

Slit Lamp Microscope

Instructions for Use

Preface

Thank you for purchasing our slit lamp .The slit lamp will have another capability of photography, if you purchase the appliance with the photography accessories. At the same time, in order to meet the needs of the customers, we provide sorts of accessories, which can be used widely. Please read this manual carefully for the sake of your best use.

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.

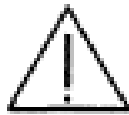
Precautions

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-proof hood when it is not in use.
10. In case there is any trouble, please first refer to the trouble-shooting guide. If it is 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 MANUAL



TERMINAL OF THE
PROTECTIVE GROUNDING

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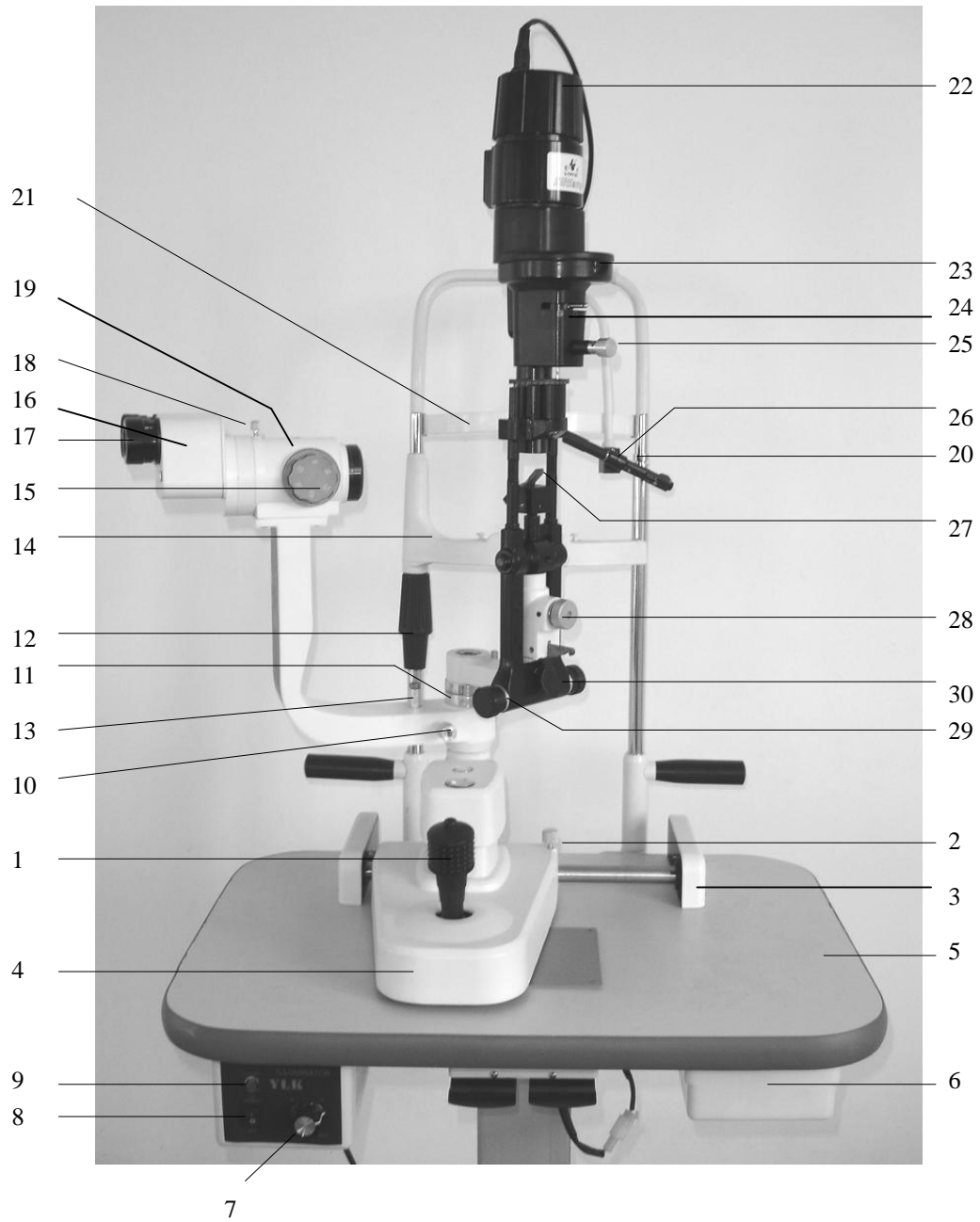


Fig.1

1 Nomenclature

1 Joystick

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

2 Base Locking Screws

- ♦ 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

- ♦ There levels are available—H (High), N (Normal), L (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 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 arm's 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.

12 Chin-rest Elevation Adjustment Knob

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

13 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° .

14 Chin-rest

15 Magnification Select Dial

- ♦ Five different magnifications are provided.

16 Prism Box

- ♦ Separate the prism box to adjust the interpupillar distance.

17 $12.5\times$ Eyepiece

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

18 Microscope Fixation Screw

19 Accessories Mount

- ♦ Accept the Goldmann applanation tonometer as well as other accessories.

20 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.

21 Forehead Belt

22 Lamp Cap

23 Aperture Slit Height and Display Window

24 Filter Selection Lever

- ♦ There are four filters for selection

25 Aperture and Slit Height Control Knob

- ♦ Rotate this knob to adjust the spot and the spot and the slit height .swing the knob horizontally to revolve the slit.

26 Fixation Target

- ♦ Fixation target is an illuminated fixed spot.

27 Reflecting Mirror

28 Centering Knob

- ♦ Loosening the knob allows the illumination light to be moved from the center of the vision field for indirect retro-illumination. Fastening the knob brings the illumination light back to the center.

29 Slit Width Control Knob

The slit width is continuously adjustable within the range from 0 to 14mm. The marks on the left knob stand for the approximate value of the width.

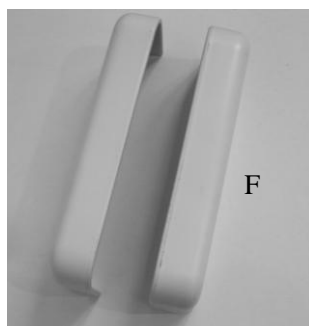
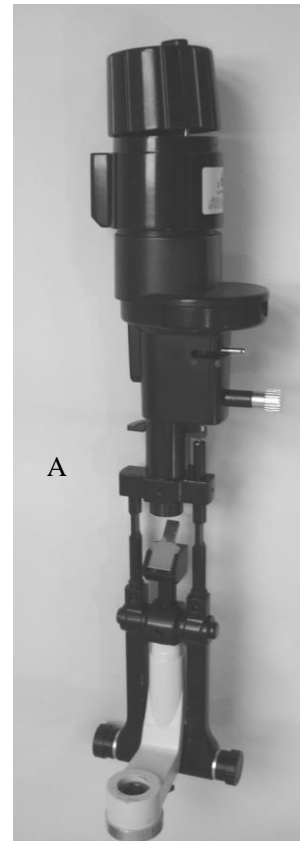
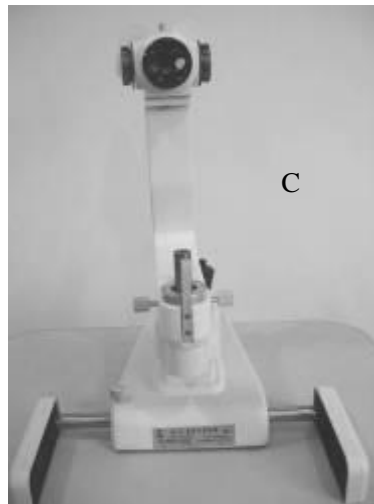
30 Illumination Inclination Lever

- ♦ Four 5° inclination stops are available-up to 20° .

2 Assembly

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

2.1 Components



G

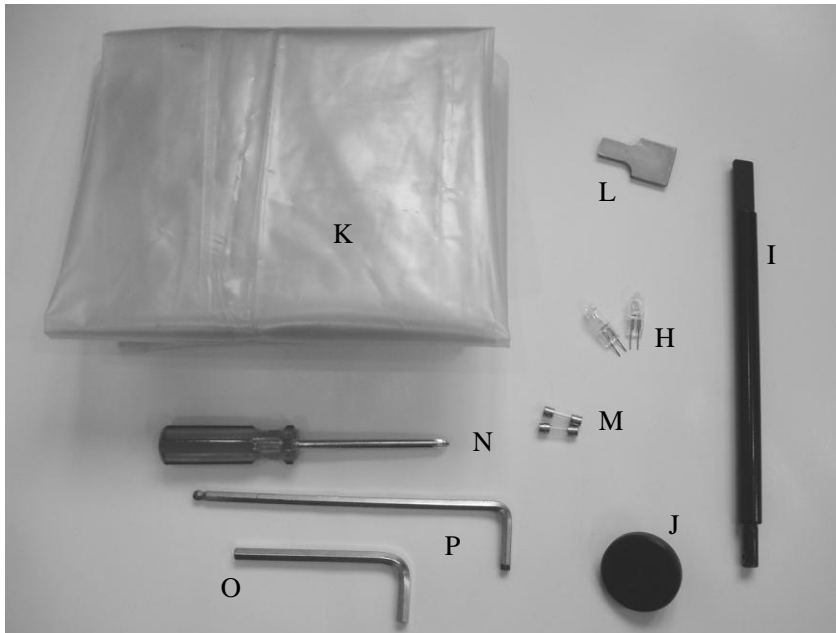


Fig.2-2

	Name	Quantity
A	Illumination part	1
B	Converging binocular tubes	1
C	Base part	1
D	Head-rest part	1
E	Worktable with power box	1
F	Rail cover	2
G	Input power cable	1
H	Spare illumination bulb	1
I	Focusing test rod	1
J	Protection cap	1
K	Dust-proof cover	1
L	Reflecting mirror	1
M	Spare fuse	2
N	Cross screw driver with wood handle	1
O	Hex wrench (big)	1
P	Hex wrench (small)	1

2.2 Assembly procedure

Necessary tools are as follows:

- ♦ Cross screw driver with wood handle(N)
- ♦ Hex wrench(O P)

1) Selecting Voltage and Fuse

- ♦ Check the setting on the voltage selector located on the bottom of the power box (Fig.3).If it don't match with the input voltage, slide it to the proper position .

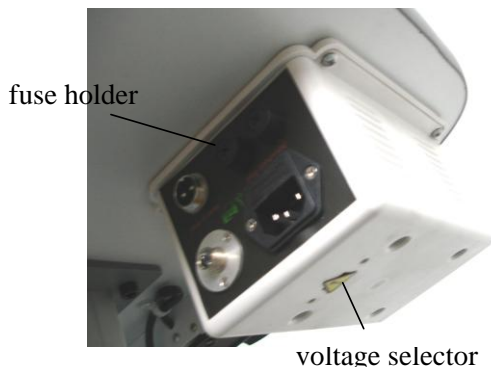


Fig.3

- ♦ Open the fuse holder with cross screw driver with wood handle (N) and take out the fuse, check and ensure that its rated value is corresponding to the mains voltage:
 - 110V-----1A
 - 220V-----0.5A
- ♦ It has been set to 220V, 0.5A before leaving our factory.

⚠ Attention: 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 BL-16 motorized instrument table , please screw off four M8×18mm bolts with spring washers with the hex wrench (O).
- ♦ 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 operator, refasten the bolt securely with the hex wrench (O)(Fig.4).



Fig.4

3) Assembling the Head-rest Part(D)

- ♦ Remove the four screws attached to the chin-rest connection board with the hex wrench (P).
- ♦ Put two cables in the gap between the headrest fixation plate and the chin-rest connection board.
- ♦ While ensuring they are not clamped, retighten the previously removed screws (Fig.5).

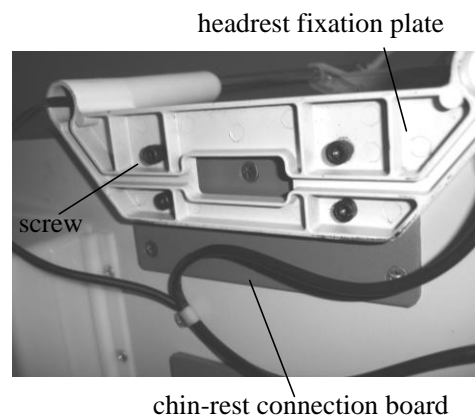


Fig.5

4) Assembling the Base part(C) and the Rail Covers(F)

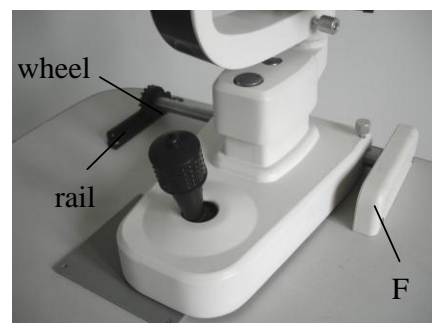


Fig.6

Place the wheels of both sides of the base on the rails on the worktable (Fig.6).

- ♦ Check whether the wheels can be rolled steadily on the rails.
- ♦ Remove four screws attached to the rail, and retighten the previously removed screws.

5) Assembling Illumination Part (A)

- ♦ Aim the assembly hole of the illumination arm at the brass shaft sleeve with care then put down, let the shaft keeping close to the bottom surface well (Fig.7 Fig.8).



Fig.7



Fig.8

6) Assembling the Converging Binocular Tubes (B)

- ♦ Match the groove on the binocular tubes with the pin on the microscope body.(Fig.9)

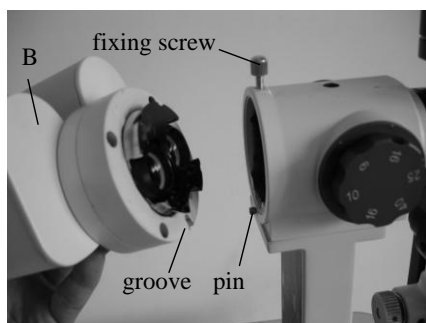


Fig.9

- ♦ Fasten the fixing screw on the body to the microscope.

 **Attention: avoid touching any**

lens surface.

7) Connecting Plug



Fig.10



Fig.11

- ♦ Insert the plug on the top of the headrest part(D) into the socket of the lamp cap on the illumination part (A)(Fig.10).
- ♦ 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 (Fig.11).

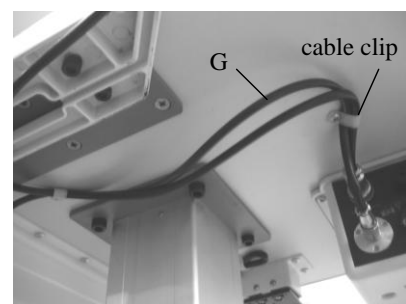


Fig.12

Remove the cable clips from the bottom of the work table with cross screw driver with wood handle (N) and wrap the output and input cables respectively, then reattach them to the bottom of the work table.(Fig.12)

8) Placing Spare Parts

- ♦ Some spare parts could be stored in(Fig.13)

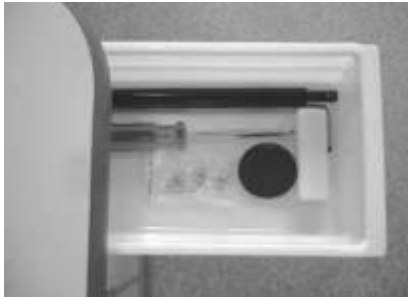


Fig.13

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 power socket.
- ◆ Turn on the main power switch, and the pilot lamp will be lighted. Open the slit lamp width control knob to examination the illumination.
- ◆ Rotate the brightness control switch respectively at three positions and the brightness will be changed accordingly.
- ◆ Check whether all those moveable parts such as aperture and the slit height control knob, filter selection lever, and magnification changer lever etc .could be operated freely.
- ◆ After examining, turn off the main power and cover the instrument with the dust-proof

cover(K).

3 Operation Procedures

3.1 Diopter Compensation and Pupil Distance Adjustment

1) Use the Focusing Text Rod (I)

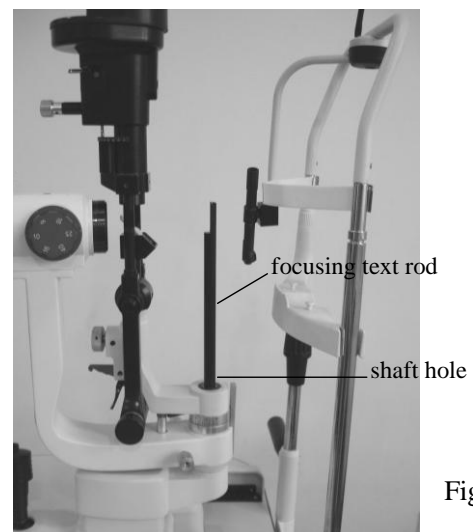


Fig.14

The rod is supplied as one of the 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.14).

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

2) Brightness Adjustment

Switch on the main power switch and set the brightness control switch (7) at 'N' position. Turn the slit switch control knob 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 which is usually placed at the right side helps to focus accurately after accessories being attached.

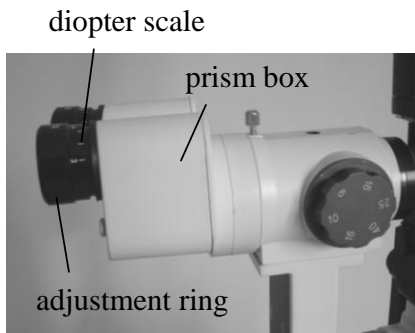


Fig.15

Suggest adjusting the diopter as following procedures

First, rotate the diopter adjustment ring (17) counter clockwise down to the end. (Fig.15)

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) Interpupillary 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 eyepieces, and at the same time a stereo vision 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 (14) and the forehead against the forehead-rest belt. Adjust the chin-rest elevation adjustment knob

(12) below the chin-rest until the patient's canthus align with the horizontal mark (20) (Fig.16).

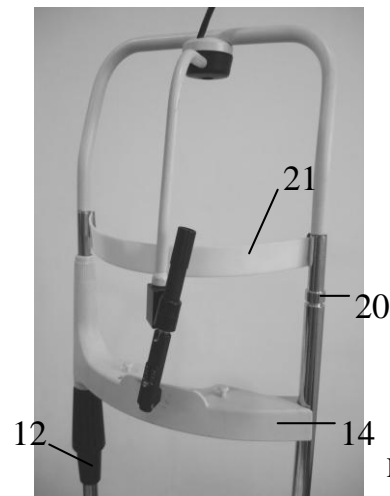


Fig.16

2) Use the Fixation Target

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

The fixation target with diopter compensation supplies a dot and concentric circles target. Slide the knob to adjust the diopter compensation within the range from -15D to +10D (Fig.17).

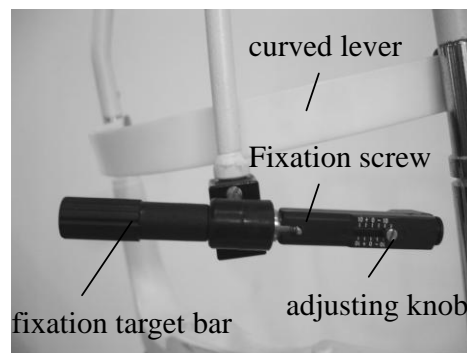


Fig.17

The fixation target with spot light is especially for the patient whose diopter exceeds -15D. When changing, just loosen the fixation screw, replace the fixation target with the spot light source and refasten the fixation screw.

3.3 Base Operation

1) Horizontal Rough Adjustment

Keep the joystick (1) erect and move the base to make the microscope move on the horizontal surface to aim at the object roughly.(Fig.18)

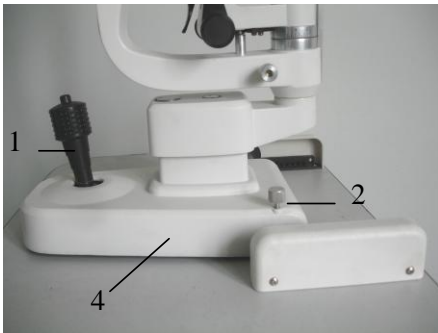


Fig.18

2) Vertical Adjustment

Rotate the joystick to the 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 Adjustment

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 to lock the base () and prevent it from sliding.

3.4 Operation Illumination Unit

1) Changing the Slit Width

Turn the slit width control knob (29) the slit width will be changed from 0mm to 12mm.the slit becomes a circle at the 12 mm size . the scale on the knob indicates the width value approximately(Fig.19).

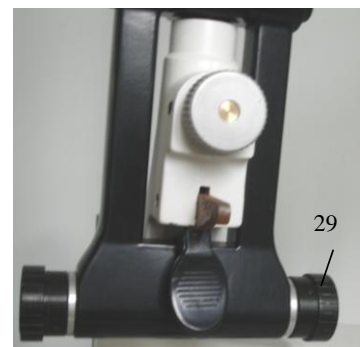


Fig.19

2) Changing the Aperture and Slit Height -----

Turn the aperture and slit height control knob (25) and 7 different circular beams of light are available at full aperture : 14,12, 8,5,3,1,0.2 dia respectively. With a slit image, the slit height can be changed continuously from 1 to 14 mm ,which is indicated through the display window (23)(Fig.20).

3) Rotating the Slit Image

Swing the aperture and slit and slit height control knob horizontally to revolve the slit image at any angle in the vertical or horizontal direction. the rotation angle scale indicates the angle of image rotation with small division for 5 ° and big division for 10° (Fig.21).



Fig.20

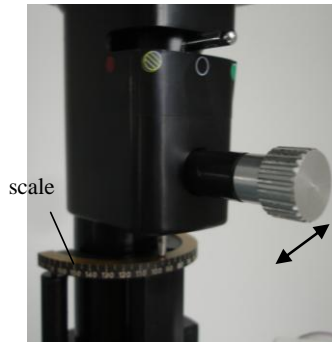


Fig.21

4) Decentering the Illumination Light

loosen the centering knob (28) and swing the slit width control knob (29) back and forth so the light spot moves away from the center of the microscope vision field .it is mainly used to examine the eyes by indirect retro-illumination .fasten the centering knob and the slit light will return to the center of the microscope vision field .(Fig.22)

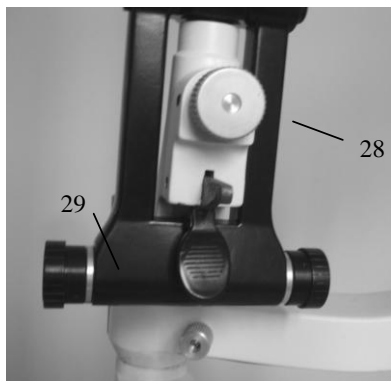


Fig.22

5) Oblique Illumination

Oblique illumination is used for sectional or fundus examination by use of a contact lens. press down the inclination lever () so that the illumination part may incline to 20 ° ,(5 ° of each division). Since the illumination part may touch the patient's head, operate carefully (Fig.23).

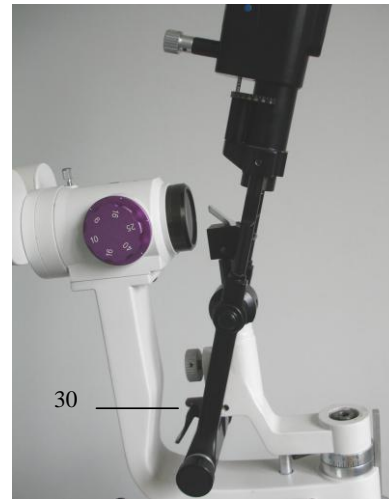


Fig.23

6) Filter Selection

By shifting the filter selection lever (24) four different filters can be inserted into the illumination pathway. Usually the heat absorption filter is used for patient comfort (Fig.24)



Fig.24

4 Maintenance

⚠ Attention: The replaced waste materials should be treated as industrial rubbish.

4.1 Replacing the Illumination Bulb

Turn the main power switch (8) off .pull out the plug attached to the lamp house, loosen the two screws and remove the lamp cap from the illumination part (A)(Fig.25)

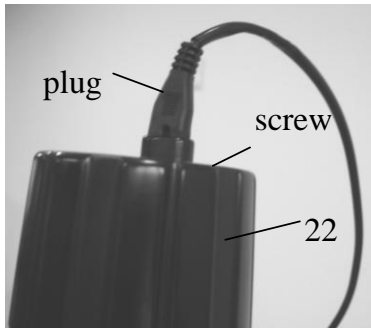


Fig.25

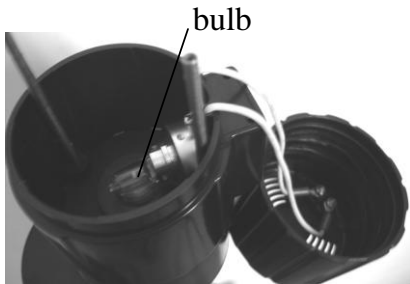


Fig.26

Remove the old bulb and replace it with a

new one (Fig.26)

⚠ Attention: The bulb is hot



Fig.27

Place the lamp cap in the original position and insert the connecting plugs. Retighten the screws (Fig.27). Turn on the main power switch and check whether the new bulb is illuminated.

4.2 Replacing the Reflecting Mirror -----

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

Incline the illumination arm by more than 10°

Remove the reflecting mirror by holding the extended surface(Fig.28)

Insert new reflecting mirror.



Fig.28

4.3 Replacing the Fuse -----



Fig.29

Turn off the main power switch (8) and remove the power cable from the outlet. With the cross screw driver with wood handle (N), turn the center of the fuse holder (Fig.29)

Replace it with a new fuse , then tighten the fuse holder.

The fuse specifications and rated values are as follows:

110V-----1A/125V

220V-----0.5A/250V

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

4.4 Adjusting the Tightness of the

Slit Width Knob

If the slit width control knob is too loose ,

the slit width may be out of the control. Loosen the screw on the right knob, and then hold the left knob firmly with one hand, while the other hand rotates the right knob clock-wise to adjust its tightness. When it is appropriate, fasten the screw of the right knob firmly again (Fig.30).

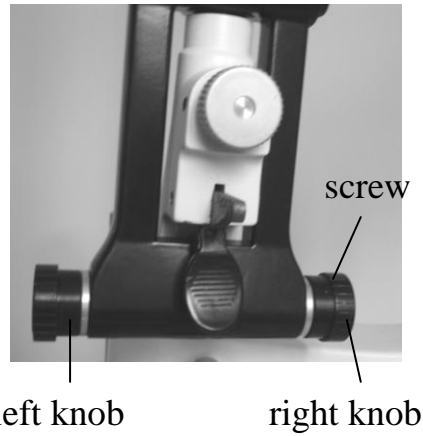


Fig.30

4.5 Adjusting the Inclination of the Illumination Part -----
 If the inclination mechanism of the illumination part is too loose, fasten the screws on both sides of the pivot with the cross screw driver with wood handle (N)

4.6 Cleaning

1) Cleaning the Lens and Mirror

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

Attention: Never scratch with fingers or any other hand 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.31)

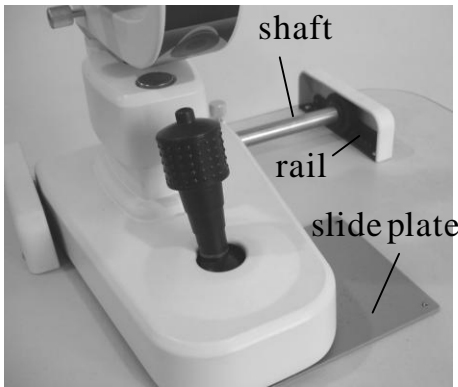


Fig.31



Fig.32

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.




⚠Attention : don't wipe with any corrosive should be damaged .

4.7 Protecting

There always are dusts and physiological salt solution dropping into the main shaft hole of the illumination arm during the operation .please cover the main shaft hole with the protection cap lest that the instrument would be damaged .take off the cap when the guide plate needs to assembled(Fig.32)

4.8 Consumables

Please specify names and quantities when ordering following consumables.

	Part name	Outlook
slit lamp	Illumination bulb	
	Reflecting mirror	
	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	P7
	The plug on the power box is loose	Insert the plug firmly	P6
	The plug on the lamp cap is loose	Insert the plug firmly	P6
	The bulb has burnt out	Change the bulb	P11
	The fuse has blown	Change the bulb	P11
Slit is too dark	The bulb is not assembled properly	Assemble the bulb properly	P11
	The filter lever is in the middle position or in the position of gray filter	Set the filter lever to the correct position	P10
	Voltage selector is wrongly set	Set the voltage selector correctly	P4
	The coat of the reflecting mirror is oxidized	Change the reflecting mirror	P11
	Too much dust on the reflecting surface	Clean the surface with the brush	P11

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	P11
Slit width closes automatically	The slit width control knob is too loose	Adjust the tightness of the control knob	P11
Fixation bulb is off	The output plug is loose	Insert the output plug firmly	P6

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 30%~80%,and environment temperature 5°C~40°C .

This instrument should be stored in a well ventilated room without corrosive gas where the relative humidity should be 10%~80% and environment temperature -40°C~ 50°C.

Specifications

Microscope -----

Type	Galilean stereoscopic microscope
Magnification Selection	5 steps by drum rotation
Eyepiece	12.5×
Magnification ratio	6× (φ33mm)、 10× (φ22.5 mm)、 16× (φ14 mm)、
(Field of View)	25× (φ 8.8 mm)、 40× (φ 5.5 mm)
Diopter Adjustment	52~82mm
Pupillary adjustment	±5D

Illumination -----

Slit Width	Continuous from 14mm to 0mm (at 14mm,slit becomes a circle)
Slit Height	Continuously variable from 1mm to 14mm
Slit Beveling Angle	5 °, 10 °,15 °, 20 °four steps

Slit Angle	0° ~ 180° adjustable
Diameter of Light Spot	φ 14、φ 10、φ 5、φ 3、φ 2、φ 1、φ 0.2
Filter	Heat Absorption, Grey, Red-free, Cobalt Blue
Illumination Bulb	12v 50w halogen bulb

Power source

Input Voltage	110V/220V AC
Frequency	50Hz/60Hz
Power Consumption	68VA

Dimension and weight -----

Packing Box	700mm×460mm×440mm
Total Weight	17kg

Subject to change in design or specifications without advance notice.