

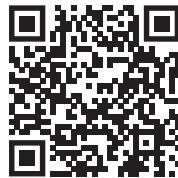
# **XCEL<sup>®</sup> 455**

## **Slit Lamp**

Instructions for Use



Scan for additional information and languages:



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**Caution: Federal law restricts this device to sale by or on the order of a Physician or Practitioner.**

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# Warnings & Cautions

Reichert Technologies® (Reichert) is not responsible for the safety and reliability of this instrument when:

- Assembly, disassembly, repair, or modification is made by unauthorized dealers or persons.
- Instrument is not used in accordance with this manual.

**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 THIS MANUAL. THE SAFETY OF THE OPERATOR AND THE PERFORMANCE OF THE INSTRUMENT CANNOT BE GUARANTEED IF USED IN A MANNER NOT SPECIFIED BY REICHERT TECHNOLOGIES.

**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 REICHERT OR 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 REICHERT 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 OR 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 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 SHOULD BE USED WITH THE INTEGRATED FILTERS WHICH PROTECT AGAINST UV RADIATION.

**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 INSTRUCTION THAT DRAWS ATTENTION TO THE RISK OF DAMAGE TO THE PRODUCT.



**CAUTION:** THE INTERNAL CIRCUITRY OF THE INSTRUMENT CONTAINS ELECTROSTATIC DISCHARGE 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 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 REICHERT TECHNOLOGIES OR MUST BE TESTED TO AN APPLICABLE IEC OR ISO STANDARDS.

**CAUTION:** THE LIGHT EMITTED FROM THIS INSTRUMENT IS POTENTIALLY HAZARDOUS. THE LONGER THE DURATION OF EXPOSURE, THE GREATER THE RISK OF OCULAR DAMAGE. EXPOSURE TO LIGHT FROM THIS INSTRUMENT WHEN OPERATED AT MAXIMUM INTENSITY WILL EXCEED THE SAFETY GUIDELINE AFTER 9.5 MINUTES.

# Symbol Information

## Symbol Information

The following symbols appear on the instrument:



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



Type B Applied Part



Accompanying Documents must be consulted



Alternating Current Power



Protective Earth Connection



ON / OFF



Date of Manufacture



Catalog Number



Serial Number



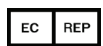
Waste of Electrical and Electronic Equipment



Compliance to Medical Device Directive 93/42/EEC



Underwriter's Laboratories has independently evaluated this device using selected tests from US and Canadian versions of IEC 60601-1 standard, and assigned a control number



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

# Introduction

Congratulations on the purchase of your new Xcel® 455 Slit Lamp from Reichert Technologies®.

These Instructions for Use are designed as a training and reference manual for the operation and maintenance of the instrument. We recommend that you read it carefully prior to use and follow the instructions to ensure optimum performance of your new instrument. Properly trained eyecare professionals such as ophthalmologists, optometrists, opticians and eye care technicians should operate this instrument.

Please retain this manual for future reference and to share with other users. Additional copies can be obtained from your authorized Reichert® distributor or from the Reichert customer service department at:

Tel: 716-686-4500

Fax: 716-686-4555

Email: reichert.information@ametech.com

## Indications for use

The Xcel 455 Slit Lamp is an AC-powered slit lamp biomicroscope that is intended for use in examining the anterior eye segment, from the corneal epithelium to the posterior capsule. It is used to aid in the diagnosis of diseases or trauma, which affect the structural properties of the anterior segment of the eye.

## Contraindications

None.

## Phototoxicity Information

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 should be used with filters that eliminate UV radiation ( $< 400$  nm) and, whenever possible, filters that eliminate short-wavelength blue light ( $< 420$  nm).

The retinal exposure dose for a photochemical hazard is a product of the radiance and the exposure time. If the value of radiance were reduced in half, twice the time would be needed to reach the maximum exposure limit.

While no acute optical radiation hazards have been identified for slit lamps, it is recommended that the intensity of light directed into the patient's eye be limited to the minimum level which is necessary for diagnosis. Infants, aphakes and persons with diseased eyes will 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.

# Features and Functions

## Parts Identification

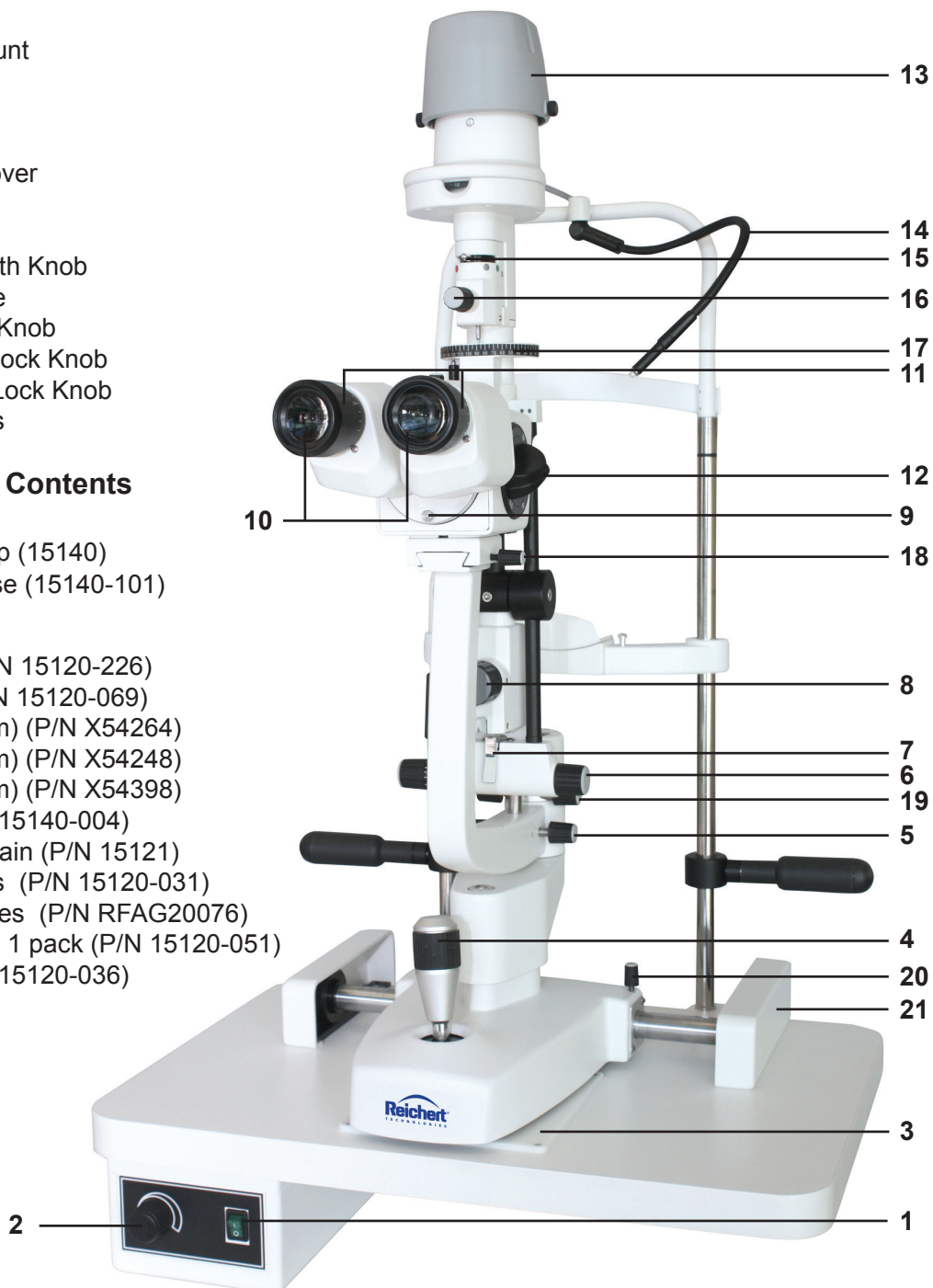
1. On/Off Switch
2. Illumination Level Control
3. Glide Plate
4. Joystick for horizontal and vertical adjustment
5. Microscope Arm Lock-Knob
6. Slit Width Knob
7. Inclination Latch Release
8. Centering Knob
9. Breath Shield Mount
10. Eyepieces
11. Focusing Rings
12. Magnification Dial
13. Lamp Housing 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

## Xcel 455 Package Contents

- Xcel 455 Slit Lamp (15140)
- Instructions for Use (15140-101)

## Accessories

- Focusing Rod (P/N 15120-226)
- Breath Shield (P/N 15120-069)
- Hex Wrench (3mm) (P/N X54264)
- Hex Wrench (4mm) (P/N X54248)
- Hex Wrench (5mm) (P/N X54398)
- Dust Cover (P/N 15140-004)
- Halogen Lamp, Main (P/N 15121)
- Guide Rail Covers (P/N 15120-031)
- Replacement Fuses (P/N RFAG20076)
- Chin Rest Paper - 1 pack (P/N 15120-051)
- Power Cord (P/N 15120-036)

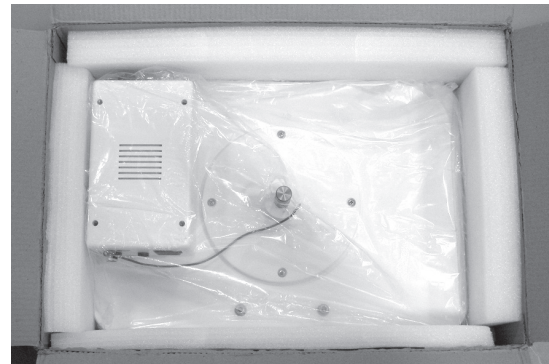




# Setup

## Unpacking and Installation

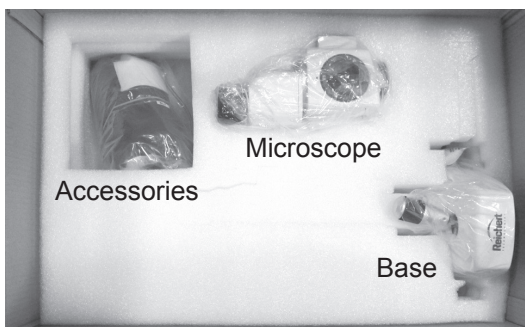
1. Open the outside shipping box and remove the four (4) inner boxes.
2. Remove the Instructions for Use and read it.
3. Open the box with the Table Top and Electronics in it. Refer to Figure SU-1.
4. Remove the Table Top from the box and install the Table Top onto the instrument stand and secure it 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 SU-2.
6. Open the box with the Microscope Assembly. Remove the Microscope Assembly, Base Assembly, and Accessories. Refer to Figure SU-3.
7. Remove the accessories and store them in an appropriate place so that when they are needed they will be available. Refer to Figure SU-4.
8. 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 SU-5.
9. 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 SU-6.



**Figure SU-1 Table Top and Electronics**



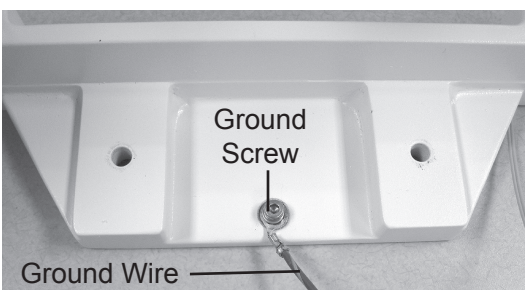
**Figure SU-2 Chin Rest Assembly**



**Figure SU-3 Microscope, Base, Accessories**



**Figure SU-4 Accessories**



**Figure SU-5 Chin Rest Ground**



**Figure SU-6 Table Top Screws**

## Setup (continued)

### Unpacking and Installation (continued)

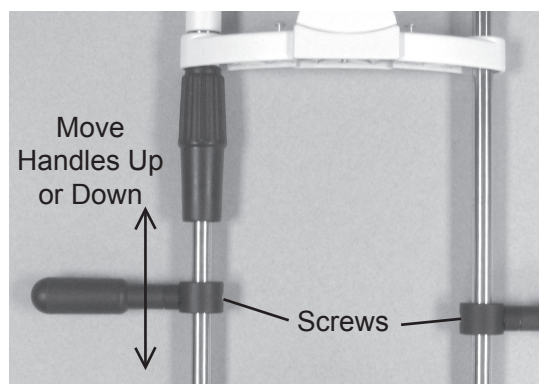
10. Using the 4mm Hex Wrench, adjust the Patient Handles by loosening the Screws that are securing them to the Chinrest Posts. Slide the Patient Handles up or down to the desired height, and secure them in place by tightening the Allen Cap Screws. Refer to Figure SU-7.
11. Attach the Fixation Light Wire from the Chin Rest Assembly into the connector on the back of the Power Supply Assembly. Refer to Figure SU-8.
12. Open the box with the Illumination Assembly and remove it. Refer to Figure SU-9.
13. Using the 5mm Hex Wrench, remove the Screw on the bottom of the Illumination Assembly and Arm.

**Note:** The Illumination Assembly and Arm are connected as one piece.

14. Mount the Illumination Assembly and Arm onto the Base Assembly and secure it with the Screw using the 5mm Hex Wrench. Refer to Figure SU-10.

**Note:** There is a Notch in the Base Assembly, and a Slot in the Illumination Assembly. Align the Illumination Assembly and Arm so the Notch goes into the Slot. If the Notch is not aligned properly, the Slit Lamp will not sit flush, and won't be aligned properly. Refer to Figure SU-11.

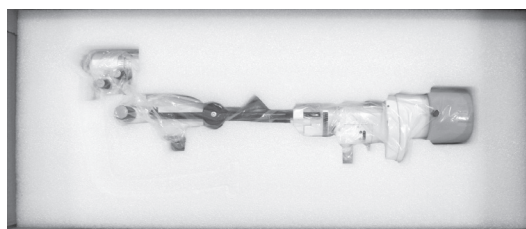
-continued-



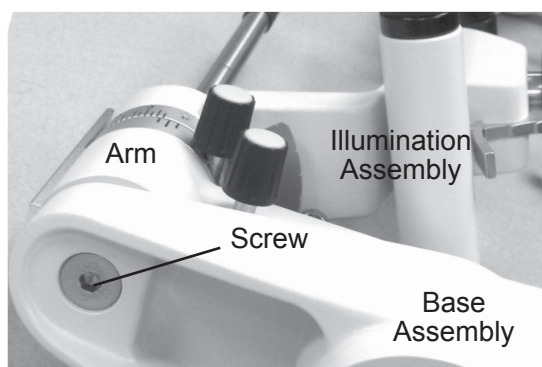
**Figure SU-7** Adjusting Patient Handle Height



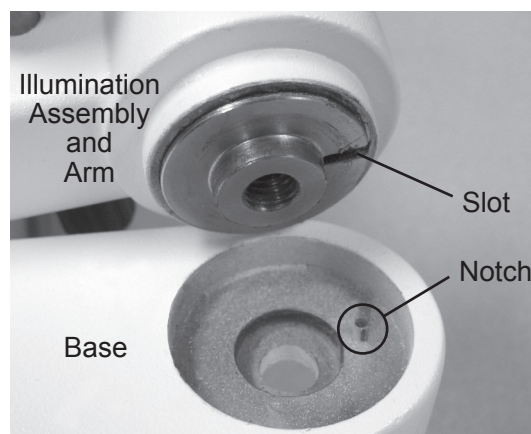
**Figure SU-8** Connections



**Figure SU-9** Illumination Assembly



**Figure SU-10** Screw



**Figure SU-11** Line Up Notch



## Setup (continued)

### Unpacking and Installation (continued)

15. Install the Base Assembly onto the tracks of the Table Top and slide the Guide Rail Covers around the tracks. Refer to Figure SU-12.
16. Attach the Base Lamp Wire to the back of the Power Supply Assembly. Refer to Figure SU-8.
17. 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 SU-13.

**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.

### 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.

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

2. Activate ON/OFF Switch (I). Refer to Figure SU-14.

**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 receptacle.



Figure SU-12 Install Base Assembly

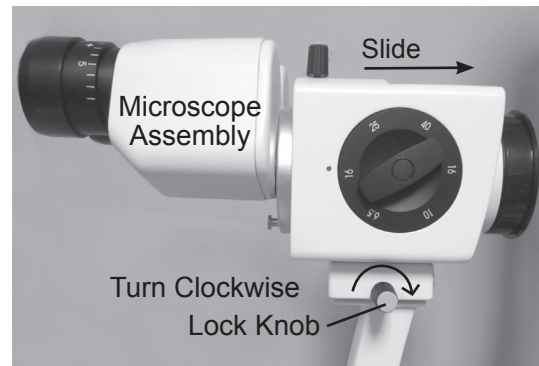


Figure SU-13 Microscope Install

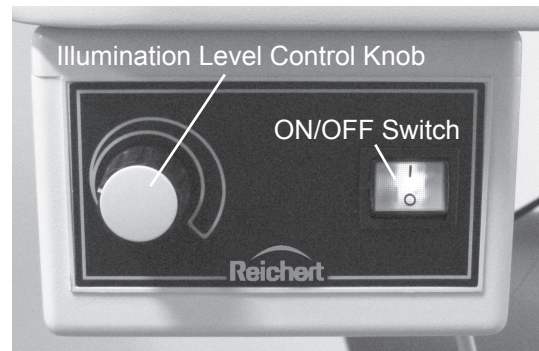


Figure SU-14 Power Supply Assembly

# 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 Control Knob. Refer to Figure SU-14.

**Note:** The maximum intensity setting is for intermittent use only. Continuous use will shorten the 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 IN-1.
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 IN-2.

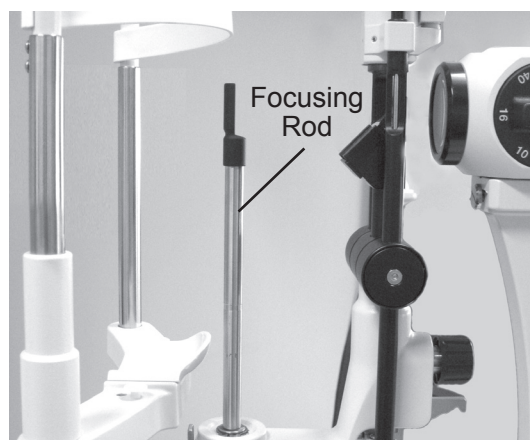
**Note:** The thinnest slit will allow for greater accuracy.

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 IN-2 and IN-3.
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 IN-4.
8. Move the slit lamp with the joystick held firmly and slightly angled toward the patient, until the slit appears sharply on the cornea.

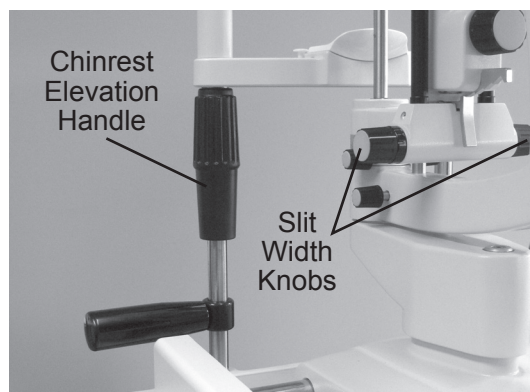
**Note:** The accuracy of this rough adjustment should be checked by the naked eye. The fine adjustment is performed while observing the slit through the microscope.

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 IN-4.

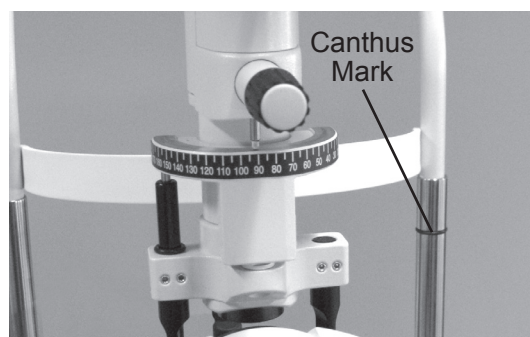
**Note:** Lock the base whenever the lamp is not in use.



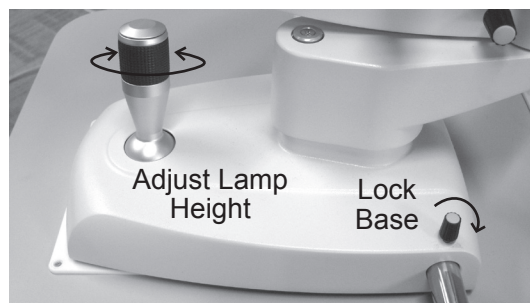
**Figure IN-1 Install Focusing Rod**



**Figure IN-2 Slit Width and Patient Height**



**Figure IN-3 Adjust Patient Height**



**Figure IN-4 Adjust Height**

## Instructions for Use (continued)

### Operation (continued)

11. 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 IN-5.
12. The illumination angle is indicated on the Illumination Angle Scale on the slit lamp arm. Refer to Figure IN-6.
13. Magnification is altered by rotating the Magnification Dial on the Microscope Assembly. Refer to Figure IN-5.

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

14. The slit width can be adjusted by rotating the Slit Width Knobs. Refer to Figure IN-7.

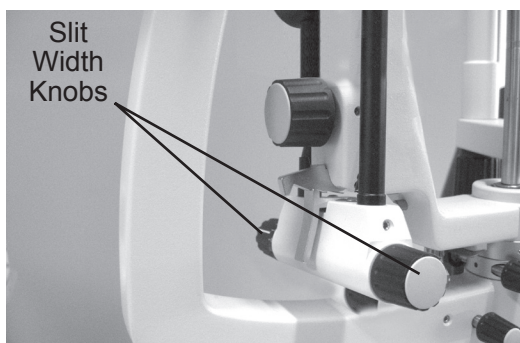
### Adjusting Slit Length

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 IN-8.

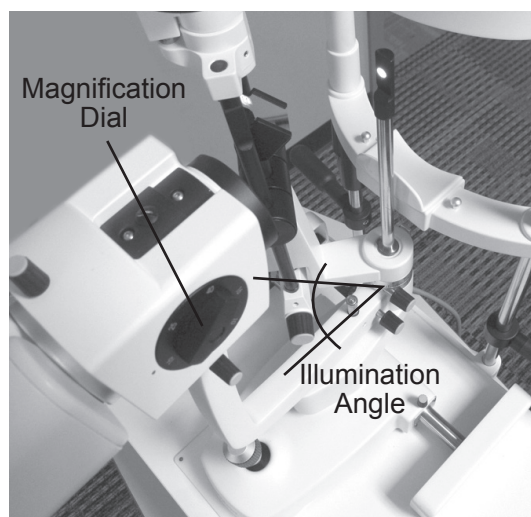
### Filters

There are five filters that can be used by indexing the Filter Lever to the coordinating Filter Dot. The Filter Dots are color coded. Refer to Figure IN-8. The color coded filters are as follows:

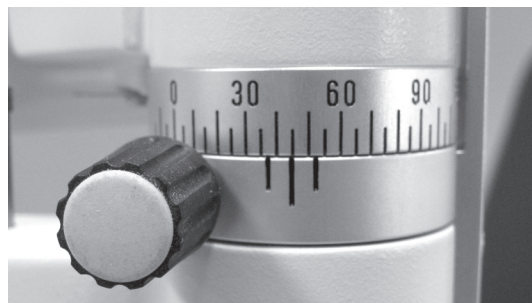
Blue dot = Cobalt Blue  
Red dot = Heat Absorbing  
White dot = Open  
Gray dot = Neutral Density  
Green dot = Red-free



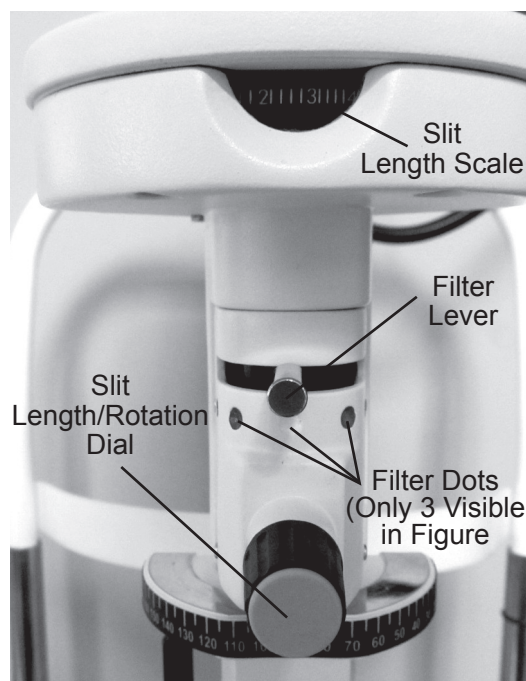
**Figure IN-7 Slit Width Adjustment**



**Figure IN-5 Illumination Angle**



**Figure IN-6 Illumination Angle Scale**



**Figure IN-8 Slit Width and Filters**

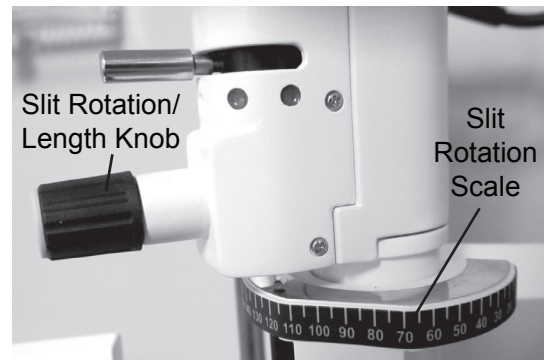


# Instructions for Use (continued)

## Operation (continued)

### Slit Rotation

By grasping the Slit Rotation/Length 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 IN-9.



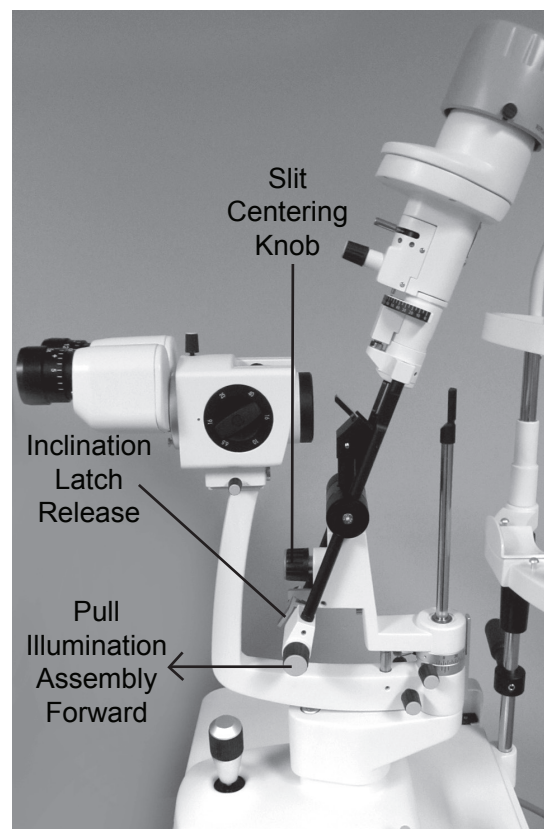
**Figure IN-9 Slit Rotation Scale**

### Illumination Inclination

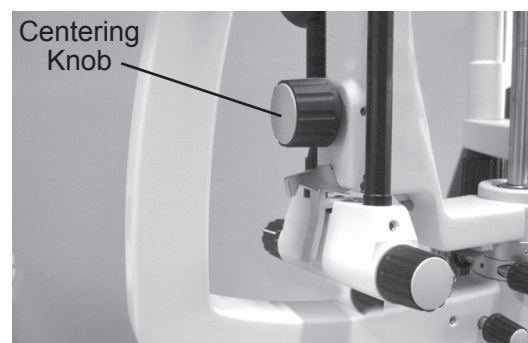
The Illumination Assembly can be inclined in the horizontal plane in 5° steps for a total of 20°. Tilt the Illumination Assembly by depressing the Inclination Latch Release and pulling the base of the Illumination Assembly toward the operator. Refer to Figure IN-10.

### 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 IN-11.



**Figure IN-10 Illumination Inclination**



**Figure IN-11 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

When cleaning the Xcel 55, use one of the following approved cleaning solutions:

- Soap and Water
- 70% Isopropyl Alcohol
- 5.25% Bleach and Water Solution
- 7.5% Hydrogen Peroxide and Water Solution
- Sani-Cloth\* Prime Germicidal Wipes (Didecyl Dimethyl Ammonium Chloride, isopropyl alcohol and ethyl alcohol.)

### External Cleaning

Clean the external surfaces of this instrument using a clean, soft cloth moistened with an approved cleaning solution. Refer to Figure MM-1.

### Forehead/Chinrest Cleaning

For hygienic reasons, wipe the forehead rest and chinrest with a clean, soft cloth moistened with an approved cleaning solution. Change the chinrest papers after each patient.

### Glide Plate Cleaning

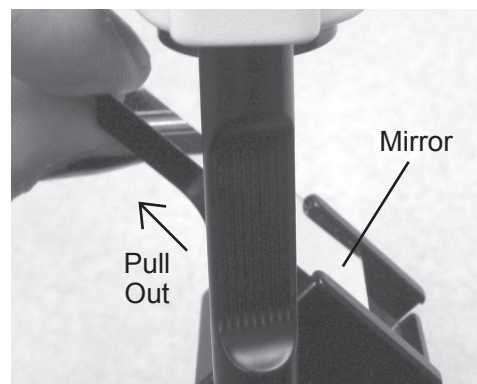
If the Glide Plate is dirty it may cause a rough feeling when maneuvering the base of the slit lamp. Clean the Glide Plate with a clean, soft cloth moistened with an approved cleaning solution.

### 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 MM-2.



**Figure MM-1** Cleaning Main Unit



**Figure MM-2** Remove Mirror

\* Sani-Cloth is a registered trademark of PDI, Inc., Woodcliff Lake, NJ.

## Cleaning & Maintenance (continued)

### Changing The Halogen Lamp

**WARNING:** NEVER REMOVE A LAMP 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 LAMP.

**WARNING:** REPLACE HALOGEN LAMP ONLY WITH REICHERT P/N 15121 TO ENSURE PATIENT LIGHT LEVEL SAFETY.

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

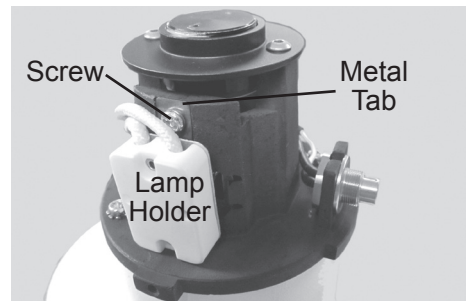
1. Remove input power to the instrument.
2. Remove the Lamp Housing Cover by loosening the Two Screws securing the Cover and lifting it straight off. Refer to Figure MM-3.
3. Using a Philips head screwdriver, unscrew the Screw securing the Metal Tab holding the Lamp Holder in place. Refer to Figure MM-4.
4. Gently pull out the Lamp Holder and Lamp. Refer to Figure MM-5.
5. Grip the Lamp by the Metal Disk that is attached to it, and pull it out of the Lamp Holder. Refer to Figure MM-6.
6. Replace the Lamp with a new one and install it by pushing the prongs into the Lamp Holder so that the Notch is positioned to the right. Refer to Figures MM-6 and MM-7.

**Note:** There is a Cut Out in the Metal Disk on the Lamp. Ensure that the Lamp is placed properly so that the Cut Out fits into the Notch. Refer to Figure MM-7.

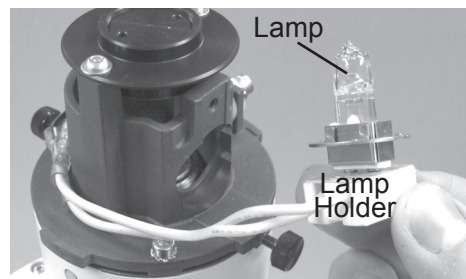
7. Secure the Lamp with the Metal Tab and Screw. Refer to Figure MM-4.
8. Install the Lamp Housing Cover and secure it by tightening the Two Screws. Refer to Figure MM-3.



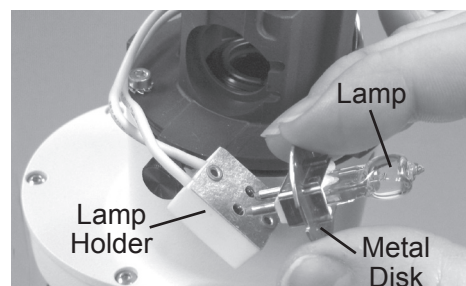
**Figure MM-3 Remove Cover**



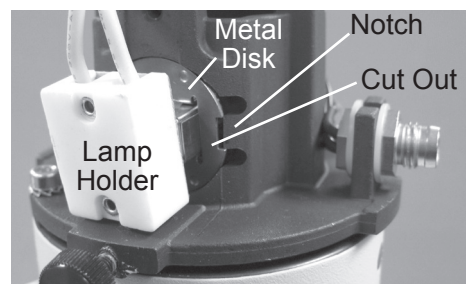
**Figure MM-4 Securing Screw**



**Figure MM-5 Lamp**



**Figure MM-6 New Lamp**



**Figure MM-7 Notch**



## Cleaning & Maintenance (continued)

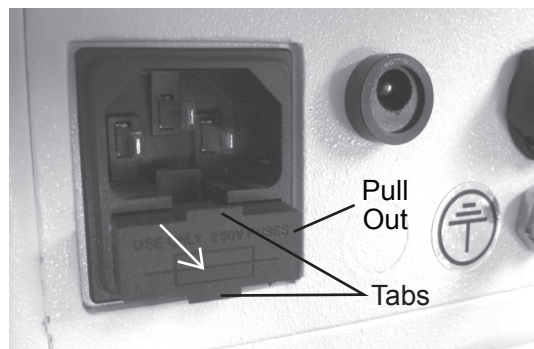
### Fuse Replacement

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

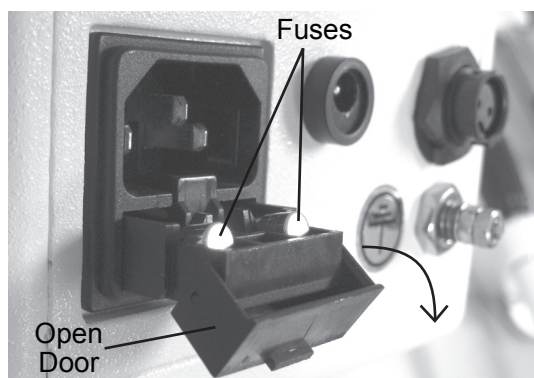
1. Remove input power to the instrument.
2. Press down on the top tab in the middle of the Power Input Module to release the Fuse Holder, and gently pull out the Fuse Holder by gripping the two small tabs. Refer to Figures MM-8 and MM-9.
3. Open the Door to the Fuse Holder by pulling it down. Refer to Figure MM-9.

**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 MM-8 Pull Out**



**Figure MM-9 Open Fuse Door**

# Troubleshooting

The following chart outlines some common issues with the Xcel 455 Slit Lamp and some steps you can take to correct the issue. If problems persist, please contact the Reichert as listed in the [Introduction](#) section of this manual.

## Chart of Common Errors

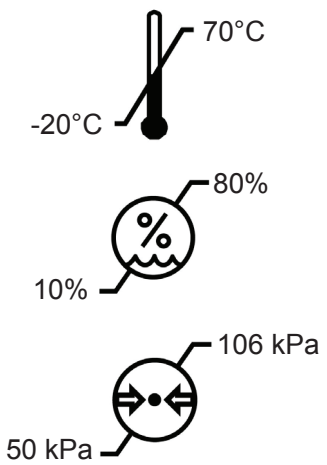
| ISSUE                              | PROBABLE CAUSE   | POSSIBLE SOLUTION  |
|------------------------------------|--|--|
| Lamp won't turn on.                | Incorrect input power supplied to the Xcel 455 Slit Lamp.          | Check the outlet to ensure proper power is being supplied.                         |
|                                    | Defective Power Cord.  | Replace the Power Cord.  |
|                                    | Lamp may be blown out.   | Replace the Lamp.  |
|                                    | Defective Power Supply.  | Replace the Power Supply Assembly.   |
| 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 Assembly.   |
| Light too dim.                     | Incorrect wattage for lamp being used.                             | Replace with the proper lamp.  |
|                                    | Lamp not installed properly.                                       | Check lamp and ensure notch lines up with lamp 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.              |
|                                    | Lamp not installed properly.                                       | Check lamp and ensure notch lines up with lamp housing.                            |

The following is a checklist of items that need to be assessed in order to determine if the Xcel 455 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 it's brightest setting, and all the way down to it's 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 15140

|  |  |   |
|--|--|---|
| <b>Physical Dimensions</b><br>Size (From Tabletop):<br>Height: 26.0 in. (66.0 cm)<br>Width: 18.0 in. (45.7 cm)<br>Depth: 13.5 in. (34.3 cm)  |  | Weight, unpacked: 39.3 lbs (17.8 Kg)<br>Weight, packed: 65 lbs (29.5 Kg)            |
| <b>Electrical</b><br>Voltage: 100V-240 VAC<br>Power Input (max): 56-73 VA<br>Frequency: 50/60 Hz<br>Fuses: Time-Lag (2.5A, 250V), 5x20 mm<br>Halogen Lamp: P/N 15121 (6V, 20 W)  |  |   |
| <b>Operational Conditions</b><br><b>Environmental:</b><br>The environmental conditions are as follows:<br><b>Operating:</b><br>Temperature 10° C (50° F) to 35° C (95° F)<br>Relative Humidity: 30% to 75%<br>Atmospheric Pressure: 80 kPa (23.6 in. Hg) to 106 kPa (31.3 in. Hg)<br><b>Transportation &amp; Storage:</b><br>Temperature -20° C (-4° F) to 70° C (158° F)<br>Relative Humidity: 10% to 80%<br>Atmospheric Pressure: 50 kPa (14.8 in. Hg) to 106 kPa (31.3 in. Hg)  |  |   |
| <b>Optics</b><br><b>Microscope</b> Galilean<br><b>Mag Change</b> 5 Step Drum Rotation<br><b>Eyepiece</b> 12.5X<br><b>Mag Ratio</b> 6.5X, 10X, 16X, 25X, 40X<br><b>PD Range</b> 48 - 82 mm<br><b>Diopter Adjustment</b> ± 8 D<br><b>Slit Illumination</b> 6V 20W Halogen<br><b>Slit Width</b> 0 - 12 mm<br><b>Slit Length</b> 1.5 - 12.5 mm<br><b>Slit Apertures</b> 0.3, 1, 3, 5, 9, 12 mm<br><b>Slit Rotation</b> 0° - 180°<br><b>Slit Inclines</b> -5°, -10°, -15°, -20°<br><b>Filters</b> Red Free, Heat Absorbing, Cobalt Blue, Neutral Density<br><b>Working Distance</b> < 370 mm<br><b>Illuminance Range</b> 0 to > 50000 lux |  |  |

## Specifications (continued)

| <b>Field of View</b> |                           |
|----------------------|---------------------------|
| <b>Magnification</b> | <b>Field of View (mm)</b> |
| 6.5 X                | 37.0                      |
| 10 X                 | 24.0                      |
| 16X                  | 15.0                      |
| 25X                  | 9.5                       |
| 40X                  | 6.0                       |

| <b>Movement Ranges</b> |                                       |
|------------------------|---------------------------------------|
| Longitudinal (In/Out)  | 4.3 in. (110 mm )                     |
| Lateral (Left/Right)   | 4.3 in. (110 mm )                     |
| Vertical (Up/Down)     | 1.2 in. (30 mm )                      |
| Chinrest Range         | 2.8 in. (70 mm )                      |
| Table Dimensions       | 18.3 in. x 12.6 in. (465 mm x 320 mm) |

### Compliance

This slit lamp complies with:

- IEC 60601-1
- ISO 10939
- ISO 15004-1
- ISO 15004-2

### Device Classification

Protection: Class I

Ingress Protection Rating: IXP0

Instrument Type: (IEC 60601-1) B

Operating Mode: Continuous

US FDA: Class II 21 CFR 886.1850

EU Medical Device Directive: Class I, Rule 12

CAN CMDR: Class I Rule 7, Clause 1

### 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

| <b>Table 201 – Guidance and Manufacturer’s Declaration</b><br><b>Electromagnetic Emissions</b><br><b>All Medical Electrical Equipment and Medical Electrical Systems</b>   |                   |  |
|--|-------------------|--|
| <b>Guidance and Manufacturer’s Declaration – Electromagnetic Emissions</b>   |                   |  |
| <p>The Xcel® 455 Slit Lamp is intended for use in the electromagnetic environment specified below.<br/> The customer or user of the Xcel 455 Slit Lamp should ensure that it is used in such an environment.</p> |                   |  |
| <b>Emissions Test</b>  | <b>Compliance</b> | <b>Electromagnetic Environment</b><br>- Guidance -   |
| Conducted and Radiated<br>RF Emissions<br>CISPR 11   | Group 1           | The Xcel® 455 Slit Lamp 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.                               |
| Conducted and Radiated<br>RF Emissions<br>CISPR 11   | Class A           | The Xcel 455 Slit Lamp is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies building for domestic power. |
| Harmonic Distortion<br>IEC 61000-3-2   | Class A           |  |
| Voltage Fluctuations and<br>Flicker<br>IEC 61000-3-3   | Complies          |  |

## Guidance Tables (continued)

| <b>Table 202 – Guidance and Manufacturer's Declaration</b><br><b>Electromagnetic Immunity</b><br><b>All Medical Electrical Equipment and Medical Electrical Systems</b>                         |  |  |   |
|---|--|--|---|
| Guidance and Manufacturer's Declaration – Electromagnetic Immunity  |  |  |   |
| The Xcel 455 Slit Lamp is suitable for use in electromagnetic environment specified below. The customer or user of the Xcel 455 Slit Lamp should ensure that it is used in such an environment. |  |  |   |
| Immunity Test   | IEC 60601 Test Level   | Compliance Level   | Electromagnetic Environment - Guidance  |
| Electrostatic Discharge<br>IEC 61000-4-2  | ±8kV Contact<br>±2kV, ±4kV, ±8kV,<br>±15kV Air   | ±8kV Contact<br>±2kV, ±4kV, ±8kV,<br>±15kV Air   | Floors should be wood, concrete or ceramic tile. If floors are synthetic, the R/H should be at least 30%.   |
| Electrical Fast Transients / Bursts<br>IEC 61000-4-4  | ±2kV Mains Power Lines<br>±1kV I/O Lines<br>100kHz repetition frequency                            | ±2kV Mains Power Lines<br>N/A I/O Lines<br>100kHz repetition frequency                             | Mains power quality should be that of a typical residential, commercial or hospital environment.  |
| Surges<br>IEC 61000-4-5   | ±0.5kV, ±1kV<br>Line-to-line<br>±0.5kV, ±1kV, ±2kV<br>Line-to-ground                               | ±0.5kV, ±1kV<br>Differential Mode<br>±0.5kV, ±1kV, ±2kV<br>Common Mode                             | Mains power quality should be that of a typical residential, commercial or hospital environment.  |
| Voltage Dips<br>IEC 61000-4-11  | 0% Ut; 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°                                     | 0% Ut; 0.5 cycle at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°                                     | Mains power quality should be that of a typical residential, commercial or hospital environment. If the user of the Xcel 455 Slit Lamp requires continued operation during power mains interruptions, it is recommended that the Xcel 455 Slit Lamp be powered from an uninterruptible power supply or battery. |
|   | 0% Ut; 1.0 cycle and 70% Ut; 25/30 cycles for 50 Hz and 60 Hz, respectively<br>Single phase: at 0° | 0% Ut; 1.0 cycle and 70% Ut; 25/30 cycles for 50 Hz and 60 Hz, respectively<br>Single phase: at 0° |   |
| Voltage Interruptions<br>IEC 61000-4-11   | 0% Ut, 250/300 cycles for 50 Hz and 60 Hz, respectively  | 0% Ut, 250/300 cycles for 50 Hz and 60 Hz, respectively  |   |
| Power Frequency 50/60Hz<br>Magnetic Field<br>IEC 61000-4-8  | 30A/m<br>50 Hz or 60 Hz  | 30A/m<br>50 Hz or 60 Hz  | Power frequency magnetic fields should be that of a typical residential, commercial or hospital environment.  |

## Guidance Tables (continued)

| Table 204 – Guidance and Manufacturer's Declaration  |  |  |  |
|--|--|--|--|
| Electromagnetic Immunity   |  |  |  |
| Medical Electrical Equipment and Medical Electrical Systems that are NOT Life-supporting   |  |  |  |
| Guidance and Manufacturer's Declaration – Electromagnetic Immunity   |  |  |  |
| The Xcel 455 Slit Lamp is intended for use in the electromagnetic environment specified below.<br>The customer or user of the Xcel 455 Slit Lamp should ensure that it is used in such an environment.   |  |  |  |
| Immunity Test  | IEC 60601 Test Level   | Compliance Level   | Electromagnetic Environment - Guidance   |
| Conducted disturbances induced by RF fields<br>IEC 61000-4-6   | 3 Vrms<br>150 kHz to 80 MHz  | (V1) = 3 Vrms<br>150 kHz to 80 MHz                                       | Portable and mobile RF communications equipment should be no closer to any part of the Xcel 455 Slit Lamp, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.<br><br>Recommended Separation Distance:<br><br>$d=(3.5/V1)(\sqrt{P})$<br>$d=(3.5/E1)(\sqrt{P})$<br>80 to 800 MHz<br><br>$d=(7/E1)(\sqrt{P})$<br>800 MHz to 2.7 GHz<br><br>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).<br><br>Field strengths from fixed transmitters, as determined by an electromagnetic site survey, should be less than the compliance levels in each frequency range.<br><br>Interference may occur in the vicinity of equipment marked with the following symbol:<br><br> |
|  | 6 Vrms<br>in ISM bands between 150 kHz and 80 MHz<br>80% AM at 1 KHz | (V1) = 6 Vrms in ISM bands between 150 kHz and 80 MHz<br>80% AM at 1 KHz |  |
| Radiated RF Electromagnetic Fields<br>IEC 61000-4-3  | 3 V/m<br>80 MHz to 2.7 GHz<br>80% AM at 1kHz                         | (E1) = 3 V/m<br>80 MHz to 2.7 GHz<br>80% AM at 1kHz                      |  |
|  | 10 V/m<br>80 MHz to 2.7 GHz<br>80% AM at 1kHz                        | N/A  |  |
| <b>Note 1:</b> At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.  |  |  |  |
| <b>Note 2:</b> These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.   |  |  |  |
| <ul style="list-style-type: none"><li>* 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.</li><li>* Over the frequency range 150 kHz to 80 MHz, field strengths should be less then [V1] V/m.</li><li>* The ISM (industrial, scientific and medical) bands between 0,15 MHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40,66 MHz to 40,70 MHz. The amateur radio bands between 0,15 MHz and 80 MHz are 1,8 MHz to 2,0 MHz, 3,5 MHz to 4,0 MHz, 5,3 MHz to 5,4 MHz, 7 MHz to 7,3 MHz, 10,1 MHz to 10,15 MHz, 14 MHz to 14,2 MHz, 18,07 MHz to 18,17 MHz, 21,0 MHz to 21,4 MHz, 24,89 MHz to 24,99 MHz, 28,0 MHz, to 29,7 MHz and 50,0 MHz to 54,0 MHz.</li></ul> |  |  |  |

## Guidance Tables (continued)

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

**Guidance and Manufacturer's Declaration - Electromagnetic Immunity**

**Recommended Separation Distances for between Portable and Mobile RF Communications Equipment and the Xcel 455 Slit Lamp**

The Xcel 455 Slit Lamp is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the Xcel 455 Slit Lamp can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the Xcel 455 Slit Lamp as recommended below, according to the maximum output power of the communications equipment.

| Max Output Power of Transmitter (W) | Separation (m)<br>150kHz to 80 MHz<br>Outside ISM Bands<br>$d=(3.5/\sqrt{1})(\sqrt{P})$ | Separation (m)<br>150kHz to 80 MHz<br>In ISM Bands<br>$d=(10/3)(3.5/\sqrt{1})(\sqrt{P})$ | Separation (m)<br>80 to 800 MHz<br>$d=(3.5/E1)(\sqrt{P})$ | Separation (m)<br>800MHz to 2.7GHz<br>$d=(7/E1)(\sqrt{P})$ |
|-------------------------------------|---|--|---|--|
| 0.01                                | 0.1166  | 0.1944   | 0.1166  | 0.2333   |
| 0.1                                 | 0.3689  | 0.6149   | 0.3689  | 0.7378   |
| 1                                   | 1.1666  | 1.9444   | 1.1666  | 2.3333   |
| 10                                  | 3.6893  | 6.1489   | 3.6893  | 7.3786   |
| 100                                 | 11.6666   | 19.4444  | 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.

**Note 3:** The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.7 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 has been incorporated into the formula used in calculating the recommended separation distance for transmitters in these frequency ranges.



## Guidance Tables (continued)

| Table 9 – Guidance and Manufacturer’s Declaration   |                      |            |  |                                |                   |              |                           |                  |  |
|---|----------------------|------------|--|--------------------------------|-------------------|--------------|---------------------------|------------------|--|
| Electromagnetic Immunity  |                      |            |  |                                |                   |              |                           |                  |  |
| Immunity to Proximity Fields from RF Wireless Communications Equipment  |                      |            |  |                                |                   |              |                           |                  |  |
| Guidance and Manufacturer’s Declaration - Electronic Immunity   |                      |            |  |                                |                   |              |                           |                  |  |
| The Xcel 455 Slit Lamp is intended for use in the electromagnetic environment as specified below related to proximity fields from RF wireless communications equipment. |                      |            |  |                                |                   |              |                           |                  |  |
| Immunity Test   | IEC 60601Test Level  |            |  |                                |                   |              |                           | Compliance Level | Electromagnetic Environment -Guidance-   |
| Radiated RF<br>IEC 61000-4-3  | Test Frequency (MHz) | Band (MHz) | Service (MHz)  | Modulation                     | Maximum Power (W) | Distance (m) | Immunity Test Level (V/m) | Compliance Level | d = 6/E √P<br><br>where<br><br>d = Minimum separation distance in meters<br><br>E = Immunity test level in V/m<br><br>P = Maximum power in Watts (W) |
|   | 385                  | 380-390    | TETRA 400  | Pulse Modulation 18 Hz         | 1,8               | 0,3          | 27                        | 27 V/m at 0,3 m  |  |
|   | 450                  | 430-470    | GMR 460, FRS 460   | FM ±5 kHz deviation 1 kHs sine | 2                 | 0,3          | 28                        | 28 V/m at 0,3 m  |  |
|   | 710                  | 704-787    | LTE Band 13, 17  | Pulse Modulation 217 Hz        | 0,2               | 0,3          | 9                         | 9 V/m at 0,3 m   |  |
|   | 745                  |            |  |                                |                   |              |                           |                  |  |
|   | 780                  |            |  |                                |                   |              |                           |                  |  |
|   | 810                  | 800-960    | GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 1, 3, 4, 25; UMTS | Pulse Modulation 18 Hz         | 2                 | 0,3          | 28                        | 28 V/m at 0,3 m  |  |
|   | 870                  |            |  |                                |                   |              |                           |                  |  |
|   | 930                  |            |  |                                |                   |              |                           |                  |  |
|   | 1720                 | 1700-1990  | GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS        | Pulse Modulation 217 Hz        | 2                 | 0,3          | 28                        | 28 V/m at 0,3 m  |  |
|   | 1845                 |            |  |                                |                   |              |                           |                  |  |
|   | 1970                 |            |  |                                |                   |              |                           |                  |  |
|   | 2450                 | 2400-2570  | Bluetooth WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7                    | Pulse Modulation 217 Hz        | 2                 | 0,3          | 28                        | 28 V/m at 0,3 m  |  |
|   | 5240                 | 5100-5800  | WLAN 802.11 a/n  | Pulse Modulation 217 Hz        | 0,2               | 0,3          | 9                         | 9 V/m at 0,3 m   |  |
|   | 5500                 |            |  |                                |                   |              |                           |                  |  |
|   | 5785                 |            |  |                                |                   |              |                           |                  |  |

# Warranty

This product is warranted by Reichert Technologies 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, Reichert's sole obligation is to repair or replace the defective part or product at Reichert's 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 Reichert instruction manual, nor to a product which has been sold, serviced, installed or repaired other than by a Reichert factory, Technical Service Center, or authorized Reichert Dealer.

Lamps, 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 Reichert 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 Reichert. Reichert 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, Reichert will defend such action at its expense and will pay costs and damages awarded in any such action, provided that Reichert shall have sole control of the defense of any such action with information and assistance (at Reichert's expense) for such defense, and of all negotiation for the settlement and compromise thereof.

## PRODUCT CHANGES

Reichert 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



Manufactured By  
**Reichert, Inc.**  
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Depew, NY 14043  
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