

SL 650



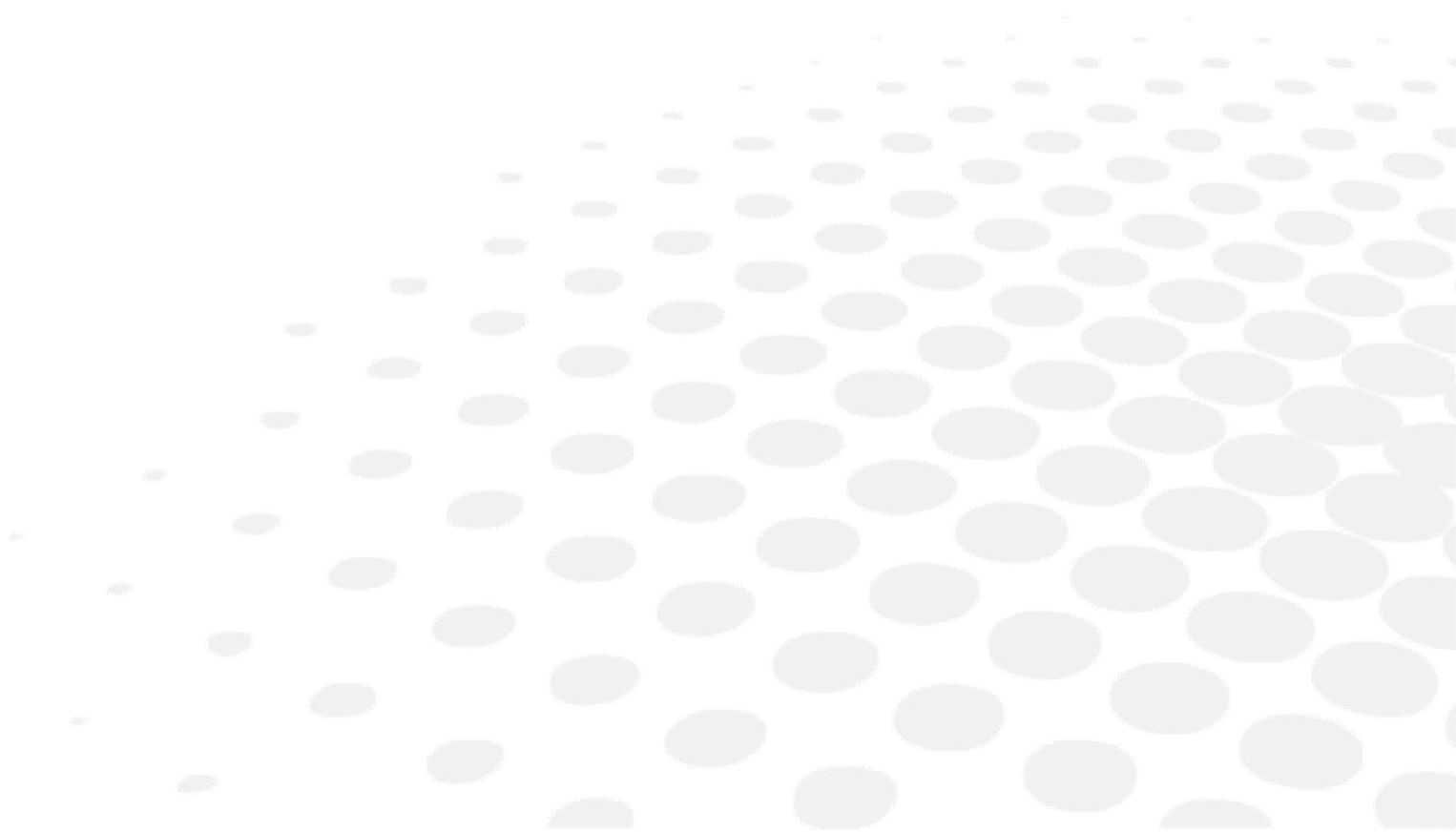
USER MANUAL

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I. INTRODUCTION





The latest version of this user manual is available on a web space.

To access other available languages, please scan the QR code available at the end of this user manual > QR Code Chapter (p.50).

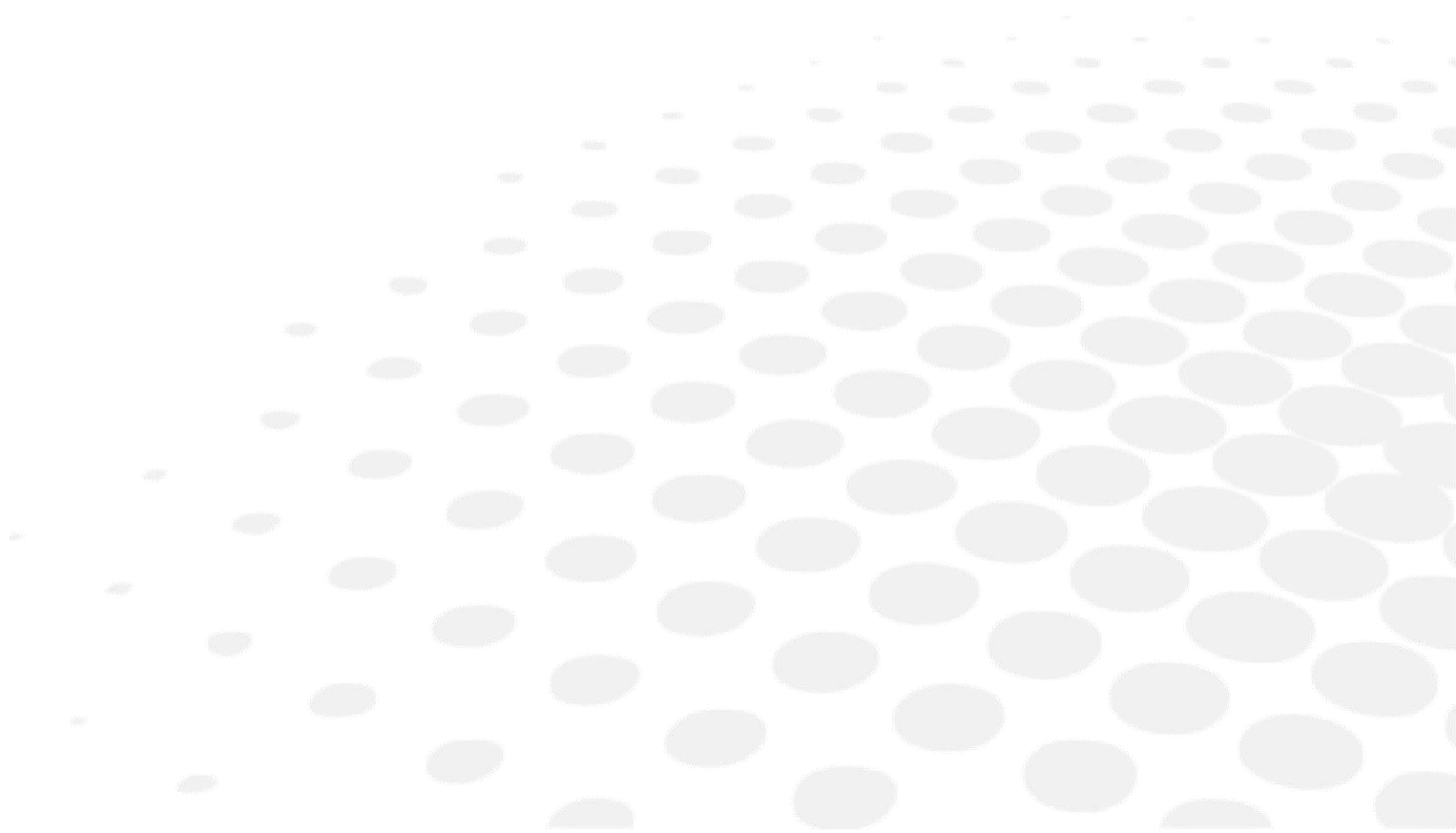
For a safer, more effective use, follow the instructions outlined in this manual.

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- This user manual is relevant for product SL650. It is based on relevant technical specification and operation of the product.
- The classification of this instrument according to IEC 60601-1 is specified in this manual.
- Labels and marks required by IEC 60601-1 standard is stuck on the instruments and described in this user manual.
- This instrument is categorized to class I Type B according to IEC 60601-1 standard, which cannot be used under two circumstances:
 - A flammable anesthetic gas and air mixture,
 - Oxygen or nitrous oxide gas and air mixture.

II. SUPPLY PACKAGE



1. Unpacking and storage

All parts should be taken out with great care from the packing case before assembling. After receive our slit lamp:

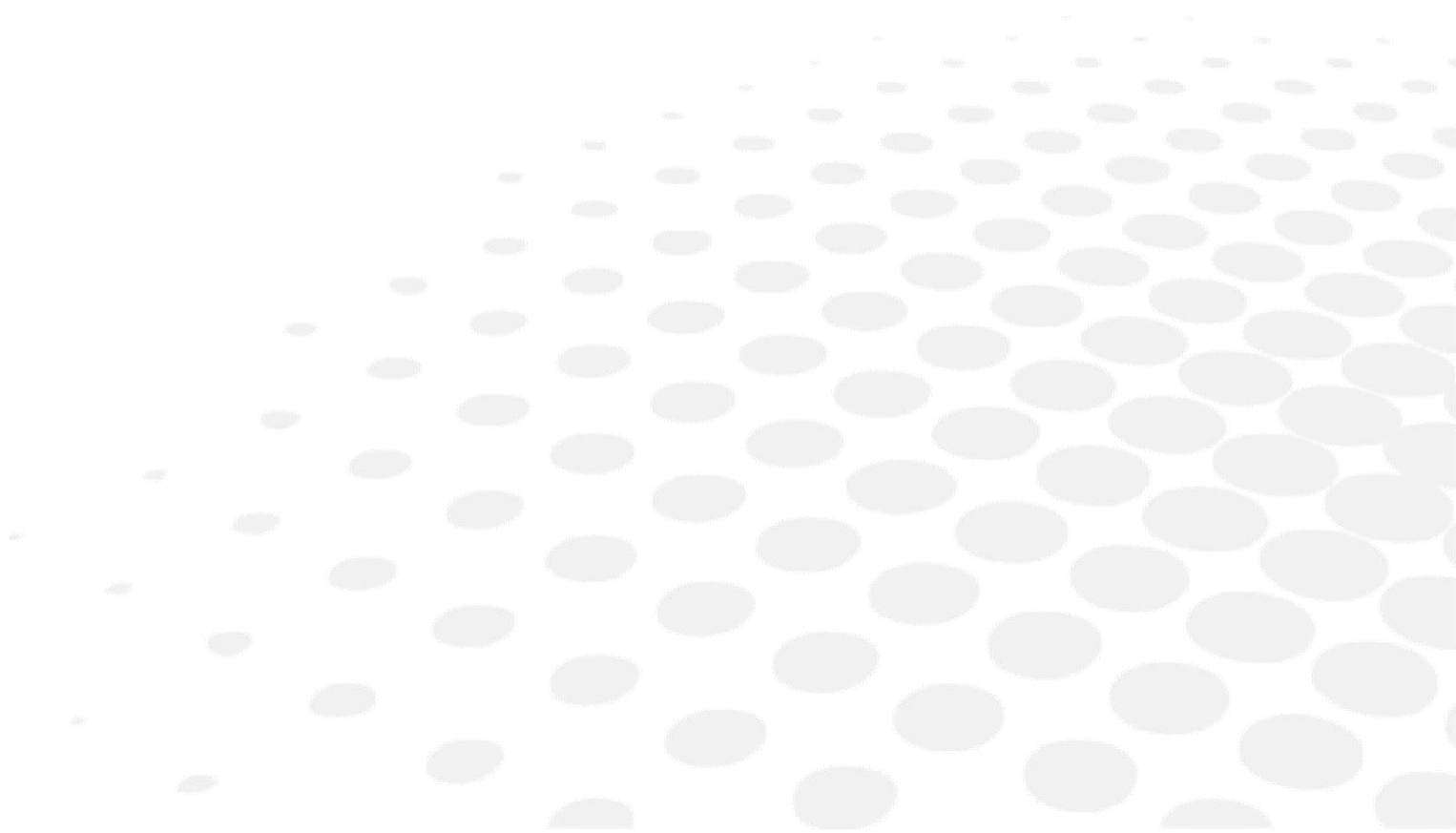
- Carefully open the box
- Take out the different part carefully
- Check if all the part of the device is presented before started the assembly

2. List of accessories

While unpacking, check that the following standard accessories are included.

- Microscope
- Chinrest
- Binocular tubes part
- Metal plate
- Rail cover (x2)
- Breath shield
- Focusing test bar
- Power cable
- Dust proof cover
- Chinrest paper
- Tabletop
- Wrench (5mm ; 2mm)
- User manual
- Packing list
- Screw driver
- Digital module
- Refraction Mirror

III. GENERAL DESCRIPTION



1. Intended use

a. Intended purpose

Slit Lamp Microscopes are intended to observe the disease of the anterior structures and tissue damage of eyes.

b. Indications for use

Slit lamp is intended for use in eye examination of the anterior eye segment, from the cornea epithelium to the posterior capsule.

It's Application scenarios:

- (1) Anterior segment disease examination;
- (2) Routine inspection of contact lens fitting;
- (3) Surface quality inspection of contact lenses to judge the smoothness of the lens surface and the integrity of the lens;
- (4) Assist orthokeratology lens fitting;
- (5) Assist doctors in the examination and judgment of dry eye;

c. Expected clinical benefit

Slit lamp examination is the most frequently used examination instrument in ophthalmology. It can examine eyelids, eyelashes, conjunctiva, cornea, sclera, aqueous humor, iris, lens, anterior vitreous, etc., and can determine the location, nature and etc.

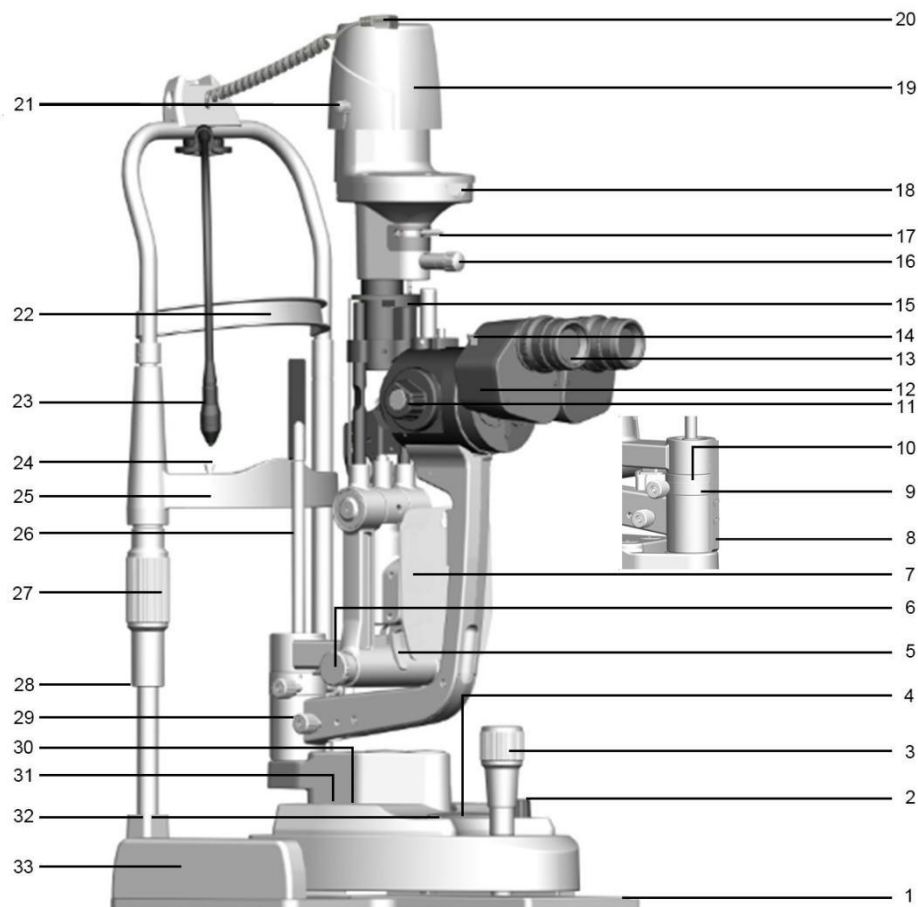
d. Intended population

The slit lamp is suitable for all people.

e. Intended users

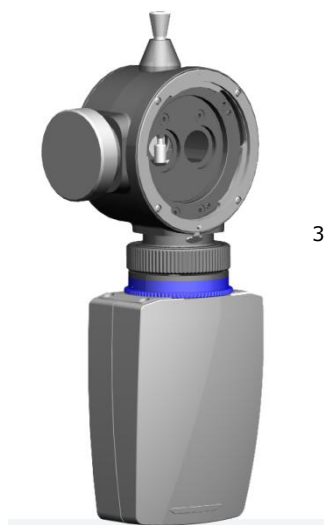
This device is intended for eye care professionals use only.

2. Device description



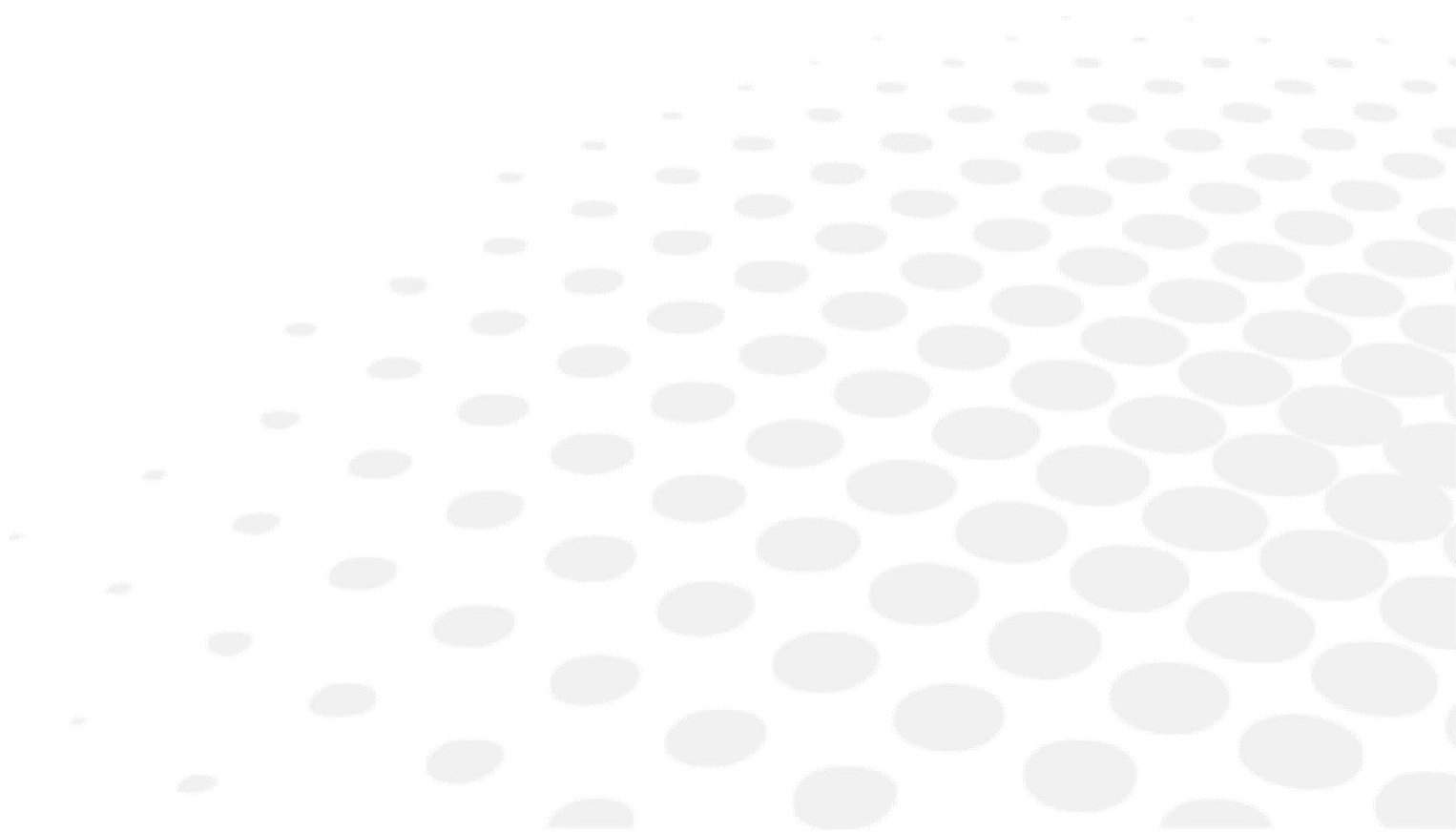
1. Metal plate.
2. Brightness control knob: The brightness can be adjusted continuously. Avoid working continuously at high setting, as the service life of the bulb will be shortened.
3. Joystick: Incline joystick to move the instrument slightly on the horizontal surface and rotate it to adjust the elevation of the microscope.
4. Shutter button: Used for digital slit lamp photography.
5. Illumination inclination lever: Four inclination stops are available from 5° up to 20°. The interval between each is 5°.
6. Slit width control knob: Turn the knob to adjust the slit width. The left knob is marked with a slit width indicator.
7. Illumination system reset knob: By loosening the knob, the light can be offset from the center of the field of view of the microscope to provide indirect backlighting. When the knob is tightened, the light can be restored to the center of the microscope field of view.
8. Limit marker: Limit viewing system and illumination system relative angle indicating and limiting illumination arm rotation angle.
9. The indication of relative angle between the microscope and illumination unit.
10. The mark of relative angle between the microscope and illumination unit.
11. Magnification changer: Five different magnifications are provided.
12. Binocular tubes base: Open it to both sides and adjust to the appropriate distance for easy observation.
13. 12.5X Eyepieces
14. Yellow filter rod: Pull up or press to switch the yellow filter.

15. Slit movement platform: Moving up and down to makes the slit opening and closing, and the lower scale shows the angle between the slit and the vertical direction.
16. Slit height control knob: Rotate this knob to adjust the spot and the slit height. Swing the knob horizontally to revolve the slit.
17. Filter selection lever and display mark: The lever can choose different filters.
18. Aperture slit height and display window: It will display the diameter of the slit and the aperture.
19. Lamp cap: With the function of protecting and insulating, its normal working temperature is around 51°C.
20. Power plug.
21. Where the light source component power is connected, the fixation knob of lamp cap. After fixing the knob, the lamp cap will not move.
22. Headrest belt: To fix the patient's head on an appropriate position.
23. Fixation target: Make the patient stare at it, it is convenient for checking.
24. Chinrest paper fixing bolt : For fixing the pad paper.
25. Chinrest: Supporting the patient's chin.
26. Focusing testing rod.
27. Chinrest elevation adjustment knob: Rotate the knob to adjust the elevation of the chinrest.
28. Illumination arm locking knob: When the knob is tightened, the illumination system and the observation system are in a linked state and can rotate together. When the knob is loosened, the illumination system can be rotated separately.
29. Microscope arm locking knob: Lock the observation system so that it cannot rotate.
30. Power input: Used to supply power to the power module.
31. Power output: Used to power main lamp and fixation target.
32. Power switch: Press the power switch button once to turn it on, then press the button again shortly to enter standby mode, and press and hold for 3 seconds to turn off all power.
33. Rail cover.
34. Digital module
Apply to S650L Image System.



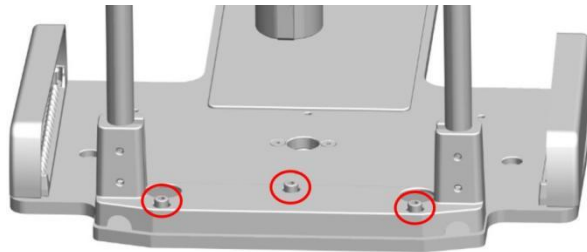
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IV. INSTALLATION / CONNECTION



1. Installation of the device

- 1 Open the carton, take out the tools like screw driver and spanner.
- 2 Remove the three screws from metal plate with the screw driver, take out the headrest from carton, ensure the three hole on head rest aim the screw hole of instrument table, re-tighten the previously removed screw and make head-rest connect with work tabletop.



- 3 Take out the slit lamp part, put it on the rails of the tabletop, and check whether the wheels can be rolled steadily on the rails.

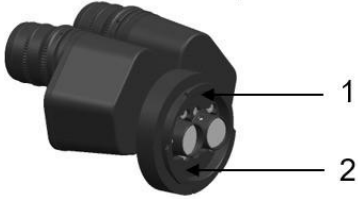
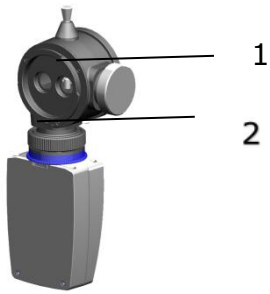
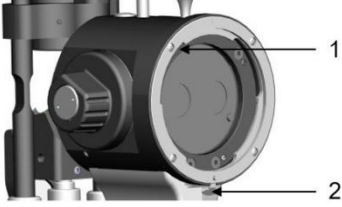
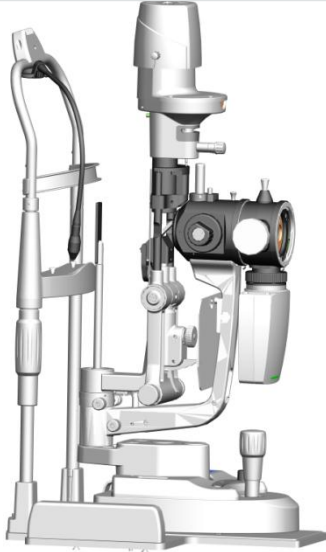
Place the rail cover to the rail, remove four screws attached to the rail with the screw drive, retighten the previously removed screws.

	<p>1 2</p>	<p>1. Locking screw on base 2. Rails</p>
	<p>1</p>	<p>1. Rail cover</p>

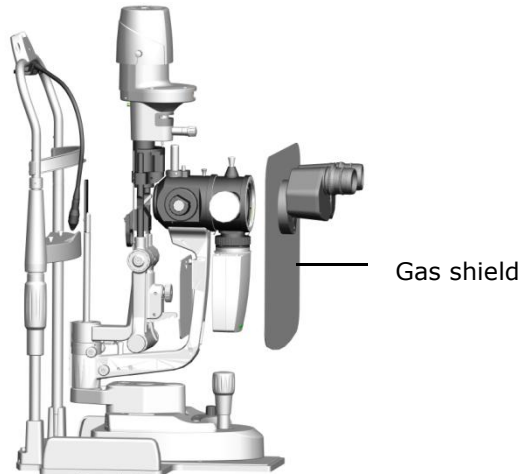
- 4 Take out the binocular tubes of microscope part.
Match the groove on the binocular tubes with the pin on the microscope body. Fasten the fixing screw on the body to the microscope.



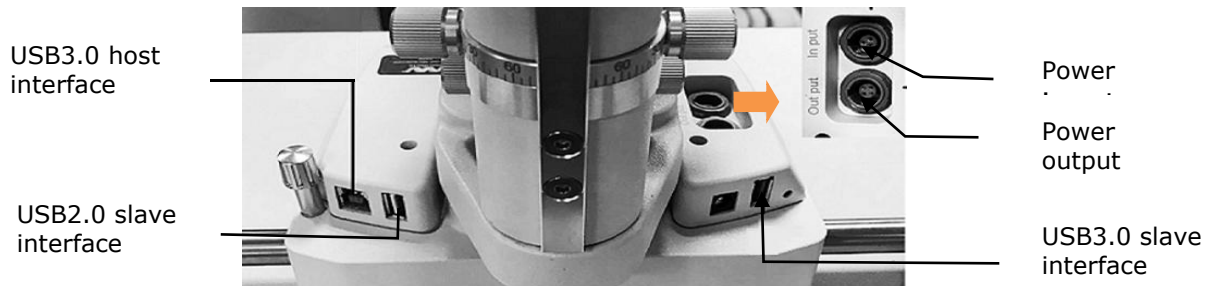
Don't touch the objective lens and eyepieces during assembling.

 <p>1 2</p>	<p>1. Binocular tubes 2. Limit groove</p>
 <p>1 2</p>	<p>1. Binocular tubes 2. Limit groove</p>
 <p>1 2</p>	<p>1. Match here 2. Pin</p>
	

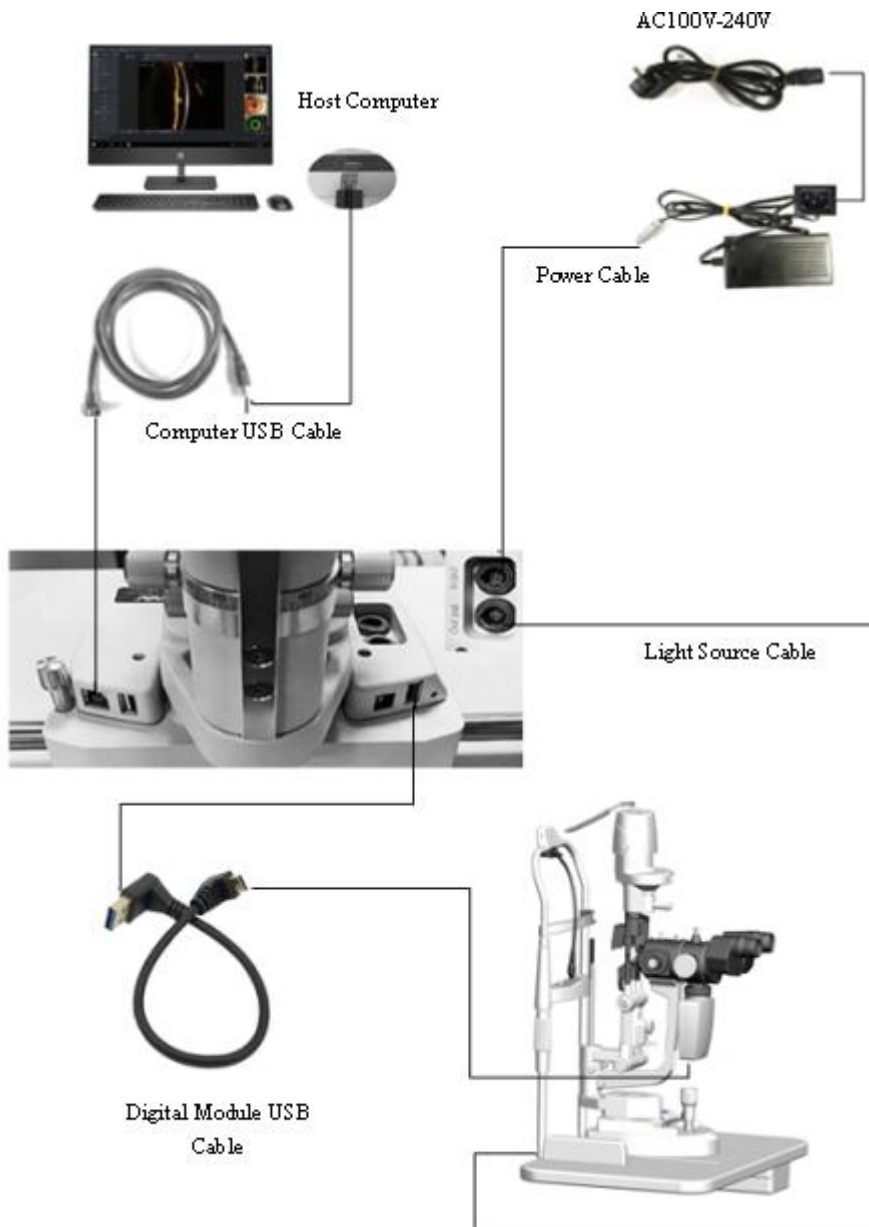
- Place the gas shield directly on the gas shield screw



- The 4-pin aviation plug of the chin-rest is connected to the "Output" on the base of the slit lamp microscope; the power adapter is connected to the "Input" on the base of the slit lamp microscope.



The limited slot on the air socket should be aligned corresponded slot when plugging and unplugging. Do not force the plug.



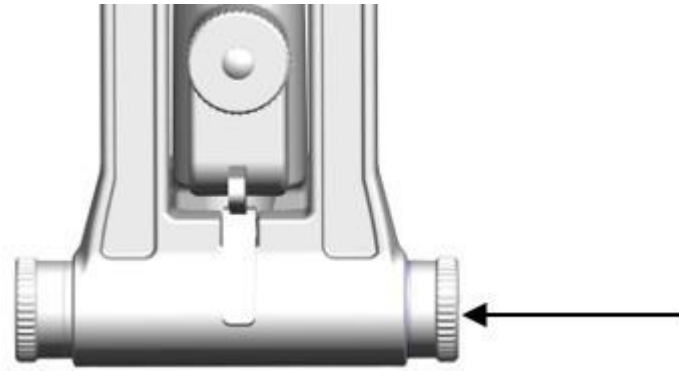
- 7 The power switch can be turned on with one short-press, short-pressed again to hold, and long press for 3seconds to turn off all power.

The power supply can work normally from 100V to 240V.



a. Checking program

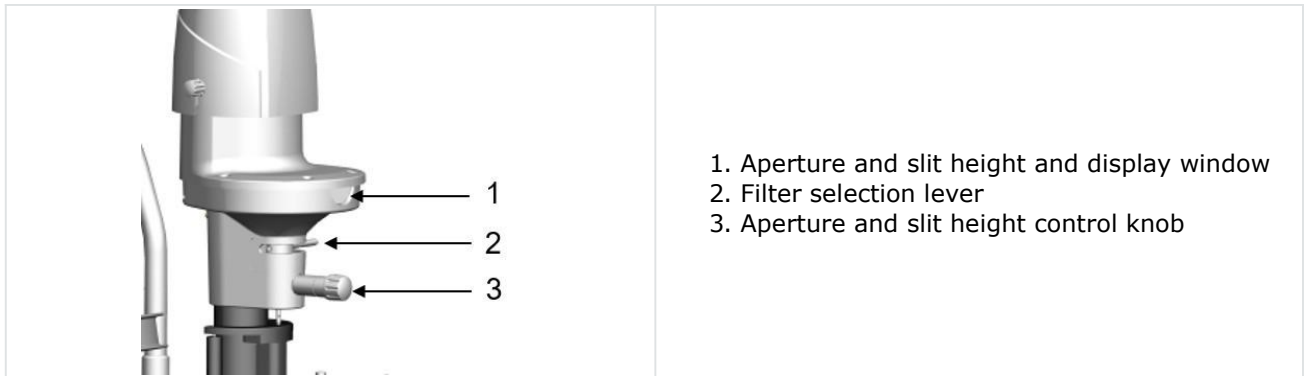
- 1 The power cord of this instrument is a three-core power cord. Please select a suitable power socket to match it.
- 2 Insert the focusing test rod and turn the slit width control knob.
The illumination spot should be observed on the black plane of the focusing test rod.



The brightness change of the illumination should be observed when rotate the brightness adjustment knob.

- 3 Check the fixation target to verify that it is properly illuminated.
- 4 Check whether the moving parts such as the slit and aperture width knob, the aperture adjustment knob, the filter selection lever, the zoom knob, and the joystick operate normally.

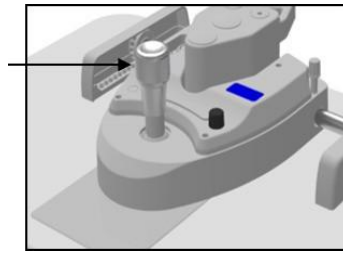
Filter selection lever:



Zoom knob:



Joystick:



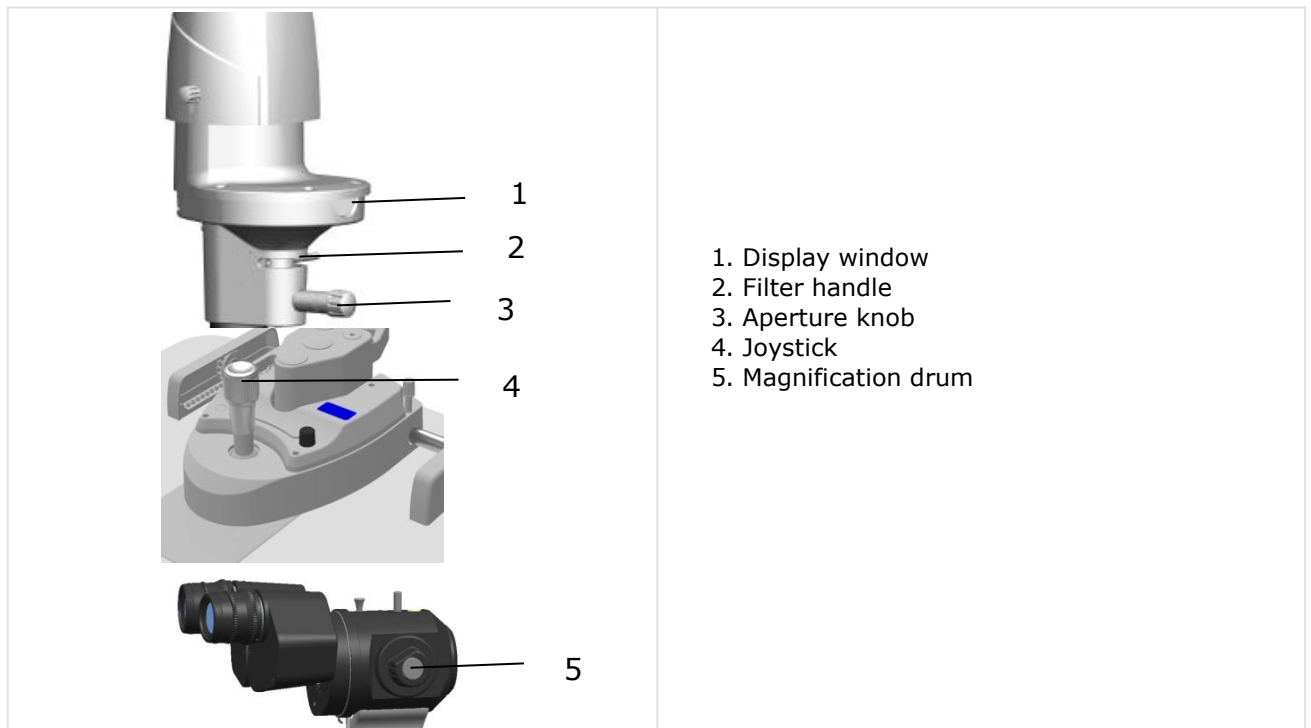
- 5 The brightness change of the illumination should be observed when rotate the brightness adjustment knob.
- 6 After the checking is completed, press and hold the key for 3 seconds to turn off the power and cover the dust cover.

2. Turning ON/OFF

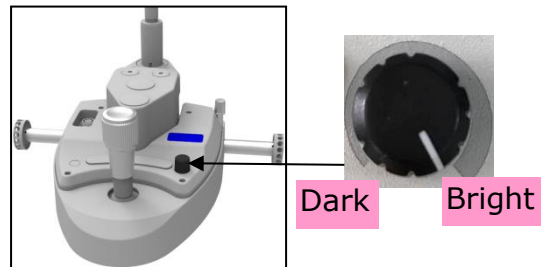


This instrument supplies a 3-wire cable. Please select a proper power socket as matched. Ensure that the instrument is grounded well.

- 1 A 3 pin cable is supplied with this instrument. Correct plug is supplied as well. Ensure the instrument is grounded.
- 2 The indicator lamp will be lighted when the instrument is power ON.
- 3 Insert the focus test bar to right position. A light spot will be projected on the focus test bar. Rotate the slit width knob to adjust the width of the spot and the light dimmer to adjust its brightness.
- 4 The fixation target is lighted.
- 5 Check the following part works flexibly:



- 6 Rotate the light dimmer knob and the brightness will go dim.



- 7 Turn OFF the main power and cover the instrument with the dust-proof cover after testing.

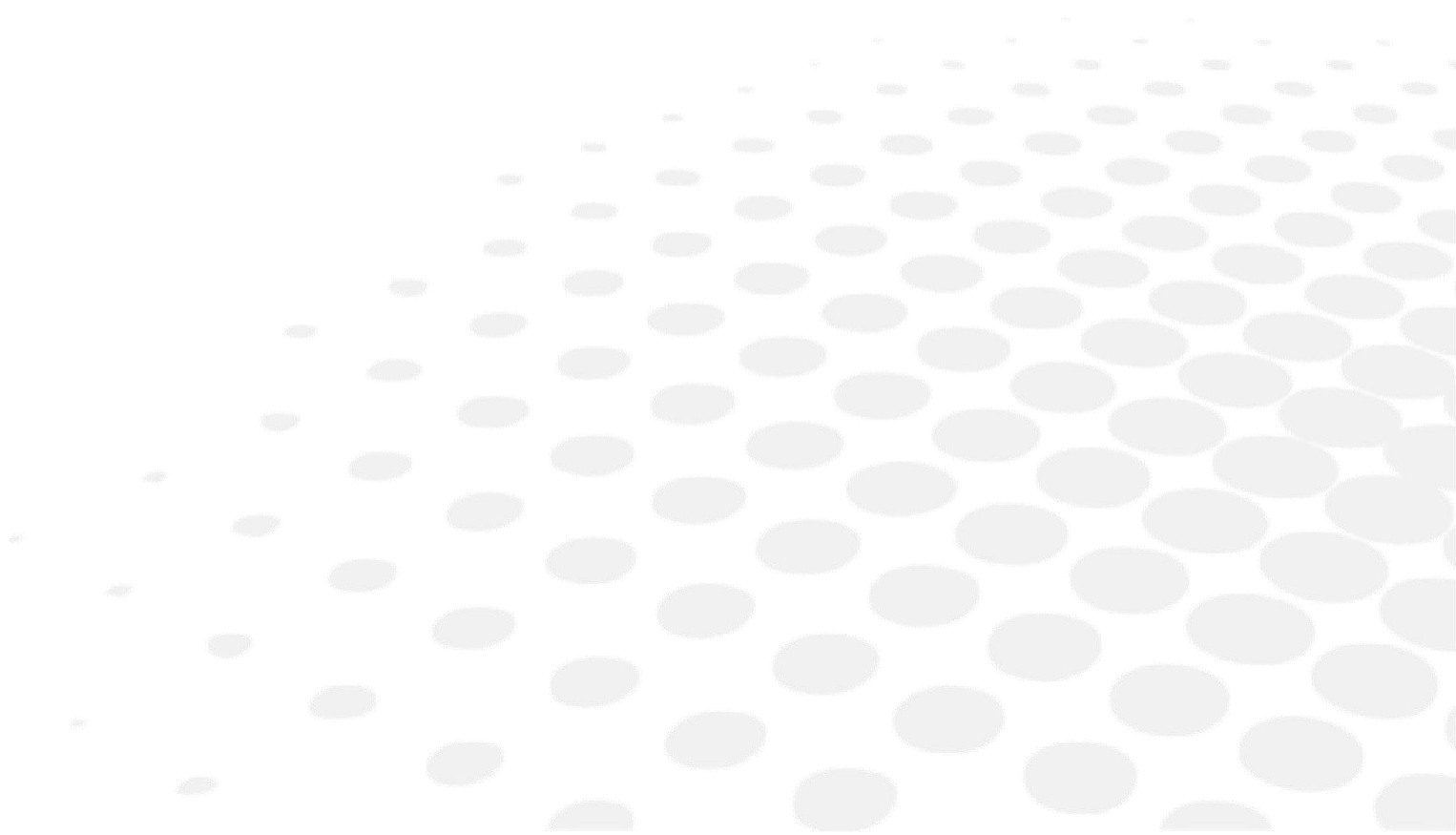
a. Turning OFF

Turn OFF the main power and cover the instrument with the dust-proof cover after testing.

3. Connection to other instruments

This section is not applicable.

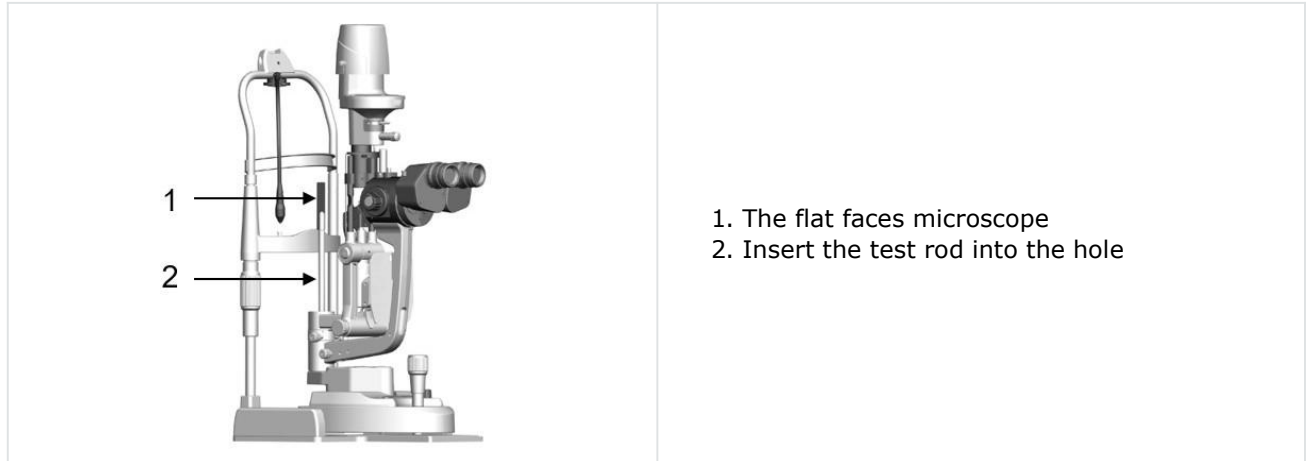
V. USE OF THE DEVICE



1. Diopter compensation and pupillary distance adjustment

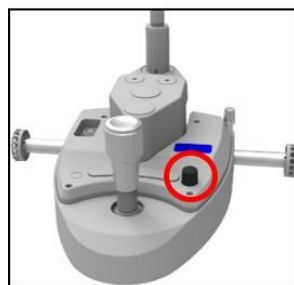
1 Use of focusing test rod

The focusing test rod is provided as a standard accessory to determine the correct adjustment of the microscope. Insert the focusing rod into the spindle hole with the black flat surface facing the objective lens of the microscope, ie the operator side.



2 Brightness adjustment.

Turn on the main power switch and turn the brightness adjustment knob to the middle. Adjust the slit width adjustment knob to make the slit width 2 to 3 mm.



Dark > Bright

3 Diopter adjustment.

The focus of the microscope is adjusted in front of the normal eye (ie, 0 diopter). If the operator has abnormal eye, gently rotate the eyepiece tube diopter adjustment ring to adjust the eyepiece diopter to the appropriate position.

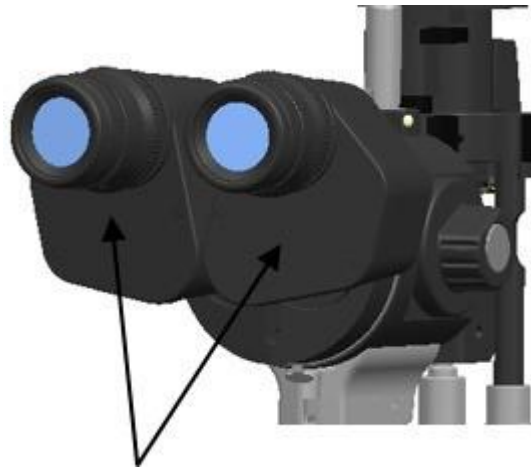


It is recommended to correct the diopter in the following order:

1. First, rotate the diopter adjustment ring counterclockwise to the end.
 2. Then, turn the diopter adjustment ring clockwise until the clearest slit image appears on the focusing test bar. Adjust the other eyepiece in the same way.
 3. Record the diopter value on each eyepiece for future reference.
- 4 Pupillary distance adjustment.

Use both hands to tilt the binocular tubes base on both sides, adjust the pupil distance to both eyes and observe the image on the focusing test rod through the eyepiece to obtain a stereoscopic image.

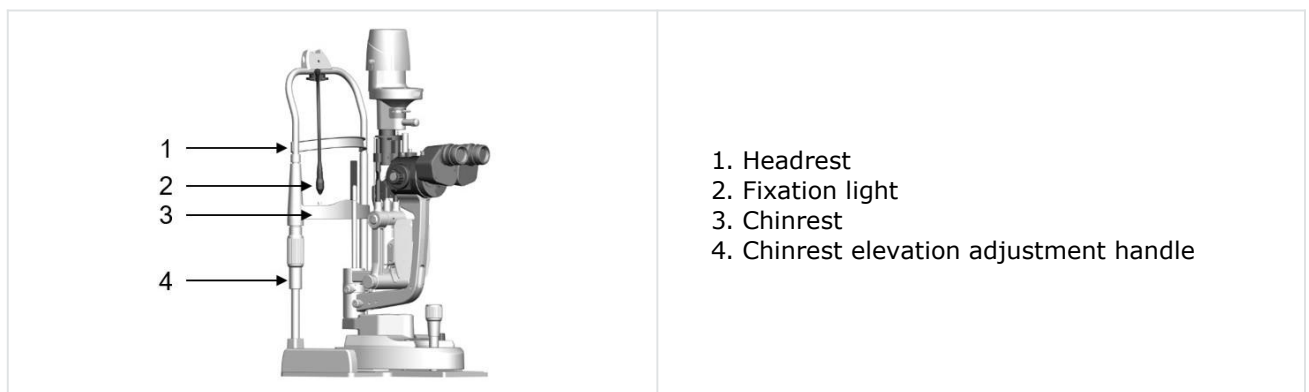
When adjusting the pupil distance, ensure that the two eyepieces are at the same height.



Tilt the binocular tubes base on both sides.

2. Patient's head position and use of fixation target

- 1 Place the patient's chin on the chin-rest, with the forehead resting on the headrest belt and adjusting a handle below the chin-rest bracket until the patient's corner of the eye match with the level of the pole marked in line.
- 2 The use of a fixation target is to fix the patient's vision, so that the patient's non-examined eye is gazing at the fixation target. When changing the fixation position, turn the fixation rod up and down or left and right to obtain the desired fixation target position.

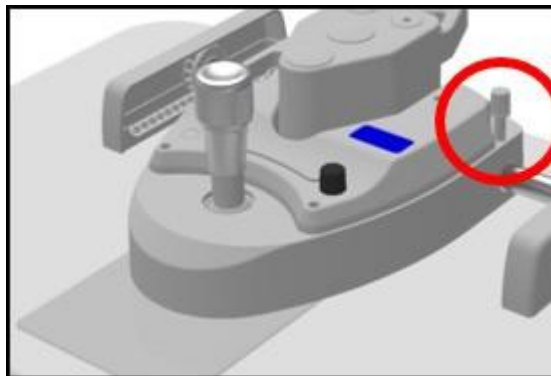


3. How to use moving base

- 1 Roughly Adjustment in the horizontal direction. with the joystick in the upright position, move the base back and forth to move the microscope in a horizontal direction to roughly align the target.
- 2 Adjustment in the vertical direction. Rotate the joystick to adjust the height of the microscope to align it with the target. Rotate clockwise to lower the microscope; counterclockwise to raise the microscope.
- 3 Slightly adjustment in the horizontal direction. Tilt the joystick forward and backward to make the microscope move slightly in the horizontal direction. Observe through the eyepiece to accurately align the target to obtain a clear observation.



- 4 Lock the base. After the microscope is adjusted, tighten the base locking screw to fix the base so that it cannot move.



4. Operation of illumination system

- 1 Change the brightness of the slit image.

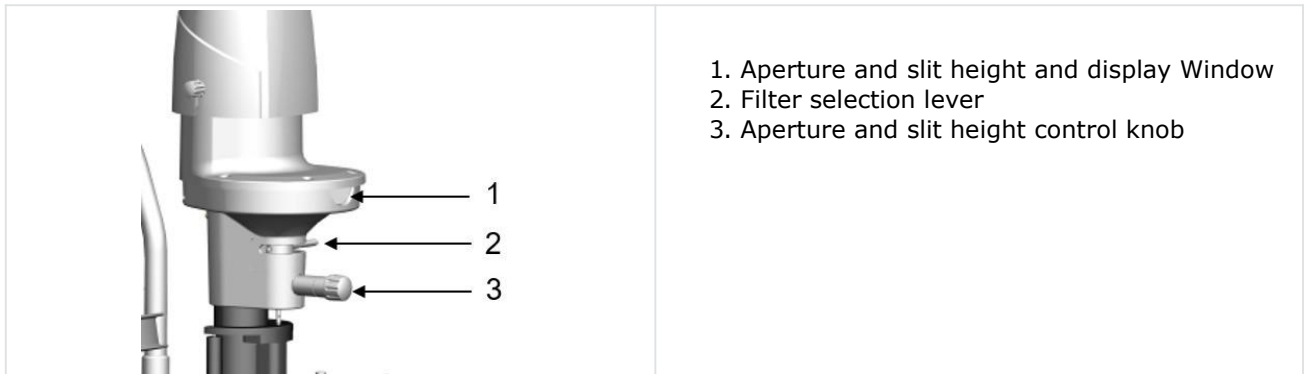
Rotate the slit width control knob to change the slit width from 0mm to 12mm (when the width is adjusted to 14mm, the slit becomes circular), the knob has a scale to indicate roughly the width value.



- 2 Change the aperture diameter and slit height: Rotate the aperture selection knob to get 7 different sizes of circular spot and 1 continuous change aperture.

The diameter of the circular spot is 14, 10, 5, 3, 2, 1, 0.2. Continuously changing the aperture can continuously change the length of the slit from 1 to 14 mm.

The aperture data is displayed from the pupil reading window.



- 3** Rotating slit image: horizontally move aperture selection knob can rotate the slit image at any angle between vertical and horizontal.

The angle of rotation can be displayed by the scale board. Each small grid is 5, and the larger grid is 10.



- 4** Offset illumination. Rotate the centering knob and rotate the slit width adjustment knob in the direction of the arrow to offset the illumination light from the center of the microscope field of view.

This is mainly used for indirect inverse illumination methods to check the eyes. Rotate the centering knob and the slit light returns to the center of the field of view.



- 5 Tilt the illumination light. When using a contact lens and using a slit section view or fundus examination, oblique illumination is required.

By pressing down on the tilting lever, the lighting components can be tilted from 5 to 20 (every 5th gear). Since this method may touch the patient's head, be careful.



- 6 Select the color filter. Rotate the filter selector lever in the horizontal direction to switch four different color filters into the light path.

Heat-absorbing filters are often used to make the patient feel more comfortable. Other filters should be placed in the position of the heat-absorbing filter after use.

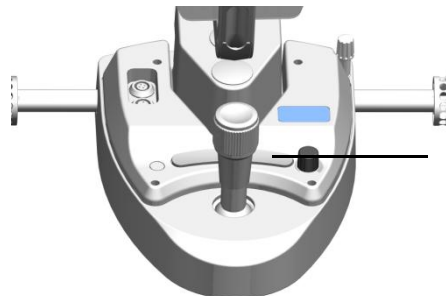


- 7 From left to right: white filter, heat absorbing filter, light reduction filter, red-free filter, cobalt blue filter. The white film is only used when the factory is calibrated, and the operator does not have to use it.



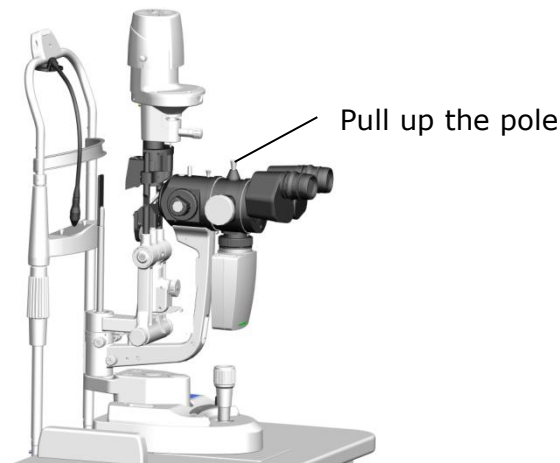
5. Digital module set operation notes

- 1 Capture
button (see Figure 3.5.1), press the capture button in the camera mode to take a photo; press the capture button in the video mode to start recording, press the capture button in the recording state to end the current recording.



Capture
button

- 2 When
capturing images, make sure that the beam splitter lever is in the pulled up position. At this point, the microscope image can be captured, and the light pass through eyepiece will decrease and the field of view brightness will decrease.



- 3 The number above the apertures: F14, F16, F18, F21, F25, F30 indicate the aperture size. The larger the number, the smaller the aperture. When the light is insufficient, a large aperture is required to ensure the brightness of the picture, apply to the condition such as observing the cornea with slit light. Use a small aperture for greater depth of field when there is plenty of light, apply to the condition such as use a large spot to observe the eye.

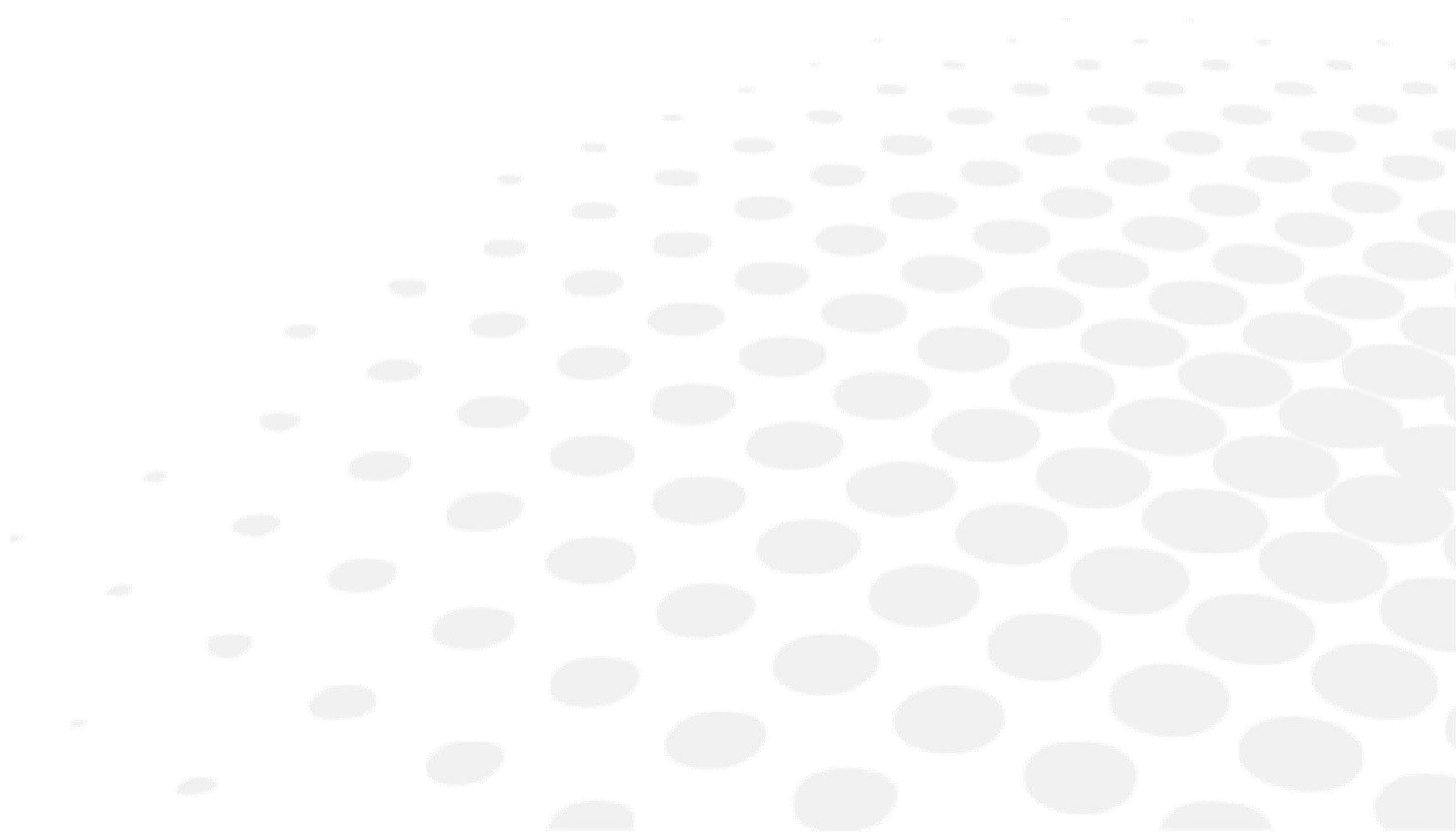


- 4 The background light source module provides additional illumination for observing, improving the quality of digital photography. The background light source has two kinds of LED light source and infrared light source.

6. Operation notes

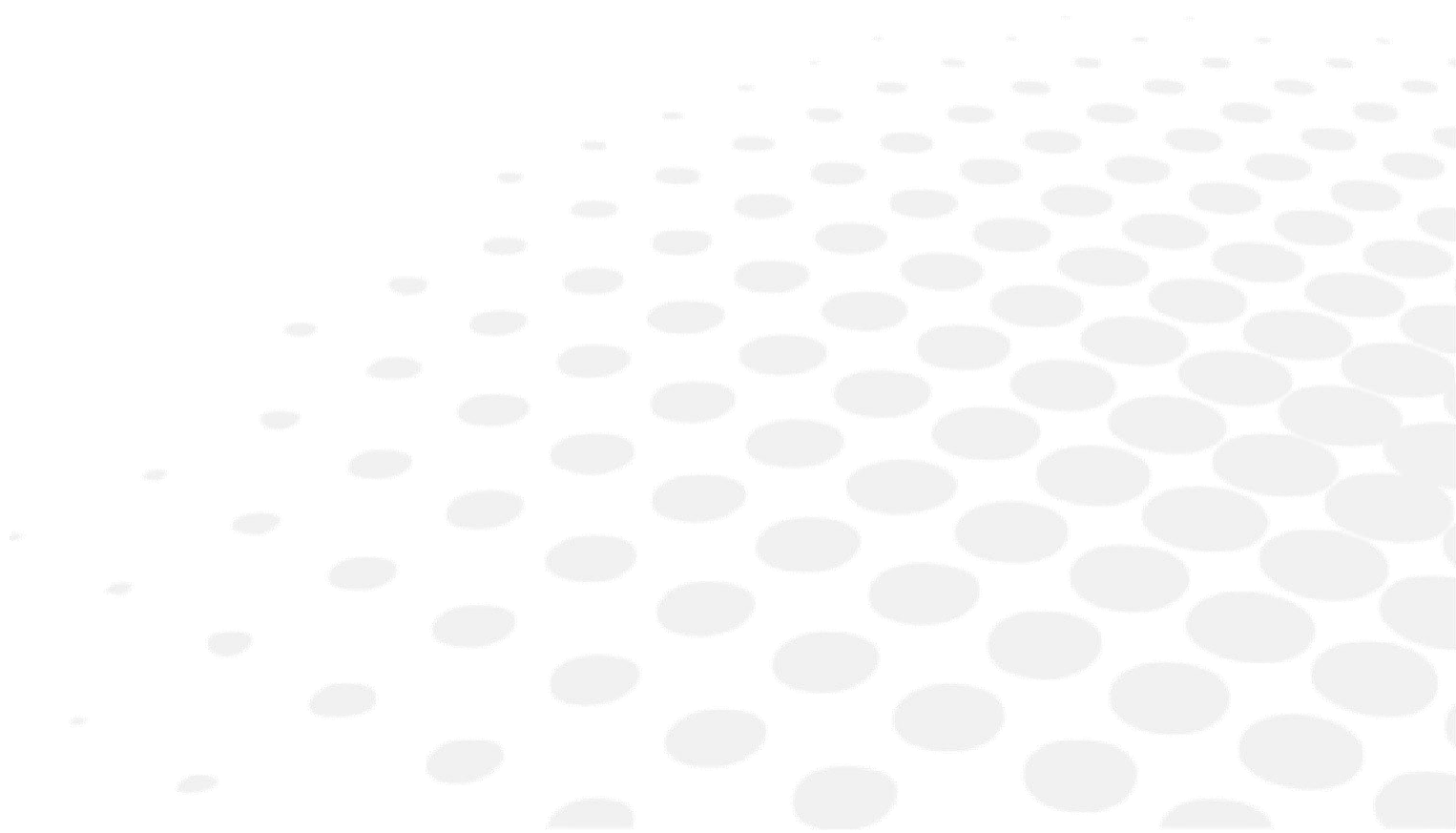
- 1 During the operation, the operator should first understand the contents of the instruction manual and master the structure and function of the slit lamp microscope. It is necessary for proper operation and diagnosis.
- 2 During the use of the operator, the different scales and different indication marks corresponding to the various knobs at different positions should be observed clearly, to prevent unnecessary misjudgments during observations.
- 3 The operator should adjust the pupil distance and the vision before observing the microscope during the operation. If the distance and vision are incorrect, there may be a feeling of dizziness.
- 4 The operator may have a feeling of dizziness if using microscope for a long time during the operation. Please adjust the observation time according to your personal situation.
- 5 When the patient is diagnosed with a slit lamp microscope, a beam of slit light is applied to the eye. If the slit light is too dark, it will affect the observation. If the slit light is too strong, and the observation last too long, it may affect the patient's vision. If the patient feels uncomfortable, please inform the operator or actively seek medical attention. Try to avoid illuminating the patient's eyes for a long time under strong light.

VI. ERROR DISPLAY



This section is not applicable.






VII. SAFETY CONSIDERATION

















Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.


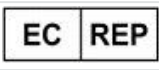



1. Symbols

a. On the document


SYMBOL	DESCRIPTION
	Caution: a hazardous situation that, if not avoided, could result in minor or moderate injury.
	Warning: a hazardous situation that, if not avoided, could result in death or serious injury.
	Danger: a hazardous situation that, if not avoided, will result in death or serious injury.
	Important and/or useful additional information to learn relating to the text in this manual.
	Tips: practical advice.

b. On the device and packaging

SYMBOL	DESCRIPTION
	Type B
	Alternate current
	D.C. current
	Manufacturer
	Manufacturing date (year)
	Refer to operation instruction
	WEEE mark: Please deal with the waste disposal produced by the machine following relevant laws and regulations.
	CE marking according to applicable directives
	Medical device
	Reference
	Serial number
	Power ON
	Power OFF
	Protective earth terminal

	The mark of light dimmer
	European authority representative
	Distributor
	Importer
	Unique device identifier
Class I	The slit lamp is class I medical device
Type B	English form of B type
Output	Indicate outlet of the power
Input	Indicate input of the power

2. Precautions for use

	<p>Please read the instruction manual carefully before using our products to avoid accidental mechanical hazards and improper use of the user, resulting in unclear images and diagnostic errors. In particular, carefully read the following safety precautions to prevent the product is damaged, personal injury, and other hazards and accidents that may occur.</p>
--	--

1. The product can only be used by qualified medical staff.
2. Do not disassemble or attempt to perform operations that are not described in this instruction manual. If the operation is not performed properly, excessive force may cause damage to the machine or personal injury. If the instrument fails, please read the troubleshooting guide carefully; follow the troubleshooting methods and steps to troubleshoot the problem; if the problems remain unsolved, please contact our Manufacturer and Service Department, and our company will arrange professional maintenance personnel to help you troubleshoot.
3. Do not store and use in a flammable, explosive, high temperature, high humidity and dusty environment; use it in a clean room, keeping the product clean and dry.
4. Other medical instruments and equipment that installed at the same site must comply with the same electromagnetic compatibility principles. Equipment that cannot comply with or is known to have poor electromagnetic compatibility must be installed at least 3 meters away from the equipment and must be powered by a different power cord.
5. Please pay attention to the rating of all electrical connection ports.
6. Before using the instrument, please check all the wires are correctly connected; if the wires are inappropriately connected it may cause the instrument to be short-circuited, which may cause the product is damaged and personal injury.
7. Users should pay attention when using the instrument, and be careful when moving the parts to avoid damage due to the moving of the base and tilting of the projection tube
8. When replacing fuses and other electrical components, turn off the main power switch. Replace the fuse that meets the specifications specified in this manual.
9. If there is a need to replace power cord, please use the power cord specified in this manual.
10. Don't touch the surface of the lens and prism with hand or hard objects.

11. When the device is not operating, the power should be turned off, and cover the device with dust cover.
12. To prevent the instrument from falling down to floor, it should be placed on the floor where the inclination angle is less than 10°.
13. Please deal with the waste disposal produced by the machine following relevant laws and regulations.
14. Please read the safety signs and other illustrations used on this instrument carefully to use the device safely.

3. Contraindication

No contraindications.

4. Side effects

No undesirable side-effects.

5. Exclusion of liability clause



- The results and/or technical data resulting from the handling or use of instruments must be analyzed by professionals experienced in various fields of application of the instrument in order to avoid any risk of misreading or incorrect analysis of the data.
- Diagnostics are carried out under the responsibility of the user and Essilor declines any responsibility for the results of these diagnostics.
- Manufacturer is not responsible for damage caused by fire, earthquake, third party behavior, other accidents, and carelessness of the user, misuse, or use under abnormal conditions.
- Manufacturer is not responsible for the deficit, bankrupt, and any loss due to unable to use this device.
- Manufacturer is not liable for any damage to the operation not described in the instruction.
- Diagnosis is the responsibility of the doctors, and Manufacturer is not responsible for the results of those diagnoses

6. Power Source

100-240V.

7. Precautions regarding IT Network

This section is not applicable.

8. Electromagnetic compatibility

Below cables information are provided for EMC reference.

Cable	Max. cable length, Shielded/unshielded		Number	Cable classification
AC power cable	1.8 m	Non shielded	1 set	AC Power
DC Power cable	1.36 m	Non shielded	1 set	DC Power
DC Power cable for the slit lamp microscope	0.7 m	Non shielded	1 set	DC Power
USB cable for the slit lamp microscope	0.3 m	Shielded	1 set	DC Power
USB cable for the slit lamp microscope	1.9 m	Shielded	1 set	DC Power

Important information regarding Electronic Magnetic Compatibility (EMC)

The slit lamp microscope needs special precautions regarding EMC and put into service according to the EMC information provided in the user manual and other documents. The slit lamp microscope complies with the IEC 60601-1-2:2014 standard.

Nevertheless, special precautions need to be observed:

- The use of accessories and cable other than those specified, with the exception of accessories and cables sold of the slit lamp microscope as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY or decreased LIFESPAN of the slit lamp microscope.
- The slit lamp microscope should not be used adjacent to or stacked with other equipment. In case adjacent or stacked use is necessary, The slit lamp microscope should be observed to verify normal operation in the configuration in which it will be used.

The length of cables or cords must be greater than 1.8 meters.

a. Electromagnetic emissions



This product is intended for use in the electromagnetic environment specified below. It is up to the customer or the user to verify that the instrument is used in this environment.

EMISSIONS TEST	COMPLIANCE	ELECTROMAGNETIC ENVIRONMENT – GUIDELINES
Electromagnetic emissions (CISPR 11)	Group 1	The product uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Disruptive voltage at power stations (Conducted emissions) (CISPR 11)	Class A	The product is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic current emission (IEC61000-3-2)	Class A	
Voltage variations, voltage fluctuations and flicker (IEC61000-3-3)	Complies	

b. Magnetic and electromagnetic immunity




The product is intended for use in the electromagnetic environment specified below. It is up to the customer or the user to verify that the instrument is used in this environment.

IMMUNITY TEST	TEST LEVEL IEC 60601	COMPLIANCE LEVEL	ELECTROMAGNETIC ENVIRONMENT – GUIDELINES
Electrostatic discharge (ESD) (IEC61000-4-2)	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transients and bursts (IEC61000-4-4)	± 2 kV for power supply lines ± 1 kV for the signal ports	± 2 kV for power supply lines ± 1 kV for the signal ports	Mains power quality should be that of a typical commercial or hospital environment
Surge (IEC61000-4-5)	± 1 kV lines to lines ± 2 kV lines to earth	± 1 kV lines to lines ± 2 kV lines to earth	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60Hz) magnetic field (IEC61000-4-8)	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment
Voltage dips, short interruptions and voltage variations (IEC61000-4-11)	< 5% U_T (>95% dip in U_T) For 0.5 cycles 40% in U_T (60% dip in U_T) For 5 cycles	< 5% U_T (>95% dip in U_T) For 0.5 cycles 40% in U_T (60% dip in U_T) For 5 cycles	Mains power quality should be that of a typical commercial or hospital environment. If the user of the product requires continued operation during power mains interruptions, it is recommended

	70% in U_T (30% dip in U_T) For 25 cycles 5% in U_T (>95% dip in U_T) For 5 cycles	70% in U_T (30% dip in U_T) For 25 cycles 5% in U_T (>95% dip in U_T) For 5 cycles	that the product be powered from an uninterruptible power supply or a battery.
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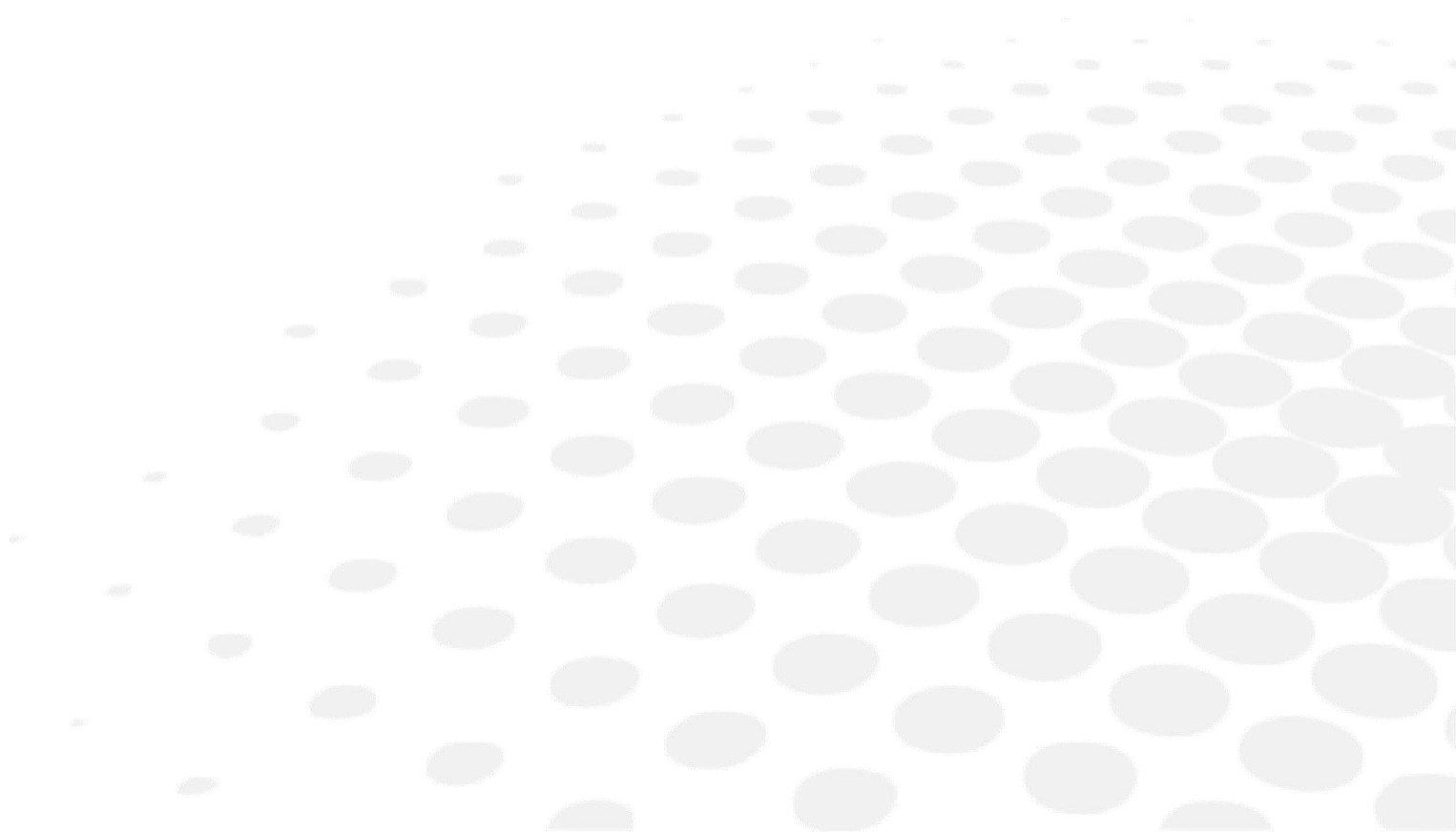
U_T is the AC mains voltage before applying the test level.

EMISSIONS TEST	IEC 60601 T _{EST} LEVEL	COMPLIANCE	ELECTROMAGNETIC ENVIRONMENT – GUIDELINES
Conducted RF (IEC 61000-4-6) Radiated RF (IEC 61000-4-3)	3vrms 150kHz to 80mhz 3vrms 80mhz to 2.5GHz	V1=3V E1=3V/m	Portable and mobile RF communication equipment should be used no closer to any part of the slit lamp, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance. $d=1,167\sqrt{P}$ $d=1,167\sqrt{P}$ 80 MHz to 800 MHz $d=2,333\sqrt{P}$ 800 MHz to 2,5 GHz Where p is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m) Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol :  .

c. Recommended separation distances between portable and mobile RF communications equipment

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150kHz to 80 MHz $d=1,167\sqrt{P}$	80MHz to 800MHz $d=1,167\sqrt{P}$	800MHz to 2.5GHz $d=2,333\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.73
1	1.2	1.2	2.3
10	3.7	3.7	7.3
100	12	12	23

VIII. TROUBLESHOOTING



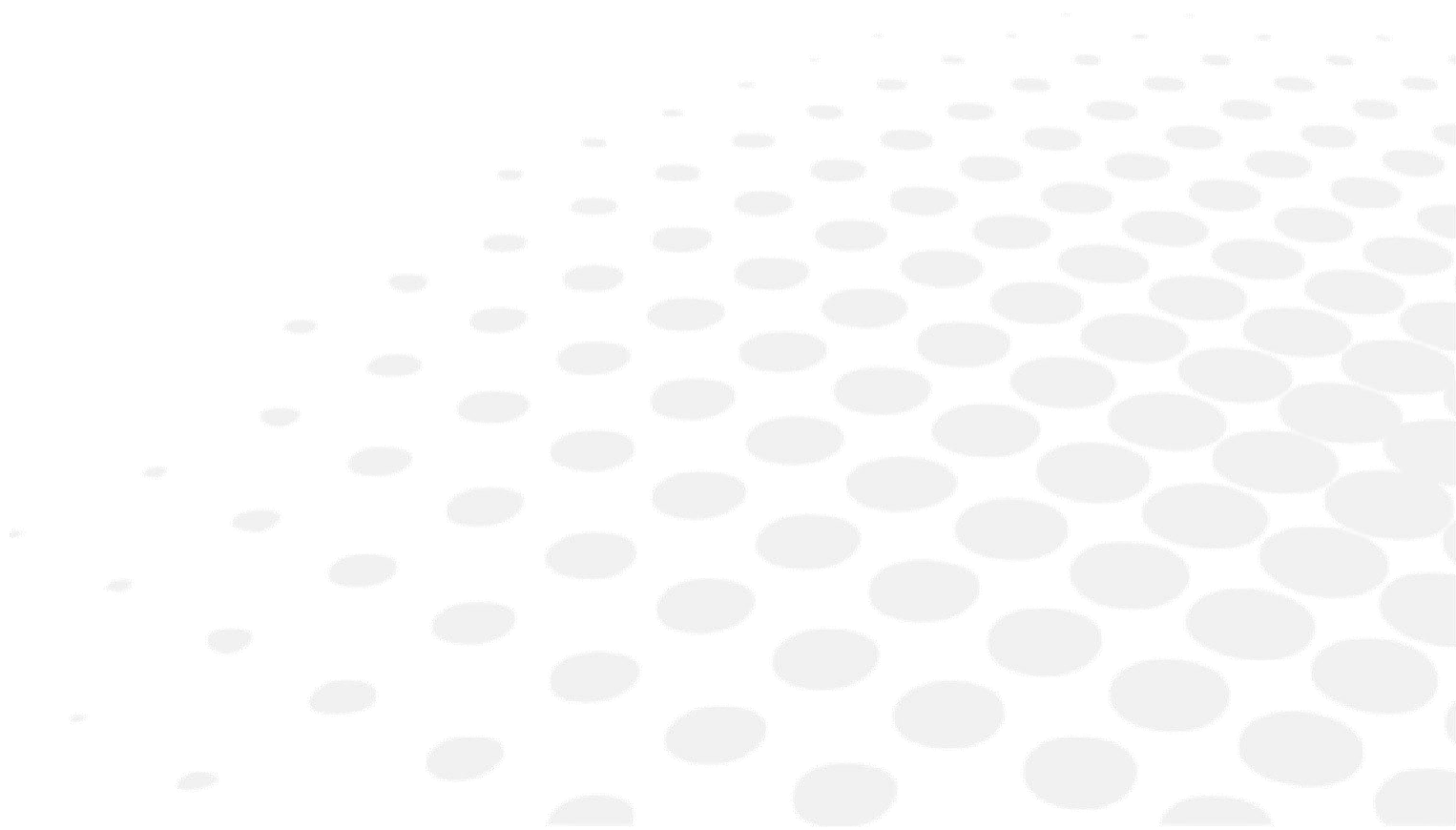
If a problem is detected, refer to the table below in order to take the appropriate measures.

SYMPTOMS	CAUSES AND MEASUREMENTS
No illumination	<ul style="list-style-type: none"> • The cable isn't connected correctly with the power socket Connect the power cable correctly • The plug on the power box is loosen or 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 minimum Set the brightness adjustment knob •
Slit is too dark	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Voltage selector is 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	<ul style="list-style-type: none"> • The slit width control knob is too loose Adjust the tightness of the control knob
Fixation bulb is off	<ul style="list-style-type: none"> • The output plug is loose Insert the output plug firmly

If the problem has not been resolved after taking the measures listed above, contact your local distributor immediately.

Your dealer has been trained by Essilor.

IX. MAINTENANCE



1. Storage and handling condition



Respect the operating, storage and transport conditions noted below.
Avoid condensation conditions.

	Temperature	Humidity	Atmospheric pressure
Use	[5°C ; 40°C]	≤ 90%	[800hPa ~ 1060hPa]
Storage	[-40°C ; 55°C]	≤ 90%	[800hPa ~ 1060hPa]
Transport	[-40°C ; 55°C]	≤ 90%	[800hPa ~ 1060hPa]

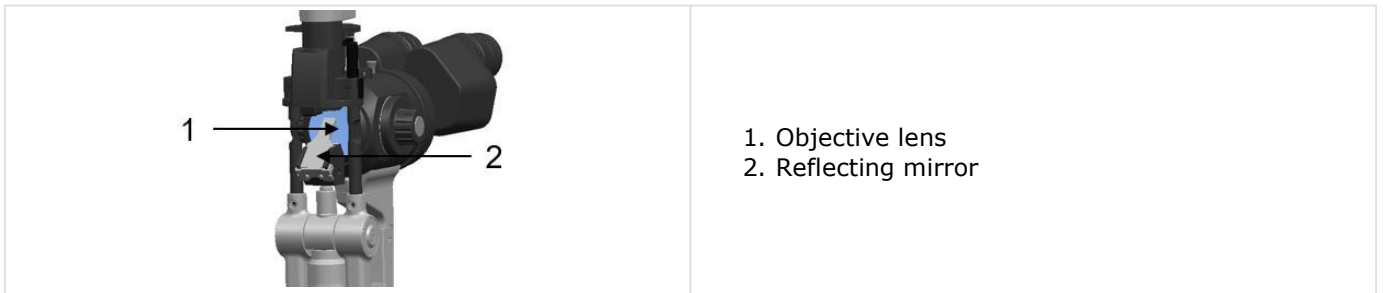
2. Cleaning



The replaced waste materials should be treated as industrial, rubbish.

a. Lens and reflecting mirror

If there is any dust on the lenses or reflecting mirror, wipe it off with soft cotton dipped in absolute alcohol.



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

b. Sliding pad, rails and shaft

Clean these parts with clean soft cloth regularly to ensure the stable movement of slit lamp.



c. Cleaning and disinfecting the plastic parts

Clean the plastic parts such as chinrest bracket, forehead rest* belt with soft cloth dipped in soluble detergent or water, and then disinfect these parts with medicinal alcohol.



Do not wipe with any abrasive cleaner to avoid damaging the surface.

*: Applied part

d. Cleaning cycle

The slit lamp microscope should be used in a relatively clean environment, and the main parts that need to be cleaned are as specified in the user manual.

In order to ensure the normal use and observation of the slit lamp, the cleaning should be carried out regularly. The cleaning cycle is recommended as follows:

1. For the eyepiece area, lens and mirror parts:

Cycle: It is recommended to do it every 2 months.

Since the surface of the lens and the mirror is coated with an anti-reflection film and a reflective film, although the coating is sufficiently strong, frequent wiping tends to cause damage to the film, thereby affecting the optical effect of observation. This cycle is only a suggestion. If there is a lot of dust adhering to the lens that has affected the quality of the observation, it is recommended to clean it immediately according to the prescribed method.

2. For the rails, shaft and the pad:

Cycle: It is recommended to do it once every month.

The use of slit lamps in a relatively clean environment in a hospital does not cause the sliding pad, rails and shafts. They will not need to clean in a short period of time (within 1 year), nor does it affect the horizontal and vertical movement of the moving base. However, we recommend that you clean the above parts with a clean soft cloth every 6 months for better positioning and positioning.

3. For chinrest, plastic parts such as headrest straps:

Cycle: It is recommended to do it once a day.

These two parts are the parts that are in frequent contact with the inspected person. They should be cleaned and disinfected in time. The cleaning and disinfection cycle is only our recommendation. A new chin-rest paper should be replaced when inspecting each of the inspectors. The headrest strap area should also be cleaned. Both parts should be cleaned and disinfected daily before the first use.

4. For the whole device

Cycle: It is recommended to do it every 2 months.

5. Product Life cycle

The slit lamp has a life cycle of 4 years.

3. Periodical inspection and maintenance

It required that the slit lamp should be stored and used in a clean environment. For prolong the service life of the instrument please clean it regularly per as suggestions below.

1. Clean the eyepieces, objective lens and reflecting mirror:

Cycle: suggested once per two months.

The lenses and mirror are coated with anti-reflection coating and the reflective film. Although the coating is strong enough, frequent wipe will lead to damage to the film, and thus affect the observed optical effect.

2. Cleaning the slide pad, rails and shaft:

Cycle: suggested once per month.

Usually, these parts won't get dirty in normal use. We suggest cleaning these parts once per 6 months for getting smoother movement experience.

3. Cleaning the plastic parts:

Cycle: suggested once per day

These two parts contact with the patients directly, so please clean and disinfect these two parts timely. Replace a piece of new and clean chinrest paper for each patient.

4. Cleaning the whole machine:

Cycle: suggested once per two months.

Life cycle of the slit lamp: 4 years.

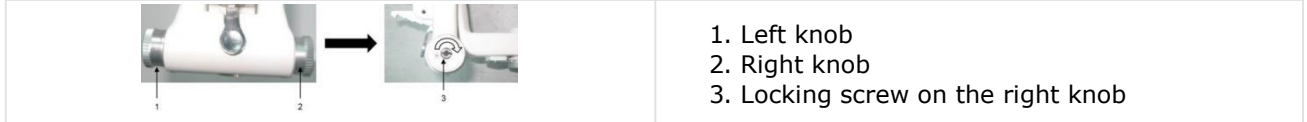
a. Protection

There are always 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 the instrument would be damaged. Take off the cap when the focus test bar needs to be assembled.



b. How to adjust the slit width of the control knob

- 1 If the slit width control knob is too loose, the slit width may be out of control. Fasten the locking screw on right side clockwise with a hexagon type screw driver.



- 2 Rotate the locking screw with a hexagon type screw driver.

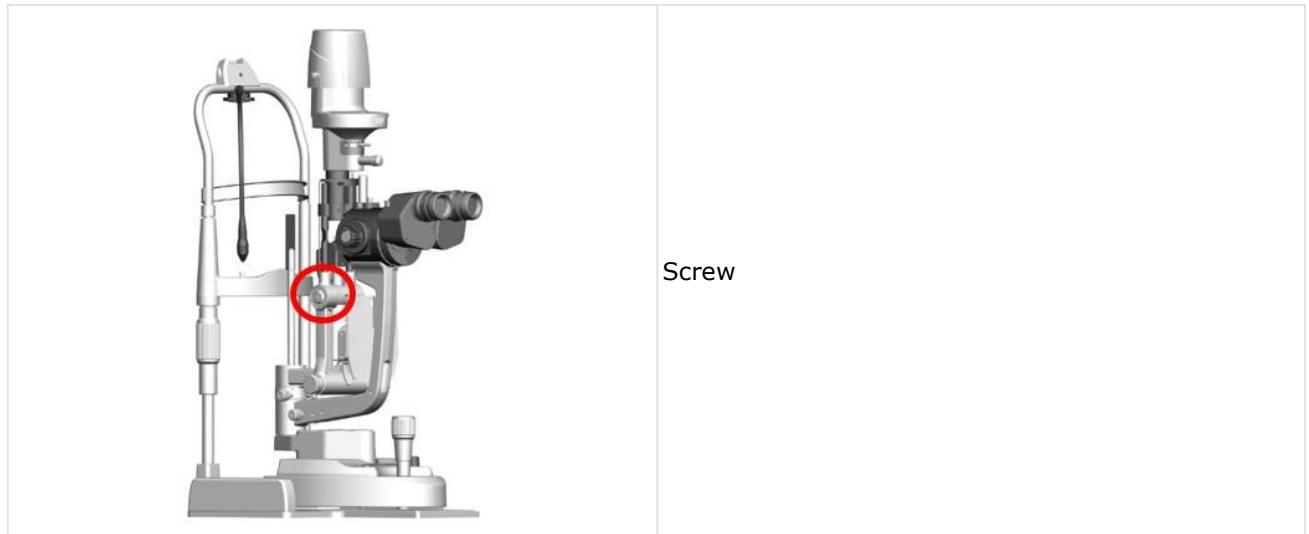


If:

- The knob is too loose, adjust the screw clockwise.
- The knob is too tight, rotate the screw anticlockwise till the knob is comfortable to use.

c. How to adjust the inclination of the illumination part

- 1 If the inclination mechanism of the illumination part is too loose, fasten the screw on both sides of the pivot point with the screw driver.

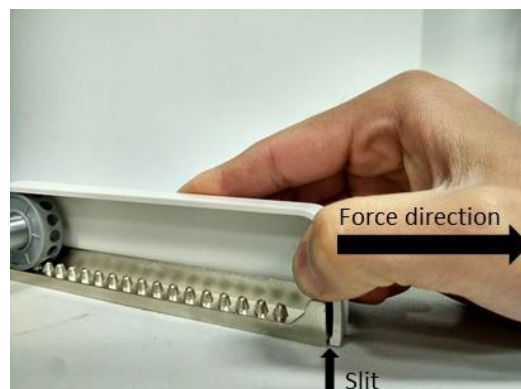


d. How to replace the rail cover

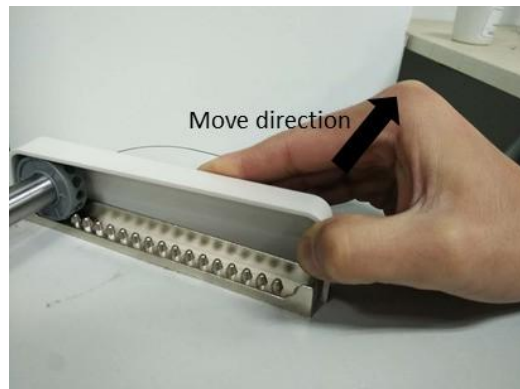
- 1 Place your hand on the rail cover.



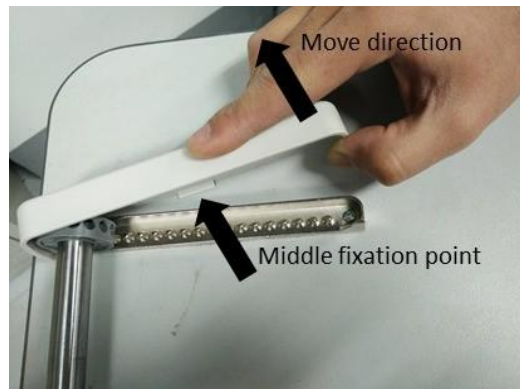
- 2 Pull the rail cover outwards to see an obvious gap.



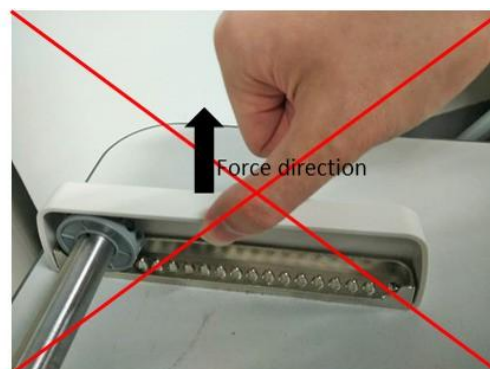
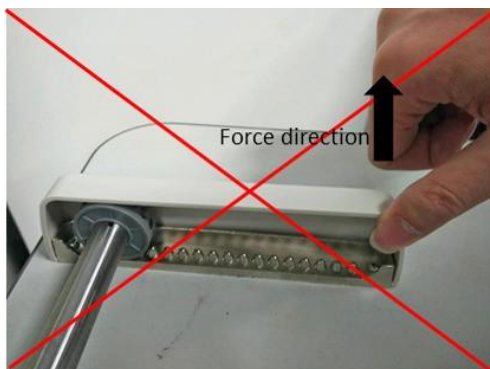
- 3 Move the rail cover in the direction of the arrow shown.



- 4 If the mid cover area is detached, the disassembly is successful.

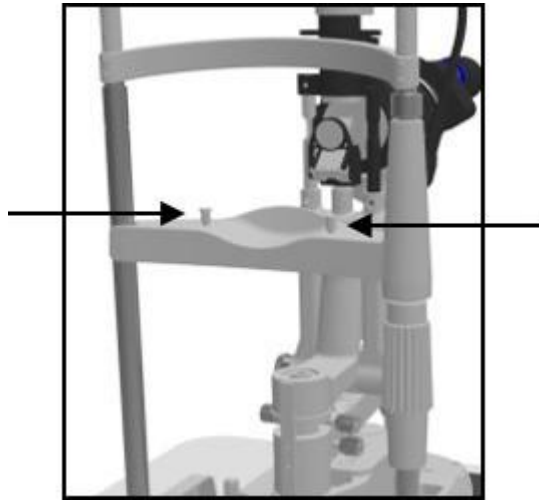


Don't



e. How to replace the chinrest paper

- 1 Remove the two fixation bolts and place the new papers.



4. Disassembly of the product and transport

Do not disassemble or attempt to perform operations that are not described in this instruction manual. If the operation is not performed properly, excessive force may cause damage to the machine or personal injury. If the instrument fails, please read the troubleshooting guide carefully; follow the troubleshooting methods and steps to troubleshoot the problem; if the problems remain unsolved, please contact our Manufacturer and Service Department, and our company will arrange professional maintenance personnel to help you troubleshoot.

5. Disposal



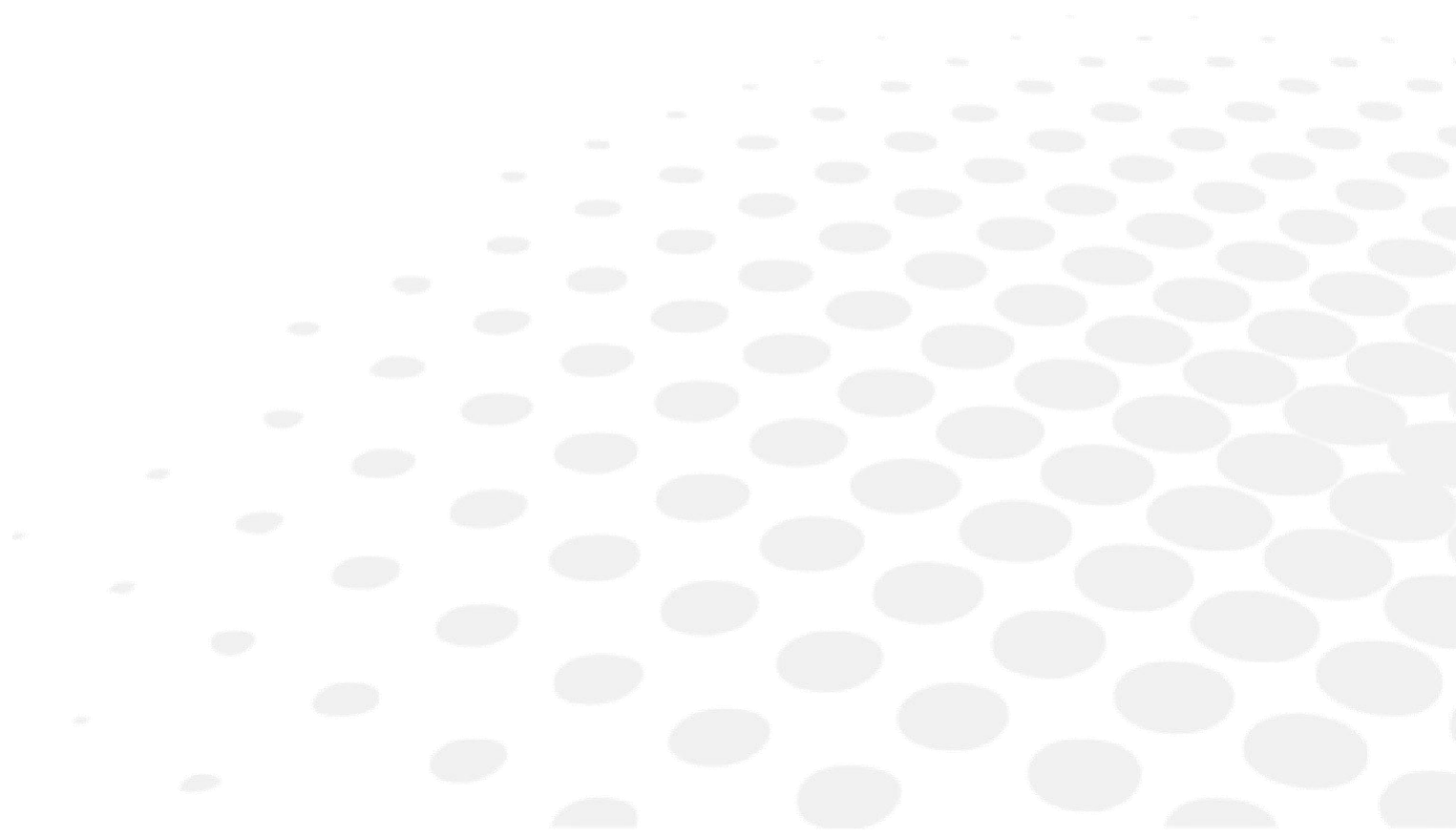
Instructions for the disposal of the instrument in accordance with Directives 2012/19/EU and 2011/65/EU regarding the limitation of dangerous substances in electrical and electronic equipment and the disposal of electrical and electronic waste.

When it reaches the end of its lifetime, the instrument should not be thrown out with the household refuse. It can be disposed of at a waste management center operated by the municipality or the retailers who offer this service.

The separate disposal of an electrical device avoids any damage to the environment or health that could result from a non-compliant disposal, and also allows the materials it is composed of to be recycled in order to save energy and resources.

The pictogram of the wheeled container appears on the label of the instrument. It indicates the obligation for separate collection and disposal of end-of-life/out-of-use electrical and electronic equipment.

X. SPECIFICATIONS



1. Technical data

The expected life of the device and its components is 8 years.

Microscope

- Type: Galilean type
- Magnification change: Five Magnifications
- Eyepieces: 12.5X
- Angle between eyepieces: 10°
- Total magnification ratio: 6.3X, 10X, 16X, 25X, 40X
- Pupillary adjustment: 52 mm ~ 80 mm
- Diopter adjustment: -8D +8D
- Field of view: 40X (5.7 mm), 25X (8.9 mm), 16X (14 mm), 10X (22.3 mm), 6.3X (36.2 mm)
- Slit width: Continuously variable from 0 to 14 mm (at 14 mm, slit becomes a circle)
- Slit length: Continuously variable from 1 mm to 14 mm
- Aperture diameters: \varnothing 14 mm, \varnothing 10 mm, \varnothing 5 mm, \varnothing 3 mm, \varnothing 2 mm, \varnothing 1 mm, \varnothing 0.2
- mmSlit angle: 0° - 180° (Adjustable both vertical and horizontal)
- Slit inclination: 4 steps: 5°, 10°, 15°, 20°
- Filters: Heat-absorbing filter, ND filter, Red-free, Cobalt blue filter, Build-in Yellow Filter
- Lamp: 3V / 3W LED module
- Luminance: 150 Klx


Base

- Longitudinal movement: 115 mm
- Lateral movement: 110 mm
- Vertical movement: 30 mm
- Fine base movement: 15mm

Chinrest

- Vertical movement: 80 mm

Power

- Input: 100~240V, 50/60Hz
Rated current: 1.2A
- Output :
 - Lamp: 3V
 - Fixation: 15V  20mA

Dimension and weight

- Dimension: 770 mm x 470 mm x 570 mm
- Gross weight: 26kg
- Net weight: 18 kg

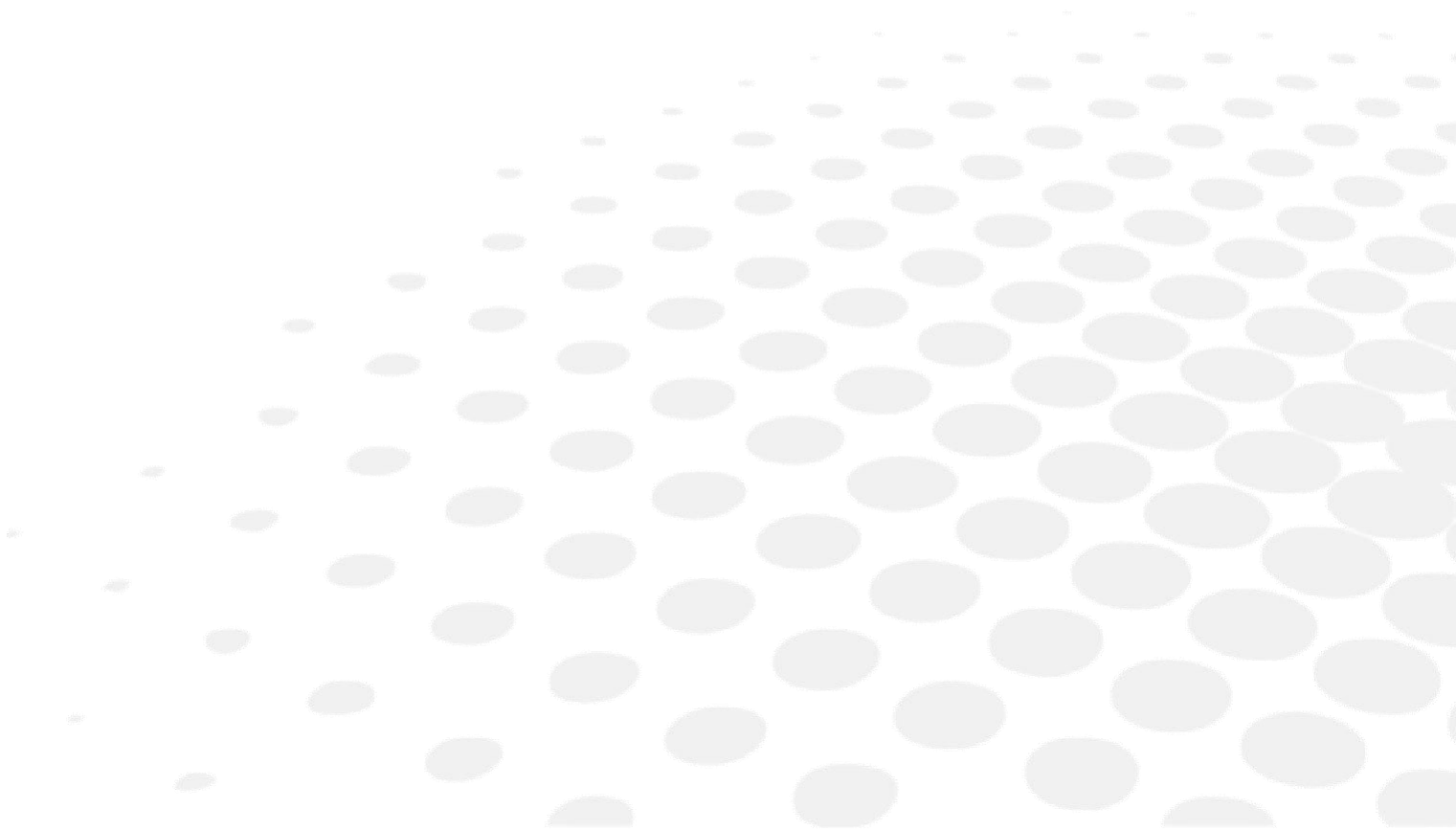
2. It requirements

This section is not applicable.

3. Connectivity to other devices

This section is not applicable.

XI. QR CODE



User manual in the appropriate language is available on a web space. Upon request, a paper version can be provided for free.



The complete user manual is available on a web space. To access it, please scan the QR code below using a dedicated application.



Le manuel utilisateur complet est disponible sur un espace web. Pour y accéder veuillez scanner le QR code ci-dessous à l'aide d'une application dédiée.



Die vollständige Bedienungsanleitung ist auf einem Speicherplatz verfügbar. Für den Zugriff darauf scannen Sie bitte untenstehenden QR-Code mittels einer dafür vorgesehenen Anwendung.



O manual do usuário completo está disponível na área web do cliente. Para acessar, escaneie o código QR abaixo usando o aplicativo respectivo.



Пълното ръководство за потребителя е достъпно на уеб пространство. За достъп, моля, сканирайте QR кода по-долу с помощта на специално предназначено приложение.



Potpuni korisnički priručnik dostupan je na webu. Da biste mu pristupili, skenirajte QR-kod u nastavku namjenskom aplikacijom.



Den komplette brugermanual findes på et websted. Du får adgang til den ved at scanne QR-koden nedenfor ved hjælp af en dertil beregnet applikation.



El manual de uso completo está disponible en la web. Para acceder, escanee el código QR que se encuentra a continuación con la ayuda de una aplicación.



Täielik kasutusjuhend on saadaval veebis. Juurdepääsuks palun skannige allolevat QR-koodi, kasutades selleks spetsiaalset rakendust.



Täydellinen käyttöohje on käytettävissä verkossa. Avaa käyttöohje skannaamalla QR-koodi asianmukaisella sovelluksella.



Το πλήρες εγχειρίδιο χρήσης διατίθεται σε έναν ιστοχώρο. Για να μεταβείτε σε αυτόν, σαρώστε τον παρακάτω κωδικό QR μέσω μιας ειδικής εφαρμογής.



A teljes használati útmutató megtalálható a webes felületen. A hozzáféréshez, kérjük, olvassa le a lenti QR-kódot a megfelelő alkalmazás használatával.



Il manuale utente completo è disponibile su uno spazio Web. Per accedervi, scansionare il codice QR seguente mediante un'applicazione dedicata.



Pilnā lietotāja instrukcija ir pieejama tīmeklī. Lai tai piekļūtu, lūdzu, noskenējiet tālāk redzamo QR kodu, izmantojot tam paredzētu lietojumprogrammu.



Den komplette brukerhåndboken er tilgjengelig på et webområde. For å få tilgang, må du skanne QR-koden nedenfor ved hjelp av en dedikert applikasjon.



De volledige gebruikershandleiding is beschikbaar op een website. U kunt de handleiding bereiken door de QR-code hiernaast te scannen met een geschikte applicatie.



Kompletna instrukcja użytkownika jest dostępna na stronie internetowej. Aby uzyskać do niej dostęp, zeskanuj poniższy kod QR przy użyciu dedykowanej aplikacji.



O manual do utilizador completo está disponível num espaço web. Para aceder, queira digitalizar o QR code seguinte com a ajuda de uma aplicação dedicada.



Celá uživatelská příručka je k dispozici na webu. Pro přístup k ní oskenujte níže uvedený QR kód pomocí specializované aplikace.



Versiunea integrală a manualului de utilizare este disponibilă pe un site web. Pentru a-l accesa, scanați codul QR de mai jos cu ajutorul unei aplicații dedicate.



Полное руководство пользователя доступно в Интернете. Для доступа просканируйте приведенный ниже QR-код с помощью специального приложения.



Potpuno korisničko uputstvo je dostupno na webu. Da biste mu pristupili, skenirajte QR kôd u nastavku pomoću namenske aplikacije.



Celý používateľský manuál je dostupný na internete. Aby ste sa k nemu dostali, naskenujte QR kód nižšie pomocou na to určenej aplikácie.



Celoten uporabniški priročnik je na voljo na spletnem mestu. Za dostop do njega skenirajte spodnjo kodo QR z uporabo namenske aplikacije.



Den fullständiga handboken finns på en plats på Internet. Skanna QR-koden nedan med en lämplig app för att få åtkomst till den.



Із-samaus naudotojo vadovo ieškokite interneto svetainėje. Kad ji atvertumėte, specialia programėle nuskaitykite toliau pateiktą QR kodą.



Повне керівництво користувача доступно в Інтернеті. Для доступу проскануйте наведений нижче QR-код за допомогою спеціального додатку.



มีคู่มือผู้ใช้ฉบับสมบูรณ์อยู่ในพื้นที่เว็บ เพื่อเข้าถึงข้อมูล กรุณาสแกนรหัส QR ด้านล่างนี้โดยใช้แอปพลิเคชันเฉพาะงาน



可通过网络空间访问操作手册全文。如需访问该空间，请使用专用应用程序扫描QR码。



완전한 사용자 매뉴얼이 웹사이트에 있습니다. 전용 앱을 사용해 아래의 QR 코드를 스캔하면 접근할 수 있습니다.



ユーザーマニュアル完全版はウェブサイト内で閲覧いただけます。そちらにアクセスするには、専用アプリケーションを使用して以下のQRコードをスキャンしてください。



Panduan pengguna yang lengkap tersedia di halaman web. Untuk mengaksesnya, silakan pindai kode QR berikut menggunakan aplikasi khusus.



Manual pengguna yang lengkap boleh didapati di ruangan web. Untuk akses, sila imbas kod QR di bawah menggunakan aplikasi yang berkenaan.



Cẩm nang hướng dẫn sử dụng hoàn chỉnh hiện có trên không gian web. Để truy cập, vui lòng quét mã QR bên dưới bằng ứng dụng chuyên dụng.

إن الدليل الكامل للمستخدم متاح على استضافة ويب. لتتمكن من الوصول إليه، يرجى مسح رمز الاستجابة السريعة أدناه باستخدام تطبيق مخصص لذلك الأدبية العربية



Kullanma kılavuzunun tamamı internette bulunmaktadır. Kılavuza erişmek için, QR kodunu uygun bir uygulama kullanarak taratınız.



Поўная інструкцыя карыстальніка даступна ў інтэрнэт-прасторы. Каб атрымаць доступ, адсканіруйце QR-код ніжэй пры дапамозе спецыяльнай праграмы.





Essilor Instruments USA
8600 W. Catalpa Avenue, Suite 703
Chicago, IL 60656
Phone: 855.393.4647
Email: info@essilorinstrumentsusa.com
www.essilorinstrumentsusa.com