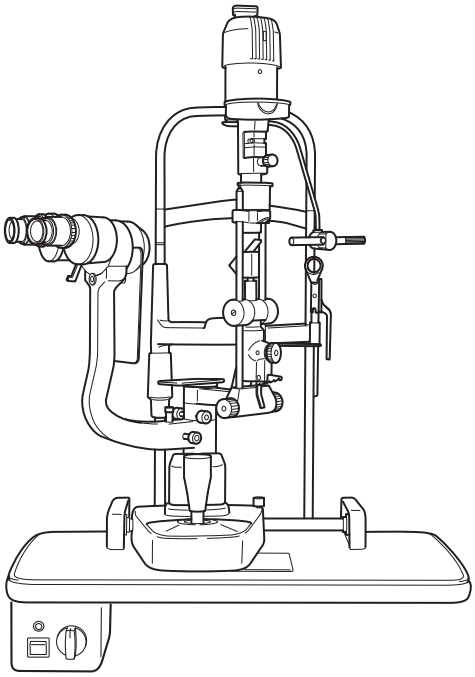
TOPCON



INSTRUCTION MANUAL

SLIT LAMP

SL-3G

INTRODUCTION

Thank you for purchasing the TOPCON SL-3G Slit Lamp.

This instrument is used for the magnified observation of the eye and its various structures.

This SL-3G has the following features:
- Smooth mechanical movements
- Bright and clear observation of the eye with natural color rendition
- Optical system to enhance natural color and resolution

This Instruction Manual covers an overview of the basic operation, troubleshooting, checking, maintenance and cleaning of the SL-3G Slit Lamp.
To get the best results from this instrument, read "Displays for Safe Use" and "Safety Cautions".
Keep this Instruction Manual close at hand for future reference.

[Warning]
To avoid injury to the patient's eye and nose, pay particular attention while operating the instrument body.
(The patient may be injured.)

[Caution]
This instrument must not be used for the following patients:
- Patients who are hypersensitive to light
- Patients who recently underwent photodynamic therapy (PDT)
- Patients taking medication that causes photosensitivity.

This symbol is applicable for EU member countries only.
To avoid potential damage to the environment and possibly human health, this instrument should be disposed of (i) for EU member countries - in accordance with WEEE (Directive on Waste Electrical and Electronic Equipment), or (ii) for all other countries, in accordance with local disposal and recycling laws.

CAUTION : Federal laws restricts this device to the sale by or on the order of a physician.

WARNING : Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause birth detects or other reproductive harm. **Wash hands after handling.**

CLASS I

IEC60601-1

CE

CAUTIONS FOR USE

Important cautions

Use this instrument carefully on the following patients:

- Patients who have epidemic corneitis, conjunctivitis or any other infectious disease
- Patients who are taking medications that cause light hypersensitivity.

Basic cautions

Be careful not to let the patient touch this instrument. The patient's hand may be pinched by the movable part.

To avoid injury or fire caused by electric shock, turn off the power switch and unplug the power cord. Then, replace the fuse with the rated one.

To avoid injury caused by electric shock, turn off the power switch when replacing the lamp.

To avoid burns caused by heat, do not replace the lamp with a new one immediately after it goes off.

When operating the base unit, please note the following:

- Beware of catching fingers in the moving parts.
- Avoid hitting the patient's eyes or nose.

To avoid injury to the patient's head, incline the illumination unit slowly while holding the base unit.

Disposal

Dispose of the instrument according to local disposal and recycling laws.

ENVIRONMENTAL CONDITIONS FOR USE

Temperature : 10°C - 40°C
Humidity : 30% - 90% (without dew condensation)
Air pressure : 700hPa - 1060hPa

STORAGE CONDITIONS

1. Environmental conditions (without package)
   ∗Temperature : 10°C - 40°C
   Humidity : 10% - 95% (without dew condensation)
   Air pressure : 700hPa - 1060hPa
   ∗ THIS INSTRUMENT DOES NOT MEET THE TEMPERATURE REQUIREMENTS OF ISO 15004-1 FOR STORAGE. DO NOT STORE THIS INSTRUMENT IN CONDITIONS WHERE THE TEMPERATURE MAY RISE ABOVE 40°C OR FALL BELOW 10°C.
2. When storing the instrument, ensure that the following conditions are met:
   (1) The instrument should not be splashed with water.
   (2) Store the instrument where environmental conditions are appropriate.
   (3) Do not store or transport the instrument on a slope or uneven surface or in an area where it is subject to vibrations or instability.
   (4) Do not store the instrument where chemicals are stored or gas is generated.
3. Usage period
   8 years from delivery providing regular maintenance is performed (according to the self-certification [TOPCON data])

ENVIRONMENTAL CONDITIONS FOR PACKAGING IN STORAGE

Temperature : -20°C - 50°C
Humidity : 10% - 95%

ENVIRONMENTAL CONDITIONS FOR PACKAGING IN TRANSPORTATION

Temperature : -40°C - 70°C
Humidity : 10% - 95%

CHECKPOINTS FOR MAINTENANCE

1. Regularly maintain and check the instrument and its parts.
2. When using the instrument after a prolonged period of inactivity, confirm normal and safe operation beforehand.
3. Keep the objective lens, eyepiece and mirror free from finger prints and dust.
4. When not in use, protect the instrument with the dust cover.
5. If the objective lens, eyepiece or mirror is stained, clean it following "Cleaning lenses and mirrors" in this Instruction Manual.

DISPLAYS FOR SAFE USE

In order to ensure the safe use of the product and to prevent danger to the operator and others, or damage to property, important warnings are placed on the product and inserted in the instruction manual.
It is recommended for all users to take note of the meaning of the following displays and icons before reading the "Safety Cautions" and text.

DISPLAYS

DISPLAY	MEANING
⚠ **WARNING**	Ignoring or disregarding this notice could lead to death or serious injury.
⚠ **CAUTION**	Ignoring or disregarding this display may lead to personal injury or physical damage.

- Injury refers to cuts, bruises, sprains, fractures, burns, electric shocks, etc.
- Physical damage refers to damage to buildings, equipment or furniture.

ICONS

ICON	MEANING
	This indicates Prohibition. Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.
	This indicates Mandatory Action. Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.
	This icon indicates Hazard Alerting (Warning). Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.

SAFETY CAUTIONS

⚠ WARNINGS

Icon	Prevention item	Page
	To avoid fire and electric shock in case of leakage, be sure to use a grounded outlet. Do not connect to outlets that are not grounded.	***16***
	To avoid injury to the eye and nose while moving the base unit, make sure that you have a clear view of the slit lamp and the patient's face.	***20***
	To avoid electric shock, do not attempt disassembling, rebuilding and/or repairs on your own. Ask your dealer for repairs.	***26***
	Do not remove the covers from the main unit, chinrest unit or power supply unit except for the lamp house cover. You may receive an electric shock.	***26***
	To avoid electric shock, unplug the power cord from the grounded outlet before removing the fuse cover. Do not connect the power cord to the grounded outlet with the fuse cover not correctly attached.	***36***
	To avoid fire in the event of an instrument malfunction, use only fuses that are listed on the marked label at the side of the fuse holder.	***36***
	To avoid fire and electric shock, install the instrument in a dry place free of water and other liquids.	—
	To avoid fire and electric shock, do not put cups or other containers with liquids near the instrument.	—
	To avoid electric shock, do not insert metal objects into any vents and/or slots.	—
	To avoid fire in the event of an instrument malfunction, immediately turn OFF the power switch "○" and unplug the cable if you see smoke coming from the instrument, etc. Ask your dealer for service.	—
	Connect the product to the power supply with the proper voltage as stated on the rating plate.	—

⚠ CAUTIONS

Icon	Prevention item	Page
	To prevent damage and injuries, install the instrument on a level surface.	***16***
	To avoid electric shock, do not handle the plugs with wet fingers.	***16***
	For the safety of the operator and the patient, do not place fingers between moving parts.	***20***
	To avoid injury to the patient's head, incline the illumination unit slowly while holding the base unit.	***21***
	To avoid causing discomfort to the patient or any damage to the patient's eye, keep the illumination at its minimum during adjustment.	***21***
	When replacing the lamp, switch off the power supply and remove the power cord to avoid electric shock.	***35***
	Beware of high temperatures when replacing the lamp immediately after switching it off: these could cause burns.	***35***
	Before carrying out daily care, remove the power cord (to avoid electric shock) and wait until the main unit has cooled (to avoid burns).	***38***
	Do not touch parts inside the lamp house cover during operation and immediately after switching off the power supply: this could cause burns.	***38***
	To prevent falling during use and movement, secure optional accessories.	***40***
	To prevent the movable parts from hitting anyone's body, tighten and fix the illumination arm locking knob, microscope arm locking knob and base locking knob before moving the instrument.	***25***

⚠ CAUTIONS

Icon	Prevention item	Page
	The light emitted from this instrument is potentially hazardous. The longer the duration of exposure, the greater the risk of ocular damage. Exposure to light from this instrument when operated at maximum intensity will exceed the safety guideline after 65 sec.	***44***
	This instrument has been tested (with 100V/120V/230V) and found to comply with IEC60601-1-2 Ed.2.1:2004. This instrument radiates radio frequency energy within standard and may affect other devices in the vicinity. If you have discovered that turning on/off the instrument affects other devices, we recommend you change its position, keep a proper distance from other devices, or change the outlet. Please consult the dealer from whom you purchased the equipment for any questions.	—

USAGE AND MAINTENANCE

Usage:
- The Slit Lamp is an electric equipment for medical use. When using this instrument, follow the instructions of a well-trained and experienced doctor.

USER MAINTENANCE

To maintain the safety and performance of the instrument, unless done by an authorized service engineer, never attempt to do maintenance of items other than those specified here in. For details about maintenance, read the descriptions in this manual.

Replacing the illumination lamp

The illumination lamp can be replaced if necessary. For specific instructions, see page 35.

Replacing the fuse

Fuses on the primary and secondary sides can be replaced, if necessary. For specific instructions, see page 36.

Replacing the fixation target bulb

The fixation target bulb can be replaced if necessary. For specific instructions, see "REPLACING THE FIXATION TARGET BULB" on page 38.

ESCAPE CLAUSES

- TOPCON shall take no responsibility for damage due to fire, earthquakes, actions by a third party or other accidents, or the negligence and misuse of the user and use under unusual conditions.
- TOPCON shall take no responsibility for damage derived from the inability to use this equipment, such as a loss of business profit and suspension of business.
- TOPCON shall take no responsibility for damage caused by operations other than those described in this Instruction Manual.
- Diagnoses made are the responsibility of qualified doctors and TOPCON shall take no responsibility for the results of such diagnoses.

WARNING INDICATIONS AND POSITIONS

To ensure safety, warning labels are provided on the instrument body.
Use the instrument following these warning instructions. If any of the following labels are missing, contact your dealer or TOPCON (see the back cover).

CAUTION

- To prevent electric shocks, switch off the power supply and remove the power cord before replacing the lamp.
  Afin d'éviter tout choc électrique, coupez le contact et débranchez le câble d'alimentation avant de remplacer l'ampoule.
- Do not replace the lamp immediately after switching it off: the high temperatures could cause burns.
  Afin d'éviter toute brûlure, prenez garde à la température élevée de l'ampoule lorsque le remplacement de celle-ci se fait immédiatement après avoir coupé l'alimentation électrique.

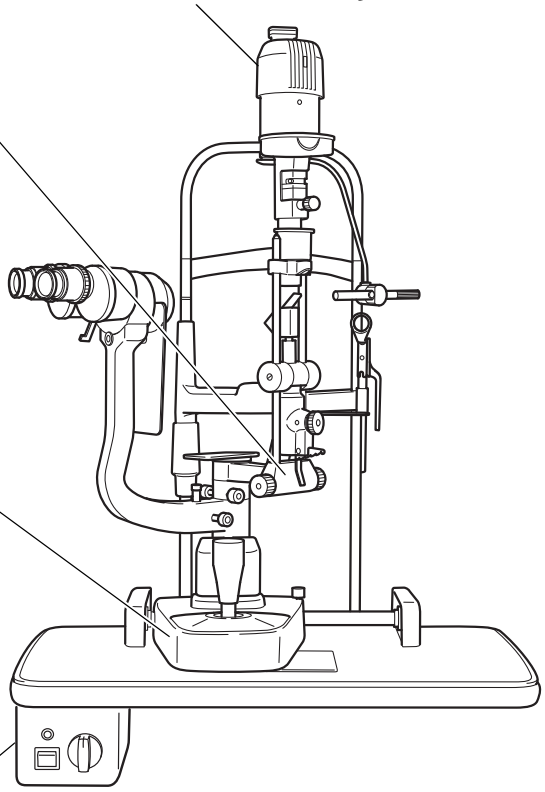
CAUTION

To avoid injury to the patient's head, incline the illumination unit slowly while holding the base unit.
Afin d'éviter toute blessure à la tête du patient, inclinez l'unité d'illumination lentement tout en maintenant la base de l'instrument.

WARNING

When operating the base unit, please note the following:
Pendant la manipulation de la base de l'instrument, veuillez prendre les précautions suivantes;

- Beware of catching fingers in the moving parts.
  Prenez garde aux pièces mobiles afin d'éviter de coincer les doigts.
- Avoid hitting the patient's eyes or nose.
  Gardez une distance de travail appropriée afin d'éviter le contact avec les yeux et le nez du patient.



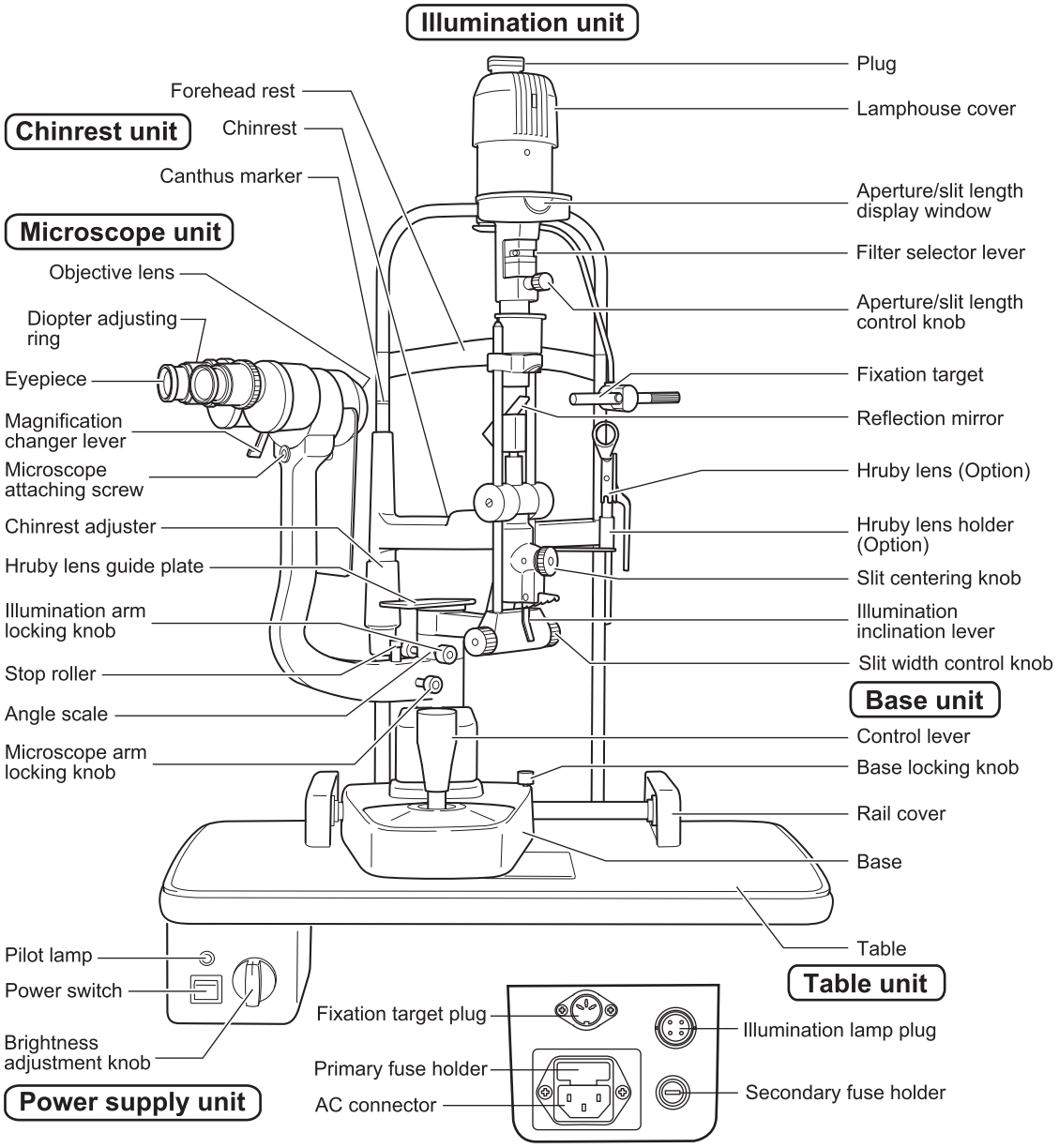
CAUTION

- To prevent electric shocks, turn off the power switch and remove the power cord before replacing fuses.
  Afin d'éviter tout choc électrique, coupez le contact et débranchez le câble d'alimentation avant de remplacer les fusibles.
- Use the specified fuse.
  Utilisez des fusibles de même type et de même valeur.

CONTENTS

CONFIGURATION

NAMES OF MAIN BODY COMPONENTS

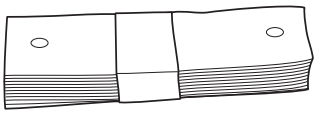
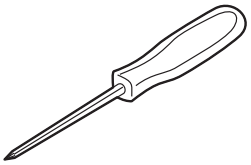
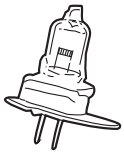
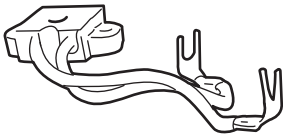
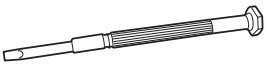
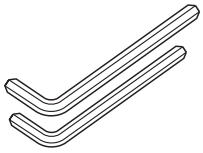
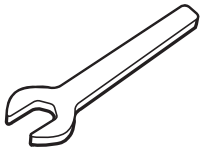
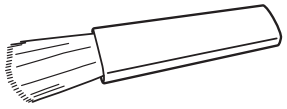
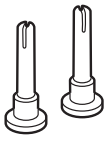


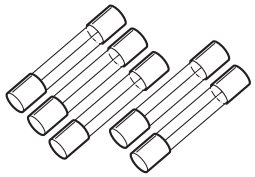
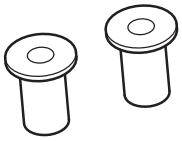
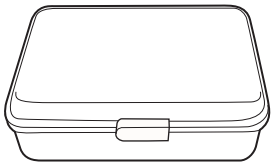
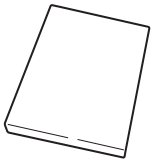
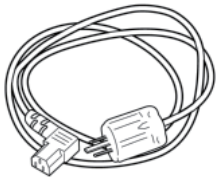
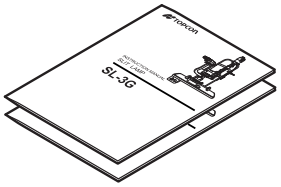
CONFIGURATION OF PARTS IN CONTACT WITH THE PATIENT

Forehead rest : Polyamide resin
Chinrest : Polyamide resin

STANDARD ACCESSORIES

Make sure that all the following standard accessories are included.
Figures in parentheses are the quantities.

Chinrest tissue (1) 	Dust cover (1) 
Test rod (1) 	Phillips screwdriver (1) 
Spare illumination lamp (1) 	Slotted screwdriver (large) (1) 
Spare socket (1) 	Slotted screwdriver (small) (1) 
Luminous fixation target (1) 	Hexagonal wrench M3/M4 (2) 
Spare fixation target bulb (1) 	Spanner (1) ∗ 
Cleaning brush (1) 	Spare chinrest tissue pin (2) 

Spare fuse Primary side (4) Secondary side (1) 	16× eyepiece (2) (16× eyepiece is optionally available in some regions) 
Accessory case (1) 	Square mirror (1) 
Power cord (1) 	"Instruction manual" and "Unpacking and assembly" (1 each) 

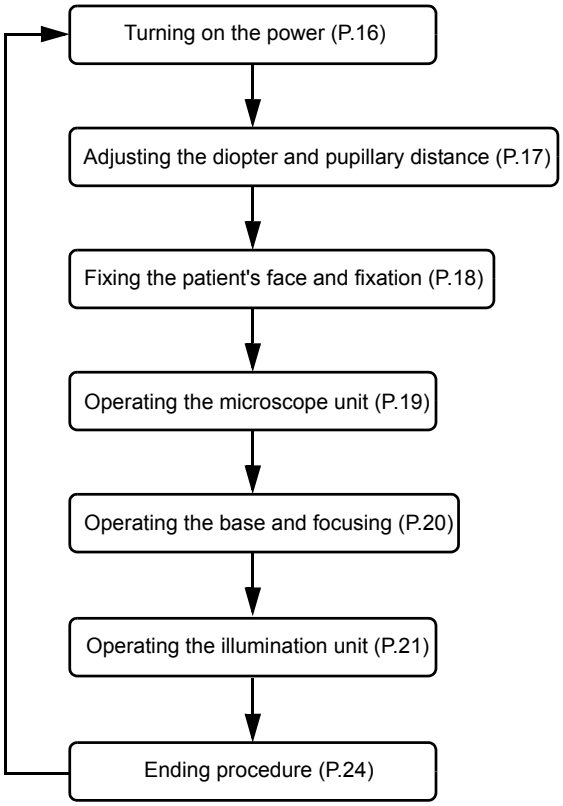
∗ The spanner is provided only when the table is used.

For optional accessories, see "OPTIONAL ACCESSORIES" on page 40.

BASIC OPERATIONS

FLOW OF OPERATION

Basic observation procedure



Other types of observation

- Observation by adjusting the slit width
- Observation by changing the aperture and slit length
- Observation by turning the slit
- Observation by swinging the slit sideways
- Observation by inclined illumination
- Observation by ND filter
- Observation by Red-Free filter
- Observation by blue filter

PREPARATIONS

CONNECTING THE POWER CORD

⚠ **WARNING**	To avoid fire and electric shock in case of leakage, be sure to use a grounded outlet. Do not connect to outlets that are not grounded.

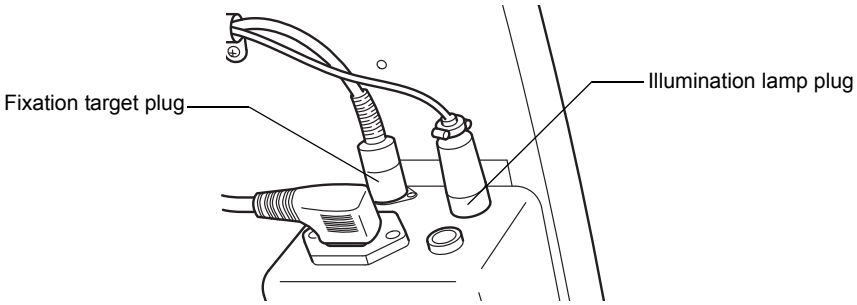
⚠ **CAUTION**	To prevent damage and injuries, install the instrument on a level surface.

⚠ **CAUTION**	To avoid electric shock, do not handle the plugs with wet fingers.

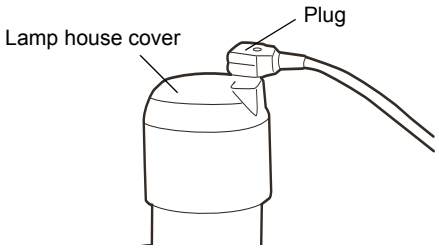
1 Make sure that the "POWER switch" is OFF (◯) on the power supply unit.

2 Connect the power cord to the AC connector on the power supply unit.

3 Make sure that the cables are connected to the illumination lamp plug and the fixation target plug on the rear surface of the power supply unit.



4 Check if the plug is inserted into the lamp house cover securely.



5 Plug the power cord into the grounded outlet.

TURNING ON THE POWER

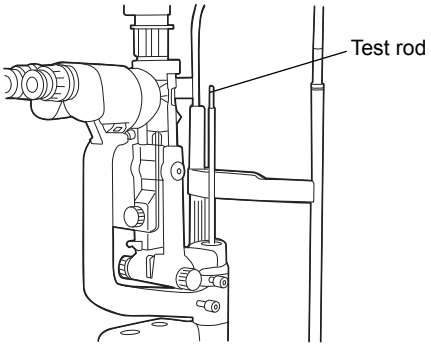
1 Connect the power cord.

2 Turn ON (|) the "POWER switch".

ADJUSTING THE DIOPTER AND PUPILLARY DISTANCE (PD)

NOTE	To ensure sharp observation of slit images, always carry out the diopter and PD adjustments.

1 Insert the "test rod" into the rotation shaft cavity, and set the black face square with the microscope.



2 Place the "brightness adjustment knob" in an intermediate position.

3 Adjust the illumination to ϕ10mm by adjusting the "slit width control knob" and "aperture/slit length control knob".

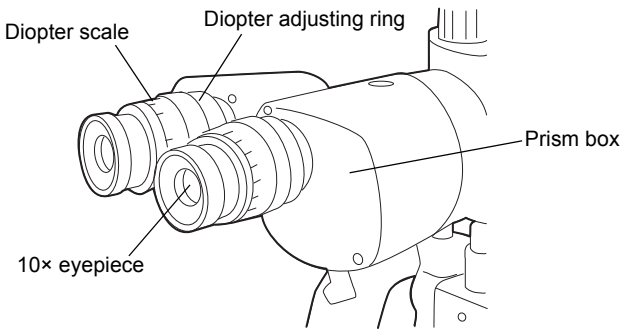
4 Turn the "diopter adjusting ring" of the "eyepiece" at one side fully counter-clockwise.

5 Turn the "diopter adjusting ring" clockwise and stop when the "test rod" can be clearly seen.
The values -8 to +8 on the scale indicate the diopter (D) on "10× eyepiece". -10 to +10 indicate the diopter (D) on "16× eyepiece".

6 Adjust the diopter of another "eyepiece" in the same way as above.

7 After adjusting the diopter, turn the "slit width control knob" until the slit width is about 1mm, then check if the slit image projected on the "test rod" is properly in focus.

8 Holding the "prism box", look through the "eyepiece" with both eyes, and adjust the pupillary distance so that the image projected on the "test rod" can be seen without diplopia (double vision), and appear to be three dimensional.

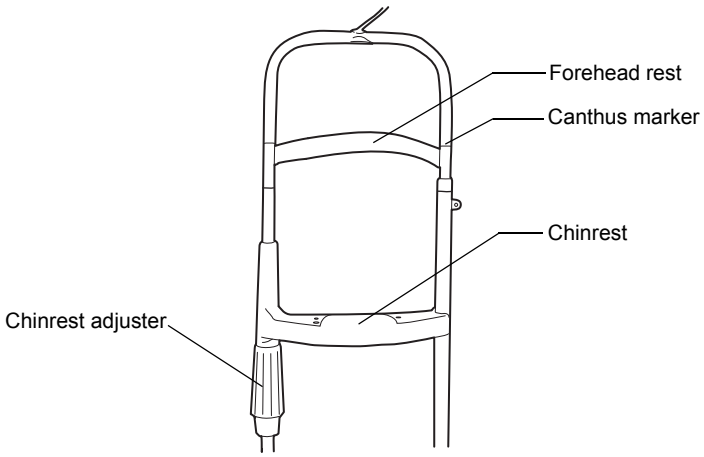


OPERATION PROCEDURE

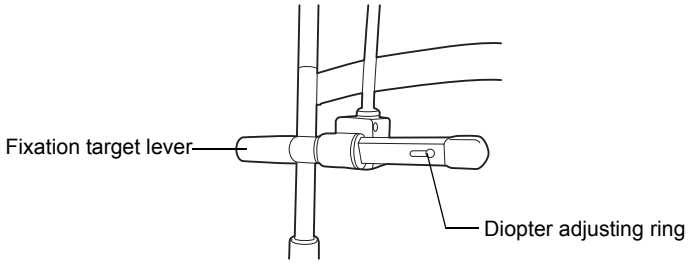
FIXING THE PATIENT'S FACE AND FIXATION

1 Place the patient's chin on the "chinrest" with his or her forehead against the "forehead rest".

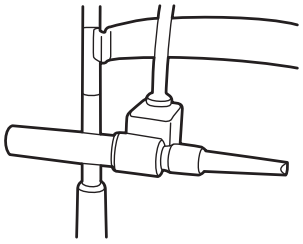
2 By rotating the "chinrest adjuster", align the patient's eye with the "canthus marker" on the chinrest frame.



3 Ask the patient to look at the fixation target with the eye that is not being examined.
To change the patient's fixation point, hold the fixation target at the end opposite to the target and adjust accordingly.



Fixation target with diopter adjustment

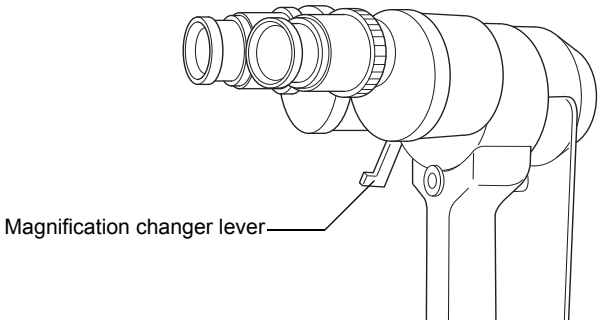


Luminous fixation target

When using the fixation target with diopter adjustment, slide the diopter adjusting ring so that the patient can see the following target (◎). The ring target can be adjusted within a range of -15D to +10D.
The luminous fixation target is used for myopia of -15D or more.
When replacing targets, remove the target by pulling gently while supporting the opposite end.

OPERATING THE MICROSCOPE UNIT

Turn the "magnification changer lever" to set a desired magnification value.



For the overall magnification in conjunction with magnification marks of the "magnification changer lever" and "eyepiece", see page 27.

OPERATING THE BASE AND FOCUSING

⚠ **CAUTION**	To avoid injury to the eye and nose while moving the base unit, make sure that you have a clear view of the slit lamp and the patient's face.

⚠ **CAUTION**	For the safety of the operator and the patient, do not place fingers between moving parts.

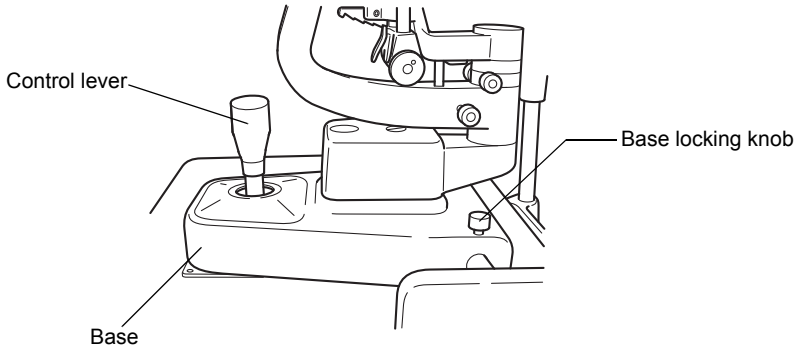
NOTE	To prevent dropping the base locking knob from the base, do not loosen the knob too much.

1 For major horizontal movements, hold the "control lever" in the upright position and move the entire base.

2 For fine adjustments, move the "control lever" in the required direction.

3 The base can be raised by turning the "control lever" clockwise, and lowered by turning the "control lever" counter-clockwise.

4 To fix the "base", fasten the base "base locking knob".



- Rough focusing is carried out with major movements, following step ***1*** to ***3***.
- Fine focusing is done with the microscope, following steps ***2*** and ***3***.

OPERATING THE ILLUMINATION UNIT

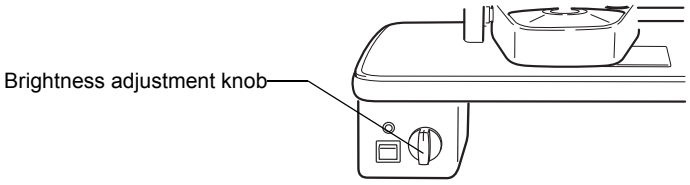
⚠ **CAUTION**	To avoid injury to the patient's head, incline the illumination unit slowly while holding the base unit.

⚠ **CAUTION**	To avoid causing discomfort to the patient or any damage to the patient's eye, keep the illumination at its minimum during adjustment.

NOTE	• Adjust the slit width according to the results of the investigation. • The slit-width scale should be used as a guideline. • When using the square mirror, incline the illumination unit at least 10°. • To protect the patient, use the heat absorption filter, as required.

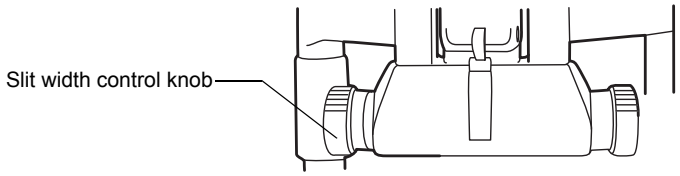
Adjusting the brightness

Turn the "brightness adjustment knob".
The brightness of the illumination light can be adjusted by three stages.



Adjusting the slit width

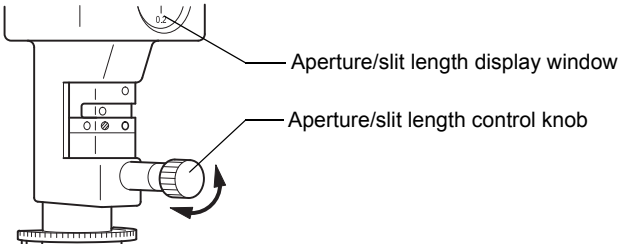
Turn the "slit width control knob".
The slit width can be changed gradually between 0 and 9mm (9mm=circle).



Changing the aperture/slit length

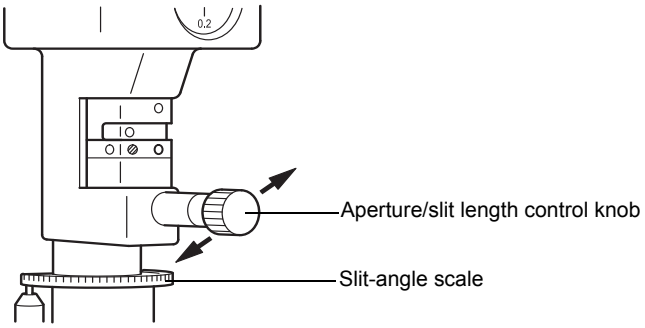
Turn the "aperture/slit length control knob".
When the slit is fully opened, 7 types of spot illumination (ϕ9, ϕ8, ϕ5, ϕ3, ϕ2, ϕ1, ϕ0.2mm) are available. The slit length can be changed gradually from 1mm to 8mm.

The spot illumination size and slit length are displayed on the "aperture/slit length display window".



Turning the slit

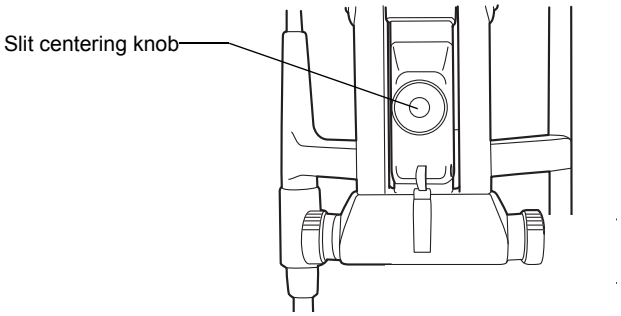
Horizontally rotate the "aperture/slit length control knob".
This directly changes the slit image from vertical to horizontal. In this mode, the slit angle can be read on the angle scale.



Swinging the slit sideways

Loosen the "slit centering knob" and swing the illumination unit right and left.
This provides indirect illumination displacing the slit light from the microscope center.
By fastening the "slit centering knob", the slit light returns to the center of the vision field.

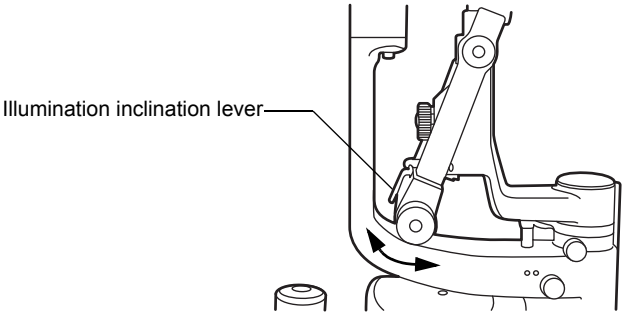
This function is used for scanning observation and observation with indirect illumination.



Inclined illumination

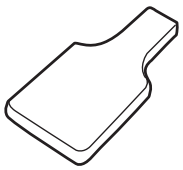
Press to unlock the "illumination inclination lever" and pull.
The illumination unit is inclined for inclined illumination up to 20° in 5° steps.

This function is used for observing a horizontal cross section, and for corner angle and fundus observation.

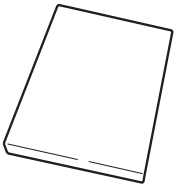


Reflection mirror

For this instrument, a "battledore mirror" and a "square mirror" are available. For normal observation, the "battledore mirror" is used.
However, if the "arm angle scale", which represents the angle formed by the "illumination arm" and "microscope arm", reads approx. 3° to 10° and the observation light flux is disturbed by the "battledore mirror", then the "square mirror" should be used.
The "square mirror" is to be used when the arm angle is opened to more than 10°.



Battledore mirror



Square mirror

Replacing reflection mirrors

Replace mirrors as follows, taking care not to touch the mirror and lens surfaces:

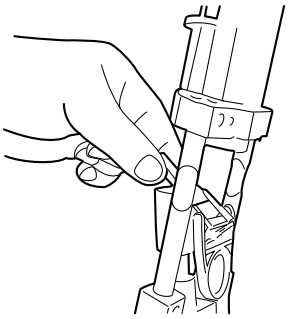
1 Open the "microscope arm" and "illumination arm" 30° or more.

2 Incline the illumination unit 10° or more.

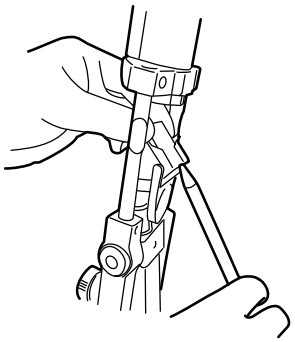
3 Pull out the "battledore mirror", holding the slender part on both sides. To reinsert the "battledore mirror", hold the slender part on both sides and insert.

4 Insert the "square mirror" from the side recessed on the back.

5 To pull out the "square mirror", which has no handle, push it up with a pencil, or something similar, as illustrated below.



Battledore mirror

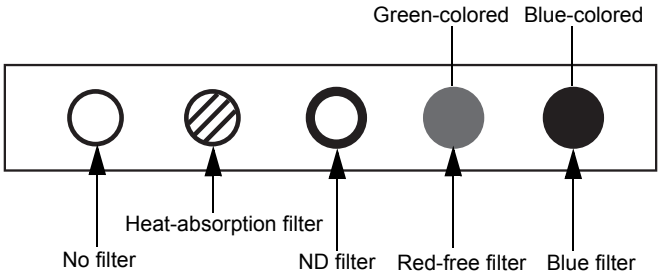


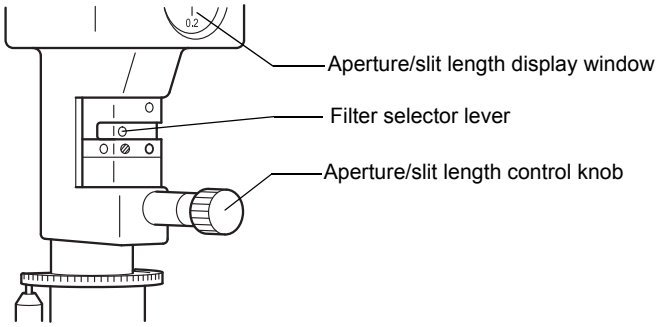
Square mirror

If you touch the mirror or lens surface, please clean this according to the process on page 39 "Cleaning lenses and mirrors".

Changing filters

Move the "filter selector lever" right and left to select the required filter from the 5 types.





ENDING PROCEDURE

1 Turn OFF (◯) the "POWER switch" on the power supply unit.

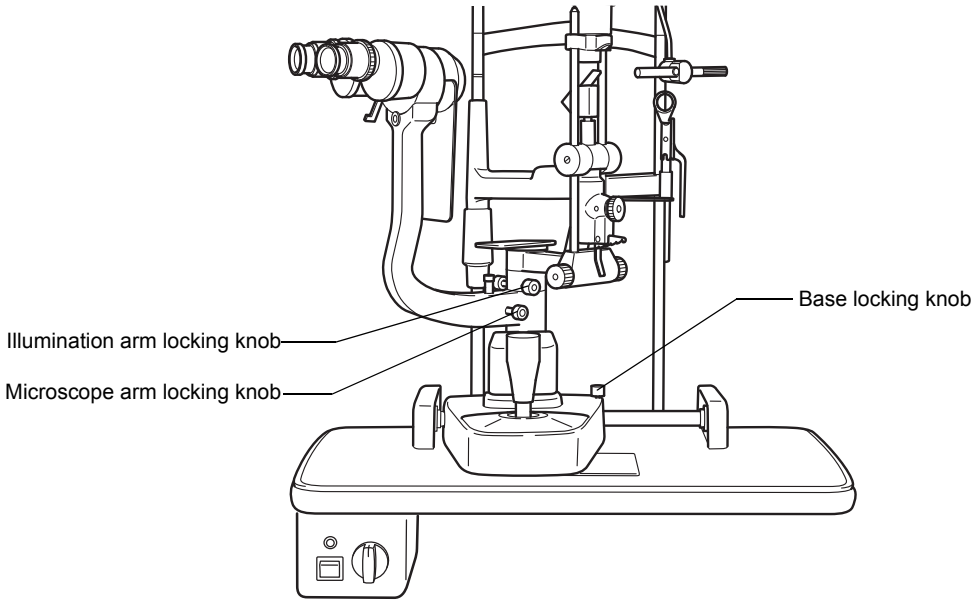
2 To prevent the base from moving unexpectedly, tighten the "base locking knob" and fix it.

When the instrument is not in use for a long time, unplug its power cord from the outlet.

CAUTION WHEN MOVING THE INSTRUMENT

⚠ **CAUTION**	To prevent the movable parts from hitting anyone's body, tighten and fix the illumination arm locking knob, microscope arm locking knob and base locking knob before moving the instrument.

Before moving the SL-3G by placing it on a movable item such as an automatic instrument table, tighten and fix "illumination arm locking knob", "microscope arm locking knob" and "base locking knob" securely.



TROUBLESHOOTING

TROUBLESHOOTING GUIDE

⚠WARNING	To avoid electric shocks, do not attempt disassembling, rebuilding and/or repairs on your own. Ask your dealer for repairs.

⚠WARNING	Do not remove the covers from the main unit, chinrest unit or power supply unit except for the lamp house cover. You may receive an electric shock.

If you suspect a problem, check the possible cause by means of the check list below.
If the check list below does not solve the problem, or if the problem is not included in the list, contact your dealer or TOPCON (see the back cover).

Check List

Problem	Possible cause	Check	Page
Illumination lamp does not work.	Cable is disconnected.	Connect the cable to the outlet correctly.	16
	POWER switch is OFF.	Turn ON (|) POWER switch.	16
	Plug of lamp house cover is switched off.	Insert the plug correctly.	16
	The fuses have blown out.	Replace them with new fuses.	34, 36 37
	Illumination lamp is broken.	Replace it with a new illumination lamp.	35
	Socket has deteriorated.	Replace it with a new socket.	36
	The illumination lamp plug on the power supply unit is switched off.	Insert the plug correctly.	16
Illumination field is not uniform/is shady/ is dark.	Filter selector lever is out of position.	Click filter selector lever.	24
Fuse blows.	Rated capacity of fuse is incorrect.	Use fuse with correct rating & authorized fuse.	34, 36 37
Slit width narrows by itself.	Slit width control knob torque has been decreased.	Carry out "Adjusting the slit width control knob torque."	33
The fixation target does not light.	The fixation target plug on the power supply unit is switched off.	Insert the plug correctly.	16

SPECIFICATIONS & PERFORMANCE

SPECIFICATIONS

Microscope unit	
Type	Greenough-type real-image direct-view normal image microscope
Magnification	Objective rotation 2-step magnification
Objective lens	1× and 1.6×
Eyepiece	10× and 16× (16× eyepiece is optionally available in some regions)
Overall magnification	Objective lens 1× Eyepiece: 10× and 10× (18) Eyepiece: 16× and 16× (14.5) Objective lens 1.6× Eyepiece: 10× and 16× (11.25) Eyepiece: 16× and 25.6× (9) The value in ( ) shows the real visual field (mmϕ).
Diopter adjustment range	Eyepiece 10×: -8D to +8D Eyepiece 16×: -10D to +10D
Pupillary distance adjustment range	Eyepiece 10×: 55 to 82mm (when diopter is "0D") Eyepiece 16×: 51 to 78mm (when diopter is "0D")
Illumination unit	
Illumination field	Slit width : 0 - 9mm, can be altered gradually. (9mm=circle) Slit length : 1 - 8mm, can be altered gradually. Aperture diameter: ϕ9, 8, 5, 3, 2, 1, 0.2mm
Inclination	5/10/15/20° from the bottom side Side swing
Filter	Blue filter, red-free filter, ND filter (13% transmission), Heat-absorption filter, UV cut filter (normal use) and IR cut filter (normal use)
Illumination lamp	6V, 20W halogen lamp
Base unit	
Forward-backward movement	90mm
Right-left movement	100mm
Vertical movement	30mm
Fine movement in all directions	15mm
Chinrest unit	
Chinrest vertical movement	80mm
Fixation target	Fixation target with diopter adjustment and luminous fixation target Light source of fixation target: Tungsten lamp

* The specifications and design are subject to change without advance notice for the product improvement.

Essential performance
1. The halogen lamp is not turned off.
2. There are no component failure.

ELECTROMAGNETIC COMPATIBILITY

This product conforms to the EMC Standard(IEC 60601-1-2 Ed.2.1:2004).

a) MEDICAL ELECTRICAL EQUIPMENT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the ACCOMPANYING DOCUMENTS.
b) Portable and mobile RF communications equipment can affect MEDICAL ELECTRICAL EQUIPMENT.
c) The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the EQUIPMENT or SYSTEM as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of the EQUIPMENT or SYSTEM.
d) The EQUIPMENT or SYSTEM should not be used adjacent to or stacked with other equipment. IF adjacent or stacked use is necessary, the EQUIPMENT or SYSTEM should be observed to verify normal operation in the configuration in which it will be used.
e) The use of the ACCESSORY, transducer or cable with EQUIPMENT and SYSTEMS other than those specified may result in increased EMISSION or decreased IMMUNITY of the EQUIPMENT or SYSTEM.

Item	Part code	Length (m)
AC power cord	41840 5010	1.5

Guidance and manufacturer's declaration - electromagnetic emissions		
The SL-3G is intended for use in the electromagnetic environment specified below. The customer or the user of the SL-3G should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The SL-3G uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The SL-3G is suitable for use in all establishments including domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The SL-3G is intended for use in the electromagnetic environment specified below. The customer or the user of the SL-3G should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Main power supply quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Main power supply quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_t (>95% dip in U_t) for 0.5 cycle 40% U_t (60% dip in U_t) for 5 cycles 70% U_t (30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 sec	<5% U_t (>95% dip in U_t) for 0.5 cycle 40% U_t (60% dip in U_t) for 5 cycles 70% U_t (30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 sec	Main power supply quality should be that of a typical commercial or hospital environment. If the user or the SL-3G requires continued operation during main power interruptions, it is recommended that the SL-3G be powered from an uninterruptible power supply or battery backup.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_t is the a.c. main voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The SL-3G is intended for use in the electromagnetic environment specified below. The customer or the user of the SL-3G should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidance**
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150kHz to 80MHz 3 V/m 80MHz to 2.5GHz	3 V 3 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the SL-3G, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80MHz to 800MHz $d = 2.3\sqrt{P}$ 80MHz to 2.5GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol: 
NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the SL-3G is used exceeds the applicable RF compliance level above, the SL-3G should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the SL-3G.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distance between portable and mobile RF communications equipment and the SL-3G

The SL-3G is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the SL-3G can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the SL-3G as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150kHz to 80MHz $d = 1.2\sqrt{P}$	80MHz to 800MHz $d = 1.2\sqrt{P}$	800MHz to 2.5GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

ELECTRIC RATING

Source voltage : AC120V/220V FREQ.50 - 60Hz(for North & South America)
: AC120V/220V/230V/240V FREQ.50 - 60Hz(outside for North & South America)
Power input : 30VA

SYSTEM CLASSIFICATION

Type of protection against electric shocks: Class I equipment

Class I equipment does not depend on basic insulation only for protection against electric shocks. It can also be grounded; therefore, the metal parts with which one comes into contact do not become conductive if the basic insulation fails.

Degree of protection against electric shocks: Type B applied part

Type B applied part is the applied part complying with the specified requirements of the Standard IEC 60601-1 to provide protection against electric shock, particularly regarding allowable LEAKAGE CURRENT.

Degree of protection against harmful ingress of water: IPX0

SL-3G has no protection against ingress of water. (The degree of protection against harmful ingress of water defined in IEC 60529 is IPX0)

Classification according to the methods of sterilization or disinfection recommended by the manufacturer: not applicable.

SL-3G has no part to be sterilized or be disinfected.

Not AP or APG equipment

Classification according to the degree of safety of application in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide.

SL-3G should be used in environments where no flammable anesthetics and/or flammable gases are presents.

Classification according to the mode of operation: Continuous operation.

Continuous operation is the operation under normal load for an unlimited period, without the specified limits of temperature being exceeded.

DIMENSIONS AND WEIGHT

Dimensions	550mm (W) × 430mm (D) × 770 - 800 (H) 440mm (W) × 410mm (D) × 770 - 800 (H) (Unit type)
Weight	21kg, 20kg (Unit type)

PURPOSE OF USE

This instrument is used for the magnified observation of the eye and its various structures by the eye care professional.

OPERATION PRINCIPLE

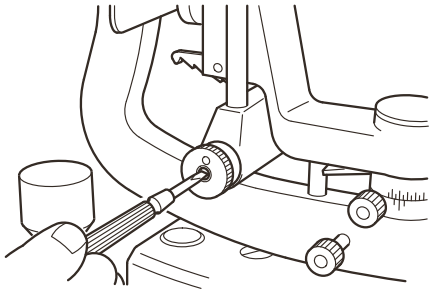
Illuminates the observed part by the illumination light emitted from the illumination optical system and allows magnified observation by binocular stereoscopic microscope.

MAINTENANCE AND CHECKUPS

MAINTAINING ACCURACY

Adjusting the slit width control knob torque

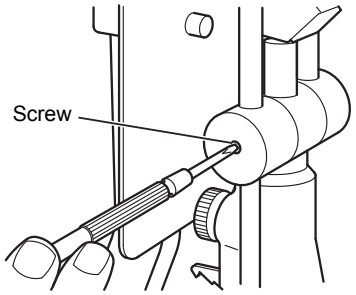
If the slit width narrows by itself due to a decrease in "slit width control knob" torque, adjust the torque as follows.



1 Press the "slit width control knob" on the left-hand side, and turn the right-hand side clockwise.

Adjusting the inclination torque

If the inclination torque of the illumination unit is too low, fasten the arm inclination by tightening the screws clockwise on both sides of the arm.



PERIODIC MAINTENANCE

Before using, confirm the following:

- Adjust the diopter and eye width following "ADJUSTING THE DIOPTER AND PUPILLARY DISTANCE (PD)" on page 17 and turn the slit width control knob and make the slit width about 1mm: The slit image projected on the test rod is seen clearly.
- Move the base forward-backward and right-left: The base moves smoothly.
- Component parts, including the eyepiece unit, are fitted in place.
- The chinrest base is firmly fitted to the table.
- Cables and plugs are firmly connected.

USER MAINTENANCE ITEMS

Item	Inspection time	Contents
Inspection	Before using	• Adjusting the diopter and pupillary distance • Focus of slit image • The base unit must move smoothly. • The components must be fitted in place correctly. • The chinrest unit must be fitted to the table unit correctly. • The cables and plugs must be connected correctly. • The objective lens, eyepiece and mirror must not be stained or damaged.
Cleaning	When the part is stained	• Objective lens • Eyepiece • Mirror • Sliding plate, rail and wheel shaft unit • Forehead rest and chinrest unit
Adjustment	As required	• Slit width control knob torque • Inclination torque of illumination unit
Replacement	As required	• Illumination lamp • Fixation target lamp • Socket • Fuse
Supply	As required	Chinrest tissue

DAILY CARE

- This instrument may be affected adversely by dust. Apply the dust cover when not using.

PLACING AN ORDER FOR CONSUMABLES

- When ordering consumable items, contact your dealer or TOPCON (see the back cover). Specify the article name, product code and quantity.

Article name			Product code
Illumination lamp			40340 2070
Socket			40526 1249
Chinrest tissue			40310 4082
Fuse (Primary side)	Source voltage	(for North & South America)	
		AC120V INPUT : T1AL 250V	T24000204A
		AC220V INPUT : T500mAL 250V	T24000203A
Fuse (Primary side)	Source voltage	(outside for North & South America)	
		AC120V INPUT : T1AL 250V	T24000204A
		AC220V/230V/240V INPUT : T500mAL 250V	T24000203A
Fuse (Secondary side)		F4AL 250V	T24000194A

REPLACING ILLUMINATION LAMPS

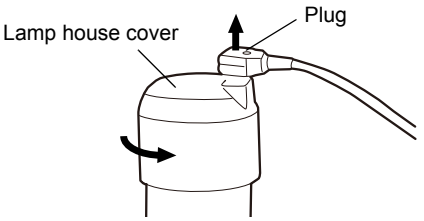
⚠ **CAUTION**	When replacing the lamp, switch off the power supply and remove the power cord to avoid electric shock.

⚠ **CAUTION**	Beware of high temperatures when replacing the lamp immediately after switching it off: these could cause burns.

NOTE	To ensure perfect illumination, make sure that the socket flange and notch are firmly fitted to the lamp house.

NOTE	Use a soft cloth and do not touch the illumination lamp with bare fingers: fingerprints and stains may affect illumination and cause premature failure of the lamp.

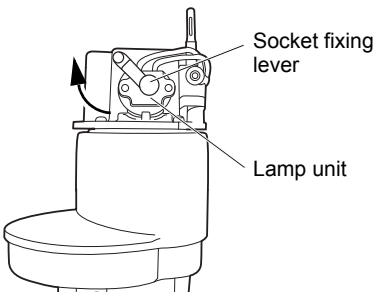
1 Turn OFF (◯) the "POWER switch" and remove the cable plug.
Pull out the plug from the "lamp house cover". Turn the "lamp house cover" counterclockwise and remove upward.



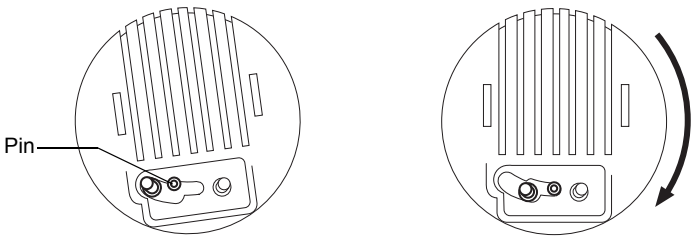
2 Lightly pull the "socket fixing lever" and turn in the direction indicated by the arrow.

3 Pull out the "lamp unit".

4 Remove the "illumination lamp" from the "socket" and fit the new lamp.
When fitting the new lamp, make sure the direction of the "illumination lamp" and "socket" is correct.
∗ For the article name and product code of the "illumination lamp", refer to "PLACING AN ORDER FOR CONSUMABLES" on P.34.



5 Fit the pin into the groove on the "lamp house cover" as shown below. Turn the lamp house cover clockwise to fix it.



6 Connect the "plug".

Unless the pin is fitted into the groove correctly, the plug is not connected properly and the illumination is not turned on.

Replacing sockets

NOTE	The socket may deteriorate due to the constant heat: therefore, it should be replaced after the lamps have been changed two or three times.

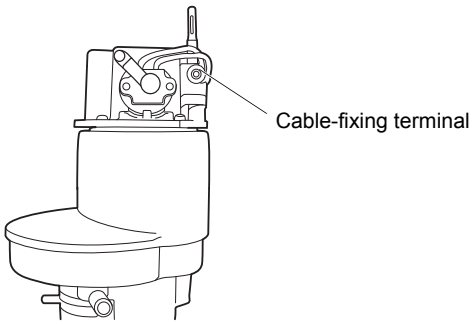
1 Remove the lamp following steps ***1*** - ***4*** of "REPLACING ILLUMINATION LAMPS".

2 Loosen the "cable-fixing terminal" by turning it counterclockwise, remove the cable and replace the "socket" with a new one.

∗ For the article name and product code of the socket, refer to "PLACING AN ORDER FOR CONSUMABLES" on P.34.

3 Turn the "cable-fixing terminal" clockwise to fix the cable securely.

Unless the "cable-fixing terminal" is fixed securely, the illumination may not be turned on.



4 Install the "lamp house cover" and "plug" following steps ***5*** - ***6*** of "REPLACING ILLUMINATION LAMPS".

REPLACING FUSES

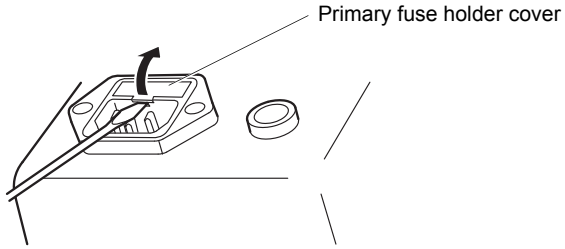
⚠WARNING	To avoid electric shock, unplug the power cord from the grounded outlet before removing the fuse cover. Do not connect the power cord to the grounded outlet with the fuse cover not correctly attached.

⚠WARNING	To avoid fire in the event of an instrument malfunction, use only fuses that are listed on the marked label at the side of the fuse holder.

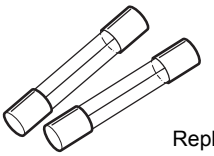
Replacing the primary fuses

1 Turn OFF (◯) the "POWER switch" on the power supply unit and unplug the power cord from the outlet.

2 Using a screwdriver, open the fuse holder cover. There are two fuses.



3 Replace the fuses with ones having the same capacity as the label.



Replacement of fuses

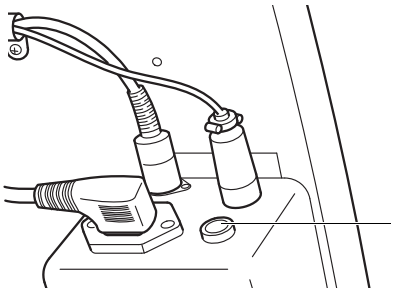
* For the article name and product code of the fuse, refer to "PLACING AN ORDER FOR CONSUMABLES" on P.34.

4 Close the fuse holder cover.

When the fuses have blown out, the whole instrument does not operate. Replace the fuses.

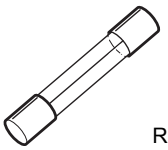
Replacing the secondary fuses

1 Turn OFF (◯) the "POWER switch" on the power supply unit and unplug the power cord from the outlet.



2 Turn the secondary fuse holder cover counterclockwise with a screwdriver. The fuse holder can be removed.

3 Replace the fuse with one having the same capacity as the label.



Replacement of fuse

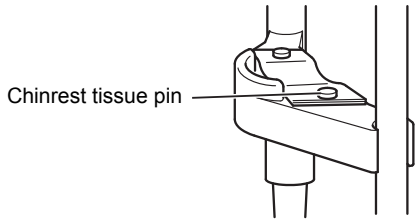
* For the article name and product code of the fuse, refer to "PLACING AN ORDER FOR CONSUMABLES" on P.34.

4 While pushing in the fuse holder cover with a screwdriver, turn it clockwise and fix it.

When the fuse has blown out, the whole instrument does not operate. Replace the fuse.

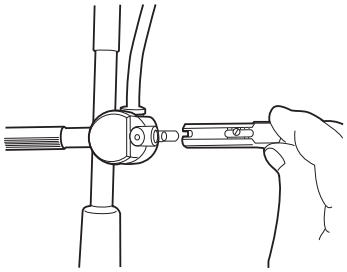
RESTOCKING CHINREST TISSUE

When the "chinrest tissue" supply is depleted, pull out the "chinrest tissue pins" and replace with new tissue paper.



REPLACING THE FIXATION TARGET BULB

1. Turn OFF (◯) the "POWER switch".
2. Loosen the locking screw of the fixation target.
   * Do not over-loosen the locking screw, or it may drop.
3. Hold the top of bulb and pull it out; then insert the new bulb.
4. Insert the fixation target, then tighten the locking screw.
5. Turn ON (|) the "POWER switch" and make sure that the fixation target lamp is lit.



DAILY CARE

⚠ **CAUTION**	Before carrying out daily care, remove the power cord (to avoid electric shock) and wait until the main unit has cooled (to avoid burns).

⚠ **CAUTION**	Do not touch parts inside the lamp house cover during operation and immediately after switching off the power supply: this could cause burns.

NOTE	• To prevent the chinrest, forehead rest and other plastic parts from discoloration and deterioration, do not use volatile solvents for cleaning, including benzine, thinner, ether, gasoline, etc. • Wipe parts with a cloth moistened with a tepid solution of neutral kitchen detergent.

Cleaning the parts in contact with the patient

When the forehead rest and chinrest unit are stained:

Prepare a tepid solution of neutral detergent for kitchenware. Moisten the cloth with the aforementioned solution and wring it thoroughly. Then wipe the unit with the cloth.

Cleaning lenses and mirrors

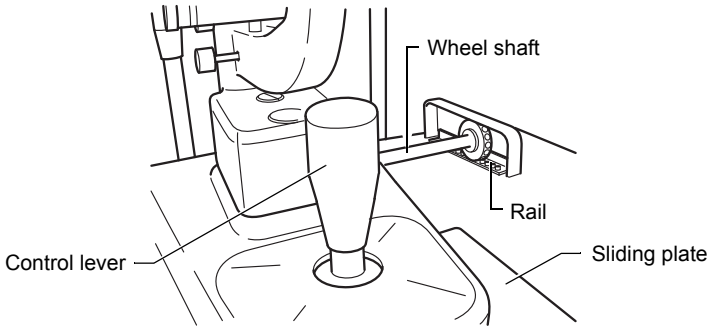
NOTE	To prevent damage to lens surfaces, do not hold gauze with tweezers.

1. Prepare a solution of ethyl alcohol 20% and ether 80%.
2. Remove dust from lens and mirror surfaces with the cleaning brush, or a blower.
3. Using clean gauze or lint-free tissue, lightly clean with a rotating movement from the center of the lens/mirror outwards.
4. If the stain remains, repeat this 2 to 3 times.
5. If stains are persistent, call your dealer or TOPCON (see the back cover).

Cleaning the sliding plate, rail and wheel shaft

NOTE	When stained, the movement of the sliding plate and rail of the tabletop and the wheel shaft of the base becomes less smooth. Clean them with a dry cloth.

1. Move the base right and left and wipe the wheel shaft clean with a dry cloth.
2. Hold up the control lever and clean the sliding plate with a dry cloth.



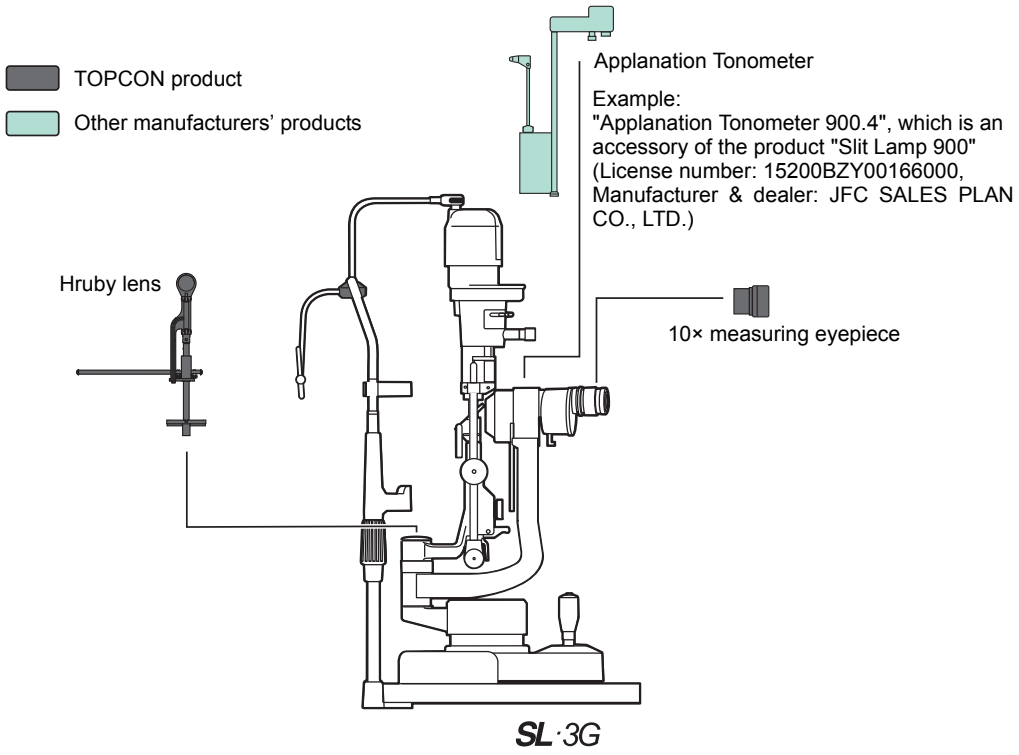
OPTIONAL ACCESSORIES

TOPCON Slit Lamp SL-3G provides the following optional accessories for imaging.
For inquiries, please call your dealer or TOPCON (see the back cover).

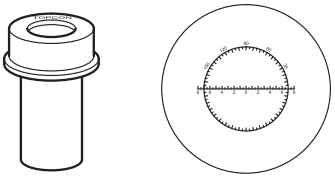
⚠ **CAUTION**	To prevent falling during use and movement, secure optional accessories.

SYSTEM CONFIGURATION

SL-3G system chart



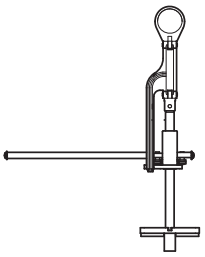
10× MEASURING EYEPIECE



Features

Can measure dimensions and angles (by replacing the normal eyepiece).

HRUBY LENS



Features

Normally, observation can be carried out only as far as the vitreous body of the anterior segment, due to the refracting power of the cornea and lens. With the Hruby lens, the posterior vitreous body and fundus can also be observed.

REFERENCE MATERIAL

SHAPE OF PLUG

Country	Voltage/frequency	Shape of plug
Mexico	110V/50Hz	Type C&E
Argentina	220V/60Hz	Type A
Peru	220V/60Hz	Type A
Venezuela	110V/50Hz	Type C&E
Bolivia & Paraguay	220V/60Hz	Type A (Most common) Type H (Infrequently)
Chile	220V/60Hz	Type A
Colombia	110V/50Hz	Type C
Brazil	220V/60Hz 127V/60Hz	Type A Type C
Ecuador	110V/50Hz	Type C&E
USA	120V/60Hz	Type A (Hospital Grade)
Canada	120V/60Hz	Type A (Hospital Grade)

SYMBOL

Symbol	IEC Publication	Description	Description (French)
	60417-5032	Alternating Current	Courant alternatif
	60417-5008	Off (power: disconnection from the main power supply)	Éteint (courant: coupure avec le secteur)
	60417-5007	On (power: connected to the main power supply)	Allumé (courant: raccordement sur le secteur)
	60878-02-02	Type B applied part	Partie appliquée du Type B
	60348	Attention, consult accompanying documents	Attention, consulter les documents d'accompagnement

ADJUSTABLE AUTOMATIC INSTRUMENT TABLE

Automatic instrument table AIT-16

Specifications

- Table size 490 (D) × 500 (W) mm
  665 - 885 (H) mm
- Weight approx. 25kg

RELATION BETWEEN SETTING OF ILLUMINATION LEVEL AND MAXIMUM RADIANCE

When the maximum radiance is "1", the ratio of radiance is shown below in relation to the setting of the illumination level.

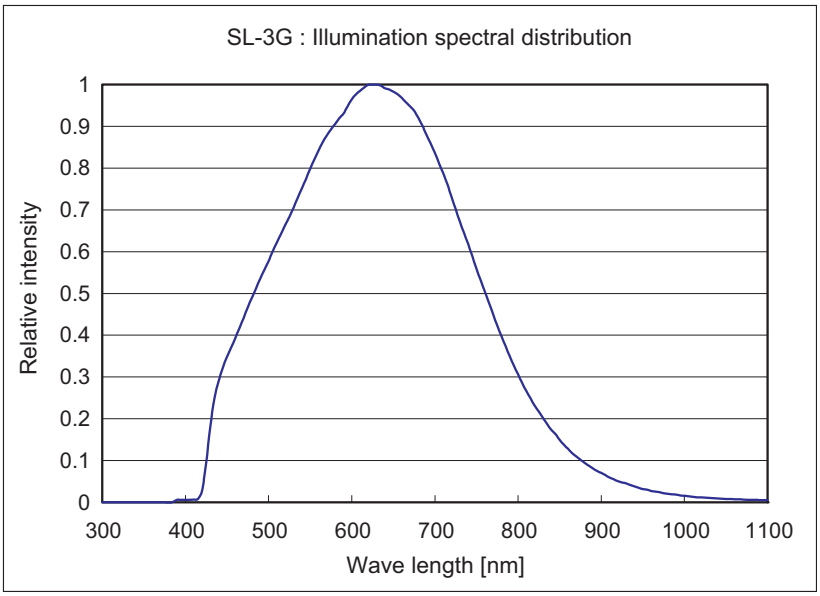
Illumination level

Indicated set value	Level ratio
1/3	0.321
2/3	0.643
1	1.00

INFORMATION ABOUT THE OPTICAL RADIATION HAZARD TO THE USER

⚠ **CAUTION**	The light emitted from this instrument is potentially hazardous. The longer the duration of exposure, the greater the risk of ocular damage. Exposure to light from this instrument when operated at maximum intensity will exceed the safety guideline after 65 sec.

Light distribution of illumination



Please provide the following information when contacting us regarding questions about this instrument:

- Model name : SL-3G
- Serial No. : This is described on the rating nameplate.
- Period of use : Please inform us of the date of purchase.
- State of instrument : Please provide us with as much detail as possible on the problem.

SLIT LAMP SL-3G

INSTRUCTION MANUAL
Version of 2008 (2008.12-100TH①)
Date of issue: December 10, 2008

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SLIT LAMP

SL-3G

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