LABOMED
ideas for vision

eVO 400
Slit Lamp

User Manual



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Caution: Federal law restricts this device to sale by or on the order of a licensed physician. Rx only.

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WARNINGS AND CAUTIONS

LABOMED is not responsible for the safety and reliability of this instrument when:
- Assembly, disassembly, repair or modification is carried out by unauthorized dealers or persons.
- The instrument is not used in accordance with this user manual.

A WARNING is an instruction that draws attention to the risk of injury or death.



WARNING: UNITED STATES FEDERAL LAW AND EUROPEAN REGULATIONS REQUIRE THAT THIS DEVICE BE PURCHASED ONLY BY A PHYSICIAN OR A PERSON ACTING ON BEHALF OF A PHYSICIAN.

WARNING: USE THIS INSTRUMENT IN STRICT ACCORDANCE WITH THE INSTRUCTIONS OUTLINED IN THIS USER MANUAL. THE SAFETY OF THE OPERATOR AND THE PERFORMANCE OF THE INSTRUMENT CANNOT BE GUARANTEED IF IT IS USED IN A MANNER NOT SPECIFIED BY LABOMED.

WARNING: DO NOT REPAIR OR SERVICE THIS INSTRUMENT WITHOUT AUTHORIZATION FROM THE MANUFACTURER. ANY REPAIR OR SERVICE MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS TRAINED BY LABOMED; OTHERWISE, SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: MODIFICATIONS TO THIS INSTRUMENT ARE NOT ALLOWED. ANY MODIFICATION TO THIS UNIT MUST BE AUTHORIZED BY LABOMED; OTHERWISE, SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: IF THIS INSTRUMENT IS MODIFIED, APPROPRIATE INSPECTION AND TESTING MUST BE CARRIED OUT TO ENSURE CONTINUED SAFE USE OF THE INSTRUMENT.

WARNING: TO AVOID THE RISK OF ELECTRIC SHOCK, THIS EQUIPMENT MUST ONLY BE CONNECTED TO A SUPPLY MAINS WITH PROTECTIVE EARTH; OTHERWISE, DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: MAKE SURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE INDICATED ON THE DATA PLATE; OTHERWISE, DAMAGE TO THE UNIT MAY OCCUR.

WARNING: THIS INSTRUMENT MUST BE PLUGGED INTO AN OUTLET WITH AN EARTH GROUND. DO NOT REMOVE OR DEFEAT THE EARTH GROUND CONNECTION OF THE POWER INPUT CONNECTOR OR OF THE UNIT'S POWER CORD; OTHERWISE, DAMAGE TO THE INSTRUMENT AND/OR INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

WARNING: THE EQUIPMENT OR SYSTEM SHOULD NOT BE USED ADJACENT TO OR STACKED WITH OTHER EQUIPMENT. IF ADJACENT OR STACKED USE IS NECESSARY, THE EQUIPMENT OR SYSTEM SHOULD BE OBSERVED TO VERIFY NORMAL OPERATION IN THE CONFIGURATION IN WHICH IT WILL BE USED.

WARNING: THIS INSTRUMENT IS NOT SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE ANESTHETIC MIXTURES WITH OXYGEN OR NITROUS OXIDE.

WARNING: BECAUSE PROLONGED INTENSE LIGHT EXPOSURE CAN DAMAGE THE RETINA, THE USE OF THE DEVICE FOR OCULAR EXAMINATION SHOULD NOT BE UNNECESSARILY PROLONGED, AND THE BRIGHTNESS SETTING SHOULD NOT EXCEED WHAT IS NEEDED TO PROVIDE CLEAR VISUALIZATION OF THE TARGET STRUCTURES. THIS DEVICE IS PROVIDED WITH FILTERS THAT ELIMINATE UV RADIATION (< 400 NM) AND, WHENEVER POSSIBLE, FILTERS FOR SHORT-WAVELENGTH BLUE LIGHT (< 420 NM).

WARNING: THE USE OF ACCESSORIES OR CABLES OTHER THAN THOSE SPECIFIED, WITH THE EXCEPTION OF THOSE SOLD BY THE MANUFACTURER AS REPLACEMENT PARTS FOR INTERNAL COMPONENTS, MAY RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF THE EQUIPMENT OR SYSTEM.

WARNINGS AND CAUTIONS (continued)

A CAUTION is an instruction that draws attention to the risk of damage to the product.



CAUTION: THE INTERNAL CIRCUITRY OF THE INSTRUMENT CONTAINS ELECTROSTATIC SENSITIVE DEVICES (ESD) THAT MAY BE SENSITIVE TO STATIC CHARGES PRODUCED BY THE HUMAN BODY. DO NOT REMOVE THE COVERS WITHOUT TAKING PROPER ESD PRECAUTIONS.

CAUTION: DO NOT USE SOLVENTS OR STRONG CLEANING SOLUTIONS ON ANY PART OF THIS INSTRUMENT, AS DAMAGE TO THE UNIT MAY OCCUR. SEE THE CARE AND MAINTENANCE SECTION FOR DETAILED CLEANING INSTRUCTIONS.

CAUTION: MEDICAL ELECTRICAL EQUIPMENT NEEDS SPECIAL PRECAUTIONS REGARDING ELECTROMAGNETIC COMPATIBILITY (EMC) AND MUST BE INSTALLED AND SERVICED ACCORDING TO THE EMC INFORMATION PROVIDED IN THE ACCOMPANYING DOCUMENTS.

CAUTION: PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT CAN AFFECT MEDICAL ELECTRICAL EQUIPMENT.

CAUTION: DO NOT USE THIS INSTRUMENT NEAR HIGH-FREQUENCY EMITTING SURGICAL EQUIPMENT.

CAUTION: THIS INSTRUMENT IS NOT INTENDED TO BE CONNECTED TO EQUIPMENT OUTSIDE THE CONTROL OF LABOMED; ANY SUCH EQUIPMENT MUST BE TESTED TO THE APPLICABLE IEC OR ISO STANDARDS.

CAUTION: CHIN REST PAPER IS FOR SINGLE USE ONLY. REPLACE IT FOR EACH PATIENT.

EXPLANATION OF SYMBOLS

The following symbols appear on the instrument:


Caution symbol indicating important operating and maintenance instructions that are included in this user manual.


Type B Applied Part


Alternating Current Power


Protective Earth


Connection ON/OFF



Manufacturer


Waste of Electrical and Electronic Equipment


Compliance with Medical Device Regulation EU MDR 2017/745


Accompanying documents must be consulted.



Authorized representative in the European Community.


Fragile contents in shipping container: handle with care.


Keep dry: keep the package away from rain.


This way up: indicates the correct upright position of the package.



U.S. federal law restricts this device to sale by or on the order of a physician.



Medical Device



Authorized European Representative



Serial No. (YY-year, MM-month, XXXX-serial no.)



Model No.

INTRODUCTION

Congratulations on your purchase of the eVO 400 slit lamp.

This user manual is a training and reference manual for the operation and maintenance of the instrument. Read it carefully before use and follow the instructions to ensure optimum performance of your new instrument. This instrument should be operated by properly trained eye care professionals such as ophthalmologists, optometrists, opticians and eye care technicians.

Keep this manual for future reference and share it with other users. Additional copies are available from your authorized LABOMED dealer or from the LABOMED Customer Service Department at:

Tel: (510) 445-1257
Email: sales@laboamerica.com

Report any serious incident involving this device to Labotech Microscopes India Pvt. Ltd. or to your national health authority.

INDICATIONS FOR USE

The eVO 400 slit lamp is an AC-powered slit lamp biomicroscope intended for examining the anterior segment of the eye, from the corneal epithelium to the posterior capsule. It is used to aid in the diagnosis of diseases or trauma that affect the structural properties of the anterior segment of the eye.

CONTRAINDICATIONS

None.

CONFIGURATIONS

eVO 400 LED WOODEN PLATFORM (EXTERNAL POWER SUPPLY)	8127201
eVO 400 LED WOODEN PLATFORM (INTERNAL POWER SUPPLY)	8127203
eVO 400 LED METAL PLATFORM (INTERNAL POWER SUPPLY)	8127205

eVO 400 LED WOODEN PLATFORM (WITH EXTERNAL POWER SUPPLY)

PART IDENTIFICATION

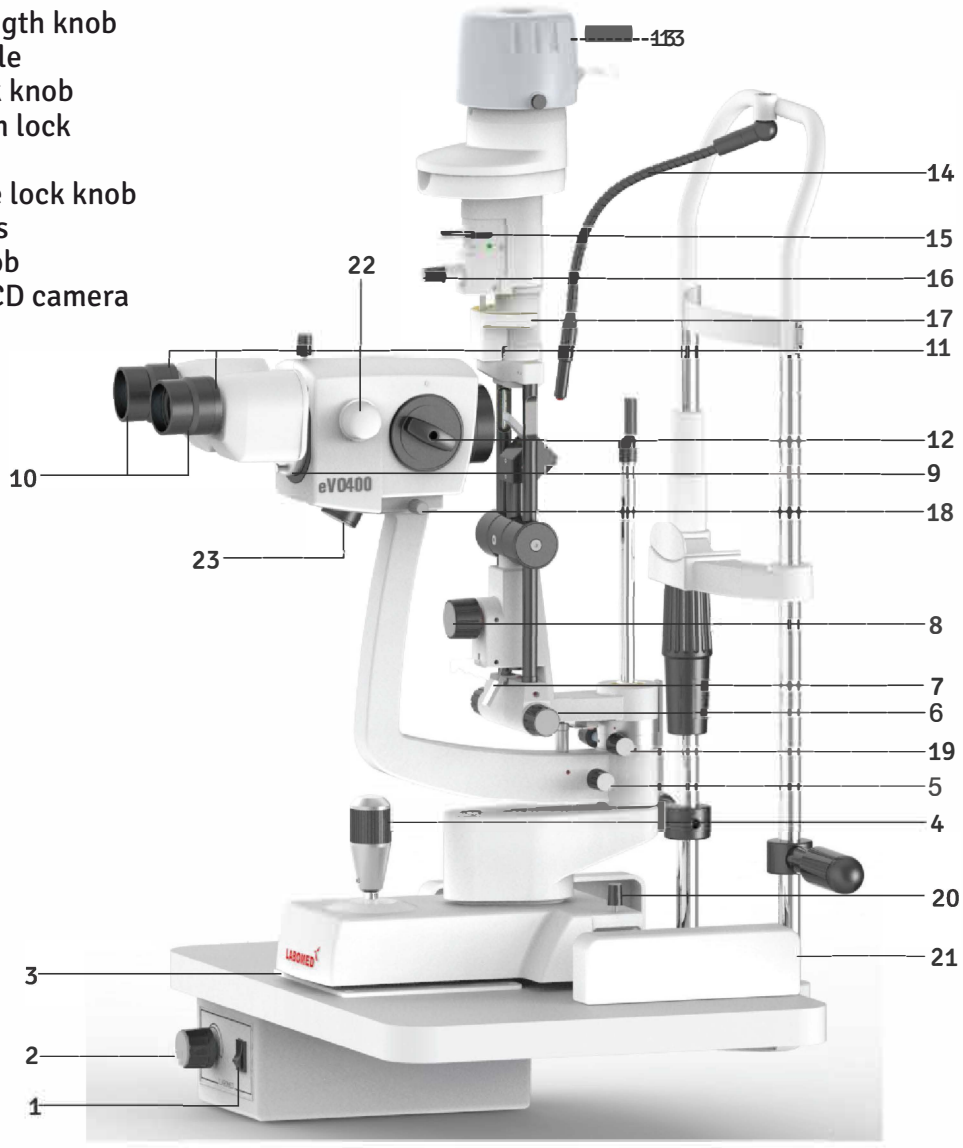
1. On/off switch
2. Illumination level control
3. Glide plate
4. Joystick for horizontal and vertical movement
5. Microscope arm lock knob
6. Slit width knob
7. Inclination latch release
8. Centering knob
9. Breath shield mount
10. Eyepieces
11. Focusing rings
12. Magnification dial
13. Lamp housing cover
14. Fixation light
15. Filter lever
16. Slit rotation/length knob
17. Slit rotation scale
18. Microscope lock knob
19. Illumination arm lock knob
20. Instrument base lock knob
21. Guide rail covers
22. Yellow filter knob
23. Inlet tube for CCD camera

eVO 400 PACKAGE CONTENTS

1. eVO 400 Slit Lamp LED (8127201)

ACCESSORIES

1. Focusing rod (8124300-801)
2. Hex wrench, 3 mm (LK-003)
3. Hex wrench, 4 mm (LK-004)
4. Hex wrench, 5 mm (LK-005)
5. Dust cover (PKG-107)
6. Rack covers (8124100-206)
7. Replacement fuses (8124900-900)
8. Chin rest paper, 1 pack (8126000-786)



eVO 400 LED WOODEN PLATFORM (WITH INTEGRATED POWER SUPPLY)

PART IDENTIFICATION

1. On/off potentiometer
2. Glide plate
3. Joystick for horizontal and vertical movement
4. Microscope arm lock knob
5. Slit width knob
6. Inclination latch release
7. Centering knob
8. Breath shield mount
9. Eyepieces
10. Focusing rings
11. Magnification dial
12. Lamp housing cover
13. Fixation light
14. Filter lever
15. Slit rotation/length knob
16. Slit rotation scale
17. Microscope lock knob
18. Illumination arm lock knob
19. Instrument base lock knob
20. Guide rail covers
21. Yellow filter knob
22. Binocular head
23. Forehead rest
24. Chin rest support
25. Wooden platform
26. Patient handles
27. Aperture size display
28. Built-in tube for CCD camera attachment
29. Power supply

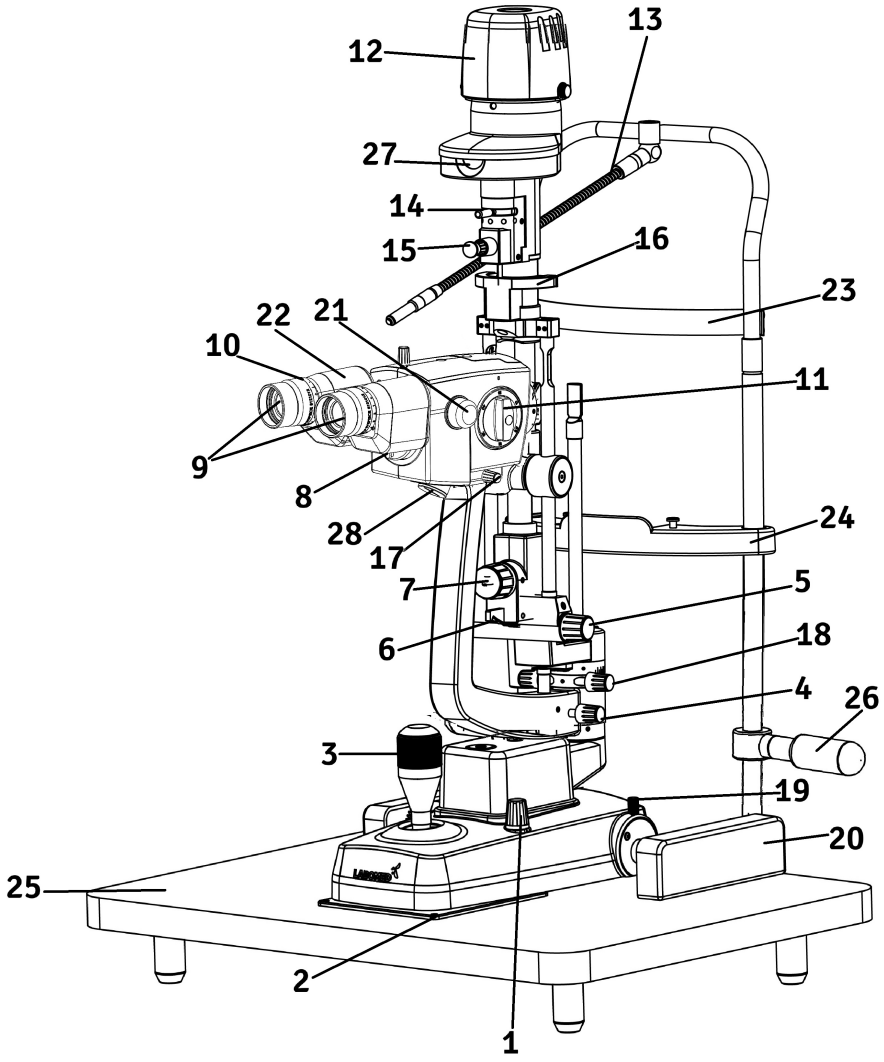
eVO 400 PACKAGE CONTENTS

1. eVO 400 Slit Lamp LED (8127203)

ACCESSORIES

1. Focusing rod (8124300-801)
2. Hex wrench, 3 mm (LK-003)
3. Hex wrench, 4 mm (LK-004)
4. Hex wrench, 5 mm (LK-005)
5. Dust cover (PKG-107)
6. Rack covers (8124100-206)
7. Replacement fuses (8124900-900)
8. Chin rest paper, 1 pack (8126000-786)





eVO 400 LED METAL PLATFORM (WITH INTEGRATED POWER SUPPLY)

PART IDENTIFICATION

1. On/off potentiometer
2. Glide plate
3. Joystick for horizontal and vertical movement
4. Microscope arm lock knob
5. Slit width knob
6. Inclination latch release
7. Centering knob
8. Breath shield mount
9. Eyepieces
10. Focusing rings
11. Magnification dial
12. Lamp housing cover
13. Fixation light
14. Filter lever
15. Slit rotation/length knob
16. Slit rotation scale
17. Microscope lock knob
18. Illumination arm lock knob
19. Instrument base lock knob
20. Guide rail covers
21. Yellow filter knob
22. Binocular head
23. Forehead rest
24. Chin rest support
25. Wooden platform
26. Patient handles
27. Aperture size display
28. Built-in tube for CCD camera attachment
29. Power supply

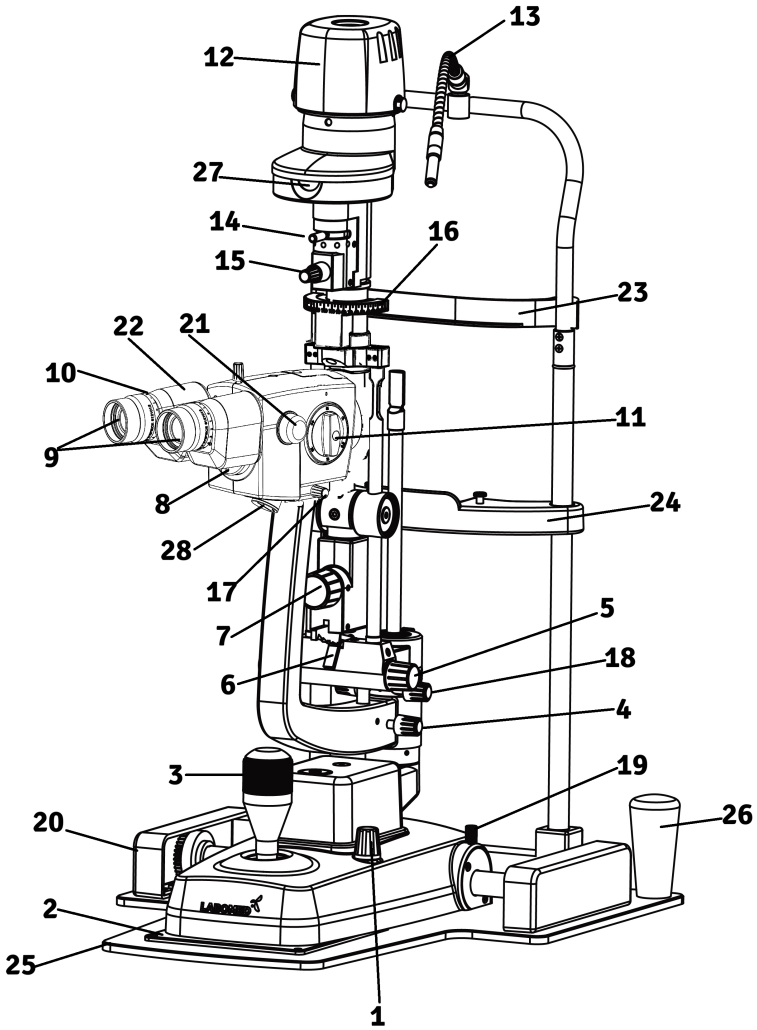
eVO 400 PACKAGE CONTENTS

1.eVO 400 Slit Lamp LED (8127205)

ACCESSORIES

1. Focusing rod (8124300-801)
2. Hex wrench, 3 mm (LK-003)
3. Hex wrench, 4 mm (LK-004)
4. Hex wrench, 5 mm (LK-005)
5. Dust cover (PKG-107)
6. Rack covers (8124100-206)
7. Replacement fuses (8124900-900)
8. Chin rest paper, 1 pack (8126000-786)





SETUP (WOODEN PLATFORM & CHIN REST ASSEMBLY)

UNPACKING AND INSTALLATION

1. Open the outer shipping box and remove the three (3) inner boxes.

2. Take out the user manual and follow it to install the slit lamp.

3. Open the box containing the table top and electronics. See Figure 1.

4. Remove the table top from the box, install it on the instrument stand or table, and secure it in place as indicated in the user guide for the stand.

5. Open the box with the chin rest assembly and remove it. See Figure 2.

6. Using the 3 mm hex wrench, connect the ground wire from the power supply to the chin rest assembly with the ground screw provided (torque to **7.8** N·m). See Figure 3.

7. Using the 5 mm hex wrench, remove the two screws from the bottom of the table top and attach the chin rest assembly to the table top with these screws. See Figure 4.



Figure-1 Table Top and Electronics

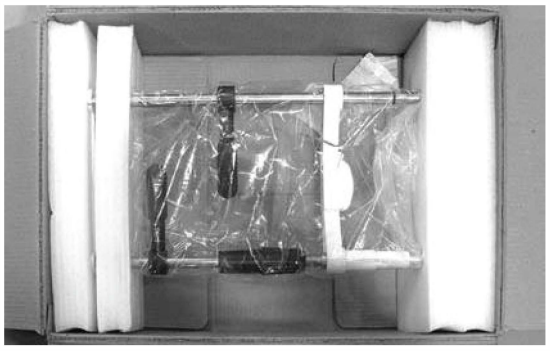


Figure-2 Chin Rest Assembly

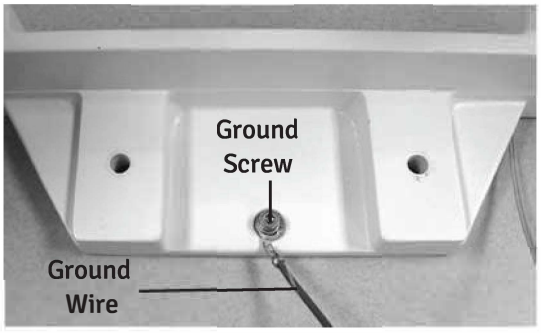


Figure-3 Chin Rest Ground

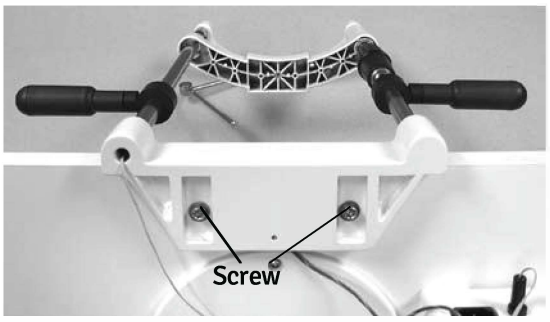


Figure-4 Chin Rest Attaching Screw

SETUP (METAL PLATE & CHIN REST ASSEMBLY)

UNPACKING AND INSTALLATION

1. Open the outer shipping box and remove the three (3) inner boxes.

2. Take out the user manual and read it.

3. Open the box containing the table top and electronics. See Figure 1.

4. Remove the table top from the box, install it on the instrument stand or table, and secure it in place as indicated in the user guide for the stand.

5. Open the box with the chin rest assembly and remove it. See Figure 2.

6. Using the 3 mm hex wrench, connect the ground wire to the power supply. See Figure 5.

7. Using the 5 mm hex wrench, remove the two screws from the bottom of the table top and attach the chin rest assembly to the table top with these screws. See Figure 4.

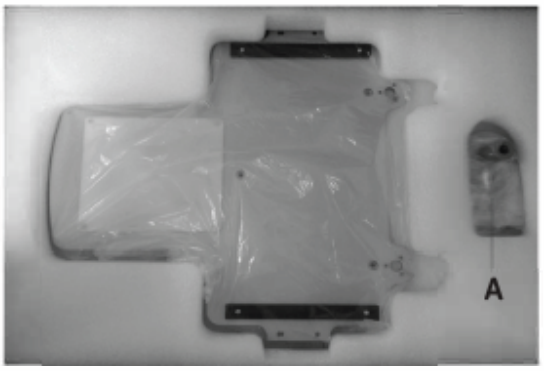


Figure- 1 Table Top and Power Supply Bracket



Figure- 2 Chin Rest Assembly



Figure- 3 Chin Rest Attaching Screws

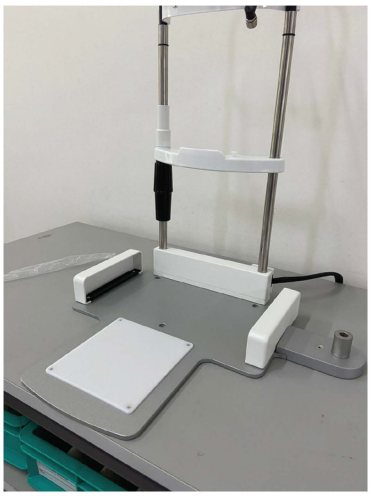


Figure- 4 Chin Rest Ground

SETUP BASE (WITH EXTERNAL POWER SUPPLY)

UNPACKING AND INSTALLATION (continued)

1. Open the box marked “Microscope Assembly”. Remove the microscope assembly, slit lamp assembly, power supply and accessories. See Figure 5.

2. Using the 5 mm hex wrench, remove the M8 Allen screw from the bottom of the illumination assembly and arm. See Figure 5a.

3. Install the slit lamp assembly on the tracks of the table top and slide the guide rail covers around the tracks. See Figure 6.

4. Fit the power supply to the table top by pushing it into the hole shown as (C). See Figure 7.

5. Connect the ground wire to the power supply with the 3 mm Allen wrench. See Fig. 8.

6. Attach the base lamp wire connector to the back of the power supply assembly. See Fig. 8.

7. Plug the chin rest target light connector into the power supply assembly. See Figure 8.

8. Using the 4 mm hex wrench, adjust the patient handles by loosening the Allen cap screws that secure them to the chin rest posts. Slide the patient handles up or down to the desired height and secure them by tightening the Allen cap screws. See Fig. 9.

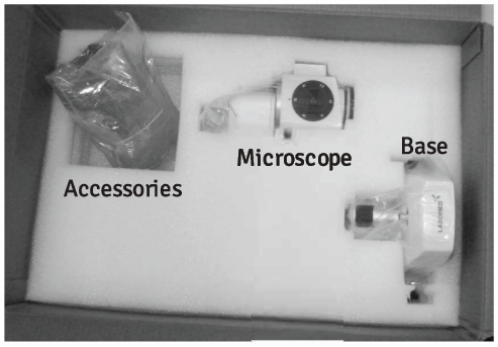


Figure- 5 Microscope, Base, Power Supply & Accessories



Figure- 5a Illumination tower

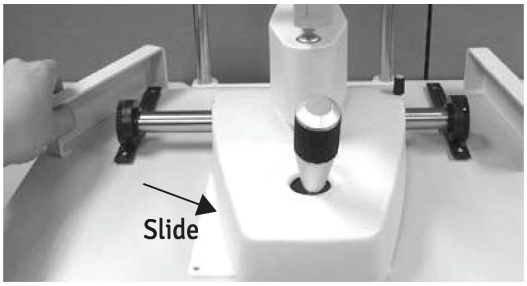


Figure- 6 Install Base

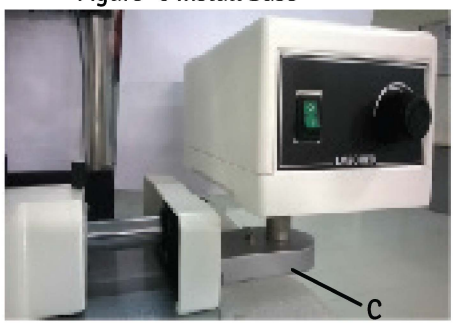


Figure. 7 Assembling Power Supply on the Power Supply Bracket

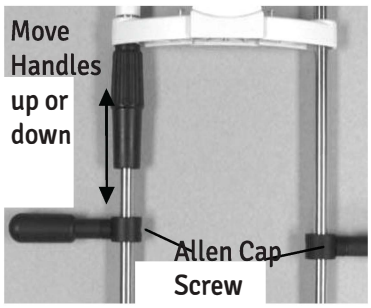


Figure- 9 Adjusting Patient Handle Height



Figure- 8 Connections

SETUP BASE (WITH INTEGRATED POWER SUPPLY)

UNPACKING AND INSTALLATION (continued)

1. Open the box marked “Microscope Assembly”. Remove the microscope assembly, slit lamp assembly, power supply and accessories. See Figure 5.

2. Using the 5 mm hex wrench, remove the M8 Allen screw from the bottom of the illumination assembly and arm. See Figure 5a.

3. Install the base assembly on the tracks of the table top and slide the guide rail covers around the tracks. See Figure 6.

4. Fit the moving and illumination arm assembly on the base with the M6 Allen screw, as shown in Fig. 7.

5. Connect the power adapter (12 V DC) to the inlet (F) at the back of the slit lamp base. See Fig. 7.

6. Connect the gray lamp wire connector to the inlet (G) at the back of the slit lamp base. See Fig. 7a.

7. Connect the chin rest target light connector to the inlet (I) at the back of the slit lamp base. See Fig. 9.

8. To switch the device ON, turn knob (B) clockwise. To increase the illumination intensity, turn knob (B) further clockwise.

9. To switch the device OFF, turn knob (B) counterclockwise.

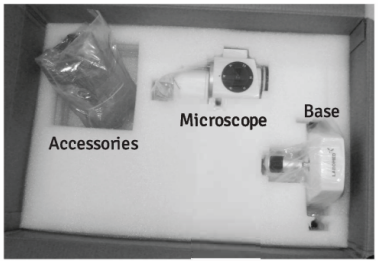


Figure- 5 Microscope, Base, Power Supply & Accessories



Figure- 5a Illumination tower

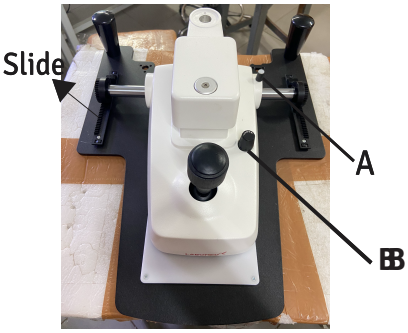


Fig. 6

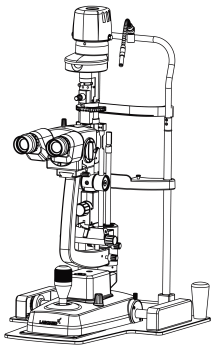


Fig. 7



Fig. 8. Connecting chin rest target light



Fig. 7a. Connecting lamp wire

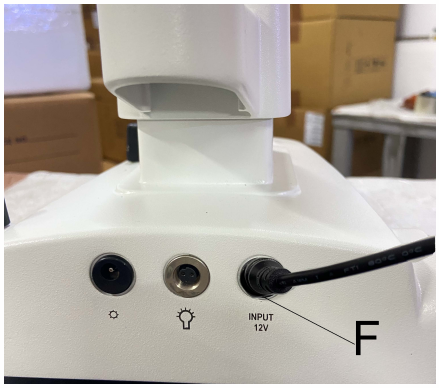


Fig. 7. Connecting power adapter

SETUP (MICROSCOPE ASSEMBLY), COMMON TO ALL VARIANTS

UNPACKING AND INSTALLATION (continued)

13. Install the microscope assembly on top of the arm by sliding it into position until it is against the stop. Then tighten the lock knob on the right side of the microscope assembly. See Figure 9.

Note: Do not adjust the microscope stop knob behind the base of the microscope; changing the vertex distance will misalign the focus and require recalibration of the slit lamp assembly.

14. Remove the accessories and store them in a suitable place so that they are available when needed. See Figure 10.

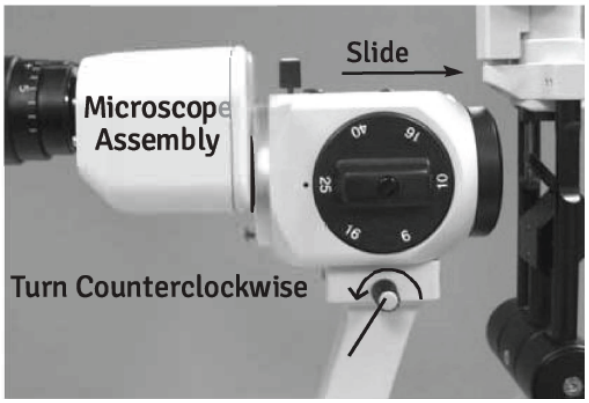


Figure -9 Install Microscope

APPLICATION OF INPUT POWER

WARNING: ARRANGE THE ACCESSORY CABLES SO THAT THEY DO NOT PRESENT A TRIPPING HAZARD TO THE EXAMINER OR A DANGER TO THE PATIENT.

WARNING: POSITION THIS INSTRUMENT SO THAT THE DISCONNECTION DEVICE (PLUG) IS EASY TO OPERATE.



Figure -10 Accessories

1. After the unit is in its secure location, apply the correct input voltage to the instrument using the power adapter from the box.

NOTE: The power inlet is located on the back of the slit lamp base.

2. Connect the slit lamp to the 12 V DC adapter provided. Rotate the rheostat (R) on the slit lamp base to light up the slit lamp. See Fig. 11.

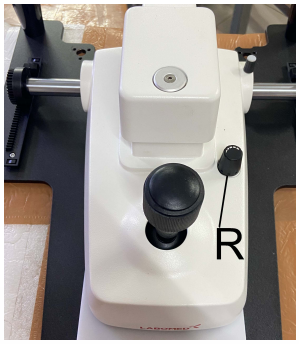


Fig. 11 Light Intensity Knob

Mounting the breath shield

1. Remove the eyepieces (S). See Fig. 11a.

2. Hold the breath shield (T) vertically, align its cut-out around the eyepiece tubes and push the eyepieces back in. See Fig. 11a.

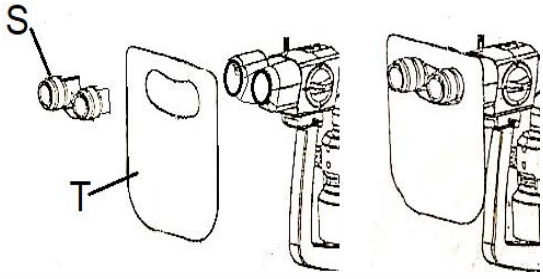


Fig. 11a Mounting the breath shield

SETUP (CCD/HD CCD CAMERA)

UNPACKING AND INSTALLATION (continued)

Set Up of Camera (CCD / HD CCD Camera)

1. Remove the check nut from the inlet tube for the CCD camera, shown as (A). See Figure 12.

2. Fit the lens adapter to the camera inlet tube by turning it clockwise, shown as (B). See Figure 13.

3. Remove the dust cover from the camera and fit the camera by turning it clockwise into the lens adapter, shown as (C). See Figure 14.

4. Plug the video cable into the analog video connector, shown as (D). See Figure 15.

5. Plug the power connector into the camera power inlet, shown as (E). See Figure 16.

6. Connect the video cable to the video-in port of the TV/LED monitor for live streaming.

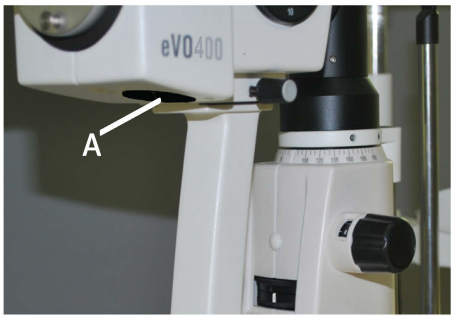


Figure 12

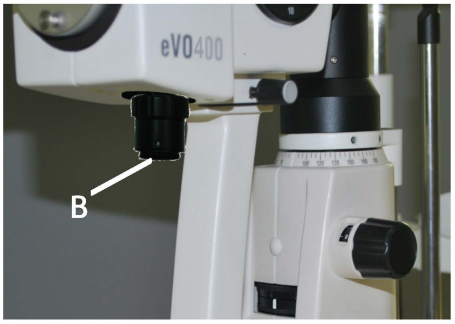


Figure 13

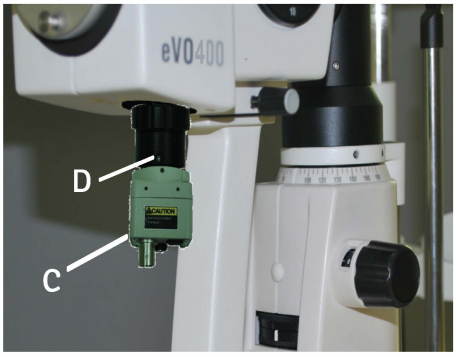


Figure 14

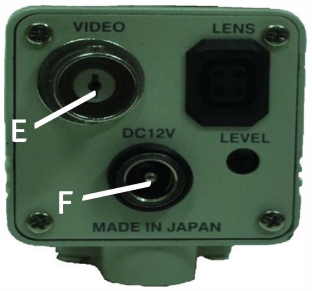


Figure 15

INSTRUCTIONS FOR USE

OPERATION

1. Switch on the power with the On/Off switch on the base (see Fig. 19). Adjust the brightness by turning the illumination level knob.

NOTE: The maximum position is for intermittent use only. Continuous use will shorten the lamp/LED life.

2. Insert the focusing rod in the pivot post of the instrument body to make rough PD and focus adjustments. See Figure 16.

3. Direct the light onto the flat surface of the focusing rod and adjust the pupillary distance and focus of the eyepieces to suit the operator.

4. Using the slit width knobs, adjust the projected slit so that the thinnest slit is shown on the focusing rod. See Figure 16.

Note: The thinnest line allows greater accuracy.

5. Remove the focusing rod.

6. To position a patient, adjust the chin rest height by turning the chin rest elevation handle on the post of the chin rest assembly until the patient's canthus is in line with the canthus mark on the chin rest post. See Figures 17 and 18.

7. Adjust the microscope elevation by rotating the joystick while observing the slit image through the microscope assembly until the slit is centered on the patient's cornea. See Figure 19.

8. Holding the joystick firmly and slightly angled toward the patient, move the slit lamp until the slit appears sharply on the cornea.

Note: Check the accuracy of this rough adjustment with the naked eye. The fine adjustment is made while observing the slit through the microscope.

9. Tilt the joystick, now held lightly at its upper end, until the slit appears sharply at the depth of the eye to be observed.

10. The horizontal motion of the base can be locked by tightening the base locking screw. See Figure 19.

Note: Lock the base whenever the lamp is not in use.

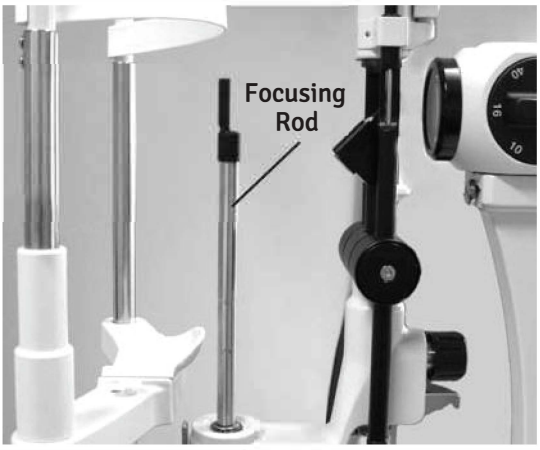


Figure- 16 Install Focusing Rod

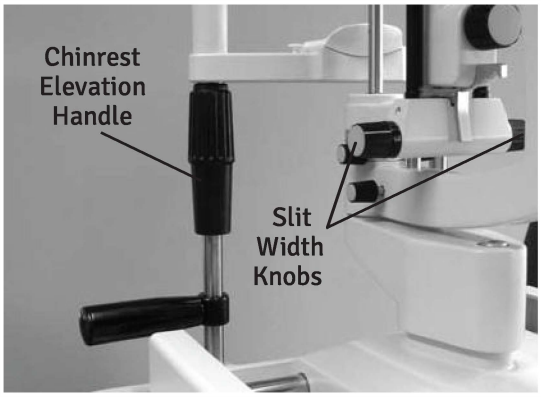


Figure- 17 Adjust Patient Height

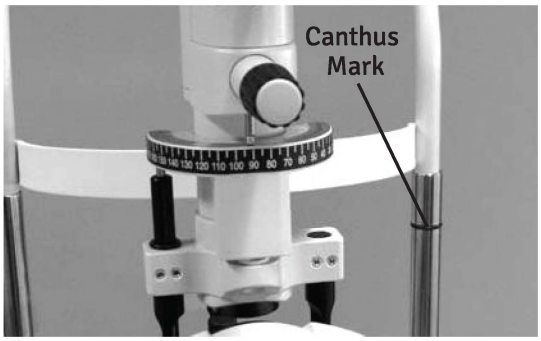


Figure- 18 Adjust Patient Height

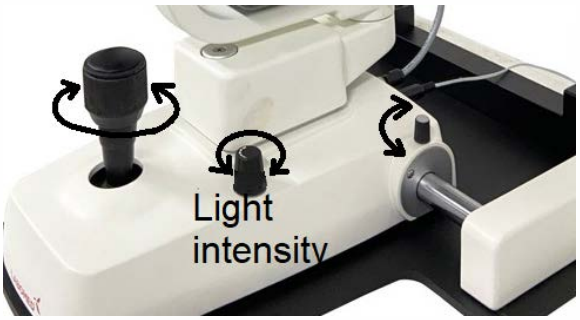


Figure- 19 Adjust Height

INSTRUCTIONS FOR USE (continued)

OPERATION (continued)

11. Adjust the slit width by rotating the slit width knobs. See Figure 17.

12. The angle between the illumination system and the microscope can be varied from 0° to 90° to the left or to the right. See Figure 21.

13. The illumination angle is shown on the illumination angle scale of the slit lamp arm. See Figure 21.

14. Change the magnification by rotating the magnification dial on the microscope assembly. See Figure 20.

Note: The magnification of each click-stop position is engraved on the magnification dial.



Figure- 20 Illumination Angle

ADJUSTING SLIT LENGTH

Adjust the slit length by rotating the slit length/rotation dial. The dial has stops at 12, 9, 5, 3, 1 and 0.3 mm diameter and a continuous length setting. See Figure 23.



Figure- 21 Illumination Angle Scale

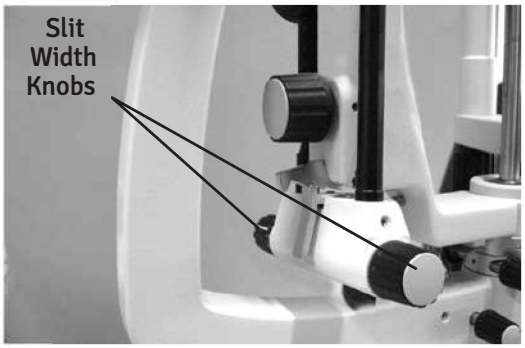


Figure- 22 Slit Width

OPERATION (continued)

FILTERS

Five filters are selected by indexing the filter lever to the matching filter dot. The filter dots are color-coded. See Figure 23. The color-coded filters are as follows:

Blue dot = cobalt blue
White dot = blank (no filter)
Red dot = heat-absorbing
Green dot = red-free
Gray dot = neutral density

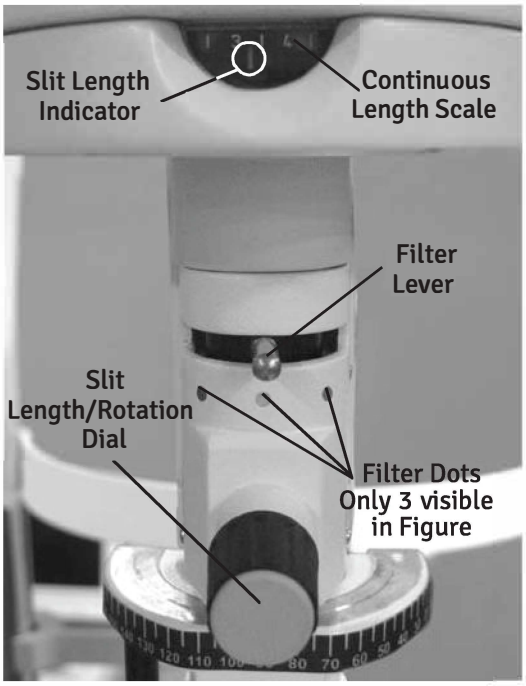


Figure- 23 Slit Width and Filters

SLIT ROTATION

Grasp the slit rotation knob to rotate the lamp housing, which rotates the slit from vertical to horizontal in either direction. The slit positions click-stop in 45° increments, stop at 0° and 180°, and are shown on the scale. See Figure 24.

YELLOW FILTER (WRATTEN FILTER)

The yellow filter of the slit lamp is ideal for detecting subtle staining caused by solution interaction with hydrogel contact lenses.
The filter can be used for early detection of micropunctate corneal staining caused by contact lens/solution interaction, for early detection of the correlation between patient symptoms and signs of dry eye syndrome, and for better visualization of RGP fluorescein patterns. See (A), Figure 25.

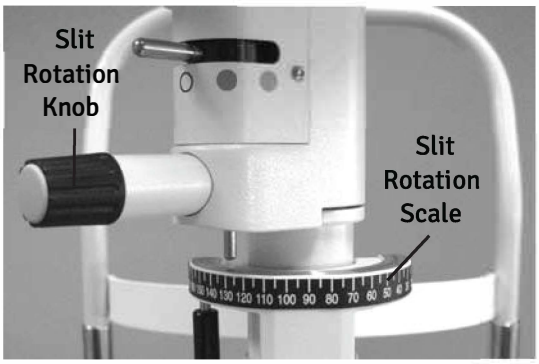


Figure- 24 Slit Rotation Scale

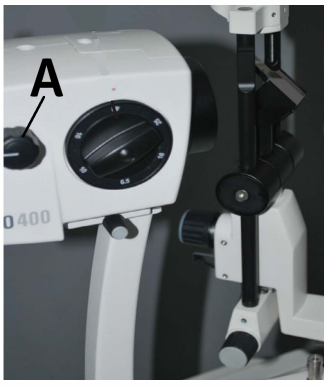


Figure- 25 Yellow Filter Knob

OPERATION (continued)

ILLUMINATION INCLINATION

The illumination assembly can be inclined in the horizontal plane in 5° steps up to a total of 20°. To tilt it, press the inclination latch release and pull the base of the illumination assembly toward the operator. See Figure 25.

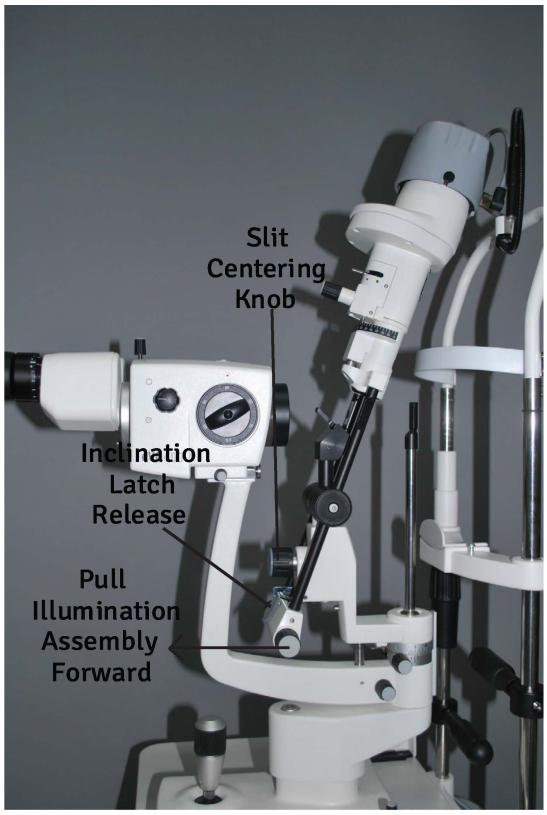


Figure- 25 Illumination Inclination

SLIT CENTRATION

When the centering screw is loosened, the slit can be moved away from the center of the field of view for retro-illumination, sclerotic scatter, etc. Tighten the screw to center the slit image again. See Figure 26.

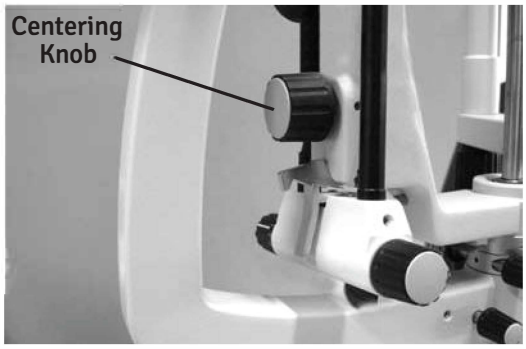


Figure- 26 Slit Centering

CLEANING & MAINTENANCE

WARNING: RISK OF ELECTRIC SHOCK. ALWAYS DISCONNECT THE POWER CORD FROM THE WALL OUTLET AND FROM THE INSTRUMENT BEFORE CARRYING OUT ANY OF THE FOLLOWING CARE AND MAINTENANCE PROCEDURES.

CLEANING

EXTERNAL CLEANING

Clean the external surfaces with a clean, soft cloth moistened with a mild solution of liquid dish soap (filtered below 5 microns). See Figure 27.

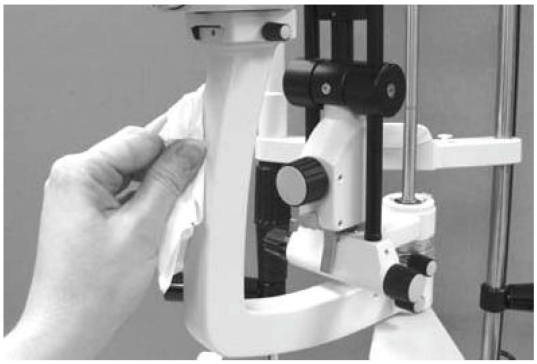


Figure- 27 Cleaning Main Unit

FOREHEAD/CHIN REST PREPARATION

For hygienic reasons, wipe the forehead rest with an alcohol wipe and change the chin rest paper after each patient.

CLEANING THE GUIDE PLATE

If the guide plate is dirty, the base of the slit lamp may feel rough when maneuvered. Clean the guide plate with a soft cloth lightly dampened with a mild soap and water solution.

MIRROR CLEANING/REPLACEMENT

To clean the mirror, blow it clean with dry air, then wipe it gently with a soft, lint-free cloth. To replace the mirror, grasp its narrow shank and pull it upward, then slide a new mirror into place. See Figure 28.

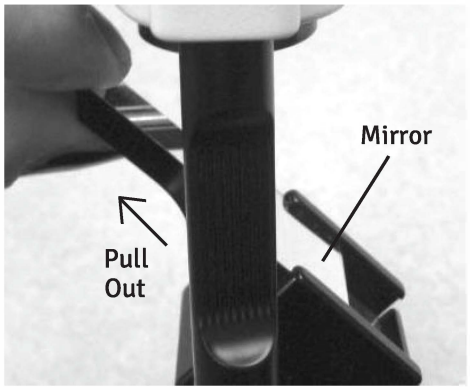


Figure- 28 Remove Mirror

USER ENVIRONMENT REQUIREMENT

- Maintain the operating environment given in the specifications section.
- Do not use this instrument in a corrosive environment, to prevent rusting.

Replacing the chin rest light indicator

1. Unscrew the LED cap. See Fig. 34.
2. Pull out the defective LED and fit the new LED (see Fig. 34a). Screw the LED cap back on.

NOTE: If the new LED does not light up after switching on, remove it and refit it with the polarity reversed.



Figure- 29 Remove Cover



Figure- 34 Changing Target Light LED

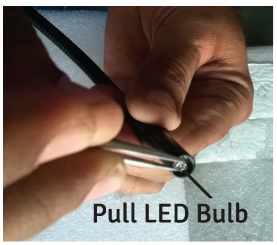


Figure- 34a Changing Target Light LED

CHANGING THE LED

WARNING: NEVER REMOVE AN LED THAT HAS RECENTLY BEEN IN USE, AS IT MAY BE VERY HOT. WAIT UNTIL IT HAS COOLED.

WARNING: NEVER TOUCH AN LED WITH BARE HANDS, AS FINGERPRINTS WILL SHORTEN THE LED LIFE.

1. Remove input power from the instrument.

2. Loosen the two screws of the lamp housing cover and lift the cover straight off. See Figure 29.

3. Unscrew the two screws to remove the heat sink from the casting. See Figure 35.

4. Unscrew the LED from the heat sink by removing the two screws. See Figure 36.

5. Fit the new LED and reassemble in reverse order.



Figure- 35

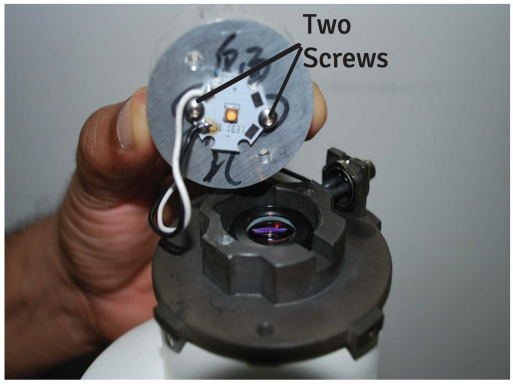


Figure- 36

FUSE REPLACEMENT

Replace the fuses in the power input module with the fuses specified in the specifications section of this manual.

1. Remove input power from the instrument.

2. Press down the top tab in the middle of the power input module to release the fuse holder, and gently pull out the fuse holder by its two small tabs. See Figures 37 and 38.

3. Open the fuse holder door by pulling it down. See Figure 38.

NOTE: The fuses pop up when the door is opened, which makes removal easier.

4. Fit the new fuses specified in the specifications section of this manual into the fuse holder.

5. Refit the fuse holder: close the door and push the fuse holder back until it snaps into place.

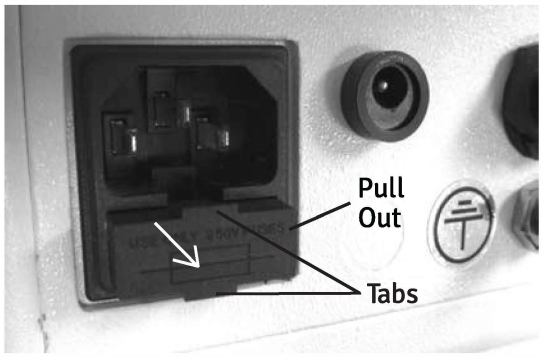


Figure- 37 Pull Out

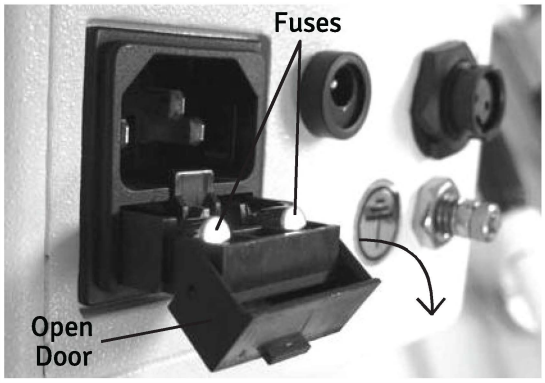
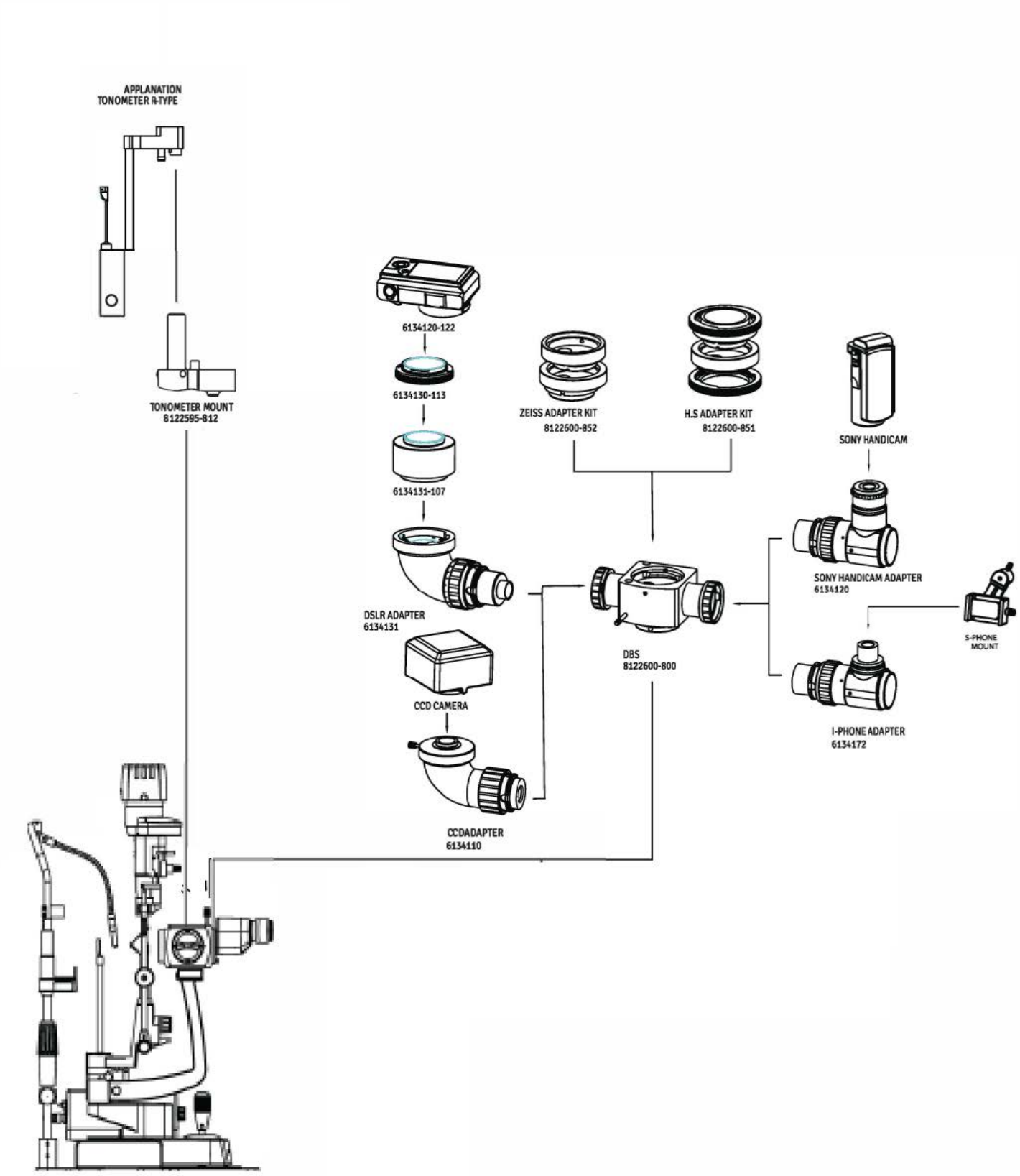


Figure- 38 Open Fuse Door

SYSTEM CONFIGURATION



TROUBLESHOOTING

The following chart lists some common issues with the eVO 400 slit lamp and steps you can take to correct them. If problems persist, contact LABOMED as listed in the Introduction section of this manual.

Chart of Common Errors

ISSUE	PROBABLE CAUSE	POSSIBLE SOLUTION
Lamp won't turn on.	Incorrect input power supplied to the eVO 400 Slit Lamp.	Check the outlet to ensure proper power is being supplied.
	Defective Power Cord.	Replace the Power Cord.
	Defective Power Supply.	Replace the Power Supply.
Slit Lamp won't move.	Rubber stopper may be attached under the joystick.	Remove the rubber stopper.
	Base Lock Screw may be tightened.	Loosen the Base Lock Screw.
Rough base movement.	Rubber stopper may be attached under the joystick.	Remove the rubber stopper.
	Bearings may be damaged.	Replace the base.
	Shaft may be damaged.	Replace the base.
Fixation light does not light up.	Fixation Light Harness not plugged into the Power Supply Assembly.	Ensure the Fixation Light Harness is properly seated in the Power Supply Assembly.
	Defective Power Supply.	Replace the Power Supply.
Double slit visible in microscope.	Microscope not focused on focusing rod before use.	Install focusing rod and check to ensure microscope is focused on it.

The following checklist lists the items to assess to determine whether the eVO 400 slit lamp requires servicing.

- Check the outside of the slit lamp for damage or missing components.
- Inspect the power cord for damage.
- Test the lamp by turning the light all the way up to its brightest setting and all the way down to its lowest setting.
- Check that all switches function properly.
- Check the filters by cycling through all the options.
- Check the slit wheel by cycling through all the options.
- Check the base movement.

SPECIFICATIONS

Catalog Number 8127200-795

Physical Dimensions

Size:
Height: 26.8 in. (68.0 cm)
Width: 17.3 in. (44.0 cm)
Depth: 15.3 in. (38.8 cm)

Weight, unpacked: 39.35 lb (17.85 kg)
Weight, packed: 52 lb (23.64 kg)

Electrical

Voltage: 100-240 V AC
Power input: max. 50-75 VA
Frequency: 50/60 Hz
Fuses: T 2.5 AH 250 V, 5 x 20 mm
LED: 5 W

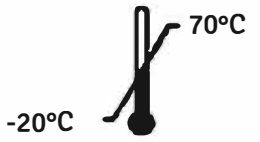
Operational Conditions

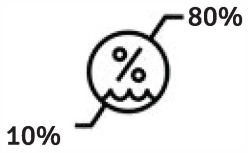
Environmental

The environmental conditions are as follows:

Operating:

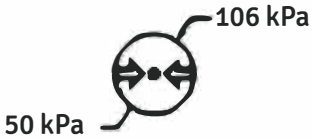
Temperature: 10 °C (50 °F) to 35 °C (95 °F)
Relative Humidity: 30% to 75%
Atmospheric Pressure: 80 kPa (23.6 in. Hg) to 106 kPa (31.3 in. Hg)





Transportation & Storage:

Temperature: -20 °C (-4 °F) to +70 °C (158 °F)
kPa Relative Humidity: 10% to 80% (non-condensing)
Atmospheric Pressure: 50 kPa (14.8 in. Hg) to 106 kPa (31.3 in. Hg)



Exposure to extreme temperature conditions indicated above must not exceed 15 weeks.

Optics

Microscope	Galilean
Mag Change	5 Step Drum Rotation
Eyepiece	12.5X
Mag Ratio	6.5X, 10X, 16X, 25X, 40X
Field of view	37.0, 24.0, 15.0, 9.5, 6.0
IPD Range	49-78 mm
Diopter Adjustment	±5
Slit Illumination	5 W LED
Slit Width	0 - 12 mm
Slit Length	1.5 - 12 mm
Slit Apertures	0.3, 1, 3, 5, 9, 12 mm
Slit Rotation	0° - 180°
Slit Inclines	5, -10, -15, -20 degrees
Filters	Red-free, heat-absorbing, cobalt blue, neutral density
Field of View	31 mm-5 mm
Working Distance	<370 mm
Illumination range of Brightness	>50000 lux

SPECIFICATIONS (continued)

MOVEMENT RANGES	
Longitudinal (In/Out)	100 mm
Lateral (Left/Right)	107 mm
Vertical (Up/Down)	30 mm
Chin Rest Range	80 mm
Table Dimensions	18.3" x 12.6" (465 mm x 316 mm)

DISPOSAL

This product does not generate any environmentally hazardous residues. At the end of its product life, follow your local laws and ordinances on the proper disposal of this equipment.

SOFTWARE REVISION

There is no software installed in this unit.

GUIDANCE TABLES

Table 201 – Guidance and Manufacturer's Declaration

Electromagnetic Emissions

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
The eVO 400 is intended for use in the electromagnetic environment specified below. The customer or user of the eVO 400 should ensure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic Environment - Guidance-**
RF Emissions CISPR 11	Group 1 Class A	The eVO 400 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.
Harmonics IEC 61000-3-2	Class A	The eVO 400 is suitable for use in all establishments other than domestic establishments and those directly connected to the public low-voltage power network that supplies buildings used for domestic purposes.
Flicker IEC 61000-3-3	Complies	

GUIDANCE TABLES (continued)

Table 202 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

All Equipment and Systems

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The eVO 400 is intended for use in the electromagnetic environment specified below. The customer or user of the eVO 400 should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
ESD IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are synthetic, the R/H should be at least 30%.
EFT IEC 61000-4-4	±2 kV mains ±1 kV I/Os	±2 kV mains ±1 kV I/Os	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential ±2 kV common mode	±1 kV differential ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
voltage Dips/Dropout IEC 61000-4-11	>95% Dip for 0.5 Cycle 60% Dip for 5 Cycles 30% Dip for 25 Cycles >95% Dip for 5 Seconds	>95% Dip for 0.5 Cycle 60% Dip for 5 Cycles 30% Dip for 25 Cycles >95% Dip for 5 Seconds	Mains power quality should be that of a typical commercial or hospital environment. If the user of the eVO 400 requires continued operation during power mains interruptions, it is recommended that the eVO 400 be powered from an uninterruptible power supply or battery.
Power Frequency 50/60 Hz Magnetic Field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic field should be that of a typical commercial or hospital environment.

GUIDANCE TABLES (continued)

Table 204 – Guidance and Manufacturer's Declaration

Electromagnetic Immunity

Equipment and Systems that are NOT Life-supporting

Guidance and Manufacturer's Declaration – Electromagnetic Immunity

The eVO 400 is intended for use in the electromagnetic environment specified below. The customer or user of the eVO 400 should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted RF **IEC 61000-4-6**	**3 Vrms** 150 kHz to 80 MHz	**(v1) = 3 Vrms**	Portable and mobile RF communications equipment should be used no closer to any part of the eVO 400, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended Separation Distance:** d=(3.5/V1)(Sqrt P) **d=(3.5/E1)(Sqrt P)** **80 to 800 MHz** d=(7/E1)(Sqrt P) **800 MHz to 2.5 GHz** **Where P is the max output power rating of the transmitter in watts (W) according to the** transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance levels in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol. 
Radiated RF IEC 61000-4-3	**80 MHz to 2.5** GHz at 3 V/m	**(E1) = 3 V/m**	

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.
***Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast, cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the ME equipment or ME system is used exceeds the applicable compliance level, the ME equipment or ME system should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the ME equipment or ME system.**
***Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [V1] V/m.**

GUIDANCE TABLES (continued)

Table 206 – Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the eVO 400 for ME Equipment and ME Systems that are NOT Life-supporting.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the eVO 400

The eVO 400 is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the eVO 400 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the eVO 400 as recommended below, according to the maximum output power of the communications equipment.

Max Output Power of Transmitter (W)	Separation (m) 150 kHz to 80 MHz d=(3.5/V1)(Sqrt P)	Separation (m) 80 to 800 MHz d=(3.5/E1)(Sqrt P)	Separation (m) 800 MHz to 2.5 GHz d=(7/E1)(Sqrt P)
0.01	0.1166	0.1166	0.2333
0.1	0.3689	0.3689	0.7378
1	1.1666	1.1666	2.3333
10	3.6893	3.6893	7.3786
100	11.6666	11.6666	23.3333

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.
Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

WARRANTY

This product is warranted by Labo America, Inc. against defects in material and workmanship under normal use for a period of one year from the date of invoice to the original purchaser. (An authorized dealer is not considered an original purchaser.) Under this warranty, the sole obligation of Labo America, Inc. is to repair or replace the defective part or product at the discretion of Labotech/LABOMED.

This warranty applies to new products and does not apply to a product that has been tampered with, altered in any way, misused, damaged by accident or negligence, or whose serial number has been removed, altered or effaced. Nor shall this warranty be extended to a product installed or operated in a manner not in accordance with the applicable LABOMED instruction manual, nor to a product that has been sold, serviced, installed or repaired other than by a Labo America, Inc. factory or an authorized LABOMED dealer.

Lamps, bulbs, charts, cards and other expendable items are not covered by this warranty.

All claims under this warranty must be made in writing to the LABOMED factory or to the authorized instrument dealer that made the original sale, and must be accompanied by a copy of the purchaser's invoice.

This warranty is in lieu of all other warranties, express or implied. All implied warranties of merchantability or fitness for a particular use are hereby disclaimed. No representative or other person is authorized to assume any other obligations for a LABOMED product. Labotech/LABOMED shall not be liable for special, incidental or consequential damages for any negligence, breach of warranty, strict liability or any other damages resulting from or relating to the design, manufacture, sale, use or handling of the product.

PATENT WARRANTY

If notified promptly in writing of any action brought against the purchaser based on a claim that the instrument infringes a U.S. patent, Labo America, Inc. will defend such action at its expense and will pay costs and damages awarded in any such action, provided that Labo America, Inc. has sole control of the defense of any such action, with information and assistance (at the expense of Labo America, Inc.) for such defense, and of all negotiations for its settlement and compromise.

PRODUCT CHANGES

Labo America, Inc. reserves the right to make changes in design or to make additions to or improvements in its products without obligation to add such to products previously manufactured.

CLAIMS FOR SHORTAGES

We use extreme care in selecting, checking, rechecking and packing to eliminate the possibility of error. If any shipping errors are discovered:

1. Carefully go through the packing material to make sure nothing was inadvertently overlooked when the unit was unpacked.
2. Call the dealer from whom you purchased the product and report the shortage. The materials are packed at the factory, and nothing should be missing if the box has never been opened.
3. Claims must be filed within 30 days of purchase.

CLAIMS FOR DAMAGES IN TRANSIT

Our shipping responsibility ends with safe delivery in good condition to the transportation company. Claims for loss or damage in transit should be made promptly and directly to the transportation company. If, on delivery, the outside of the packing case shows evidence of rough handling or damage, ask the transportation company's agent to note "Received in Bad Order" on the delivery receipt. If, within **48** hours of delivery, concealed damage is found when unpacking the shipment and there is no exterior evidence of rough handling, ask the transportation company to make out a "Bad Order" report. This procedure is necessary for the dealer to maintain the right of recovery from the carrier.

Revision History

Revision History

Rev. No.	Date of Release	DCR #	Change	App. By
1.0	April 1,2026			S Bal

LABOMED
ideas for vision

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