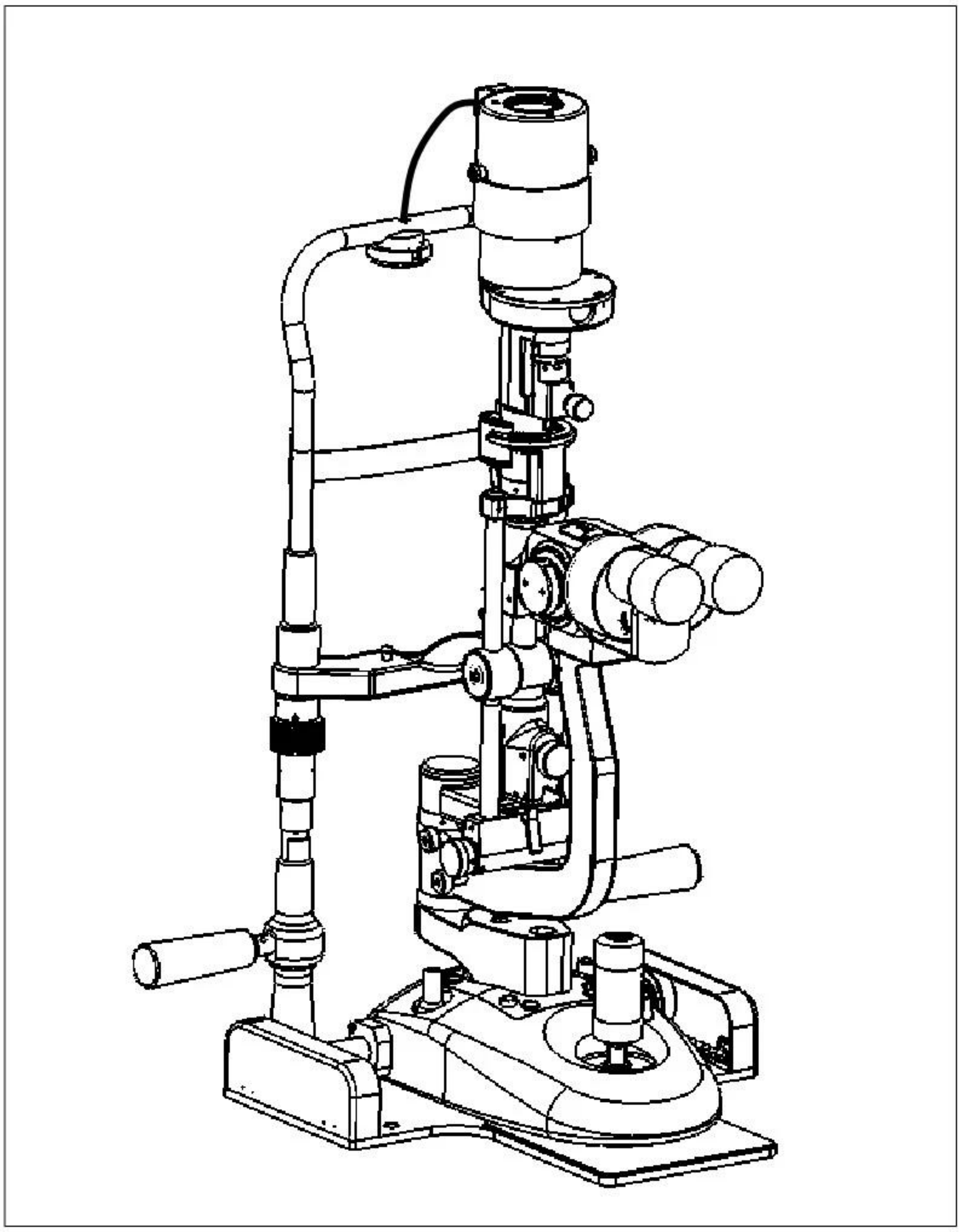
Operation
Maintenance manual

ELI EZER®

SLIT LAMP

Emerald-26/H



CONTENTS

1. Safety

1) SAFETY CONSIDERATIONS

For safer and more effective use of the apparatus, the reader is asked to observe the following points:

General definitions of safety symbols are indicated below.

⚠	Caution
❗	**General mandatory action.**
🚫	**No specific definition given. Denotes general ban or prohibition.**

🚫 At no time attempt to remodel or disassemble this machine.(Damage to the machine or personal injury will result)

🚫 This machine is a precision optical unit, operations must be carried out at all times by experienced, authorized personnel. (Damage to the machine or personal injury will result.)

❗ The power cord must be firmly connected to an electrical ground (safety ground) at the power outlet.(Personal injury may result from electric shock etc.)

🚫 Do not touch the optical parts. (Measurement accuracy will be affected.)

🚫 Always take great care when operating the unit. (Malfunction or damage to the equipment could occur.)

❗ If the machine fails to work properly, the client should not try to repair the fault themselves, but consult their dealer immediately. (Damage to the equipment or personal injury will result. Consult your dealer, if repair work needs to be carried out.)

❗ If a malfunction occurs during operation, immediately cut the power.(Damage to the equipment or personal injury will result. Consult your dealer, if repair work needs to be carried out.)

❗ Never remove the plug from the outlet if your hands are wet. (Electric shock or personal injury could result.)

🚫 Make sure the power cord is not damaged. (Fire or electric shock may occur.)

❗ If the machine is not to be used for some time, remove the plug. (Electric shock, leakage or fire may occur.)

❗ Don't install the machine near from RF communication machine or other relative machines .It will occur the problem of normal operative function of the machine.

Caution

Avoid storage or use of the machine under the following conditions:

1) In an environment where the temperature falls below- 10℃ or exceeds +40℃.
2) Where noxious gasses or air pollutants are present.
3) In steamy or moist environments, especially where condensation forms.
4) Where dust and grit may occur.
5) Where oil fumes or greasy substances are emitted.
6) Where there are atmospheric concentrations of salt.
7) Near gas generation areas and places where dust accumulates.
8) Keep in a secure, stable situation. Do not expose to strong vibrations (areas of seismic activity) and sudden shocks (this includes transportation) etc.
9) Where there is an inclination of more than 10 degrees.
10) Where the voltage from the power source rises or falls sharply during loading.
11) Where fluctuations in the voltage of the power source occurs.
12) In direct contact with sunlight.

Avoid transportation of the machine under the following conditions:

1) Where dust and grit may occur.
2) Where oil fumes or greasy substances are emitted.
3) Keep in a seismic, stable situation. Do not expose to strong vibrations and Sudden shocks, etc.

Make sure the indicator of the voltage selector on the transformer is same voltage from the power source.

Do not use the different fuse and make sure the power is off position and remove the plug from the outlet.

When not in use, the machine should be protected with the provided dust cover.

2) SAFEGUARD SUMMARY

Caution

For safer and more effective use of the apparatus, the reader is asked to observe the following points:

1) The power cord must be firmly connected to an electrical ground (safety ground) at the power outlet.

2) If the machine is not to be used for some time, remove the plug.

3) If a malfunction occurs during operation, immediately cut the power.

4) Never remove the plug from the outlet if your hands are wet.

5) Similarly, if the machine fails to work properly, the client should not try to repair the fault themselves, but consult their dealer immediately.

6) This machine is a precision optical instrument. Handle with care at all times, making sure not to accidentally drop it.

7) When cleaning the chin rest and head rest, use small amount of methyl alcohol on the cotton swab or soft cloth.

8) When you replace AC cable or other parts including accessories stated in this manual, please use specified parts only to avoid any increase of Emissions or decrease of Immunity.

1) Make sure the cords are not damaged.

2) This machine is a precision optical unit, operations must be carried out at all times by experienced. Authorized personnel.

3) Do not touch the optical parts.

4) At no time attempt to remodel or disassemble this machine.

5) Do not touch area around lamp house while light is on or immediately after putting it off. It is extra hot.

6) Do not remove the support racks and pinion covers on the table top while in operation. Even when they are mounted, be careful not to have your fingers caught in.

7) TV pictures may be disturbed by noise caused by this apparatus. Keep the two apart in such a case, or do not use them at the same time.

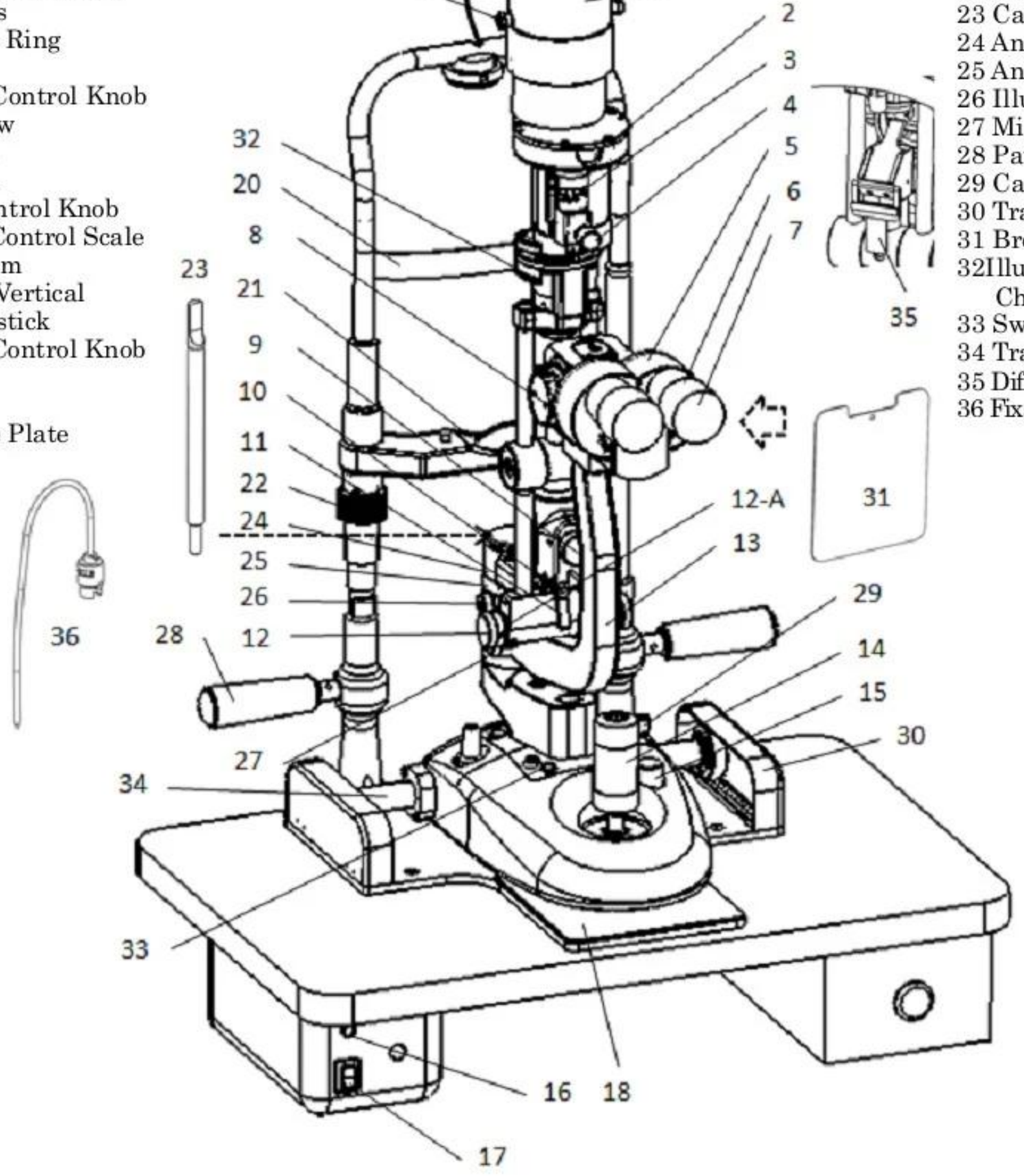
8) Do not use portable, mobile phone and RF communication equipment in the vicinity of the equipment because the radio interference can cause the equipment to malfunction. The effects of radio interference on medical equipment depend on a number of various factors and are therefore entirely unforeseeable.

9) The machine is not adjacent or stacked use with other medical devices.

2. NOMENCLATURE OF Emerald-26/H SLIT LAMP

The Emerald-26/H Slit Lamp provides the practitioner with all the new features required to perform a complete slit lamp examination.

1 Lamp Housing Cover
2 Slit Length Scale
3 Filter Control Lever
4 Slit Rotation Control Lever and slit Length Control Knob
5 Prism Housings
6 Eyepiece Focus Ring
7 Eyepiece
8 Magnification Control Knob
9 Centering Screw
10 Slit Tilt Stops
11 Slit Tilt Latch
12 Slit Width Control Knob
12-A Slit Width Control Scale
13 Microscope Arm
14 Horizontal & Vertical Movement Joystick
15 Illumination Control Knob
16 Pilot Light
17 Power Switch
18 Joystick Glide Plate



19 Lamp Housing Cover Retaining Nuts
20 Headrest
21 Chin-rest
22Control for the chin-rest
23 Calibration Bar
24 Angle Scale Ring
25 Angle Index Ring
26 Illumination Am Lock
27 Microscope Arm Lock
28 Patient Handgrip(option)
29 Carriage Lock
30 Track Cover
31 Breath Shield
32Illumination Field Changing Unit
33 Switch
34 Track Bar
35 Diffuser (Frost glass)
36 Fixation device

Fig.1

Specificatione:

·Parallel tube stereomicroscope

Eyepieces: 12.5X **Variable magnification:** 6X, 10X, 16X, 25X, and 40X **Working distance:** 98mm

Eyepiece focus adjustment: +6D to -6D **P.D.adjustment:** 53-83mm

·Illumination system

Slit length: position 1…0.3, 1.4, 4.2, 5.5, 8.3, 14mm and continuously variable 0.6-14mm
position 2…0.2, 0.8, 2.4, 3.2, 4.8, 8mm and continuously variable 0.3-8mm

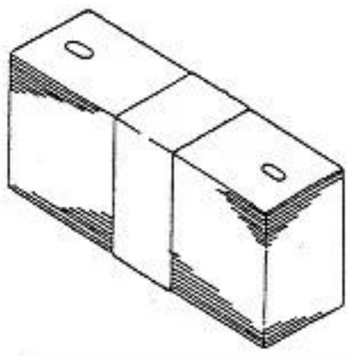
Slit width: position 1…continuously variable from 0-14mm
position 2…continuously variable from 0-8mm

Slit image rotation: 0 - 180° **Slit tilt:** 5, 10, 15, and 20° **Filter disc:** Open, cobalt blue, 50% neutral density, heat absorbing, red-free, yellow

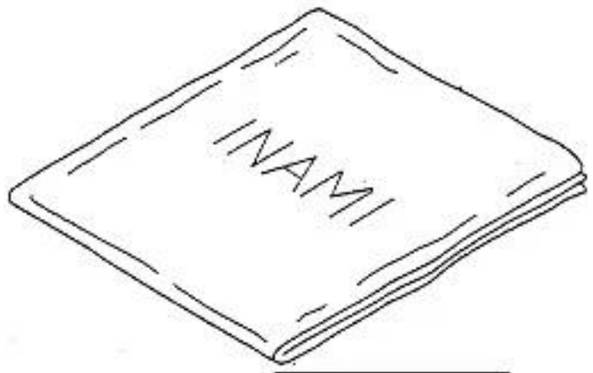
Lamp: 12V, 50W halogen, prefocused (L0160H1)

·Optional accessories: Applanation tonometer, Beam splitter module, Teaching tube with image rotation, 35mm camera adaptor, 35mm Digital video camera beam splitter, CCD TV Camera & adaptor, Patient Handgrip.

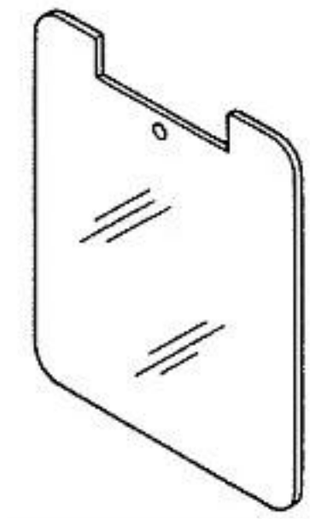
Accessories:



Chin-rest paper

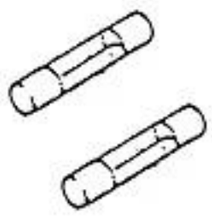


Dust cover

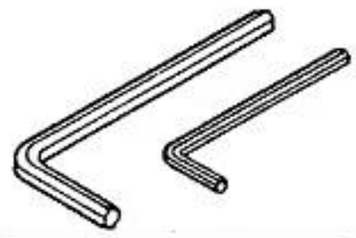


Breath Shield

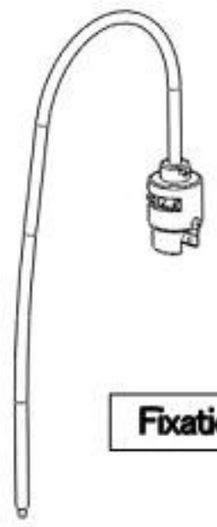
Calibration Bar



Fuse



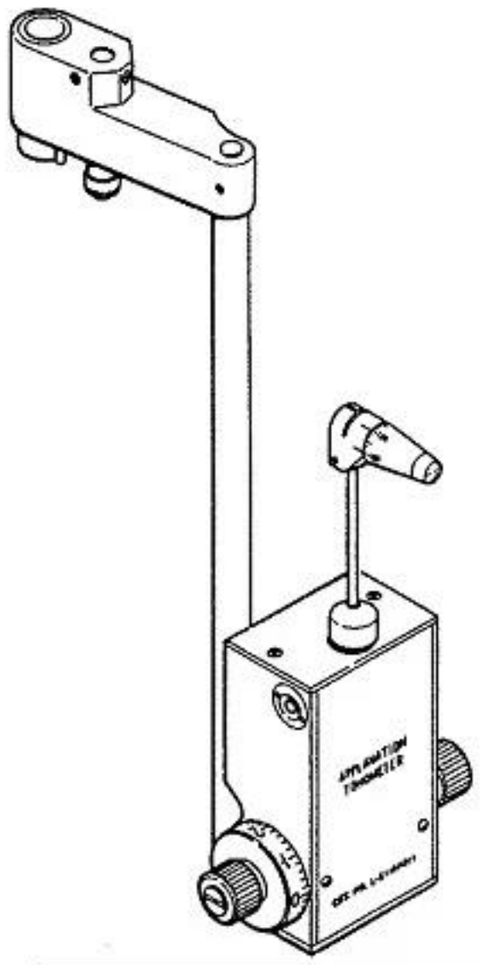
Hexagon wrench



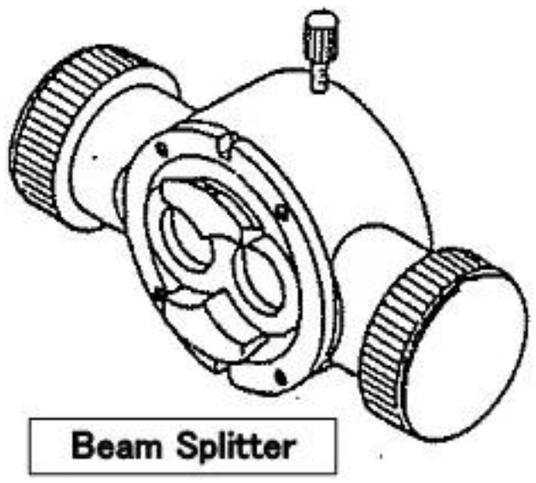
Fixation device

Option:

digital video camera beam splitter



APPLANATION TONOMETER

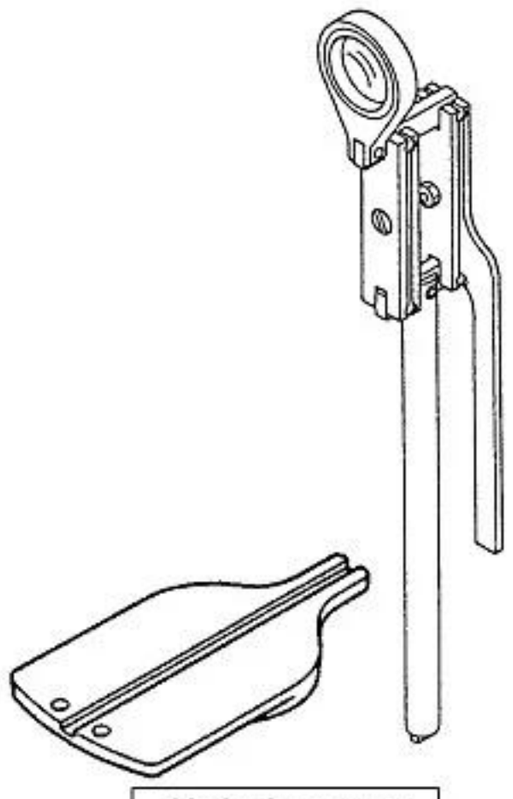


Beam Splitter

USB unit

TV camera adapter

Patient Handgrip



Hruby lens unit

3. UNPACKING AND ASSEMBLY

Slit Lamp is over-packed with a sturdy corrugated cardboard carton.
The lower container holds the tabletop with the attached transformer and accessory drawer.
The accessory drawer contains the following items:

Chinrest papers	Dust cover
Spare fuses	Breath shield
Calibration Bar	Hexagon wrench

The upper container holds the cross-slide instrument base with the microscope mounted on the supporting arm, the illumination unit with its supporting arm, the focusing rod and the fixation device.
Screw the two patient hand grips(option) into the sockets as shown in Fig. 2.

Place the cross-slide instrument base and microscope unit on the tabletop so that the perforated rollers engage the pinned tracks on the tabletop, and the joystick rests on the glide plate. The rollers should engage the same pins on each track. Test the action of the joystick and cross-slide by operating the assembly through its full forward/backward and left/right travels.
Connect the pin plug and receptacle as shown in Figs. 3. Take the pin plugs down under the table as shown in Figs. 4.
Install the track covers 31(Fig. 1) by sliding the cover tabs under the track.
Connect the plugs to the receptacles(No.1 and 2) at the back of the transformer case as shown in Fig. 5. (When you use the digital camera attachment: Emerald-VD , connect the cable to receptacle No.3)
Connect the main power plug to the three pins on the lamp housing cover.
Connect the lamp plugs (black and red) to the black and red receptacles according to color code.
Place the focusing rod in the hole provided in the cross-slide assembly shaft with the flat side of the rod facing the microscope as shovm in Fig.6. Set the illumination system and the microscope perpendicular to the flat surface as shown. Remove the eyepiece and objective lens caps. Turn the instrument on, and while observing a narrow slit image on the rod surface, check the instrument for proper focus and image centration.
Attach the breath shield 32 (Fig. 1) to the microscope arm.

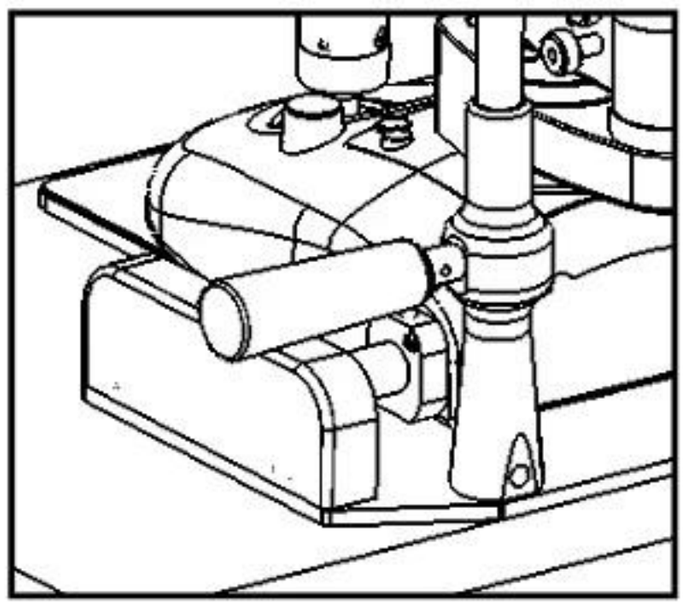


Fig.2 Attaching the Handgrips(option)

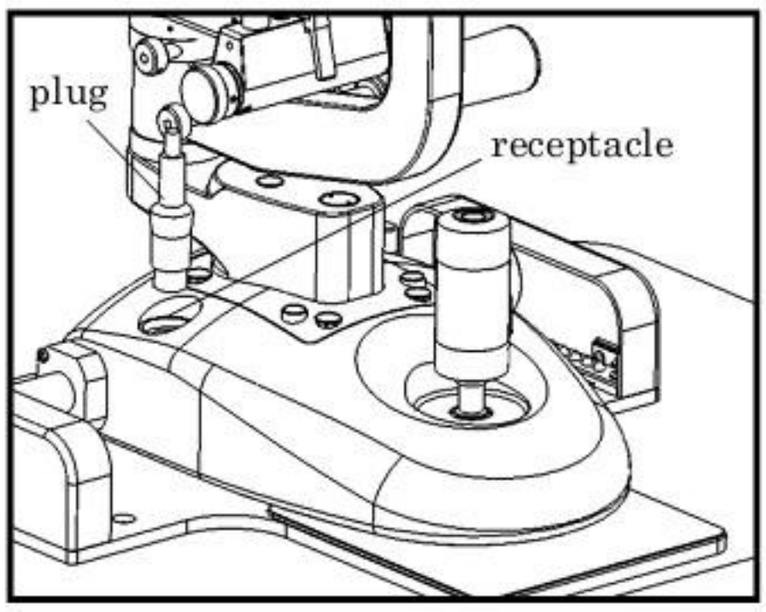


Fig.3 Connecting the one-Pin Plug and Receptacle

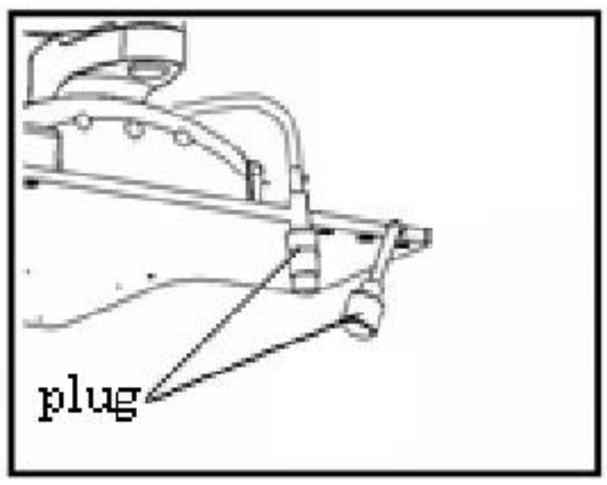


Fig.4 Plug and Receptacle Connected

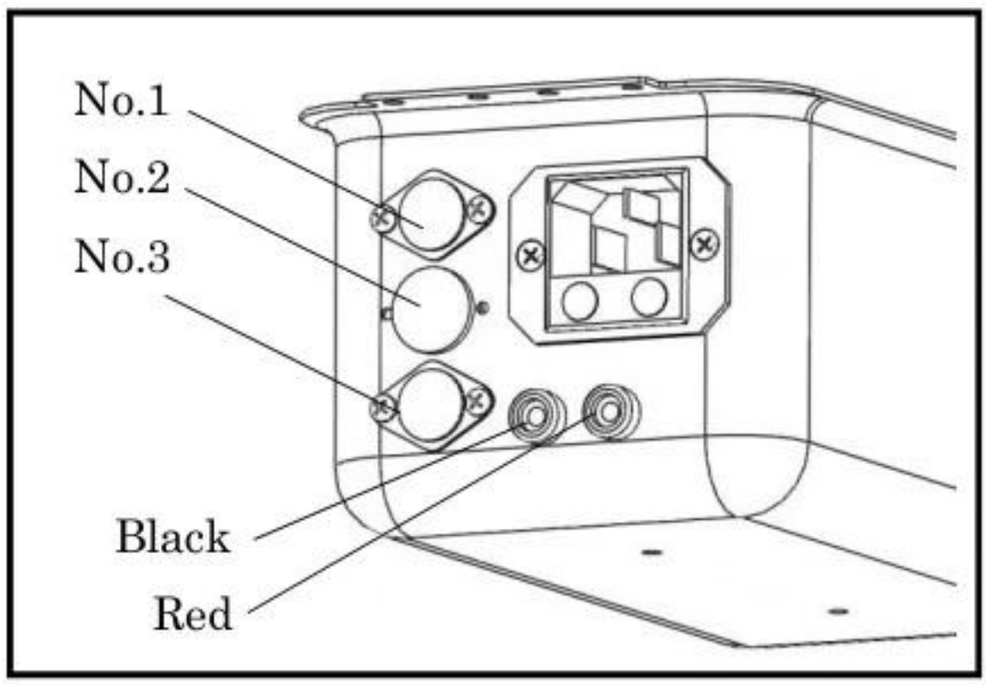


Fig.5 Transformer Case-Rear View

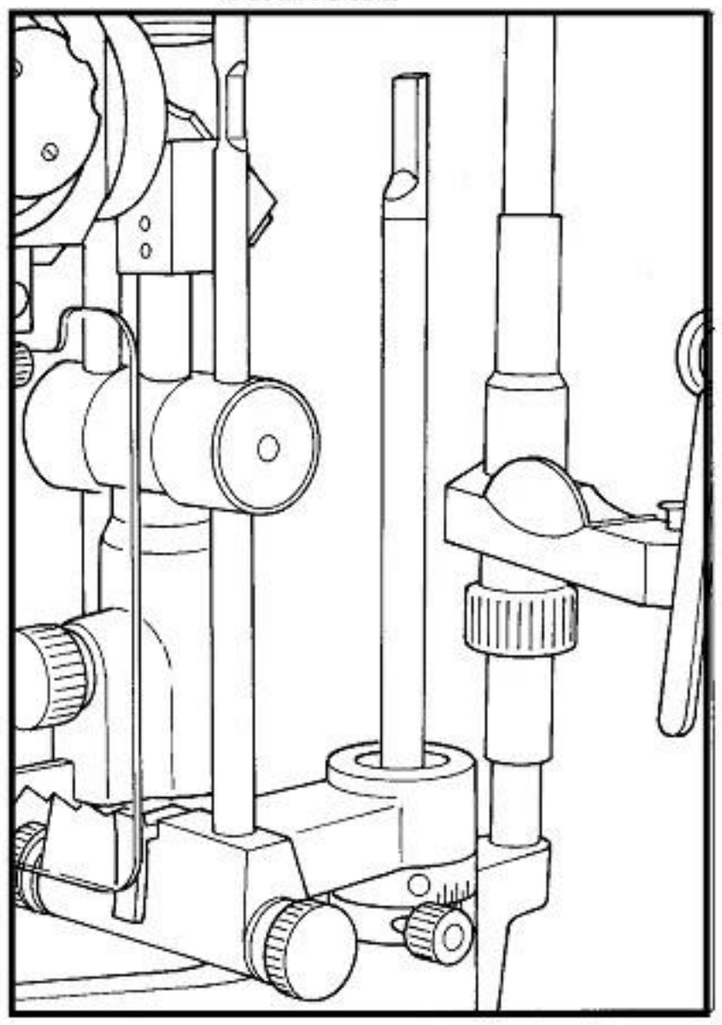


Fig.6 The Focusing Rod in place

4. OPERATION

Adjust the microscope before beginning the examination.
If the user is emmetropic, or is wearing a distance correction, focus the eyepieces at zero by rotating the focusing rings, 6 (Fig. 1), until the index marks coincide with the 0 on the adjacent scales. If the operator is ametropic and is not wearing a correction, set the distance spherical equivalent of the correction for each eye on the scale. If a significant amount of astigmatism is present, the user should wear the distance correction.
Adjust the interpupillary distance by graping the prism housings, 5 (Fig. 1), and rotating them to the correct value according to the scale below the right eyepiece.
Seat the patient facing the headrest and adjust the instrument and/or the chair height so that the patient and the operator are seated comfortably. Have the patient lean forward, resting the forehead on the headrest.
Adjust the chinrest using control, so that the patient's eyes are aligned with the canthus mark.
Move the instrument approximately to the correct position by grasping the joystick, 14(Fig.1), and moving the lamp and microscope together in the required directions. Turn the slit lamp on with the main power switch, 17 (Fig.7). The pilot light, 16, indicates power is on. Regulate the brightness of the illumination with knob 15(Fig.8). Adjust and focus the fixation lamp, 21(Fig.1), to obtain the desired direction of the patient's gaze.
Continue to refine the alignment until the slit image is properly positioned, and is approximately in focus to the unaided eye, by tilting the joystick and rotating for the vertical movement, 14(Fig.1). Obtain final alignment and focus by observation through the microscope.

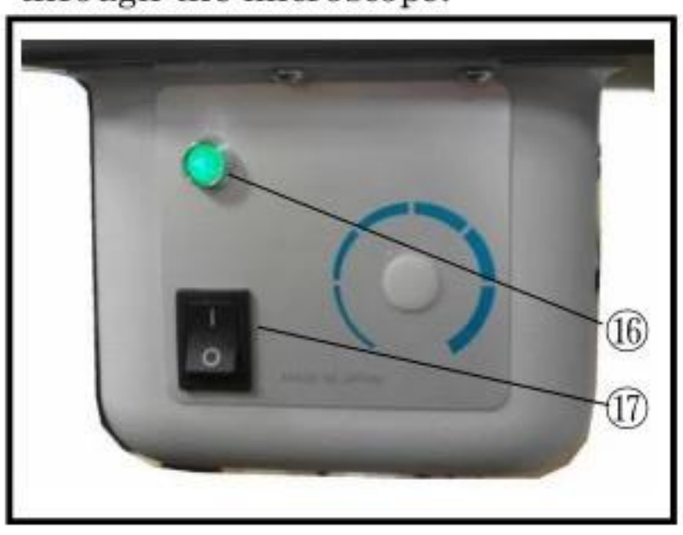


Fig. 7 Transformer
Pilot Light, 16
Main Power Switch, 17

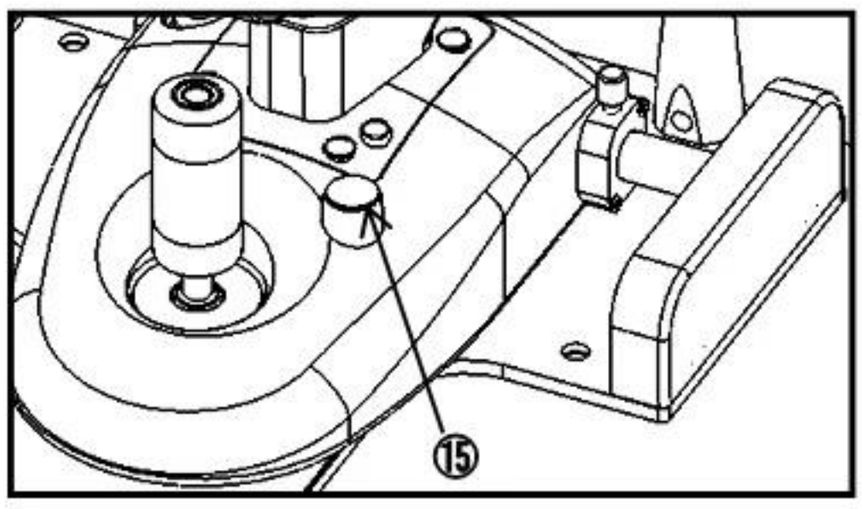


Fig. 8 Illumination Controls
Illumination Knob, 15

Rotate either of the slit width control knobs, 12 (Fig. 9), to vary the slit width. These knobs are also used as handles to rotate the illumination system to the left or right. The angle between the microscope and the illumination system can be adjusted from 0° to 90° on either side. This angle is indicated by a scale, 25 (Fig. 1)
The scale on the left side slit width control indicates the width of the slit, 12-A(Fig. 10).

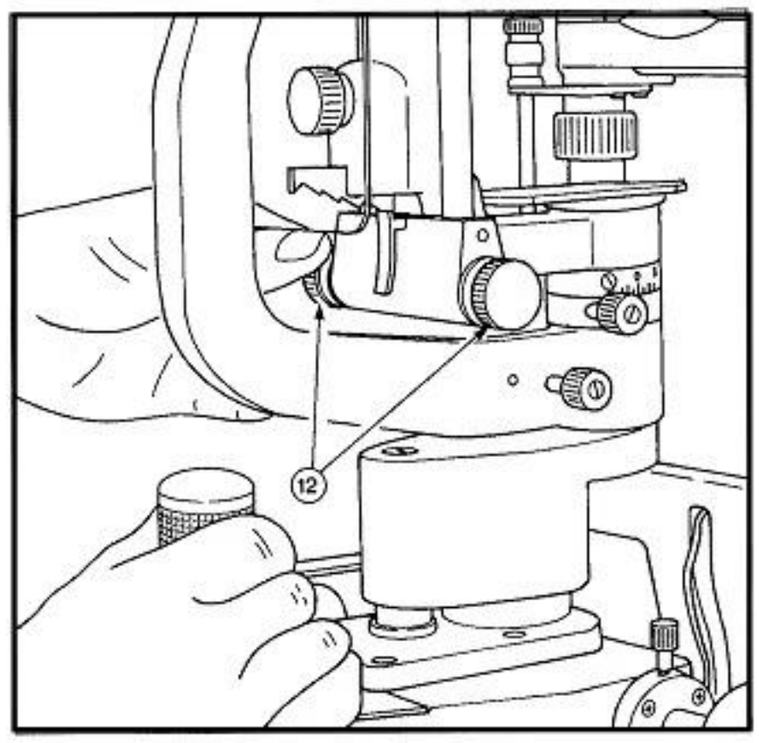


Fig.9 Slit Width Control Knobs, 12

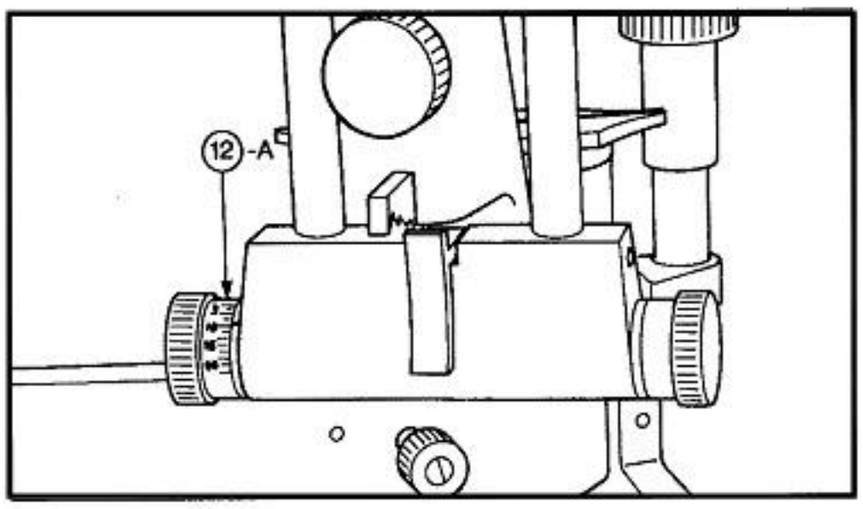


Fig.10 Slit Width Control Scale,12-A

The projected slit can be rotated about the optical axis continuously from vertical to horizontal by pushing the control, 4 (Fig. 11), to the left or right. Slit angles of 45°, 90° and 135° are indicated by click stops.
The illumination system can project an inclined slit image in 5° increments up to 20° below the horizontal.
This is valuable in gonioscopy and fundus examination.

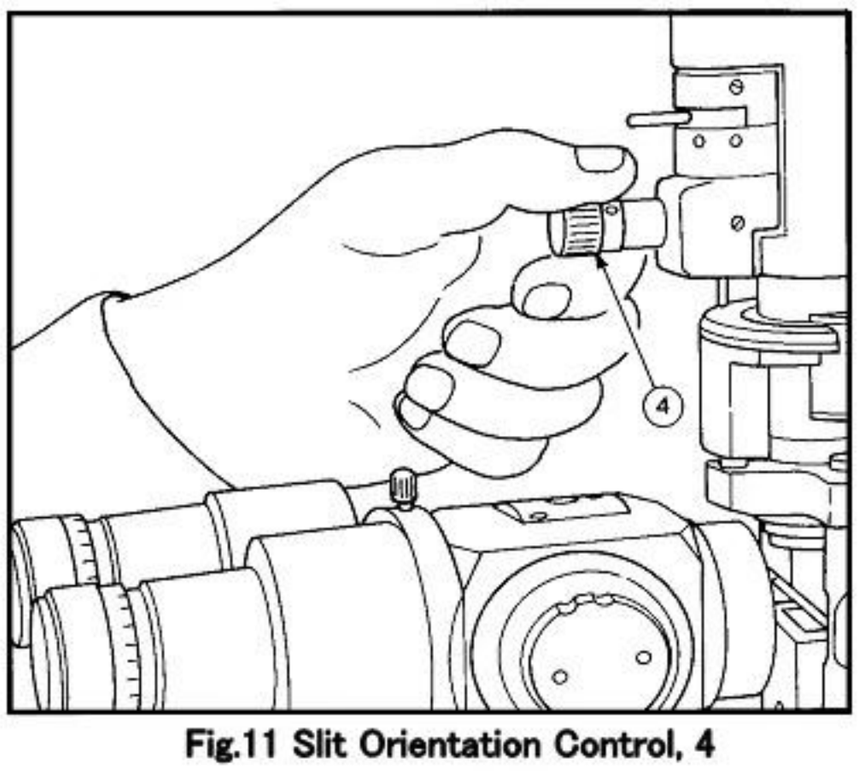


Fig.11 Slit Orientation Control, 4

The system is tilted by depressing latch, 11 (Fig. 12), and pulling the base of the illumination system toward the operator, (Fig. 13). The latch is released to engage the desired tilt stop.

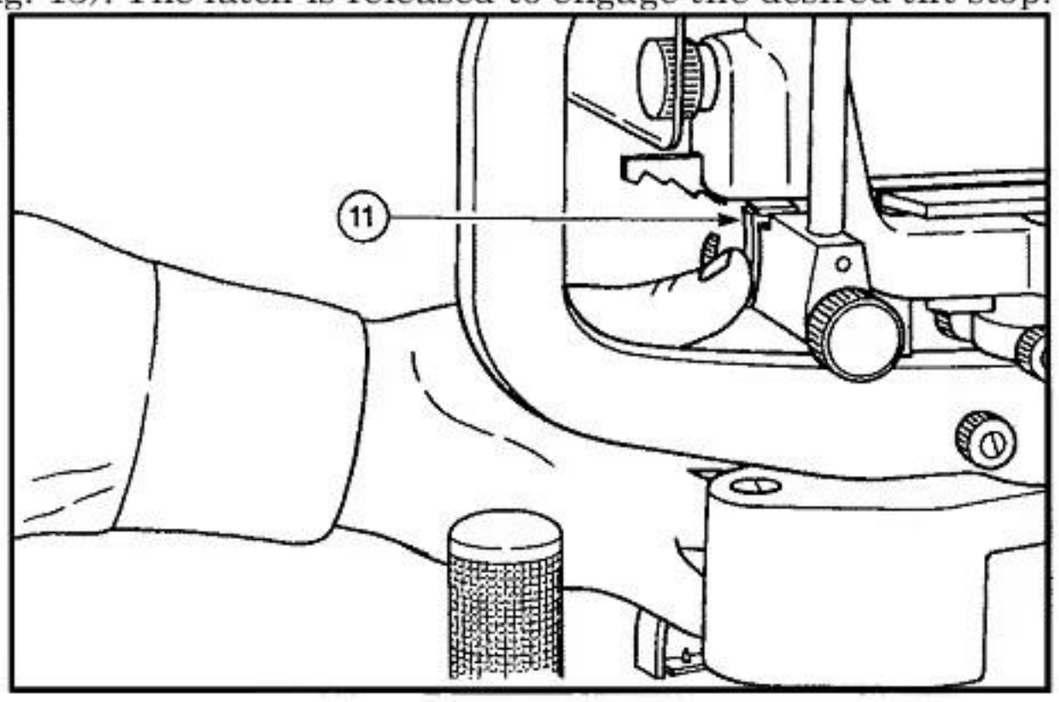


Fig. 12 Tilt Control Latch, 11

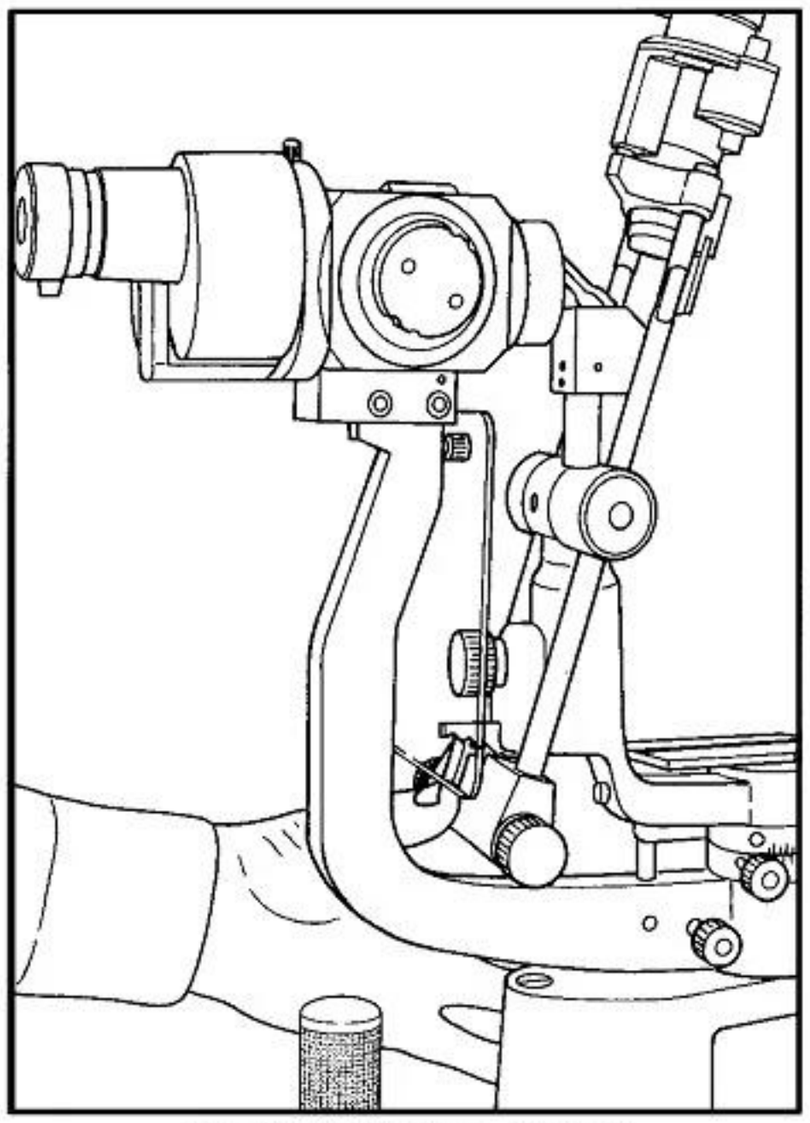


Fig. 13 Tilting the System

The illumination system also contains a filter disc and an aperture disc. The filter disc is controlled by lever 3, (Fig. 14). The filter disc contains filters in the following order:
a yellow filter (for fluorescein examinations), an open aperture, a heat absorbing filter, a 50% neutral density filter and a red free filter. The aperture disc is operated by turning the control knob, 4 (Fig. 14), to adjust the length of the projected slit. Fixed apertures are provided for 10, 6, 4, 3, 1 and 0.2. The aperture disc mount a cobalt filter .Continued rotation of control knob, 4, introduces a wedge-shaped diaphragm for producing continuously variable slit lengths in a range from 0 to 10. The length of the slit is indicated by scale, 2 (Fig. 15). Retrograde illumination, indirect illumination and lateral scanning of the slit can be accomplished by loosening the screw, 9 (Fig. 16), and rotating the illuminating system about its vertical axis. For normal use, the slit image is recentered automatically by tightening the screw.

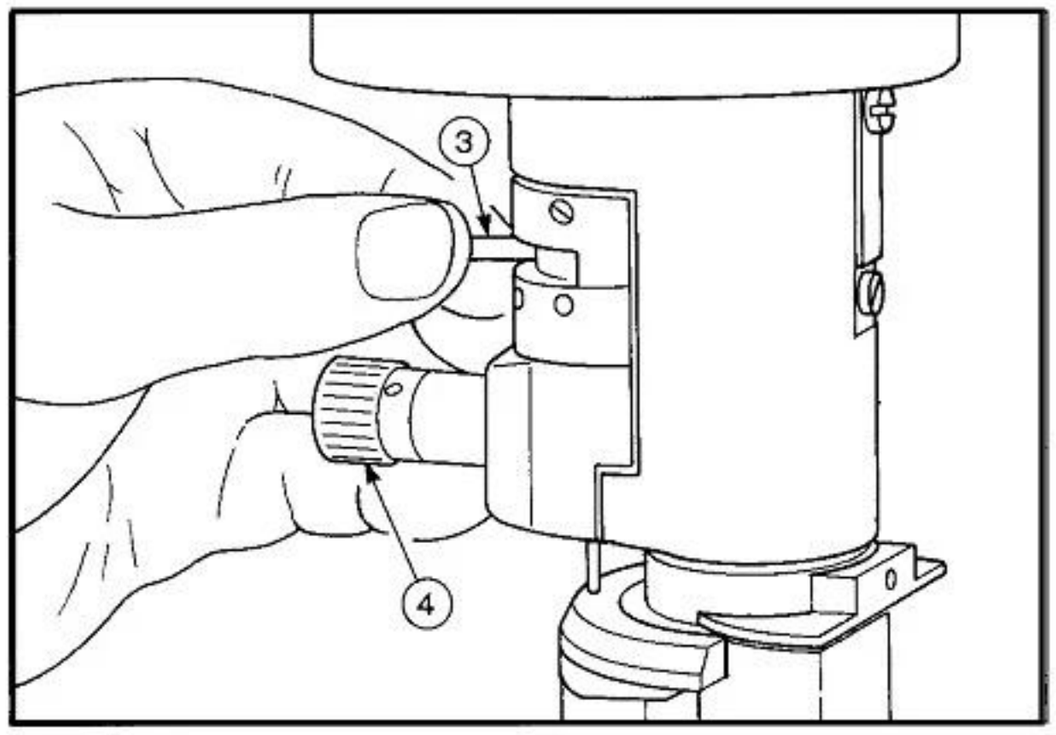


Fig. 14 Illumination System Controls
3. Filter Disc Lever
4. Aperture Disc Control Knob

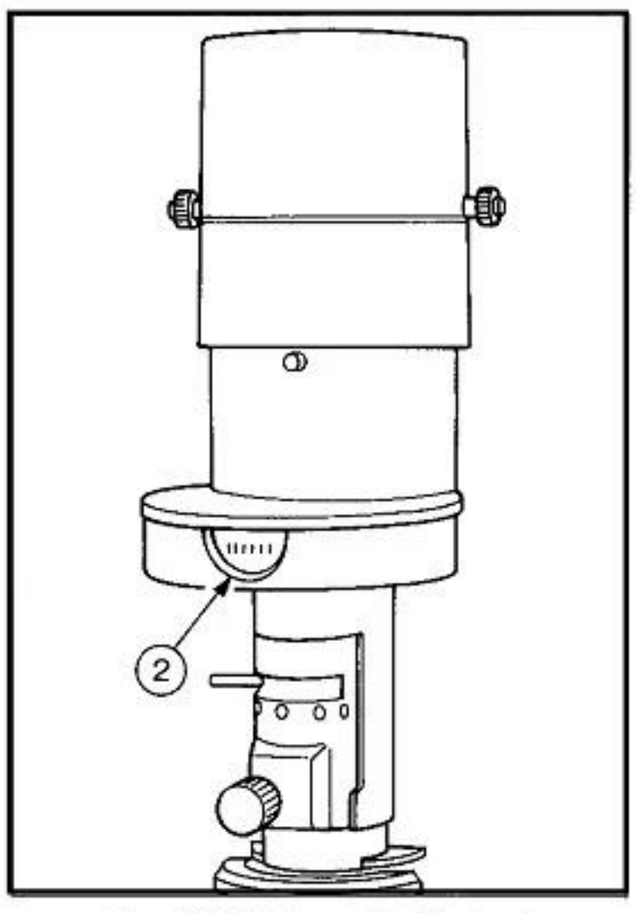


Fig. 15 Slit Length Scale, 2

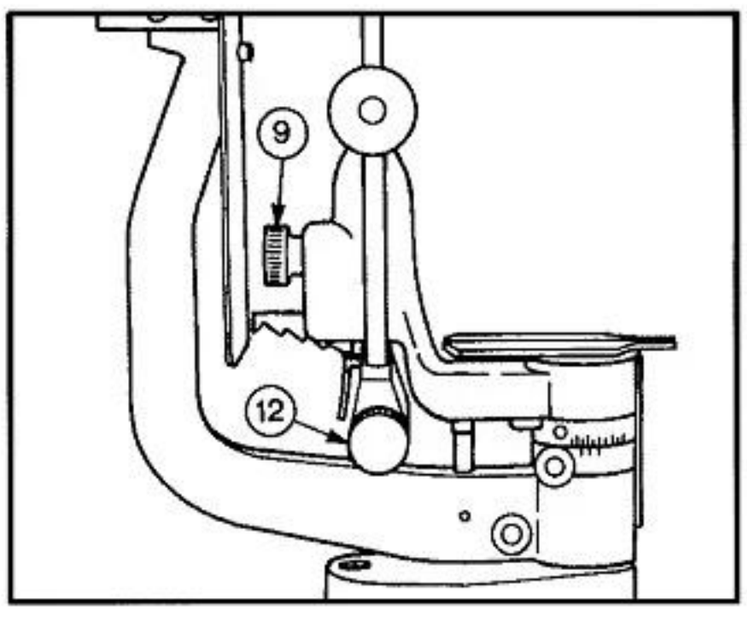
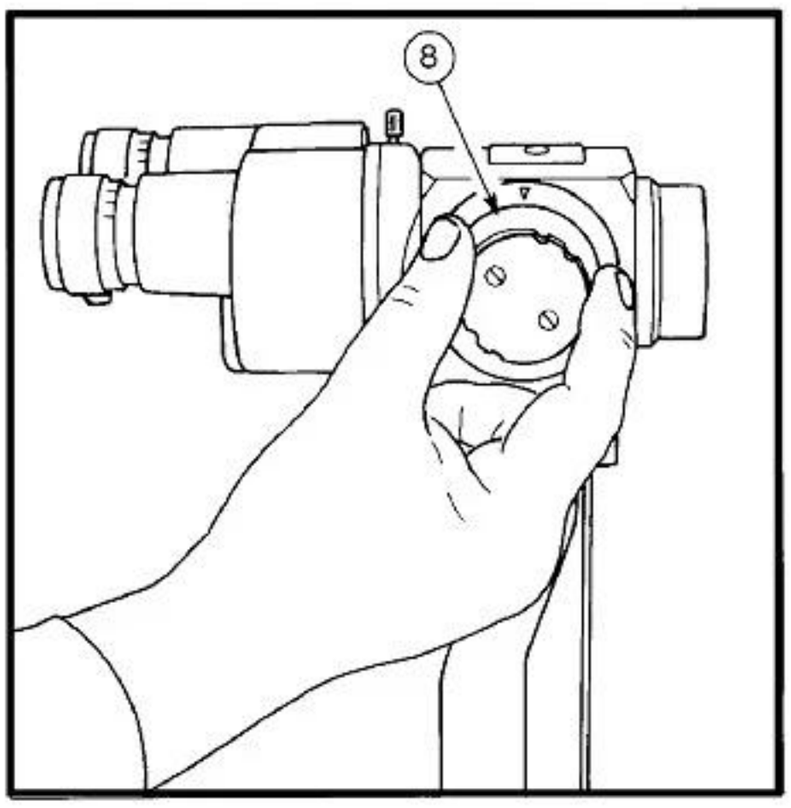
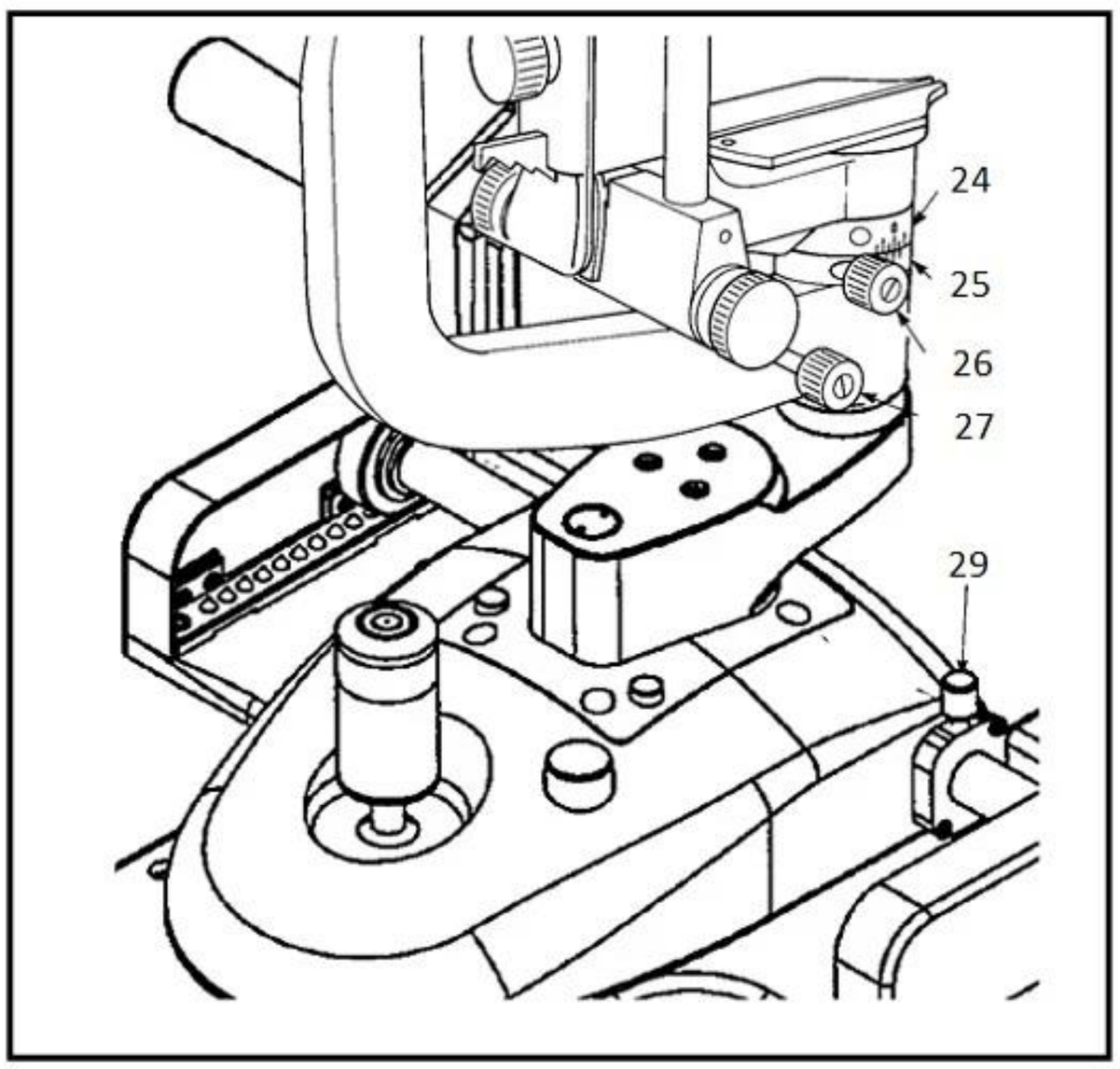


Fig.16 9.Centering Screw
12.Fridion Adjusting Screw



The microscope has objectives providing total magnifications of 6X, 10X,16X, 25X, and 40X.
The magnification is controlled by the knob, 8 (Fig. 17).
The objectives are parfocal and the working distance is constant for any magnification. If the microscope is focused at a high magnification, all lower magnifications will also be in focus.

Fig. 17 Magnification Contrd knob, 8



The lateral movement of the instrument base is locked by tightening screw, 29 (Fig. 18).
The microscope and illumination system can swing independently or together about the vertical pivot axis.
The two units will move together with any fixed angle between them when knob 26, (Fig. 18), is tightened.The microscope rotation can be locked by tightening knob 27, and loosening knob 26 leaving the illumination system free to pivot arotnd the axis. The index ring 25 and the scale ring 24 indicates the angle between the micrscope and illumination systems. A detent is provided for the 0°, 10°right and 10° left positions.
Normally, the settings of the illumination control will provide suitable slit illumination for the examination.

Fig. 18 Instrument Base

24. Scale Ring
25. Index Ring
26. Illumination Arm Lock
27. Microscope Arm Lock
29. Carriage Lock

Additional Function to Change the Diameter of the Illumination field

1). Change of the Illumination Field.

1-1. When the illumination field changing unit was moved to the click point. (Fig. 19)

Slit width : Continuously variable from 0-14mm
Slit length : 0.3, 1.4, 4.2, 5.5, 8.3, 14.0mm
and continuously variable 0.6-14mm

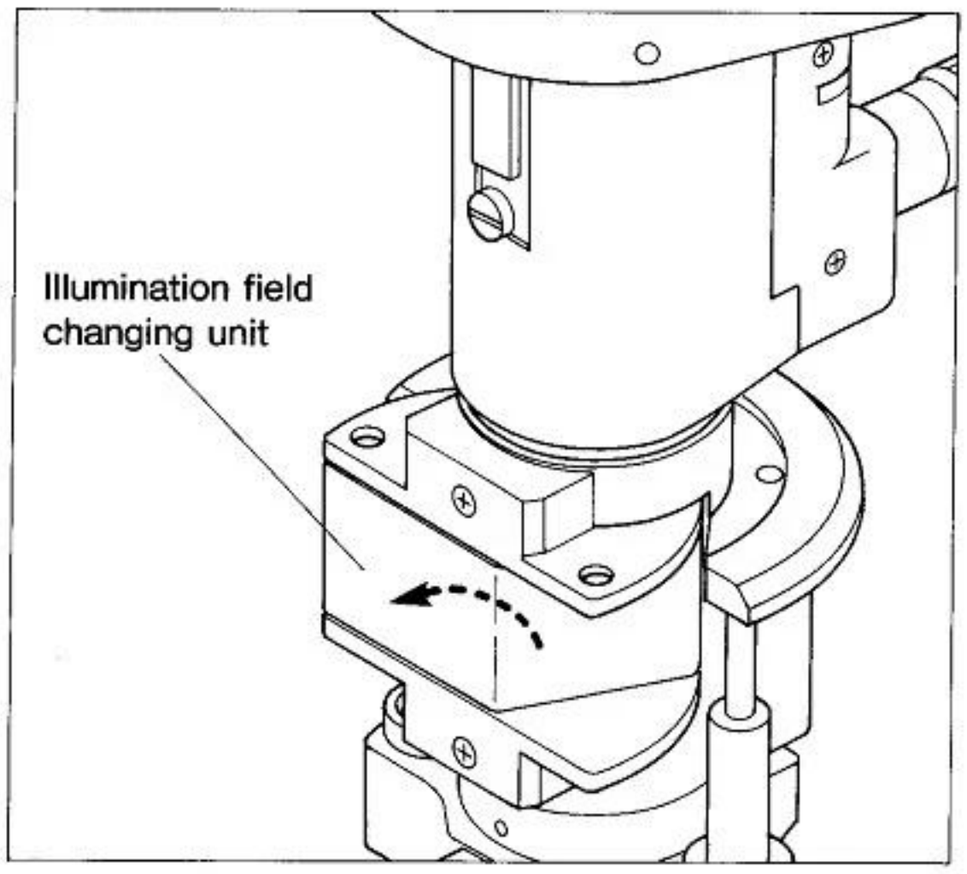


Fig. 19 Illumination field changing unit (Position 1)

1-2. When the illumination field Changing unit was moved to the oposit side of the click point (Fig. 20).

Slit width : Continuously variable from 0-8mm
Slit length : 0.2, 0.8, 2.4, 3.2, 4.8, 8mm and
continuously variable 0.3 - 8mm

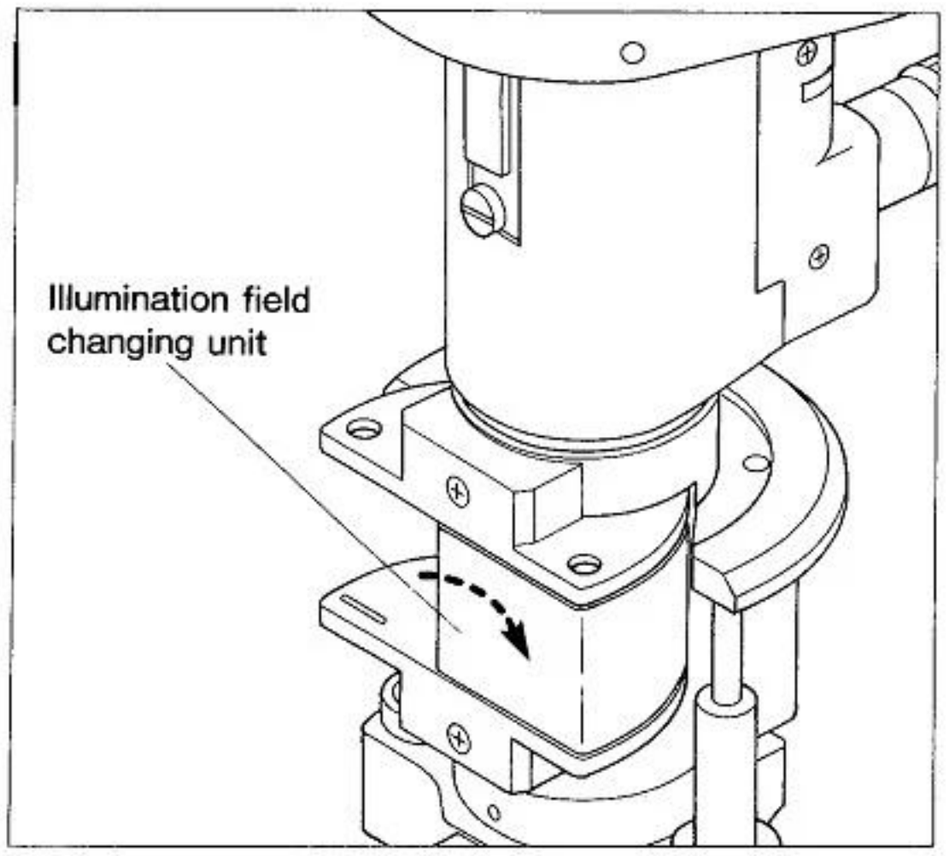


Fig. 20 Illumination field changing unit (Position 2)

2). Diffuser

The diffuser is mounted to make the observation for whole the anterior segment. Then the illumination has to be full-aperture (Fig. 21).

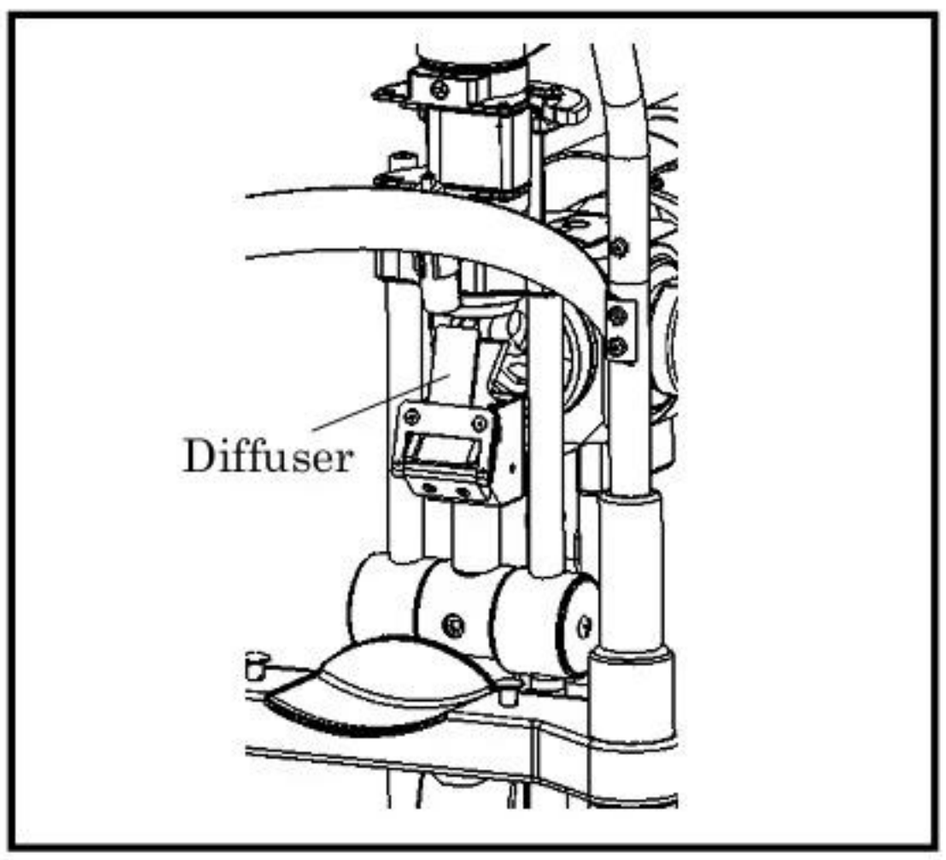
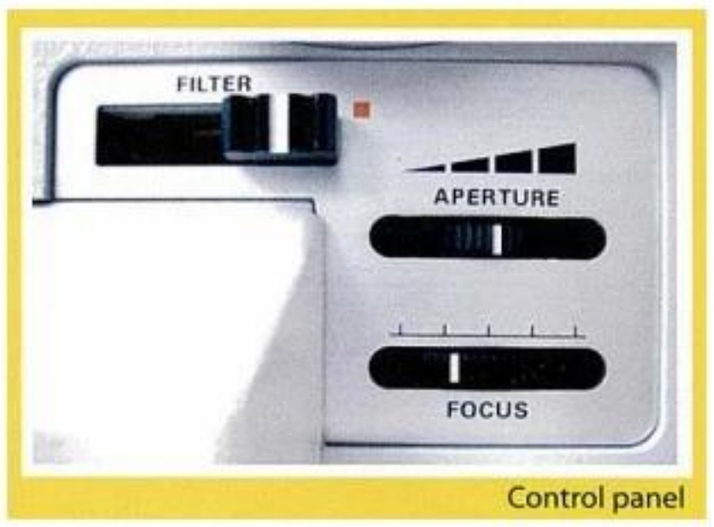


Fig. 21 Diffuser

5. Optional accessories

Digital Video Camera Beam Splitter



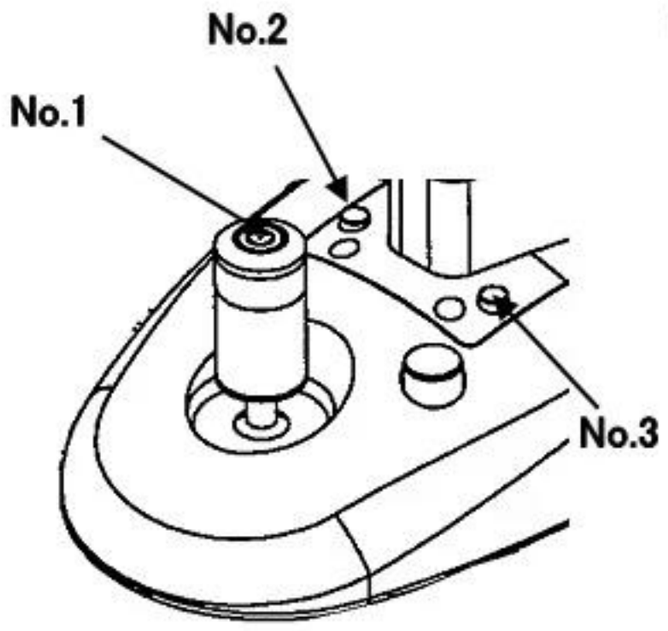
Connection to PC

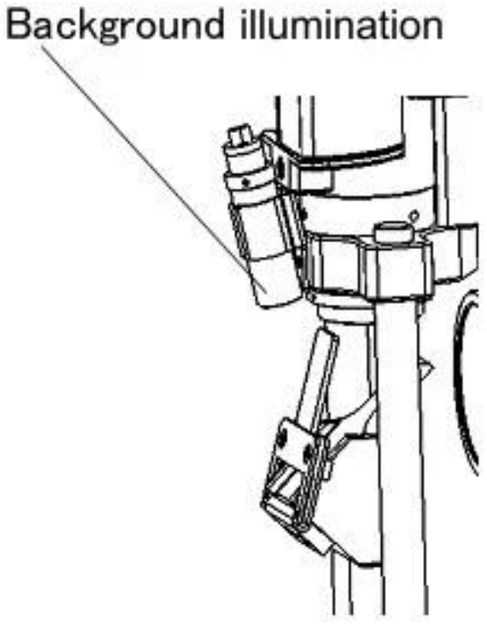
(Emerald-VD)

Please connect the cable to USB port of PC. Electricity can be supplied to the camera automatically through the cable.

In case of using Inami image filing and capturing software "Pixel filer".

In order to use switches on the base of slit lamp as shutter and video camera buttons and then file the data with Pixel filer, 2 pins (No.1 and No.2) of slit lamp have to be connected to jacks of USB cable provided according to the number.





And Then connect the cable to USB port of PC.

The background illumination is lighted when you push the switch No.3. Please push the switch once again if you want to turn off the background illumination.

In case of using other filing software

It is possible to use switches on the base of L-0229-E as trigger signals by connecting 2 pins to USB cable and PC.
In this case the setting of each switch depends on software used.
Please check the detail with the software.

6. MAINTENANCE

Main Lamp Replacement

The main lamp is a tungsten or halogen lamp which operates for long periods without blackening of the glass envelope. When it is eventually necessary to replace the lamp, it can be done quickly and easily by using the followirlg Procedure.

CAUTION

Allow sufficient time for the lamp to cool before replacement. Metal add glass park of the lamp can be hot enough to bum the fingers even if the instrument has been in use for only a short time.

Loosen the two lamp housing cover retaining nuts 19, (Fig. 22). Remove the cover as shown in Fig. 23. Remove the old lamp as shown in Fig. 24 and replace it with a new one. The lamps are pre-focused and aligned so it is only necessary to be certain that the notch in the lamp base engages the tab on the lamp housing 35, (Fig. 25).

Replace the lamp housing cover and press down against the spring force while tightening the two retaining nuts.

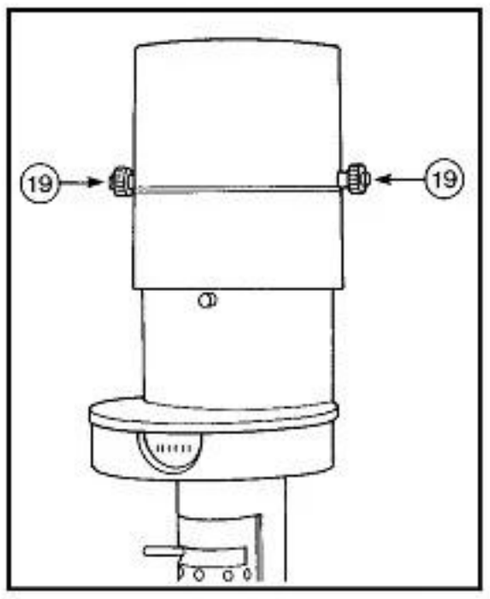


Fig. 22 Lamp Housing Cover Retaining Nuts, 19

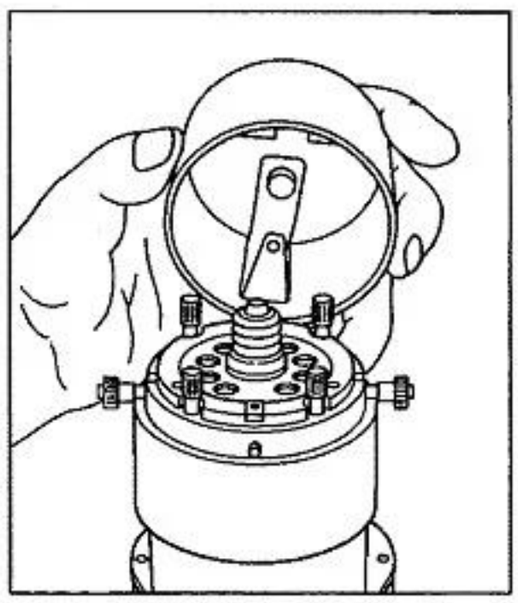


Fig. 23 Lamp Housing Cover Removal

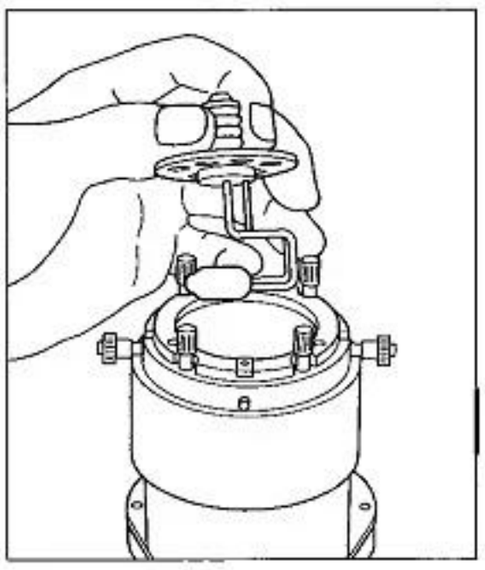


Fig. 24 Lamp Removal

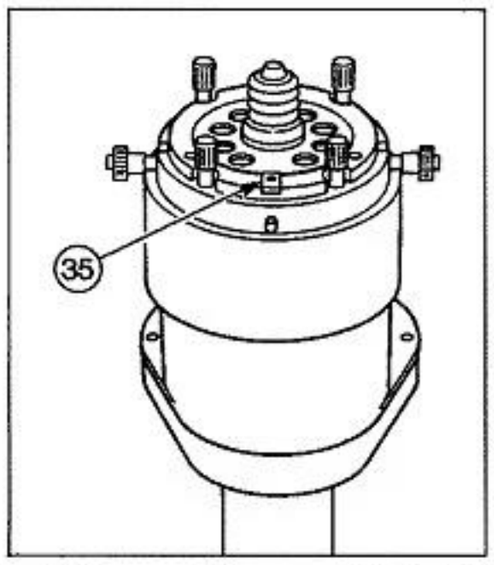


Fig. 25 Lamp Alignment Rab, 35

Mirror Replacement

Tilt the illumination system by releasing the latch 11, (Fig. 21). Grasp the narrow shank of the mirror by its edges and pull upward as shown in Fig. 26.

Mirror Cleaning

Remove dust accumulation with a camel's hair brush.

After brushing, finger marks can be removed, if necessary, with isopropyl alcohol and a cotton swab.

Dry with a facial tissue.

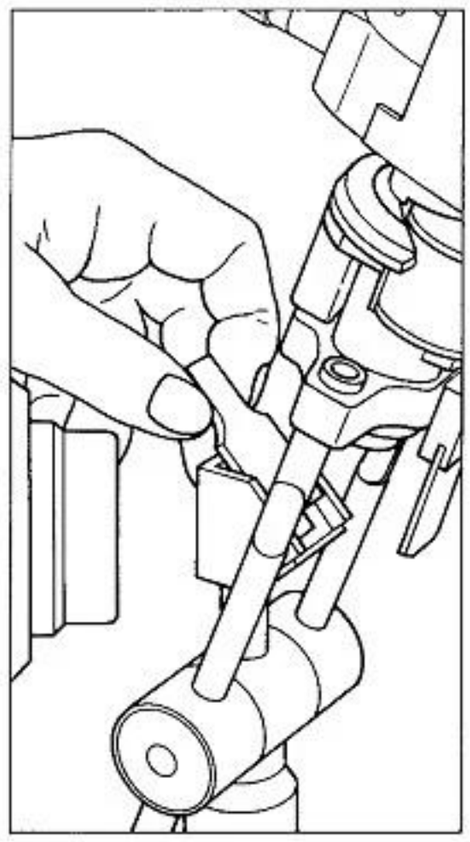


Fig. 26 Mirror Replacement

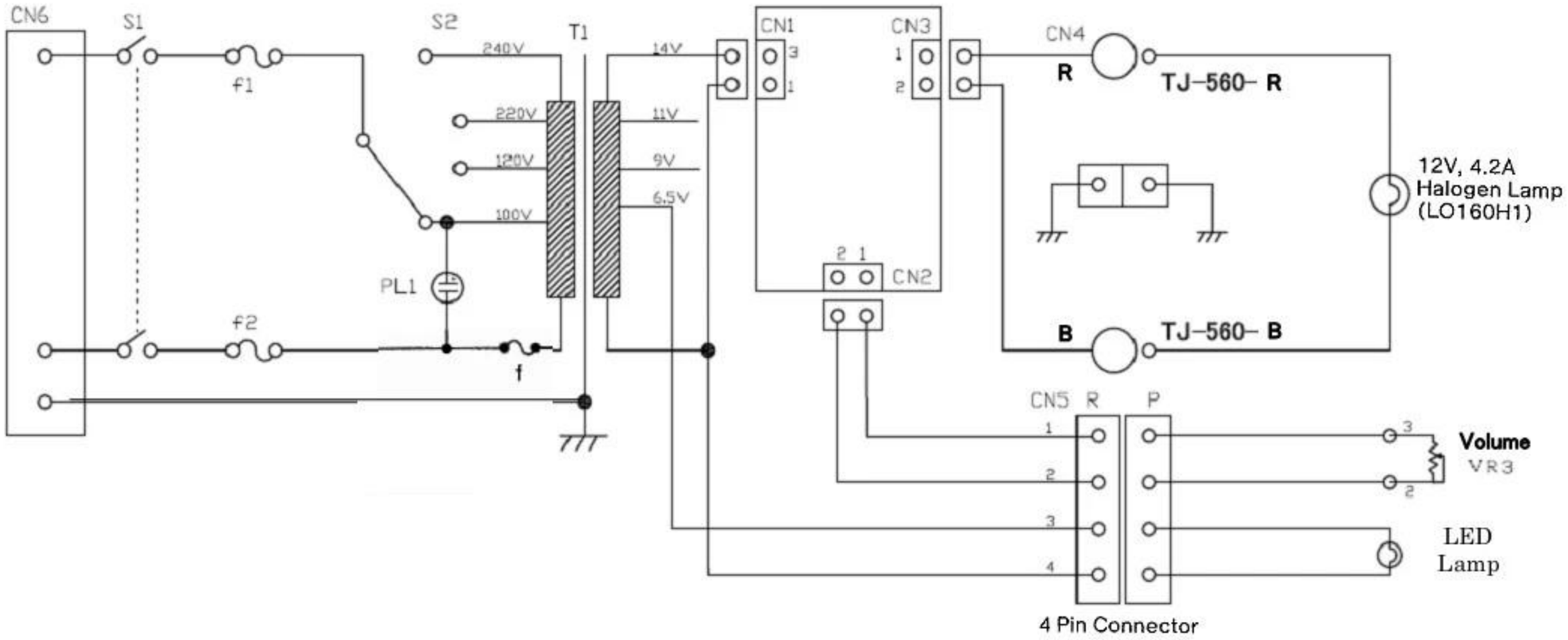
Eyepiece Lens Cleaning

Finger marks can be removed by the same method used for the mirror. A minimum of alcohol should be used in this case.

Exterior Surface Cleaning

Clean the exterior surfaces, especially the joystick glide plate, by wiping with a soft, dry cloth. Do not use comrnerical or household cleaners.

7. WIRING


CN6
S1
f1
S2
240V
220V
120V
100V
T1
14V
11V
9V
6.5V
PL1
f2
f
CN1
CN3
CN4
R
TJ-560- R
12V, 4.2A
Halogen Lamp
(LO160H1)
2 1
CN2
B
TJ-560- B
CN5 R P
1
2
3
4
3
2
Volume
VR3
LED
Lamp
4 Pin Connector

US Ophthalmic LLC
9990 NW 14th Street
Unit 105 Doral,FL 33172

2021.2 edition 1