User Guide

IBEX 5-Step LED Slit Lamp

Introduction

Congratulations on your new purchase and welcome to IBEX! We appreciate your patronage and the opportunity to exceed your expectations with outstanding products and services. As a valued customer, your experience with IBEX is our top priority, and we strive for a 100% customer satisfaction rate.

Your new IBEX 5-Step LED Slit Lamp arrives with a comprehensive 3-Year Warranty, should you have any questions or concerns, please do not hesitate to contact us.

Product Registration

If you purchased your product directly through IBEX, **your product is already registered**.

If you purchased your product from one of our many Business Partners, please register your products.

As part of our ongoing efforts to provide you with the best possible customer support and user experience, we urge you to register your new product at https://www.ibexeye.com/welcome. *It's fast & easy*.

IBEX LED Slit Lamps are serialized in order to track product versions and revision changes. The serial number may be required to complete any necessary services and or repairs. Registering your product serial number simply allows our IBEX support team to better understand the product revisions in order to expedite your service.

Before you begin using your new **IBEX 5-Step LED Slit Lamp**, please read, understand and follow all safety instructions. This will insure safe operation, optimum performance and a longer service life for your instrument. Be sure to retain this manual for future reference.

Warning and Information Symbols

General Warning

Hot Surface

Voltage Hazard

Optical Radiation

General Mandatory Action

Read Operator's Manual

Type B Applied Part

Notes

CE European Certificate of Conformity

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Product Overview

Indications for use

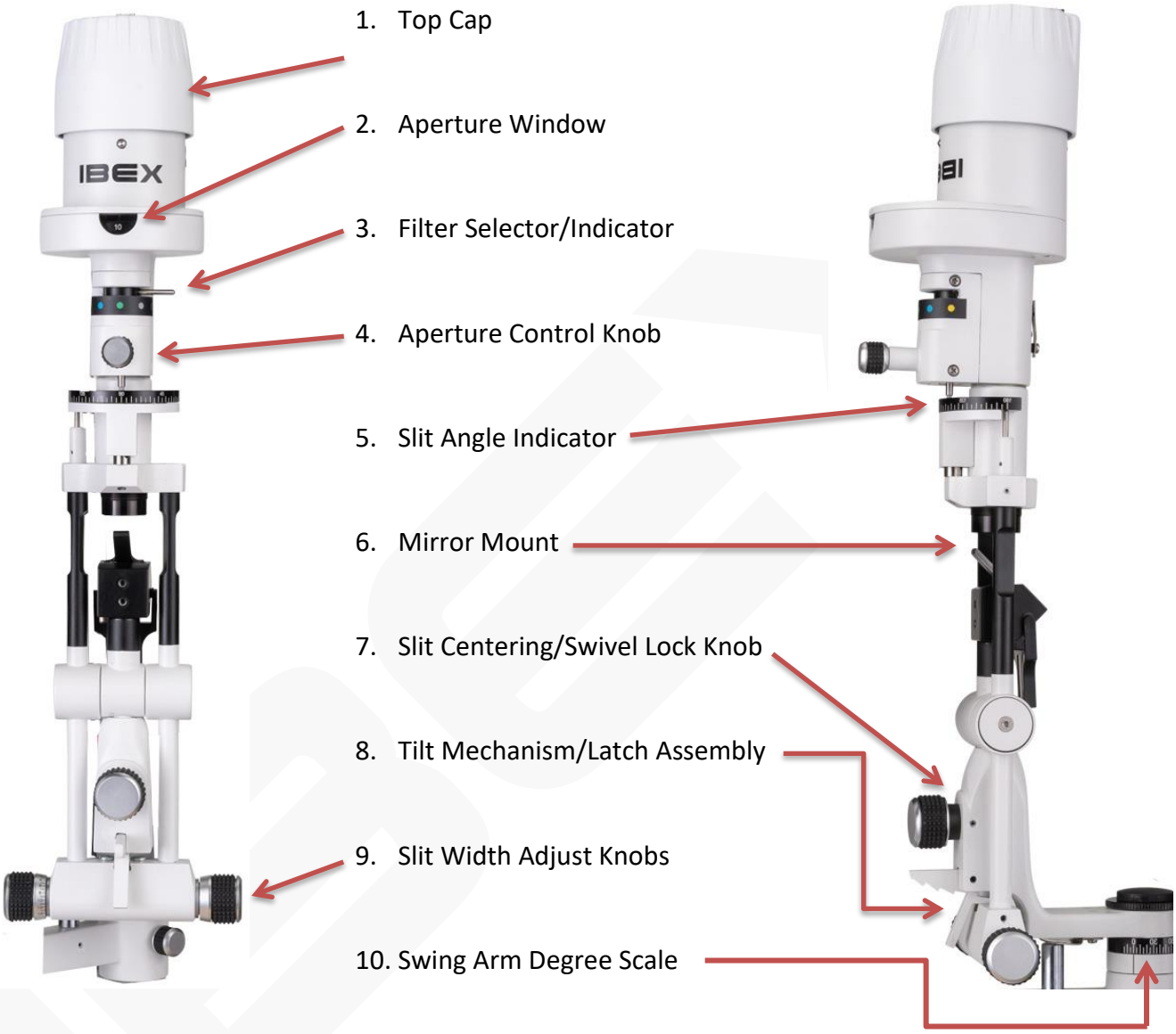
All **IBEX Slit Lamps** are specialized LED illuminated biomicroscope that provide a stereoscopic magnified view of the eye structures in crystal clear detail, enabling anatomical diagnoses to be made for a variety of eye conditions. They are precision instruments intended for use, by professionally trained personnel, in the examination of the anterior eye segment from the cornea epithelium to the posterior capsule. They are used to aid in the diagnosis of diseases or trauma in which affects the structural properties of the anterior eye segment.

Major Components

IBEX Slit Lamps consists of 3 major components; ***main body, headrest assembly*** and ***table base***.

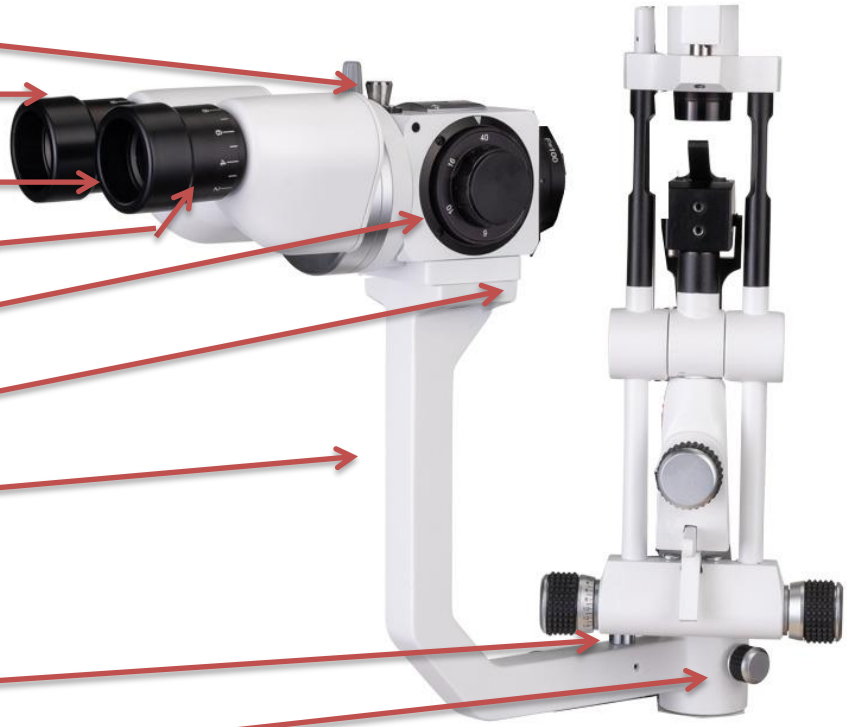
1. Main Body
2. Headrest Assembly
3. Table Base

Illumination Tower Assembly



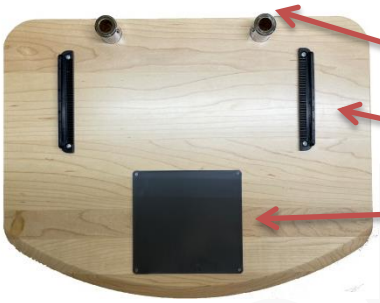
Biomicroscope Swing Arm Assembly

1. Yellow Filter Plunger
2. Eyepieces
3. Eye Cap
4. Eyepiece Adjust Rings
5. Magnification Drum
6. Breath Shield Screw
7. Swing Arm
8. Tower / Swing Arm Detent Post
9. Swing Arm Locking Knob

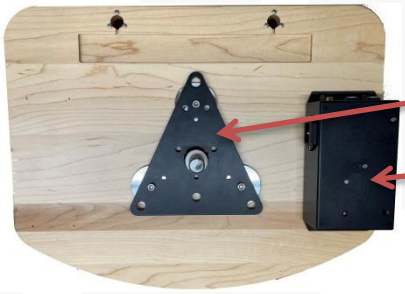


Slit Lamp Transitional Base Assembly

1. Joy Stick
2. Transitional Base
3. Elvation Assembly
4. Base Locking Screw
5. Slide Bar (Axle)
6. Wheel Cover

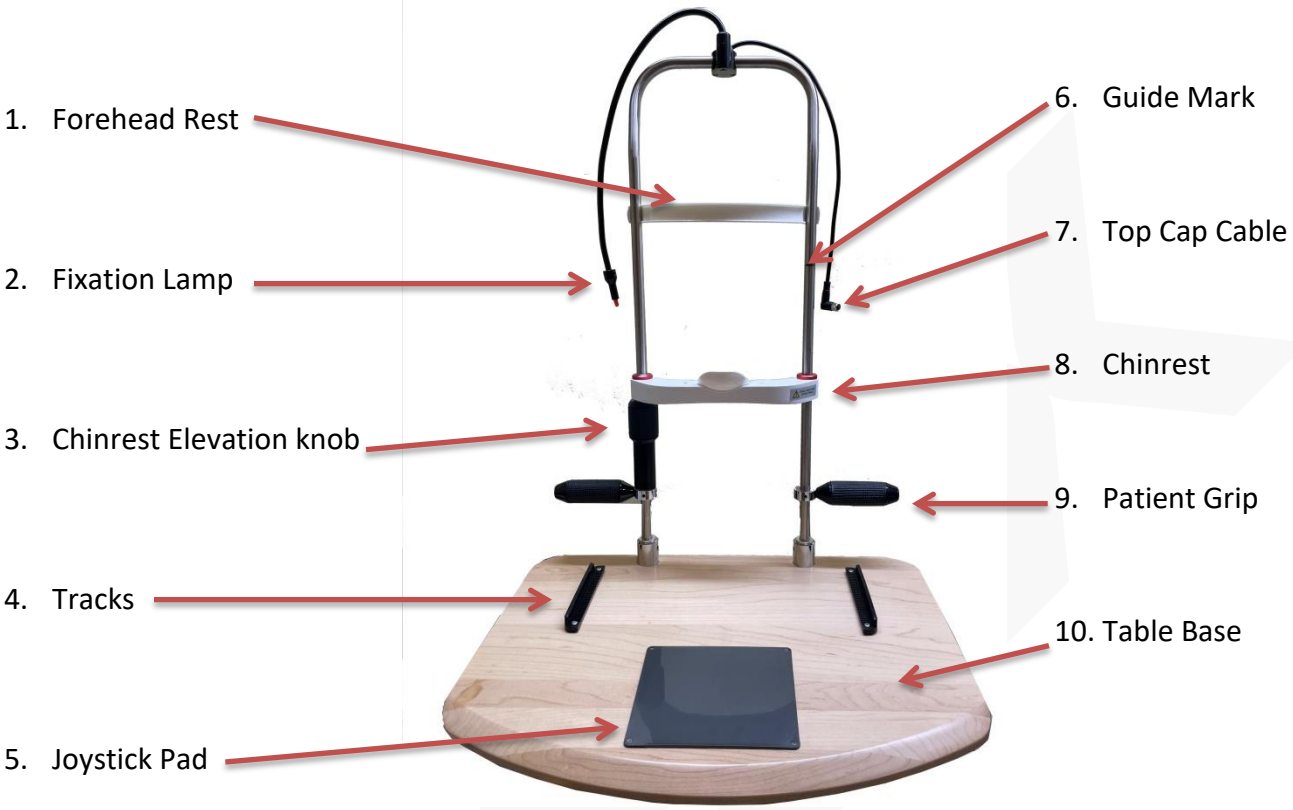


1. Headrest Mounts
2. Tracks
3. Joy Stick Pad



1. Instrument Stand Mounting Plate
2. Power Supply Box

Table Base with Headrest



Accessories

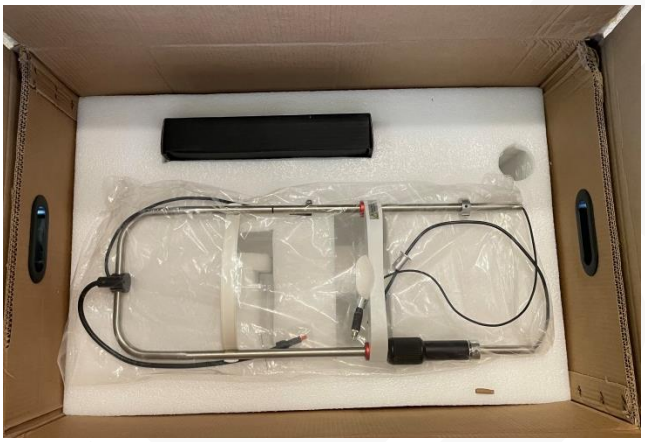
1. Test Rod
2. Track Covers
3. Chin Papers
4. Chin Paper Pins
5. Patient Grips
6. Mirror
7. Pivot Cover
8. Breath Shield
9. Allen Wrench Set
10. Fuses

Optional Accessories: IBEX Model R Tonometer

Installation

Unpacking

Your New IBEX Slit Lamp arrived in 1 box, the Slit lamp body, headrest assembly and table top assembly. Slit lamp body is fully assembly for easy installation. They are double boxed and layered in foam for added safety.

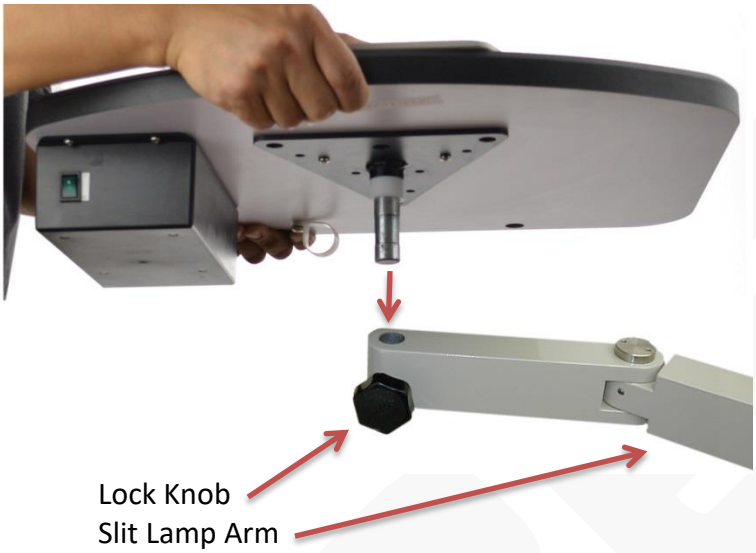


Your **IBEX** Slit Lamp can be mounted on a 3rd party instrument stand or a motorized table.

Ensure that your instrument stand or motorized table is on a **level and stable** surface before installation of your new slit lamp. Use the level from the accessory kit if necessary.

Ophthalmic Stand Installation

Step 1: Installation of the table base on your instrument stand.



a. Remove the table base form small table shipping carton.

b. Insert the mounting post (on the underside of the table base) into the slit lamp arm on the instrument stand.

You may have to loosen the lock knob on the slit lamp arm.

Step 2: Installation of the headrest on the table base.

a. Remove headrest from large Slit Lamp body box.
b. Insert the headrest cables though the headrest mounts.
c. Insure the adapter holes are aligned with the set screws.
d. Install the headrest onto the table base and tighten the four set screws to secure the headrest.

Step 3: Installation of the slit lamp on the table base.

a. Install the slit lamp onto the table base.

b. Insure the slit lamp is aligned evenly on the tracks.

c. Install the track covers by inserting them under the tracks.

Step 4: Connection of cables.

a. Remove link cable from the accessory box and connect to the slit lamp transitional base.

b. Connect the fixation light cable and intensity cable to the back of the power supply.

c. Connect the main power cord into the side of the power supply and to your AC power source.

Leveling the slit lamp

Your slit lamp is come with a smart leveling mechanism. It allows you to level the slit lamp on an instrument stand.

Step 1: Place the bubble level on the table top in front of the slit lamp gliding base to check the level on x-axis. Then put the bubble level beside the joystick pad to check the level of y-axis.

Step 2: Loosen the allen screw until the bubble sets in the center of the level. You may need to adjust all 3 allen screws multiple times to achieve centering.

You can make an adjustment of as much as 5° with respect to the table top.

Step 3: Turn the thumb nut until it against the mounting plate to lock the position.

Motorized Table Installation

Installation of the table base on an **IBEX** motorized table.

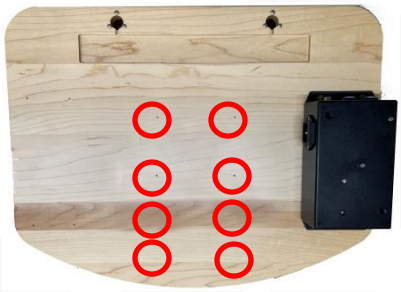
Again insure that the surface where you are placing your table is level and stable. Use the level from the accessory kit.

Step 1:

a. Remove table base from the small shipping carton.

b. Remove the triangular mounting bracket from the bottom of the table base if applicable.

Step 2:



c. Place the motorized table mounting plate (if the motorized table came with one) or the motorized table column in the center of the table top. And the controller near the front end of the table top. Mark and drill the mounting holes.

Step 3:

d. Attach the motorized table column and the up/down controller with the provided screws and washers. Then connect the cable.

Installing Optional Applanation Tonometer

Step 1: Attach the Tonometer mounting block onto the biomicroscope head using the countersunk screw that is supplied with the Tonometer.

Step 2: Slide the Tonometer Swing Arm Mount down onto the vertical post of the Mounting Block.

Step 3: Insert the Prism completely into the Prism Holder so that the axis marks on the Prism and Prism Holder meet.

Usage - Getting Started

Before use, the slit lamp should be allowed to adjust to the ambient room temperature for several hours. This is especially important when the unit has been stored or transported in a cold environment.

Before setting up the Biomicroscope eye pieces, set the magnification to 16x by rotating the magnification drum.

Each eyepiece and the PD must be individually adjusted for each examiner.

Telescoping eye cups at the front of the oculars enable users with or without glasses to see the maximum field of view.

Insert test rod in place of pivot cover.

Turn the test rod so that the flat surface is facing toward the Bio-microscope.

Return both the illumination tower and Bio-microscope swing arms to the central position.

Never attempt to connect or disconnect this instrument with ***wet or damp*** hands.

Do not disconnect this instrument by pulling on the power cord. Grip and hold the connector firmly when disconnecting from the power source.

LED fixtures can reach high temperatures during use – allow ample time to cool before handling any potentially hot surface.

Switch the slit lamp ON using the rocker switch on the front of the power supply. The rocker switch will light up green when the switch is in the ON position. Slowly turn the intensity control knob on the transitional base until you see the light projected onto the test rod. If you do not see any light on the test wand turn the slit width control knob to full width.

Knowing your Slit Lamp

Telescoping eye cup adjustment

The dual purpose of the eye cups are excluding extraneous sidelight and positioning the eye pupils to the correct distance from the eyepieces so as to see the instrument's full field of view. As a general rule of thumb, pull the eye cups out for non-eyeglass wearers and push the eye cups in for eyeglass wearers.

Eyepiece setting

Turn both eyepieces to maximum (+) diopter position. Close your non-dominate eye and with your dominate eye look through the ocular and focusing on the test rod circle of light. Slowly turn the eyepiece toward the (-) diopter position until the circle of light surface of the test rod is in focus. Repeat the same procedure for the other eyepiece.

PD setting

Begin by holding the binocular head in a normal viewing position. Then, while grasping the ocular barrels firmly with your hands, move them either closer together or spread them farther apart until the images seen by your eyes form a single circular field of view.

Tips for parallel optics fusing

If you are having trouble fusing when using slit lamps with parallel optics, try the following procedure with the Calibration/test rod insert into the slit lamp

1. Spread the oculars as far as possible. (Widest PD)
2. Set the magnification drum to 16.
3. Focus the eyepiece for your dominate eye while keeping the other eye closed.
4. Focus the eyepiece for your non-dominate eye while keeping your dominate eye closed.
5. Bring the oculars together slowly until you see one clear image.

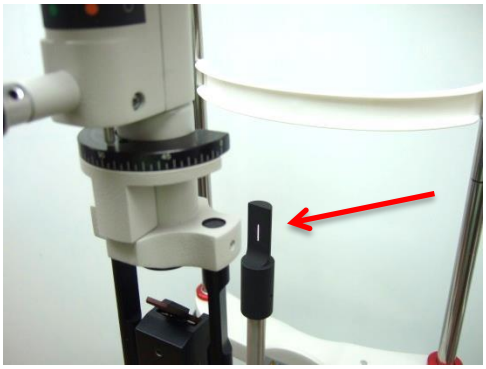
Slit width control

Slit width can be changed continuously (0 – 14mm depending on the aperture selected) by rotating either of the two knurled slit width control knobs to the desired width.

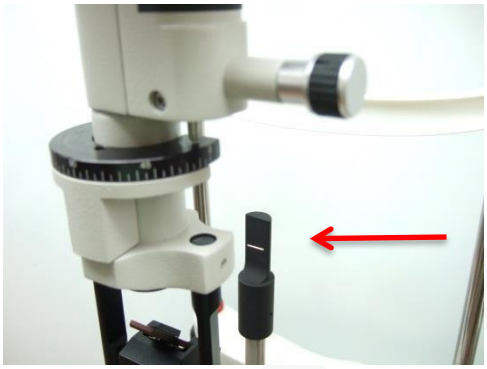
Slit Width Control Knobs

Slit angle control

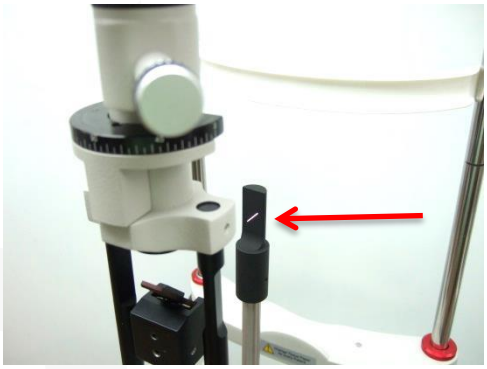
Swing the aperture control knob horizontally to revolve the slit image at any angle in the vertical or horizontal direction. The angle of image rotation is indicated in 5° increments on the rotation angle scale. With indents at 45°, 90°, 135° and stops at 0° and 180°.



Vertical slit at 90°



Horizontal slit at 0°



Slanted slit at 45°

Setting aperture size

Turn the aperture control knob to the desired aperture. The following diameters are available: 14, 10, 6, 4, 3, 1, 0.2 mm. Width and length of the slit image can be changed continuously from 14mm to 0.2mm, which is indicated through the display windows.

1) Apertures of 14 ,10, 6, 4, 3, 1, 0.2 mm in diameter
2) Display of variable slit length in mm

Filter Selection

Filter selection can be changed by swinging the filter lever from left to right or vice versa.

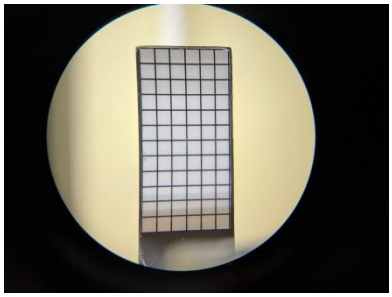
1) Yellow
2) Cobalt blue
3) Green (red free)
4) Neutral Density
5) Open

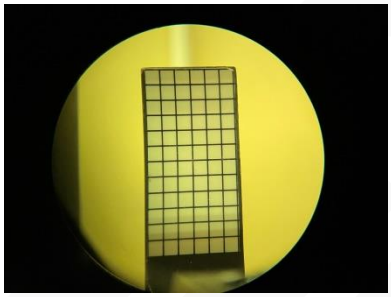
Build-in Yellow Filter

Pull the plunger to the up position to engage the Wratten yellow filter

Plunger Down

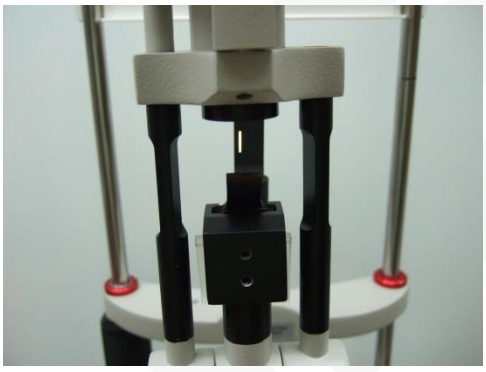
Plunger Up



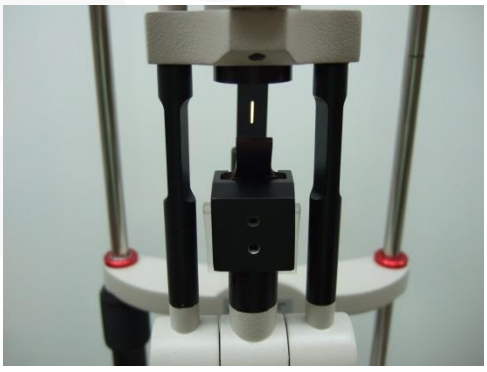


Slit centering control

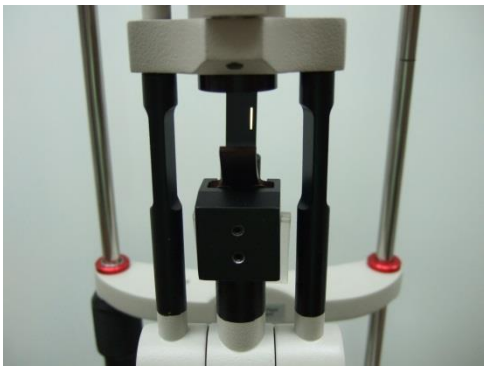
Loosening the slit centering control knob on the lower portion of the illumination tower allows the illumination light to be moved left or right as much as 5° from the center of the visual field for indirect retro-illumination. Tightening the knob brings the illumination light back to the center.



Light beam at 5° left from the center of the visual field.



Tower centered, knob tightened.



Light beam at 5° right from the center of the visual field.

Illumination tower tilt control

The illumination tower may touch the patient's head during operation, use caution when using the tilt function.

For oblique illumination such as sectional or fundus examination, press the incline tilt lever at the bottom of the illumination tower which allows the tower to incline as much as 20° in 5°increments.

Biomicroscope

The magnification can be changed from 6x to 40x by rotate the magnification drum. The overall magnification power is as following;

Eyepiece	12.5x	12.5x	12.5x	12.5x	12.5x
Total Magnification	6x	10x	16x	25x	40x
Magnification field of view (in mm diameter)	43	27	16	11	7

Preparing the patient

For general hygiene, IBEX recommends the use of a fresh disposable chinrest paper for every patient. Additionally, IBEX recommends cleaning of the head band before each patient exam.

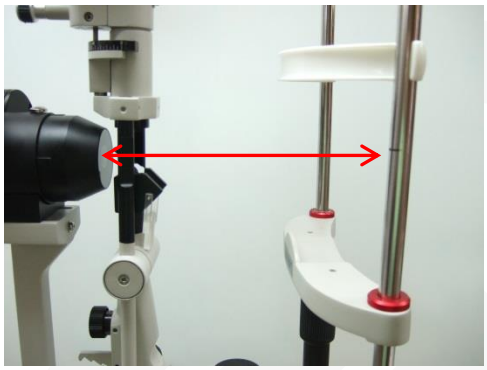
Insure that the illumination intensity knob on the transitional base of the slit lamp is set to the lowest level after each patient examine to prevent uncomfortably bright light reaching the next patient to the patient.

Insure the eye pieces have been adjusted in accordance with the examiner.

Patient Alignment

Arrange the slit lamp so your patient will be in a comfortable position. For a quality eye exam, ensure the patient's forehead maintains contact with the head band at all times.

Adjust the chin rest on the headrest assembly up or down by using the chin rest elevation knob so that the patient's eyes are approximately level with the headrest guide mark and the optical head.



Slowly adjust the intensity knob until a dim light is visible.

Select aperture size 14 then turn the slit width control knob so the light beam is in a thin long vertical line.

Rotate the joystick, until the light beam is centered on the patient's pupil.

Basic Instrument Operation

This coarse alignment should be carried out with the user's naked eye.

Holding the Joystick inclined towards yourself, move/slide the slit lamp transitional base left or right and forward, slowly, closer to the patient, by sliding and rolling the unit on its slide bar (axle) until the slit appears to be approximately in focus on the cornea. Fine adjustment or focus is achieved by carefully tilting the Joystick forward, toward the patient, while observing the slit image through the Optical head.

Maintenance

Routine maintenance

Never attempt to connect or disconnect this instrument with ***wet or damp*** hands.

Do not disconnect this instrument by pulling on the power cord. Grip and hold the connector firmly when disconnecting from the power source.

Before performing any maintenance or cleaning procedure, ensure the power supply rocker switch is set to the “O” off position.

IBEX LEDs have a life expectancy of 10,000+ hours and should not require changing by the user. We recommend turning off the device after each use to conserve energy and LED life.

In the unlikely event of failure of the LED, please contact your IBEX representative for guidance.

Fuse Replacement

The power supply fuses are located at the rear of the power supply assembly.

To help prevent the possibility of electrical shock ***always*** unplug the slit lamp from its power source before removing or replacing a fuse.

1) First disconnect the slit lamp from the main power source by unplugging the power cord.

2) Insert a small flathead screwdriver into one of the slots and gently pry open the fuse holder located on the back on the power supply.

3) Replace the fuse with the same kind (1Amp 250Volt Slow Blow).

4) Push the fuse holder back in until a “Click” sound is heard and the fuse holder is locked in place.

General Cleaning

Before any cleaning of the instrument or the base unit insure that the power cord is disconnected from the power source.

To keep your slit lamp in optimum condition, the slit lamp should be cleaned with a **lightly damp lint free cloth** whenever dust or dirt is detected. Do not use any form of chemical liquids and/or corrosive agents to clean the slit lamp.

Tips for taking care of your optical parts

- Since oil and debris from your hands or from used lens tissue can stain or damage optical coatings, you should not touch any trans-missive or reflective surface of your optical system and never reuse a lens tissue.

- *If it's not dirty, don't clean it!* Handling optics increases their chances of getting dirty or damaged, so you should clean optics only when necessary.

- Inspect the eyepieces for dust and stains by holding it near a bright visible-light source. Viewing the optic at different angles allows you to see any scattering of dust and stains.

Recommended Lens Cleaning Technique and Procedure

Step 1: Remove dust

Dusting is always the first step in cleaning your optics. Wiping a dusty optic is like cleaning it with sandpaper. So always dust with a canned air duster, soft optical brush or air blower before wiping any optic. If the dusted optic has no visible stains after you dust it, remember: *"If it's not dirty, don't clean it."* If it's still not clean, proper use of solvents and lens tissue can often do the trick.

Step 2: Wiping the optic

Remember "always wipe slowly and clean the edges first."
Blow off the dust before attempting to clean any optics. Place the brush on the optic surface, apply slight pressure and slowly wipe straight across, from one edge of the optic surface to the other. If the optic still appears dirty proceed to step 3.

Step 3: Use of solvents and lens tissue

Glass-cleaning solvents will streak, and tissue paper or a t-shirt can scratch, so always clean optics with optical cleaning solution and a low-lint tissue manufactured for cleaning optics. Always use lens tissue with a solvent, because dry lens tissue can scratch optical surfaces. Cleaning your optic's edges before cleaning its faces

prevents dirt from being drawn up onto the face. Wiping slowly allows the solvent to evaporate without streaking. Remember, slow and steady cleans the optic.

Technical Specifications

Microscope	Galilean	**Input Voltage**	110V/220V AC, 50/60 Hz
Magnification Change	5 drum rotation	**LED Input**	3.4V, 700mA
Eye Piece	12.5x	**Filters**	Yellow, Cobalt blue, Red-free (Green) & Neutral density
Magnification Ratio	6x, 10x, 16x, 25x, 40x	**Power Consumption**	2.4W (Max)
Real field of view in mm	43, 27, 16, 11, 7.0mm	**Longitudinal (In/Out)**	3.9in. (99mm)
Pupillary Distance	55 – 75mm Adjustable	**Lateral (Left/Right)**	4.6in. (118mm)
Diopter Adjustment	+/- 6D	**Vertical (Up/Down)**	1.18in. (30mm)
Working Distance	100mm	**Chin Rest Range**	4.7in. (120mm)
Slit Width	0 – 14mm Continually	**Dimension (inch)**	20.9(L) x 15.0(W) x 30.7(H)
Slit Length	1 – 14mm Continually	**Weight (Packed)**	57lb (26kg)
Slit Angles	0° - 180°		

General Classifications

Mode of operation	Intermediate
Degree of mobility	Portable
Type of protection against Electrical Shock	Class I
Degree of protection against Electrical Shock	Type B
Protection against harmful ingress of water	IPX-0
Classification	CE-Regulation 93/42/EEC

Basic Troubleshooting

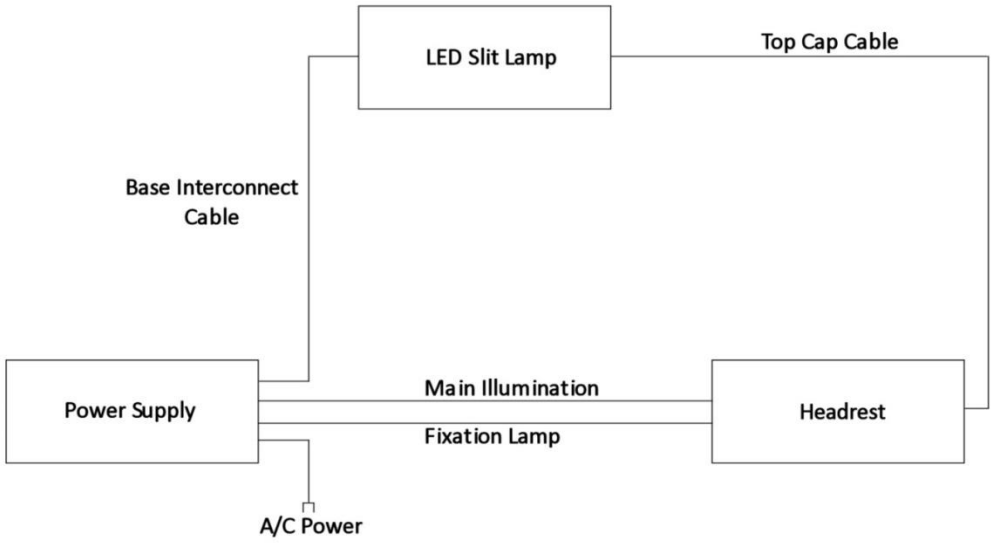
To help prevent the possibility of electrical shock always unplug the power source.

If the main illumination lamp does not light, check the followings:

1. Check the ON/OFF switch located on the front of the unit
2. Turn the intensity knob clockwise for brightness.
3. Check the slit to ensure they are opened widely.

Due to the complicated design of the MCPCB (LED star). Only an authorized Trevi Technology® technician can perform the procedure of replacing the LED star. Please contact your dealer for further instruction.

Block diagram



Storage, Transportation & Environment

Storage: Temperature -5°C to +50°C

Air Pressure 35% to 95%

Relative Humidity 700kPa to 1060kPa

Transport: Temperature -40°C to +70°C

Air Pressure 35% to 95%

Relative Humidity 700kPa to 1060kPa

Environment Condition of Use:

Temperature 0°C to + 50°C

Air Pressure 35% to 95%

Relative Humidity 700kPa to 1060kPa

Warranty

Three-Year Comprehensive Warranty

IBEX Slit Lamps are guaranteed for thirty-six months against faulty workmanship, materials or factory defects. The Warranty is a Return-To-Base (RTB) basis at the cost of the customer. All parts and services rendered are included at no additional cost to the customer and in most cases the work is completed within 2-3 business days.

The **IBEX** LED illumination system is designed to operate with consistency for 10,000+ hours of continuous use and therefore is considered as a non-consumable item. In the unlikely event of an LED failure within or after the warranty period, please contact Trevi Technology, Inc. for a replacement.

In case of any defect during warranty period, the concerned person / hospital / institution, shall immediately contact Trevi Technology®. Trevi Technology® will rectify the problem and replace any parts if necessary with no cost.

Quality Systems

Safety Instructions

Read and follow the instructions, cautions and warnings before installing or using this instrument.

The repair/service of this instrument will only be performed by a qualified technician authorized by Trevi Technology®.

Trevi Technology® is responsible for the safety and performance of the equipment only if it is used in accordance with its intended use and the instructions given in the user guide.

This instrument is designed to perform as per the declared indications for safe and reliable service.

Do not modify and/or repair this equipment without authorization of the manufacturer. The manufacturer declines any and all responsibility for loss and/or damages resulting from unauthorized repairs and/or modifications. Any repairs must only be performed by trained and authorized specialists.

Check your slit lamp periodically for any signs of damage or misuse.

This device is intended to be used only by suitably trained and authorized healthcare professionals. Federal law restricts this device to sale by or on the order of a licensed physician.

Never use this device in a potentially explosive environment where volatile solvents (alcohol, petrol, etc.) or flammable anesthetics are in use.

Connect the equipment to properly powered outlets. The entire electrical system in the room or building where your slit lamp is located should conform to IEC and/or local government regulations.

Disconnect the equipment from AC power before servicing and/or cleaning.

Never touch the cable and main power supply system with ***wet or damp*** hands.

Before any cleaning of the instrument or the base unit insure that the power lead is disconnected.

LED fixtures can reach high temperatures during use – allow ample time to cool before handling any potentially hot surface.

Safety Standards

The FDA and CE marks on the **IBEX** Slit Lamp indicates that it has been tested to meet and/or exceed the U.S. Department of Health and Human Services, Food and Drug Administration Guidance for Slit Lamp Optical Equivalency and Radiation Safety, International Standards within the 93/42/EEC Medical Device Directive and Electrical Safety.

The optical radiation emissions from the slit lamp do not exceed the Threshold Limit Values (TLVs) for optical radiation, as established by the American Conference of Governmental Industrial Hygienists (ACGIH) under worst case clinical exposure conditions and times for ultraviolet and infrared radiation, and visible and near infrared radiation including blue light and aphakic hazards.

It is recommended that the intensity of the light directed into the patient's eye be limited to the minimum level necessary for diagnosis. **IBEX** Slit Lamps are equipped with protective filters that eliminate UV radiation and short wavelength blue light. Children, infants, aphakes and any person with diseased eyes may be at greater risk. The risk may also be increased if the person being examined has had any exposure with the same instrument or any other ophthalmic instrument using a visible light source during the previous 24 hours. This will apply particularly if the eye has been exposed to retinal photography.

The **IBEX** Slit Lamp is manufactured under strict quality manufacturing systems and certifications as established by ISO 9001:2008 and ISO 13485:2012. These systems encompass materials, processes, assembly and packaging.

Standards Compliance

IBEX Slit Lamp development, production, testing, set-up, maintenance and repair is compatible with IEC 60601-1 (electrical safety), IEC 60601-1-2 (electromagnetic compatibility), EN ISO 15004-2 (optical radiation safety). In addition, **IBEX** Slit Lamps are compliant with the Directive 93/42/EEC as confirmed by the CE marking.

This device meets all the requirements for electromagnetic compatibility according to IEC 60601-1-2. This device is built so that the generation and emission of electromagnetic interference is limited to the extent that other devices are not disturbed in their use in accordance with the regulation and so that the slit lamp itself has appropriate immunity to electromagnetic interference.

This device is designed to comply with the following safety aspects.

Leakage current is less than 0.5mA in normal condition.
Leakage current is less than 1.0mA in a single fault condition.
Isolation voltage between ground and main wires is greater than 1500V.

Contact Information

If for some reason your, **IBEX 5-Step LED Slit Lamp** does not perform properly or you incur a problem with the instrument:

a. Consult the applicable section of this manual.

b. Check: www.ibexeye.com

c. E-Mail: info@ibexeye.com
Attn: Engineering Department

d. Call: 614-754-7175
Ask for the Engineering Department

Trevi Technology, Inc.
1029 Dublin Rd.
Columbus, OH 43215
614-754-7175
www.ibexeye.com