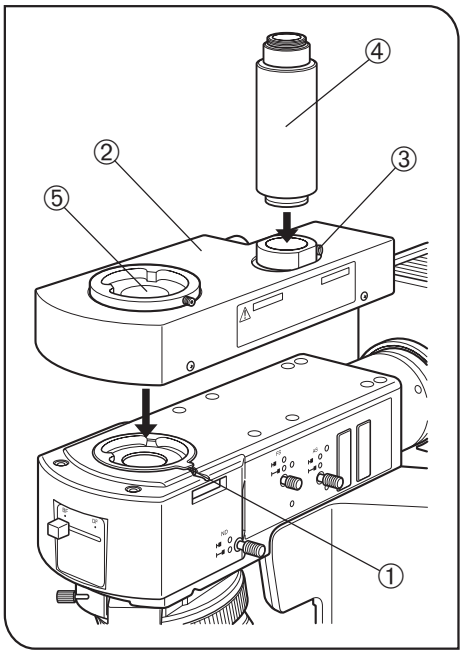


Fig. 5

1. Using the Allen screwdriver, fully loosen the observation tube clamping screw ① of the reflected light illuminator, fit the round dovetail on the bottom of the UV248 observation tube ② into the observation tube mount, and tighten the observation tube clamping screw ①.

When Using the Active AF Unit
- Mount the AF unit above the reflected light illuminator.
- With certain AF unit models, the spacer 10 provided with the UV248 observation tube should be attached to the AF unit body.

2. Using the Allen screwdriver, loosen the TV adapter clamping screw ③, fit the TV adapter ④ and tighten the clamping screw ③.
3. Screw in the TV camera for UV observation into the C-mount for TV adapter.
4. Attach the observation tube for visible light on the observation tube mount ⑤.
When the TV adapter is to be used, attach it to the straight tube section of the trinocular observation tube.

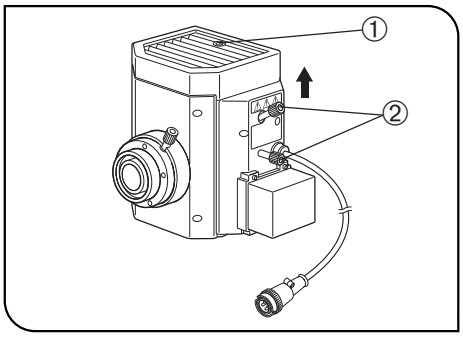


Fig. 6

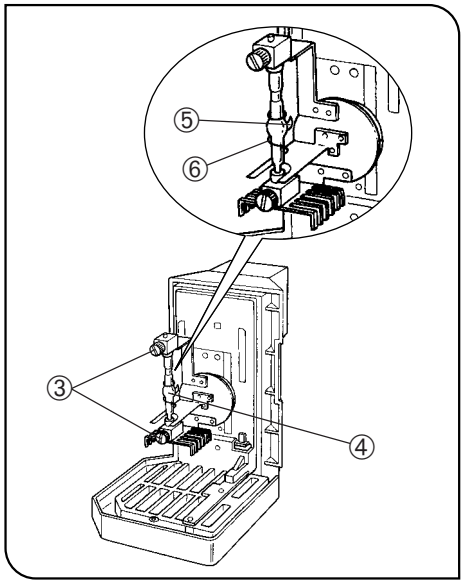


Fig. 7

3 Attaching the UV248 Light Source Box (Figs. 6 to 8)

Attaching the Mercury/Xenon Burner (Figs. 6 & 7)

⚠ **The burner and areas near it will be extremely hot during and right after use. To prevent burns, wait until the burner and lamp housing have cooled down after turning the burner off.**

⚠ **Do not touch the burner socket immediately after ignition. Otherwise, an electric shock may result due to the remaining charge of the high voltage required for ignition.**
Before opening the lamp housing after use, set the power switch to "O" (OFF) and wait 10 minutes or more until the burner and lamp housing have cooled down.

1. Loosen the socket clamping screw ① using the Allen screwdriver.
2. Hold the upper part of the lamp housing and pull it up straight 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. 7.

◎ 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 burner so that the - (negative) pole comes at the top and tighten the - (negative) pole side with one of the screws ③. Then fit the + (positive) pole of the burner into the + (positive) side socket hole and tighten the other screw ③.

⚠ **Be sure to use the UXM80E burner (mfd. by USHIO) that is available through Olympus.**

★ **Be careful not to soil the burner with fingerprints or dust. If it becomes dirty, wipe clean the burner surface with a piece of gauze moistened with a mixture of ether (70%) and alcohol (30%).**

★ **The burner ④ should be attached so that projection ⑤ on the tube is oriented toward the burner mounting side and does not hinder the light path.**

★ **The trigger wire ⑥ of the xenon burner should face the starter connecting surface so that it will not interfere with the light path.**

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

★ **To attach, align the external surface of the socket with that of the lamp housing and push the socket straight downward.**

⚠ **Do not ignite the burner until the lamp housing is mounted on the UV248 light source box. Otherwise, the UV rays may injure your eyes or skin.**

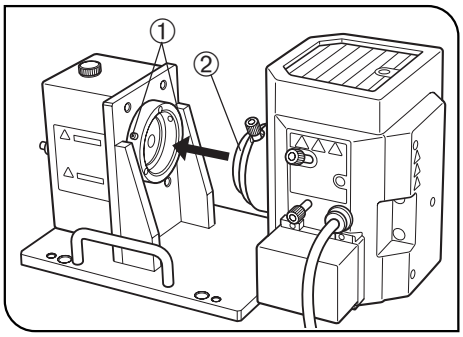


Fig. 8

Attaching the Lamp Housing (Fig. 8)

1. Loosen the two lamp housing clamping screws ① of the UV248 light source box.
2. Insert the mount seat ② of the lamp housing into the mount and tighten the clamping screws ①.

⚠ Attach the lamp housing and take care not to tilt it. Reserve enough space around the lamp housing to ensure ventilation.

Resetting the Burner Hour Counter

Set the hour counter by referring to the instruction manual provided with the power supply.

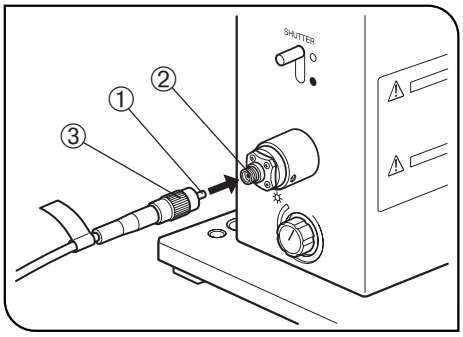


Fig. 9

4 Attaching the UV Light Guide (Figs. 9 & 10)

⚠ Do not bend the UV light guide into a radius below 100 mm to prevent it from breaking. Also do not place a heavy object on the light guide or subject it to strong force.

1. Remove the protective rubber caps from the two ends of the light guide. Handle the light guide carefully so as not to leave stain or damage on the end surfaces.
2. Insert the input connector ① into the UV light guide mount ② on the UV248 light source box by aligning the positioning marks, and tighten the clamping ring ③.
3. Loosen the clamping knob ④ and insert the output connector ⑤ all the way. Clamp the connection so that the clamping knob ④ is aligned with the positioning reference plane ⑥.

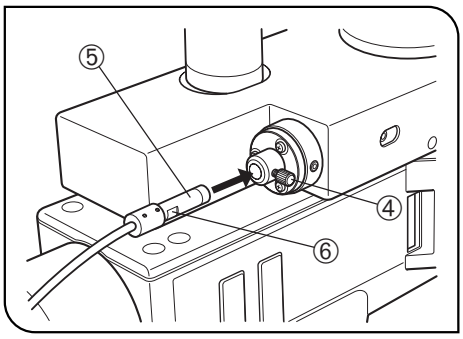


Fig. 10

5 Attaching the MApo100X Objective for UV Observation

Attach the objective in the same way as a UIS2 (UIS) objective.

⚠ To prevent unexpected irradiation of UV rays, be sure to close the idle objective positions of the revolving nosepiece by attaching the caps provided with the revolving nosepiece.

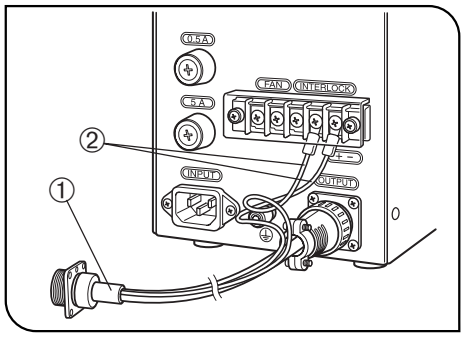


Fig. 11

6 Connecting the Power Supply for Mercury/ Xenon Burner (Fig. 11)

◎For the basic connections, refer to the instruction manual provided with the power supply for mercury/xenon burner.
The following description pertains to the settings required for use of this unit and the method of attaching the conversion cable.

1. Set the 75 W/150 W switch to 150 W.
2. Use the same output setting as the factory-shipped setting.
3. Use the conversion cable ① for the connection of the lamp housing. Connect the interlock cables ② to the positions shown in the figure.
   • Red cable: To INTERLOCK (+).
   • Blue cable: To INTERLOCK (-).

7 Connecting Other Cables

1. When connecting a module equipped with a main switch, set it to "O" (OFF) before connection or disconnection.
2. For safety, the connection of the power cord into the power outlet should always be the last connected cable.
3. Be sure to connect each cable firmly.

8 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 mercury burner 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.

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