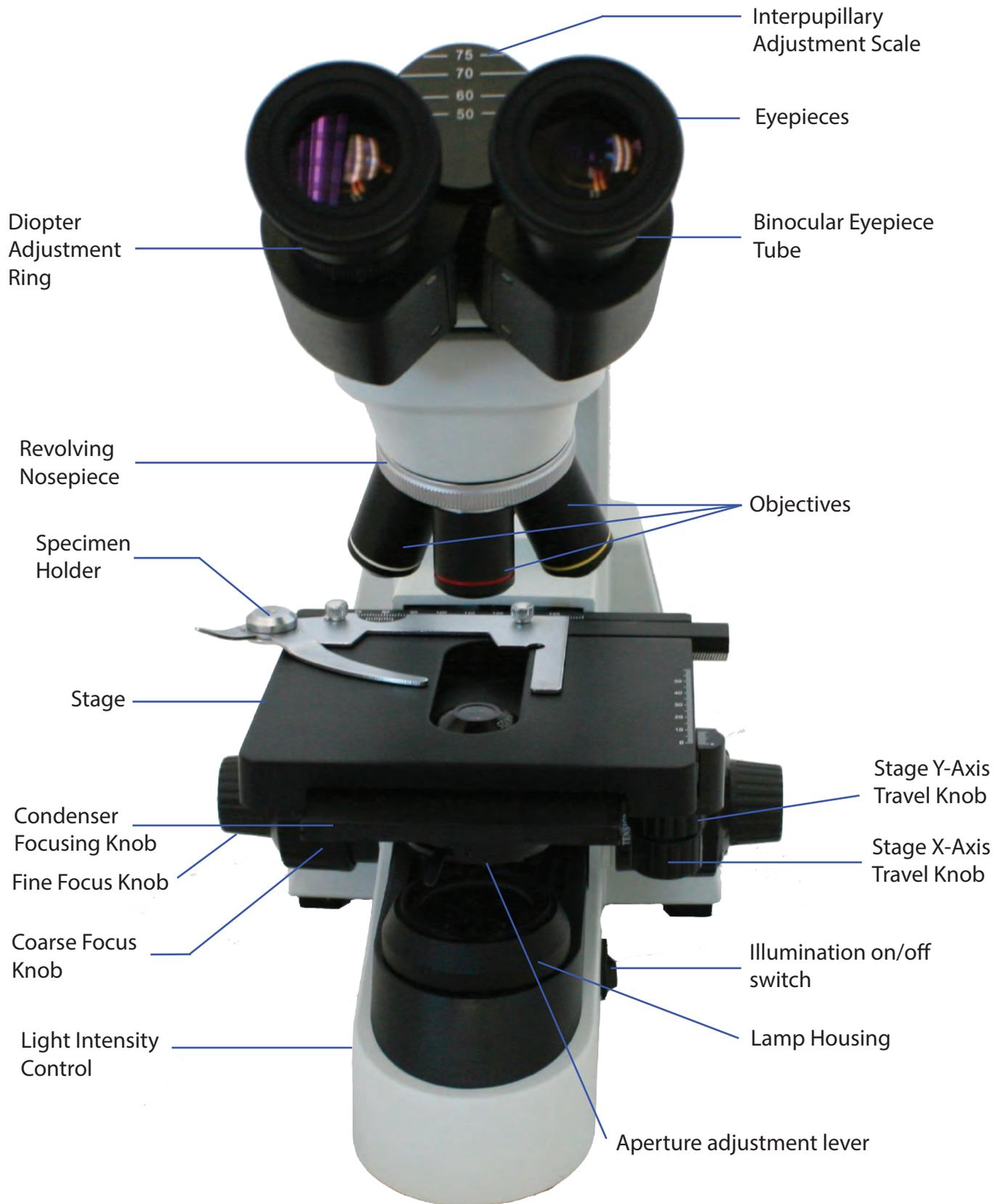




Richter Optica

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Instructions for Models:
UX1B Binocular and UX1T Trinocular
Laboratory and University Biological Microscope



Thank you for your purchase of a Richter Optica microscope. The information in this manual is provided to answer most questions that can arise when operating your microscope and to help you avoid unnecessary maintenance expenses in the future.

Please carefully read instructions before operating microscope. Nomenclature used to describe components and controls are identified on opposite page.

UNPACKING

Do not discard styrofoam container or packing materials until you are sure shipment is complete and undamaged (retain styrofoam shipping container to store your microscope when it is not in use). Remove all tape and packing material used to protect microscope during shipment. Make certain lens surfaces do not come in contact with dirt, fingerprints or oil. Damage of lens surfaces occur when they come in contact with such contaminants, and image quality is reduced.

BEFORE USE

When moving the microscope, use both hands and only lay on flat, even surfaces. Damage will occur by holding the stage, focussing knobs or head when moving the microscope.

For safety, make sure the power switch is always turned to the off position "O" before replacing the bulb or fuse and wait until both the bulb and bulb holder have cooled down.

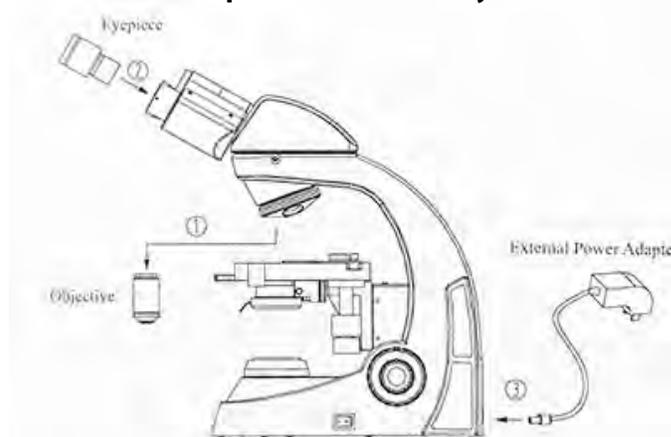
Replacement bulb: Single 3w LED bulb.

SETTING UP THE INSTRUMENT

Avoid placing the instrument in locations exposed to direct sunlight, dust, vibration, high humidity and where it is difficult to unplug the power supply cord.

MAINTENANCE

- 1. Wipe lenses only with lens paper.**
- 2. Never disassemble the microscope, disassembling the microscope will affect the performance of the microscope and void any warranty.**
- 3. Cover microscope with dust cover provided after every use.**



ASSEMBLING THE MICROSCOPE

1. Objectives

Lower the stage completely. Screw the objectives into the revolving nosepiece so that each clockwise rotation brings the next highest magnification objective into position.

3. Eyepieces

Use the same magnification eyepieces for both eyetubes. Remove the eyetube cover caps and discard. Insert eyepieces into eyetubes. To lock the eyepieces, tighten the small clamping screws on the side of the eyetube.

4. Power Cord

Connect the socket of the power cord into the AC inlet on the rear of the base of the microscope. Plug in the other end of the cord to an AC outlet with ground conductor.

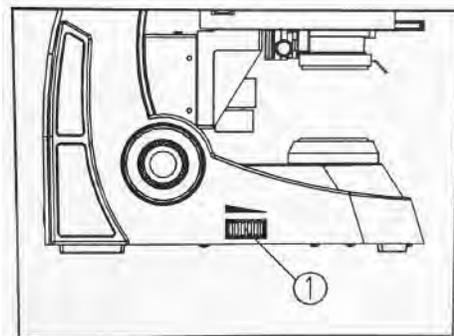
5. Batteries

The microscope comes equipped with 3 rechargeable AA batteries. The rechargeable batteries are located underneath the silver plate on the base of the microscope. To access/replace the batteries, remove all screws in the corners of the silver metal plate. Once screws are removed, lift off metal plate and access battery compartment.

6. Adjusting the Illumination

a.) Turn the main power switch to the on position.

b.) Adjust the light adjustment knob (1) until the illumination is comfortable for observation. Rotate the knob away from you to increase the intensity and towards you to lower the intensity.



GETTING STARTED

1. Coarse and Fine Focusing

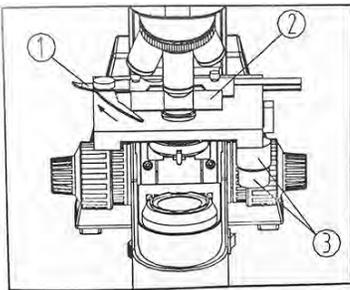
Focusing is done with coarse and fine focus knobs at the left and right of the microscope stand.

The direction of vertical movement of the stage corresponds to the direction the focus knobs are turned.

Never attempt either of the following actions, since doing so will damage the focus mechanism:

- Rotate the left or right knob while holding the other stationary
- Turning the coarse and fine focus knobs further than their limit.

GETTING STARTED



2. Placing the Specimen Slide

Push the silver finger of the specimen holder away from you (1). Place the specimen slide (2) against the other side of the specimen holder while holding the finger open. Once slide is placed properly with the cover glass facing upward you can release the silver finger so that the slide remains clamped. Use the x and y axis adjustment knobs (3) to maneuver the slide into the proper position where it is centered above the light source.

3. Adjust Focusing

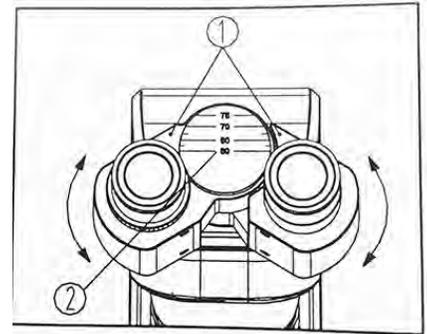
- a. Shift the 4x objective into the light path until you hear it click properly in place.
- b. Observe with just the right eye in the right eyepiece. Rotate the coarse focusing knob until the image appears clearly in the field of view.
- c. Rotate the fine focus knob to achieve finer focused details.

2. Coarse Focus Tension Adjustment

To increase the tension, turn the tension adjustment ring located on the inside of the coarse focus knob in the direction indicated by the arrow.

3. Interpupillary Distance Adjustment

Before adjusting the interpupillary distance, bring a specimen into focus using the 4x objective. While looking through the eyepieces move the eyetubes either further apart or closer together until the right and left field of view become one. Line up the dots (1) on either side of the basepoint scale (2). This adjustment will enable the user to see the specimen with both eyes.



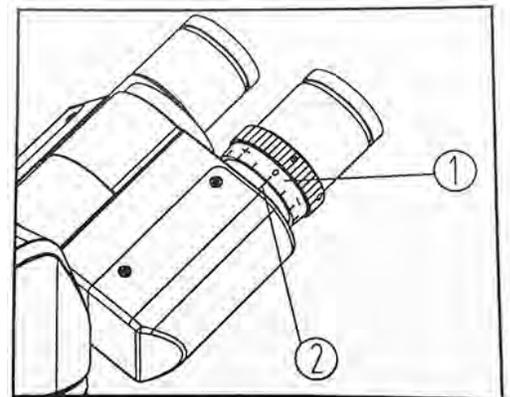
4. Diopter adjustment

Diopter adjustment will compensate for the differences in vision between the left and right eyes. In addition to making observation with both eyes easier, it will also help reduce the extent to which focusing is lost when the objective magnification is changed. In particular, this occurs when a low magnification objective is used.

Rotate the nosepiece until the 4x objective “clicks” into position. Using the fine and/or coarse focus knobs, focus the microscope until the image is at its sharpest. The left and right eyepieces have separate focusing provisions to compensate for slight differences in the focusing of each eye.

Using the right eye only and viewing through the right-hand eyepiece, adjust the diopter until the image is clearly in focus.

Using the left eye only and viewing through the left-hand eyepiece with its independent diopter focusing ring, focus until the specimen is at its sharpest. Once completing these steps, the microscope should now be ready for binocular viewing.



7. Adjusting the aperture diaphragm and condenser

The aperture diaphragm decides the numerical aperture (N.A.) of the illumination system. If the N.A. of the illumination system matches with the NA of the objective, it can obtain better resolution and contrast and increase the depth of field.

- a. You can adjust the condenser adjustment knob by turning it towards you. Raise the condenser towards the slide on the stage to fill the field of view with more light or turn the knob away from you to lower the condenser and fill less of the field of view with light. Since natural light to your specimen is usually low, it is a good idea to adjust the condenser aperture diaphragm to be 70-80% of the NA of the objective. Adjust the aperture adjustment lever to allow the correct amount of light through. A good rule of thumb is when using the 4x objective move the lever all the way to the right (open), and when using the 100x objective move the lever all the way to the left (closed). For the objectives in between adjust the lever between these settings.

8. Using the oil immersion objective

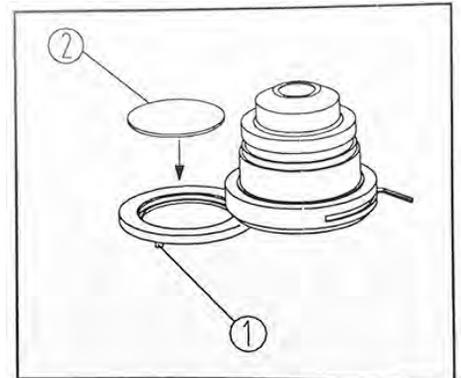
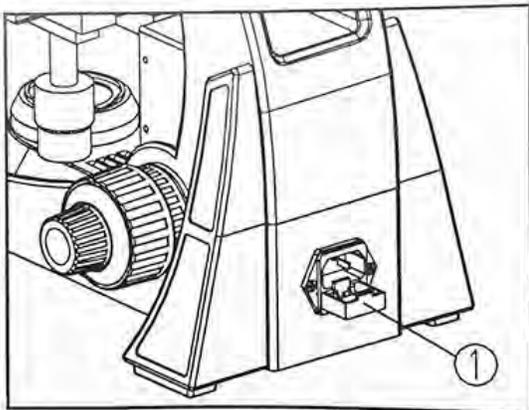
- a. First, use the 4x objective to focus the specimen.
- b. Place a drop of oil on the specimen.
- c. Rotate the nosepiece counterclockwise and rotate the oil objective (100x) into the light path. Then use the fine focusing knob to focus the specimen.

****Make sure there are no air bubbles in the oil. Air bubbles will distort the image. If you do experience an air bubble, you can gently swing the oil objective a few times to remove the bubble.**

- d. After use, wipe the lens with a tissue moistened with lens cleaner. Make sure all excess oil is removed from the objective after use. *Left over oil can damage the objective if not properly removed.*

9. Use of colored filters

Swing out the colored filter holder at the bottom of the condenser (1) in a clockwise direction. Place the filter (2) into the hole and then replace the holder.



10. Replacing the Fuse

Turn the main switch to OFF before replacing the fuse. Pull out the power cord. Pull the fuse base until the fuse can be removed from the fuse base. Install new fuse and push it into the fuse base firmly.

TROUBLESHOOTING

Optical

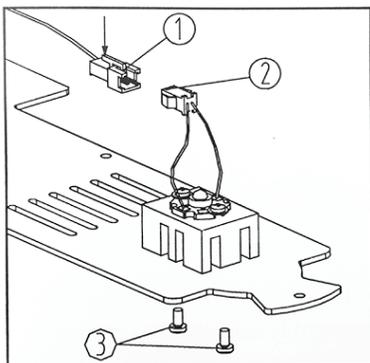
| Problem | Possible Cause |
|---|--|
| Dust or dirt in field of view. | Dust or dirt on objective, filter, condenser or eyepiece |
| Poor image (low contrast or resolution) | Condenser is set too low or too high |
| | Aperture diaphragm closed too far |
| | No cover glass |
| | Too thick or thin cover glass |
| | Immersion oil not used on immersion procedure |
| | Air bubbles in immersion oil |
| | Immersion oil used on a dry objective |
| | Greasy residue on eye lens |
| Uneven Focus | Incorrect illumination |
| | Specimen holder not fixed securely on stage |
| | Specimen not secured in position |
| Focusing is not possible with high magnification objectives | Specimen tilted on stage |
| | Slide is upside down |
| Insufficient parfocality of objectives | Cover glass is too thick |
| | Eyepiece diopter not adjusted |
| No cohesion of binocular image | Eyepiece diopter not adjusted |
| | Magnification or field of view of left and right eyepiece differ |
| | Interpupillary distance not adjusted |
| | Eyepiece diopter not adjusted |

Optical

| Problem | Possible Cause |
|---|---|
| High magnification objectives strike the specimen when changing over from low to high magnification | Slide is upside down |
| | Cover glass is too thick |
| Insufficient parfocality of objectives | Eyepiece diopter not adjusted |
| Eye strain or fatigue | Interpupillary distance not adjusted |
| | Diopter adjustment not made |
| | Field of view of left and right eyepiece differ |
| | Inadequate illumination |

Electrical

| | |
|-----------------------------------|--|
| <i>Lamp does not light</i> | <i>Power supply not plugged in</i> |
| | <i>Lamp not installed</i> |
| | <i>Lamp burnt out</i> |
| <i>Inadequate brightness</i> | <i>Specified lamp not being used</i> |
| <i>Lamp blows out immediately</i> | <i>Specified Lamp not being used</i> |
| <i>Lamp flickers</i> | <i>Connectors are not securely connected</i> |
| | <i>Lamp near end of service life</i> |
| | <i>Lamp not securely plugged into socket</i> |



Lightbulb Replacement:

Make sure microscope is not plugged in!

Remove screws from base plate (3) to access bulb. Disconnect bulb wire (2) from microscope connection (1). Insert new bulb and reconnect wires. Replace base plate and screws.

Mechanical System

| Problem | Possible Cause | Solution |
|--|--|---|
| Having trouble focusing when using high magnification objective. | Cover glass is facing down. | Make sure cover glass is facing up. |
| | Cover glass is too thick. | Use a standard cover glass with a thickness of 0.13-0.17mm |
| Objective touches cover glass while turning the nosepiece | Cover glass faces down | Turn the nosepiece into the right position until you hear it click into place |
| | Cover glass is too thick | Clean the appropriate lenses |
| Coarse Focusing Knob is too tight | Tension Adjustment Knob is too tight | Loosen it to an appropriate position |
| Stage drifts and will not stay in the focal plane | Tension adjustment knob is too loose | Tighten it to an appropriate position |
| Slide does not move smoothly | The slide is not positioned correctly | Adjust it correctly |
| | The moveable specimen holder is not fixed properly | Adjust it correctly |
| The image moves considerably when touching the stage | The stage is fashioned incorrectly | Fasten the stage correctly |

Electrical System

| Problem | Possible Cause | Solution |
|--|---|---------------------------------|
| Bulb does not work | No power supply | Check connection of power cable |
| | Bulb is not installed correctly | Install bulb correctly |
| | Bulb is burnt out | Replace bulb |
| Bulb burns out quickly | Wrong bulb is being used | Replace with correct bulb |
| The field of view is not bright enough | Wrong bulb being used | Replace with correct bulb |
| | Light adjustment knob is not being used correctly | Adjust knob correctly |

CARE AND MAINTENANCE

Do Not Disassemble

1. Disassembly may significantly affect the performance of the instrument, and may result in electric shock or injury and will void the terms of the warranty.
2. Never attempt to dismantle any parts other than described in this manual. If you notice any malfunction, contact your Richter Optica representative.

Cleaning the Microscope

1. Do not use organic solvents such as ether; alcohol or paint thinner on painted surfaces or plastic components. Doing so could result in discolouration of painted or plastic surfaces.
2. When cleaning lenses do not use any solvents other than absolute alcohol, as they may damage lens bonding cement.
3. Do not use petroleum benzene when cleaning components such as filters or lenses.
4. Absolute alcohol and petroleum benzene are highly flammable. Keep away from open flames and when turning power switch on and off.
5. For stubborn dirt, dampen a piece of gauze with diluted neutral detergent and wipe lightly.

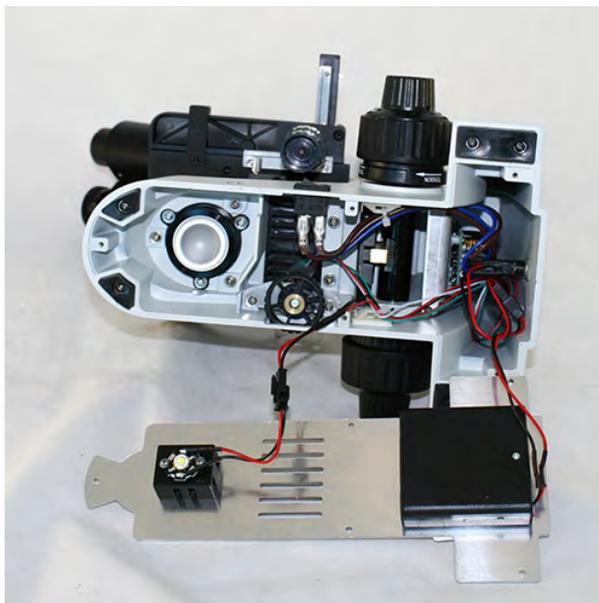
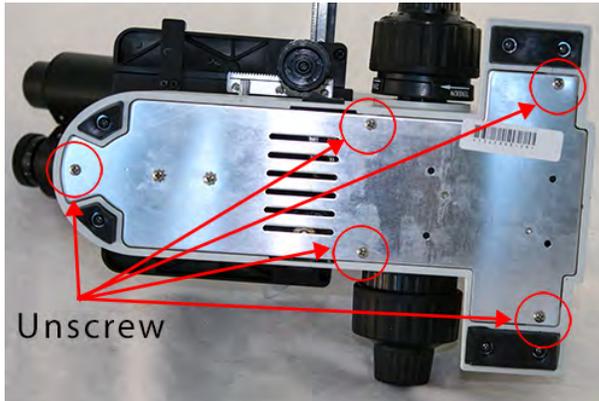
Disinfecting the Microscope

Follow the standard procedures for your laboratory.

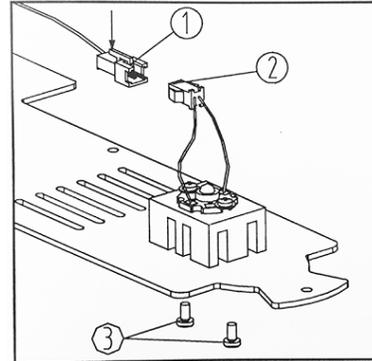
When Not in Use

1. When not in use, cover instrument with dust cover and store in a place in low humidity where mold is not likely to form.
2. Proper handling of the microscope will ensure years of trouble free service.
3. If repair becomes necessary, please contact Richter Optica directly at info@richter-optica.com.

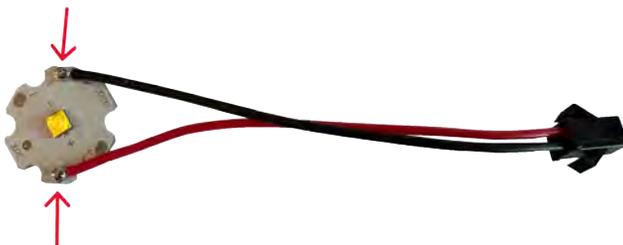
LED Lightbulb Replacement



1. Unplug the microscope.
2. Unscrew 5 screws as shown in image at left.
3. Remove base plate carefully, as wires are connected.
4. Disconnect wire (1) from wire (2) as shown in illustration below.



6. Remove the two screws, indicated by the red arrows, that hold the LED assembly plate. Remove the LED assembly from base and detach wires.
7. Position the new LED assembly on the plate and secure into place with the two screws.
8. Reconnect wires (1) and (2) as shown above.
9. Replace screws in base plate.



Replacement LED Bulb for UX1 Microscope. Part # RB20-001.