

INSTRUCTIONS

TH4

HALOGEN LAMP POWER SUPPLY UNIT

Optical Microscope Accessory

To ensure the safety and obtain optimum performance and to familiarize yourself fully with the use of this unit, we recommended that you study this manual thoroughly before operating the unit.

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

- Immunity Industrial and basic electromagnetic environment

Emissions exceeding the level required by aforementioned standards may occur if this product is electrically connected to other equipment.



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 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.

For Korea only

B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

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IMPORTANT




This power supply unit is only for use with our halogen lamp housings.

SAFETY PRECAUTIONS

1. A power supply is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impact.
2. Do not use the power supply where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations.
3. For operation environmental conditions, see chapter 5, "SPECIFICATIONS" on page 8.
4. Always use the power cord provided by us. If no power cord is provided, please select the proper power cord by referring to the chapter "PROPER SELECTION OF THE POWER SUPPLY CORD" at the end of this instruction manual.
5. Always set the main switch on the power supply unit to "●" (OFF) before connecting the power cord to the wall outlet.
6. This power supply is air-cooled so its surfaces become hot during operation. When installing it, leave spaces of more than 10cm around it. Also make sure to distribute cables away from the power supply.
7. To avoid potential shock hazard, make sure that the power cord is properly **grounded**.
8. Be sure to set the main switch to "●" (OFF) and unplug the power cord before replacing the halogen lamp bulb.
9. The surfaces of the lamp housing will become extremely hot. When installing the lamp housing, be sure to allow ample free spaces around and in particular above and below the lamp housing.
10. 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 pages 18, 19.

Safety Symbols

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

Symbol	Meaning
	Before use, carefully read the instruction manual. Improper use could result in personal injury to the user and/or damage to the equipment.
	Indicates that the main switch is ON.
	Indicates that the main switch is OFF.

1 Maintenance and Storage

1. Do not attempt to use organic solvents to clean the power supply unit. To clean it, use a lint-free, soft cloth slightly moistened with a diluted neutral detergent.
2. Never attempt to disassemble any part of the power supply unit.

2 Caution

If the power supply unit 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 system 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).

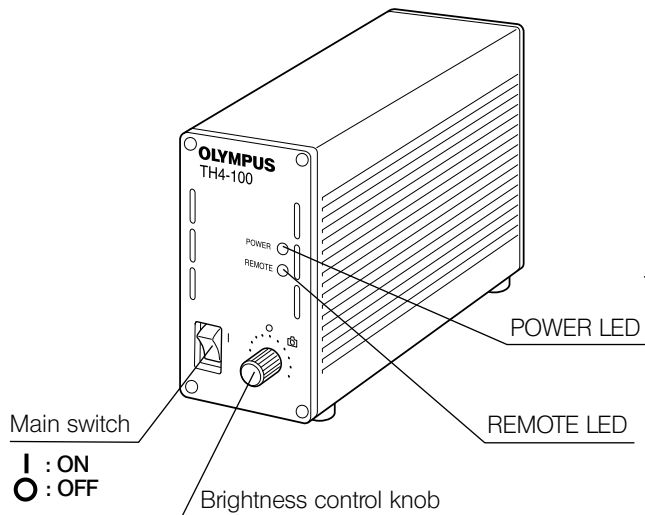
3 Intended use

This instrument has been designed to be used to observe magnified images of specimens in routine and research applications.

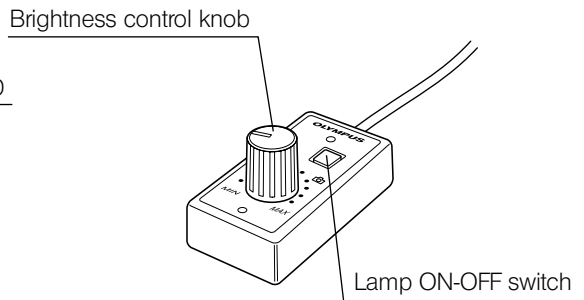
Do not use this instrument for any purpose other than its intended use.

1 NOMENCLATURE

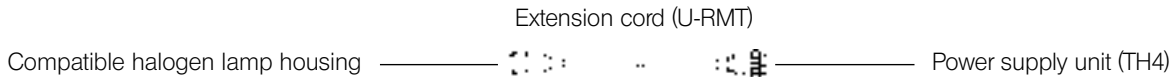
Power Supply Unit TH4



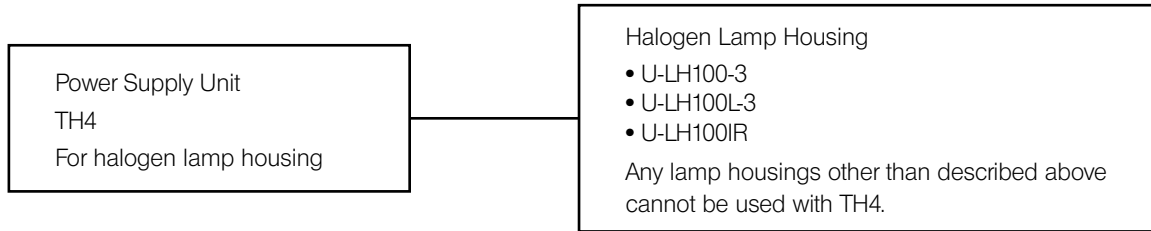
Hand Switch TH4-HS (Optional)



Extension Cord U-RMT (Optional)



2 *COMPATIBLE HALOGEN LAMP HOUSING*



1 Connecting the Cables and Cords (Fig. 1 & 2)

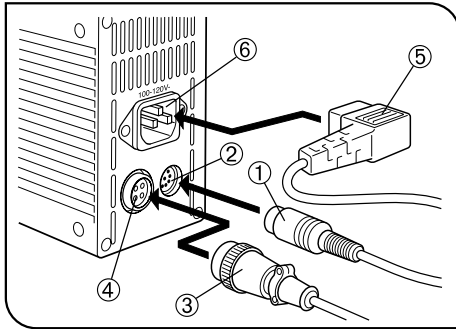


Fig. 1

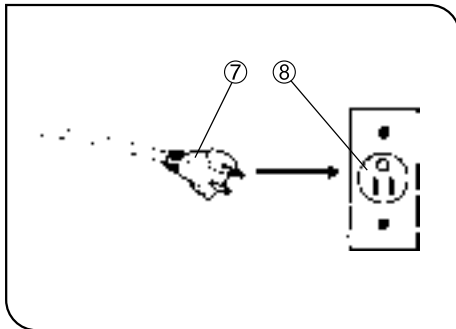


Fig. 2

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

▲ Make sure that the main switch is set to "O" (OFF) before connecting cables and power cord. Otherwise equipment failure may result.

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

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

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

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

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

4 OPERATION

1 Voltage Indication

(Fig. 3 & 4)

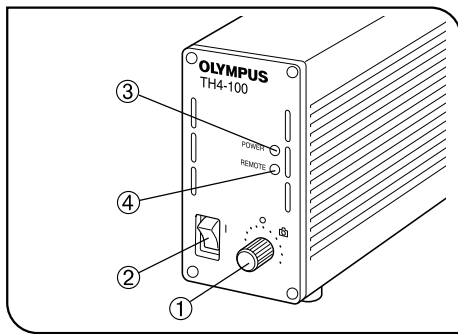


Fig. 3

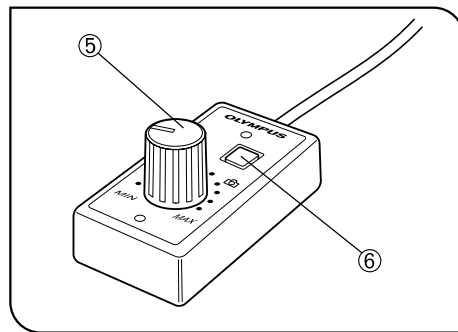


Fig. 4

1. Ensure that the brightness control knob ① is set to MIN (lowest voltage) then set the main switch ② to "I" (ON). (The POWER LED ③ lights up)
 2. Turn the control knob ① toward MAX (highest voltage) to increase the voltage intensity and brighten the illumination.
- ☉ The position marked indicates the position with which daylight suitable for photography can be obtained when an LBD filter is engaged in the light path.

Hand Switch Operation

- ☉ When the hand switch is connected (the REMOTE LED ④ lights), the brightness control knob ① is defeated but the brightness control knob ⑤ of the hand switch is activated.
1. Press the lamp ON-OFF switch ⑥ and adjust the brightness with the control knob ⑤.
 2. To turn the lamp OFF, press the lamp ON-OFF switch ⑥ again.
- ★ **When the REMOTE LED ④ is lit, the hand switch in standby mode and consumes about 2.5 W of power.**
- When the equipment is not to be used for a long period of time, be sure to set the main switch ② to "O" (OFF).

5 SPECIFICATIONS

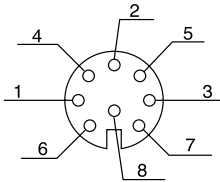
Item	Specifications
Input rating TH4-100 TH4-200	100-120 V \sim , 50/60 Hz, 1.8 A 200-240 V \sim , 50/60 Hz, 0.9 A
Output rating	0.9 to 12.6 V DC, 8.4A
Ventilation	Natural cooling system ★ Be sure to leave at least 10 cm (4 in.) of free spaces between the walls or other solid objects.
Dimensions	75 mm (W) x 125 mm (H) x 200 mm (D)
Weight	Approx. 2.3 kg
Operating environment	<ul style="list-style-type: none"> • 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 nominal voltage. • Pollution degree: 2 (in accordance with IEC60664-1) • Installation (overvoltage) category: II (in accordance with IEC60664-1) • Transient overvoltage: 2500 V • Temporary overvoltage: <ul style="list-style-type: none"> TH4-100: 1320 V (up to 5 sec); 370 V (longer than 5 sec) TH4-200: 1440 V (up to 5 sec); 490 V (longer than 5 sec.)

6 CONTROL VIA THE REMOTE CONNECTOR

Recommended DIN 8-pin plug

- Connector type: TCP0500 Series
(mfd. by Hosiden Electronics Co., Ltd.)

DIN 8-pin connector specifications



Pin No.	Name
①	Analog input for light intensity control
②	Remote ON/OFF - H
③	Vcc (13.5 V) input
④	Analog input for light intensity control using external VR - GND
⑤	Vcc (13.5 V) output
⑥	+5 V output
⑦	Detection of failed lamp

- ★ Be sure not to make a mistake with the connections.
- ★ Input voltage rating: 4.75 to 5.25 V.

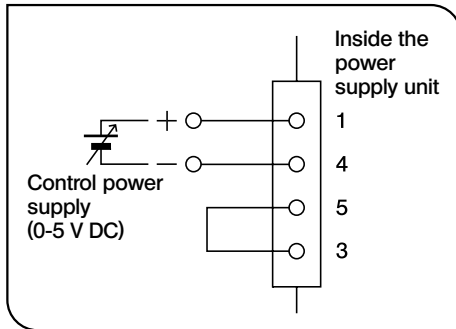


Fig. 5

1

Controlling the Amount of Light According to External Analog Voltage (Fig. 5)

◎ The amount of light can be varied between MIN and MAX by applying a DC voltage input from 0 to 5 V.

1. Connect a DC power supply as shown in Fig. 5. Do not turn on the power supply yet.
2. Set the main switch to "I" (ON).
3. Apply the external analog voltage.

DC voltages from 0 to 5 V correspond to the light amount from MIN to MAX.

- ★ The external wiring should have a wire gauge of AWG28 (0.1 mm²) or more.
- ★ Do not apply voltage above 5 V DC. Doing so will cause the unit to malfunction.
- ★ Do not apply the analog voltage before setting the main switch to "I" (ON). Doing so will cause the unit to malfunction.

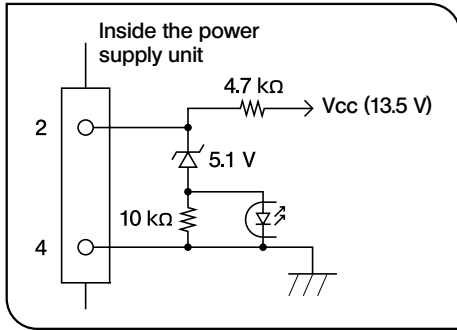


Fig. 6

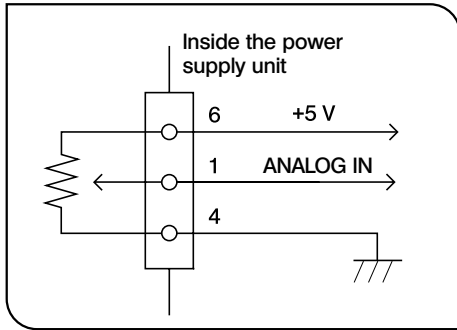


Fig. 7

2 Remote ON/OFF Operation (Fig. 6)

- ◎ The lamp can be turned off by shorting pins 4 and 2 of the DIN 8-pin connector.
- ★ The external wiring should have a wire gauge of AWG28 (0.1 mm²) or more.
- ★ The external contact should be fully capable of switching 10 mA on and off.
- ★ When the lamp is to be turned on/off with the open collector, connect the emitter to pin 2.

3 Controlling the Amount of Light with External VR (Fig. 7)

- ◎ The amount of light can be controlled between MIN and MAX by connecting an external VR.
 1. Connect a VR as shown in Fig. 7.
 2. Set the main switch to "I" (ON).
 3. The amount of light is minimized when the voltage at pin 1 is 0 V and maximized when it is +5 V.
- ★ The external wiring should have a wire gauge of AWG28 (0.1 mm²) or more.
- ★ Use an external VR of 10kΩ 0.1 W.

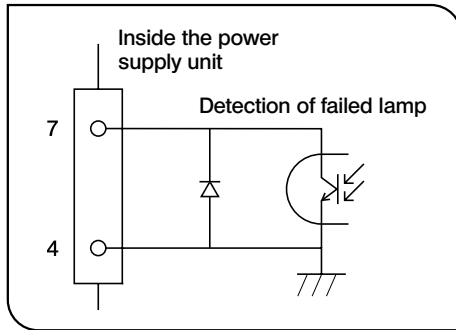


Fig. 8

4

Detection of Failed Lamp

(Fig. 8)

© Detects failed lamp and gives output alarm signal.

When lamp is normal: Open collector output is "ON" (i.e. there is a short circuit between pins 4 and 7).

When lamp fails: Open collector output is "OFF" (i.e. there is an open circuit between pins 4 and 7).

- ★ The external wiring should have a wire gauge of AWG28 (0.1 mm²) or more.
- ★ External voltage connected to pin 4 should be negative and that connected to pin 7 should be positive.
- ★ External voltage should be limited to 40 V or less and current limited to 5 mA or less.

7 TROUBLESHOOTING GUIDE

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

Problem	Cause	Remedy	Page
1) Bulb intermittently lights and goes out.	Bulb is nearly burned out.	Replace bulb.	**
	A cord plug is improperly connected.	Check all connections.	6
2) POWER LED lights but bulb does not light.	Bulb is nearly burned out.	Replace bulb.	**
	A cord plug is improperly connected.	Check all connections.	6
	Lamp ON-OFF switch on hand switch is set to OFF.	Set it to ON.	7
3) Brightness cannot be increased by turning brightness control knob on power supply unit.	Brightness control knob on power supply unit is disabled when hand switch is connected.	Increase brightness with brightness control knob on hand switch.	7

** Please refer to the instruction manual of microscope for details.

■ 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 our products, we can no longer warrant the electrical safety of the equipment.

Specifications

Voltage Rating	125V AC (for 100-120 V AC area) or, 250V AC (for 220-240V AC area)
Current Rating	6A minimum
Temperature Rating	60°C minimum
Length	3.05m 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 the agencies listed in Table 1. In case you are unable to buy locally 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		USA	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. Prüstelle	⟨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

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 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 us for detailed inspections or replace the lamp housing.
- If you detect an abnormality other than that listed below or with other our product, also stop the use of the product and contact us 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 us.

Check items	Check results (Date)			
	/	/	/	/
1. More than 8 years have passed since original purchase or the total power ON time has exceeded 20,000 hours.				
2. Lamp does not light sometimes even though the main switch is set to on.				
3. Illumination flickers when you move the lamp cable or lamp housing.				
4. Lamp cable is unusually hot to the touch.				
5. Scorching or burning odor is produced during use.				
6. Illumination still flickers after replacement with a new lamp bulb.				
7. 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.)				
8. Extreme discoloration of the lamp housing connection terminal or lamp socket. Uneven discoloration of the left and right sections of these parts.				
9. Discoloration, deformation or cracking of the lamp housing.				
10. Melting, crack, deformation or solidification of the lamp cable or a wiring part.				
11. 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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Life science solutions

Service Center



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

Official website



<https://www.olympus-lifescience.com>

Industrial solutions

Service Center



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

Official website



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