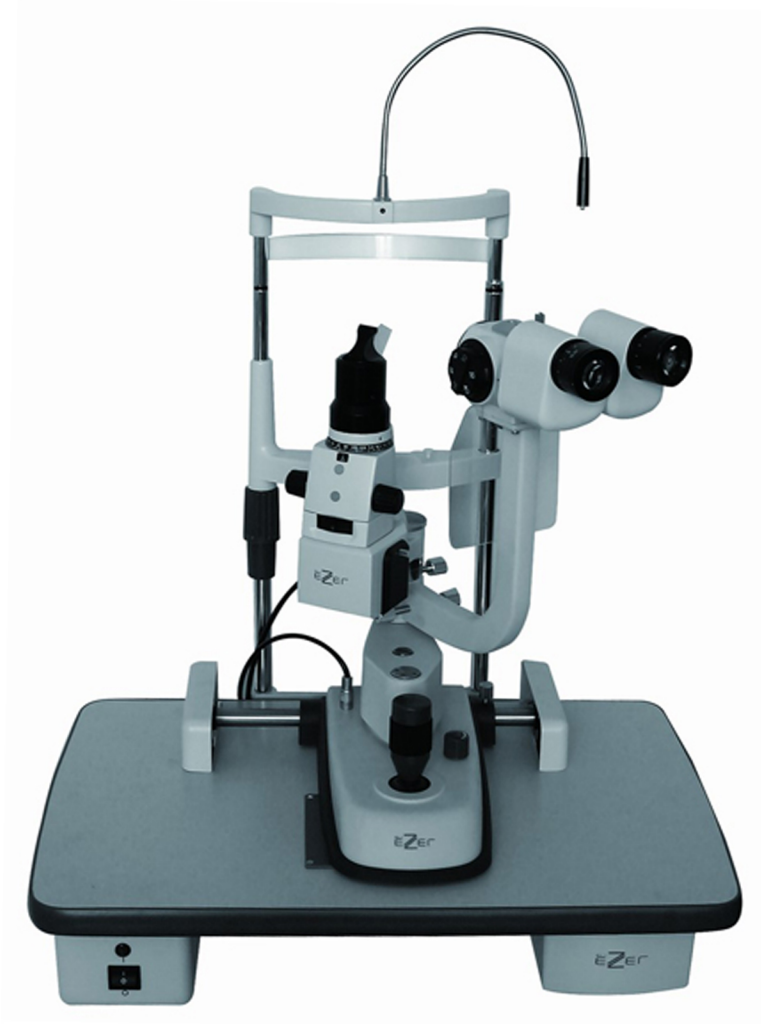

ESL-1800 Slit Lamp

Operation Manual

ESL-1800

Slit Lamp



ELI
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Preface

Thank you for purchasing our ESL-1800 slit lamp. Please read this manual carefully before using this instrument in order to operate it properly and safely.

Scope of Application

The slit lamp is mainly used for ophthalmic examination in hospital and/or the glasses trade.

General Requirements for Safety

Please read carefully about following precautions to avoid unexpected personal injury as well as the product being damaged and other possible dangers.

Precautions

1. Do not use this instrument in the environment prone to fire and blast or where there is much dust and with high temperature. Use it in the room and simultaneously be careful to keep it clean and dry.
2. Check that all the wires are correctly and firmly connected before using. Ensure that the instrument is well grounded.
3. Please pay attention to all the ratings of the electrical connecting terminal.
4. Only use fuse according to the specifications and rated values stipulated by our product.
5. Use the power cable supplied with this instrument.
6. Don't touch the surface of the lens and prism with hand or hard objects.
7. Turn off the main power first before replacing the main bulb, flash lamp and fuse.
8. To prevent the instrument from falling down to floor, it should be placed on the floor where the inclination angle is less than 10° .
9. Turn off the power and cover the instrument with dust-prove hood when it is not in use.
10. In case there is any trouble, please first refer to the trouble-shooting guide. If it still can't work, please contact with the authorized distributor or our Repair Department.

◇ THE SAFETY MARKS USED IN THIS INSTRUMENT



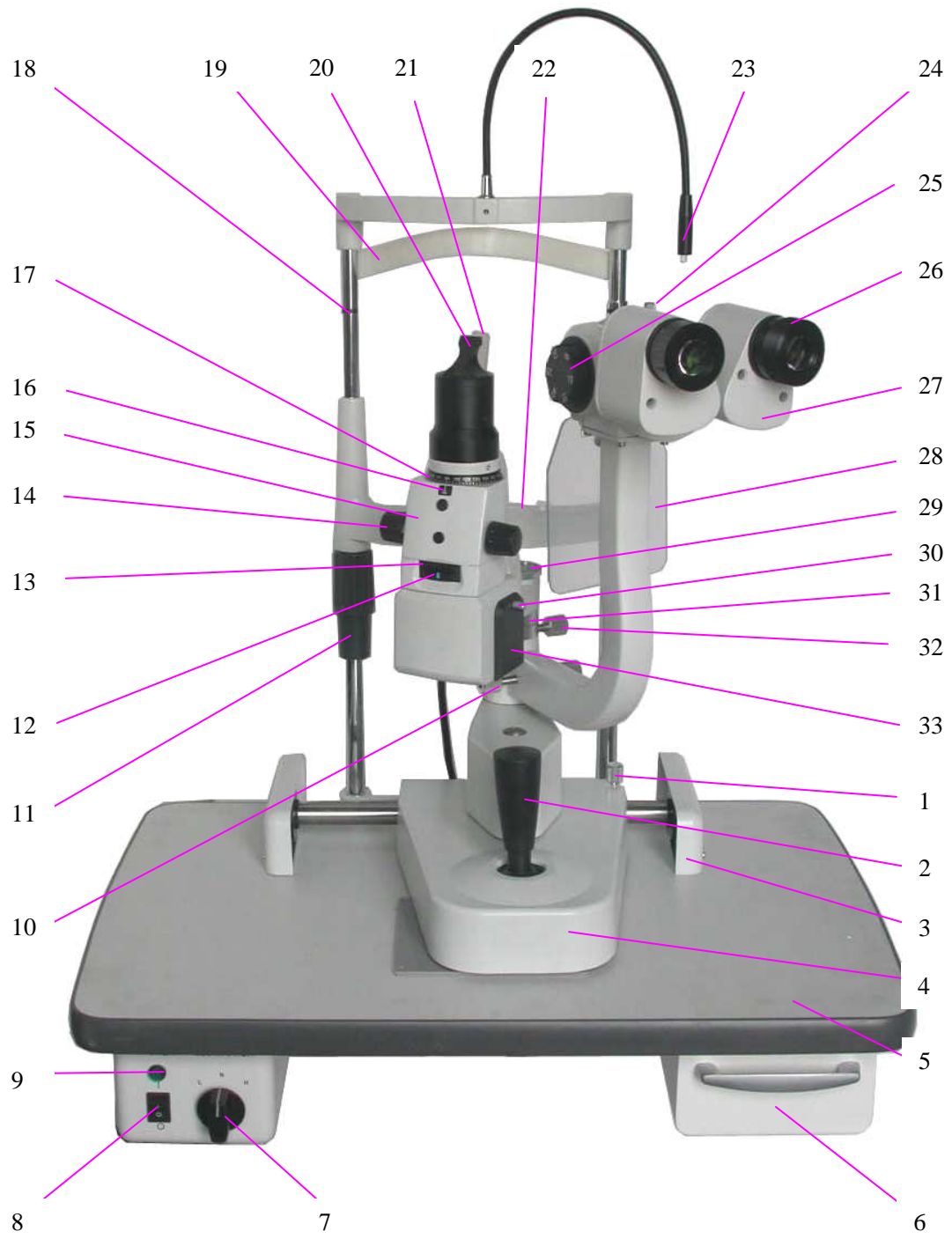
TYPE B



ATTENTION PLEASE
REFER TO THIS MANUAL



TERMINAL OF
THE PROTECTIVE GROUNDING



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1. Nomenclature

1 Base Locking Screw

The base will be locked when fastening this screw.

2 Joystick

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

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

The brightness can be adjusted [at high n and low](#). Avoid working continuously at high setting, as the service life of the bulb will be shortened.

8 Main Power Switch

9 Pilot Lamp

10 Microscope Arm Locking Knob

Lock the rotational movement of the microscope arm.

11 Chin-rest Elevation Adjustment Knob

Rotate the knob to adjust the elevation of the chin-rest.

12 Filter Selection Tray

[Except a hole \(no filter\), there are three filters for selection.](#)

13 Aperture and Slit Height Control Tray

[Move this tray to adjust the spot and the slit height.](#)

14 Slit Width Control Knob

The slit width is continuously adjustable within the range from 0 to 14mm.

15 Main Body of Slit

[Rotate the can make the image of slit revolve.](#)

16 Index

17 Reading Ring

[Sign the angle,when the image of slit revolve.](#)

18 Horizontal Mark

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

19 Forehead Belt

20 Project Prism

21 Diffusion Lens

Used for observing and photographing at a low magnification, and for enlarging the illumination field.

22 Chin-rest

23 Fixation target

[Fix the sight of patient](#)

24 Microscope Fixation Screw**25 Magnification Select Dial**

Five different magnifications are provided.

26 12.5X Eyepiece

Before using the slit lamp, adjust the proper diopter for each eyepiece to obtain a definite image.

27 Prism Box

Separate the prism box to adjust the interpupillar distance.

28 Breath Shield**29 Protect Cap****30 Knob of Lamp Cap****31 Angle Mark Ring**

Marks on the angle mark ring of the illumination arm, which relates to the long mark of the microscope arm, represent the two arms' angle. When the '0' on the ring relates to the short mark at one side of the operator, the right eyepiece may be blocked, and the side of the patient the left eyepiece.

32 Microscope and Illumination Arm Couple Bolt

Fasten this bolt and the illumination arm and the microscope arm could rotate together in couple state. Loosen it and the illumination arm then can rotate separately.

33 Lamp Cap

2. Assembly

This section of the manual describes how to assemble ESL-1800 slit lamp. All parts should be taken out with great care from the packing case before assembling.

2.1. Components



Fig.1

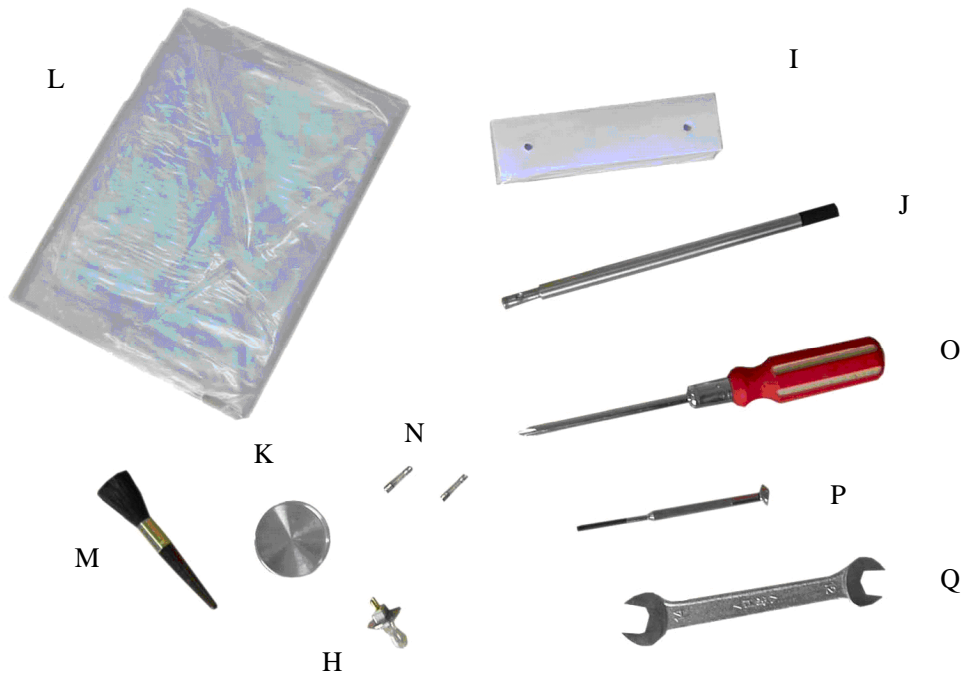


Fig.2

	Name	Quantity
A	Binocular Tube	1
B	Illumination and movement Part	1
C	Base Part 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	Spare Illumination Bulb	1
I	Chin-rest Paper	1
J	Focusing Test Rod	1
K	Protection Cap	1
L	Dust-proof Cover	1
M	Brush	1
N	Spare Fuse	2
O	Cross Screw Driver with Wood Handle	1
P	Watch Screw Driver	1
Q	Spanner	1

2.2. Assembly procedure

Necessary tools are as follows:

Cross screwdriver with wood handle (O)
Watch screwdriver (P)
Spanner (Q)

1) Selecting voltage and fuse

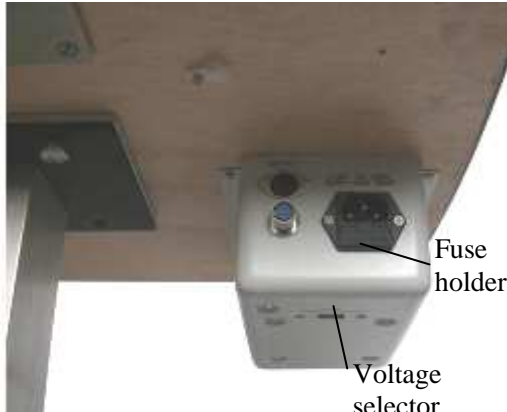


Fig.3

✧ Check the setting on the voltage selector located on the bottom of the power box (Fig.3). If it doesn't match with the input voltage, slide it to the proper position with watch screw driver (P).

✧ Open the fuse holder with screw driver (O) and take out the fuse, check and ensure that its rated value is corresponding to the mains voltage:

115V-----1A
230V-----0.5A

It has been set to 230V, 0.5A before leaving factory.

▽ **Attention: Set the input voltage and frequency of the instrument according to that of the mains.**

2) Assembling the work table (E)

✧ To attach the work table on the YT2A motorized instrument table, please screw off four M8x20mm bolts with spring washers with the spanner (Q).

✧ Lift the work table to aim its screw hole at the assembly hole of the instrument table.

✧ Put down the work table, with the power panel facing the operator, refasten the bolt securely with the spanner (Fig.4).

5

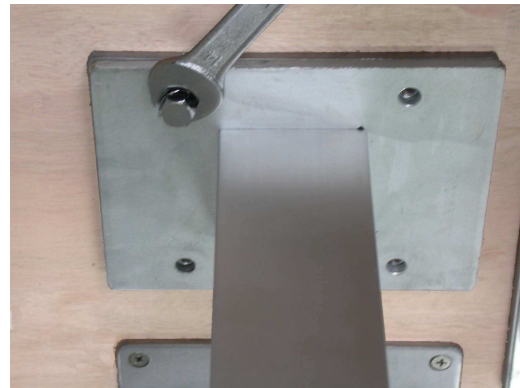


Fig.4

3) Assembling the head-rest part (D)

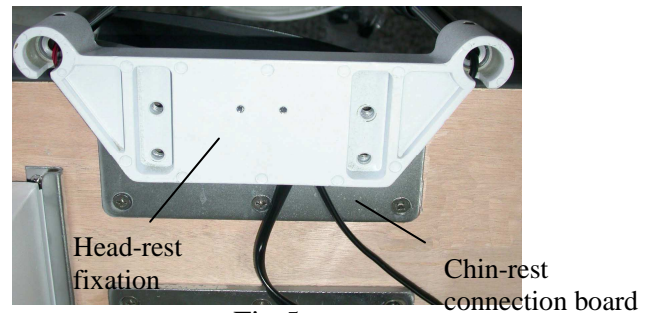


Fig.5

✧ Remove the four screws attached to the chin-rest connection board with the screwdriver (O).

✧ 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 (Fig.6).

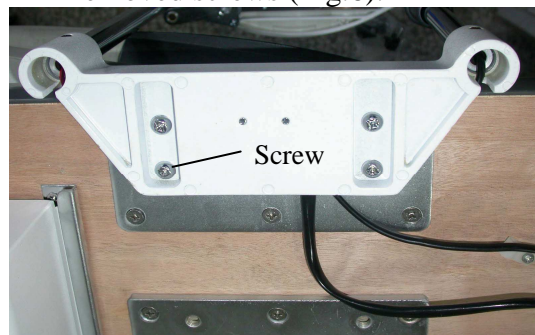


Fig.6

4) Assembling the **Illumination and movement Part (B)** and the rail covers (F)



Fig.7

- ✧ Place the wheels of both sides of the **Illumination and movement Part (B)** on the rails on the work table (Fig.7).
- ✧ Check whether the wheels can be rolled steadily on the rails.
- ✧ Remove four screws attached to the rail with the screwdriver (O).
- ✧ Place the rail cover (F) to the rail, and retighten the previously removed screws.

5) Assembling the binocular tube (A)

- ✧ Match the groove on the binocular tube with the pin on the microscope body (Fig.8).
- ✧ Fasten the fixing screw on the body.

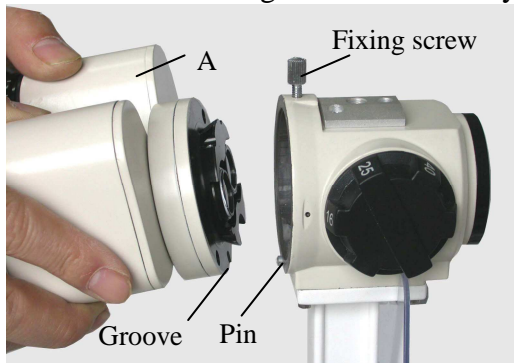


Fig.8

⚠ **Attention: Avoid touching any lens surface.**

6) Assembling the breath shield (D)



Fig.9

- ✧ Remove the breath shield fixing screw from the microscope arm.
- ✧ Pass the removed screw through the hole of the breath shield then re-screw it into the arm (Fig.9).
- ✧ Connect the two plugs below the headrest 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 work table with screw driver (O) and wrap the output and input cables respectively, then reattach them to the bottom of the work table (Fig.10).

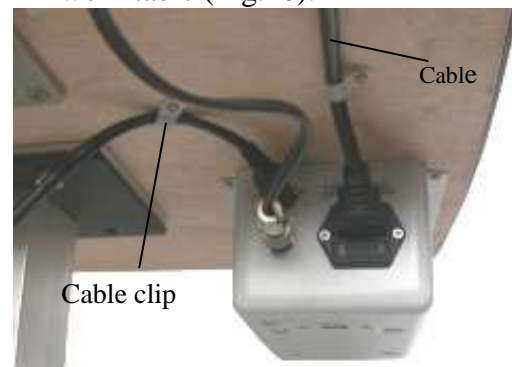


Fig.10

7) Assembling the chin-rest paper (I)

- ✧ 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 (Fig.11).

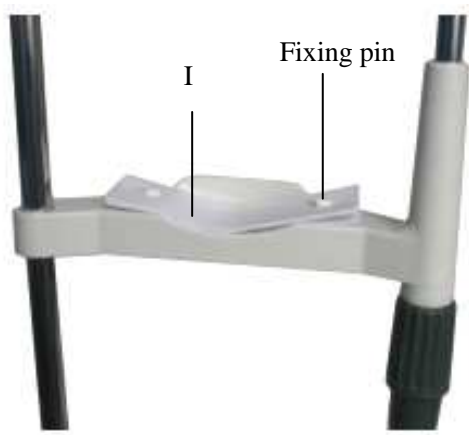


Fig.11

8) Placing spare parts

Some spare parts could be stored in the accessory drawer (6) (Fig.12).



Fig.12

2.3. Checking procedure after assembling

1) Power plug

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

⚠Attention: 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 (14) to examine the illumination.
- ✧ Rotate the brightness control switch (7), the brightness should be changed accordingly.
- ✧ Check whether all those moveable parts such as Aperture and slit height Control Tray(13), Filter selection lever(12) , and magnification changer lever (25) etc. could be operated freely.
- ✧ After examining, turn off the main power. Cover the instrument with the dust-proof cover (L) after the lamp cap has been cool.

3. Operation procedures

3.1. Diopter compensation and pupil distance adjustment

1) Use of the focusing text rod (J)

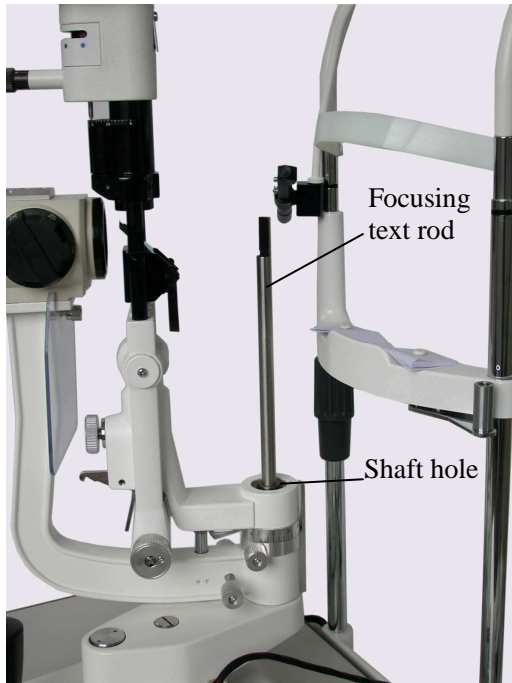


Fig.13

The rod is supplied as standard accessories for confirming the microscope's accurate adjustment. Insert it into the main shaft hole with the flat surface facing the objective lens the direction of the operator (Fig.13).

⚠ Attention: After adjusting, remember to take out the rod.

2) Brightness adjustment

Switch on the main power switch and set the brightness control switch at middle position. Turn the slit width control knob (14) 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 operator is an ametropia, he should adjust the

eyepiece diopter. One eyepiece with four short reticle lines that is usually placed at the right side helps to focus accurately when accessories being attached.

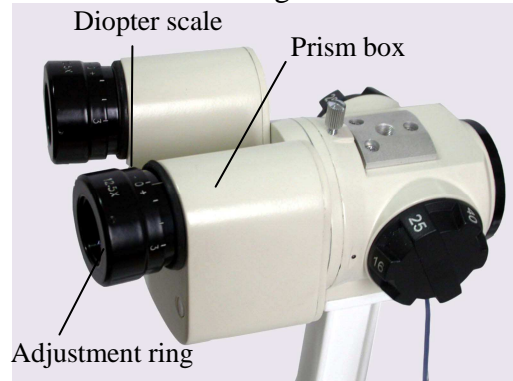


Fig.14

Suggest adjusting the diopter as following procedures:

- ✧ First, rotate the diopter adjustment ring counter clockwise down to the end (Fig.14).
- ✧ Second, rotate the ring clockwise until a sharp slit image appears on the focusing text rod. At this time, it is also the clearest observation of the reticule in the eyepiece
- ✧ Adjust another eyepiece in the same procedure.
- ✧ Record the diopter value on each eyepiece for future reference.

4) Interpupillar distance adjustment

Separate the prism box of the microscope with both hands to adjust the interpupillar distance until both eyes could see the same image on the focusing test rod through the eyepieces, and at the same time a stereovision will be obtained.

3.2. Patient position and fixation target

1) Positioning the patient's head

Have the patient place his chin on the chin-rest (22) and the forehead against the forehead-rest belt (19). Adjust the chin-rest elevation adjustment knob (11) below the chin-rest until the patient's canthus aligns with the horizontal mark (18) (Fig.15).

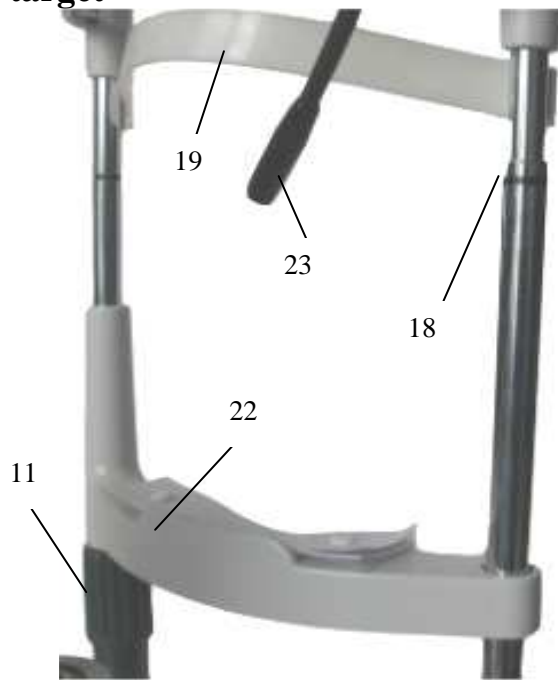


Fig.15

3.3. Base operation

1) Horizontal rough adjustment

Keep the joystick (2) upright and move the base (4) to make the microscope move horizontally to aim at the object roughly (Fig.16).

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.

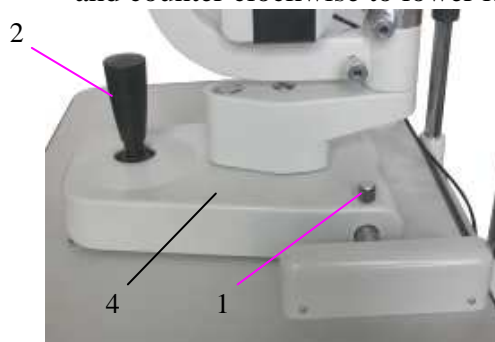


Fig.16

Tilt the joystick to make the microscope move slightly on the horizontal surface. While 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 (1) to lock the base (4) and prevent it from sliding.

3) Horizontal Fine adjustment

3.4. Operation illumination unit

1) Changing the slit width

Turn the slit width control knob (14) to change the slit width from 0mm to 14mm. The slit becomes a circle at 14mm. (Fig.19).



Fig.19

2) Changing the aperture and slit height



Fig.20

Move the aperture and slit height Control Tray (13) and 4 different circular beams of light are available at full aperture: 14mm, 9mm, 5.5mm, 0.3mm respectively. With a slit image, the slit height can be changed continuously from 1 to 14mm.

3) Rotating the slit image

Swing the Main Body of slit (15) horizontally to revolve the slit image at any angle in the vertical or horizontal direction. The angle of image rotation is indicated by the rotation angle scale with small division for 5° and big for 10° (Fig.21).



Fig.21

4) Filter selection

By shifting the filter selection Tray (12) four different filters can be inserted into the illumination pathway(include a hole). Usually the heat absorption filter is used for patient comfort (Fig.22). Blue means Blue filter, white means Heat absorption filter, red means Heat absorption filter, green means Red-free filter.



Fig.22

8) Diffusion lens

Turn the diffusion lens(21) up when using it. Set the slit at full aperture, otherwise the light intensity will be reduced. Turn it down after using(Fig.23).



Fig.23

4. Maintenance

⚠Attention: Treat the replaced waste materials as industrial rubbish.

4.1. Replacing the illumination bulb

- ✧ Turn the main power switch (8) off.
- ✧ turn knob of Lamp Cap (30) counter clockwise and open it (Fig.24, Fig.25).



Fig.24

- ✧ Loosen the bolt on the spring with the Screw Driver "O". Push away the spring and pull out the lamp socket. Replace the old lamp with a new one. The groove of

lamp fixation disc should be aimed at the flange of lamp base; otherwise the illumination may be uneven. Insert lamp socket into lamp feet. Turn the spring to original position (Fig.25).

⚠Attention: The bulb is hot

- ✧ Open the lamp cap and fasten knob of Lamp Cap.
- ✧ Turn on the main power switch and check if the new bulb is illuminated.

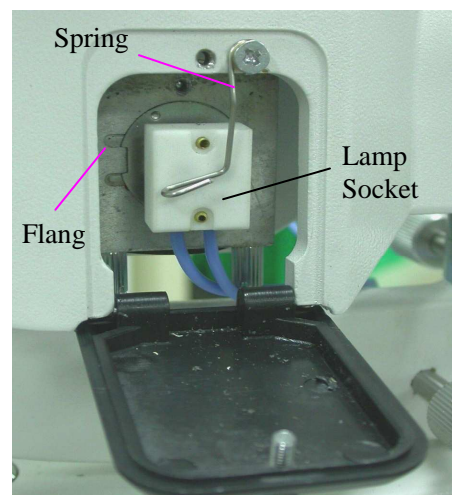


Fig.25

4.2. Replacing the fuse

- ✧ Turn off the main power switch (8) and remove the power cable from the outlet.
- ✧ With the screw driver (O), turn the center of the fuse holder (Fig.26).
- ✧ Replace it with a new fuse, and then tighten the fuse holder.
- ✧ The fuse specifications and rated values are as follows:

110V	1A / 250V
220V	0.5A / 250V



Fig.26

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

4.3. Replacing the chin-rest paper

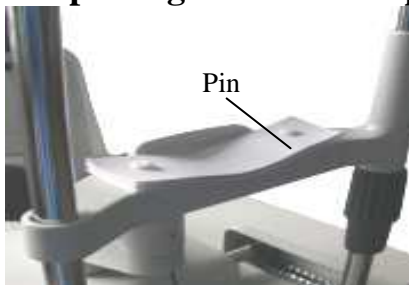


Fig.27

When the paper is depleted, pull upward two fixing pins of the chin-rest and place a new package of paper, then fix the fixing pins again (Fig.27).

4.4. Cleaning

1) Cleaning the lens and **project Prism**

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

⚠ Attention: Never scratch with fingers or any other hard materials.

2) **Cleaning the slide plate, rails and shaft**

If the slide plate, rails and shaft are dirty, the vertical and horizontal movement will be unsteady. Wipe them with clean soft cloth (Fig.28).

3) **Cleaning and sterilizing the plastic parts**

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

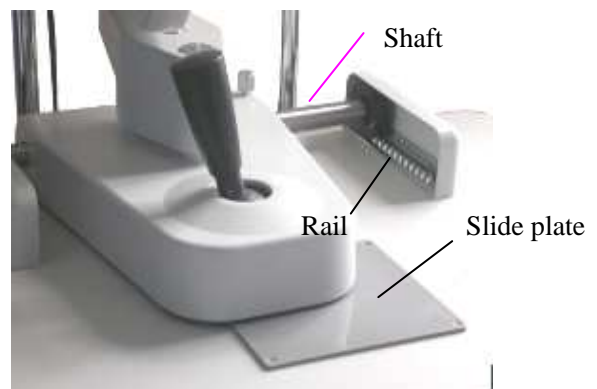


Fig.28

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

4.5. Protecting




There always are dusts and physiological salt solution dropping into the main shaft hole during the operation. Please cover the main shaft hole with the protection cap(K) lest that the instrument would be damaged. (Fig.29).



Fig.29

4.6. Consumables

Please specify names and quantities when ordering following consumables.

	Part name	Outlook
ESL-1800	Illumination bulb	
Slit	Chin-rest paper	
Lamp	Fuse 1A (110V) 0.5A (220V)	

5. Trouble shooting guide

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

Trouble	Possible cause	Remedy	Refer to
No illumination	The cable isn't connected correctly with the power socket	Connect the power cable correctly	P6
	The main power switch is on 'O' position	Place the switch on 'I' position	P9
	The plug on the power box is loose.	Insert the plug firmly	P6
	The plug of brightness control connector is not connected	Insert the plug of brightness control connector	P6
	The bulb has burnt out	Change the bulb	P14

	The fuse has blown	Change the fuse	P14
Slit is too dark	The bulb is not assembled properly	Assemble the bulb properly	P16
	Voltage selector is wrongly set	Set the voltage selector correctly	P5
	Too much dust on the reflecting surface	Clean the surface with the brush	P16
	Protection piece of microscope and ocular surface are polluted	Clean the surface	P17
Fuse has blown	Voltage selector is wrongly set	Set the voltage selector properly	P5
	The fuse doesn't comply with the specification	Replace it with a suitable fuse	P16
Fixation bulb is off	The output plug is loose	Insert the output plug firmly	P7

6. Responsibility

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 inquiry of relative information and relative service or some questions, please contact with us directly or authorized distributors.

7. Transportation and storage

During the transportation, be careful to protect it from wetness, upside down and violent vibration. The relative humidity should be 10% to 90%, and environment temperature -25°C to 40°C .

Store this instrument a well ventilated room without corrosive gas where the relative humidity should be 10% to 80% and environment temperature -10°C to 40°C .

If the assembled instrument should be moved or transported in short distance, please lock all the movable parts. Move this instrument carefully with hands pushing or carrying its table. If for long distance transportation, please repack it with original package.

8. Specifications

Microscope -----	
Type	Galileo magnification changer with converging
Model of magnifying	5 steps by drum rotation
Eyepiece	12.5 x
Total magnification rate	6x 10x 16x 25x 40x
(Field-of-view)	(Ø33mm) (Ø 22.5mm) (Ø 14mm) (Ø 8.8mm) (Ø 5.5mm)
Range of P.D. adjustment	55mm to 75mm
Diopter adjustment	-5D to +3D
Illumination -----	
Slit projection magnification	1.16x
Slit width	continuous from 0mm to 14mm(become a circle at 14mm)
Slit height	continuous from 1mm to 14mm
Aperture diameter	14mm, 9mm, 5.5mm, 0.3mm,
Slit angle	0° to 180° continuously adjustable from vertical to horizontal
Filter piece	Heat-absorbing, red-free, blue
Illumination bulb	6V20W 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
Power source -----	
Input voltage	AC110V/220V±10%
Input frequency	50/60Hz
Input power	30VA
Output voltage	Illumination bulb 4V, 5V, 6V Fixation target 6V
Electric safe standard	Conform to Standard IEC601 -1, Class I Type B
Dimension and weight -----	
Packing box	720mm x 495mm x 480mm
Total weight	23Kg
Net weight	17 Kg

* Specifications and design are subject to change without notice for improvement

ESL-1800 Slit Lamp

