

eVO 400

Slit Lamp

User's Guide



eVO 400 is a registered Trade Mark of Labotech Microscopes India Pvt. Ltd.

LABOMED is the registered Trade Mark of Labo America Inc.

All other trademarks are property of their respective owners.

The information contained in this document was accurate at time of publication. Specification subject to change without notice. Labotech and Labo America Inc. reserves the right to make changes in the product described in this manual without notice and without incorporating those changes in any products already sold.

ISO 9001/13485 Certified-LABOMED products are designed and manufactured under quality processes meeting ISO 9001/13485 requirements.

No parts of this publication may be reproduced, stored in a retrieval system, or transmitted in any form of by any means, electronic, mechanical, recording, or otherwise without the prior written permission of Labo America Inc.

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

Table of Contents

Warnings and Cautions	4
Symbol Information	6
Introduction	7
Indications for Use.	7
Contraindications	7
Features & Functions	8
Parts Identification.	8
eVO 400 Package Contents.	8
Accessories.	8
Setup	9
Unpacking & Installation	9
Application of Input Power.	11
Disconnection of Input Power	11
Setup of Camera.	12
Instructions for Use	13
Operation	13
Adjusting Slit Length.	14
Filters	15
Slit Rotation.	15
Illumination Inclination	16
Slit Centration.	16
Cleaning & Maintenance	17
Cleaning.	17
External Cleaning.	17
Forehead / Chinrest Preparation	17
Cleaning the Glide Plate.	17
Mirror Cleaning / Replacement.	17
Changing the Halogen Bulb.	18
Replacement of Chinrest light Indicator	18
Changing the LED.	19
Fuse Replacement	20
Troubleshooting	21
Specifications.	22
Physical Dimensions	22
Electrical	22
Operational Conditions.	22
Optics.	22
Movement Ranges	23
Disposal	23
Software Revision	23
Guidance Tables	24
Warranty	28

Warnings & Cautions

Labo America Inc. (LABOMED) is not responsible for the safety and reliability of this instrument when:

- Assembly, disassembly, repair, or modification is made by unauthorized dealer or persons.
- Instrument is not used in accordance with this User's Guide.

WARNING: AN INSTRUCTION THAT DRAWS ATTENTION TO 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: THIS INSTRUMENT SHOULD BE USED IN STRICT ACCORDANCE WITH THE INSTRUCTIONS OUTLINED IN THE USER'S GUIDE. THE SAFETY OF THE OPERATOR AND THE PERFORMANCE OF THE INSTRUMENT CANNOT BE GUARANTEED IF 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 TO THIS INSTRUMENT MUST BE PERFORMED BY EXPERIENCED PERSONNEL OR DEALERS WHO ARE TRAINED BY LABOMED OR SERIOUS INJURY TO THE OPERATOR OR PATIENT MAY OCCUR.

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

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

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

WARNING: ENSURE THAT THE VOLTAGE APPLIED TO THE UNIT IS THE SAME AS THE VOLTAGE THAT IS INDICATED ON THE DATA PLATE OR 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 ON POWER INPUT CONNECTOR OR THE UNIT'S POWER CORD OF THIS INSTRUMENT OF DAMAGE TO IT 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 AND THAT 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, SUCH AS OXYGEN OR NITROUS OXIDE.

WARNING: BECAUSE PROLONGED INTENSE LIGHT EXPOSURE CAN DAMAGE THE RETINA, THE USE OF THE DEVICE OR 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 SHOULD BE USED WITH FILTERS THAT ELIMINATE UV RADIATION (<420 NM) AND, WHENEVER POSSIBLE, FILTERS THAT ELIMINATE 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 THE INTERNAL COMPONENTS, MAY RESULT IN INCREASED EMISSIONS OR DECREASED IMMUNITY OF THE EQUIPMENT OR SYSTEM.

Warnings & Cautions (continued)

CAUTION: AN INSTRUMENT THAT DRAWS ATTENTION TO THE RISK OF DAMAGE TO THE PRODUCT



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

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

CAUTION: MEDICAL ELECTRONIC EQUIPMENT NEEDS SPECIAL PRECAUTIONS REGARDING EMC AND NEEDS TO BE INSTALLED AND PUT INTO SERVICE ACCORDING TO THE EMC INFORMATION PROVIDED IN THE ACCOMPANYING DOCUMENTS.

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

CAUTION: THIS INSTRUMENT IS NOT TO BE USED NEAR HIGH-FREQUENCY EMITTING SURGICAL EQUIPMENT.

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

Symbol Information

Symbol Information

The following symbols appear on the instrument:



Caution symbol indicating important operating and maintenance instructions that are included in this User's Guide



Type B Applied Part



Alternating Current Power



Protective Earth



Connection ON / OFF



Date of Manufacture

REF

Catalog Number

S/N

Serial Number



Waste of Electrical and Electronic Equipment



Compliance to Medical Device Directive 93/42/EEC



Accompanying Documents must be consulted



Authorized Representative in European Community



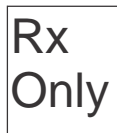
Fragile Contents in Shipping Container - handle with care



Keep Dry - Package shall be kept away from rain



This Way Up - Indicates correct upright position of package



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

Introduction

Congratulations on your purchase of the eVO 400 Slit Lamp.

This User's guide is designed as a training and reference manual for the operation and maintenance of the instrument. We recommended that you read it carefully prior to use and follow the instructions to ensure optimum performance of your new instrument. Properly trained eye care professionals such as ophthalmologists, optometrists, opticians and eye care technicians should operate this instruments.

Please retain this manual for future reference and to share with other uses. Additional copies can be obtained from your authorized LABOMED dealer or from the LABOMED Customer Service Department at:

Tel: (510)445-1257

Fax: (510)991-9862

Email: sales@laboamerica.com

Indication for use

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

Contradictions

None.

Features and Functions

Parts Identification

1. On/Off Switch
2. Illumination Level Control
3. GuidePlate
4. Joystick for horizontal and vertical adjustment
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

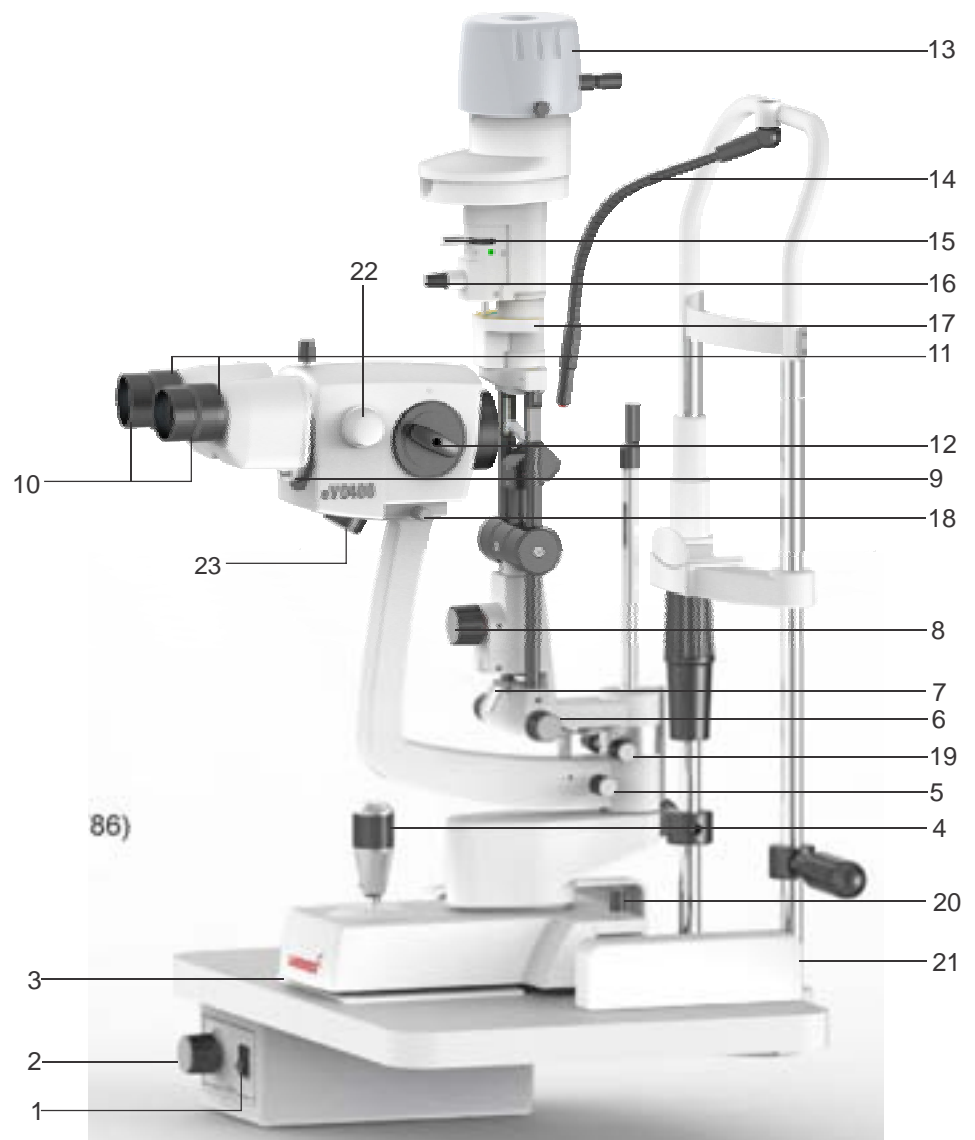
eVO 400 slit Lamp HL (8127200)

eVO 400 slit lamp LED (8127201)

User's Guide (8127200-795)

Accessories

- Focusing Rod (8124300-801)
- Hex Wrench (3mm) (LK-003)
- Hex Wrench (4mm) (LK-004)
- Hex Wrench (5mm) (LK-005)
- Dust Cover (PKG-107)
- Halogen Lamp, Main (8124300-401)
- Guide Rail Covers (8124100-206)
- Replacement Fuses (8124900-900)
- Chin Rest Paper - 1 pack (8126000-78)



Setup

Unpacking and Installation

1. Open the outside shipping box and remove the three (3) inner boxes.
2. Remove the User's Guide and read it.
3. Open the box with the Table Top and Electronics in it. Refer to Figure 1.
4. Remove the Table Top from the box and install the Table Top onto the instrument stand and secure it into place as indicated in the user guide for the stand.
5. Open the box with the Chin Rest Assembly and remove it. Refer to Figure 2.
6. Using the 3mm Hex Wrench, connect the Ground Wire from the Power Supply to the Chin Rest Assembly using the Ground Screw provided (torque to 7.8 N•m). Refer to Figure 3.
7. Using the 5mm Hex Wrench, remove the two Screws from the bottom of the Table Top and attach the Chin Rest Assembly to the Table Top using these Screws. Refer to Figure 4.

-continued-



Figure 1 Table Top and Electronics

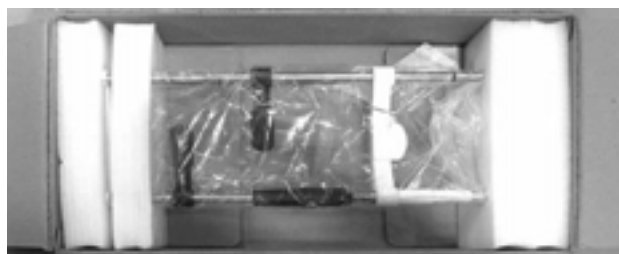


Figure 2 Chin Rest Assembly

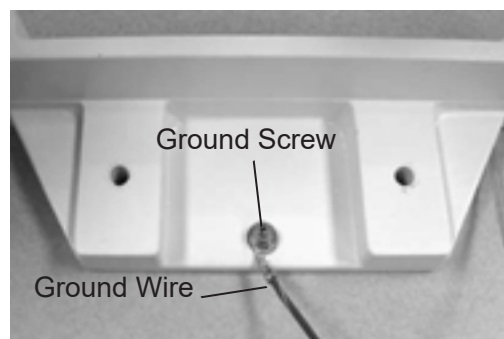


Figure 3 Chin Rest Ground

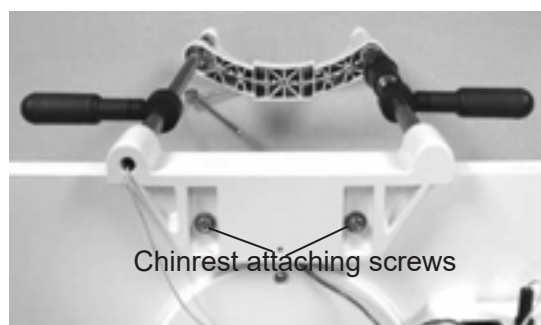


Figure 4 Chinrest Ground

Setup (continued)

Unpacking and Installation (continued)

8. Attach the Fixation Light Wire from the Chin Rest Assembly into the connector on the back of the Power Supply Assembly. Refer to Figure 5.
9. Open the box with the Microscope Assembly. Remove the Microscope, Base and Accessories. As shown in Figure 6a.
10. Using the 5mm Hex Wrench remove the M8 Allen Screw from the bottom of the Illumination Assembly and Arm. Refer Figure 6b. Assemble Illumination tower and Arm on to the base as shown in Figure 7a.

Note: The Illumination Assembly and Arm are connected as one piece. Refer Figure 6b.

11. Install the Base Assembly onto the tracks of the Table Top and slide the Guide Rail Covers around the tracks. Refer to Figure 8.
12. Attach the Base Lamp Wire to the back of the Power Supply Assembly. Refer to Figure 5.
13. Using the 4mm Hex Wrench, adjust the Patient Handles by loosening the Allen Cap screws that are securing them to the Chinrest Posts. Slide the Patient Handles up or down to the desired height, and secure them in place by tightening the Allen Cap Screws. Refer Figure 7b.

-continued-

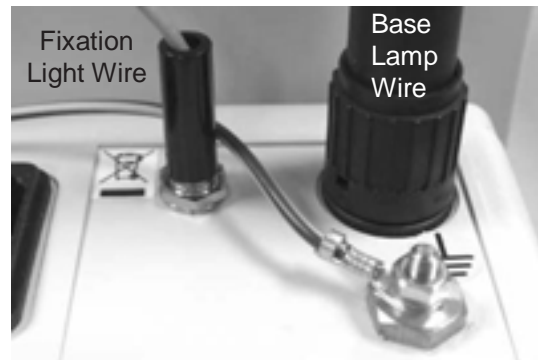


Figure 5 Connections

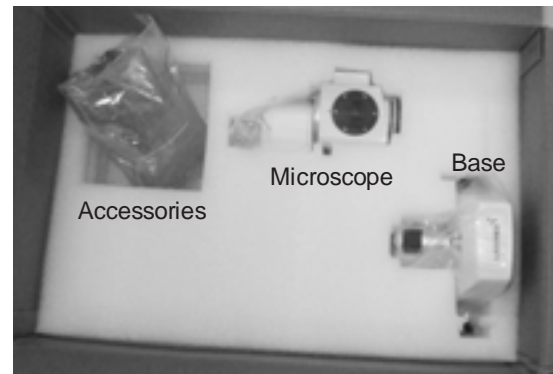


Figure 6a Microscope, Base, Accessories



Figure 6b Illumination Tower

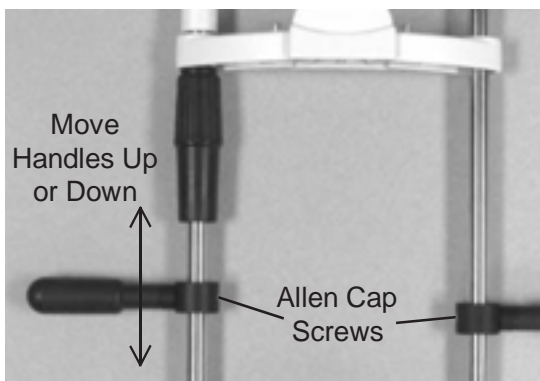


Figure 7b Adjusting Patient Handle Height



Figure 7a Mounting Illumination Tower & Arm

Setup (continued)

Unpacking and Installation (continued)

16. Install the Microscope Assembly onto the top of the Arm by sliding it into position, making sure it is up against the stop. Then, tighten the Lock Knob located on the right side of the Microscope Assembly. Refer to Figure 9.

Note: Do not adjust the microscope stop knob behind the base of the microscope or the vertex distance will cause misalignment of focus and require re-calibration of the slit lamp assembly.

17. Remove the accessories and store them in an appropriate place so that when they are needed they will be available. Refer to Figure 10.

Application of Input Power

WARNING: CARE MUST BE TAKEN TO ARRANGE THE CABLES FOR THE ACCESSORIES SUCH THAT THEY DO NOT PRESENT A TRIPPING HAZARD TO THE EXAMINER OR A DANGER TO THE PATIENT.

WARNING: POSITION THIS INSTRUMENT SO THAT IT

IS NOT DIFFICULT TO OPERATE THE DISCONNECTION DEVICE (PLUG).

1. After the unit is in its secure location, apply the correct input voltage to the instrument using the Power Cord from the Accessory Tray.

Note: The power inlet is located on the backside of the Power Supply Assembly.

2. Press down on the “I” located on the ON/OFF Switch. Refer to Figure 11.

Note: The ON/OFF Switch will illuminate green when there is power to the unit. When the ON/OFF Switch is set to off, the green light will turn off.

Disconnection of Input Power

1. At any time, the power switch can be set to OFF. The unit does not have a power down sequence. To terminate operation of this instrument, press the ON / OFF switch to the OFF position (O).
2. If this instrument is intended to be OFF for an extended period of time, it can be disconnected from power by detaching the power cord from the its receptacle.



Figure 8 Install Base Assembly

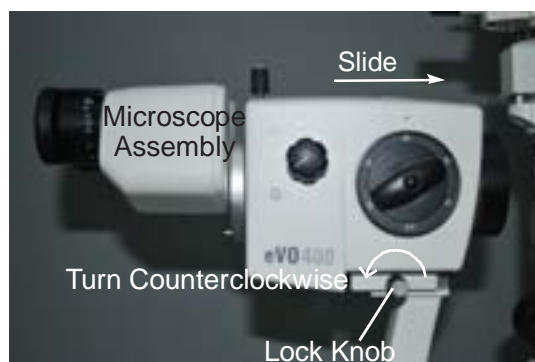


Figure 9 Microscope Install



Figure 10 Accessories

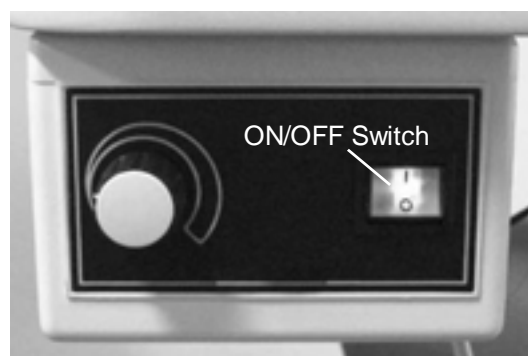


Figure 11 Power Supply Assembly

Setup (continued)

Unpacking and Installation (continued)

Set Up of Camera (CCD / HD CCD Camera)

1. Remove the Check Nut from the Inlet Tube for CCD Camera shown as (A)., Refer Figure. 12.
2. Fix the Lens Adapter by rotating it Clock wise to the Inlet Tube for Camera shown as (B)., Refer Figure. 13.
3. Remove the Dust Cover from the Camera and fix the Camera by rotating it clockwise onto the Lens Adapter. Shown as (C)., Refer Figure. 14.
4. Plug in the video cable into the Analog video Connector. Shown as (D)., Refer Figure. 15.
5. Plug in the Power Connector into the Camera Power inlet. Shown as (E)., Refer Figure. 16.
6. Connect the Video Cable into The TV/LED Video in Port to Live streaming.

Note:

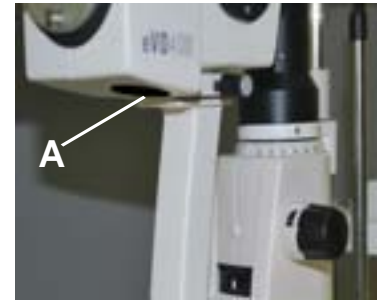


Figure. 12

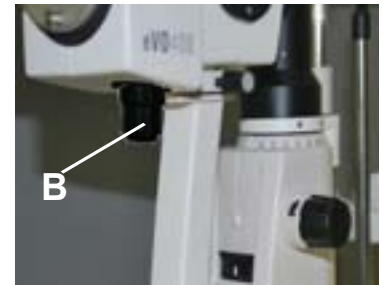


Figure. 13



Figure. 14

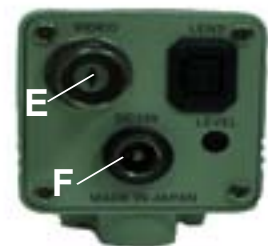


Figure. 15

Instructions for Use

Operation

1. Turn on the power using the On/Off switch located on the front of the Power Supply Assembly. Brightness can be adjusted by rotating the illumination level knob.

Note: The maximum position is for intermittent use only. Continuous use will shorten lamp life.

2. Insert the Focusing Rod in the pivot post of the instrument body to make rough PD and focus adjustments. Refer to Figure 16.
3. Position the light onto the flat surface of the Focusing Rod and adjust the pupillary distance and focus of the eyepieces to suit the needs of the operator.
4. Using the Slit Width Knobs, adjust the projected slit so that the thinnest slit is shown on the Focusing Rod. Refer to Figure 16.

Note: The thinnest line will allow for greater accuracy.

5. Remove the Focusing Rod.
6. To position a patient, adjust the chinrest height by turning the Chinrest 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. Refer to Figures 17 and 18.
7. Microscope elevation is adjusted by rotating the joystick and observing the slit image through the Microscope Assembly until the slit is centered on the patient's cornea. Refer to Figure 19.
8. Move the slit lamp with the joystick held firmly and slightly angled toward the patient, until the slit appears sharply on the cornea.

Note: The accuracy of this rough adjustment should be checked by the naked eye. The fine adjustment is performed while observing the slit through the microscope.

9. Tilt the joystick, which is now held lightly at its upper end, until the slit appears sharply at the depth of the eye which is to be observed.
10. The horizontal motion of the base can be locked by tightening the base locking screw. Refer to Figure 19.

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

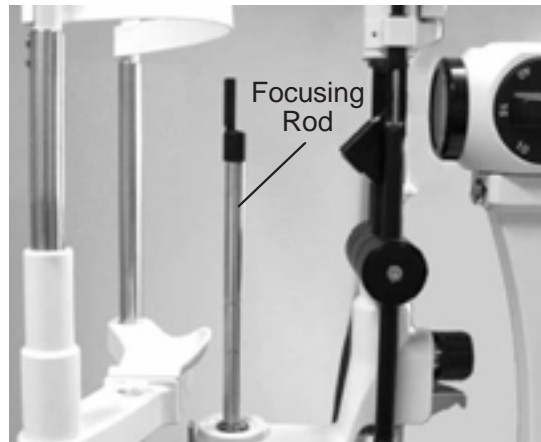


Figure16 Install Focusing Rod

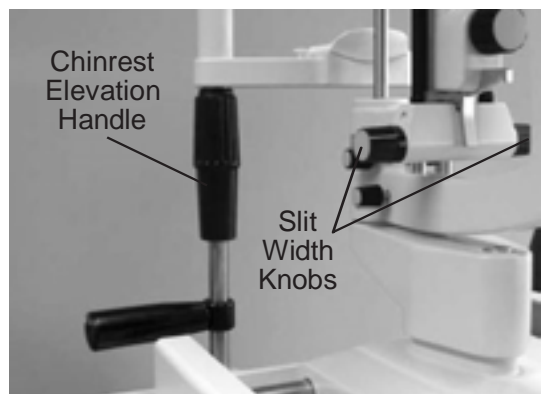


Figure17 Adjust Patient Height

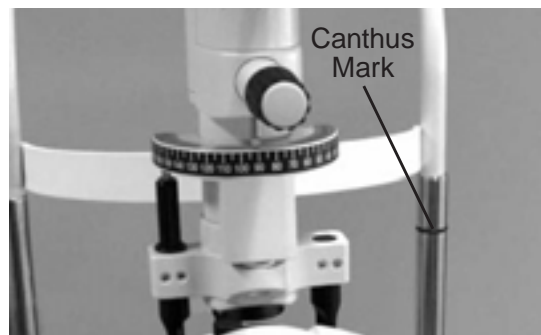


Figure 18 Adjust Patient Height

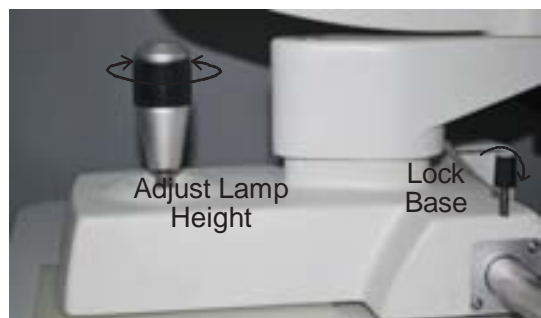


Figure 19 Adjust Height

Instructions for Use (continued)

Operation (continued)

11. The slit width can be adjusted by rotating the Slit Width Knobs. Refer to Figure 17.
12. The angle between the illumination system and the microscope can be varied between 0° and 90° to either the left or right. Refer to Figure 21.
13. The illumination angle is indicated on the Illumination Angle Scale on the slit lamp arm. Refer to Figure 21.
14. Magnification is altered by rotating the Magnification Dial on the Microscope Assembly. Refer to Figure 20.

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

Adjusting Slit Length

The slit length is adjusted by rotating the Slit Length/Rotation Dial. The dial has five stops for adjustments. They are 12, 9, 5, 3, 1 and 0.3 mm diameter and continuous length. Refer to Figure 23.

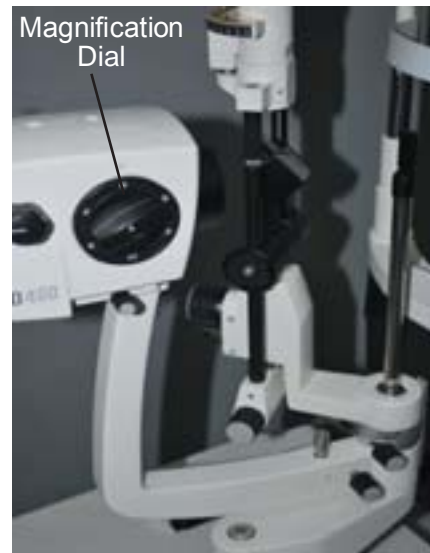


Figure 20 Illumination Angle



Figure 21 Illumination Angle Scale

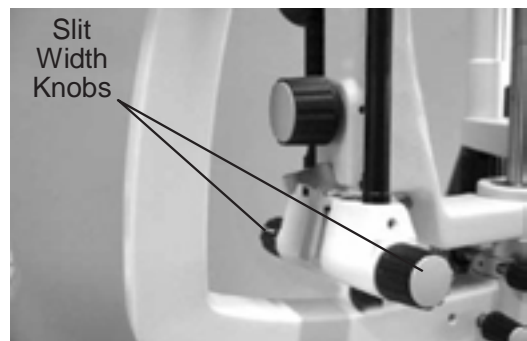


Figure 22 Slit Width

Instructions for Use (continued)

Operation (continued)

Filters

There are five filters that can be used by indexing the Filters Lever to the co-ordinating Filters Dot. The Filter Dots are color coded. Refer to Figure 23. The color coded filters are as follows:

Blue Dot: Cobalt Blue
Red Dot: Heat Absorbing
White Dot: Blank (No filter)
Gray Dot: Neutral Density
Green Dot: Red Free

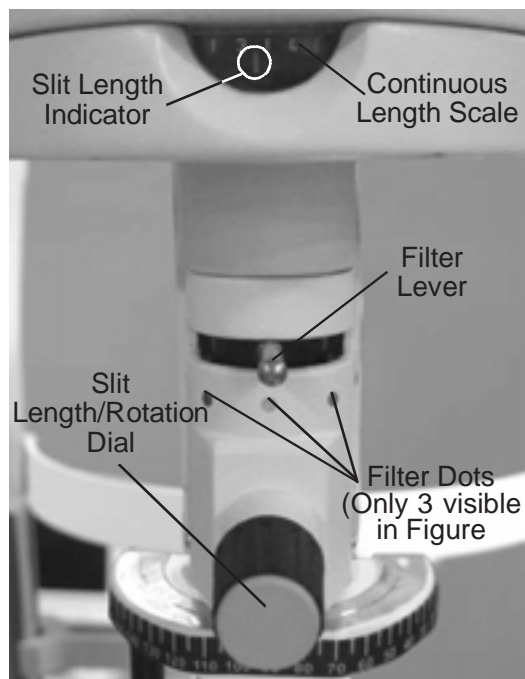


Figure 23 Slit width and Filters

Slit Rotation

By grasping the Slit Rotation Knob, the lamp housing can be rotated. This, in turn, rotates the slit from vertical to horizontal in either direction. The slit positions are click-stopped in 45° increments and stopped at 0° and 180° and is indicated by the scale. Refer to Figure 24.

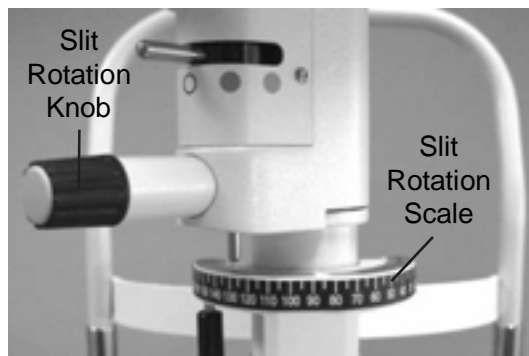


Figure 24 Slit Rotation Scale

Instructions for Use (continued)

Operation (continued)

Illumination Inclination

The Illumination Assembly can be inclined in the horizontal plane in 5° steps for a total of 20°. Tilt the Illumination Assembly by depressing the Inclination Latch Release and pulling the base of the Illumination Assembly toward the operator. Refer to Figure 25.

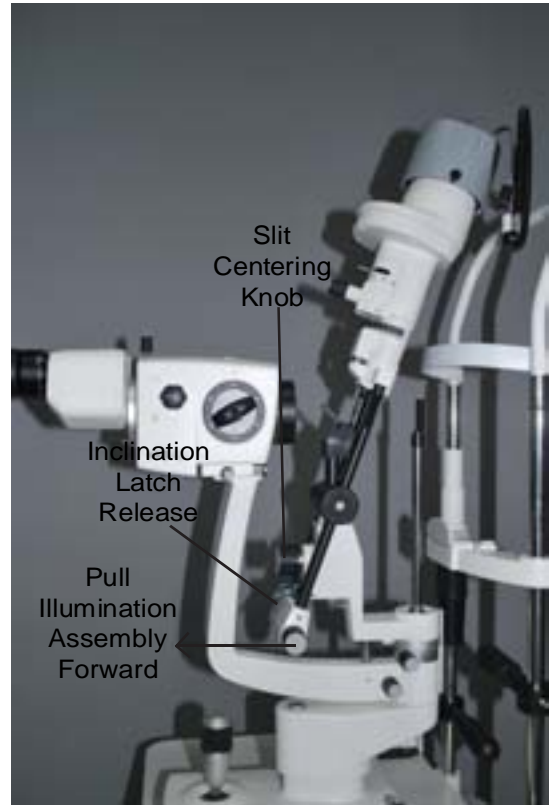


Figure 25 Illumination Inclination

Slit Centration

When the centering screw is loosened, the slit can be scanned away from the center of the field of vision for retro-illumination, scleral scatter, etc. The slit image is centered again by tightening the screw. Refer to Figure 26.

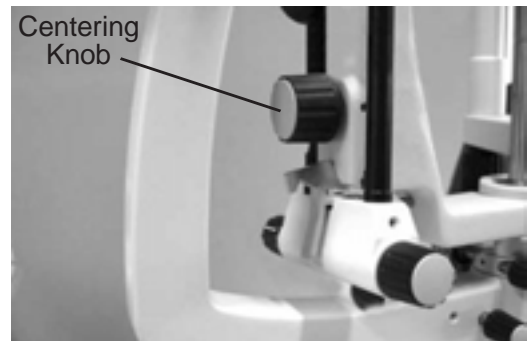


Figure 26 Slit Centering

Cleaning & Maintenance

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

Cleaning

External Cleaning

Clean the external surfaces of this instrument using a clean, soft cloth moistened with a mild detergent solution (1 cc of liquid dish soap to one liter of clean, filtered water (filtered below 5 microns)). Refer to Figure 27.

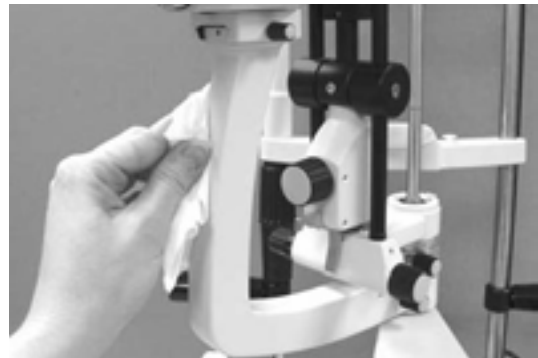


Figure 27 Cleaning Main Unit

Forehead / Chinrest Preparation

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

Cleaning the Glide Plate

If the Glide Plate is dirty it may cause a rough feeling when maneuvering the base of the slit lamp. Clean the Glide Plate with a soft cloth lightly dampened with a mild soap and water solution.

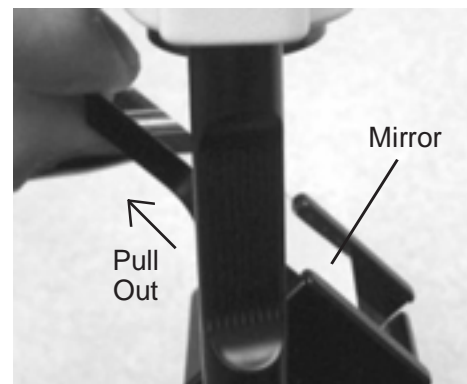


Figure 28 Remove Mirror

Mirror Cleaning / Replacement

When cleaning the mirror, clean off the mirror using dry air, then gently wipe with a soft lint-free cloth. If replacing the mirror, grasp the narrow shank of the mirror and pull upwards. Replace it with a new one by sliding it in place. Refer to Figure 28.

continued

Cleaning & Maintenance (continued)

Changing The Halogen Bulb (HL)

WARNING: NEVER REMOVE A BULB THAT HAS RECENTLY BEEN IN USE AS IT WILL BE VERY HOT. WAIT UNTIL IT HAS COOLED AND USE GLOVES OR A THICK CLOTH WHEN HANDLING ANY HALOGEN BULB.

WARNING: NEVER TOUCH A HALOGEN BULB WITH BARE HANDS AS FINGERPRINTS WILL SHORTEN THE BULB LIFE.

1. Remove input power to the instrument.
2. Remove the Lamp Housing Cover by loosening the Two Screws securing the Cover and lifting it straight off. Refer to Figure 29.
3. Unscrew the Screw securing the Metal Tab holding the Bulb Holder in place. Refer to Figure 30.
4. Gently pull out the Bulb Holder and Bulb. Refer to Figure 31.
5. Grip the Bulb by the Metal Disk that is attached to it, and pull it out of the Bulb Holder. Refer to Figure 32.
6. Replace the Bulb with a new one and install it by pushing the prongs into the Bulb Holder so that the Notch is positioned to the right. Refer to Figures 32 and 33.

Note: There is a Cut Out in the Metal Disk on the Bulb. Ensure that the Bulb is placed properly so that the Cut Out fits into the Notch. Refer to Figure 33

7. Secure the Bulb with the Metal Tab and Screw. Refer to Figure 33.
8. Install the Lamp Housing Cover and secure it by tightening the Two Screws. Refer to Figure 29.

Replacement of Chin Rest Light Indicator

1. Unscrew the LED cap refer Fig. 34.
2. pull out the defective LED and replace with new LED Refer fig. 34 a. Thread in the LED cap back.

Note: if New LED does not light up after switching on. remove it and re-fix after changing its polarity.



Figure 34 Changing Target Light LED

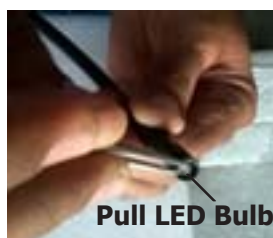


Figure 34 a Changing Target Light LED

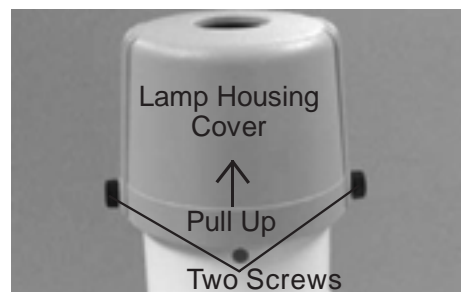


Figure 29 Remove Cover

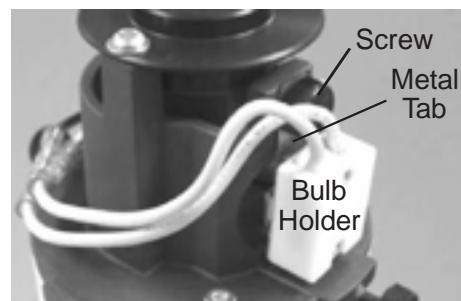


Figure 30 Securing Screw

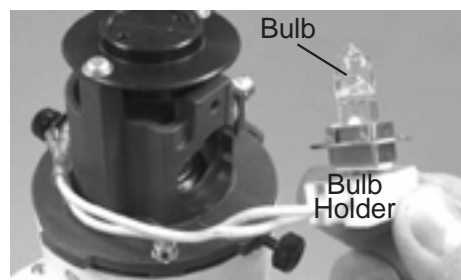


Figure 31 Bulb

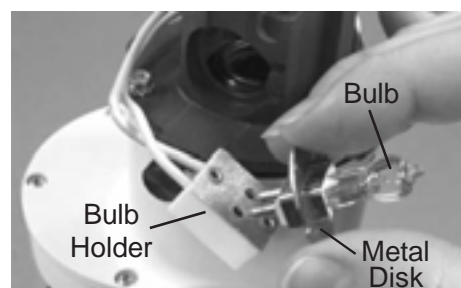


Figure 32 New Bulb

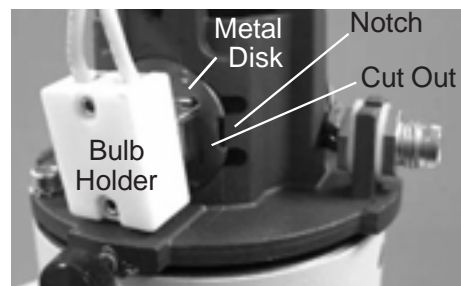


Figure 33 Notch

Cleaning & Maintenance (continued)

Changing The LED (For LED illumination only)

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

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

1. Remove input power to the instrument.
2. Remove the Lamp Housing Cover by loosening the Two Screws securing the Cover and lifting it straight off. Refer to Figure 29.
3. Unscrew the Two Screws to disassemble Heat Sink from the casting. Refer to Figure 35.
4. Unscrew the LED from Heat Sink by unscrewing the Two Screws. Refer to Figure - 36.
5. Replace New LED and follow Reverse to complete assembly.



Figure 35



Figure 36

Cleaning & Maintenance (continued)

Fuse Replacement

Replace the fuses in the Power Input Module with the fuses indicated in the Specifications section of this manual.

1. Remove input power to the instrument.
2. Press down on the top tab in the middle of the Power Input Module to release the Fuse Holder, and gently pull out the Fuse Holder by gripping the two small tabs. Refer to Figures 37 and 38.
3. Open the Door to the Fuse Holder by pulling it down. Refer to Figure 38.

Note: The Fuses will pop up when the door is open, making removal easier.

4. Install new fuses into the Fuse Holder that is indicated in the Specification section of this manual.
5. Install the Fuse Holder by closing the door, and pushing the Fuse Holder back until it snaps into place.

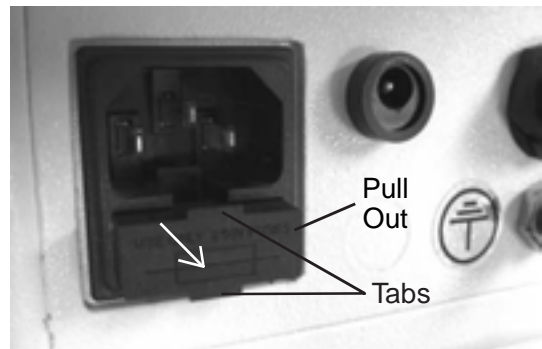


Figure 37 Pull Out

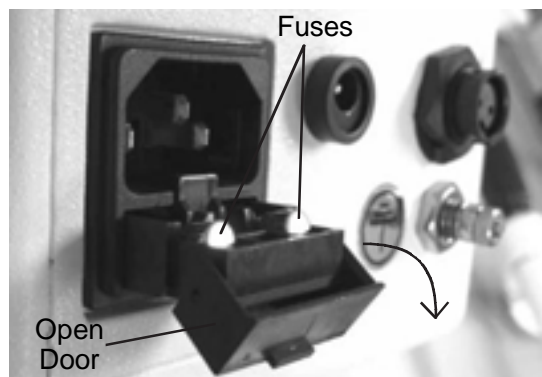


Figure 38 Open Fuse Door

Troubleshooting

The following chart outlines some common issues with the eVO 400 Slit Lamp and some steps you can take to correct the issue. If problems persist, please contact the 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.
	Bulb may be blown out.	Replace Bulb.
	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.
Light too dim.	Incorrect wattage for bulb being used.	Replace with the proper Bulb.
	Bulb not installed properly.	Check bulb and ensure notch lines up with bulb housing.
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.
	Bulb not installed properly.	Check bulb and ensure notch lines up with bulb housing.

The following is a checklist of items that need to be assessed in order to determine if the eVO 400 Slit Lamp requires servicing.

- Check the outside of the slit lamp for any damage or missing components.
- Inspect the power cord for damage.
- Test the lamp by turning the lamp on and turning the light all the way to its brightest setting, and all the way down to its lowest setting.
- Check to ensure all switches are functioning 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 8127000-795

Physical Dimensions

Size: Weight, unpacked: 39.35 lbs. (17.85 Kg)
 Height: 26.8 in. (68.0 cm) Weight, packed: 52 lbs (23.64 Kg)
 Width: 17.3 in. (44.0 cm)
 Depth: 15.3 in. (38.8 cm)

Electrical

Voltage: 100-240 vAC
 Power Input (max): 56-73 vA
 Frequency: 50/60 Hz
 Fuses: Time-Lag (1.6A, 250v), 5x20mm, RoHS (P/N RFAG20063)
 Halogen Bulb: (6v, 20 W), LED 5 Watt

Operational Conditions

Environmental:

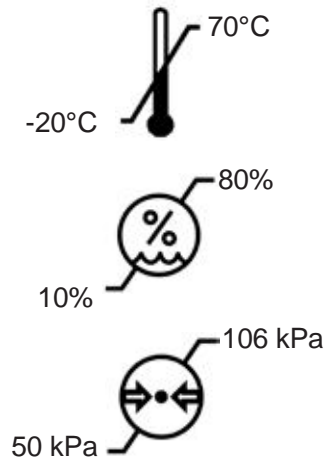
The environmental conditions are as follows:

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).
 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
IPDRange 48.5 - 77 mm
Diopter Adjustment +/- 5
Slit Illumination 6v 20W Halogen / LED 5 Watt
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 31mm-5mm
Working Distance <370mm
Illumination- Range of Brightness >50000 lux

Specifications (continued)

Movement Ranges

Longitudinal (In/Out)	100mm
Lateral (Left/Right)	107mm
vertical (Up/Down)	30mm
Chinrest Range	80mm
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 regarding the proper disposal of this equipment.

Software Revision

There is no software installed in this unit.

Due to a policy of continuous development, we reserve the right to change specifications without notice.

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 environments 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, and those connected directly 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			
<p>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.</p>			
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance–
ESD IEC 61000-4-2	±6kv Contact ±8kv Air	±6kv Contact ±8kv 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	±2kv Mains ±1kv I/Os	±2kv Mains ±1kv I/Os	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kv Differential ±2kv Common	±1kv Differential ±2kv Common	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 use 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 50/60Hz Magnetic Field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be that of a typical commercial or hospital environment.


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 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.
Radiated RF IEC 61000-4-3	80 MHz to 2.5 GHz @ 3V/m	(E1) = 3 v/m	<p>Recommended Separation Distance:</p> $d=(3.5/v1)(\text{Sqrt } P)$ $d=(3.5/E1)(\text{Sqrt } P)$ <p>80 to 800 MHz</p> $d=(7/E1)(\text{Sqrt } P)$ <p>800 MHz to 2.5 GHz</p> <p>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).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range.</p> <p>Interference may occur in the vicinity of equipment marked with the following</p> 
<p>Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>* 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. The measured field strength in the location in which 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 re-orienting or relocating the ME Equipment or ME System.</p> <p>* Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [V1] V/m.</p>			

Table 206 – Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the SL 45 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 Xpert SL-45			
<p>The eVO 400 is intended for use in electromagnetic environment in which radiated RF disturbance 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 Communication Equipment (transmitters) and the eVO 400 as recommended below, according to the maximum output power of the communications equipments</p>			
Max Output Power of Transmitter (W)	Separation (m) 150kHz to 80 MHz $d=(3.5/\sqrt{f})(\sqrt{P})$	Separation (m) 80 to 800 MHz $d=(3.5/\sqrt{f})(\sqrt{P})$	Separation (m) 800MHz to 2.5GHz $d=(7/\sqrt{f})(\sqrt{P})$
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
<p>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.</p> <p>Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.</p>			

Warranty

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

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 which has had the serial number 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 which has been sold, serviced, installed or repaired other than by a LABOMED factory, Technical Service Center, or authorized Labo America Inc. Dealer.

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

All claims under this warranty must be in writing and directed to the Labo America Inc. factory, Technical Service Center, or authorized instrument dealer making the original sale and must be accompanied by a copy of the purchaser's invoice.

This warranty is in lieu of all other warranties implied or expressed. All implied warranties of merchantability or fitness for a particular use are hereby disclaimed. No representative or other person is authorized to make any other obligations for Labomed. Labomed shall not be liable for any special, incidental, or consequent damages for any negligence, breach of warranty, strict liability or any other damages resulting from or relating to 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, Labomed will defend such action at its expense and will pay costs and damages awarded in any such action, provided that Labomed shall have sole control of the defense of any such action with information and assistance (at Labomed expense) for such defense, and of all negotiation for the settlement and compromise thereof.

PRODUCT CHANGES

Labomed 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 selection, checking, rechecking and packing to eliminate the possibility of error. If any shipping errors are discovered:

1. Carefully go through the packing materials to be sure nothing was inadvertently overlooked when the unit was unpacked.
2. Call the dealer you purchased the product from and report the shortage. The materials are packed at the factory and none 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 ceases with the 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, upon delivery, the outside of the packing case shows evidence of rough handling or damage, the transportation company's agent should be requested to make a "Received in Bad Order" notation on the delivery receipt. If within 48 hours of delivery, concealed damage is noted upon unpacking the shipment and no exterior evidence of rough handling is apparent, the transportation company should be requested to make out a "Bad Order" report. This procedure is necessary in order for the dealer to maintain the right of recovery from the carrier.

Notes

Notes



Labo America Inc.

920 Auburn Court
Fremont, CA
94538
USA

Phone: 510-445-1257
Fax: 510-991-9862
Email: sales@laboamerica.com
www.laboamerica.com

Labomed Europe b.v.

T.a.v.: Cor Treure
Essebaan 52,
2908 LK Capelle aan den IJssel
THE NETHERLANDS

Phone: +31-10-458-4222,
Fax: +31-10-450-8251

ISO-9001/13485 Registered



8127200-795

Issue 1.1

March, 2016