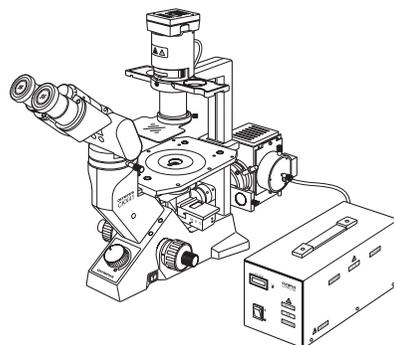


OLYMPUS®

Modules described in this manual

CKX-RFA
U-LH50HG
U-RFLT50
CKX-NU



INSTRUCTIONS

REFLECTED FLUORESCENCE SYSTEM FOR CKX41

This instruction manual is for the Olympus Reflected Fluorescence System for use with the CKX41 culture microscope. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this system, we recommend that you study this manual thoroughly before operating the system. Retain this instruction manual in an easily accessible place near the work desk for future reference.

— This publication is printed on 100% recycled paper —



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CONTENTS

To let the reflected fluorescence system manifest its full performance, it is critical that you assemble and adjust the system properly. If you want to assemble the system yourself, read Chapter 7, "ASSEMBLY" (pages 21 to 28) first.

IMPORTANT - Be sure to read this first for safe use of the equipment. -	1-3
1 NOMENCLATURE	4
2 CONTROLS OF EACH MODULE	5,6
3 SUMMARY OF REFLECTED FLUORESCENCE OBSERVATION PROCEDURE	7,8
4 USING THE CONTROLS	9-17
<ul style="list-style-type: none"> 1 General Precautions for Observation 2 Selecting the Reflected Light Fluorescent Mirror 3 Applicable Fluorescence Objectives 4 Turning On the Mercury Burner 5 Centering the Mercury Burner 6 Centering the Field Iris Diaphragm 7 Switching the Filter Slider 	
5 TROUBLESHOOTING GUIDE	18,19
6 SPECIFICATIONS	20
7 ASSEMBLY	21-28
8 U-EXCITATION FILTER SET CKX-NU (OPTIONAL)	29
■ PROPER SELECTION OF THE POWER SUPPLY CORD	30,31

IMPORTANT

The reflected fluorescence system is designed to be mounted on the CKX41 culture microscope to enable the transmitted light observation and B/G-excited (U-excitation optionally available) fluorescence observation by switching them using a slider.

SAFETY PRECAUTIONS

1. Make sure that the main switch of the power supply unit is set to "○" (OFF) before connecting the power cord to the AC outlet.
2. The power supply unit contains high-voltage components. Never attempt to disassembly the unit, or you may run the risk of electric shock.
3. Always be sure to **ground** (earth) the equipment. Otherwise, Olympus will no longer warrant the electrical safety of the equipment.
4. The reflected fluorescence system should be installed on a flat surface so that the ventilation opening on the bottom panel is not blocked.
Do not install the system on a surface which is soft or which may collapse under the weight of the microscope, for the subsequent blockage of the bottom panel ventilation opening could create a fire hazard.
5. The high-pressure mercury burner used should be the HBO50W/AC (OSRAM) or CS50W4 (PHILIPS).
6. Before opening the lamp housing for replacement of the burner or any other internal part, set the mains switch to "○" (OFF), unplug the lamp housing connecting cord from the outlet connector on the power supply unit, and wait 10 minutes or more until the lamp housing cools down.
7. Do not open the lamp housing while it is turned on or for at least 10 minutes after it has been turned off. Lamp housing parts are extremely hot and cause burns if touched (see page 13).
8. Do not remove the lamp housing while the burner is lit.
Also, do not turn the burner on while the lamp housing is removed.
9. Do not install the lamp housing upside down or at an angle.
The lamp housing surface becomes very hot during operation, so ensure that there is ample free space around the lamp housing, especially above and below.
10. If the microscope power cord comes in contact with the lamp housing or its surroundings, the cord may melt and subsequently cause electric shock. Be sure to position the power cord at a safe distance from the lamp housing.
11. A used mercury burner should be disposed of in compliance with the ordinances or regulations of your national or local government.
12. To replace the lithium battery (for the hour counter) built into the power supply unit, consult Olympus.
As the power supply unit incorporates a lithium battery, it should be disposed of in the same way as a used mercury burner, i.e., in compliance with the ordinances or regulations of your national or local government.
13. Before placement of the dust cover for protection after operation, wait until the lamp housing cools down sufficiently and unplug the power cord.

Safety Symbols

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

Symbol	Explanation
	Indicates that the surface becomes hot, and should not be touched with bare hands.
	Before use, carefully read the instruction manual. Improper use could result in personal injury to the user and/or damage to the equipment.
	Indicates a potential fire hazard; when replacing fuses, be sure that the replacement fuses are of the specified rating.
	Indicates that the main switch is ON.
	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 system. Always heed the warnings.

Warning indication position	Lamp housing U-LH50HG	[Warning against high temperature]	
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1 Getting Ready

1. The system is composed of precision instruments. Handle it with care and avoid subjecting it to sudden or severe impact.
2. Do not use the system where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations. (For the operating conditions, see chapter 6, "SPECIFICATIONS".)
3. Make certain that the burner is installed correctly and that all cords are correctly connected.
4. The stopper mechanisms provided for the functions indicate the limits of motion. To prevent damage, do not apply excessive force to these limiting mechanisms.
5. Flare may be observed in fluorescence observation using cooled CCD. This flare can be reduced by inserting a filter, which is available on custom order, in the fluorescence illumination tube. (Please contact Olympus.)

2 Maintenance and Storage

1. Be careful to avoid leaving dirt or fingerprints on the lenses, filters and high-pressure mercury burner, for contamination of these parts may cast the shadow of a foreign object in the field of view or compromises the burner performance.

If a glass component is contaminated, clean it by wiping gently with gauze. To remove fingerprints or oil smudges, wipe with gauze slightly moistened with a mixture of ether (70%) and alcohol (30%).

▲ Since solvents such as ether and alcohol are highly flammable, they must be handled carefully. Be sure to keep these chemicals 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 these chemicals only in a well-ventilated room.

2. The mercury burner has an average service life of 100 hours. When the hour counter on the power supply unit indicates 100 hours, replace the burner with a new one (see page 26).
Using a burner after its service life expires could lead to the burner exploding, though this occurs very rarely.
3. The surfaces of the dichroic mirror and excitation/barrier filters are very delicate. When it becomes necessary to clean it, please contact Olympus.
4. Do not disassemble any part of the system as this could result in malfunction or reduced performance.

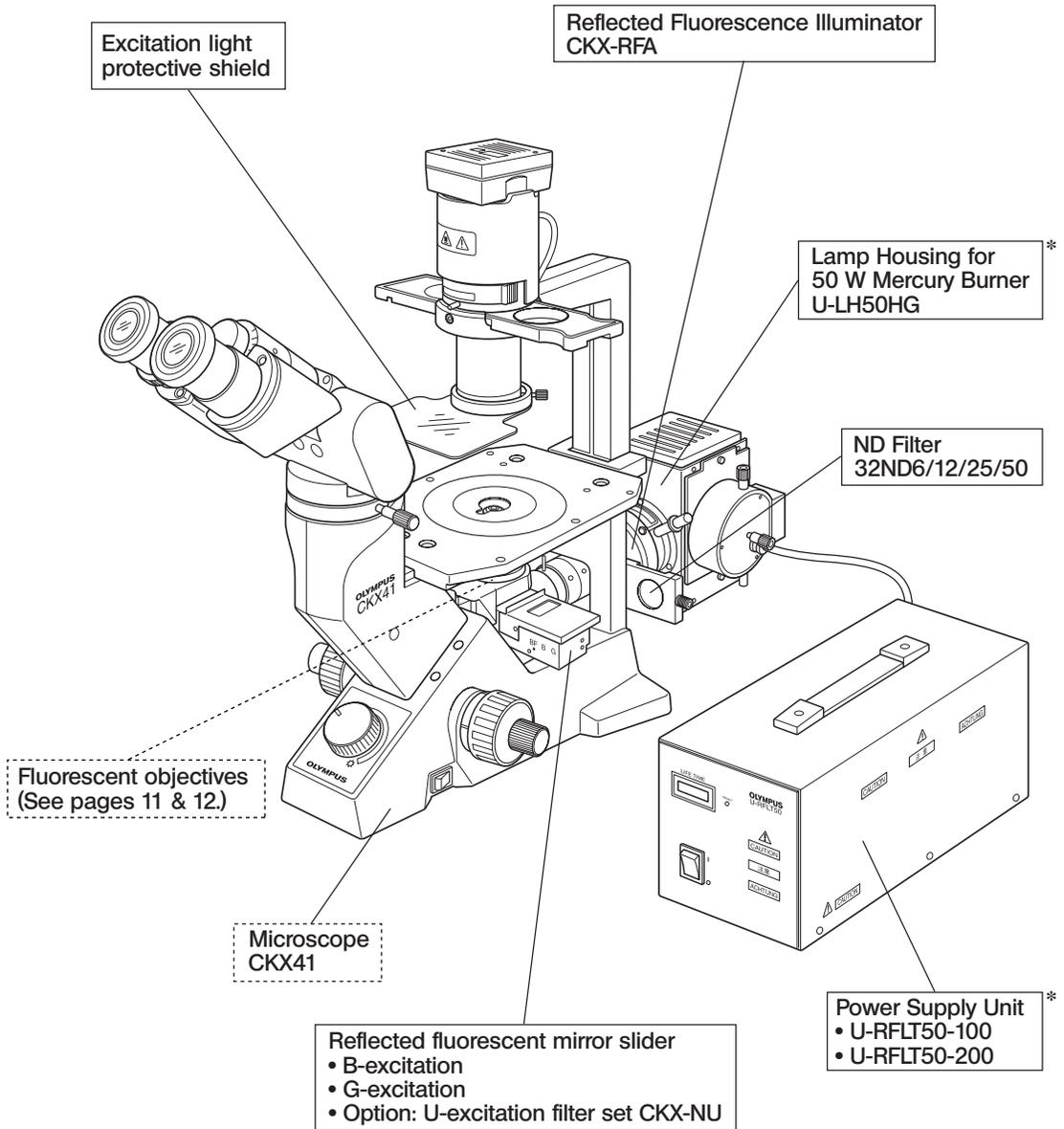
3 Caution

If the 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

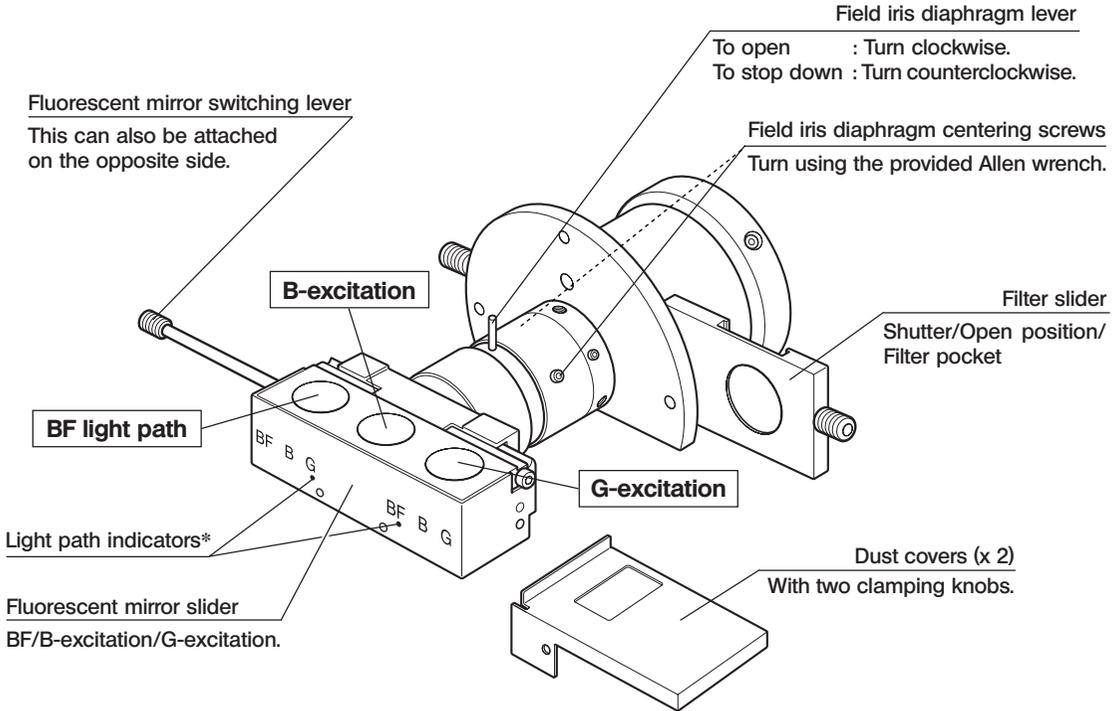


* A metal halide lamp can be used instead of the 50 W mercury burner (except in U-excitation). (Lamp housing: U-LH50MH. Power supply unit: U-PS50MH)

* The 100 W mercury burner cannot be used.

2 CONTROLS OF EACH MODULE

Reflected Fluorescence Illuminator CKX-RFA

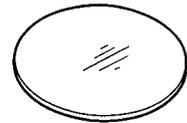


Fluorescent mirror slider
BF/B-excitation/G-excitation.

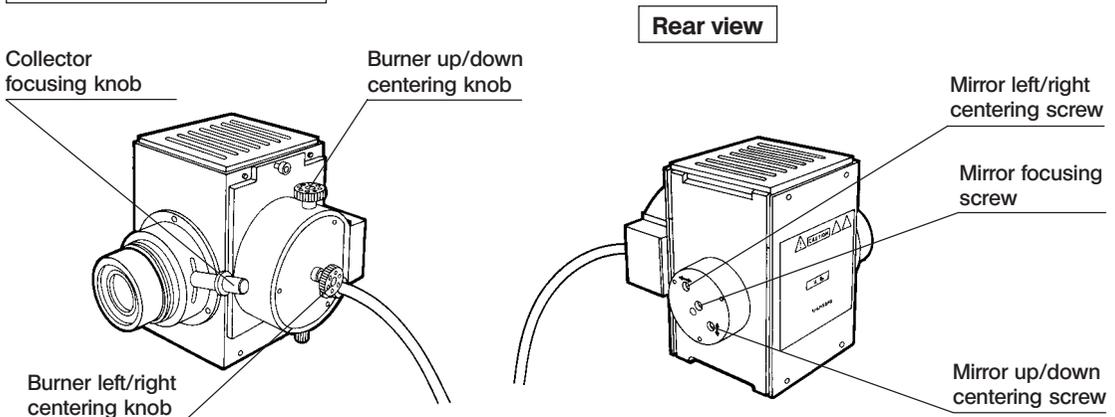
* View of light path indicators from the front side of microscope

Light Path	G-excitation	B-excitation	Brightfield
View	BF B G	No indication	BF B G

ND Filter 32ND6/12/25/50

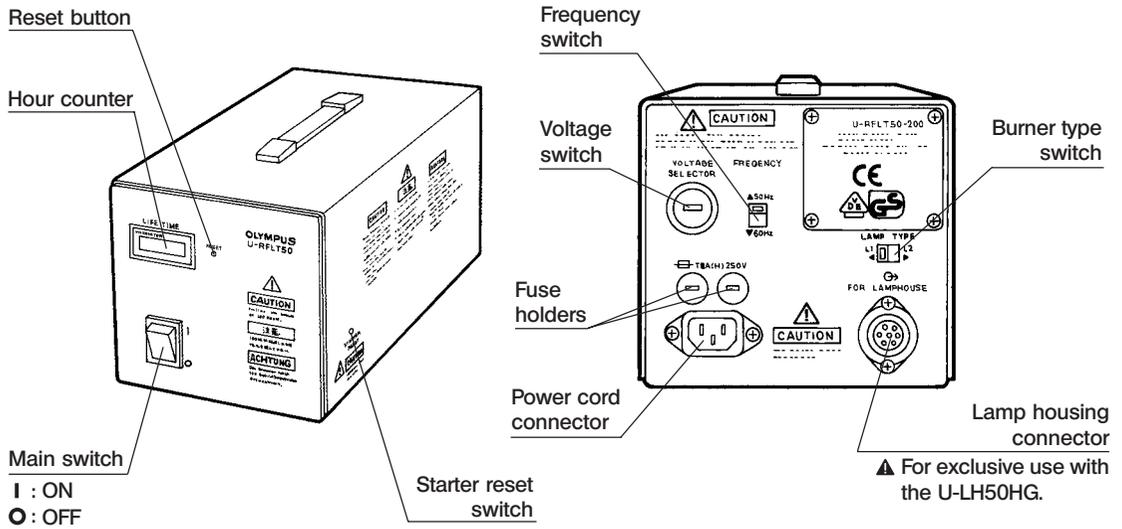


Lamp Housing U-LH50HG



**Power Supply Unit for 50 W
Mercury Burner U-RFLT50**

★ The depth dimensions of the 100 V and 200 V models differ from each other.



3

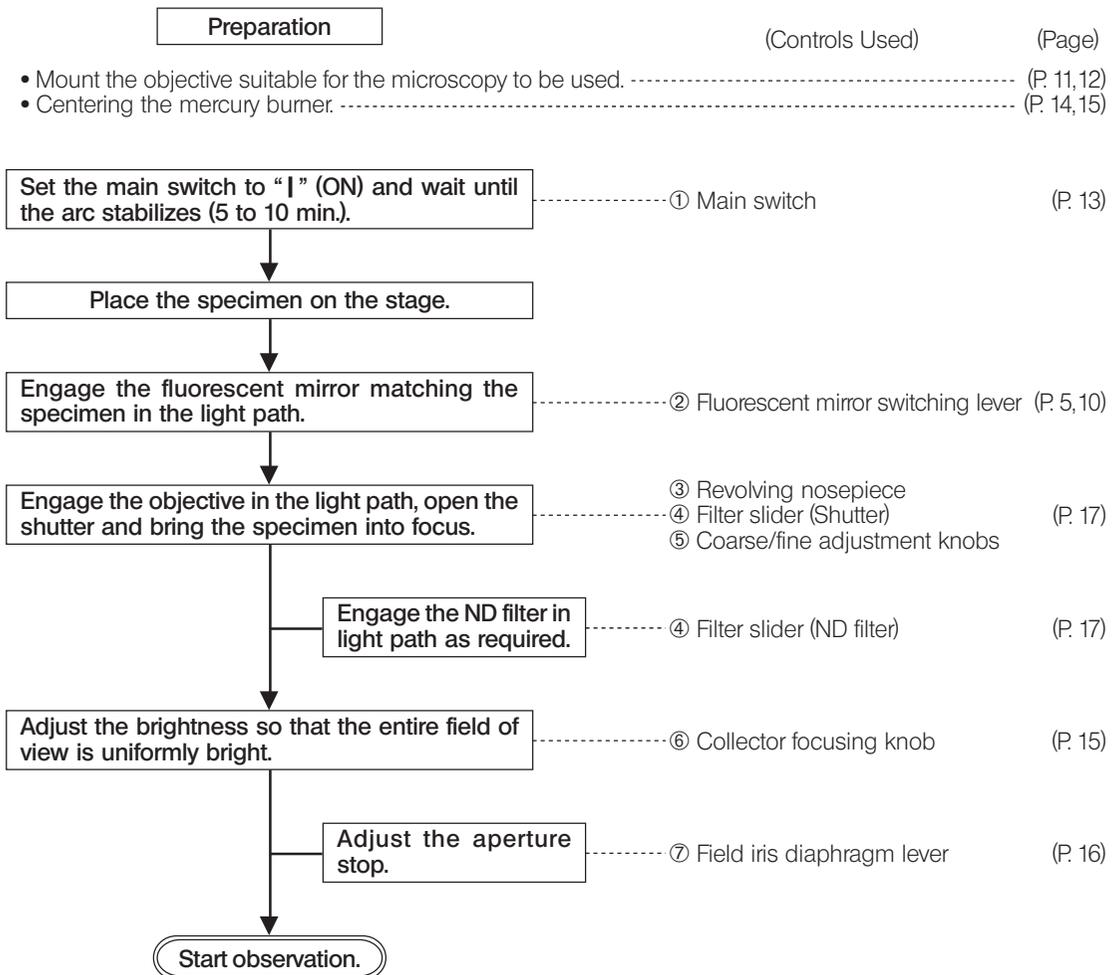
SUMMARY OF REFLECTED FLUORESCENCE OBSERVATION PROCEDURE

⊙ If you view excitation light during observation, the light may be slightly glaring except when it is seen through the excitation light protective shield. However, as the lamp housing incorporates a UV cut filter, the excitation light is not hazardous even if it enters your eye. However, it is still recommended to view the excitation light through the excitation light protective shield whenever possible.

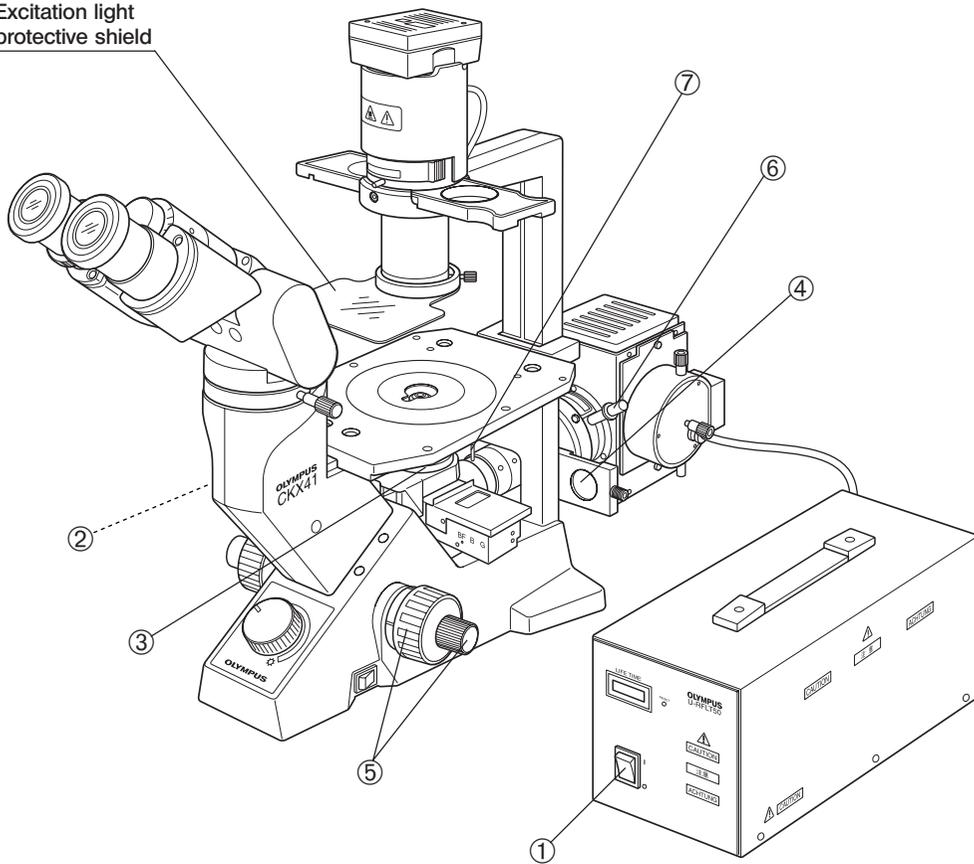
▲ When U-excitation is used, always be sure to view it through the excitation light protective shield.

⊙ When it is required to interrupt observation for a short period, use the shutter (in ④ Filter slider).

⊙ When searching for the observation target position on the specimen, it is recommended to set the CKX41 for transmitted brightfield observation (possible by stopping down the aperture iris diaphragm) or transmitted phase contrast observation to facilitate it. After locating the observation target position, turn off the transmitted light illumination.



Excitation light
protective shield



©Make a photocopy of the observation procedure pages on separate sheets and post it near your microscope.

4 USING THE CONTROLS

1 General Precautions for Observation

1. Confirm that the power supply unit has been set to the proper power supply voltage, power supply frequency and burner type. Improper setting of these items may degrade burner service life considerably.
2. Confirm that the power cord and connecting cords are connected properly.
3. When transmitted phase contrast or transmitted relief contrast observation is required, leave an open position (BF) in the reflected fluorescent mirror slider. This position will allow the original colors to be reproduced.
4. Stop down the field iris diaphragm until its image circumscribes the field of view. If it is decentered, adjust centering using the Allen screwdriver. (P:16)
5. When using an LCPlanFI series objective, attach the correction cap, which compensates for the material and thickness of the container used in observation. For the type of the correction cap to be used, refer to the instruction manual for the CKX series culture microscopes.
6. The LUCPlanFLN20X/40X/60X, LCPlanFI40X and LUCPlanFI40X objectives with correction collar are capable of compensating for the drop in resolution due to variance in the cover glass thickness. For details, refer to the instruction manual for the CKX series culture microscopes.
7. When it is required to interrupt observation for a short period, use the shutter. (Repeated on-off of the mercury burner will shorten its service life considerably.)
8. Precautions on the specimen color fading:

The system employs high-intensity excitation light to enable bright observation of dark fluorescent specimens.

As a result, if high-power objectives are used frequently, color fading of the specimen occurs early, degrading the view (contrast) of fluorescent images.

To delay color fading of the specimen and obtain favorable fluorescent images, it is recommended to reduce the excitation light intensity a little.

The excitation light intensity can be reduced by using ND filters to an extent that does not hinder observation. It is also effective to use the shutter frequently to avoid illuminating the specimen for a longer period than required.

Color fading of the specimen can also be delayed using a commercially available color fading preventing agent (DABCO, etc.).

The use of color fading preventing agent is recommended specially when you perform high-magnification observation frequently.

★ **Note that color fading preventing agent cannot be used with certain specimens.**

2 Selecting the Reflected Light Fluorescent Mirror

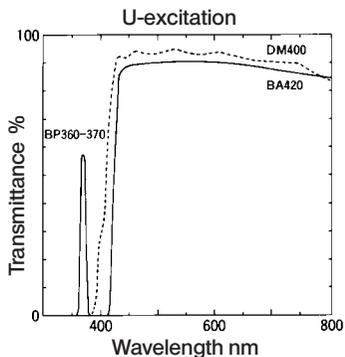
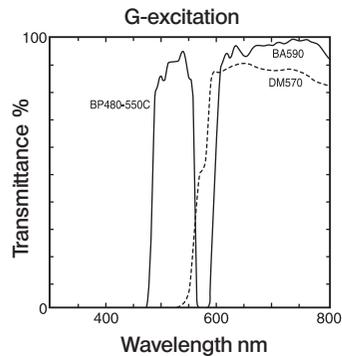
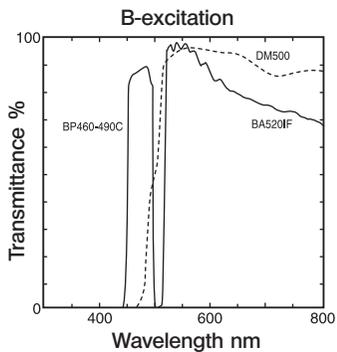
©The reflected light fluorescent mirrors for B-excitation and G-excitation have been installed in the fluorescent mirror slider at the factory.

If required, the optional CKX-NU mirror for U-excitation can be mounted in the open position or by removing the B- or G-excitation mirror. (Work to be done by the dealer)

Fluorescent mirror specifications

Excitation	Fluorescent Mirror	Dichroic Mirror	Excitation Filter	Barrier Filter	Applications
B	—	DM500	BP460-490C	BA520 IF	<ul style="list-style-type: none"> • FITC: Fluorescent antibody method • Acidine orange: DNA, RNA • Auramine: Tubercle bacillus • EGFP, S65T, RSGFP
G	—	DM570	BP480-550C	BA590	<ul style="list-style-type: none"> • Rhodamine, TRITC: Fluorescent antibody method • Propidium iodide: DNA • RFP
U	CKX-NU	DM400	BP360-370	BA420	<ul style="list-style-type: none"> • Auto-fluorescence observation • DAPI: DNA • Hoechst 33258, 33342: Chromosome

Spectral characteristics



3 Applicable Fluorescence Objectives

UIS2 Series

Microscopy	Fluorescence		
Excitation	B, G		U, B, G
Specimen	Plastic petri dish	Slide glass	Slide glass
Applicable objectives	PlanCN 4X PlanCN 10X		UPlanFLN 4X UPlanFLN 10X UPlanFLN 20X LUCPlanFLN 40X
	LCAchN 20XPh/PhP LUCPlanFLN 20X	PlanCN 20X	
	LUCPlanFLN 40X		

Microscopy	Fluorescence/Phase Contrast		
	IX2-SL		IX2-SLP
Excitation	B, G		
Specimen	Plastic petri dish		Plastic petri dish
	Multi-well / Dish, etc.	Dish, etc.	
Applicable objectives	UPlanFLN 4XPh		UPlanFLN 4XPhP CAchN 10XPhP LCAchN 20XPhP LCAchN 40XPhP
	CPlanN 10XPh	PlanN 10XPh	
	LCAchN 20XPh	LUCPlanFLN 20XPh	
	LCAchN 40XPh		

(Note) When a phase contrast objective is used in fluorescence observation, the brightness or contrast may sometimes be deteriorated slightly.

UIS Series

Microscopy	Fluorescence		
Excitation	B, G		U, B, G
Specimen	Plastic petri dish	Slide glass	Slide glass
Applicable objectives	PlanC 4X PlanC 10X		UPlanFI 4X UPlanFI 10X UPlanFI 20X LUCPlanFI 40X
	LCAch 20XPh/PhP LCPlanFI 20X	Ach 20X	
	LCPlanFI 40X		

Microscopy	Fluorescence/Phase Contrast		
	IX2-SL		IX2-SLP
Excitation	B, G		
Specimen	Plastic petri dish		Plastic petri dish
	Multi-well / Dish, etc.	Dish, etc.	
Applicable objectives	UPlanFI 4XPh		UPlanFI 4XPhP CAch 10XPhP LCAch 20XPhP LCAch 40XPhP
	CPlan 10XPh	Plan 10XPh	
	LCAch 20XPh	LCPlanFI 20XPh	
	LCAch 40XPh, LCAch 40XPh-2		

(Note) When a phase contrast objective is used in fluorescence observation, the brightness or contrast may sometimes be deteriorated slightly.

4 Turning On the Mercury Burner

(Fig. 1)

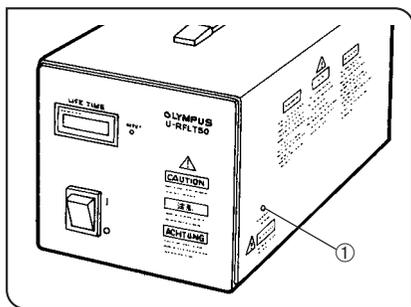


Fig. 1

- Set the main switch of the power supply unit to “I” (ON). The arc will stabilize in 5 to 10 minutes after ignition.
- ★ Some mercury burners may not ignite the first time the power is turned ON due to variance in production, and the safety mechanism in the starter of the power supply unit is activated to reset the starter in such a case. If this occurs, set the main switch to “O” (OFF) once, then insert a thin object such as a mechanical pencil tip into the starter reset hole ① on the right panel of the power supply unit to press the internal switch, and set the main switch to “I” (ON) again.
- ★ To avoid shortening the power supply unit’s operating life, avoid turning power on while the burner is not mounted or turning power on and off within short time intervals.
- ★ To avoid shortening the burner life, do not turn the burner off within 15 minutes after ignition. Use the shutter instead.
- ★ After the burner is turned off, it cannot be re-ignited before the mercury vapor cools and condenses to liquid. Wait about 10 minutes before restarting the burner.
- ▲ If the lamp housing is opened while the burner is ignited, the safety interlock will activate and switch off the power automatically. In this case, set the main switch to “O” (OFF) and wait for more than 10 minutes before restarting the burner. The lamp housing can be opened only after it has cooled down fully.
- ▲ When resetting the hour counter, be sure to press the reset button until “0.0” is displayed. When the hour counter indicates “100.0”, set the main switch to “O” (OFF) for safety, wait for more than 10 minutes, then replace the lamp burner after making sure that the lamp housing has cooled down. A mercury burner seals high-pressure gas inside. If the burner is used beyond its service life, stress may accumulate inside the burner, and in the worst (but very rare) case, the burner could explode.

5 Centering the Mercury Burner (Figs. 2 to 6)

☉ Before proceeding to center the burner, wait for the arc image to stabilize. To protect against glare during arc image centering, it should be viewed across the excitation light protective shield.

1. Remove the cap (or objective) from a revolving nosepiece position and engage this position in the light path.
2. Push in the fluorescent mirror switching knob ① to engage the B-excitation mirror in the center position in the light path.
3. Turn the field iris diaphragm lever ② clockwise to open the iris diaphragm.
4. Place a piece of white paper, such as copy paper, on the top of the stage, set the filter slider ③ to the center position and project the arc image.

☉ The arc image can be confirmed more easily by using the U-CST centering target screen.

★ If the arc image is too bright, insert the ND filter ④ into the filter pocket ⑤ and engage it in the light path. When the 32ND25 is used, the transmittance is 25%.

★ If the arc image focusing position cannot be identified easily, close the field iris diaphragm.

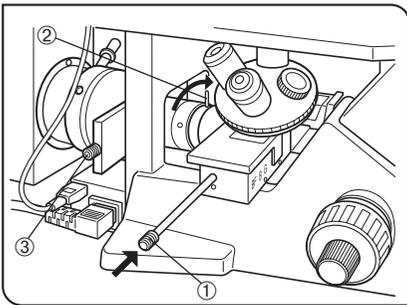


Fig. 2

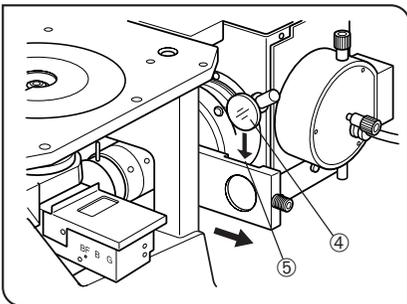


Fig. 3

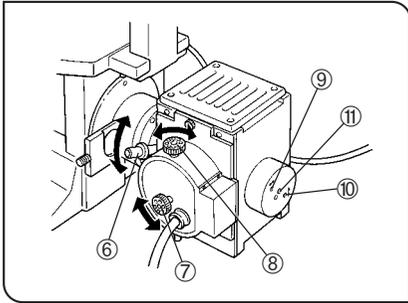


Fig. 4

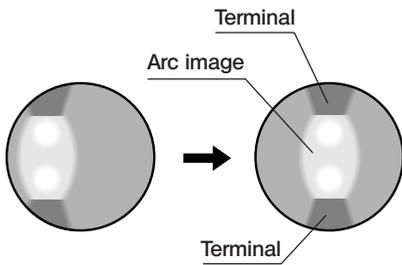


Fig. 5

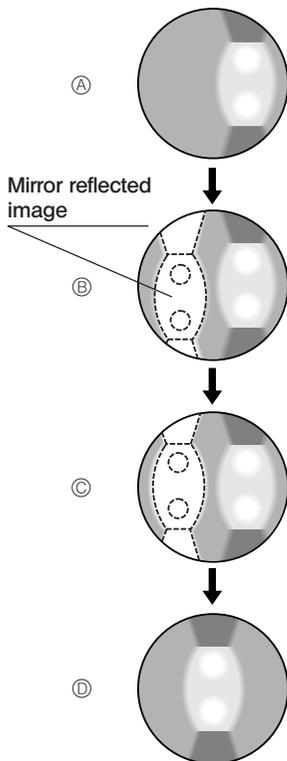


Fig. 6

5. Project the arc image on the white paper, then center and sharpen it by manipulating the collector focusing knob ⑥, burner left/right centering knob ⑦ and burner up/down centering knob ⑧ on the lamp housing. (Figs. 4 & 5)

★ **There may be causes in which the arc image projected on the white paper is a mirror-reflected image. If the arc image moves when the mirror left/right centering screw ⑨ or mirror up/down centering screw ⑩ is turned, it is a mirror-reflected image; bring it out of the field and center the arc image as described above. (Fig. 4)**

6. Manipulate the burner left/right centering knob ⑦ slightly to move the arc image to the right (or left). (Figs. 4 & 6 ㉔)

7. Using the Allen wrench provided with the illuminator, turn the mirror focusing screw ⑨, mirror left/right centering screw ⑨ and mirror up/down centering screw ⑩ to form the mirror-reflected arc image on the white paper. (Figs. 4 & 6 ㉕)

8. Adjust the mirror centering screws ⑨ and ⑩ to move the direct and mirror-reflected arc images in the symmetrical position between each other, and turn the mirror focusing screw ⑩ to adjust the size of the mirror-reflected image until it is identical to that of the direct image. (Figs. 4 & 6 ㉖)

9. Turn the burner left/right centering screw ⑦ to overlap the direct image with the mirror-reflected image. (Figs. 4 & 6 ㉗)

10. Engage the 10X objective in the light path while continuing to use the B-excitation mirror.

11. Place a specimen on the stage and bring into approximate focus.

12. Look into the eyepiece and manipulate the collector focusing knob ⑥ to make the field as bright as regular as possible, then turn the knob clockwise to tighten. (Fig. 4)

㉘ Maintain this condition until the next time the burner is replaced.

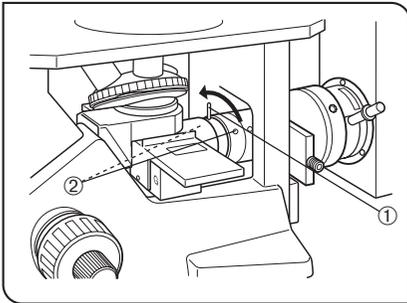


Fig. 7



Fig. 8

6 Centering the Field Iris Diaphragm (Figs. 7 & 8)

1. Engage the 10X objective in the light path, push in the fluorescent mirror switching knob to engage the B-excitation mirror in the light path, and set the filter slider to the central open position or the position of the ND filter.
2. Place a specimen on the stage and bring into approximate focus.
3. Turn the field iris diaphragm lever ① counterclockwise little by little, and confirm the iris diaphragm position.
4. Using the provided Allen wrench, turn the two field iris centering screws ② alternately to move the image of the diaphragm to the center.
5. After moving the diaphragm image to the center, open the field iris diaphragm. As this makes slight deviation noticeable, adjust the centering precisely.
6. After completion of centering, engage the iris diaphragm diameter until it just circumscribes the field of view.

Adjusting the field iris diaphragm

The field iris diaphragm adjusts the diameter of the illuminating beam to obtain good image contrast.

Keeping the field iris diaphragm stopped down to the smallest required area for each observation makes it possible to prevent color fading of areas outside the observation target region.

According to the objective in use, adjust the diaphragm image using the field iris diaphragm lever so that the field of view is circumscribed by the field iris diaphragm to exclude stray light.

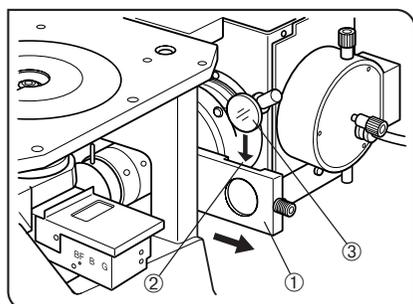


Fig. 9

7 Switching the Filter Slider

(Fig. 9)

☉ Hold the knob of the filter slider ① on the illuminator and move the knob to the left and right to select one of the three positions, which are arranged in order of the filter pocket, open position and shutter from the right to the left.

To adjust the observation brightness, insert an optimum ND filter (32ND6, 32ND12, 32ND25 or 32ND50) into the filter pocket and set the filter slider to engage it in the light path. When not performing observation, set the filter to the shutter position to prevent the specimen fluorescence color fading by cutting the excitation light.

ND filter

☉ The ND filter can reduce the excitation light intensity to delay color fading of the specimen. Use the ND filter as far as this does not hinder operation.

1. Slide the filter slider ① on the illuminator in the direction of the arrow.
2. Drop in the ND filter ③ into the filter pocket ②.

★ **To prevent the ND filter from being cracked, insert it so that the surface with indications faces the observation side.**

⚠ **When replacing the ND filter, be sure to wait until the ND filter cools down.**

⚠ **When the mercury burner is lit for a long period while an ND filter is inserted, the filter and its metallic frame will become very hot. Take care not to burn yourself. Do not leave the filter slider to a position other than the click positions for a long period.**

☉ A filter other than ND filter can also be inserted provided that the outer diameter is 32 mm and the thickness is 3 mm or less.

★ **Use a reflection type ND filter (32ND6, 12, 25 or 50). Do not use a commercially available low-reflection ND filter as this may crack or burn the filter.**

5 TROUBLESHOOTING GUIDE

Under certain conditions, performance of the system 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 Olympus for assistance.

Problem	Cause	Remedy	Page
1. Optical System			
a) Although the mercury burner illumination is on, the field of view seen through the eye-pieces is invisible or dark.	An ND filter is engaged in the light path.	Set the filter slider to the open position.	17
	The fluorescent mirror is improperly engaged in the light path.	Engage it properly.	5
	The shutter is engaged in the light path.	Set the filter slider to the open position.	17
b) Visibility is poor. Image is not sharp. Contrast is poor.	The 40X objective in use is inaccurate or the correction collar not properly adjusted.	A 40X objective without correction collar cannot obtain the required fluorescence performance. Use the objective with correction collar and adjust it to find the best position.	-
	The objective or filter is dirty.	Clean them thoroughly.	3
	The field iris diaphragm is adjusted improperly.	Adjust it so that it circumscribes the field of view.	16
c) The edge of the field of view is obscured or not evenly illuminated	The objective is improperly engaged in the light path.	Make sure that the revolving nosepiece clicks properly into place.	16
	The fluorescent mirror is improperly engaged in the light path.	Engage it properly in the light path.	5
	The filter slider is stopped halfway in the light path.	Move the filter slider until the open position is engaged in the light path.	17
	The ND filter is stopped halfway in the light path.	Move the filter slider until it clicks into place.	17
	The mercury burner is centered improperly.	Adjust its centering.	14,15
	The collector focus position is deviated.	Adjust to an optimum position.	15
2. Electrical System			
a) The main switch cannot supply power to the system.	The power cord is connected improperly.	Connect it properly.	27
	A fuse is blown.	Replace the fuses.	28

Problem	Cause	Remedy	Page
b) The main switch can be set to ON but the burner does not ignite.	The lamp housing connecting cord is connected improperly.	Connect it properly to the connectors.	27
	The mercury burner is not mounted.	Attach a mercury burner.	25, 26
	The safety mechanism in the lamp housing is activated.	Tighten the lamp burner socket clamping screw firmly.	25
	The auto ignition system is malfunctioning.	Set the main switch of the power supply unit to "O" (OFF) then "I" (ON) again. (Repeated ON-OFF is possible in this case.)	13
c) The mercury burner flickers or the brightness is low.	The auto ignition safety mechanism is activated.	Press the switch inside the starter reset hole on the right panel of the power supply unit, and then set the main switch to "I" (ON) again.	13
	This phenomenon is observed in a short period after ignition.	Wait for 10 minutes or more after ignition.	13
	The power supply voltage and/or frequency switches are set improperly.	Set them properly.	27
	The burner life has expired.	Replace the mercury burner.	25, 26
d) The service lives of mercury burners are very short.	The power supply voltage is set improperly.	Set it properly.	27

6 SPECIFICATIONS

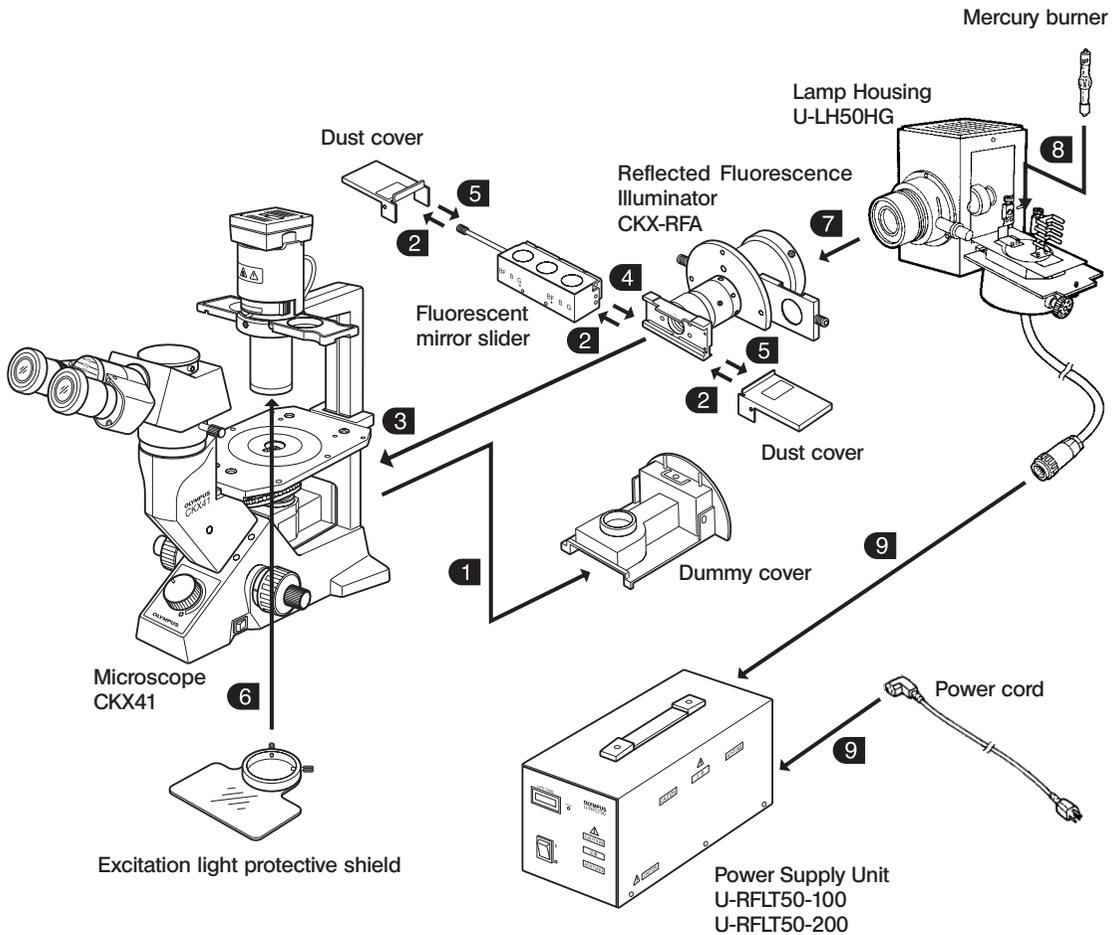
Module	Specifications
Reflected Fluorescence Illuminator CKX-RFA	Fluorescent lighting method: Reflected fluorescent lighting based on slide switching of fluorescent mirrors. Fied number: 22 (when the WH10X is used). Shutter: Switching using filter slider (Shutter/Open position/Filter pocket). Excitation light protective shield: Fixed on condenser with a screw. Possible observation methods: B-excitation, G-excitation, U-excitation (optional).
Lamp Housing for 50W Mercury Burner U-LH50HG	Burner centering, Up/down, left/right. Mirror centering: Up/down, left/right. Burner focusing: Collector focusing and mirror focusing screw system. Safety mechanism: Interlock switch, UV cut filter built in. « Applicable high-pressure mercury burners » <ul style="list-style-type: none"> • HBO50W/AC (OSRAM) • CS50W4 (PHILIPS)
Power Supply Unit U-RFLT50-100 U-RFLT50-200	Ignition system: Auto ignition. Hour counter: Displays the accumulated hours of operation. Input rating: Input voltage switchable. U-RFLT50-100: 100/110/120 V AC \sim , 2.5/2.3/2.0 A, 50/60 Hz U-RFLT50-200: 220/230/240 V AC \sim , 1.7 A, 50/60 Hz Dimensions U-RFLT50-100: 150(W) x 150(H) x 320(D) mm U-RFLT50-200: 150(W) x 150(H) x 210(D) mm Weight U-RFLT50-100: 12 kg (26.4 lbs) U-RFLT50-200: 7 kg (15.4 lbs.)
Operating environment	Indoor use. Altitude: Max. 2000 meters. Ambient temperature: 5° to 40°C (41° to 104°F). Maximum relative humidity: 80% for temperatures up to 31°C (88°F), decreasing linearly through 70% at 34°C (93°F), 60% at 37°C (99°F), to 50% relative humidity at 40°C (104°F). Supply voltage fluctuations; Not to exceed \pm 10% of the normal voltage. Pollution degree: 2 (in accordance with IEC60664). Installation category (Overvoltage category): II (in accordance with IEC60664).

7 ASSEMBLY

7-1 Assembly Diagram

The diagram below shows how to assemble the various modules for the microscope system. The numbers in the diagram indicates the assembly step order.

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



7-2 Detailed Assembly Procedure

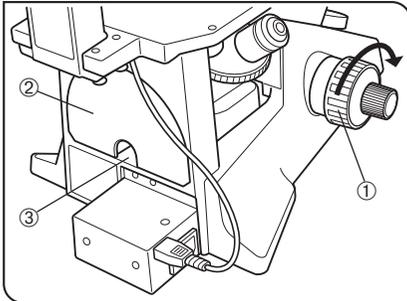


Fig. 10

1 Removing the Dummy Cover (Fig. 10)

1. Rotate the coarse adjustment knob ① in the direction of the arrow to raise the revolving nosepiece to the upper limit.
2. Hook your finger into the pulling hole ③ on the cover ② and remove the cover.

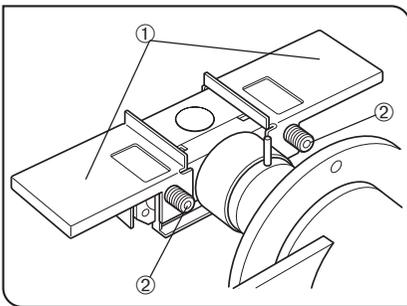


Fig. 11

2 Removing the Dust Cover and Fluorescent Mirror Slider (Figs. 11 & 12)

(Figs. 11 & 12)

1. Using the Allen wrench provided with the illuminator, loosen the clamping knob ② of the dust cover ① and remove it.
2. Using the Allen wrench provided with the illuminator, loosen the stopper screw ④ of the fluorescent mirror slider ③ at the extremity of the CKX-RFA illuminator and remove the screw and washer.
3. Pull the fluorescent mirror slider ③ in the direction of the arrow to remove it.

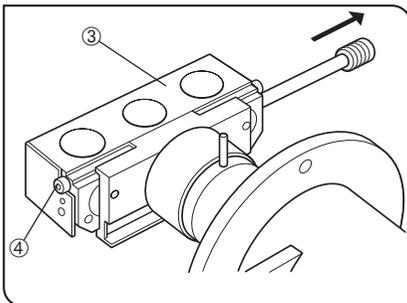


Fig. 12

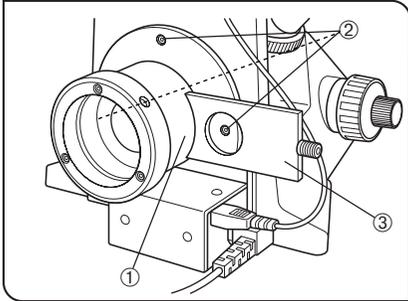


Fig. 13

3 Attaching the CKX-RFA Reflected Fluorescence Illuminator

(Fig. 13)

1. Gently insert the illuminator into the place from which the dummy cover has been removed.
2. Using the Allen wrench, tighten the three screws provided with the illuminator.

★ **Push the illuminator down while tightening the screws so that the illuminator does not go upward.**

- ⊙ The filter slider ③ may obstruct the lower one of the screw holes ②. Adjust the filter slider so that the open position or the filter pocket is placed over the lower screw hole when clamping the illuminator.

4 Attaching the Fluorescent Mirror Slider

Attach the fluorescent mirror slider, removed in ② above, attach the washer and tighten the screw.

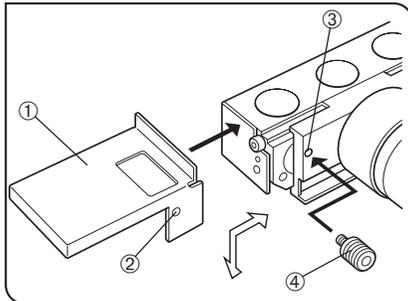


Fig. 14

5 Attaching the Dust Covers

(Fig. 14)

⊙ The dust covers on the left and right are identical.

1. Align the mounting hole ② of the dust cover ① and the screw hole ③ of the holding side of the slider and lightly secure the clamping knob ④ with your hand.
2. To prevent the dust cover ① from interfering with the fluorescent mirror slider and revolving nosepiece, push the dust cover downward as well as inward and secure the clamping knob tightly using the Allen wrench.
3. Attach the dust cover on the opposite side in the same way as above.

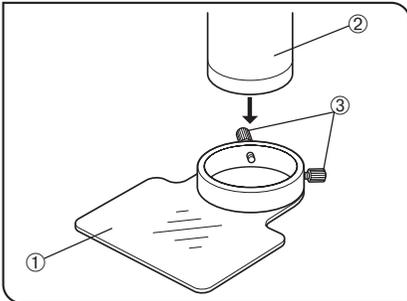


Fig. 15

6 Attaching the Excitation Light Protective Shield (Fig. 15)

⊙ The mounting holes for the excitation light protective shield have a large size because they are also used with the CKX-RCD condenser.

Insert the excitation light protective shield ① from the bottom of the condenser ②, and then tighten the two clamping screws ③.

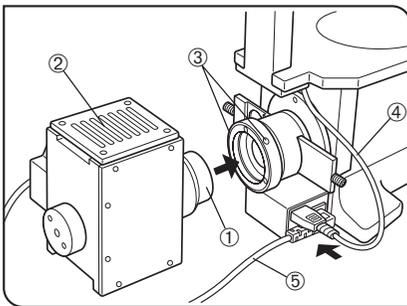


Fig. 16

7 Attaching the U-LH50HG Lamp Housing (Fig. 16)

Insert the collector ① of the lamp housing into the illuminator, rotate the lamp housing so that its top panel ② becomes horizontal, then tighten the two clamping screws ③ on the illuminator using the Allen wrench.

▲ As the lamp housing surface becomes very hot during operation, ensure that there is ample free space around the lamp housing, especially above and below.

▲ If the lamp socket cord ④ or power cord ⑤ of the CKX41 comes in contact with the lamp housing or its surroundings, the cord could melt and cause electric shock. Be sure to position these cords at safe distances from the lamp housing.

8 Attaching the High-Pressure Mercury Burner (Figs. 17 & 18)

« Applicable burners »

- HBO50W/AC (OSRAM)
- CS50W4 (PHILIPS)

CAUTION

Burner type information must be set in the power supply unit, so check the burner box or burner base to confirm whether it is of type L1 or L2.

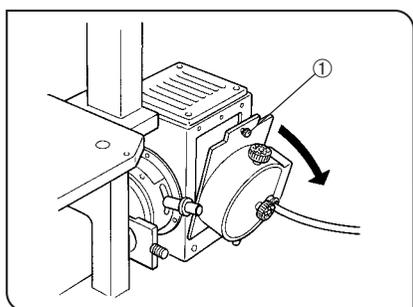


Fig. 17

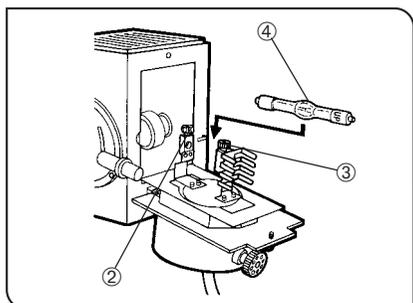


Fig. 18

1. Using the Allen wrench, loosen the burner socket clamping screw ① and flap open the burner socket section by about 90° in the direction of the arrow.
2. Loosen the burner clamping screws ② and ③ and remove the transport post attached to the burner socket.

Ⓞ To replace the burner, remove the used burner now.

3. Loosen the clamping screw ② and attach the extremity without the "UP" marking of the mercury burner ④ so that it comes on the lower side.

Then, loosen the clamping screw ③ and attach the extremity marked "UP".

★ Do not attach the mercury burner upside down. Otherwise, the light may become dim and the original performance will not be achievable.

In addition, the burner service life may also be shortened.

★ Contamination of the burner surface with dirt may cause its shadow to be cast in the field of view. Be sure to remove any dirty from the burner surface.

4. Close the burner socket with burner into the original position and tighten the socket clamping screw ①.

Ⓞ A click sound is generated when the socket clamping screw ① is tightened. This sound indicates the normal action of an interlock switch safety mechanism.

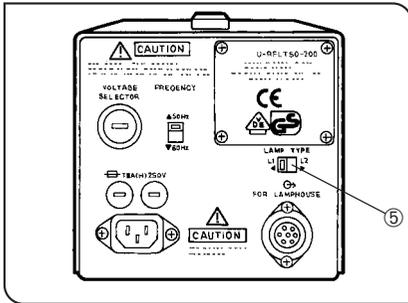


Fig. 19

5. Set the burner type switch ⑤ on the rear of the power supply unit according to the type of the mounted burner (L1 or L2). (Fig. 19)

★ If the burner socket clamping screw ① is loosened while the burner is on, the interlock switch turns off the burner. (Fig. 17)

To restart the burner, first set the main switch of the power supply unit to “O” (OFF), wait for about 10 minutes*. Then, after firmly tightening the clamping screw, set the main switch to “I” (ON) again.

*The burner cannot be re-ignited for about 10 minutes, that is, until the mercury vapor inside it has cooled down and condenser to liquid.

⚠ Caution for burner replacement during observation

The burner, lamp housing and its surroundings are very hot during operation.

Before replacing the burner, set the main switch to “O” (OFF), unplug the power cord and wait until the burner, lamp housing and its surroundings cool down completely.

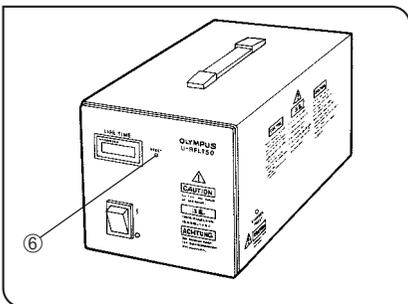


Fig. 20

6. Press the reset button ⑥ on the front of the power supply unit to reset the hour counter display to “0.0”. (Fig. 20)

⊙ The unit of hour counter display is hour. Replace the burner when the displayed time reaches “100.0” hours.

Note that the above-mentioned life of a mercury burner may expire before the above-mentioned average depending on how frequently the main switch is set to “I” (ON) and “O” (OFF). When ignition of the burner deteriorates or flickering becomes noticeable, replace the burner regardless of the hour counter display.

★ Be sure to reset to “0.0”. Otherwise, the burner may not be ignitable.

⚠ Clear mode than 10 cm of space around the power supply unit to assure proper heat radiation.

The power supply unit should be installed so that the main switch can easily be accessed and set to “O” (OFF) in case of emergency.

9 Connecting the Cords

(Figs. 21 to 23)

Setting the input power voltage

1. Using a flat-blade screwdriver, set the voltage switch ① on the rear of the power supply unit to your local power voltage.
 2. Set the frequency switch ② to your local power frequency.
- ★ Improper setting of the above switches may degrade burner performance, or in the worst case (although very rare), cause the burner to explode.

▲ Cables and cords are vulnerable when bent or twisted. Never subject them to excessive force.

▲ Make sure that the main switch of the power supply is set to “O” (OFF) before connecting cables.

1. Plug the connector ③ from the burner socket securely into the connector ④ on the power supply unit. (Fig. 22)

▲ Always use the U-LH50HG Lamp Housing.

▲ Always use the power cord provided by Olympus. If no power cord is provided, please select the proper power cord by referring to the section “PROPER SELECTION OF THE POWER SUPPLY CORD” at the end of this instruction manual. If the proper power cord is not used, product safety performance cannot be warranted.

2. Connect the power cord connector ⑤ to connector ⑥ firmly. (Fig. 22)

3. Connect the power cord plug ⑦ to a wall outlet ⑧. (Fig. 23)

▲ Be sure to supply power from a grounded, 3-conductor power outlet using the proper power cord. If the power outlet is not grounded properly, Olympus can no longer warrant the electrical safety performance of the equipment.

▲ If the power cord or a connection cable comes in contact with the lamp socket or surrounding equipment, the cord or cable may melt and result in shock hazard. To prevent this, distribute the cords and cables apart from the lamp housing.

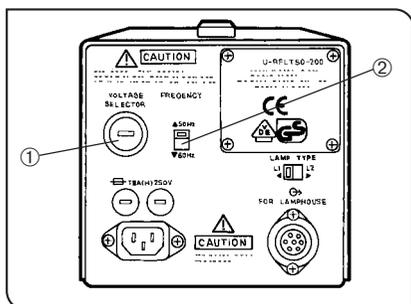


Fig. 21

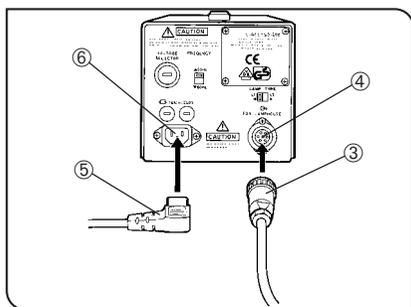


Fig. 22

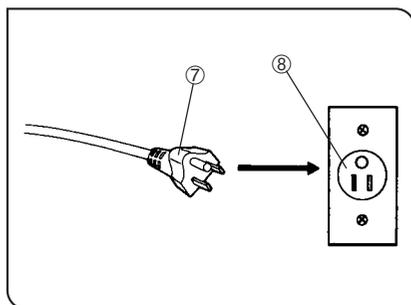


Fig. 23

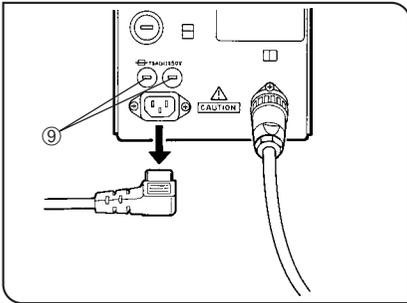


Fig. 24

Fuse replacement (Fig. 24)

★ Set the main switch to “O” (OFF) and unplug the power cord before replacing fuses.

1. Remove each of the fuse holders ⑨ by turning it counter-clockwise using a flat-blade screwdriver and pulling out.
2. Replace both fuses with new ones.

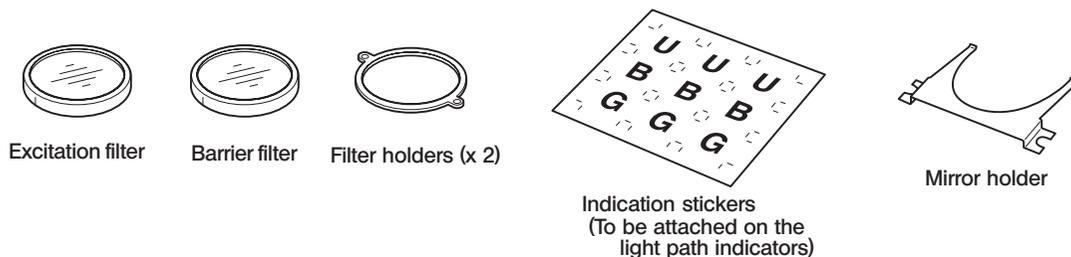
★ Always use the designated fuses. Otherwise, a fire hazard may result.

Applicable fuses	U-RFTL50-100: ⇔ T4A(H)250V (LITTELFUSE 215004), 2 pieces
	U-RFTL50-200: ⇔ T2.5A(H)250V (LITTELFUSE 215025), 2 pieces

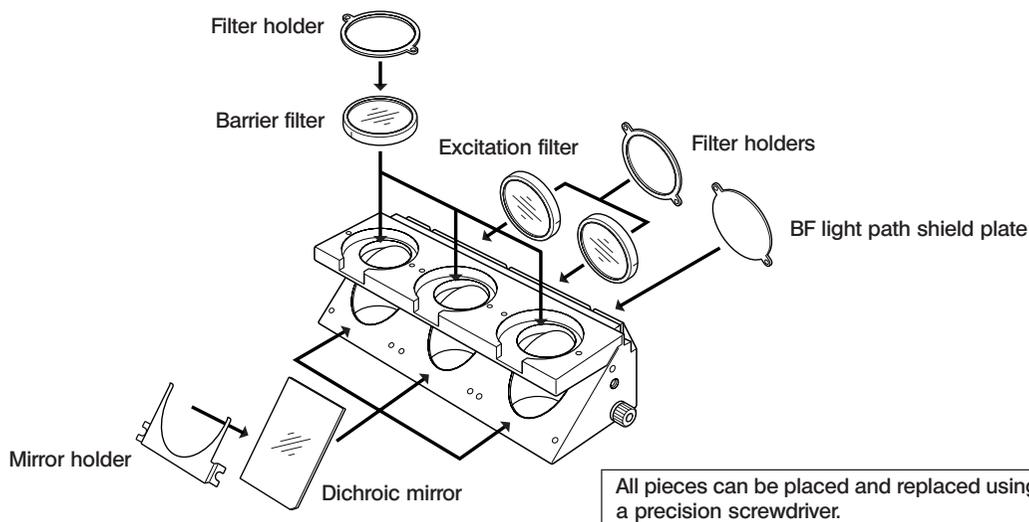
8 U-EXCITATION FILTER SET CKX-NU (OPTIONAL)

©The CKX-NU U-Excitation Filter Set should be mounted by the dealer in the position (fluorescent mirror slider position) specified by the customer. (It is also possible, on custom order, to replace the U-excitation filters with excitation filter, barrier filter and/or dichroic mirror of the UIS fluorescent mirror unit series.)

Contents of the set



Construction of the fluorescent mirror slider



Removing the UV cut filter (Fig. 25)

Loosen the holder ring ② of the UV cut filter ① in the front of the collector of the U-LH50HG lamp housing by turning the ring counterclockwise, and then take out the filter.

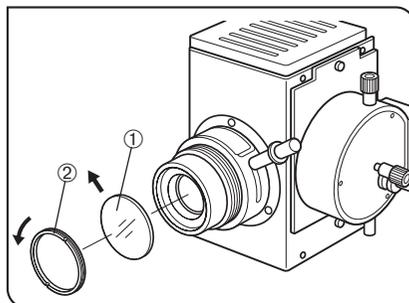


Fig. 25

■ 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.

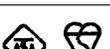
Country	Agency	Certification Mark	Country	Agency	Certification Mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET, JQA, TÜV, UL-APEX / MITI	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		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 Materielkontroll (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)

Canadian Standards Association (CSA)

SV, SVT, SJ or SJT, 3 X 18AWG

SV, SVT, SJ or SJT, 3 X 18AWG

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

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