USER MANUAL

SLIT LAMP MICROSCOPE
Model: GR-7

Version: 1.0

Gilras LLC

Thank you for your purchasing our slit lamp microscope!
The following is the description and specification of our product.

General description

- This user manual elaborates on the relevant technical specification and operation notes of our slit lamp.
- Working principle: A beam of light attached to the slit lamp projects to the patients' eye, which forms an optical section of the living tissue of the eye, in this way the doctor can observe and examine the disease of anterior ocular segment and tissue damage.
- Slit Lamp Microscopes are used to observe the disease of the anterior structures and tissue damage of eyes.

The specification of our slit lamp microscope!

Microscope:

Type:	Converging stereoscope
Magnification change:	Two steps by objective lens rotation
Total magnification Ratio:	10X, 16X
Eyepieces	10X
Angle between eyepieces:	13º
Interpupillary adjustment:	52mm～78mm
Diopter adjustment:	+5D～-8D
Field of view:	16X (∅14.5mm), 10X (∅18mm)

Slit Illumination:

Slit width:	Continuously variable from 0 to 14mm （at 14mm,slit becomes a circle ）
Slit length:	Continuously variable from 1mm to 14mm
Aperture diameters:	∅14mm, ∅8mm, ∅3.5mm, ∅0.5mm
Slit angle:	0°-180°
Filters:	Heat-absorbing, Red-free, Cobalt Blue
Lamp:	6V/20W Halogen Lamp
Illumination:	≥50klx

Base

Longitudinal movement:	90mm
Lateral movement:	100mm

Fine Base movement:	15mm
Vertical movement:	30mm

Chin-Rest

Vertical movement:	80mm

Power:

Input voltage:	220V/110V～±10％
Input frequency:	50Hz/60Hz
Power Consumption:	30VA（max）

Output voltage:

Light:	6V (continuously adjustable)
Fixation:	3V

Dimension & Weight:

Dimension	740mm × 450mm x 500mm
Gross weight:	22Kg
Net weight:	16Kg

Working environment

Temperature:	+5℃～+40℃
Relative humidity:	≤80%
Air pressure:	800hpa～1060hpa

Storing environment

Temperature:	-40℃～+55℃
Relative humidity:	≤93%
Air pressure:	700hpa～1060hpa

Transporting environment

Temperature:	-40℃～+55℃
Relative humidity:	≤93%
Air pressure:	700hpa～1060hpa

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

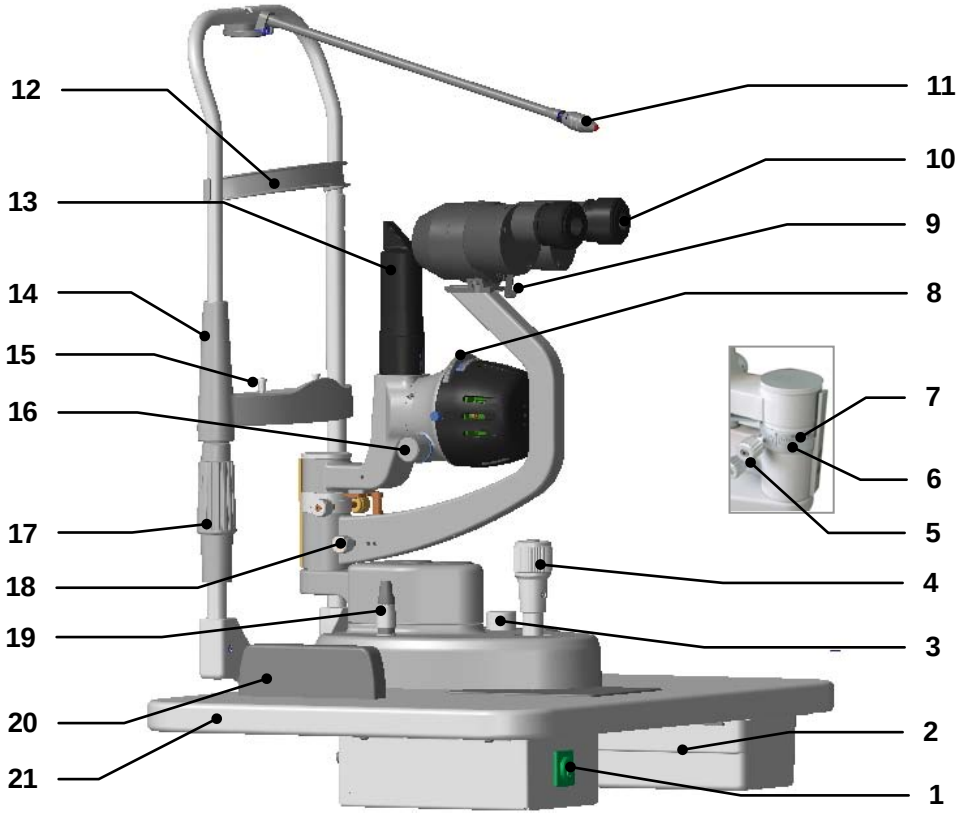
1. Please do not try to detach the slit lamp or do any operation not included in this user manual. In case there is any trouble, please first refer to the trouble-shooting guide. If it still can't work, please contact with the authorized distributor or our Repair Department.
2. Do not use this instrument in the environment prone to fire and blast or where there is much dust and with high temperature. Use the instrument indoor and be careful to keep it clean and dry.
3. Other instruments installed in the same place with this instrument must be compliant to the same electromagnetism compatibility rule. If not, please install the other instrument to a distance of three meters minimum from the slit lamp microscope. And the power supplied to these two instruments must be through different cable.
4. Check that all the wires are correctly and firmly connected before using. Ensure that the instrument is well grounded.
5. Please pay attention to all the ratings of the electrical connecting terminal.
6. Turn off the main power first before replacing the main bulb, flash lamp and fuse.
7. When replacing the power cable, please use the power cable in accordance with the notes in the instruction manual.
8. Don't touch the surface of the lens and prism with hand or hard objects.
9. Please be careful when using the moving parts of the slit lamp, in case that the movement of the base or microscope arm hurts people.
10. To prevent the instrument from falling down to floor, it should be placed on the floor where the inclination angle is less than 10°.
11. Please deal with the waste disposal produced by the machine following relevant laws and regulations.
12. Read carefully the safety and other signals on this machine in order to use the product safely.

THE SAFETY MARKS, PICTURES USED IN THIS INSTRUMENT

No.	mark	Description
1		TYPE B
2		DATE
3	**Class I**	The slit lamp is type I medical using equipment
4	**Type B**	English form of B type
5		**WEEE marking** Please deal with the waste disposal produced by the machine following relevant laws and regulations.
6		CE marking
7	PN:	Part Number
8	SN:	Serial Number
9		ON
10		OFF
11	Output	At the back of power supply box ,indicate outlet of the power
12	Input	At the back of power supply box ,indicate input of the power
13	Fuse 1 F1AL250V	Beside the fuse box on the back of power box. Rated value and current value
14	Power	At the front of power supply box, use with on and off
15	Voltage selector	Change input voltage to adjust the equipment to work under appropriate voltage
16		THE MARKS OF LIGHT

Contents

1 Nomenclature



1. Main Power Switch
   Turn on the switch, the mark lamp will light
2. Drawer
3. Brightness Control knob
   Avoid working continuously at high brightness or the service life of the bulb will be shortened.
4. Joysticks
   Incline joystick to move the instrument slightly on the horizontal surface and rotate it to adjust the elevation of the microscope.
5. Illumination Arm Locking Knob
   When locking the screw, the illumination system and checking system were connected, when loosing it the illumination system can be used separately.
6. The indicate of relative angle between the microscope and illumination unit
   Be together with (7) to indicate the angle between the microscope and illumination unit.
7. The mark line on the ring of the microscope arm.
   Be together with (6) to indicate the angle between the microscope and illumination unit.
8. The dial of Aperture Slit Height & the dial of Filter Selection
   Dial it; there are a few slit heights for selection. Dial it, there are four kinds of filters for selection.
9. Magnification changing lever
   Switch the lever to get different magnification.
10. Microscope and 10X Eyepieces
    Separate the eyepieces to adjust the interpupillary distance.
11. Fixation target
    Let the patient stare at it and make the patient's eyes being observed in a stationary state
12. Forehead Belt
    Make patient's head in an appropriate position
13. Light projecting lens cone
14. Chin-rest
    Supporting the patient's chin
15. The Fixation Knob of Chin-rest Paper
    It is used to fix the chin-rest paper.
16. Slit Width Control Knob
    The slit width is continuously adjustable within the range from 0 to 14mm.The marks on the left knob stands for the approximant value of the width.

17. Chin-rest Elevation Adjustment Knob
    Rotate the knob to adjust the elevation of the chin-rest
18. Microscope Arm locking screw
19. Brightness control knob wire socket
    Be used to connect the power box with the brightness control knob on the base.
20. Base Locking Screw
    The base will be locked when fastening this screw.
21. Rail Cover
    To protect the rail
22. Work table top

2 Assembly

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

2.1 Check List

NO.	MARK	NAME	QUANTITY	NOTE
1	A	CHIN-REST PART	1	Fig.2.1.1
2	B	SLIT LAMP MICROSCOPE PART	1	Fig.2.1.2
3	D	WORK TABLE PART	1	Fig.2.1.3
4	E	RAIL COVER	1	Fig.2.1.4
5	F	POWER CABLE	1	
6	G	FOCUSING TEST ROD	1	Fig.2.1.5
7	H	COVER	1	
8	I	CHIN-REST PAPER	1	
9	J	SCREW DRIVER	1	
10	K	ASSEMBLY DIRECTION		
11	M	PACKING LIST	1	

Fig.2. 1. 2

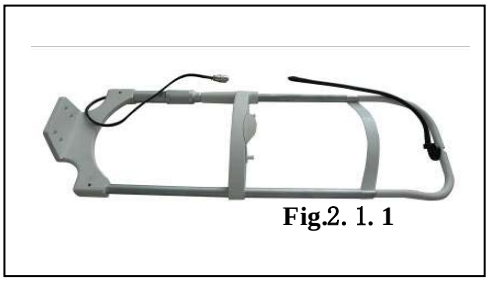


Fig.2. 1. 1

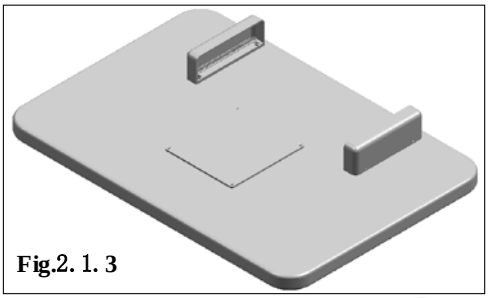


Fig.2. 1. 3

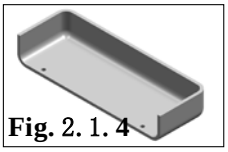


Fig. 2. 1. 4

Fig.2. 1. 5

2.2 Assembly procedure

1. Open the carton, take out the tools like screw driver and spanner.
2. 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 watch screw driver. There are two kinds of voltage for selection. (**220V/50Hz** Or **110V/60Hz**), it has been set to **220V/50Hz** by the manufacturer for safety.

3. Open the fuse holder with screw driver and take out the fuse, check and ensure that its rated value is corresponding to the mains voltage:
   110V----------2A
   220V----------1A

   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.
4. Before attaching the worktable （Fig.2.1.3）on to the power table, please screw off four M6x20mm（Fig. 2.2.1 A Team）.

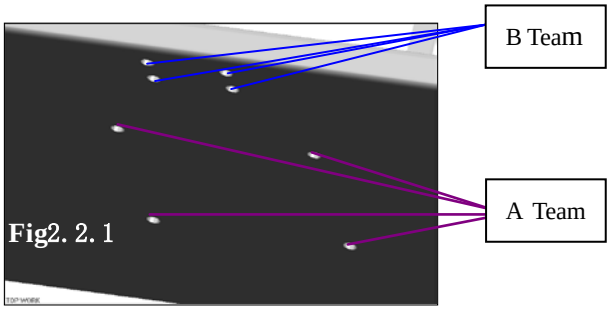


Fig2. 2. 1

5. Lift the worktable to aim its screw hole at

the assembly hole of the instrument table. （Fig.2.2.2）

6. Put down the worktable, with the power panel facing the operator, refasten the bolt securely with the spanner （Fig.2.2.2）.

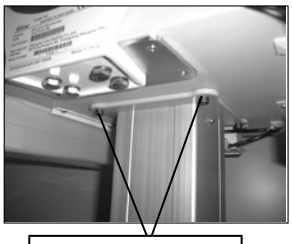
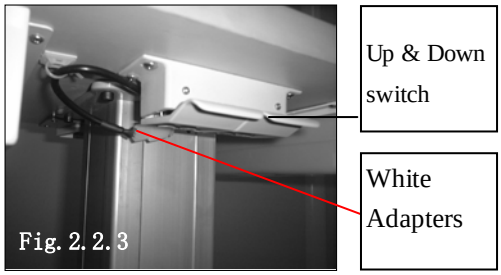
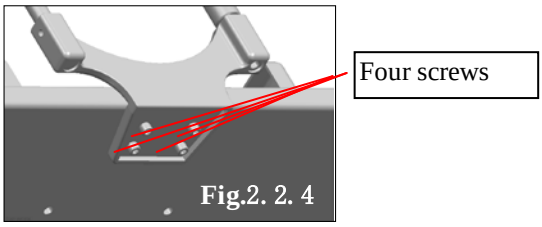


Fig.2.2.2

7. Connect two white adapters under table board, Turn on and press Up & Down switch to check whether power table is normal.（Fig.2.2.3）.



8. Remove the four screws of B Team with the screw drive (Fig.2.2.4), take out the head-rest from carton （Fig.2.1.1）, ensure the four hole on head rest aim at the screw hole of B team（Fig.2.2.1 B team）, retighten the previously removed screw to make the head-rest connect with work table .(Fig. 2.2.4)

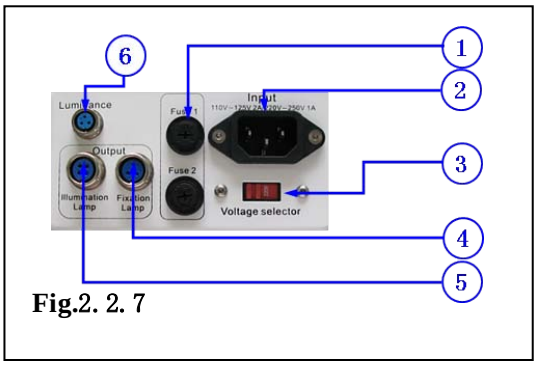


9. Take out the slit lamp part (Fig.2.1.3), put it on the rails of the table board, Check whether the wheels can be rolled steadily on the rails. (Fig.2.2.5&2.2.6), Place the rail cover to the rail, Remove four screws attached to the rail with the screw drive, retighten the previously removed screws.（Fig.2.2.5and 2.2.6）.

Fig.2.2.5

Fig.2.2.6

10. Ensure the slit lamp is not connected with the main power supply. Take out the link wire of brightness control knob on the base (refer to Fig.2.2.8) and connect it to the corresponding socket on the power box. Refer to Fig.2.2.7, insert the plug of chin-rest bracket in the correct socket, and fasten it.



1) Fuse box
2) Power socket
3) 110V/220V voltage selector
4) Fixation lamp socket
5) Illumination lamp socket
6) Brightness control knob

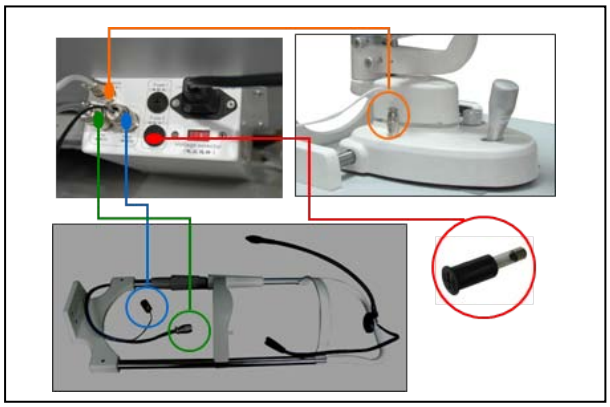
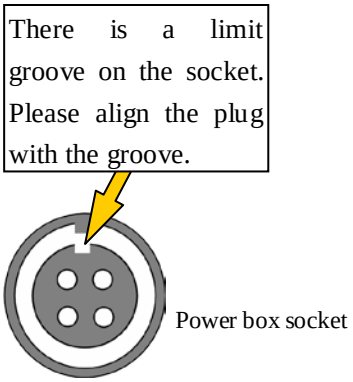


Fig.2.2.8

11. Check the voltage selector, this power box support working under the voltage of 110V and 220V. Please select the right voltage according to the voltage in your country.

Caution: Wrong power selection may lead to damage of the instruments.



12. Open the fuse box and make sure there is a fuse assembled

Specification of the fuse: 1A/250V

13. Collect tools and spare parts; put them into the drawer under right side of table board.

2.3 Checking procedure after assembling

14. This instrument supplies a three-wire cable. Please select a proper power socket as matched. Ensure that the instrument is grounded well.
15. When the main power switch 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.
16. Turn on the main power switch, the power signal will turn bright when the power is connected (Fig.3.1.3).
17. Put on focusing rod (Fig.2.1.6) and adjust the slit width control knob (Fig.2.3.1). There should be facula on the black flat surface. Adjust the brightness control knob, the illumination bulb is adjustable.
18. Check the fixation target device to ensure it can be normally lighted. (Fig.3.2.1)
19. Check whether all the moveable parts such as aperture and slit height control knob (Fig.2.3.1) filter selection dial, magnification selection lever (fig.2.3.2) and joy stick (Fig.2.3.1) could be operated freely.

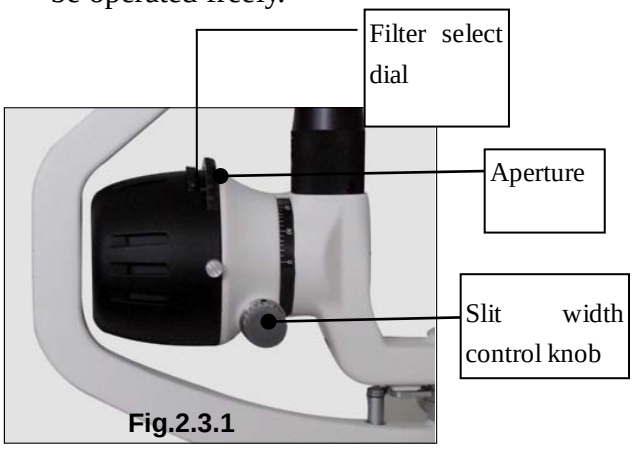


Fig.2.3.1

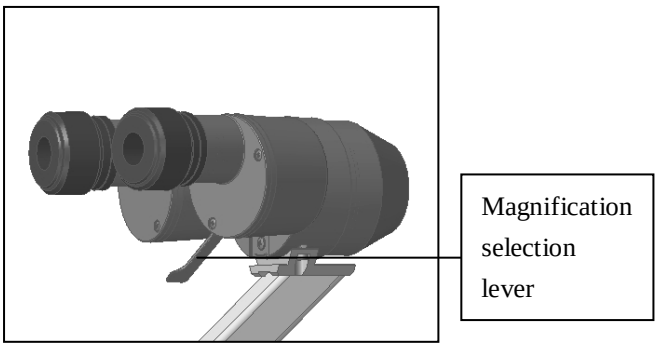
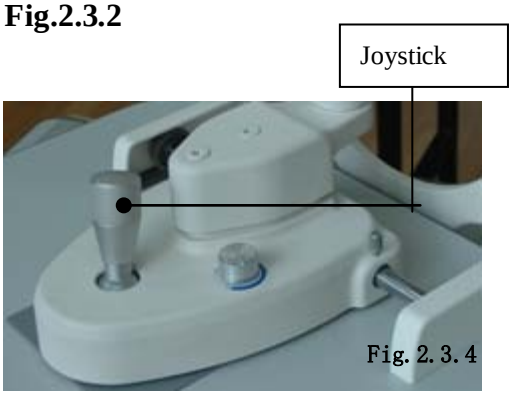


Fig.2.3.2



20. Rotate the brightness control knob (Fig.3.1.3); the light should be from dark to bright.
21. After examination, turn off the main power and cover the instrument with the dust-proof cover.

3 Operation procedures

3.1 Diopter compensation and Pupil Distance adjustment

① Use of the focusing test rod

The rod is supplied as one of standard accessories for confirming the microscope's accurate adjustment. Insert it into the main shaft hole with the black flat surface facing the objective lens i.e. the direction of the operator (Fig.3.1.1 & 3.1.2).

ATTENTION: After the adjustment, take out the rod.

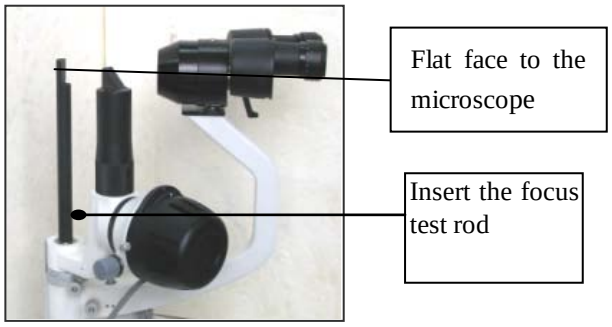
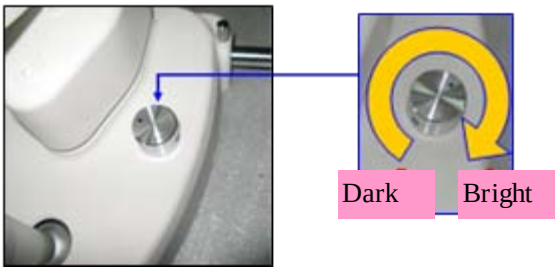


Fig3.1.1

②Brightness adjustment

Switch on the main power switch and set the brightness control switch (Fig.3.1.3) at central part. Turn the slit width control knob (Fig.2.3.1) 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. (Fig.3.1.4).

Suggest adjusting the diopter as following procedures:

First, rotate the diopter adjustment ring counter clockwise down to the end. (Fig.3.1.4)

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 sane

procedure.

Record the diopter value on each eyepiece for future reference.

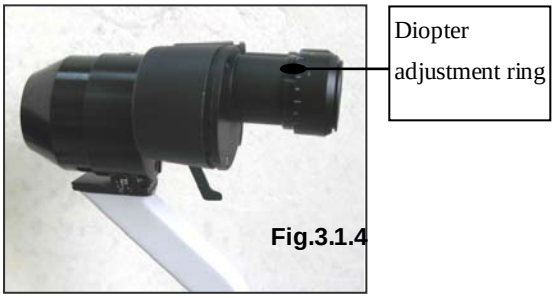


Fig.3.1.4

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. When adjusting, be sure that the eyepieces are at the same level. (Fig.3.1.5).

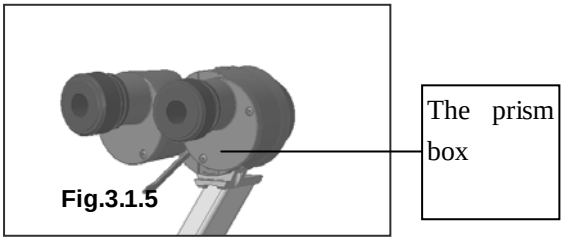


Fig.3.1.5

3.2 Patient position and the use of fixation target

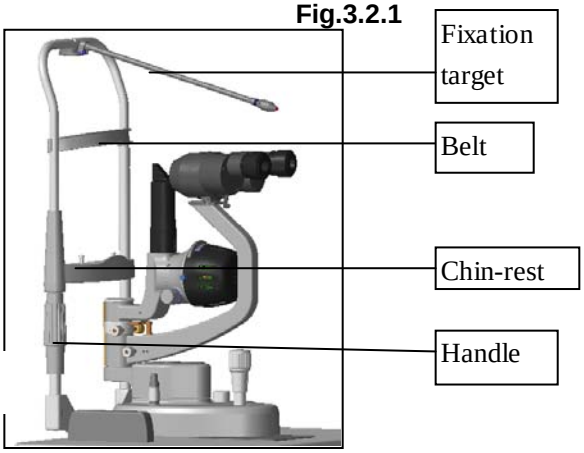
1) Positioning the patient's head

Place the patient's chin on the chin-rest with the forehead against the forehead-rest belt. Adjust the chin-rest elevation adjustment knob until the patient's can thus align with the horizontal mark (Fig.3.2.1).

2) Use of the fixation target

① For fixing the patient's eyesight, just mark him look at the fixation target with the eye not to be examined. Move the lamp bar to change fixing position, so as to achieve the appropriate lamp position

Fig.3.2.1



3.3 Base operation

1) Horizontal rough adjustment

Keep the joystick erect and move the base to make the microscope move on the horizontal surface to aim at the object roughly. (Fig.3.3.1)

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.3.3.1).

3) Horizontal Fine adjustment

Tilt the joystick to make the microscope move slightly on the horizontal surface. While watching though the eyepieces, tilt the joystick to aim accurately at the object for a sharp image. (Fig.3.3.1).

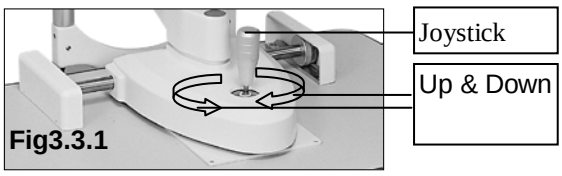
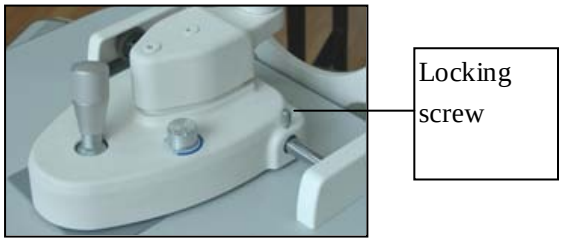


Fig3.3.1

4) Locking the base

When finishing the adjustment, fasten the base locking screw to lock the base and prevent it from sliding. (Fig.3.3.2)



3.4 Operation illumination unit

1) Changing the aperture and slit height

① Turn the aperture and slit height control knob and 4 different circular beams of light are available at full aperture: 14,8,3.5,0.5mm respectively and one continuously changing aperture with a slit height from 1 to 14mm, which is indicated through the display window (Fig.3.4.1)

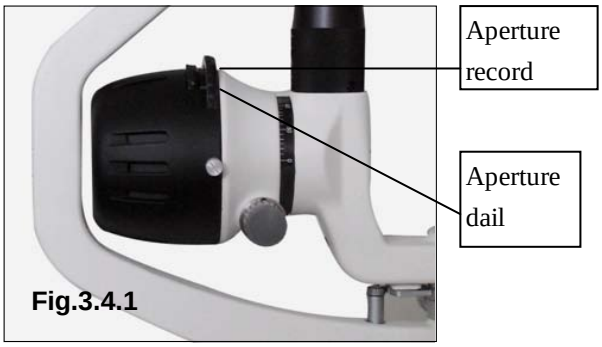


Fig.3.4.1

② **Rotating the slit image**: Swing the aperture and slit height control; knob 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 division for 10° (Fig.3.4.3).

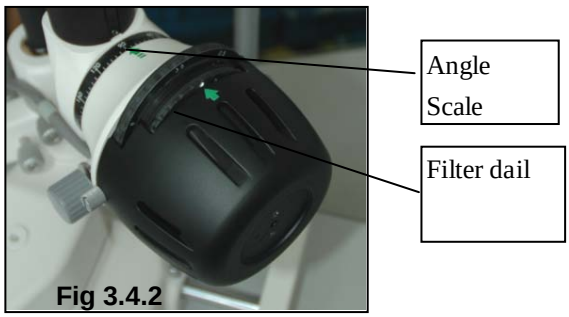


Fig 3.4.2

③ Filter selection. By shifting the selection lever four different filters can be inserted into the illumination pathway. Usually the thermal safety filter can make the patients feel comfortable. After using the other filters, we should turn back to the thermal safety. (Fig.3.4.2).

3.5 Operation notes

1) In the course of the operation the operator should learn more about the contents of the user menu, to master the structure and function of slit lamp microscope so as to carry out the right operation and diagnosis.

2) In order to prevent unnecessary observations arising from the misuse of the judge, operators should observe clearly the different locations in the knob corresponding to a different scale and different directional marks in the process of using the SLM.

3) Operator should adjust the interpupillary distance and diopter correctly in the operating or which may lead a feeling of dizziness

4) Operator may have a feeling of dizziness in long time observing, so please adjust observing time according to personal habit.

5) There will be a branch of crack-ray irradiation in patients' eyes, when they receiving SLM diagnosis. So if the light is too dark, it will affect the observing

effect. Conversely, if the light is too bright, in a long time exposure patients' vision might be affected. If patients feel uncomfortable, please tell the operator or take medical treatment. Therefore, please try to avoid prolonged exposure of patients' eyes in the bright light.

4 Maintenance

4.1 Cleaning and maintenance

4.1.1Cleaning way

① **Cleaning the lens and prism**: If any dust stick on the lenses or reflecting prism, wipe it off with soft cotton dipped with absolute alcohol. (Fig.4.1.1).

Attention: Don't wipe with hand, hard projects or any corrosive detergent lest that the surface be damaged.

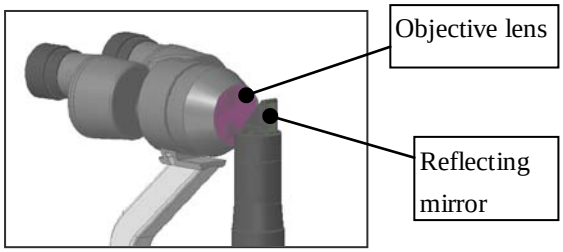
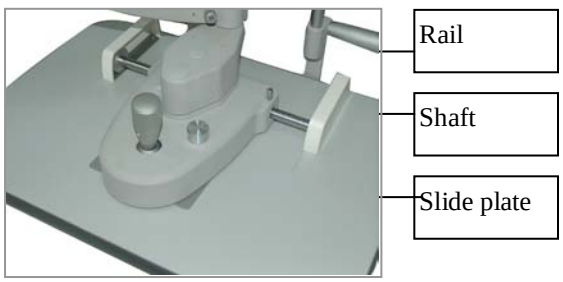


Fig.4.1.1

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.4.1.2).

Fig.4.1.2



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, then sterilize with medicinal alcohol. **Attention: Don't wipe with any corrosive detergent lest that the surface be damaged.** (Fig.3.2.1).

4.1.2 The cleaning and maintenance circle of the product.

a) Clean the eyepieces, objective lens and refractor:

Cycle: suggested once every two months.

The lenses are plated with a reflection reducing coating and reflective coating on its surface. Although the coating is hard enough, too frequent wiping will weaken it, which leads to a bad observing optical effect. Two month is a recommendation; if there is lots of dust on the lens, please wipe it immediately.

b) Cleaning the slide plate, rails and shaft:

Cycle: suggested once a month

These parts won't get dirty in a clean environment such as hospital in one year. However, we suggest you clean them once every 6 months so that you can get a much better movement effect.

c) Cleaning the plastic parts:

Cycle: suggested once a day

These two parts contact with the patients directly, so please clean them timely. Please replace a new and clean chin-rest paper for each patient.

d) Cleaning the whole machine:

Cycle: suggested once every two months.

4.2 Protecting

There always are dusts and physiological salt solution dropping into the main shaft hole of the illumination ram 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 focus

test rod needs to be assembled (Fig.4.2.1).

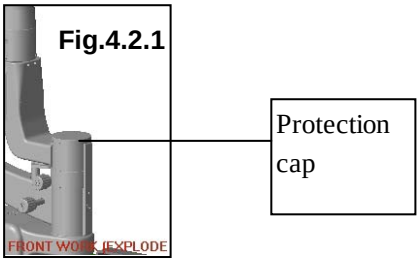


Fig.4.2.1

4.3 Change Bulb

1. Turn off the main power switch (Fig.3.1.3);
2. Take out the plug in the light cap. Rotate out the knob on the light cap. And Take out the light cap. (Fig.4.5.1);

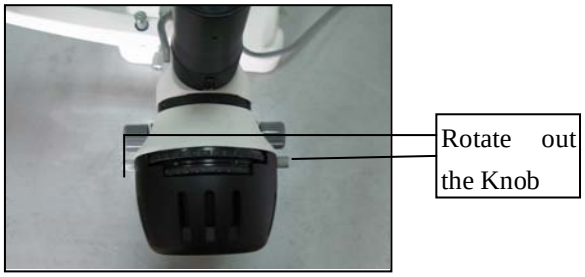


Fig.4.3.1

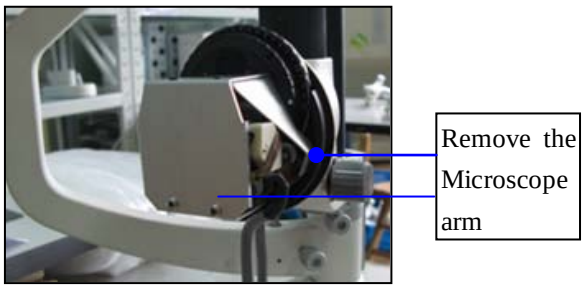


Fig.4.3.2

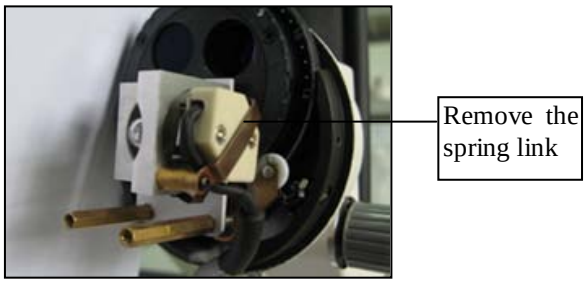


Fig.4.3.3

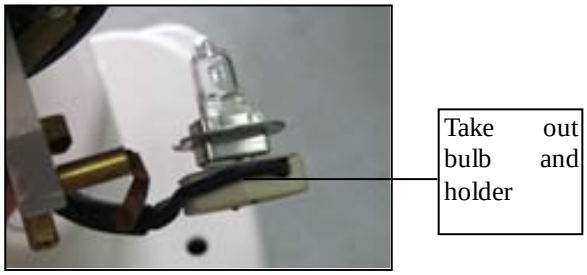


Fig.4.3.4

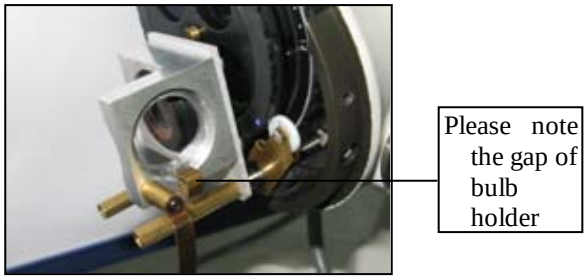


Fig.4.3.5

3. Remove the spring link（Fig.4.3.2）, Take out bulb and holder（Fig.4.3.3）, pull out bad bulb and change a new bulb.
4. Place bulb and holder the original place. Please make the gap of bulb （ Fig.4.3.4 ） on the metal patch.（Fig.4.3.5）, rotate the spring to press bulb, mount the light cap, screw on the knob .
5. Turn on the switch (Fig.3.1.3), check whether the bulb is working normally and the facula is round with mixed light.

4.4 Replacing the fuse

1. Turn off the main power switch (Fig.3.1.3), remove the power cable from the socket. (Fig.4.4.1).
2. The fuse is in the outlet where has fuse mark, take out the fuse part (Fig.4.4.2) with screw, you can see two fuses, one is in use, other is in spare, check them, Replace it with a spare fuse, place the fuse part into original place.

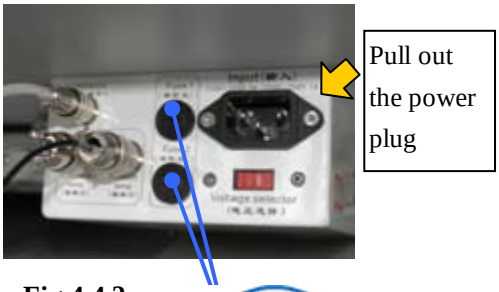


Fig.4.4.2

Replace the fuse

3. The fuse specification:

F1AL250V

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

4.5 Replacing the chin-rest paper

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.4.5.1).

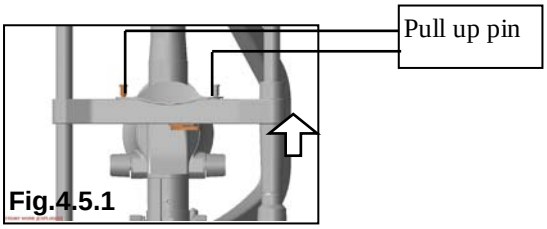


Fig.4.5.1

4.6 Consumables

1. Fuse: F1AL250V

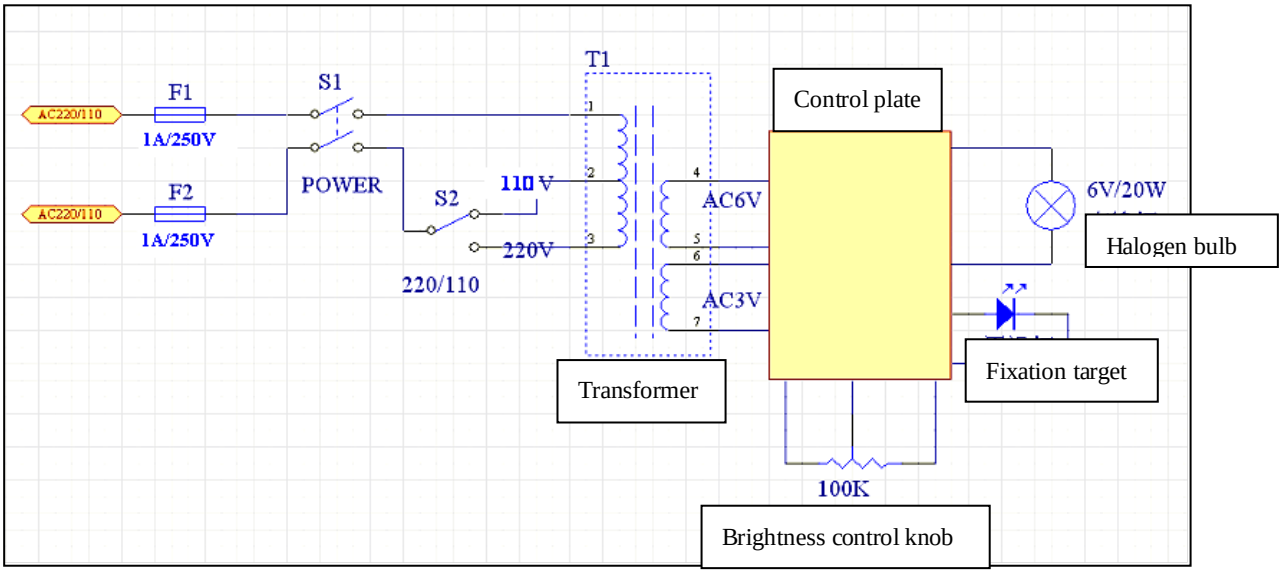
2. Bulb: 6V20W halogen bulb (the life span of the bulb is 480 hours; however, it can still work out of the time span though the brightness of the bulb may be lower).

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 the 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 'O' position	Place the switch on 'I' position
	The plug on the power box is loosen	Insert the plug firmly
	The plug on the lamp cap is loosen	Insert the plug firmly
	The bulb has burnt out	Change the bulb
	The fuse has blown	Change the fuse
	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 position
	the brightness adjustment knob is at min.	the brightness adjustment knob
Slit is too dark	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
Fuse has blown	Voltage selector id wrongly set	Set the voltage selector properly
	The fuse doesn't comply with the specification	Replace it with a suitable fuse
Slit width closes automatically	The slit width control knob is too loose	Adjust the tightness of the control knob
Fixation bulb is off	The output plug is loose	Insert the output plug firmly

Appendix A
Electronic Circle Drawing



Subject to change in design or specifications without advance notice

version: 1.0