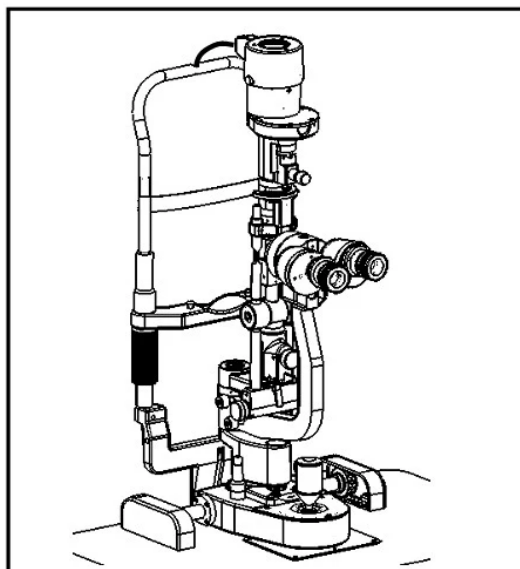


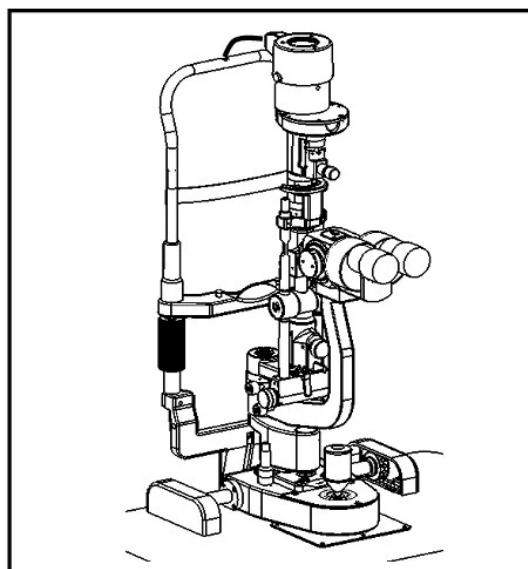
SLIT LAMP

Emerald-1/L Emerald-8/L

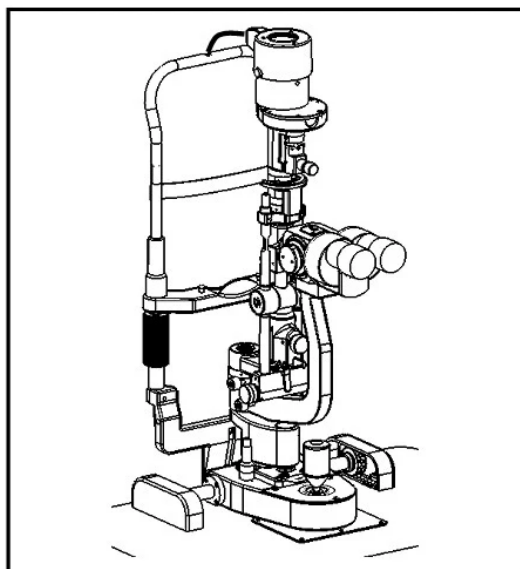
Emerald-12/L Emerald-18/L



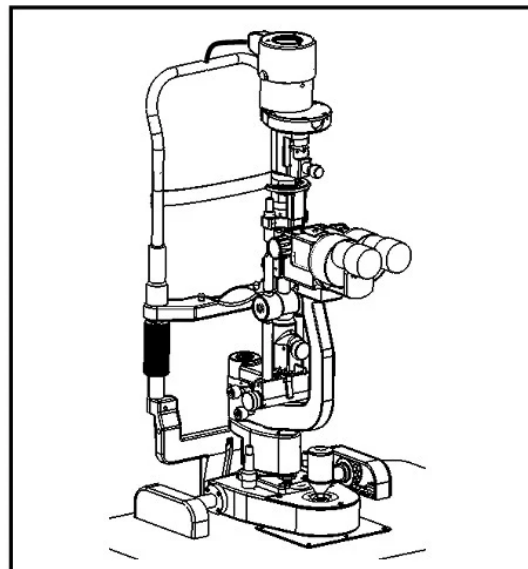
Emerald-1/L



Emerald-8/L



Emerald-12/L



Emerald-18/L

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Notice

- 1) In order to keep the instrument in the best condition, please read this manual and perform the inspection of the instrument.
- 2) Please store the instrument avoiding humidity.
- 3) Before you move this instrument, please hold the arm and tighten the handle to lock the first arm. The instrument with locked arm should be moved slowly.
- 4) The content of this manual may be changed without prior notice according to the update of the product specification.
- 5) This manual is created completely. Please contact your dealer in the unlikely event that you find any errors in writing or missing stated points.
- 6) The manual will be replaced with new one if it has manufacturing defects. Please contact your dealer.

Indication

Name plate

The following matters are displayed on a nameplate.

• Product name • Model No. • Manufacture & Distributer • Serial No.

The following emblems are displayed.



Caution



CF. instruction manual



The name of the maker the location

Safety Instructions

Please read this operation manual carefully before using the instrument.

This manual should be kept in a place where it is available for the operator whenever they need. You must follow the safety instructions below that describes the important precautions.

The symbols and their meanings are as follows.

	Danger	indicates that death or serious physical injuries will occur if necessary safety precautions are not taken.
	Warning	indicates that death or serious physical injuries can occur if necessary safety precautions are not taken.
	Caution	indicates that a slight physical injury or material damage can occur if necessary safety precautions are not taken.

Material damage means expanded damages related to houses, household goods, etc.

 Warning	
• During the replacement of parts, make sure to set main power switch OFF (O). If you operate while energizing, it will cause electric shock. • Do not tilt the body of the main unit more than 10 degrees. Physical injury or material damage of houses and other instruments can occur if the unit falls over.	
 Caution	
The equipment cannot be used except for the specified power supply voltage. Using wrong power supply voltage may cause ignition. • Make sure to install the ground wire. Electric shock may be caused when mechanical failure or electric leakage occurs. • When unplugging /plugging in the power supply plug, hands must be dry to unplugging / plugging in the outlet with insertion plug. Electric shock or ignition caused by short-circuit may occur. • Do not use the power supply cord and plugs when they are deteriorated or damaged. Electric shock or ignition caused by short-circuit may occur. • Do not take following actions: damaging, bending with force, pulling, twisting and bundling the power supply cord as well as putting heavy things on it and pressing it. The power cord may be damaged resulting in fire or electric shock. • Keep the power cord clean at all times so that there is no dirt, oil etc. If the terminal part is dirty, it may cause mechanical breakdown or fire. • Except for medical treatment hours, please unplug the plug from the outlet. It may cause electric leakage or fire. • Do not use bulbs, fuses, electric parts other than specified. There is risk of fire caused by heating. • Handle lenses and mirrors carefully. When lenses and mirrors are scratched, it will not be possible to observe properly. • Do not use lenses other than specified. When wrong lens are used, it will not be possible to observe with the proper focus and magnification. • When setting the main unit with the table, fix them firmly with the handle of the table clamping system. If the unit slides sideways on the table and falls over, physical injury or material damage of houses and other instruments can occur. • Please never disassemble the unit body. Disassembling the unit body will cause mechanical breakdown or fire.	

1. NOMENCLATURE OF Emerald-1/L SLIT LAMP

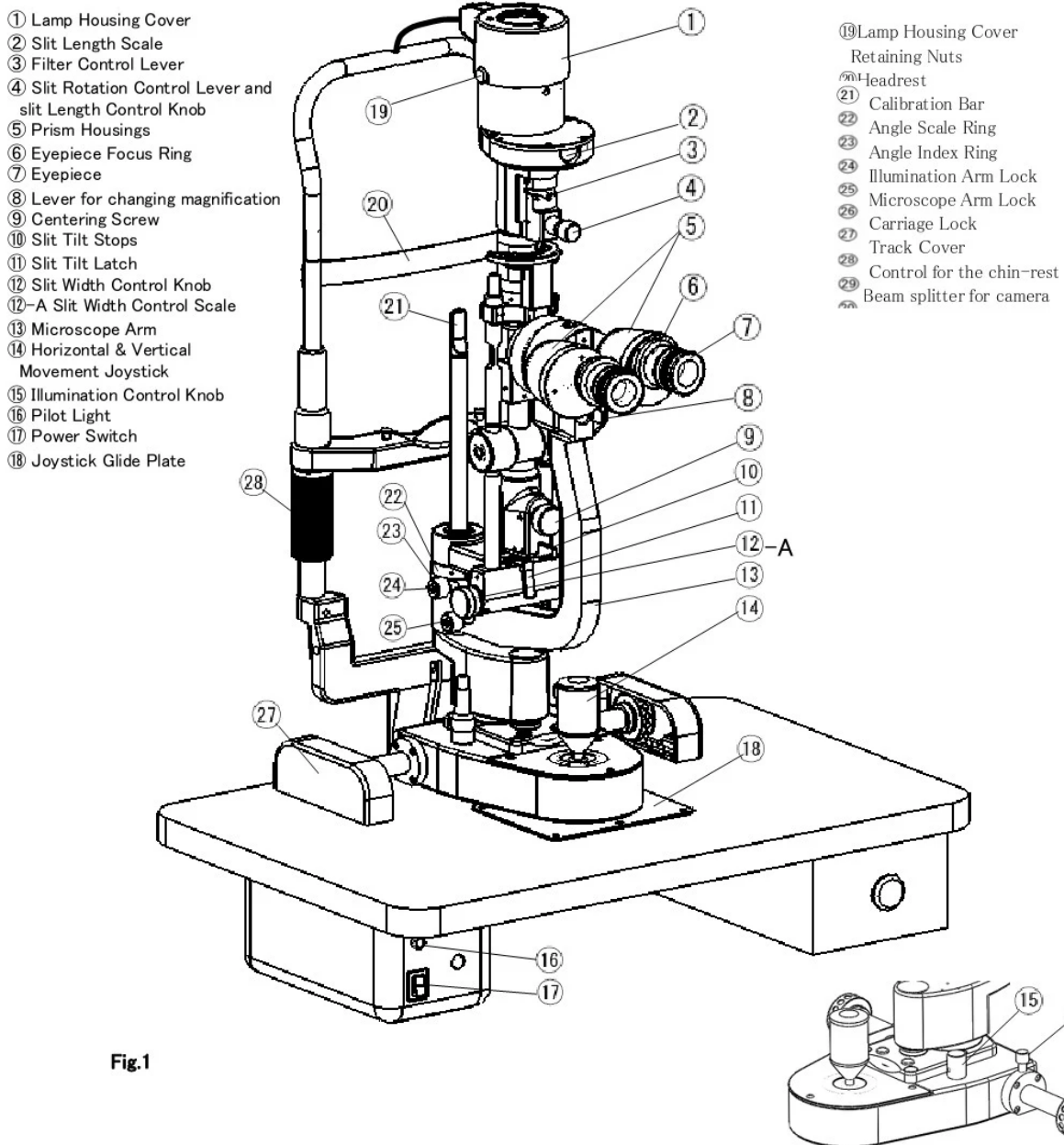


Fig.1

Specifications:

• Binocular microscope

Eyepieces: 10X, and 16X **Objectives:** 1X, 1.6X **Total magnifications:** 10X, 16X and 25X

P.D.adjustment: 52.90mm(w/10X eyepiece)

• Illumination unit

• **slit length:** 0.2, 1, 3, 4, 6, 10mm steps and continuously variable 0–10mm **Slit width:** Continuously variable from 0–10mm

• **slit image rotation:** 0 – 180° **Slit tilt:** 5, 10, 15, and 20° **Filter disc:** Open, cobalt blue, warm light, heat absorbing, red-free

• **Lamp:** 14V, 15W LED

• **Optional accessories:** Applanation tonometer

2. NOMENCLATURE OF Emerald-8/L SLIT LAMP

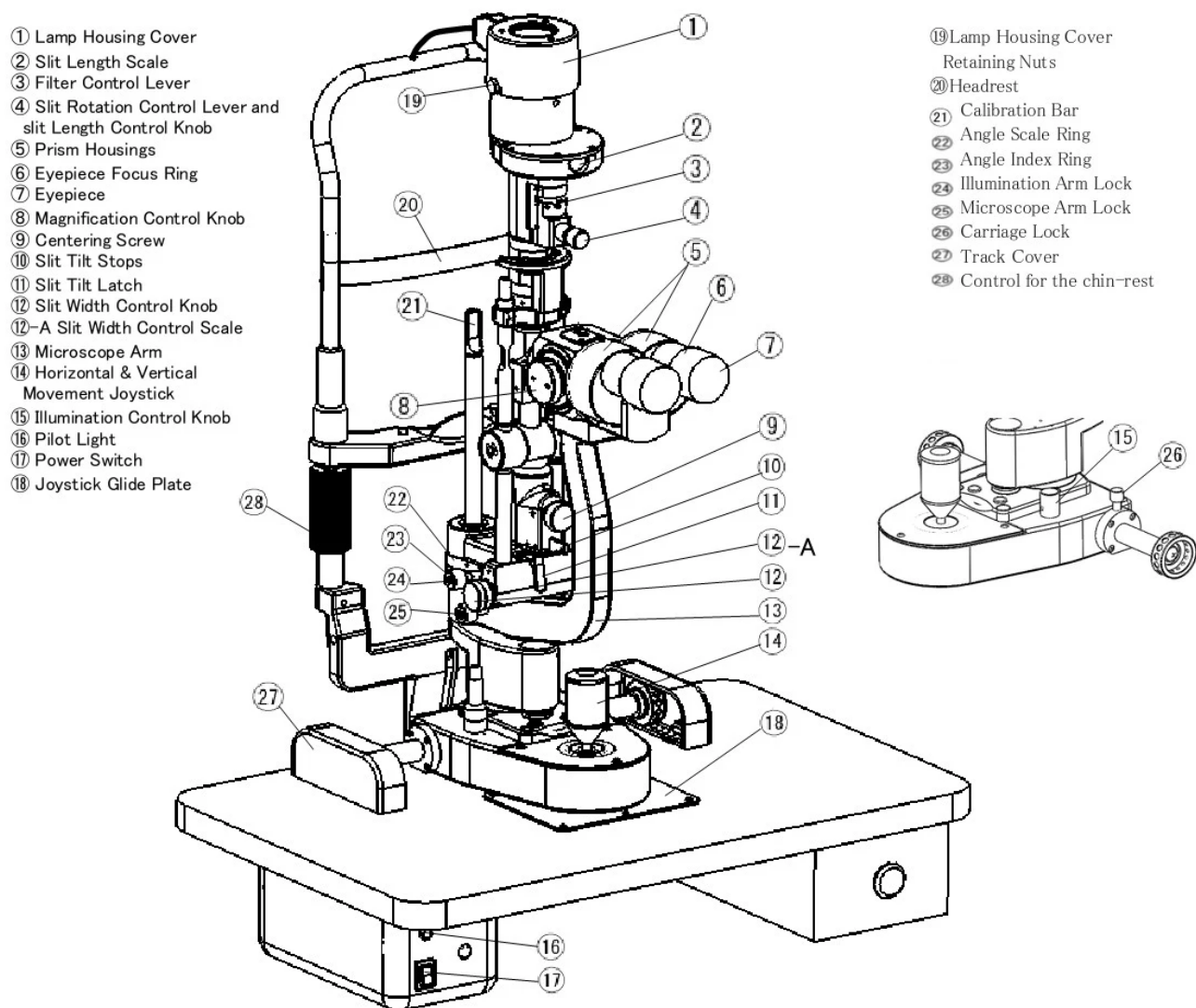


Fig.2

Specifications:

•Parallel tube stereomicroscope

Eyepieces:12.5X Variable magnification: 10X, 16X and 25X Working distance: 98mm Eyepiece focus adjustment:

+ 6D to - 6D

P.D.adjustment: 48 - 78mm

•Illumination system

•**slit length:** 0.2, 1, 3, 4, 6, 10mm steps and continuously variable 0-10mm Slit width: Continuously variable from 0-10mm

•**slit image rotation:** 0 - 180° Slit tilt: 5, 10, 15, and 20° Filter disc: Open, cobalt blue, warm light, heat absorbing, red-free

•**Lamp:** 14V, 15W LED

•**Optional accessories:** Applanation tonometer, Beam splitter module. Teaching tube with image rotation, 35mm camera adaptor, 35mm SLR camera body with automatic film advance, CCD TV Camera & adaptor

3. NOMENCLATURE OF Emerald-12/L SLIT LAMP

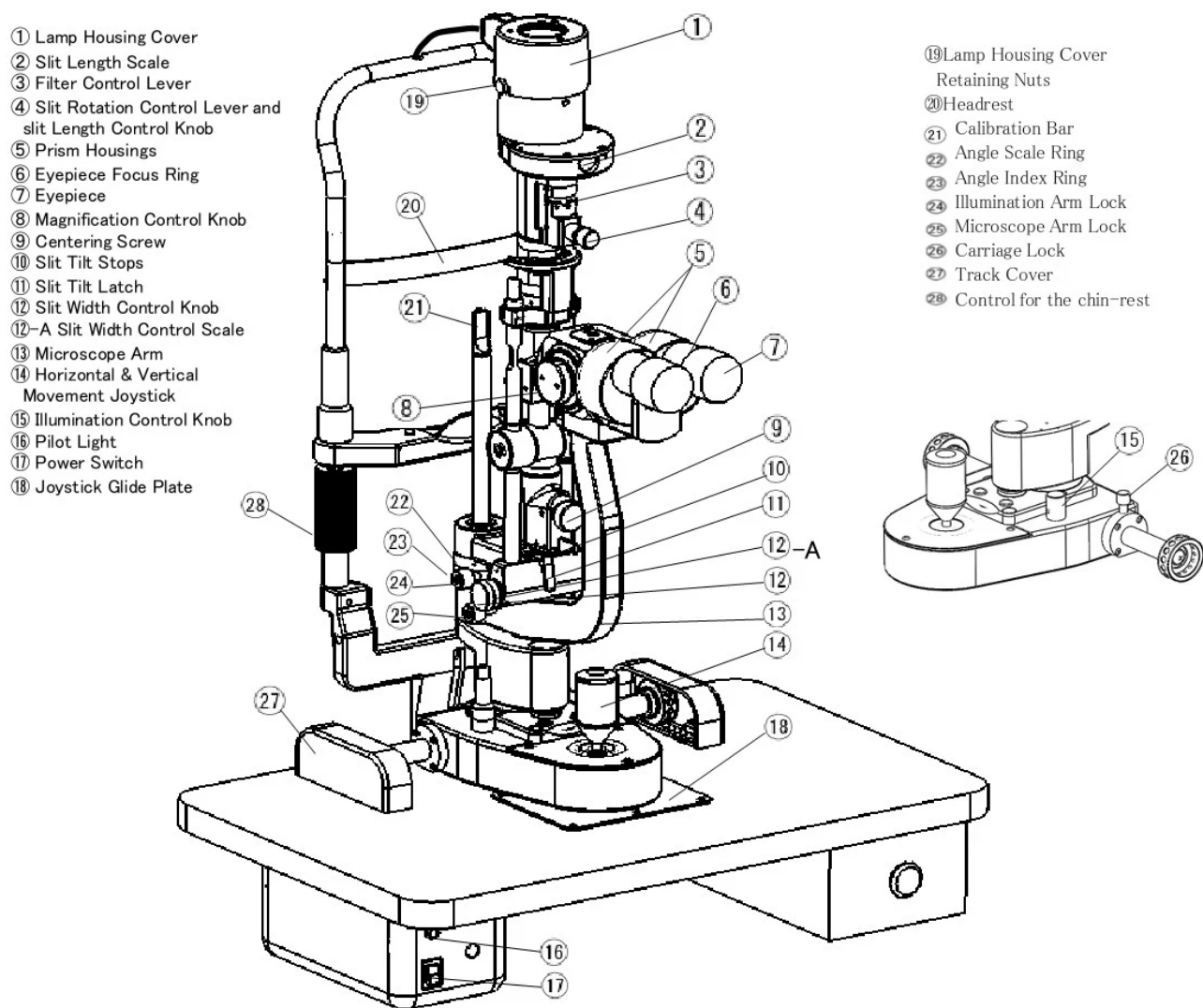


Fig.3

Specifications:

•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: 48 - 78mm

•Illumination system

• **slit length:** 0.2, 1, 3, 4, 6, 10mm steps and continuously variable 0-10mm Slit width: Continuously variable from 0-10mm

• **slit image rotation:** 0 - 180° Slit tilt: 5, 10, 15, and 20° Filter disc: Open, cobalt blue, warm light, heat absorbing, red-free

• **Lamp:** 14V, 15W LED

• **Optional accessories:** Applanation tonometer, Beam splitter module. Teaching tube with image rotation, 35mm camera adaptor, 35mm SLR camera body with automatic film advance, CCD TV Camera & adaptor

4. NOMENCLATURE OF Emerald-18/L SLIT LAMP

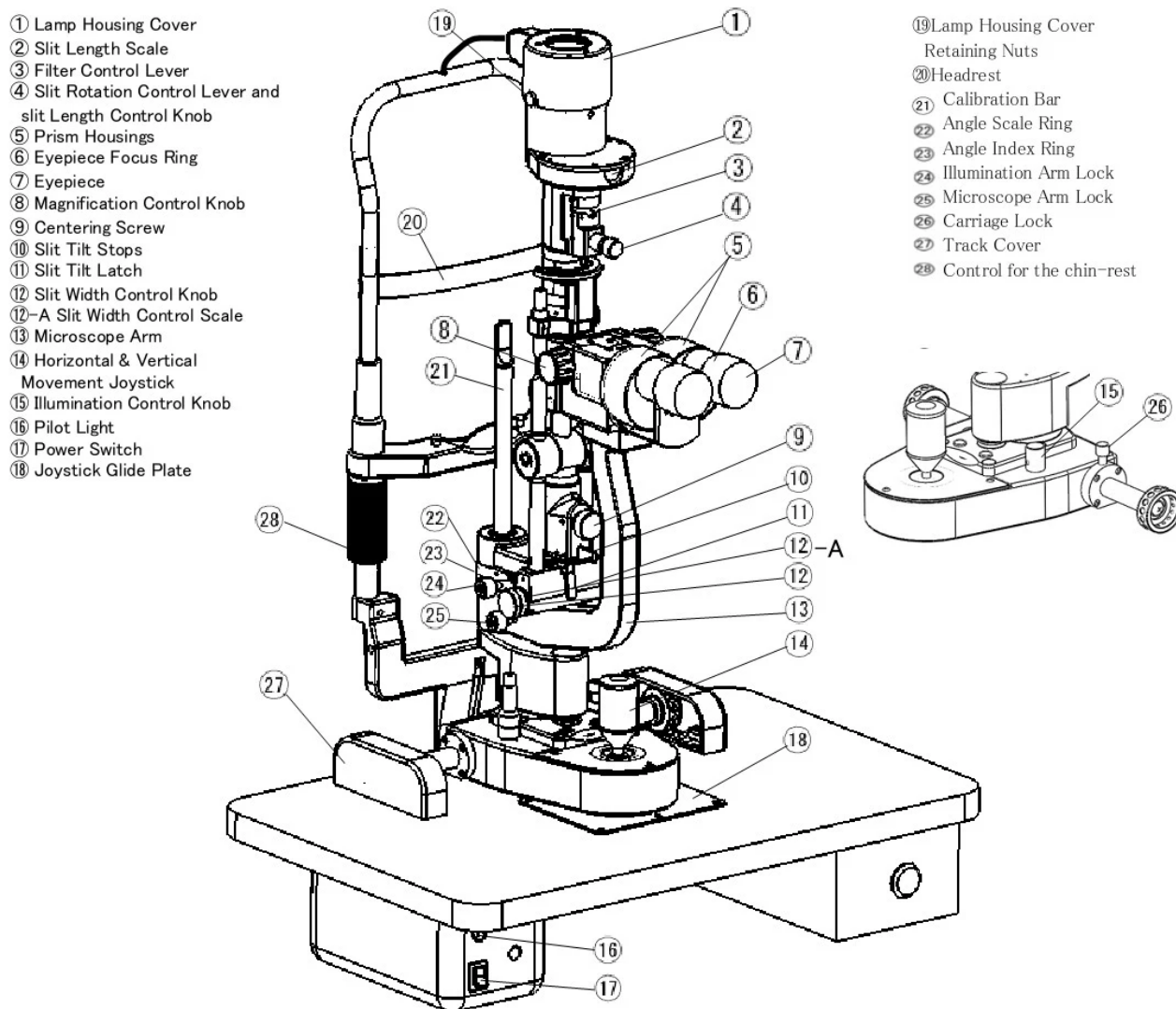


Fig.4

Specifications:

•Parallel tube stereomicroscope

Eyepieces:15X Variable magnification: 11X to 33X Working distance: 98mm Eyepiece focus adjustment: + 6D to - 6D

P.D.adjustment: 48 - 78mm

•Illumination system

•**slit length:** 0.2, 1, 3, 4, 6, 10mm steps and continuously variable 0-10mm Slit width: Continuously variable from 0-10mm

•**slit image rotation:** 0 - 180° Slit tilt: 5, 10, 15, and 20° Filter disc: Open, cobalt blue, warm light, heat absorbing, red-free

•**Lamp:** 14V, 15W LED

•**Optional accessories:** Applanation tonometer, Beam splitter module. Teaching tube with image rotation, 35mm camera adaptor, 35mm SLR camera body with automatic film advance, CCD TV Camera & adaptor

5. UNPACKING AND ASSEMBLY

Slit Lamp is packed for shipment in three stacking, molded polystyrene foam containers and covered with a sheet of foam material (Fig. 5).

These containers are over-packed with a sturdy corrugated cardboard carton.

The lower container (Fig. 6) 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 three hexagonal wrenches required for assembly.

The middle container (Fig. 7) holds the headrest assembly and the fixation device.

The upper container (Fig. 8) holds the tabletop with the attached transformer and accessory drawer

The accessory drawer contains the following items:

Dust cover

Spare fuses

Breath shield

Chinrest papers

Focusing rod

Remove the tabletop from the lower container and remove the contents of the accessory drawer. Place the tabletop upside down on a table or other suitable work surface. The headrest side of the tabletop should be toward the assembler, with the top slightly overhanging the edge of the work surface.

Remove the two hex socket screws from the headrest mounting plate with one of the wrenches supplied (Fig. 9).

Remove the two thumb screws holding the plastic wire retaining plate (Fig. 10).

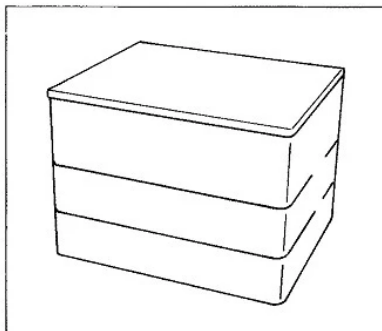


Fig. 5 Shipping Container

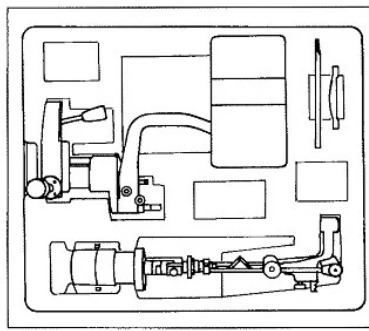


Fig. 6 Lower Container

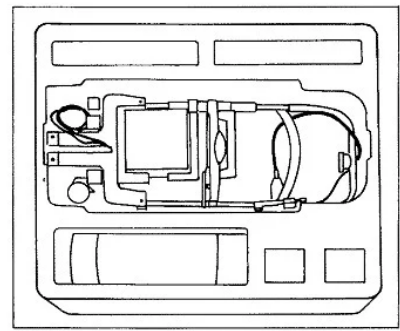


Fig. 7 Middle Container

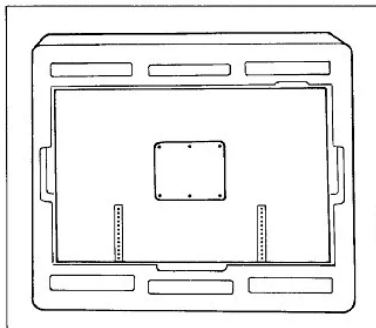


Fig. 8 Upper Container

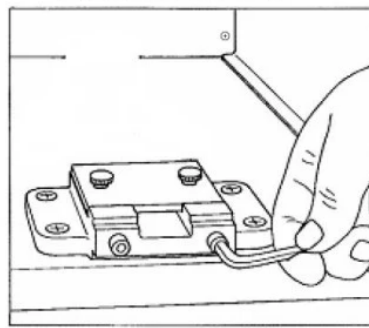


Fig. 9 Removing Headrest Mounting Plate Hex Screws

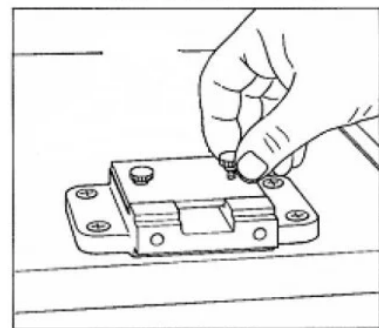


Fig. 10 Removing Thumbscrews from Plastic Wire Retaining Plate

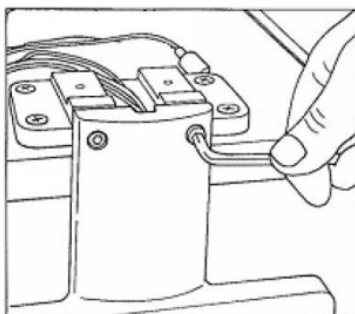


Fig. 11 Attaching the Headrest to the Mounting plate

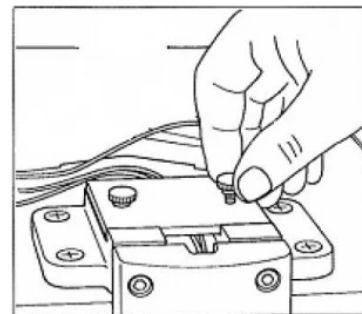


Fig. 12 Replacing the Wire Retaining Plate

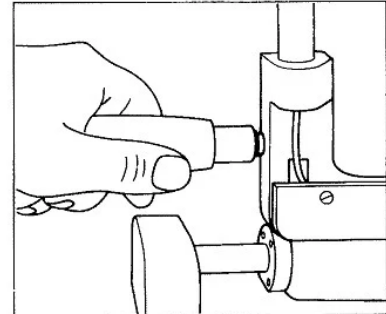


Fig. 13 Attaching the Handgrips(option)

Assemble the headrest to the mounting plate. Be sure that the tongue of the plate engages the groove in the headrest. The wires should be located as Shown in the grooves in the plate and headrest (Fig. 11). Tighten the two screws securely.

Replace the wire retaining plate and tighten the thumb screws as shown in Fig. 12.

Turn the tabletop and headrest assembly rightside up.

Screw the two patient hand grips(option) into the sockets as shown in Fig. 13.

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.

Install the track covers 31(Fig. 1~4) by sliding the cover tabs under the track.

Install the illumination unit by sliding it carefully over the cross-slide assembly shaft as shown in Fig. 14.

Tighten the retaining screw as shown in Fig. 15 with the hex wrench supplied.

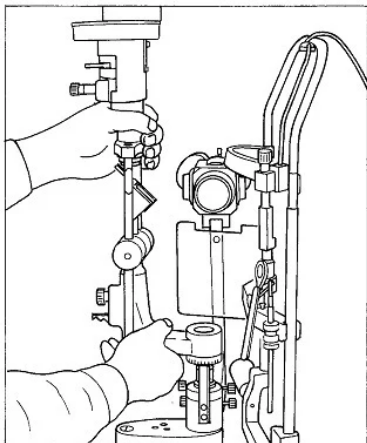


Fig.14 Installing the Illumination Unit

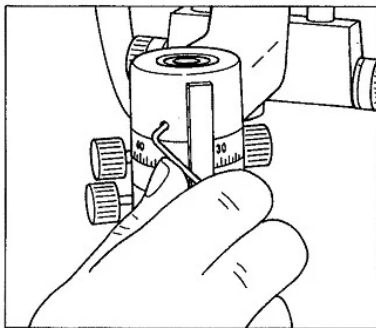


Fig.15 Tightening the Illumination Unit Retaining Screw

Connect the plugs to the receptacles at the back of the transformer case as shown in Fig. 16.

Connect the main power plug to the three pins on the lamp housing cover.

Connect the black plugs to the receptacle No.1.

Connect the blue plugs to the receptacle No.2.

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 shown in Fig. 17. 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. 1~4) to the microscope arm.

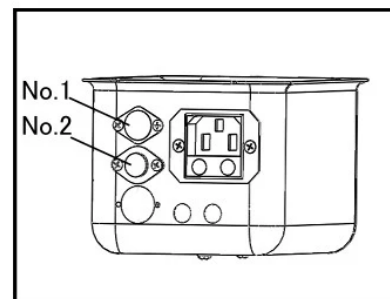


Fig.16 Transformer Case-Rear View

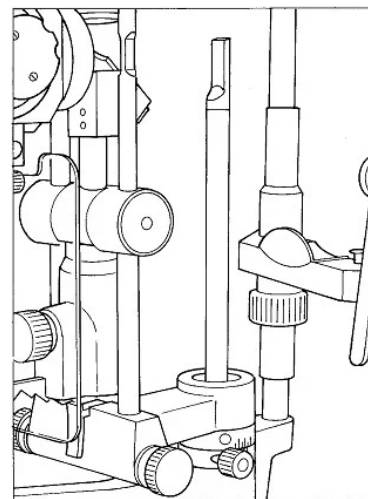


Fig.17 The Focusing Rod in place

Base fixed

(1) Fixed to base

Attach the base to sturdy poles, supports, etc.

(2) Screw mounting

Securely fix with three screws (Fig. 18).

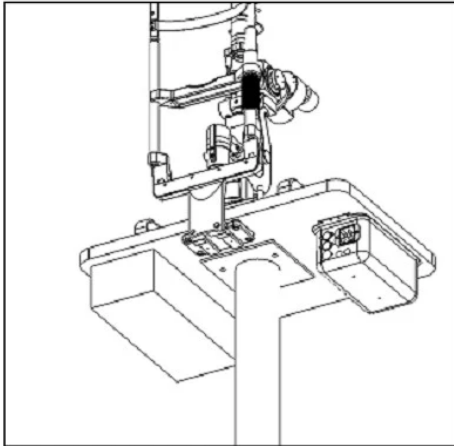


Fig. 18: fixed to base

Installation Environment

2.1 Installation Environment

(1) Installation conditions

- Set the instrument in a place not subject to water.
- Set the instrument in a place where there is no fear of adverse effect due to atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, salt, air containing ions etc.
- Stable environment must be maintained avoiding inclination, vibration and impact etc.
- Do not set the instrument in a place where chemicals are stored or gas is generated.

(2) Environmental conditions

• The operating environmental conditions below must be required when installing the instrument.

Operating environment conditions	
Temperature	+10°C — +35°C
Relative humidity	30% — 75%
Air pressure	800hPa — 1060hPa

6. 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. 1~4), 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 grasping the prism housings, 5 (Fig. 1~4), 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, 33(Fig.1~4), 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.1~4), and moving the lamp and microscope together in the required directions. Turn the slit lamp on with the main power switch, F (Fig.19). The pilot light, E, indicates power is on. Regulate the brightness of the illumination with knob D. Adjust and focus the fixation lamp, 21(Fig.1~4), 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.1~4). Obtain final alignment and focus by observation through the microscope.

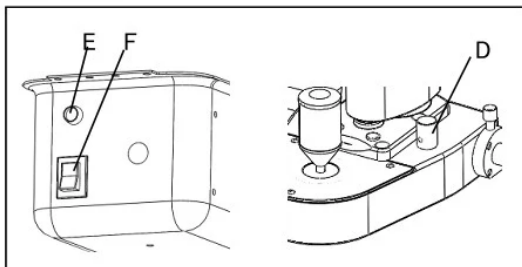


Fig. 19 Illumination Controls

D. Illumination Knob

E. Pilot Light

F. Main Power Switch

Rotate either of the slit width control knobs, 12 (Fig. 20), 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. 1~4). The scale on the left side slit width control indicates the width of the slit, 12-A(Fig. 21).

The projected slit can be rotated about the optical axis continuously from vertical to horizontal by pushing the control, 4 (Fig. 22), 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.

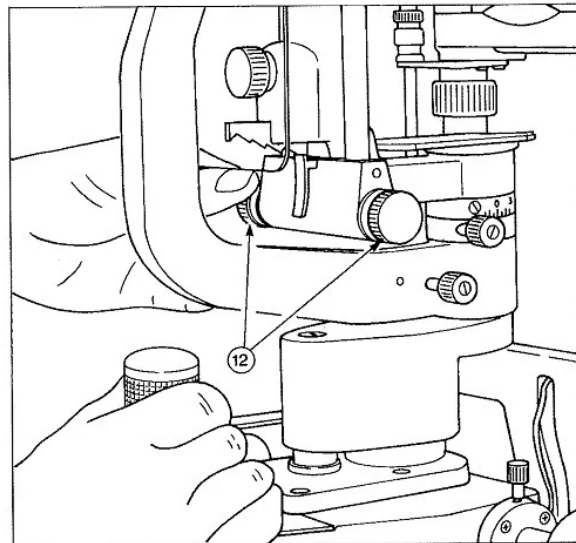


Fig.20 Slit Width Control Knobs, 12

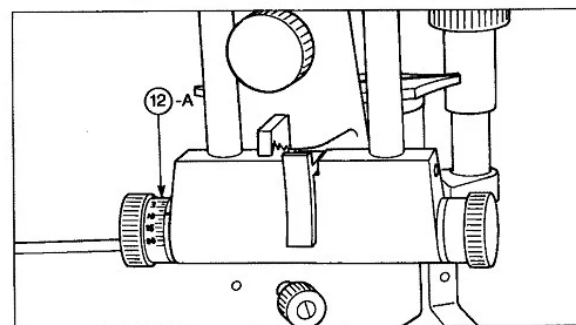


Fig.21 Slit Width Control Scale, 12-A

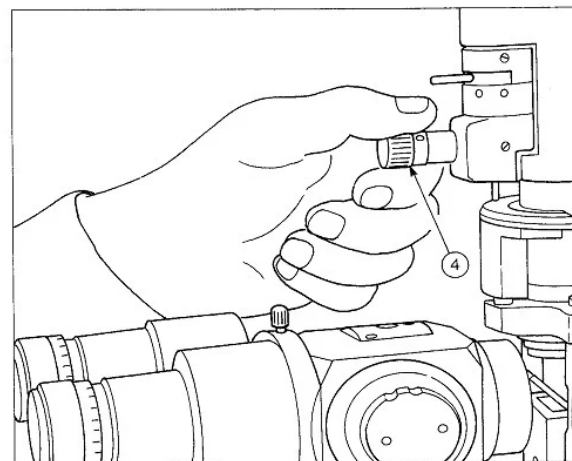


Fig.22 Slit Orientation Control, 4

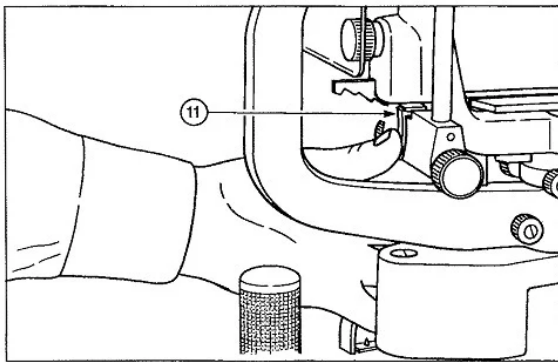


Fig. 23 Tilt Control Latch, 11

The system is tilted by depressing latch, 11 (Fig. 23), and pulling the base of the illumination system toward the operator, (Fig. 24). The latch is released to engage the desired tilt stop.

The illumination system also contains a filter disc and an aperture disc. The filter disc is controlled by lever 3, (Fig. 25). This disc contains filters in the following order: a cobalt blue 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. 25), to adjust the length of the projected slit. Fixed apertures are provided for 10, 6, 4, 3, 1 and 0.2mm. Continued rotation of control knob, 4, introduces a wedge-shaped diaphragm for producing continuously variable slit lengths in a range from 0 to 10mm. The length of the slit is indicated by scale, 2 (Fig. 26). Retrograde illumination, indirect illumination and lateral scanning of the slit can be accomplished by loosening the centering screw, 9 (Fig. 27), and rotating the illuminating system about its vertical axis. For normal use, the slit image is recentered automatically by tightening the screw.

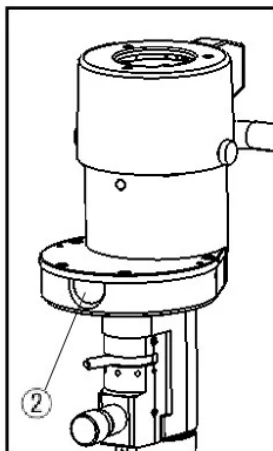


Fig. 26 Slit Length Scale, 2

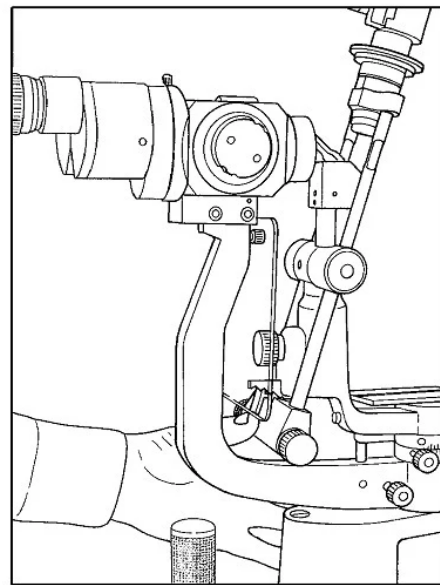


Fig. 24 Tilting the System

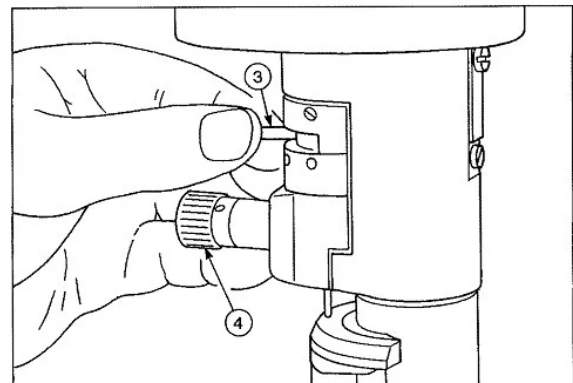


Fig. 25 Illumination System Controls

3. Filter Disc Lever

4. Aperture Disc Control Knob

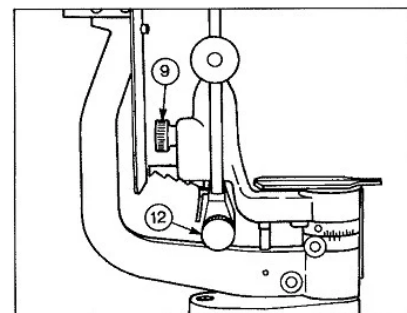
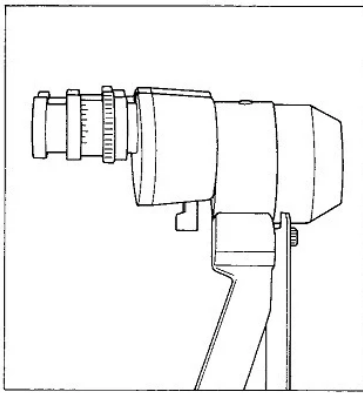


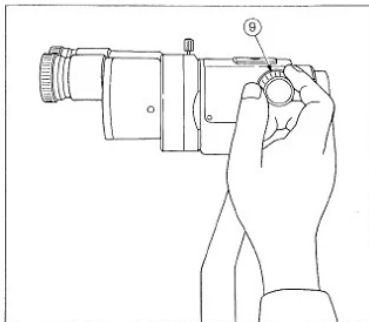
Fig. 27 9.Centering Screw

12.Fridion Adjusting Screw



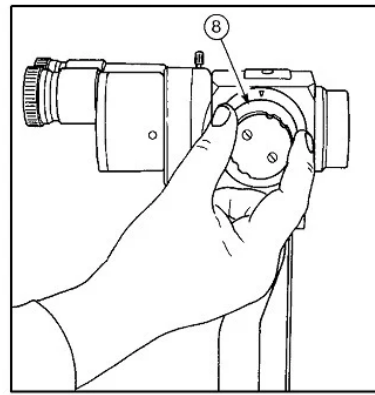
Emerald-1/L

By changing the eyepieces total magnifications up to 10X, 16X.



Emerald-18/L

The microscope has objectives providing total magnifications of 11X – 16X continuously.



**Emerald-8/L
Emerald-12/L**

Emerald-8/L

The microscope has objectives providing total magnifications of 10X, 16X, and 25X

Emerald-12/L

The microscope has objectives providing total magnifications of 6X, 10X, 16X, 25X and 40X

The magnification is controlled by the knob, 8 (Fig. 27). 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. 28 Magnification Control

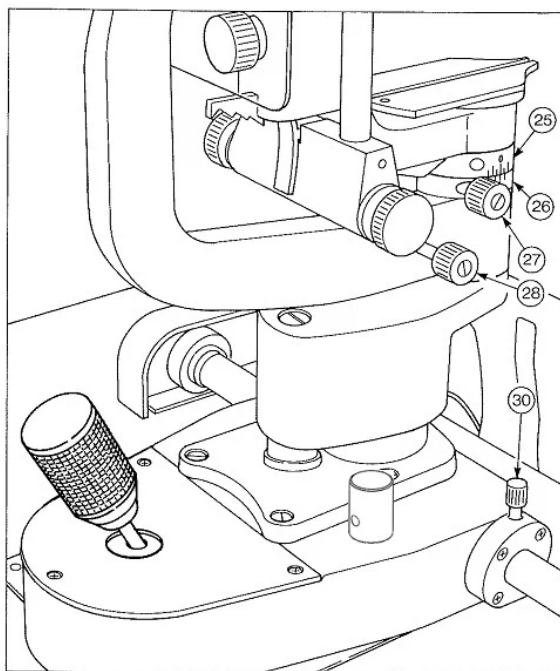


Fig. 29 Instrument Base 25. Scale Ring

26. Index Ring

27. Illumination Arm Lock

28. Microscope Arm Lock

30. Horizontal Motion Lock

7. MAINTENANCE

LED Replacement

It can use the LED for a long period of time.

When it is eventually necessary to replace the LED, it can be replaced by using the following Procedure.

CAUTION

Allow sufficient time for the lamp to cool before replacement. Metal add lamp house 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 bolts 19, (Fig. 33). Remove the cover as shown in Fig. 34. Take the bolts off the LED unit(Fig.34). Remove the old LED unit as shown in Fig. 35 and replace it with a new one.

Connect the electric wire(White) to the left pin of LED.(Fig.36)
Connect the electric wire(Black) to the right pin of LED.(Fig.36)

Assemble the lamp housing cover and tighten the two retaining bolts.

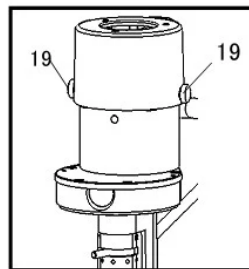


Fig. 33 Lamp Housing Cover Retaining Bolts, 19

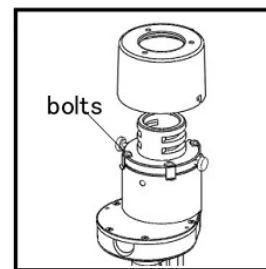


Fig. 34 Lamp Housing Cover Removal

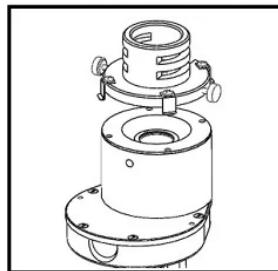


Fig. 35 LED Unit Removal

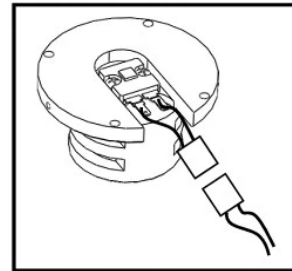


Fig. 36 Connect the LED and the electric wire.

Mirror Replacement

Tilt the illumination system by releasing the latch 11, (Fig. 1). Grasp the narrow shank of the mirror by its edges and pull upward as shown in Fig. 37.

Mirror Cleaning

Remove dust accumulation with a soft cloth.

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

Dry with a facial tissue.

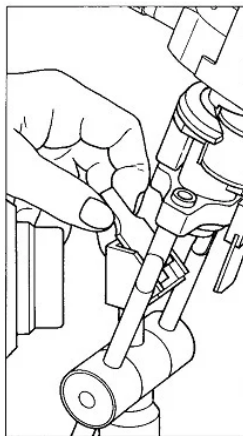


Fig. 37 Mirror Replacement

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 chemical or household cleaners.

Replacement of the base design

Loosen the three screws of base, and pull out the decoration sheet.

Flip the decoration sheet, and return to the base.

Put the plastic cover on the decoration sheet and tighten the screws.

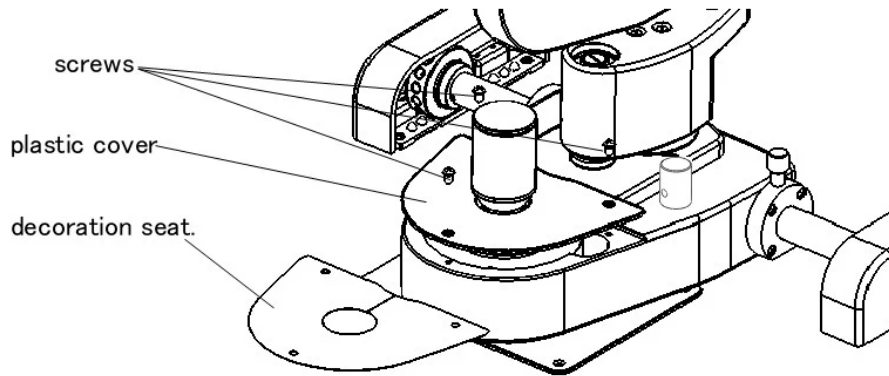
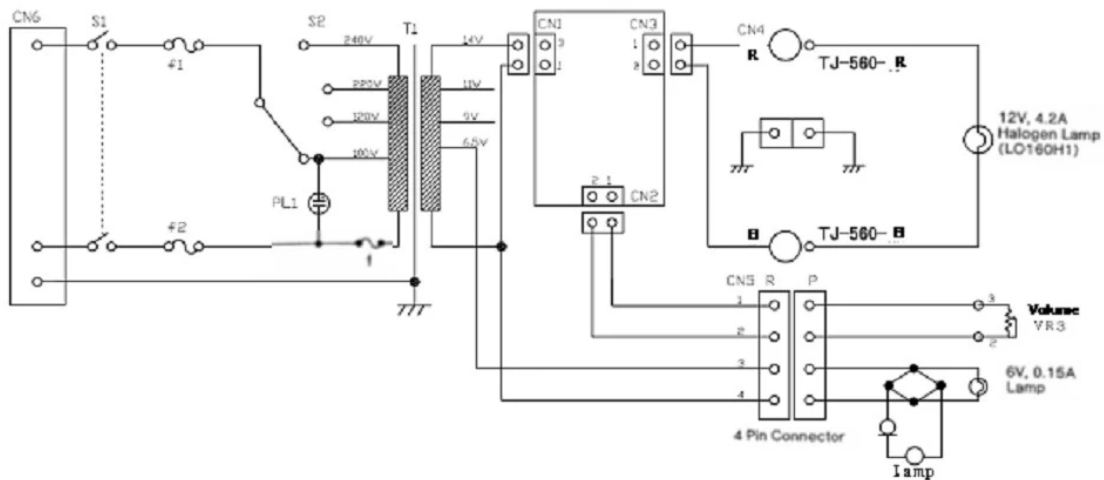


Fig. 38 Replacement of the base design

8.WIRING





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