USER'S MANUAL | SILT LAMP

SL 880

LUXVISION®
PRECISION INSTRUMENTS

Notification

Dear Users,
Thank you for your purchase of SL 880 Slit Lamp. Please take time to read our user's manual carefully before use.
This guarantees you to make full use of this unit and prolongs the operation life of this unit.

Precautions

If you have detected abnormal heat, smoke, noise or smell, immediately stop using the product.
In the event of an abnormality, turn off the power and disconnect the power plug from the power socket. Continuing to use the product may result in electric shock or fire.

Observe the instructions given below regarding the power cable:

- Be sure to use the supplied or specified power cable.
- Do not modify, forcibly bend, kink or pull the power cable.
- When disconnecting the power cable from the AC outlet, be sure to hold the cable by the plug.
  Pulling the cable may cause wire breakage or shot circuit, resulting in fire or electric shock.
- Do not connect or disconnect the plug of the power cable to/from the AC outlet using wet hands.
  Doing so may result in electric shock.
- Do not touch the product with wet hands while the power cable is connected to the AC outlet.
  Doing so may result in electric shock.
- If the product will not be used for a long period, disconnect the power cable from the power source. Leaving the cable connected to the power socket for a prolonged period will consume electricity and may result in heating.

Content

1. Name of Parts

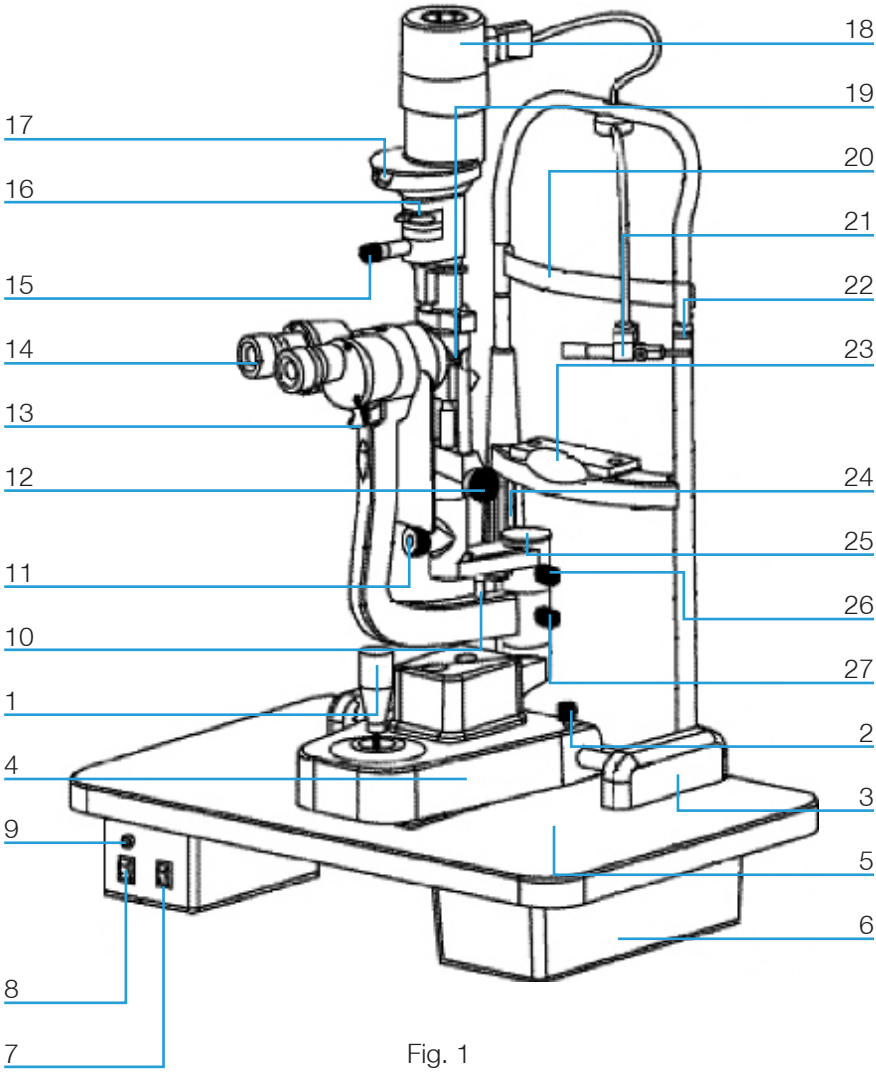


Fig. 1

1. **Joystick**
   Incline joystick to move the instrument slightly on the horizontal surface and rotate it to adjust the elevation of the microscope.

2. **Base Locking Screw**
   The base will be locked when fastening this screw.

3. **Rail Cover**
   Protect the rail surface

4. **Base**
   Support the microscope and the illumination arms with the joystick controlling its movement.

5. **Work Table**

6. **Accessory Drawer**
   Store the focusing test rod and other accessories.

7. **Brightness Control Switch**
   Two levels are available – H (HIGH), N (NOR - MAL). Avoid working continuously at high setting, as the service life of the bulb will be shortened.

8. **Main PowerSwitch**

9. **Pilot Lamp**

10. **Location Roller**
    When it is in the middle, it stands for included angle of 0 between the microscope arm and the illumination arm. And the right or left side the included angle of 10.

11. **Centering Knob**
    Loosening the knob allows the illumination light to be moved from the center of the vision filed for indirect retro-illumination. Fastening the knob brings the illumination light back to the center.

12. **Slit Width Control Knob**
    The slit width is continuously adjustable within the range from 0 to 9mm.

13. **Magnification Changer Lever**
    Push the lever of either side to select the desired magnification of the microscope.

14. DiopterAdjustment ring

Adjust the eyepieces diopter to obtain a clear image before using the instrument.

15. Aperture and Slit Height Control Knob

Rotate this knob to adjust the spot and the slit height. Swing the knob horizontally to revolve the slit.

16. FilterSelection Lever

There are four filters for selections

17. Slit height and aperture display window

18. Lamp cap

19. Reflecting Mirror

The long mirror is provided. The observation pathway may be interfe red if the included angle between the microscpe arm and the illumination arm is only 3° - 10°.

20. Forehead Belt

21. Fixation target

An illuminated fixed spot for patient to look at.

22. Horizontal Mark

When the horizontal center of the patient's eye is in line with the mark, the elevation of the microscope controlled by joystick is also in its center position.

23. Chin-rest

24. Chin-rest elevation adjustment knob

Rotate the knob to adjust the elevation of the Chinrest.

25. Protection cap

Please cover the main shaft hole with the protection to prevent dusts and physiological salt solution from dropping into the main shaft pole of the illumination arm during the operation. Take off the cap when assemble the focusing test rod.

26. Mocroscope and illumination arm couple bolt

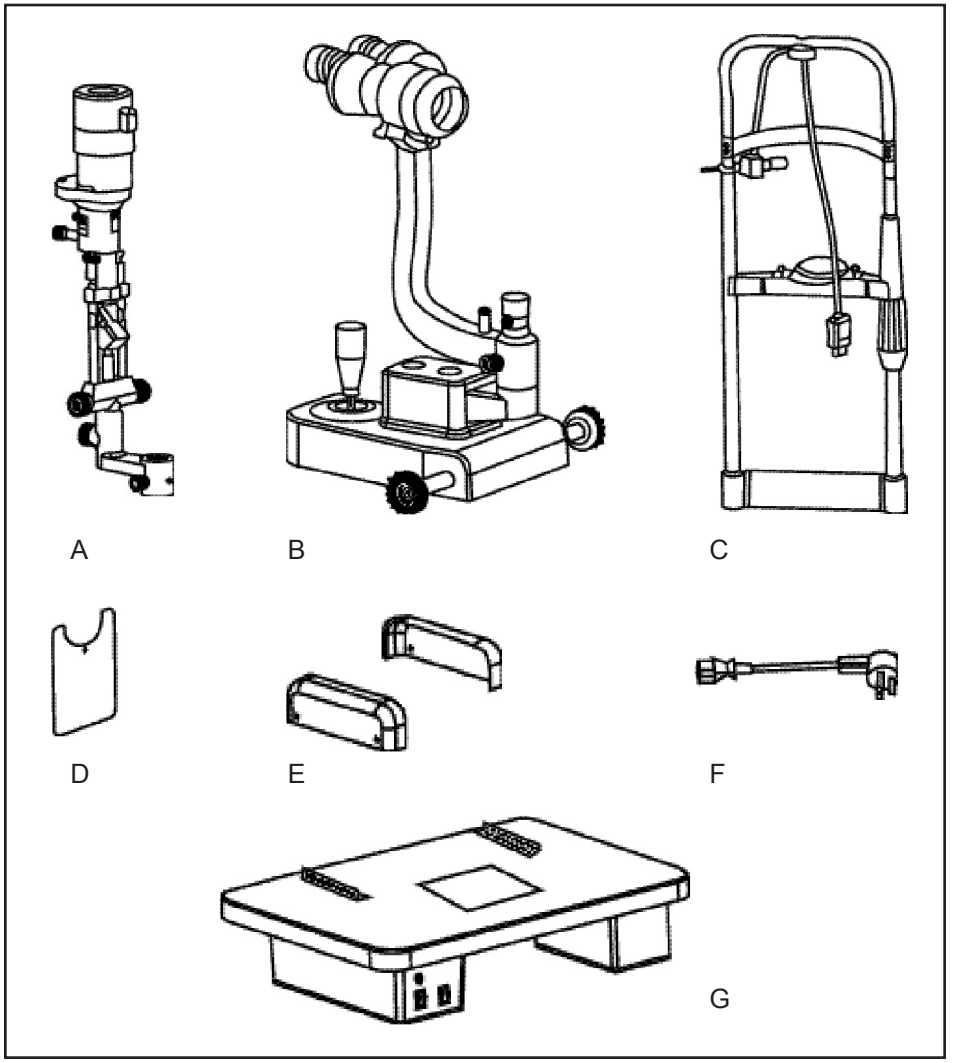
Fasten this bolt and illumination arm and the mircroscope arm could be move in couple state to rotate together. Loosen it and the illumination arm then

can rotate separalely.

27. Microscope arm locking knob
Lock the rotational movement of the microscopearm.

2. Assembly

2.1 Components



H

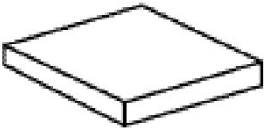
I

J

K

L

M



N

O

P

Q

R

S

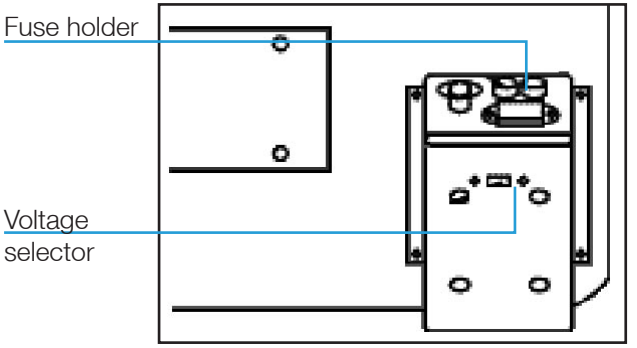
	Name	Quantity
A	Illumination Part	1
B	Base Part (with microscope)	1
C	Head rest part	1
D	Breath shield	1
E	Work table with Power Box	1
F	Rail cover	2
G	Input Power cable	1
H	Chin-rest paper	1
I	Spare main illumination Bulb	1
J	Protection cap	1
K	Spare fuse	2
L	Spare long Reflecting Mirror	1
M	Brush	1
N	Dust Cover	1
O	Focusing Test Road	1*
P	Cross Screw Driver with Wood handle	1
Q	Watch screw Driver (small)	1
R	Watch screw Driver (big)	1
S	Spaner	1

(*Optionally available in some region)

2.2 Assembly Procedure

Necessary tools are as follows:
Cross Screw Driver With Wood Handle (P)
Watch screwdriver (R)
Spanner (S)

1. Selecting voltage and fuse



Selector voltage and fuse

- Check the setting on the voltage selector located on the bottom of the power box. If it doesn't match with the input voltage, slide it to the proper position with screwdriver (R).

- Open the fuse holder with screw driver (P) and take out the fuse, check and ensure that its rated value iscorresponding to the mains voltage:

  110 Volt.....1A
  220 Volt..... 0.5 A

  It has been set to the 220 v 0,5 A before leaving our factory.

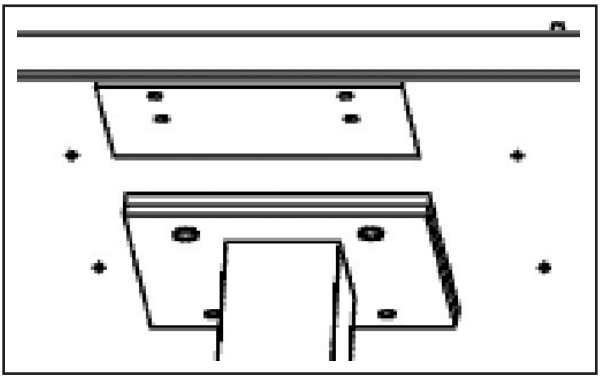
Important Matters

Set the input voltage and frequency of the instrument according to that of the mains.

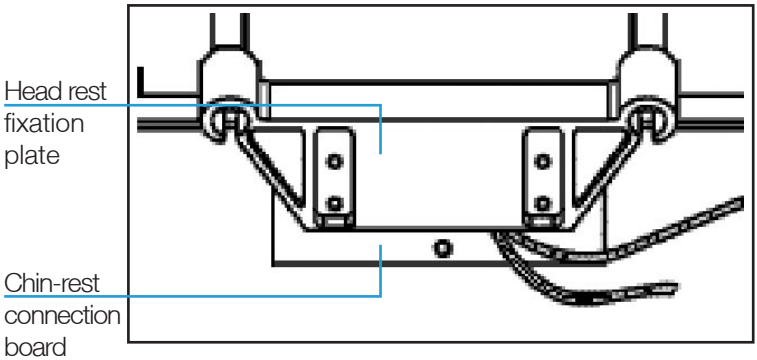
2. Assembling the worktable (E)

To attach the worktable on the motorizedinstrument table, please screw off four M8x20mm bolts with spring washers with the spanner (S).
Lift the worktable to aim its screw hole at the assembly hole of the instrument table.

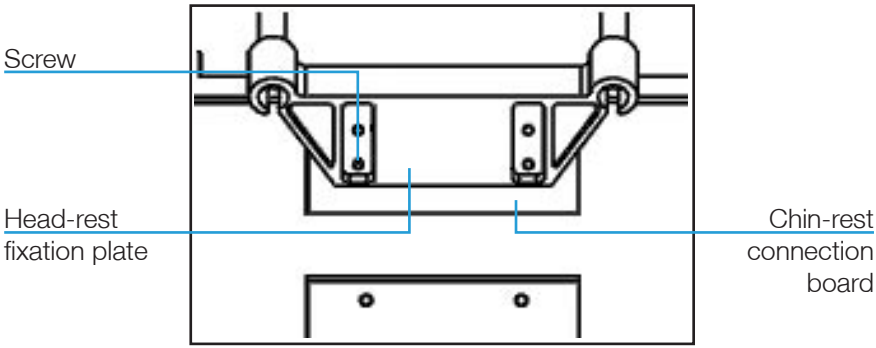
- Put down the worktable, with the power panel facing the user, refasten the bolt securely with the spanner.



3. Assembling the Head-rest Part (C)



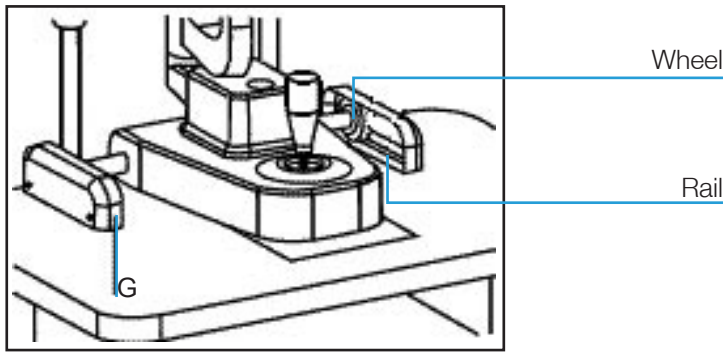
- Remove the four screws attached to the chin-rest connection board with the screw driver (P).



- Put two cables in the gap between the headrest fixation plate and the chin-rest connection board (Fig 5.)

- While ensuring they are not clamped, retighten the previously removed screws.

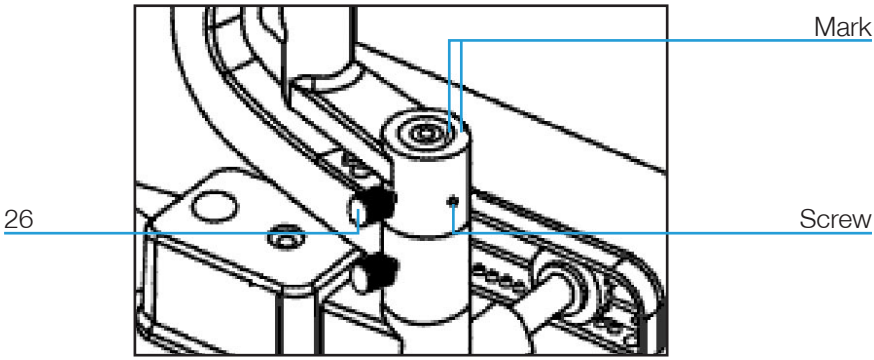
4. Assembling the base part (B) and the rail cover (F)



- Place the wheels of both sides of the base (B) on the rails on the worktable
- Check whether the wheels can be rolled steadily on the rails.
- Remove four screws attached to the rail with the screw driver (P).
- Place the rail cover (F) to the rail, retighten the previously removed screws.

5. Assembling Illumination part (A)

- Loosen the illumination arm couple bolt (13).

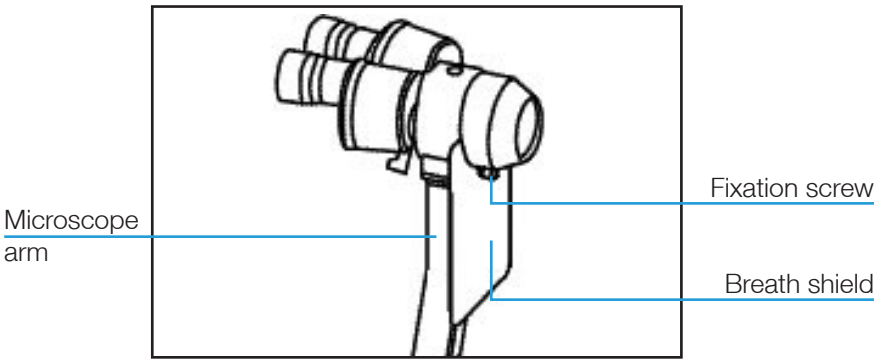


- Rotate the brass shaft sleeve to make the angle of the red mark and the illumination arm between 30° - 90°

- Loosen the screw in the illumination arm with the screwdriver (R). Aim the assembly hole of the illumination arm at the brass shaft sleeve then put it down with care, let the shaft keeping close to the bottom surface well and the two red marks stretch in one line simultaneously.

- After the two red marks accurately aligned re-tighten the screw.

6. Assembling the breath shield (E)

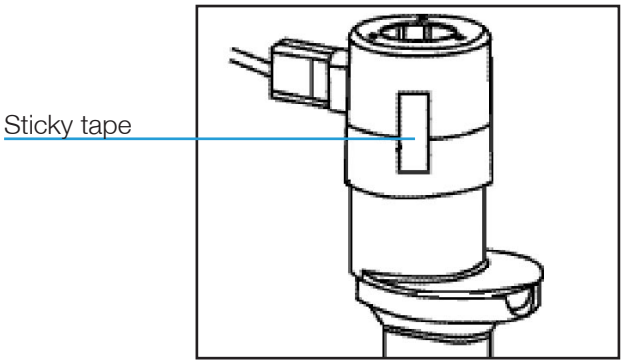


- Remove the breath shield fixation screw from the microscope arm.

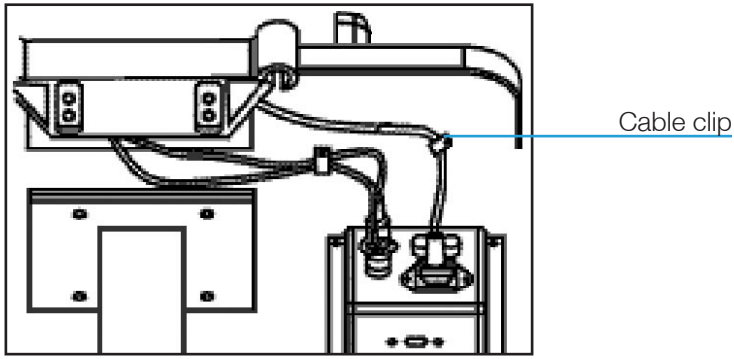
- Pass the removed screw trough the hole of the breath shield then re-screw it into the arm.

7. Connecting Plug

- Peel of the sticky tape attached to the cap, which ensures that the cap is tightened to the lamp base during transportation.

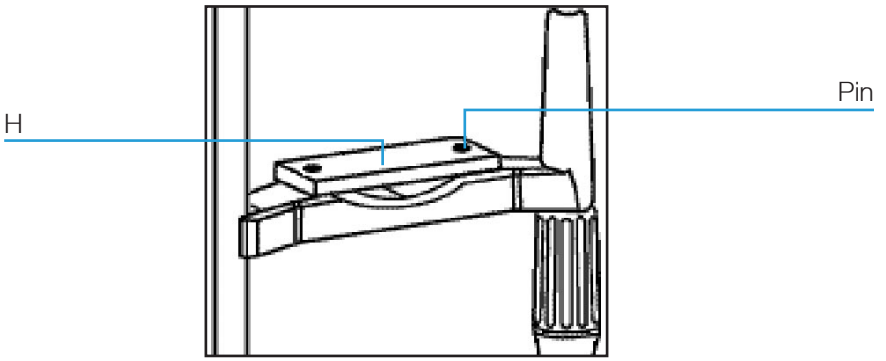


- Insert the plug on the top of the head-rest part (C) into the socket of the lamp cap (18) on the illumination part (A).
- Connect the two plugs below the head-rest part with the corresponding output socket of the power box.
- Insert the plug of the input power cable (G) into the input socket of the power box.
- Remove the cable clips from the bottom of the worktable with screwdriver (P) and wrap the output and input cables respectively, then re-attach them to the bottom of the worktable.



8. Assembling the breath shield (E)

- Pull out the two fixing pins from the chin-rest.
- Get rid of the paper package and let the pins go through its holes.
- Insert the fixing pins into the hole again.



2.3 Checking procedure after assembling.

1. Power plug

- This instrument supplies a 3-wire cable. Please select a proper power socket as matched.
- Ensured that the instrument is grounded well.

Important Matters

Please use the special cable supplied with this instrument.

2. The power box and the illumination part

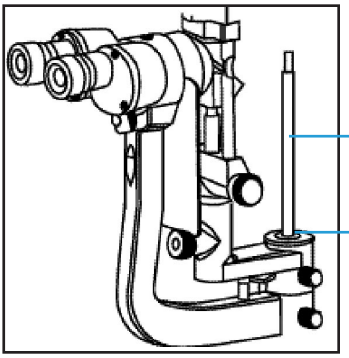
- When the main power switch (8) of the power box is placed at “I” it turns on, and “O” for turn off. The main power switch should be set at the “O” position before connecting the input cable with the power socket.

- Turn on the main power switch, and the pilot lamp (9) will be lighted. Open the slit width control knob (12) to examine the illumination.
- Press the brightness control switch (7) respectively at two positions and the brightness should be changed according.
- Check the fixation target device to confirm it is lighting.
- Check it all the movable parts such as aperture and slit height control knob (15), filter selection lever (16), and magnification changer lever (13) etc. could be operated freely.
- After examining, turn off the main power ad cover the instrument with the dust cover (N).

3. Operation

3.1 Diopter compensation and pupil distance adjustment.

1. Use of the focusing text rod (M) The rod is supplied as one of standard accesories for confirming the microscopes is adjusted correctly. Insert it into the main shaft hole with the flat surface.



Important Matters

After adjusting, remember to take out the rod and insert the protection cap.

2. Brightness adjustment

Switch on the main power switch and set the brighttness control switch (7) at “N” position. Turn the slit width control knob (12) to make the slit width to be 2-3mm.

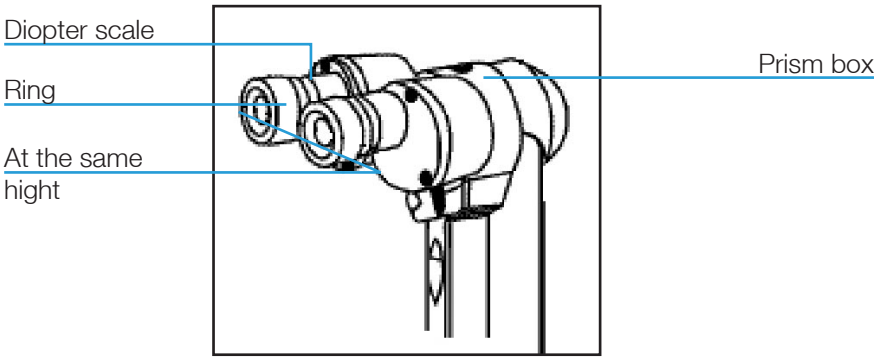
3. Diopter compensation
The focus of the microscope is calibrated according to the emmetropia. If the user is an ametropia, he or she should adjust the eyepiece diopter.

Suggest adjusting the diopter as following procedures.

- First, rotate the diopter adjustment ring (19) counter clockwise down to end.
- Second, rotate the ring clockwise untila sharp slit image appears on the focusing text rod.
- Adjust another eyepieces as the same procedure.
- Racord the diopter value on each eyepiece for future reference.

4. Pupil distance adjustment

Separate the prism box of the microscope with both hands to adjust the P.D. until both eyes could see the same image on the focusing test rod through the eyespieces, and at the same time a stereo vision will be obtained.



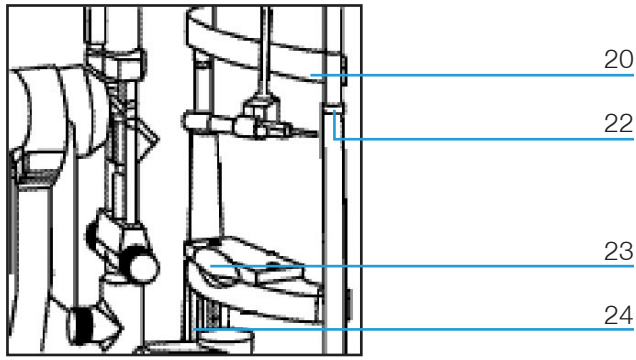
Important Matters

While adjusting the p.d., ensure that both eyepieces are at the same height.

3.2 Patient position and fixation target.

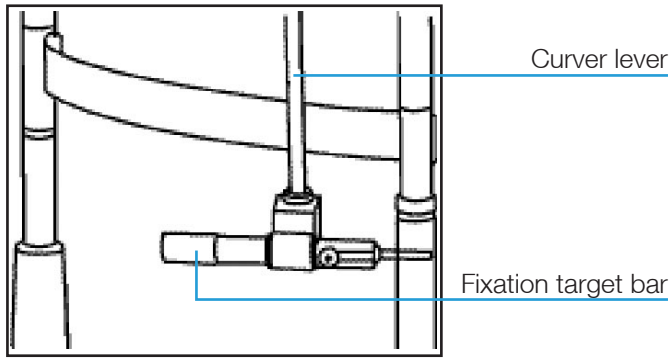
1. Positining the patient´s head

Have the patient place his chin on the chin-rest (23) and the forehead against the forehead belt (20). Adjust the chin-rest elevation adjustment knob (24) below the chin-rest until the patient´s canthus aligns with the horizontal mark (22).



2. Use of the fixation target

For fixing the patient´s eyesight, just make him look at the fixation target (21) with the eye not to be examined. To change fixing position, move the lamp bar, as well as move the curved lever around the headrest.



3.3 Base operation

1. Horizontal rough adjustment

Keep the joystick (1) erect and move the base (4) to make the microscope move on the horizontal surface to aim at the object roughly.

2. Vertical adjustment

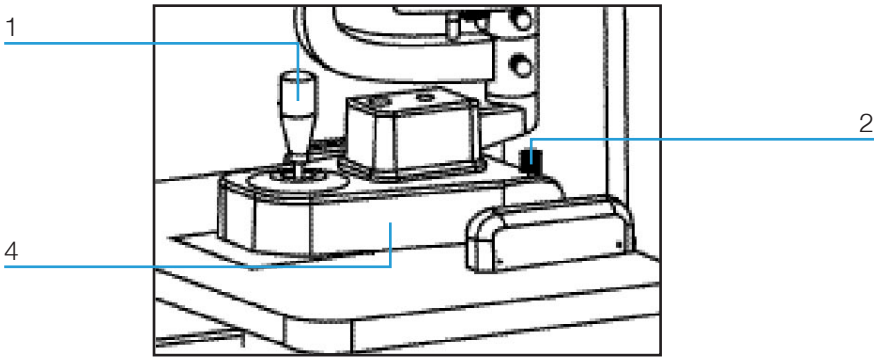
Rotate the joystick to adjust the microscope´s height until it aligns with the target. Turn the joystick clockwise to raise the microscope and counter clockwise to lower it.

3. Horizontal fine adjustmen

Tilt the joystick to make the microscope move slightly on the horizontal surface. White watching through the eyepieces, tilt the joystick to aim accurately at the object for a sharp image.

4. Locking the base

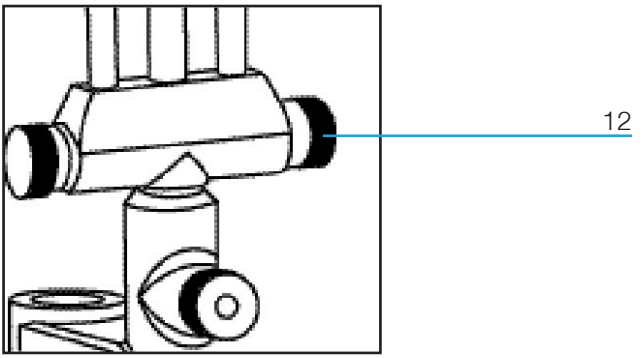
When finishing the adjustment, fasten the base locking screw (2) to lock the base (4) and prevent it from sliding.



3.4 Illumination parts operation

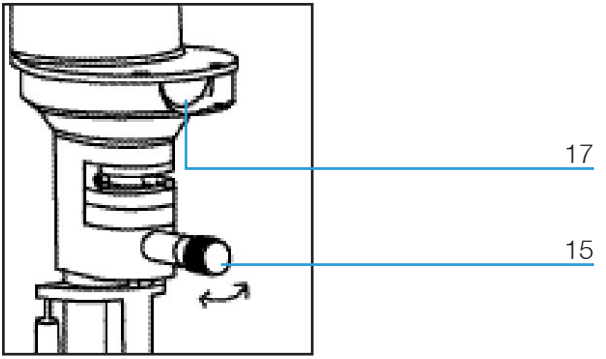
1. Changing the slit width

Turn the slit width control knob (12) and the slit width will be changed from 0mm to 9mm. The slit becomes a circle all the 9mm size.



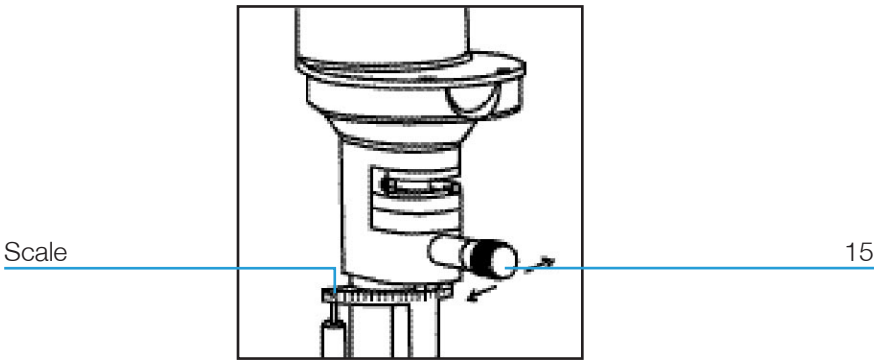
2. Changing the aperture and slit height

Turn the aperture and slit height control knob (15) and 6 different circular bearns of light are available at full aperture: 9, 8, 5, 3, 1, 0.2 diameter respectively. With a slit image, the slit height can be changed continuously from 1 to 9mm, which is indicated through the display window (17).



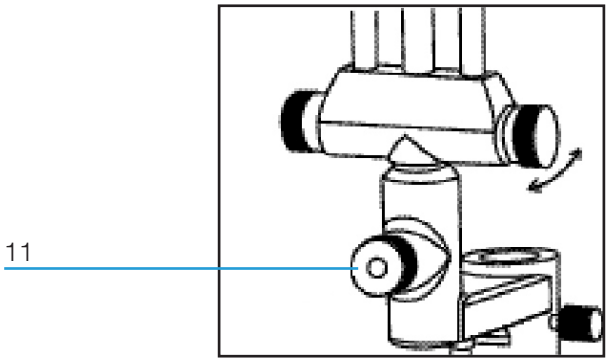
3. Rotating the slit image

Swing the aperture and slit height controlknob (15) horizontally to revolve the slit image at any angle from vertical to horizontal. The rotation angle scale indicates the angle of image rotation with small division for 5° and big division for 10°.



4. Deflecting the illumination light

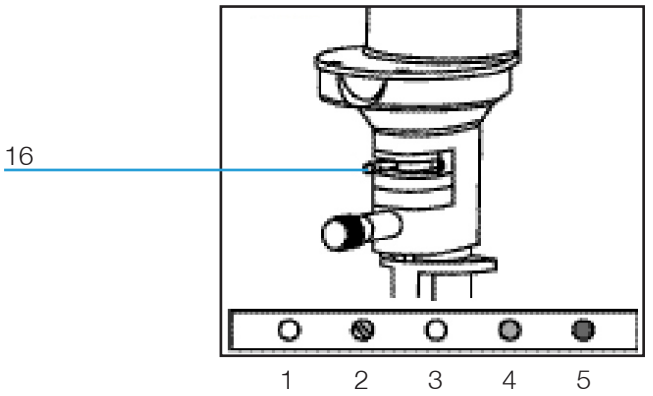
Loosen the centering knob (11) and swing the slit widht control knob (12) by the arrow, so the light spot moves away from the center of the microscope vision field. It is mainly used to examine the eye by indirect retro-illumination. Fasten the centering knob and the slit light will return to the center of the microscope vision field.



5. Filter selection

Turn the filter selection lever (16) in the horizontal surface to add four different kinds of filtersrespectively into the illumination pathway.
Usually the heat absorption filter is used so that the patient may feel more comfortable in long period or examination.

1. No filter
2. Heat absorption filter
3. ND filter
4. Red-free filter
5. Blue filter



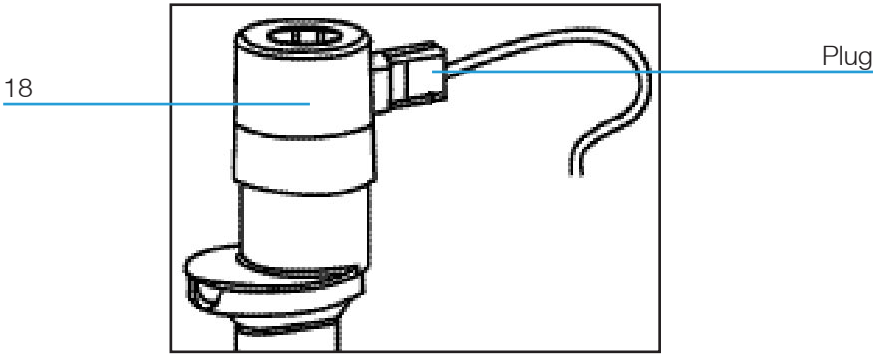
4. Maintenance

Important Matters

The replace waste materials should be tr eated as industrial rubbish.

4.1 Replacing the illumination bulb

- Turn the main power switch (8) off.
- Pull out the plug connected to the lamp house, rotate the lamp cap (18) counter clockwise and pull it out from the illumination part (A).

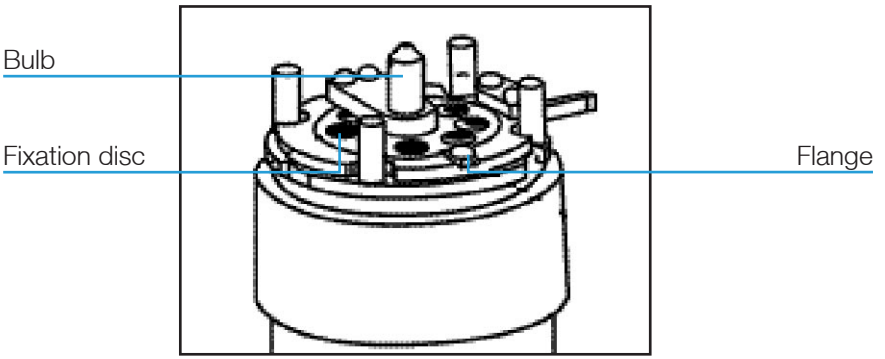


- Take out the old bulb and replace it with a new one. The groove in the bulb fixation disc should be almed at the flange of the lamp base, otherwise the illumination may be uneven.

Important Matters

The bulb is hot

- Place the lamp cap in the original position and rotate it clockwise and insert the connecting plugs.
- Turn on the main power switch and check whether the new bulb works or not.



- Place the lamp cap in the original position and rotate it clockwise and insert the connecting plugs.

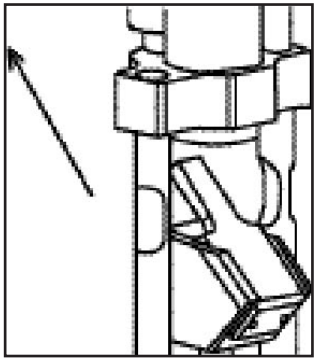
- Turn on the main power switch and check whether the new bulb works or not.

4.2 Replacing the reflecting mirror

- Set the angle between the microscope and the illumination arm to exceed 30°

- Remove the long mirror by holding the extended surface.

- Insert new long reflecting mirror.



4.3 Replacing the fuse

- Turn off the main power switch (8) and pull out the input cable from the power socket.

- Screw off the fuse holder cover with the screw driver (P).

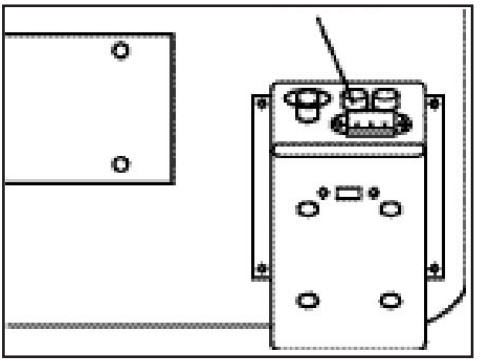
- Replace it with a new fuse, then fasten the cover.

- The fuse specifications are as follows

110V	1A, 250V
220V	0,5A, 250V

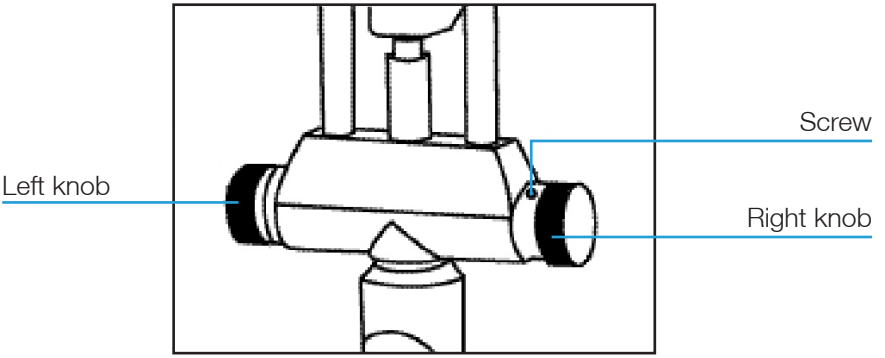
Important Matters

Please select the fuse of the same type, specification and rate value.



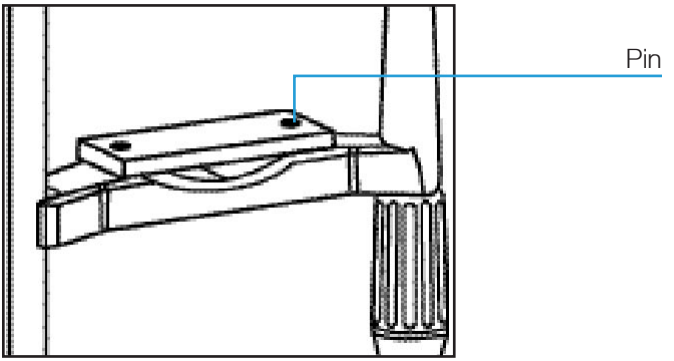
4.4 Adjusting the tightness of the slit width knob.

It the slit width control knob is too loose, the slit width may be out of control. Loosen the screw on the right knob with the screw driver (O), then hold the left knob firmly with one hand, white the other hand rotate the right knob clockwise to adjust its tightness. When it is appropiate, fasten the screw of the right knob firmly again.



4.5 Replacing the chin-rest paper

When the paper is exhausted, pull upwards two fixing pins of the chin-rest and place a new package of paper, then fix the fixing pins again.



4.6 Cleaning

1. Cleaning the lenses and mirrors

If any dust stick on the lenses or reflecting mirrors, brush them with the brush (M) supplied in the standard accesories. In case any dust still remains, wipe it off with soft cotton dipped with absolute alcohol.

Important Matters

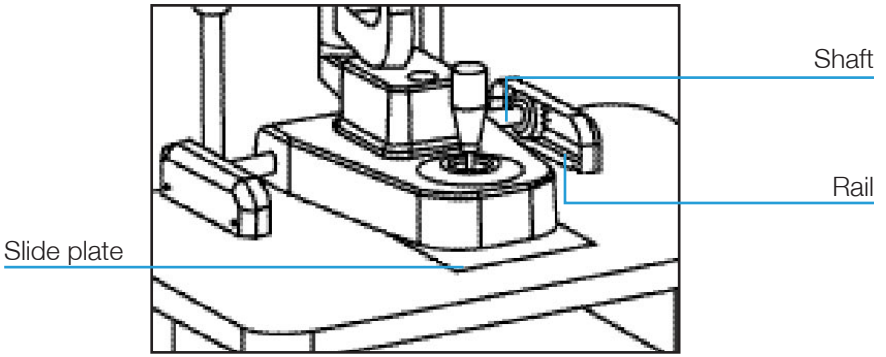
Never scratch with fingers or any other hard materials.

2. Cleaning the slide plate, rail and shaft are dirty

The vertical and horizontal movement will be unsteady. Wipe them with clean soft cloth.

3. Cleaning and sterilizing the plastic parts

Clean the palstic parts such as chin-rest bracket, forehead belt with soft cloth, dipped with soluble detergent or water, sterilize with medicinal alcohol.



Important Matters

Don't wipe with any corrosive detergent lest that the surface should be damaged.

4.7 Consumables

Please specify names and quantities when ordering following consulmables.

	Part name	Outlook
SL 880 Slit Lamp	Illumination Bulb	
	Long Reflecting Mirror	
	Chin – rest paper	
	Fuse 1 A (110 V) 0,5 A (220V)	

5. Common Trouble Shooting

In case there is any trouble, please check according to the following table for reference. If it still cannot work, please contact the Repair Department or an authorized distributor.

Trouble	Possible Cause	Remedy
No illumination	The cable isn't connected correctly with the power socket.	Connect the power cable correctly.
	The main power switch is on the "O" position.	Place the switch on "I" position.
	The plug on the power box is loose.	Insert the plug firmly.
	The plug in the lamp cap is loose.	Insert the plug firmly.
	The bulb has burnt out.	Change the bulb.
	The fuse has blown.	Change the fuse.
Slit is too dark	The bulb is not assembled properly.	Assemble the bulb properly.
	The filter lever is in the middle position or in the position of gray filter.	Set the filter lever to the correct.
Fuse has blown	Voltage selector is wrongly set.	Set the voltage selector correctly.
	The coat of the reflecting mirror is oxidized.	Change the reflecting mirror.
	Too much dust on the reflecting surface.	Clean the surface with the brush.
	Voltage selector is wrongly set.	Set the voltage selector correctly.

Trouble	Possible Cause	Remedy
	The fuse doesn't comply with the specification.	Replace it with a suitable fuse.
Slit closes automatically	The slit width control knob is too loose.	Adjust the tightness of the control.
Fixation target is off	The output plug is loose.	Insert the output plug firmly.

6. Responsability

We will supply the circuit diagram of the instrument, electric component list, drawing annotation and calibration details according to the customer´s need for repair.
If there is any need for enquiry of relative information and relative service or some questions, please contact with us directly.

7. Transportation

During the transportation, be careful to protect it from wetness, upside down and violent vibration. The relative humidlty should be 10% to 90%, and enviroment temperature -25ºC to 40ºC. This instrument should be stored in a well ventilated room without corrosive gas where the relative humidlty should be 10% to 80% and enviroment temperature -10ºC to 40 ºC.
If the assembled instrument should be moved or tranported in short distance; please lock all the moveble parts. Move this instrument carefully with hands pushing or carrying its table. If for long distance transportation, please repack it with original package.

8. Optional Accessories
(purchase in addition)

8.1 10% measuring eyepieces

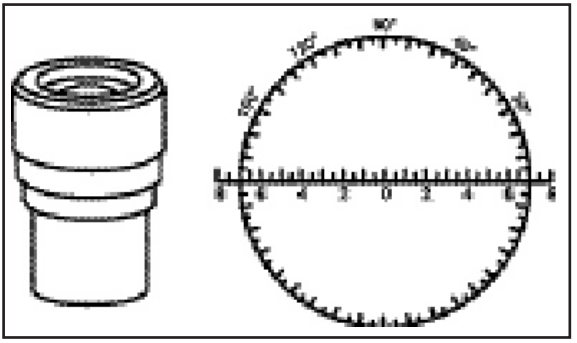
Replace the common eyepieces withthis one to measure the length and angle.

Scale specification

Length scale	16mm (0.5mm minimum graduations)
Angle scale	360° (5° minimum graduations)

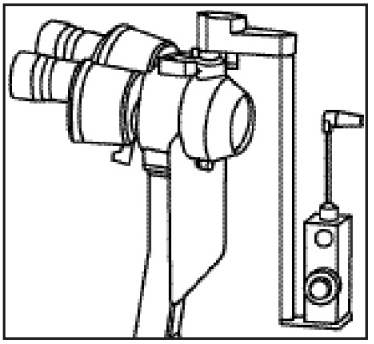
Measuring parameters

Length scale	To be used at 10x only
Diopter compensation	-5D to +3D
Angle scale	No limit



8.2 Applanation tonometer

This LSL 880 slit lamp could be equipped with Haag-Streit AG Model R-900 or model T-900 applanation tonometer for measuring the intraocular pressure.



9. Specifications

Microscope				
Type	cross angle stereovision			
Model of magnifying	change the objective for 2 grades magnification			
Eyepiece	10X			
Total magnification rate	objective x eyepiece = magnification rate/vision field.			
	1X	10X	10X	18mm
	1.6X	10X	16X	14,5mm
Range of PD adjustment	10x eyepiece		55mm to 82 mm	
Diopter adjustment	10x eyepiece		+- 6D	
Illumination				
Slit projection magnification	2/3X			
Slit width	continuous from 0mm to 9 mm. (at 9 mm, slit becomes a circle)			
Slit height	continuous from 1 to 8 mm			
Aperture diameter	9mm, 8mm, 5mm, 3mm, 2mm, 1mm, 0,2mm			
Slit angle	0° to 180° with horizontal scanning capability			
Slit inclination	5°,10°,15°,20° four steps			
Filter piece	Heat absorption, 13%ND, red-free, and blue			
Illumination bulb	12V30W halogen bulb			

Movement base	
Fore and back movement	90mm
Left and right movement	100mm
Fine movement	15mm
Vertical movement	30mm
Chin – rest parts	
Vertical movement	80mm
Fixation target	Red Led
Powersource	
Input voltage	100/220V + 10%
Input frequency	50/60 Hz
Input power	58 VA
Output voltage	Illumination bulb 9,8V, 11,6V
Fixation target	7,2V
Electreic safe standard	Conform to Standard IEC601- 1, Class I Type B
Dimension and Weight	
Packing box	670mm x 570 mm x 510mm
Total weight	23 Kg
Net weight	20 Kg

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